

Measuring Information Quality on E-Government Websites: Evidence from Saudi Arabia

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ABSTRACT

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This study investigated user perceptions of e-government information quality in the context of Saudi Arabia and examined the effect of information quality on user satisfaction. It adopted the Wang and Strong model of data quality to identify the most influential dimensions on e-government websites. The study also assessed the current status of Saudi e-government websites. Based on survey data collected from 208 respondents in Saudi Arabia, the findings indicate that the overall status of e-government websites is satisfactory and that the information provided is perceived as valuable. The results show that information quality has a positive impact on user satisfaction. Among the dimensions, intrinsic and accessibility data quality have a highly significant effect on overall information quality, whereas contextual and representational data quality dimensions do not exhibit a statistically significant impact.

Keywords: E-government; information-quality; Saudi government; user experience; user satisfaction.

INTRODUCTION

In recent years, there has been growing interest in the issue of information quality. This interest is particularly significant given the increasing volume of published information resulting from the rapid expansion of information technology. Poor information quality can lead to various problems, whereas reliable, accurate, and up-to-date information is considered high-quality and suitable for use by both individuals and organizations (Rasool & Warraich, 2018). Several researchers have proposed different dimensions for evaluating information quality (Wang & Strong, 1996; Wang & Liao, 2008; Alenezi et al., 2015; Bataineh & Abu-Shanab, 2016; Elahi and Ahmed, 2023, Rokhman et al., 2024). According to Wang and Strong (1996), information quality can be assessed using four dimensions: intrinsic, contextual, representational, and accessibility. Information quality is a key indicator that influences and determines user satisfaction (Sharma & Lijuan, 2015).

Information quality has become a critical concern for both private and public organizations. This concern is particularly pronounced in the context of e-government websites. Currently, many sectors in Saudi Arabia offer services online. Despite the increasing adoption of technology in government operations, most Saudi government websites remain inefficient, as they primarily provide basic and general information, and the data is often not updated (Alkhusaili & Aljazzaf, 2020). The proliferation of data warehouses and the growing number of users accessing information from multiple sources have amplified the need to evaluate information quality. The way information is processed and stored is a key success factor in electronic government services (Ziemba, 2013). Moreover, there is increasing interest in understanding how user interface design in e-government platforms affects service quality and user satisfaction (Zamzami, 2019; Alam & Yasin, 2010).

Several studies have examined the impact of information quality in relation to other factors, such as information sharing, citizen trust, and user interface design (Klischewski & Scholl, 2008; Zamzami, 2019; Lee & Levy, 2014; Rokhman et al., 2024). Other research has explored the role of information quality in different contexts, including Pakistan and mobile government (m-government) platforms (Zamzami, 2019; Rasool et al., 2019). However, to the

best of the author's knowledge, limited research has been conducted on the impact of information quality on e-government within the context of Saudi Arabia.

This study, therefore, aims to assess the information quality of e-government websites in Saudi Arabia. Specifically, it evaluates users' perceptions of the information quality dimensions described by Wang and Strong (1996) and investigates the effect of information quality on user satisfaction, which is regarded as a critical measure of information system success (Xiao & Dasgupta, 2002). Accordingly, this study addresses the following research questions:

RQ1: What is the current level of information quality in e-government websites?

RQ2: Which information quality dimensions impact e-government website visitors' satisfaction?

The findings of this study offer valuable insights and practical guidelines for designing e-government websites by integrating the most effective information quality factors into their development.

LITERATURE REVIEW

Information quality

Most online services and websites serve the fundamental function of providing information (Masrek & Mohd Helmi, 2013). One of the key principles of website usability asserts that if users encounter difficulty reading the provided information—or if the information fails to answer their key questions—they are likely to leave the site (Nielsen & Budiu, 2013). This underscores the importance of ensuring high-quality information in online environments. Organizations cannot analyze the status of their information quality or monitor improvements without the ability to assess it effectively (Lee et al., 2002).

To define what constitutes quality information, several researchers have offered conceptualizations. Lee et al. (1997) defined it as information that is useful to its users (Strong et al., 1997). According to Klischewski & Scholl (2006), the definition of quality varies depending on the stakeholder, as there are many different types of information consumers. Despite ongoing efforts to improve information delivery, the effective use of information remains a critical topic in contemporary research (United Nations, 2017).

