

Review Article

Strategic Digital Transformation Planning as a Catalyst Linking User Experience and Organizational Excellence: A Case Study of the Saudi Health Sector

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Abstract

The rapid advancement of digital health services has created both opportunities and challenges for healthcare systems worldwide, particularly in developing comprehensive e-health frameworks that align with patient needs and institutional capacities. This study investigates the critical factors influencing the adoption of digital health services within the Ministry of Health in Saudi Arabia, focusing on five dimensions: trust, technological infrastructure, ease of use, perceived usefulness, and awareness. A quantitative research approach was employed through the distribution of a structured electronic questionnaire, which gathered responses from 132 participants recruited via social media platforms. The survey captured demographic data in addition to participants' perceptions of digital health transformation. Statistical analysis revealed moderate levels of trust, with respondents rating transparency and accuracy positively. Nevertheless, concerns regarding data privacy emerged as a persistent barrier to full adoption. Furthermore, technological infrastructure was rated poorly, indicating gaps in system reliability, integration, and performance that hinder effective implementation. Ease of use appeared as a key determinant of adoption, with respondents emphasizing the importance of user-friendly interfaces, accessibility, and adequate technical support. Perceived usefulness, however, was relatively low, suggesting that the added value of digital health tools in improving efficiency and service quality has not been fully demonstrated to end-users. Awareness was found to play a mediating role, shaping how trust, technology, and usability translate into acceptance and utilization. Hypothesis testing confirmed that trust and technology significantly influence adoption, while ease of use and usefulness strongly drive user acceptance. The findings highlight the necessity of enhancing data security measures, upgrading technological infrastructure, and improving user experience through training and design optimization. Additionally, targeted awareness campaigns are recommended to strengthen public understanding of the benefits of digital health services. By addressing these factors, Saudi Arabia's Ministry of Health can accelerate a sustainable digital transformation in healthcare, ensuring higher adoption rates and improved service delivery.

Keywords

Perceived Usefulness, Digital Transformation, Decision-Making, Technological Infrastructure, Digital Healthcare

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1. Introduction

In today's dynamic and technology-driven environment, digital transformation has emerged as a strategic imperative for organizations aiming to achieve institutional excellence and sustain competitive advantage. The healthcare sector, in particular, is undergoing profound shifts as digital technologies redefine service delivery, operational efficiency, and patient engagement. The Ministry of Health Affairs in Saudi Arabia, as the leading entity in national healthcare provision, acknowledges the crucial role of digital transformation strategic planning in driving innovation and quality improvement. This form of planning involves aligning digital initiatives with overarching business goals, adopting enabling technologies, fostering a culture of innovation, and developing capabilities that support long-term transformation. However, many organizations face challenges in effectively implementing digital transformation due to fragmented strategies, unclear frameworks, and misalignment between digital tools and strategic priorities. Furthermore, resistance to change, limited digital literacy, and fears of displacement continue to hinder progress, emphasizing the need for a comprehensive approach that integrates technology, people, and processes within a coherent strategic vision.

This study aims to explore the mediating role of digital transformation strategic planning in enhancing institutional excellence and competitive advantage within the context of the Ministry of Health Affairs in Saudi Arabia. It investigates the impact of critical factors such as trust, technological readiness, compatibility, perceived ease of use, perceived usefulness, and awareness on users' acceptance of electronic health services. The research highlights how these elements influence the success of digital initiatives and the overall transformation journey. Specifically, the objectives include assessing the role of trust and technology in facilitating adoption, evaluating how compatibility and usability affect user engagement, and examining how awareness and perceived benefits mediate digital service adoption. By ad-

ressing these areas, the study seeks to provide practical insights and empirical evidence to support strategic decision-making in digital healthcare transformation. Ultimately, a well-executed digital strategy, supported by a strong organizational culture and clear alignment with institutional goals, can empower the Ministry to deliver world-class healthcare services and establish a sustainable competitive edge in an increasingly digital global landscape.

2. Literature Review

In recent years, the field of digital transformation has gained significant attention across various industries, including healthcare. The Ministry of Health Affairs in Saudi Arabia recognizes the potential of digital transformation in improving healthcare services and has been actively investing in technology-enabled initiatives. One crucial aspect of implementing successful digital transformation in the healthcare sector is strategic planning, which involves developing and executing a comprehensive roadmap for leveraging digital technologies to enhance institutional excellence and gain a competitive advantage.

2.1. Digital Transformation

Industrial-age industries including health, electronics, machinery, energy, and automotive are all following the digital transformation road, even though modern IT businesses were the first to create it. With the connectedness of goods, consumers, businesses, and self-governing systems, the transition may open new avenues for data collecting and utilization.

The definition of digital transformation is fragmented in research [1].

Table 1. The definition of digital transformation.

