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The effect of digital governance in risk management in health institutions amidst Corona Pandemic: A study applied on a sample of workers in health institutions

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Abstract---This study aimed to identify the existing situation and the extent to which digitization of governance contribute in enhancing the role of health institutions in preventing the spread of epidemics by managing and containing the risks resulting from the spread of the Corona virus and reducing its risks. It was applied to a representative sample of health institutions workers in the Kingdom of Saudi Arabia which included (50) members. The data was analyzed using the statistical analysis program, statistical packages for the social sciences, and many results and recommendations were presented. The results revealed that there is a clear tendency towards digitization of governance in health institutions in the Kingdom, which resulted in a superior ability to manage risks during the pandemic, limit its spread and reduce its risks, as it was found from the statistical tables for the respondents' response to the elements of the hypothesis related to the first factor (governance of formulating plans for risk management) and the second element (The digital governance of health institutions) reflected positive responses by more than (90%) of the total responses. The researchers recommend that the health institutions in the Kingdom of Saudi Arabia should establish a special section for the management of research and risks to enhance the process of analyzing and diagnosing the environment to be early warnings that help preserve health specialists in the future with gracefulness through situational plans. They also recommend professionals to conduct medical research, address all expected phenomena during and after the Corona pandemic, and prepare to confront them in scientific ways.

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Keywords---digitizing governance, risk management, corona, health institutions.

Introduction

The future challenges facing global organizations in general and health institutions in particular, in the foreseeable future, indicate that they are facing imminent dangers that are difficult or cannot be faced and dealt with except by using the methods and means of modern technologies. These challenges necessitated that this era shift towards digitization and knowledge in all fields. Societies have shifted from industrial societies to digital knowledge societies. These changes also obliged production and service institutions to design programs and policies that enhance the digital capacity of their programs and employees, by enhancing digitization in governance to enhance methods and strategies for managing and evaluating the risks caused by the Corona pandemic and creating scenarios for all the problems that humanity may face after Corona. Epidemics and environmental pollution are among the biggest problems facing the world today and affecting all aspects of life socially, economically, psychologically and politically. Since health institutions are the responsible party for facing all the risks resulting from these phenomena, it is necessary to activate strategic partnerships between academics and employees of health institutions to prepare to face risks expected to happen in the future, reduce risks in the current situation, and find explanations for the questions that have baffled the world .In this study, believing that the collective responsibility in combating Corona virus and in order to enhance the role of universities in the field of scientific research as one of the most important goals of universities in addition to education, learning and community service, we seek to measure and study the reality of digital governance in enhancing the role of health institutions in reducing the effects of epidemics represented by the Covid-19 pandemic as the biggest problem facing humanity at the global level, and benefiting from the technological revolution by strengthening digital governance in managing these risks**.**

Problem Statement

Strategic planning and setting accurate standards and oversight mechanisms are among the most important means that enhance the performance of organizations and eliminate the threats they face, in addition to formulating policies that enable workers to carry out their jobs effectively by preparing digital intellectual capital to implement the organizations' plans, follow up on environmental changes and work to stave off the risks that appear and face humanity. This can only be activated by shifting towards the digitization of governance and making use of artificial intelligence, programs and smart applications in managing the environmental risks left behind .Accordingly, the problem of the study lies in identifying the reality of the digitization of governance and its role in identifying the problems it faces in light of the changing and complex environment. The main research question is**:**

Does digital governance have an effective impact on risk management in the health sectors amidst Corona pandemic?

A number of sub-questions emerged from it:

- Has the absence of a clear strategy for digitizing governance in health institutions led to the exacerbation of the Corona pandemic and the inability to contain it globally?
- Is there an accurate follow-up of the standards of scientific and correct performance of the practices of institutions and bodies that may contribute to spreading some epidemics by committing some mistakes such as laboratory experiments, and is there digitization of the governance of these institutions to make information available at the right time and the right quantity?
- Will the development of effective programs, policies and rules for the possibility of some international institutions, such as the World Health Organization interfering in developing a clear plan towards the transformation of the digitization of governance for these institutions will enhance the management of the expected risks in the post-Corona age**?**
- Are there obstacles and threats that hinder international cooperation to eradicate global epidemics?
- Will the shift towards digital governance help in making information available and managing it, thus limiting the spread of epidemics by unethical methods such as biological warfare?
- Have the countries affected by the Corona virus developed scientific mechanisms for digital transformation in governance and studying the negative effects of the absence of digitization in the governance of health institutions?
- Will setting scientific standards, a digital strategy to know and measure the psychological, social and economic effects of this pandemic, help in finding scientific solutions to these factors and eliminating their negative effects globally?
- Were the precautionary measures taken by governments and competent authorities sufficient and acceptable to limit the spread of this pandemic, and are digital programs and systems sufficient to shift towards digitizing the governance of these institutions?

Objectives

The main objective of this research is to identify the existing situation and the extent to which digital governance contributes to enhancing the role of Saudi organizations in preventing the spread of epidemics, managing the risks resulting from them and containing them with the least losses, in addition to sub-goals represented in**:**

- Enhancing the contributions of researchers in Saudi universities in finding some answers to the questions facing humanity amidst the spread of the Corona pandemic and the reality of the digital transformation of the governance of health institution.

- Presenting some recommendations and suggestions to specialists to enhance the role of global and Saudi health institutions and to propose more effective control policies and standards in raising the efficiency of their performance by shifting towards digital governance and assuming their professional responsibilities.
- Contributing to the development of researchers' capabilities by involving models and specialists in preparing and proposing scientific solutions and establishing strategic partnerships between professionals from professors and doctors in the field of scientific research and laboratories to serve communities in the face of pandemics.