Numerous scholars have developed data quality frameworks across various domains, identifying and categorizing relevant attributes. Six major classifications of data quality have been presented in the literature (Wang & Strong, 1996; Jarke et al., 2000; Wand & Wang, 1996). This study adopts the original classification proposed by Wang and Strong (1996), as it provides a comprehensive conceptualization of data quality. Although their work refers to "data quality," the term "information quality" is used in this study to better align with the research context. Their framework is regarded as one of the most comprehensive in the field due to its large-scale survey and rigorous methodological design, and it has been widely adopted in subsequent research.

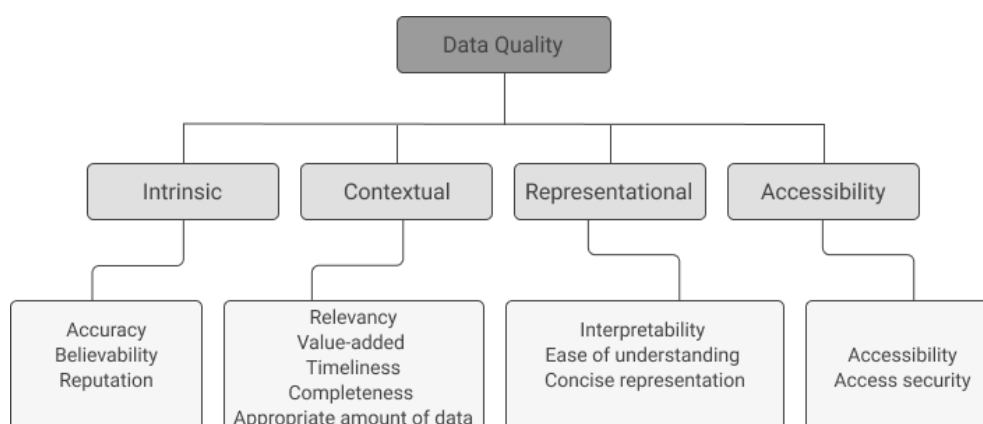


Figure 1. Wang and Strong (1996) Conceptual Framework of Data Quality

The framework categorizes information characteristics into four dimensions: intrinsic, contextual, representational, and accessibility (see Figure 1). The first, intrinsic information quality, reflects the inherent quality of the data and includes four dimensions: accuracy, objectivity, believability, and reputation. Contextual information quality emphasizes that information must be relevant, timely, and appropriately detailed. This dimension includes relevancy, value-added, timeliness, completeness, and the appropriate amount of data. Representational information quality pertains to the format and interpretability of information, incorporating attributes such as interpretability, ease of understanding, representational consistency, and concise representation. The final category, accessibility, requires that information be both easily retrievable and secure. It includes two dimensions: accessibility and access security. Catarci and Scannapieco (2002) observed that most studies focus on four core data quality dimensions: accuracy, completeness, consistency, and timeliness.

E-government and information quality

E-government comprises a collection of political and administrative sub-systems that serve society (Bataineh & Abu-Shanab, 2016). Its implementation supports and enhances governmental performance and service delivery. The concept of e-government was initially introduced to improve government operations through the use of information and communication technology (ICT), reduce costs, and increase efficiency (Almarabeh & Abuali, 2010). Citizens' and businesses' needs are increasingly placed at the center of e-government services (Alenezi et al., 2015). Although e-government websites are designed to meet citizens' or users' information needs and facilitate communication, they often fall short in fostering user engagement and public discourse due to limitations in information quality (Karkin & Janssen, 2014). According to Rokhman et al. (2024), a key finding in the evaluation of e-government initiatives is the necessity of integrating engagement services into government websites, underscoring the importance of adopting a user-centered design that promotes interaction and civic participation. Multiple factors influence the quality of e-government websites, including website design, content, service quality, and user-friendliness (Jiang & Ji, 2014). Lee and Levy (2014) emphasize the role of information quality in promoting the growth and development of e-government. Governments seek to enhance efficiency and effectiveness by implementing diverse projects and engaging citizens through various channels, such as traditional media (e.g., radio, television), online platforms, and social media. Accordingly, e-government content should be written in the local language to ensure effective communication with citizens (Bataineh & Abu-Shanab, 2016). Moreover, platforms that incorporate speech or visual elements should be considered as alternatives to text-based content to improve accessibility and usability (Almarabeh & Abuali, 2010; Bhatnagar, 2004; Abu-Shanab, 2013).