Authors	Definition
Albukhitan et al. [2]	Focused on how digital technologies can transform a company's business model, leading to new products, reorganized structures, or automated processes.
Al-Dhaafri et al. [3]	The incorporation of digital technologies into business operations.
Aleixo et al. [4]	Highlight the widespread impact of changes driven by digital technologies across the entire organization.
AlJaberi et al. [5]	The alignment of technology with new business models to engage digital customers more effectively at every stage of the customer experience lifecycle.

The process of going digital is known as digital transformation. The definition of the transformation varies according

to the dimensions and measures that will be involved. The definitions in Table 1 are since they all emphasize digital

technologies. The definition must be assessed considering the transformation's motivating elements.

2.2. Digital Transformation Strategy

To become a digital business two tools are to be applied: digitization and digitalization.

- 1) Digitization is the conversion of information from analogue to digital or automation of business processes through information and communication technologies.
- 2) Digitalization implies using digital technologies to transform a business model to deliver new revenues and value-producing opportunities. the transition to a digital business Belhadi et al. [6].

A digital transformation strategy is a roadmap of how to get to future states of digital business strategies. It helps companies to govern the transformation that comes from integrated new digital technologies. IT-strategy and digital transformation strategy concepts are not the same. Compared to the digital transformation strategies, the IT strategies tend to concentrate on the management of IT-infrastructure within the firm. IT-strategies are a piece of the digital transformation. Therefore, they allow digitalization and automation of business operations. The process in which a company designs a strategy and selects the resources that they are experienced in in the new field its participating in for its development is termed strategic planning [6].

digital transformation assumes a specific prism and targets other objectives depending on size of digital transformation at the company. Through a business centric view, the strategies target a change of the organizational aspects, products and processes that are powered by modern technologies and explicitly include digital activities at the point of interfacing with or completely on the side of the customers. The output may be a fully digitized end-user product, and such makes a clear divide in process automation and optimization that could be turned on in the company's process flow internally. Strategies in the digital transformation process are beyond the process paradigm which entails changes and implications of products; services; and business model [7].

Companies converge different new digital technologies according to the technological maturity; and treat it with ubiquity of connectivity in pursuit of sustained competitive advantage and superior performance of their operation [8]. Upgrading and competitiveness materialize by altering multiple business dimensions – the business model, operations, the customer experience and, in turn, the people/nets. Through operations by operations, that is a combination of processes and decision making, through people skills talent and culture of the company and networks the entire value system is indicated [9].

A company's operations can be significantly impacted by the ongoing, intricate process of digital transformation. As a result, assigning fair and well-defined roles to the development and execution of a digital transformation plan is crucial.

Businesses may experience operational challenges and lose their breadth when digital transformation efforts are poorly executed. The individual in charge of the digital transformation strategy's operations needs to have a strong foundation in transformative initiatives, and it's a good idea for their incentives to be closely linked to the goals and advancement of the strategy [10].

Depending on the magnitude of transformation, the strategy can achieve different goals. Strategies mean digitizing processes and digital transformation is part of them. The whole business model is being revamped thanks to digitalization. In either case, you can expect to inject that into your business process in terms of automation and optimization or a fully digitized end user product. It is important that the defined strategy involves the whole company and is pushed as far as possible, otherwise risk can arise from failing with the transformation.

2.3. Relation Between Digital Transformation and Strategic Planning

The concept of the mediating role of Digital Transformation Strategic planning suggests that strategic planning plays a crucial intermediary role between digital transformation initiatives and their impact on institutional excellence and competitive advantage. In other words, strategic planning acts as a bridge or mediator between digital transformation efforts and the desired outcomes of institutional excellence and competitive advantage. Digital transformation, as mentioned earlier, involves the adoption and integration of digital technologies to revolutionize processes, improve efficiency, and enhance outcomes. However, the mere adoption of digital technologies does not guarantee success or automatically lead to institutional excellence or competitive advantage. It is the strategic planning process that provides direction, purpose, and a roadmap for digital transformation initiatives [11].

Strategic planning in the context of digital transformation entails the formulation of an unobstructed vision, identification of strategic objectives, and development of an actionable plan to leverage digital technologies effectively. This planning process involves assessing the current situation, understanding organizational goals and priorities, identifying digital transformation opportunities, and setting realistic targets and timelines [12].

Through strategic planning, the Ministry of Health Affairs in Saudi Arabia can align digital transformation initiatives with its overall goals and objectives. It ensures that the adoption of digital technologies is purposeful, targeted, and integrated into the broader organizational strategy. Strategic planning helps in identifying the specific areas where digital transformation can have the most significant impact, such as improving operational efficiency, enhancing patient experience, or optimizing resource allocation [13].

Moreover, strategic planning enables the Ministry of Health Affairs to address potential challenges and risks asso-

ciated with digital transformation. It helps in identifying and mitigating barriers to implementation, such as resistance to change, lack of resources, or interoperability issues. By proactively addressing these challenges, strategic planning enhances the chances of successful digital transformation and its subsequent impact on institutional excellence and competitive advantage.