Significance

- This study is considered one of the few studies, if not the first, to the best of the researchers' knowledge, which investigates the digital governance of health institutions and their role in managing risks and eliminating global pandemics represented by Corona.
- The study contributes to enriching Arab and foreign libraries with information on the topic of research represented in digital governance and its role in eliminating epidemics and reducing their risks.
- The study contributes to providing preliminary and valuable data on the reality of the role of digital governance for health institutions and its role in limiting the spread of epidemics.
- The study highlights the role of Saudi universities in the field of scientific research and works to enrich knowledge in cooperation between professionals, through teamwork in order to find some solutions to the problem of Corona, and to present some of the pros and cons of digital transformation in order to reduce the effects of the spread of epidemics and reduce their risks.

Research Hypothesis

This research is based on the hypothesis that there is a direct statistically significant relationship between digital governance and risk management and limiting its effects in the health sectors.

Research Methodology

The researchers use the social survey method because this approach is close to the nature of the descriptive study, as it is considered one of the most appropriate approaches to the subject of this research. This is due to the fact that it depends on the description, analysis and interpretation through which the reality of digital governance can be reached, in addition to knowing the ways to manage risks and limiting the spread of the ongoing pandemic and then makingsuggestions based on scientific foundations to try to overcome these obstacles.

Study tool

This study relies on the use of a questionnaire in collecting its primary data because it is one of the appropriate tools for the social survey approach and the

nature of the subject of the study, and because it is one of the most important means of data collection in descriptive and survey studies, in addition to being the best way to collect data from different parties, whether they work in the Ministry of Health and its affiliated institutions. The questionnaire will be prepared in its initial form after reviewing the studies related to the subject of the present study. Moreover, its form will include a number of closed questions according to the Likert scale to test the hypothesis of the study and the validity of its statements.

Limits of the study

- Sample: a number of professionals working in the Ministry of Health in the Kingdom of Saudi Arabia.
- Place: The field study will be applied in the Kingdom of Saudi Arabia in Riyadh.
- Time: 2021-2022**.**

Population and sample

The population is represented by workers in the health care sector in the Kingdom of Saudi Arabia (as for the study population, they are workers in health institutions in the Riyadh region).
Sample: (50) members.

Topic limits

Digital Governance – Risk Management, Health Institutions, Corona

Statistical methods

To achieve the objectives of the study, the researchers use the Statistical Program for Social Sciences (SPSS) in order to extract the results of the study. Tables of percentages and frequencies were also used.

The concept of governance and its objectives

Organizations and studies have used many different concepts of governance based on the viewpoint adopted by each of them. Among the most famous definitions is the definition of Sir Adrian Cadbury in 1992, who defined governance as the system by which companies monitor and manage their business (Al-Asiri, 2013). Corporate governance has also been defined as a set of rules and standards regulating the management of companies within a scope of transparency and responsibility to ensure adherence to the best practices that ensure the protection of shareholders' rights and the rights of stakeholders (Al-Arnaout, 2019).In the same context, (Hammad, 2005) defined it as the procedures that are used by stakeholders in the organization, such as shareholders and others, in order to supervise the risks and control the risks carried out by the management**.**

Corporate governance seeks to raise the efficiency of the financial performance of companies and enhance confidence in their reports and financial statements, which will reflect positively on their competitive advantage and protect them from financial crises. It also aims to impose rules and procedures related to the conduct of work within the company, and to set regulatory systems to avoid fraud and unacceptable practices materially, administratively and morally, and to ensure compliance with them. Corporate governance works to achieve justice and protect the rights of all stakeholders in the company by eliminating all types of administrative and financial corruption (Ibrahim et al., 2017). The researchers believe that governance can be defined as a set of principles, rules, mechanisms and regulations issued to regulate relations between stakeholders in the company to ensure the rights of all parties, enhance oversight, disclosure and transparency, and reduce manipulation and fraud practices with the aim of achieving justice, transparency and integrity and raising the value of the company, the financial market and the national economy in general..

Governance in the Kingdom of Saudi Arabia

The first corporate governance regulation in the Kingdom of Saudi Arabia was issued in 2006 by the Capital Market Authority. The governance regulation at that time was mostly indicative, as the first article stipulated that the governance regulation would be indicative unless any of its texts included the compulsorinessof some of what was stated in it. In 2017, the Board of the Capital Market Authority issued its decision to adopt the corporate governance regulation as a mandatory regulation consisting of 12 chapters and 98 articles, in addition to a template for the remuneration schedule for members of the Board of Directors. This regulation seeks to clarify the rules governing the management of the company and to establish an effective legal framework to ensure compliance with the principles and practices of governance that ensure the protection of the rights of shareholders and stakeholders, achieving transparency, integrity and justice in the financial market and its dealings, strengthening control and accountability mechanisms for company employees, as well as raising awareness of companies about the concept of professional ethical behavior and urging them to abide by it. It is noted that the Kingdom of Saudi Arabia has given the issue of governance a special importance due to its role in achieving transparency and justice, enhancing the confidence of shareholders, stakeholders and investors, and reducing risks, which is reflected on the stability of the financial market and the strength and development of the economy (Lamis Jamil et al., 2020).

Digital Governance

The basis on which digital governance operates is the use of the Internet that provides working methods, integrates with technologies and other elements, and reconstructs and adapts instructions. Digital governance is also a positive and significant change in the field of job performance and a strategic shift in the provision of institutions services and their delivery to beneficiaries and the building of advanced methods for the participation of beneficiaries in developing tasks and monitoring the performance of the behavior of institutions that seek to implement them as a trend that includes a fundamental modification in their structures and work mechanisms (Adel, 2014).