Citizen satisfaction and information quality

As mentioned earlier, citizens' needs are central to e-government services. Meeting these needs and expectations is essential for establishing long-term relationships with users (Buttle et al., 2009). Developing such relationships and understanding user expectations are necessary for fostering citizen satisfaction. In the context of e-government, citizen satisfaction is regarded as a critical metric, and many government agencies prioritize it in their performance evaluations. Although there is no universally accepted definition of citizen satisfaction in the e-government domain, numerous studies conceptualize it as the relationship between service providers (i.e., government entities) and customers (i.e., citizens) (Nguyen et al., 2020). Therefore, citizen satisfaction is often equated with customer satisfaction.

Information quality not only affects the performance and growth of e-government systems and organizations but also significantly influences user satisfaction. In their well-known IS success model, DeLone and McLean (1992) argue that information quality is a key predictor of user satisfaction. Several researchers support the view that higher information quality contributes to greater satisfaction among e-government users (Wang & Liao, 2008; Dwivedi et al., 2011; Floropoulos et al., 2010). Furthermore, Flavián et al. (2009) found that the organization and management of website content play a crucial role in enhancing user satisfaction. Additionally, Rana et al. (2011), in their meta-analysis on information quality and user satisfaction, identified a positive correlation between the two within the e-government context.

MODEL DEVELOPMENT

The quality of information is a critical component, as high-quality information contributes significantly to user satisfaction (Sharma & Lijuan, 2015). According to Wang and Liao (2008), e-government authorities should prioritize the provision of high-quality information to enhance users' perceived benefits, which, in turn, influence their overall satisfaction. Information content must be appropriately developed and structured to address users' needs effectively, thereby impacting their satisfaction levels. Based on the findings of Santa et al. (2019), information quality is the most influential determinant of user satisfaction. Their results indicate a positive relationship between information quality and user satisfaction. Similarly, the findings of Chen and Chang (2018) demonstrate that information quality has a significant positive effect on consumer satisfaction. Based on the foregoing discussion, the following hypothesis is proposed:

H1: The overall information quality of e-government websites has a positive impact on users' satisfaction.

As discussed in the literature, four categories of dimensions influence the quality of information. Parker et al. (2006) identified accuracy, believability, timeliness, completeness, representation, and accessibility as the most useful dimensions for managing information quality. Moreover, accuracy has been shown to enhance the effectiveness of information (Jiang & Ji, 2014). According to Rasool & Warraich (2018), citizens report the highest satisfaction with key indicators of information quality, including accuracy, relevancy, completeness, reliability, and security. Additionally, providing secure information has been found to reduce customer complaints (Alenezi et al., 2015). Based on this prior research, the following hypotheses are proposed:

H2: Intrinsic data quality has a positive impact on users' perceptions of the overall information quality of e-government websites.

H3: Contextual data quality has a positive impact on users' perceptions of the overall information quality of e-government websites.

H4: Representational data quality has a significant impact on users' perceptions of the overall information quality of e-government websites.

H5: Accessibility has a positive impact on users' perceptions of the overall information quality of e-government websites.

METHODOLOGY

The current study aims to assess the information quality of e-government websites and online services in Saudi Arabia. To achieve this objective, a quantitative research design was employed, utilizing a structured questionnaire for data collection. The questionnaire comprises several measurement items that were adopted from previous studies and evaluates six main constructs: overall information quality of e-government websites; intrinsic data quality (i.e., accuracy, believability, and reputation); contextual data quality (i.e., relevance, value-added, timeliness, completeness, and the appropriate amount of data); representational data quality (i.e., interpretability, ease of understanding, and concise representation); accessibility (i.e., accessibility and access security); and user satisfaction.

To measure user satisfaction, the End-User Computing Satisfaction (EUCS) instrument, developed and validated by Doll and Torkzadeh (1988), was adopted. The EUCS includes five dimensions: content, accuracy, format, ease of use, and timeliness. It is considered a comprehensive tool, as it was developed following an extensive review of the user satisfaction literature and encompasses a full range of items related to satisfaction with information systems (Xiao & Dasgupta, 2002).

Table 1. Demographic information of the respondents.

Attribute	Item	Number (N = 208)	Percent (%)
Gender	Female	157	75.5%
	Male	51	24.5%
Age	18-25	61	29.3%
	26-35	81	38.9%
	36-55	56	26.9%
	56-65	9	4.3%
	Above 65	1	0.5%
Nationality	Citizen	201	96.6%
	Resident	7	3.4%
Education	High school	40	19.2%
	Bachelor's Degree	128	61.5%
	Master's Degree	20	9.6%
	PHD	13	6.3%
	Other	7	3.4%

The target population consisted of Saudi Arabian citizens and residents. Participants were randomly selected from users of e-government websites—that is, individuals who searched for and accessed information on these platforms. The survey was distributed via popular social media platforms, including Twitter and WhatsApp. Data collection was conducted entirely online using Google Forms and lasted for three weeks. A total of 208 completed questionnaires were collected. Table 1 presents the demographic characteristics of the respondents. Participants responded based on their experiences with official Saudi government websites, including those of the Ministry of Justice, Ministry of Health, and Ministry of Commerce, as well as general e-government platforms such as Absher.sa and Jadara.