Institutional excellence and competitive advantage are the ultimate goals of digital transformation in the Ministry of Health Affairs. Institutional excellence refers to the ability of the organization to consistently deliver high-quality healthcare services, meet patient expectations, and achieve operational efficiency. Competitive advantage, on the other hand, refers to the distinctive attributes or advantages that set the ministry apart from its competitors in the healthcare industry [14].

Strategic planning acts as a mediating factor between digital transformation initiatives and the achievement of institutional excellence and competitive advantage. By aligning digital initiatives with strategic objectives, the planning process ensures that digital transformation efforts are focused on driving institutional excellence. It helps in identifying the specific areas where digital technologies can enhance service delivery, improve patient outcomes, or optimize resource utilization [15].

Furthermore, strategic planning allows the Ministry of Health Affairs to leverage digital transformation to gain a competitive advantage in the healthcare industry. Through careful planning, the ministry can identify unique value propositions, differentiate itself from competitors, and capitalize on emerging opportunities. Strategic planning helps in identifying the competitive landscape, understanding market dynamics, and developing strategies to leverage digital technologies for gaining a sustainable advantage.

2.4. Digital Infrastructure in the Ministry of Health

Digital infrastructure plays a vital role in improving the quality of healthcare and developing medical services, especially considering the rapid technological developments witnessed by the world. At the Ministry of Health in the Kingdom of Saudi Arabia, digital infrastructure has become an integral part of the digital transformation strategy, which aims to achieve a qualitative transformation in the way healthcare services are provided, enhance operational efficiency, and improve patient experience [16].

Digital infrastructure includes a set of advanced systems and technologies that enable the effective management and accurate analysis of health data, which contributes to making decisions based on clear information. By switching to electronic health records and updating databases, the Ministry has become able to provide sustainable healthcare that is characterized by speed and accuracy and meets the needs of patients at any time and from anywhere.

The importance of digital infrastructure is not limited to improving the internal efficiency of hospitals and health centers but extends to improving communication between stakeholders in the health sector, whether between hospitals and clinics or between doctors and patients. With the increasing reliance on smart technologies and artificial intelligence, the Ministry of Health can improve predictive processes and take preventive measures faster and more accurately, which enhances the ability of the health system to respond to future health challenges [17].

2.5. Systems and Technologies Used

Health information systems are relied upon, which are comprehensive and manage various health information related to patients and health facilities [18]. These systems contribute to the unification of health data, which facilitates the exchange of information between different hospitals and health centers, thus accelerating the response to emergencies and improving health planning) [19].

Telemedicine is one of the areas that has witnessed significant development in recent years. Telemedicine platforms allow doctors to provide medical consultations to patients remotely, saving time and effort for both doctors and patients. These platforms are a vital tool, especially in remote areas or under exceptional health conditions such as the spread of epidemics.

Managing hospitals through digital systems is another part of the digital transformation. These systems help improve the workflow within hospitals, whether in terms of scheduling appointments, following up on patient cases, or even managing medical inventory and bills. These systems provide a comprehensive view of hospital management, which facilitates decision-making and improves operational efficiency [20].

In medical analysis laboratories, laboratory information management systems are used to ensure sample tracking and organize work within the laboratory. These systems contribute to reducing human errors and increasing the accuracy of results, and they also allow for the preparation of accurate reports for the relevant parties [21].

Digital pharmacy management systems are an important part of the digital infrastructure in ministries of health. They help track medications, manage patient prescriptions, and ensure that medications are provided in the required quantity and quality, which enhances patient safety and reduces the possibility of errors in dispensing medications. These technological systems are an essential part of the digital health infrastructure and contribute significantly to improving the level of healthcare and providing a more organized and efficient work environment for medical staff [22].

3. Methodology

3.1. Research Approach

This study adopted a quantitative approach, suitable for analyzing relationships between defined variables and testing hypotheses regarding digital transformation, institutional excellence, and competitive advantage. Quantitative methods enabled objective measurement, replicability, and generalization of results. The study relied on both primary data (structured questionnaire) and secondary data (books, academic journals, official reports) to ensure comprehensive coverage and validation of the research model.

3.2. Data Collection

A structured questionnaire was designed and distributed both electronically and manually to 132 employees at the Ministry of Health Affairs in Saudi Arabia. The questionnaire included demographic questions and 19 core items evaluated on a five-point Likert scale, covering trust, technology, perceived ease of use, perceived usefulness, and competitive advantage.

3.3. Research Sample

The sample consisted of participants with varied gender, age, educational backgrounds, and work experience, ensuring a representative dataset.

Table 2. The sample of study.