Risk Management

Albahar & Crandall (1990:534) defines risk as the possibility of exposure to future events that have a negative or positive impact and affect the performance of organizations as a result of uncertainty. This definition includes the probability of the occurrence of a positive or negative event. According to the American Institute of Internal Auditors, risk management is "the possibility of the implementation or non-implementation by management of a matter or action that may adversely affect the project or activity under audit."

Field Study Procedures: Study Methodology

The researchers relied on the historical method in providing the theoretical framework for the study and the research literature. A wide range of historical sources have been relied upon to provide these frameworks. The descriptive inductive approach was also relied upon to formulate the questionnaire as a primary source for collecting data and information related to research, study and analysis on the SPSS V26.0 statistical software package for social sciences to extrapolate the results based on a set of statistical methods (frequency tables, frequency ratios, descriptive statistics measures, measures of dispersion, Likert response pattern scale, inferential statistical methods, analysis of variance, correlation coefficients, analysis of averages).

First: Validity and reliability test

To verify the stability of the scale of the impact of digital governance on risk management in health institutions during the Corona pandemic, an applied study on workers in health institutions, the researchers calculated the Alpha Cronbach measure of stability. Table (1.1.) shows the values of those transactions to measure the impact of digital governance on risk management in health institutions during the Corona pandemic: an applied study on workers in health institutions.

Table 1.1
The transaction values to measure the impact of digital governance on risk management during the Corona pandemic

Statistics	Validity	Reliability	Degree of correlation	Determination coefficient	Mean of paragraphs
Values	0.917	0.841	0.752	0.565	4.31
Statistics	Standard deviations	Fisher statistic	Significance level	Chi-squared test	Significance level
Values	0.641	4.825	0.000	177.7	0.000

Source: Prepared by the researchers, the outputs of the questionnaire analysis in SPSS V26 package, Riyadh, February 2022

Second: Factor Analysis Methodology

The factor analysis methodology depends on grouping the variables affecting a particular phenomenon into a smaller number of factors, which facilitates the study of the phenomenon in a deeper way, and therefore becomes clear and explains the impact of each factor on it by relying on the factor analysis mechanism to divide the hypothesis into a number of factors. We note from the results of the analysis that the average correlation between the constituent factors is 0.797, which is a significant correlation in terms of strength and the type of relationship.

Table 1.2
Degrees of correlation of factors extracted using the main components

2	1	Component
0.605	0.797	1
0.797	0.605-	2

Source: Prepared by the researchers, the outputs of the questionnaire analysis in SPSS V26 package, Riyadh, February 2022

Table 3.2
The eigenvalues and the explained variance of the extracted factors

cumulative explained variance	unexplained variance	Explained variance	Eigenvalue	Component
53.05%	46.95%	53.05%	8.704	1
88.19%	11.81%	35.14%	2.957	2
		88.19%	11.66	Total

Source: Prepared by the researchers, the outputs of the resolution analysis in SPSS V26 package, Riyadh, February 2022

Third: The descriptive frequency distribution of the data

Basic Information
Frequency distribution of the age variable

Table 4.1
Frequency Distribution of the Age Variable

Age group	Response values	
	Frequency	Percentage
Less than 30 years	06	12.0%
From 30 to less than 40 years	30	60.0%
40years and more	14	28.0%
Total	50	100.0%

Source: Prepared by the researchers, the outputs of the resolution analysis in SPSS V26 package, Riyadh, February 2022

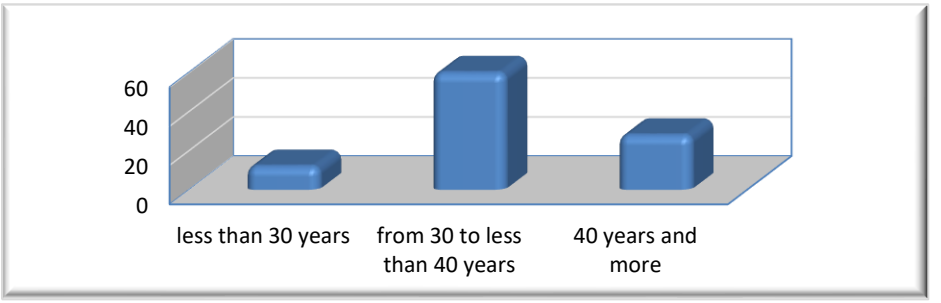


Figure 1.1 Frequency distribution of the age variable
Source: Prepared by researchers, questionnaire data analysis outputs, Riyadh February 2022, Excel 2016.

From Table (4/1) and Figure (1/1) above, we find that most of the respondents' response to the age variable was within the age group of 30 years and less than 40 years, with a response rate of 60.0% (30 cases). The response rate of less than 30 years is 12.0% (6 cases) as the lowest response that was monitored, while the response rate of 40 years and over is 28.0% by 14 cases.

Frequency distribution of years of experience variable

Table (5/1): Frequency distribution of years of experience variable

Age group	Response values	
	Frequency	Percentage
Less than 5 years	10	20.0%
From 5 to less than 10 years	22	44.0%
10years and more	18	36.0%
Total	50	100.0%

Source: Prepared by the researchers, the outputs of the questionnaire analysis in SPSS V26 package, Riyadh, February 2022

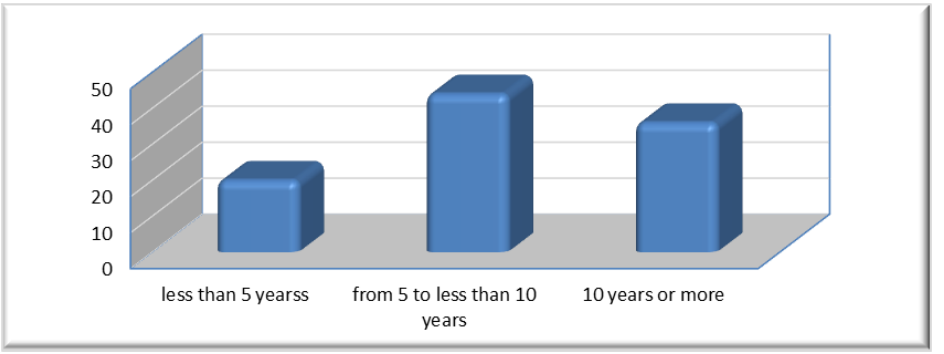


Figure 2.1. Frequency distribution of years of experience variable
Source: Prepared by researchers, questionnaire data analysis outputs, Riyadh February 2022, 2016 Excel

From Table (5/1) and Figure (2/1) above, we find that most of the respondents' response to the variable of years of experience was within the category of years of experience from 5 to less than 10 years, with a response rate of 44.0% (22 cases), the response rate of less than 5 years is 20.0% (10 cases) as the lowest response observed, while the response rate of 10 years or more is 36.0% (18 cases) of the total respondents.

Frequency distribution of the job title variable

Table 6.1
Frequency Distribution of Job Title Variable

Job title	Response values	
	Frequency	Percentage
Doctor	17	34.0%
Radiographer	06	12.0%
Laboratory technician	12	24.0%
University teacher	01	2.00%
Nurse	10	20.0%
Pharmacist	02	4.00%
Administrative	01	2.00%
Social worker	01	2.00%
Total	50	100.0%

Source: Prepared by the researchers, the outputs of the questionnaire analysis in SPSS V26 package, Riyadh, February 2022

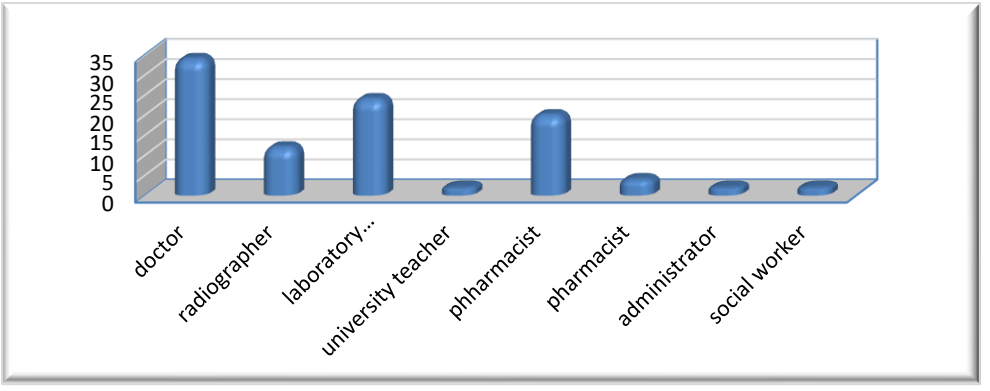


Figure 1.3. The frequency distribution of the job title variable
Source: Prepared by researchers, questionnaire data analysis outputs, Riyadh February, 2022, 2016 Excel

From Table (6/1) and Figure (3/1) above, we find that most of the respondents' response to the job title variable (doctor) reflected a response rate of 34.0% (17 cases). The response rate (radiology technician) is 12.0% with 6 cases, and the

response rate (laboratory technician) is 24.0% (12 cases). The response rate (nurse) is 20.0% (5 cases) and the response rate (pharmacist) is 4.00% (two cases), while the response rate (teaching in universities), (administrative), (social worker) is 2.00% (one case) for each response.

Frequency distribution of objective data

The frequency distribution of the phrases of the first factor: (governance of formulating plans to manage risks during the Corona pandemic).

Table 7.1
Frequency distribution of the phrases of the first factor: (Governance of formulating plans to manage risks during the Corona pandemic)

Paragraphs	Response type					Total
	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	
Health institutions set clear goals for risk management amidst COVID-19	30 %60.0	17 %34.0	02 %4.00	01 %2.00	00 %0.00	50 %9.09
Health institutions develop clear policies based on governance rules to manage the risks they face amidst the COVID-19 crisis	24 %48.0	23 %46.0	01 %2.00	01 %2.00	01 %2.00	50 %9.09
Digitizing governance in health institutions leads to the strengthening of self-monitoring	24 %48.0	23 %46.0	02 %4.00	01 %2.00	00 %0.00	50 %9.09
Implementing and digitizing the rules of governance leads to the establishment of clear and effective risk management standards amidst COVID-19	23 %46.0	25 %50.0	02 %4.00	00 %0.00	00 %0.00	50 %9.09
The digitization of governance helps to coordinate between different departments to provide accurate data on health risks amidst quantity and time	24 %48.0	24 %48.0	01 %2.00	01 %2.00	00 %0.00	50 %9.09
The digitization of governance helps to provide information on the expected risks and threats to prepare to face them in a timely manner	24 %48.0	24 %48.0	02 %4.00	00 %0.00	00 %0.00	50 %9.09
The digitization of governance helps to improve the system of operational control, which increases the efficiency of medical services	19 %38.0	29 %58.0	02 %4.00	00 %0.00	00 %0.00	50 %9.09
The use of electronic applications such as Tawakkalna and Sehhatyi is very effective in confronting the spread of Covid-19	27 %54.0	16 %32.0	04 %8.00	03 %6.00	00 %0.00	50 %9.09
Enhancing the digitization of governance leads to upgrading health services and improving the quality and efficiency of services	26 %52.0	22 %44.0	01 %2.00	01 %2.00	00 %0.00	50 %9.09
Digital transformation amidstCOVID-19 leads to the promotion of both virtual	18 %36.0	27 %54.0	05 %10.0	00 %0.00	00 %0.00	50 %9.09

self-care and self-censorship						
Promoting artificial intelligence and its uses in providing health care, treatment and disinfection reduces the chances of transmission of infection between health care workers	20 %40.0	29 %58.0	01 %2.00	00 %0.00	00 %0.00	50 %9.09
Total	259 47.1%	259 47.1%	023 4.18%	008 1.45%	001 0.17%	550 100.0%