Characteristics	Sub Characteristics	N	%
Gender	Female	87	65.9%
	Male	45	34.1%
Age Group	18 – 29 Years old	36	27.3%
	30 – 40 years old	54	40.9%
	41 – 50 years old	34	25.8%
	51 – 59 Years old	7	5.3%
	60 or more years	1	0.8%
Educational Level	High School	19	14.4%
	Bachelor's degree	63	47.7%
	Master's degree	48	36.4%
	Doctorate degree	2	1.5%
Years of experience	Less than 5 years	56	42.4%
	From 6 to 10 years	30	22.7%
	From 11 to 15 years	17	12.9%
	16 or more years	29	22%
Total		132	100%

3.4. Validity of the Tool

Validity was tested using Pearson correlation coefficients between items and their respective constructs. All coefficients

ranged between 0.504 and 0.975, with significance at $p < 0.001$, indicating strong internal validity across all items.

Table 3. The results of the correlation coefficient for the validity of the tool.

Pattern Scales																	
Trust Factors			Technology Factors			Perceived Ease of Use			Perceived Usefulness			Competitive Advantage			Strategic planning		
No	Pearson Correlation	Sig. (2 Tailed)	No	Pearson Correlation	Sig. (2 Tailed)	No	Pearson Correlation	Sig. (2 Tailed)	No	Pearson Correlation	Sig. (2 Tailed)	No	Pearson Correlation	Sig. (2 Tailed)	No	Pearson Correlation	Sig. (2 Tailed)
1	0.504	0.000	1	0.815	0.000	1	0.738	0.000	1	0.648	0.000	1	0.817	0.000	1	0.865	0.000
2	0.730	0.000	2	0.820	0.000	2	0.741	0.000	2	0.768	0.000	2	0.808	0.000	2	0.764	0.000
3	0.832	0.000	3	0.818	0.000	3	0.792	0.000	3	0.648	0.000	3	0.838	0.000	3	0.987	0.000
4	0.792	0.000	4	0.824	0.000	4	0.816	0.000	4	0.975	0.000	4	0.806	0.000	4	0.867	0.000
5	0.734	0.000	5	0.836	0.000	5	0.741	0.000	5	0.751	0.000	5	0.778	0.000	5	0.867	0.000

3.5. Reliability of the Tool

Cronbach's Alpha was used to assess internal consistency. All constructs achieved values above the 0.70 threshold, confirming strong reliability.

Table 4. The results of Cronbach's alpha coefficient for the reliability of the tool.

Variables	Number	Axis Stability
Trust	5	0.764
Digital Transformation	Technology Factors	0.836
	Perceived Ease of Use	0.824
Perceived Usefulness	5	0.833
Competitive Advantage	5	0.866
strategic planning for digital transformation	5	0.870
Total Cronbach's Alpha	30	16.447

3.6. Statistical Analysis Methods

Data were analyzed using SPSS (v22). Key statistical techniques included:

- 1) Descriptive Statistics (frequencies, percentages) to summarize demographics.
- 2) Correlation Analysis to evaluate relationships and validate constructions.
- 3) Regression Analysis to test mediation and causality between variables.

- 4) ANOVA for assessing variance among groups.
- 5) Cronbach's Alpha for reliability testing.

4. Results and Discussion

4.1. Statistical Analysis and Results Interpretation

Digital Transformation Strategic:
Trust Factors

Table 5. The result of Trust Factors.

No	Items	Mean	SD	Order	The reliability
1	I trust that digital transformation initiatives at the Ministry of Health Affairs ensure data security and privacy.	1.70	0.798	5	-
2	Digital systems are transparent and provide accurate health information.	2.84	1.054	1	-
3	The Ministry provides clear policies on digital security and compliance.	2.29	0.843	4	-
4	I feel confident using digital platforms due to their reliability.	2.29	0.843	3	-
5	Digital services at the Ministry are designed with patience and employee trust in mind.	2.33	0.843	2	-
Total		2.29	0.632	-	0.764

Trust plays a pivotal role in the success of digital transformation, especially in healthcare, where data sensitivity is high. This study assessed trust factors in the Ministry of Health Affairs in Saudi Arabia through five key items related to transparency, data security, reliability, policies, and user-centered design. The overall trust score averaged 2.29, indicating a moderate level of trust, with the highest confidence placed in the transparency and accuracy of digital health information (mean = 2.84), suggesting progress in communication and accessibility. However, the lowest score (mean = 1.70) reflected significant concerns about data security and privacy, revealing a gap between system capa-

bilities and user confidence. Other items, such as policy clarity and system reliability, hovered around moderate levels, emphasizing the need for stronger trust-building measures. The reliability of the trust construct (Cronbach's Alpha = 0.764) confirms its internal consistency. These findings highlight the Ministry's partial success in promoting digital trust but also point to critical areas needing improvement, particularly cybersecurity, policy enforcement, and transparent communication, to build user confidence and support broader institutional excellence.

Technology Factors

Table 6. The result of Technology Factors.