Source: Prepared by the researchers, the outputs of the questionnaire analysis in SPSS V26 package, Riyadh, February 2022

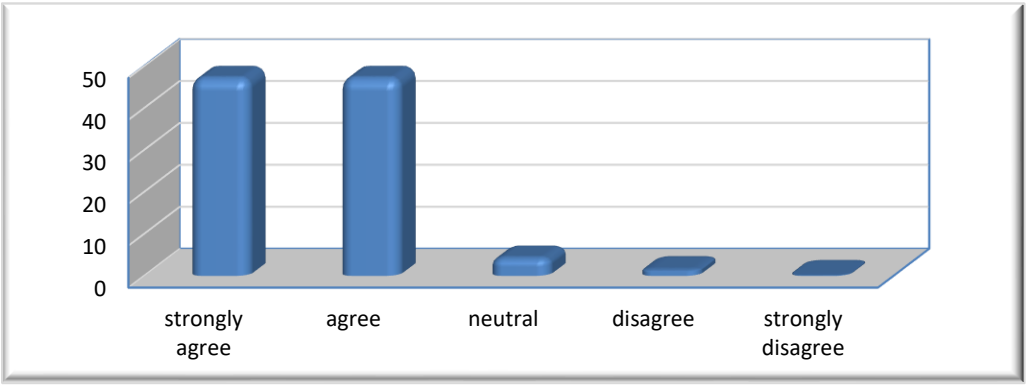


Figure 4.1. Frequency distribution of the phrases of the first factor: (Governance of formulating plans to manage risks during the Corona pandemic)
Source: Prepared by the researchers, questionnaire data analysis outputs, Riyadh February 2022, 2016 Excel

Frequency distribution of expressions for the second factor

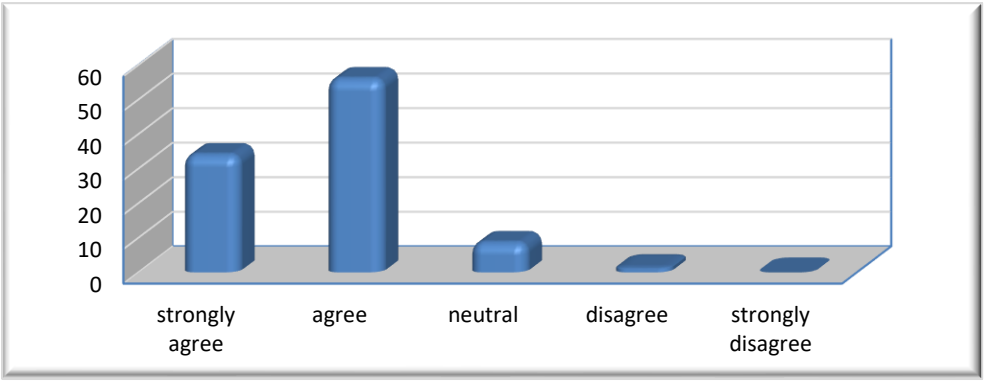
Table 1.8
Frequency distribution of phrases for the second factor: (Digital Governance for Health Institutions)

Paragraphs	Response type					Total
	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	
Strengthening digital governance needs to strengthen training programs in digital health to maintain health staff and patients and reduce the spread of epidemics	26 %52.0	22 %44.0	02 %4.00	00 %0.00	00 %0.00	50 %9.09
The use of social media and popular platforms reduces the spread of corona as it promotes self-protection and health education	13 %26.0	26 %52.0	07 %14.0	04 %8.00	00 %0.00	50 %9.09
The digitization of governance will enhance strategic partnerships between IT institutions and medical research academics to accelerate the development of new vaccines and	21 %42.0	24 %48.0	05 %10.0	00 %0.00	00 %0.00	50 %9.09

predict mutation in the virus.						
Governance digitization helps build control platforms and develop advanced algorithms to detect and predict virus spread	14 %28.0	30 %60.0	06 %12.0	00 %0.00	00 %0.00	50 %9.09
Promoting the use of artificial intelligence techniques in the governance of health services helps in obtaining data and improving the efficiency of medical rescue in emergency situations	20 %40.0	27 %54.0	03 %6.00	00 %0.00	00 %0.00	50 %9.09
Promoting the digitization of health services, facilitating experts' access to the electronic health record, discussing the treatment plan in a timely manner, and giving their professional opinions remotely.	21 %42.0	27 %54.0	02 %4.00	00 %0.00	00 %0.00	50 %9.09
Enhancing the digitization of governance will lead to assessing the current situation with scientific standards, detecting deviations, and working on continuous improvement	18 %36.0	28 %56.0	03 %6.00	01 %2.00	00 %0.00	50 %9.09
Risk management amidst the Corona virus needs to reformulate a strategic plan based on scientific and agile standards, with which it is easier to keep pace with the continuous changes and developments in the virus.	14 %28.0	27 %54.0	08 %16.0	01 %2.00	00 %0.00	50 %9.09
Managing the risks of the Corona virus requires consistency and planning at the level of the global health sector, and coming up with clear policies to meet the challenges of this virus	20 %40.0	29 %58.0	00 %0.00	01 %2.00	00 %0.00	50 %9.09
The application of mandatory governance rules in health institutions globally will reduce the spread of the virus among the countries of the world	20 %40.0	25 %50.0	04 %8.00	01 %2.00	00 %0.00	50 %9.09
The Ministry of Health promotes studied methods and policies to familiarize beneficiaries with the technical systems that are activated to face risks and reduce their effects	00 %0.00	43 %86.0	07 %14.0	00 %0.00	00 %0.00	50 %9.09
Total	187 34.0%	308 56.0%	047 8.55%	008 1.45%	00 0.00%	550 100.0%

Source: Prepared by the researchers, the outputs of the questionnaire analysis in SPSS V26 package, Riyadh, February 2022

Table 9.1
Frequency distribution of phrases for the second factor (digital governance of health institutions)



Source: Prepared by the researchers, questionnaire data analysis outputs, Riyadh February 2022, 2016 Excel

From Table (9/1) and Figure (5/1), we find that the respondents' response about the hypothesis elements included in the second factor (the digital governance of health institutions) in the five-point Likert scale is mostly limited to the responses (strongly agree) and (agree). The overall response rate (agree) reached 56.0% (308 cases) as the highest response rate observed, and the total response rate (strongly agreed) is 34.0% (187 cases).The total direct response to the hypothesis elements included in the second factor (the digital governance of health institutions) is 90.0% (495 cases) of response out of 550 cases. The percentage of the total response to the response (neutral) is 8.55% (47 cases), while the percentage of the total response to the response (disagree) and (strongly disagree) is 1.45% (8 cases) of the total responses of the respondents .Therefore, we find that the hypothesis of the study, which states that there is a direct statistically significant relationship between digital governance, risk management and limiting its effects in the health sectors is distributed according to response patterns in the five-point Likert scale, as shown in Table (9/1).

Table 10.1
Frequency distribution of the study hypothesis components and elements

Factors		Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Total
First factor	Frequency	259	259	023	008	001	550
	Percentage	47.1%	47.1%	4.18%	1.45%	0.17%	50.0%
Second factor	Frequency	187	308	047	008	00	550
	Percentage	34.0%	56.0%	8.55%	1.45%	0.00%	50.0%
Total	Frequency	446	567	070	016	001	1100
	Percentage	40.5%	51.5%	6.36%	1.45%	0.19	100.0%

Source: Prepared by the researchers, the outputs of the questionnaire analysis in SPSS V26 package, Riyadh, February 2022

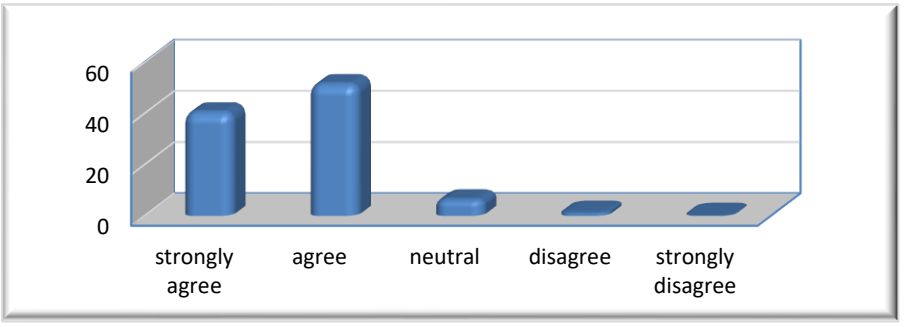


Figure 6.1. Frequency distribution of the elements and components of the study hypothesis
Source: Prepared by researchers, questionnaire data analysis outputs, Riyadh February 2022, 2016 Excel

From Table (10/1) and Figure (5/1), we find that the respondents' response to the elements of the hypothesis which states that there is a direct statistically significant relationship between digital governance, risk management and limiting its effects in the health sectors in the five-point Likert scale is mostly confined to the two responses (strongly agree) and (agree). The overall response rate (agree) was 51.5% (567 cases) as the highest response rate observed .The percentage of the total response to the response (strongly agree) is 40.5% (446 cases) and the percentage of the total positive response to the elements of the hypothesis (there is a direct statistically significant relationship between digital governance, risk management and limiting its effects in the health sectors) is 92.0% (1013 cases) response out of 1100 cases . The percentage of the total response to the response (neutral) is 6.36% (70 cases), while the percentage of the total response to the response (disagree) and (strongly disagree) is 1.64% (17 cases) of the total responses of the respondents.

Fourth: Descriptive Distribution of Likert Scale

In the following, descriptive statistics will be calculated for each of the axes of the study, in order to know the general direction of each of the axes' hypotheses, and then determine the general direction of the hypotheses axis. Since the variable that expresses the options (strongly disagree, disagree, neutral, agree, strongly agree) is an ordinal scale in Likert Scale, the boundaries between each of the options of the scale are as in Table (11/1).

Table 11.1
Limits of Likert Scale Options

Response (Level, choice)	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Weighted average	From 1.00 to 1.79	From 1.80 to 2.59	From 2.60 to 3.39	From 3.40 to 4.19	From 4.20 to 5.00

Source: Prepared by the researchers, the outputs of the resolution analysis in SPSS V26 package, Riyadh, February 2022.