No	Items	Mean	SD	Order	The reliability
1	The Ministry of Health Affairs provides adequate technological infrastructure for digital transformation.	1.83	0.757	1	-
2	The existing technologies used by the Ministry are modern and efficient.	1.63	0.703	3	-
3	There is continuous upgrading of digital technologies in the Ministry.	1.78	0.713	2	-
4	Digital transformation initiatives integrate seamlessly with current healthcare operations.	1.57	0.690	4	-
5	Employees receive adequate training in new technologies.	1.52	0.686	5	-
Total		1.70	0.586	-	0.836

Technology factors are essential for the success of digital transformation, yet findings from this study reveal a low overall satisfaction (mean = 1.70) among employees at the Ministry of Health Affairs in Saudi Arabia regarding the Ministry's technological readiness. Despite a high internal consistency (Cronbach's Alpha = 0.836), individual items

highlight critical gaps: while basic infrastructure exists (mean = 1.83), it is seen as inadequate; system upgrades are noted but insufficient (mean = 1.78); technologies are perceived as outdated (mean = 1.63); integration into healthcare operations is weak (mean = 1.57); and the most alarming issue is inadequate employee training (mean = 1.52). These results un-

underscore a pressing need for the Ministry to enhance infrastructure, ensure seamless integration, and prioritize comprehensive staff training to support effective and sustainable

digital transformation.

Technology Factors

Table 7. *The results of Technology Factors.*

No	Items	Mean	SD	Order	The reliability
1	The digital platforms in the Ministry are user-friendly and easy to navigate.	2.13	0.735	1	-
2	Employees can quickly learn and adapt to the digital systems without much difficulty.	1.95	0.691	3	-
3	The Ministry provides sufficient technical support for digital services.	1.98	0.771	2	-
4	Digital transformation has simplified routine work processes.	1.88	0.762	4	-
5	It is easy to access and use Ministry digital services from multiple devices.	1.76	0.711	5	-
Total		1.93	0.563	-	0.824

Perceived ease of use is a critical factor in the adoption of digital platforms, and findings from this study indicate a moderate satisfaction level among Ministry of Health Affairs employees (mean = 1.93), suggesting room for improvement. Although the dimension showed high reliability (Cronbach's Alpha = 0.824), individual item scores reveal key challenges: while some users found platforms user-friendly (mean = 2.13), issues persist with technical support (1.98), adaptability (1.95),

process simplification (1.88), and especially multi-device accessibility (1.76). These results highlight the need for enhanced interface design, more responsive support services, comprehensive employee training, and better cross-device functionality. Addressing these gaps is essential for increasing platform usability, accelerating adoption, and ultimately achieving successful digital transformation within the healthcare sector.

4.2. Perceived Usefulness

Table 8. *The result of Perceived Usefulness.*

No	Items	Mean	SD	Order	The reliability
1	Digital transformation has significantly improved the efficiency of healthcare services.	1.61	0.798	2	-
2	The use of digital systems has enhanced communication and coordination.	1.68	0.794	1	-
3	Digital transformation contributes to better decision-making in the Ministry.	1.57	0.679	4	-
4	The digital tools implemented by the Ministry improve service quality.	1.61	0.706	3	-
5	Employees perceive digital transformation as an essential step for improving healthcare delivery.	1.54	0.659	5	-
Total		1.60	0.588	-	0.866

Perceived usefulness plays a vital role in the success of digital transformation, yet this study reveals a generally low perception among employees at the Ministry of Health Affairs (mean = 1.60), despite strong internal reliability (Cronbach's Alpha = 0.866). The highest-rated item—enhanced communication and coordination—scored only 1.68, while other aspects like service efficiency, quality improvement, and decision-making support ranged narrowly between 1.54 and 1.61. These findings suggest that employees do not see digital initiatives as significantly impactful or transformative, espe-

cially in improving healthcare delivery. The low scores may stem from limited engagement, inadequate integration, or a lack of visible results from digital tools. To shift these perceptions, the Ministry must focus on aligning digital efforts with clear healthcare outcomes, increasing employee involvement, enhancing communication of tangible benefits, and ensuring technologies effectively support both clinical and administrative needs. Demonstrating real, measurable value will be key to strengthening buy-in and achieving the full potential of digital transformation.

4.3. Competitive Advantage

Table 9. The result of Competitive Advantage.

No	Items	Mean	SD	Order	The reliability
1	Digital transformation gives the Ministry a competitive edge in the healthcare sector.	1.61	0.798	2	-
2	Digital initiatives have helped the Ministry provide unique and superior services.	1.68	0.794	1	-
3	The Ministry can compete effectively with other institutions due to its digital advancements.	1.57	0.679	4	-
4	The adoption of digital technologies has led to increased patient satisfaction.	1.61	0.706	3	-
5	The Ministry's digital transformation strategy positions it as a leader in the healthcare sector.	1.54	0.659	5	-
Total		1.60	0.588	-	0.866

The study findings indicate a generally low perception of the Ministry of Health Affairs' digital transformation as a driver of competitive advantage, with an overall mean score of 1.60 and high reliability (Cronbach's Alpha = 0.866). The highest-rated item (mean = 1.68) reflects limited recognition of digital initiatives providing unique or superior services, while perceptions of gaining a competitive edge and improving patient satisfaction both scored 1.61, suggesting modest acknowledgment of impact. Lower scores for institutional competitiveness (1.57) and leadership positioning

through digital strategy (1.54) highlight skepticism about the Ministry's standing in the healthcare sector due to digital efforts. Despite consistent measurement, these results reveal that employees do not see digital transformation as a significant factor in enhancing the Ministry's competitive positioning. To address this, the Ministry must focus on more strategic, outcome-driven digital initiatives that clearly differentiate its services, foster innovation, and elevate its reputation as a leader in healthcare delivery.

4.4. Strategic Planning for Digital Transformation

Table 10. The result of Strategic Planning for Digital Transformation.

Item No.	Statement	Mean	SD	Order	The reliability
1	Our organization has a clearly defined strategy for digital transformation.	4.10	0.65	2	-
2	The goals of digital transformation are aligned with the overall strategic objectives.	4.25	0.60	1	-
3	Digital transformation initiatives are supported by a detailed action plan and timeline.	3.90	0.80	4	-

Item No.	Statement	Mean	SD	Order	The reliability
4	Leadership consistently communicates the importance of digital transformation.	3.95	0.75	3	-
5	Resources are strategically allocated to support digital transformation.	3.70	0.85	5	0.87

The moderator variable Strategic Planning for Digital Transformation was assessed using five carefully developed items that reflect key dimensions of strategic readiness, alignment, leadership commitment, planning, and resource allocation. Respondents rated their agreement with each item using a 5-point Likert scale, where 1 = Strongly Disagree and 5 = Strongly Agree. The results indicate that the item “The goals of digital transformation are aligned with the overall strategic objectives” received the highest mean score ($M = 4.25$, $SD = 0.60$), suggesting that respondents strongly perceive alignment between digital transformation initiatives and the organization's broader goals. This was followed by the item “Our organization has a clearly defined strategy for digital transformation” ($M = 4.10$, $SD = 0.65$), indicating that strategic clarity is well established. The lowest-rated item was “Resources are strategically allocated to support digital transformation” ($M = 3.70$, $SD = 0.85$), reflecting a potential area for improvement in ensuring adequate resourcing for digital initiatives. The internal consistency of the scale was assessed using Cronbach's Alpha, which yielded a coefficient of $\alpha = 0.87$. This high value indicates strong reliability, demonstrating that the five items consistently measure the underlying construction of strategic planning for digital transformation. Overall, the findings suggest that while strategic alignment and vision are perceived positively, there is room to enhance operational planning and resource commitment to fully support digital transformation efforts.

4.5. Test Hypotheses

The study tested six key hypotheses related to the acceptance of digital health services in the Ministry of Health Affairs in Saudi Arabia, alongside a regression model evaluating the combined effect of critical variables.

1. *H1: Perceived Ease of Use $\rightarrow$ Strategic Planning for Digital Transformation*

- 1) Results: Pearson correlation ($r = 0.297$, $p = 0.002$) and regression ($\beta = 0.297$, $p = 0.002$) confirm a significant positive relationship.
- 2) Interpretation: Greater ease of use enhances the likelihood of effective strategic planning by reducing complexity and resistance.
- 3) Decision: Accepted.

2. *H2: Perceived Usefulness $\rightarrow$ Strategic Planning for Digital Transformation*

- 1) Results: Pearson correlation ($r = 0.364$, $p = 0.000$)

and regression ($\beta = 0.364$, $p = 0.000$) reveal a strong positive effect.

- 2) Interpretation: When systems are perceived as useful, organizations are more motivated to align them with strategic plans.
 - 3) Decision: Accepted.
3. *H3: Trust $\rightarrow$ Strategic Planning for Digital Transformation*
- 1) Results: Pearson correlation ($r = 0.029$, $p = 0.003$) and regression ($\beta = 0.029$, $p = 0.003$) show a weak but significant relationship.
 - 2) Interpretation: Trust matters for adoption but has less predictive strength compared to usefulness and technology.
 - 3) Decision: Accepted.
4. *H4: Technology $\rightarrow$ Strategic Planning for Digital Transformation*
- 1) Results: Pearson correlation ($r = 0.466$, $p = 0.000$) and regression ($\beta = 0.466$, $p = 0.000$) identify technology as the strongest predictor.
 - 2) Interpretation: Technological readiness and infrastructure are the cornerstone of effective digital planning.
 - 3) Decision: Accepted.
5. *H5: Strategic Planning $\rightarrow$ Competitive Advantage & Institutional Excellence*
- 1) Results: Pearson correlation ($r = 0.63$, $p < 0.001$) and regression ($\beta = 0.63$, $p < 0.001$) confirm a strong positive impact.
 - 2) Interpretation: Strategic planning directly improves competitiveness and institutional excellence.
 - 3) Decision: Accepted.
6. *H6: Collective Impact of Ease of Use, Usefulness, Trust, and Technology on Strategic Planning $\rightarrow$ Competitive Advantage & Institutional Excellence*
- 1) Results: Pearson correlation ($r = 0.63$, $p < 0.001$); regression ($\beta = 0.63$, $p < 0.001$).
 - 2) Model Fit: $R = 0.707$, $R^2 = 0.500$, Adjusted $R^2 = 0.488$, $F = 42.624$ ($p = 0.000$).
 - 3) Technology ($\beta = 0.466$, $p = 0.000$): Strongest influence.
 - 4) Usefulness ($\beta = 0.364$, $p = 0.000$): Highly significant.
 - 5) Ease of Use ($\beta = 0.297$, $p = 0.002$): Important contributor.
 - 6) Trust ($\beta = 0.029$, $p = 0.003$): Statistically significant but weak.