Here are the results of the analysis:

Description of the elements of the first factor of the hypothesis (there is a direct relationship with a statistical significance between digital governance, risk management and limiting its effects in the health sectors)

Table 12.1.
Descriptive statistical distribution of the hypothesis elements included in the first factor (governance of formulating plans to manage risks during the Corona pandemic)

Paragraphs	Mean	Response intensity	Standard deviation	Opinion	Significance
Health institutions set clear goals for risk management amidst COVID-19	4.52	5	0.677	Strongly agree	Strong
Health institutions develop clear policies based on governance rules to manage the risks they face amidst the COVID-19 crisis	4.36	5	0.802	Strongly agree	Strong
Digitizing governance in health institutions leads to the strengthening of self-monitoring	4.40	5	0.670	Strongly agree	Strong
Implementing and digitizing the rules of governance leads to the establishment of clear and effective risk management standards amidst COVID-19	4.42	4	0.575	Strongly agree	Strong
The digitization of governance helps to coordinate between different departments to provide accurate data on health risks in the right quantity and time	4.42	4	0.642	Strongly agree	Strong
The digitization of governance helps to provide information on the expected risks and threats to prepare for them in a timely manner	4.44	4	0.577	Strongly agree	Strong
The digitization of governance helps to improve the system of operational control, which increases the efficiency of medical services	4.34	4	0.557	Strongly agree	Strong
The use of electronic applications such as Tawakkalna and Sehhaty is very effective in confronting the spread of Covid 19	4.34	5	0.872	Strongly agree	Strong
Enhancing the digitization of governance leads to upgrading health services and improving the quality and efficiency of services	4.46	5	0.646	Strongly agree	Strong
Digital transformation amidst COVID-19 leads to the promotion of both virtual self-care and self-censorship	4.26	4	0.633	Strongly agree	Strong
Promoting artificial intelligence and its uses in providing health care, treatment and disinfection reduces the chances of transmission of infection between health care workers	4.38	4	0.530	Strongly agree	Strong
Total	4.39	4	0.653	Strongly agree	Strong

Source: Prepared by the researchers, the outputs of the questionnaire analysis in SPSS V26 package, Riyadh, February 2022.

Characterization of the elements of the second factor of the hypothesis (there is a direct and statistically significant relationship between digital governance, risk management and limiting its effects in the health sectors)

Table 13.1
Descriptive statistical distribution of the hypothesis elements included in the second factor (the digital governance of health institutions)

Paragraphs	Mean	Response intensity	Standard deviation	Opinion	Significance
Strengthening digital governance needs to strengthen training programs in digital health to maintain health staff and patients and reduce the spread of epidemics	4.48	5	0.580	Strongly agree	Strong
The use of social media and popular platforms reduces the spread of corona as it promotes self-protection and health education	3.96	4	0.856	Agree	Strong
The digitization of governance will enhance strategic partnerships between IT institutions and medical research academics to accelerate the development of new vaccines and predict mutation in the virus.	4.32	4	0.653	Strongly agree	Strong
Governance digitization helps build control platforms and develop advanced algorithms to detect and predict virus spread	4.16	4	0.618	Agree	Strong
Promoting the use of artificial intelligence techniques in the governance of health services helps in obtaining data and improving the efficiency of medical rescue in emergency situations	4.34	4	0.593	Strongly agree	Strong
Promoting the digitization of health services, facilitating experts' access to the electronic health record, discussing the treatment plan in a timely manner, and giving their professional opinions remotely.	4.38	4	0.567	Strongly agree	Strong
Enhancing the digitization of governance will lead to assessing the current situation with scientific standards, detecting deviations, and working on continuous improvement	4.26	4	0.664	Strongly agree	Strong
Risk management in light of the Corona virus needs to reformulate a strategic plan based on scientific and agile standards, with which it is easier to keep pace with the continuous changes and developments in the virus.	4.08	4	0.724	Agree	Strong
Managing the risks of the Corona virus requires consistency and planning at the level of the global health sector, and coming up with clear policies to meet the challenges of this virus	4.36	4	0.598	Strongly agree	Strong
The application of mandatory governance rules in health institutions globally will reduce the spread of the virus among the countries of the world	4.28	4	0.701	Strongly agree	Strong
The Ministry of Health promotes studied methods and policies to familiarize beneficiaries with the technical systems that are activated to face risks and reduce their effects	3.86	4	0.351	Agree	Strong

Total	4.23	4	0.628	Strongly agree	Strong

Source: Prepared by the researchers, the outputs of the questionnaire analysis in SPSS V26 package, Riyadh, February 2022

Therefore, we find that the hypothesis of the study, which states that there is a direct statistically significant relationship between digital governance, risk management, and limiting its effects in the health sectors is distributed with descriptive statistics according to response patterns in the five-point Likert scale, as shown in Table (14/1).

Table 14.1
Descriptive distribution of the elements and components of the study hypothesis

Factors	Mean	Response intensity	Standard deviation	Opinion	Significance
First factor	4.39	4	0.653	Strongly agree	Strong
Second factor	4.23	4	0.628	Strongly agree	Strong
Total	4.31	4	0.641	Strongly agree	Strong

Source: Prepared by the researchers, the outputs of the questionnaire analysis in SPSS V26 package, Riyadh, February 2022

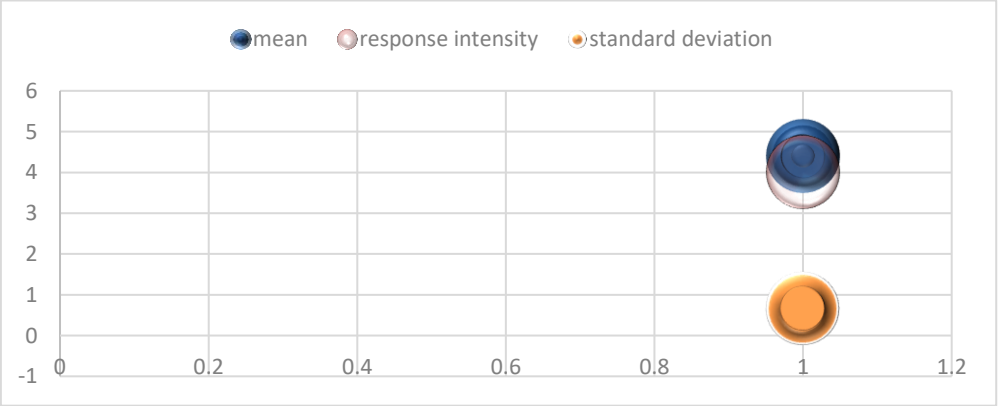


Figure 7.1. Descriptive distribution of the elements and components of the study hypothesis
Source: Prepared by researchers, questionnaire data analysis outputs, Riyadh February 2022, 2016 Excel

Fifth: Objective Tests

One-sample t-test to test the significance of factors and hypothesis

The t-test will be performed at the level of significance of the probability of 5%, and depending on the value, the acceptance or rejection of the hypothesis will be determined based on the criterion that if the sig-probability value of the t-test

statistic is less than 5%, the validity of the stated hypothesis is confirmed by measuring the difference between the actual mean of the statement MA and MO response unit. The test results were as shown in Table (15/1).

	t-value	Freedom degree	Significance level
First factor	42.44	10	0.000
Second factor	12.64	10	0.000
Total hypothesis	23.09	21	0.000

Source: Prepared by the researchers, the outputs of the questionnaire analysis in SPSS V26 package, Riyadh, February 2022

From the table (15/1), we find that the value of the T-test statistic reached, respectively (42.44, 12.64, 23.09), and these values are significant at the level of significance less than 5.0%. Thus, the validity of the factors and hypotheses is confirmed.

Correlation test

Here, several tests will be conducted to measure the correlative pattern around the hypothesis (there is a direct statistically significant relationship between digital governance, risk management and limiting its effects in the health sectors). The test results were as in Table (16/1).

Correlation coefficient	0.694	F Value	3.776	Chi-square	88.01	Eta 0.569
Correlation significance	0.018	F Value	0.011	Chi-square	0.002	

Source: Prepared by the researchers, the outputs of the questionnaire analysis in SPSS V26 package, Riyadh, February 2022

Findings

- The study shows that more than half of the study sample is between the ages of (30-40) years, and that (44%) years of experience range between (5-10) years, and that the most responsive health personnel were (doctors) (34%) of the total sample people.
- The study showed that the opinions of the study sample members are positive concerning the paragraphs of the first axis
- The study showed that the negative opinions and disapproval of the statements of the first axis are weak, with a percentage not exceeding (5%) for all statements. The same applies to the neutral opinion of all statements that do not exceed (5%) for all statements of the first axis.
- The results of the study showed in the table (1/10), which shows the recurring distribution of the elements and components of the study hypothesis, that those who hold positive attitudes about all the statements of the first factor (the governance of formulating plans to manage risks

during the spread of Corona) received more than (94%) of the total percentage.

- The study also showed that the opinions of the sample members are positive concerning most of the paragraphs of the second axis (digital governance of health institutions): strengthening governance will lead to assessing the current situation with scientific standards, discovering imbalances and working on continuous evaluation, and that promoting the digitization of health services facilitates the access of experts to the health record Email and discuss the treatment plan in a timely manner remotely. Promoting the use of artificial intelligence techniques in the governance of health services helps the efficiency of medical rescue in emergency situations, and the digitization of governance will enhance the establishment of strategic partnerships to produce and develop effective vaccines and predict the future mutation in the virus.
- According to Table (1/10), the recurring distribution of the study's hypothesis components related to the second factor (the digital governance of health institutions) obviously shows that those who hold positive attitudes about all the factor's statements received (90%) of the total percentage.
- The study confirms that there is a clear tendency towards digitization governance in health institutions in the Kingdom, which has resulted in a superior ability to manage risks during the pandemic, limit its spread and reduce its risks.

Recommendations

- We recommend that the responsible authorities should move towards strengthening the governance of formulating plans to manage risks at a time in which the business environment has become changing, complex and threatening, and the decision is taken in light of the uncertainty that the situation will continue to be.
- We recommend the need to adopt the best policies in the field of digital governance for health institutions, as they are institutions that provide the most important service to society, especially amidst the spread of epidemics.
- We recommend that specialists pay attention to health staff and refine their technical expertise curve through training courses and establishing strategic partnerships with technical institutions that help localize digitization in health institutions.
- We recommend the need to strengthen artificial intelligence to gradually shift towards its use in diagnosing epidemics and to undertake some tasks entrusted to health cadres to reduce the spread of infection among them and limit its transmission to them from infected people.
- We recommend the need to strengthen the operational control methods to raise the efficiency of medical services and to take advantage of the available resources and invest them effectively.
- We recommend the establishment of a special section for health institutions to manage risks and research related to analyzing and diagnosing the environment in order to be early warnings to contain future health disasters with agility and position plans.

- We recommend professionals to conduct scientific research and deal with all expected phenomena after the elimination of the Corona virus, to prepare to face all future risks. Among the research proposals are (electronic health and its role in reducing the transmission of epidemics to health staff).

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