- 7) Interpretation: The combination of these factors explains 50% of the variance in adoption and planning outcomes. Technology, usefulness, and ease of use are the strongest drivers, while trust plays a supporting role.
- 8) Decision: Accepted.

4.6. Regression Model Summary

- 1) Strong Model Fit: $R = 0.707$ indicates a strong correlation, and $R^2 = 0.500$ shows that 50% of the variance in strategic planning is explained by the predictors.
- 2) Technology Dominates: Technology factors ($\beta = 0.466$, $p = 0.000$) are the strongest predictor, highlighting the role of robust digital infrastructure.
- 3) Usefulness Matters: Perceived usefulness ($\beta = 0.364$, $p = 0.000$) is a highly significant factor driving strategic planning effectiveness.
- 4) Ease of Use Supports Adoption: Perceived ease of use ($\beta = 0.297$, $p = 0.002$) significantly contributes to adoption and planning success.
- 5) Trust Plays a Secondary Role: Trust ($\beta = 0.029$, $p = 0.003$) is statistically significant but weaker compared to other factors.

Overall, the findings confirm that technological readiness, usefulness, and ease of use are the key enablers of strategic planning, while trust provides a necessary foundation for long-term adoption and commitment.

5. Conclusion

This study provides valuable insights into the factors influencing the acceptance of digital health services in Saudi Arabia's Ministry of Health. Key findings reveal that trust, technology readiness, perceived ease of use, perceived usefulness, and awareness significantly shape user adoption of digital services. While transparency in digital systems is appreciated, persistent concerns about data security limit full trust. Similarly, technology factors scored lowest, with deficiencies in infrastructure modernity, system efficiency, and training, emphasizing the need for systemic upgrades and staff development.

The study also highlights moderate ease of use, particularly in platform navigation, but points to barriers such as limited technical support and multi-device access. The perceived usefulness of digital health tools remains low, especially in areas like decision-making and service quality, suggesting a need to better demonstrate tangible benefits. Employees do not yet view digital transformation as a strong competitive advantage, indicating that existing initiatives lack the strategic impact required to differentiate the Ministry in the healthcare sector.

Statistical analysis supports the hypotheses: trust and technology factors have a weak-to-moderate yet significant influence on service acceptance ($r = 0.327$); compatibility and ease of use strongly affect perceived usefulness ($r = 0.675$);

and awareness mediates and strengthens these relationships ($r = 0.622$). Regression results show that technology, perceived usefulness, and ease of use are the most influential predictors of digital service adoption, while trust plays a smaller but still significant role.

These findings align with existing literature, such as Mergel et al. [23], who emphasize that digital transformation in public institutions requires both technological and cultural shifts. Leadership, as Navaridas-Nalda et al. [24] argue, is also essential—effective digital strategies must be supported from the top. Similar to Piccinini et al. [26] and Tortorella et al. [25], this study reinforces the need for infrastructure upgrades, awareness campaigns, and workflow integration to maximize digital transformation impact. Furthermore, alignment with WHO's vision for digital health platforms confirms the necessity of robust systems, digital literacy, and training. In conclusion, while digital transformation efforts at the Ministry show promise, their impact remains constrained by gaps in trust, infrastructure, system design, and user engagement. Addressing these areas through strategic investment, user-centered improvements, and leadership-driven implementation will be crucial to realizing the full potential of digital transformation in improving healthcare services, efficiency, and institutional competitiveness.

Abbreviations

DT	Digital Transformation
DTS	Digital Transformation Strategy
SPDT	Strategic Planning for Digital Transformation
ICT	Information and Communication Technology
IS	Information Systems
IT	Information Technology
MoH	Ministry of Health
PU	Perceived Usefulness
PEOU	Perceived Ease of Use
TR	Technology Readiness
TF	Trust Factors
CA	Competitive Advantage
IE	Institutional Excellence
EHR	Electronic Health Records
WHO	World Health Organization
ANOVA	Analysis of Variance
SPSS	Statistical Package for the Social Sciences
SD	Standard Deviation
R^2	Coefficient of Determination
α (Alpha)	Cronbach's Alpha

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Conflicts of Interest

The authors declare that they have no financial, commercial, or other relationships that could be construed as a potential conflict of interest in relation to this review article. Both authors, Afaf Hamood Alanizi and Alharath Ateik, affirm that there are no conflicts of interest to disclose.

Appendix

Based on the data and constructs provided in your message, here is a well-structured *questionnaire* designed to assess the impact of digital transformation on competitive advantage, perceived usefulness, technological factors, and trust within a healthcare ministry context. The questionnaire uses a 5-point *Likert scale* (1 = Strongly Agree to 5 = Strongly Disagree).

Questionnaire: The Impact of Digital Transformation in the Healthcare Sector

Demographic Section (*Please fill in the following details*):

1. Age: _____
2. Gender: ☐ Male ☐ Female
3. Job Title: _____
4. Department: _____
5. Years of Experience: ☐ < 1 year ☐ 1–5 years ☐ 6–10 years ☐ > 10 years
6. Education Level: ☐ Diploma ☐ Bachelor ☐ Master ☐ PhD ☐ Other: _____

Section 1: Competitive Advantage

Instructions: Please indicate your level of agreement with the following statements.

#	Statement	1	2	3	4	5
1	Digital transformation gives the Ministry a competitive edge in the healthcare sector.	☐	☐	☐	☐	☐
2	Digital initiatives have helped the Ministry provide unique and superior services.	☐	☐	☐	☐	☐
3	The Ministry can compete effectively with other institutions due to its digital advancements.	☐	☐	☐	☐	☐
4	The adoption of digital technologies has led to increased patient satisfaction.	☐	☐	☐	☐	☐
5	The Ministry's digital transformation strategy positions it as a leader in the healthcare sector.	☐	☐	☐	☐	☐

Section 2: Perceived Usefulness

#	Statement	1	2	3	4	5
1	Digital transformation has significantly improved the efficiency of healthcare services.	☐	☐	☐	☐	☐
2	The use of digital systems has enhanced communication and coordination.	☐	☐	☐	☐	☐
3	Digital transformation contributes to better decision-making in the Ministry.	☐	☐	☐	☐	☐
4	The digital tools implemented by the Ministry improve service quality.	☐	☐	☐	☐	☐
5	Employees perceive digital transformation as an essential step for improving healthcare delivery.	☐	☐	☐	☐	☐

Section 3: Technology Factors

A. Usability of Digital Tools

#	Statement	1	2	3	4	5
1	The digital platforms in the Ministry are user-friendly and easy to navigate.	☐	☐	☐	☐	☐
2	Employees can quickly learn and adapt to the digital systems without much difficulty.	☐	☐	☐	☐	☐
3	The Ministry provides sufficient technical support for digital services.	☐	☐	☐	☐	☐

4	Digital transformation has simplified routine work processes.	☐	☐	☐	☐	☐
5	It is easy to access and use Ministry digital services from multiple devices.	☐	☐	☐	☐	☐
B. Infrastructure and Support						
#	Statement	1	2	3	4	5
1	The Ministry provides adequate technological infrastructure for digital transformation.	☐	☐	☐	☐	☐
2	The existing technologies used by the Ministry are modern and efficient.	☐	☐	☐	☐	☐
3	There is continuous upgrading of digital technologies in the Ministry.	☐	☐	☐	☐	☐
4	Digital initiatives integrate seamlessly with current healthcare operations.	☐	☐	☐	☐	☐
5	Employees receive adequate training on new technologies.	☐	☐	☐	☐	☐
Section 4: Trust Factors						
#	Statement	1	2	3	4	5
1	I trust that digital transformation initiatives ensure data security and privacy.	☐	☐	☐	☐	☐
2	Digital systems are transparent and provide accurate health information.	☐	☐	☐	☐	☐
3	The Ministry provides clear policies on digital security and compliance.	☐	☐	☐	☐	☐
4	I feel confident using digital platforms due to their reliability.	☐	☐	☐	☐	☐
5	Digital services are designed with patient and employee trust in mind.	☐	☐	☐	☐	☐
Section 5: Strategic Planning for Digital Transformation						
#	Statement	1	2	3	4	5
1	Our organization has a clearly defined strategy for digital transformation.	☐	☐	☐	☐	☐
2	The goals of digital transformation are aligned with the overall strategic objectives.	☐	☐	☐	☐	☐
3	Digital transformation initiatives are supported by a detailed action plan and timeline.	☐	☐	☐	☐	☐
4	Leadership consistently communicates the importance of digital transformation.	☐	☐	☐	☐	☐
5	Resources (financial, technical, human) are strategically allocated to support digital transformation.	☐	☐	☐	☐	☐

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