ANALYSIS AND RESULTS

The data were analyzed using the Partial Least Squares (PLS) method, which offers several advantages for structural model testing. PLS is particularly well-suited for model evaluation in exploratory research and is appropriate for this study, which includes 208 responses (Gefen et al., 2000). The analysis was conducted using SmartPLS software.

Descriptive analysis

Approximately 75% of the respondents were female, with the majority (81.0%) aged between 26 and 35 years. Among the respondents, 68% perceived e-government websites as useful for guidance by providing practical information, while 50% considered them useful for informing users about related topics. More than half of the participants rated the length of information provided on e-government websites as average, whereas 33% preferred the content to be brief.

In terms of complexity, 58% of respondents described the information on e-government websites as simple, while 39% found it somewhat complex. Furthermore, 77% reported that it was easy to find the information they needed, with 12% finding it quite easy and 11% finding it difficult. Nearly all respondents considered the information provided by e-government websites to be useful—68% rated it as useful, and 30% as somewhat useful.

Figure 2 illustrates users' perceptions of the usefulness of the most frequently accessed e-government websites. The majority of these platforms are viewed as useful for providing guidance, with over 60% of users expressing this opinion. Conversely, the least common reason for using e-government websites was for informational introductions. Notably, nearly 35% of Absher.sa users perceived its content as somewhat complex.

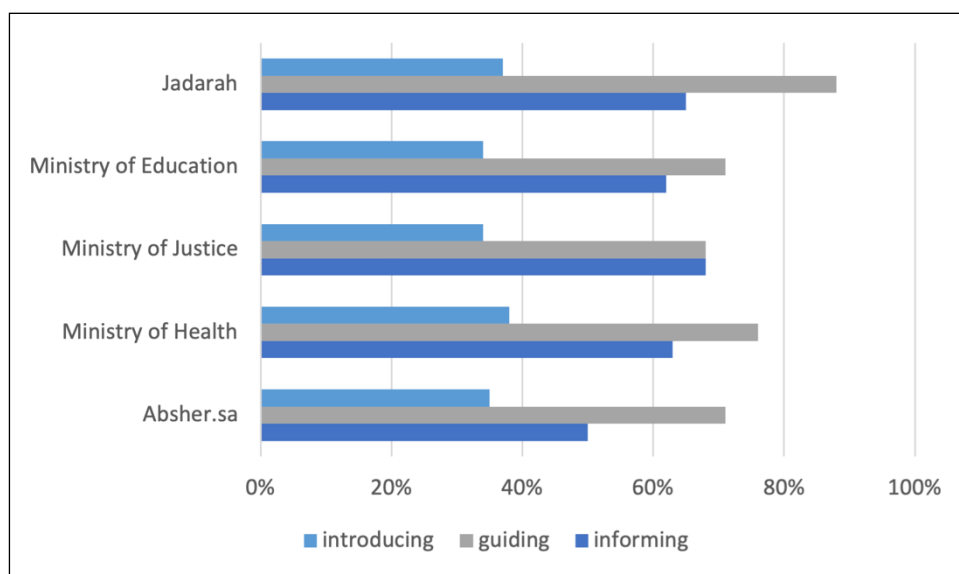


Figure 1. E-government websites usefulness

Measurement model

To perform the statistical analysis, the Partial Least Squares (PLS) method was used to evaluate the reliability and validity of the research measurement model. Reliability refers to the extent to which observed variables explain the variance in their respective latent constructs, and it is assessed by calculating the outer loadings of the items (Götz et al., 2010). In this study, reliability was evaluated using three indicators: item outer loadings, Cronbach's alpha (CA), and Composite Reliability (CR). As shown in Table 2, nearly all item outer loadings exceeded the threshold of 0.7, which is considered highly satisfactory (Götz et al., 2010; Henseler et al., 2009; Cheney, 2006). Although one item had an outer loading of 0.6, this value is still acceptable based on prior research (Hair et al., 2010). The Cronbach's alpha and Composite Reliability values for all constructs exceeded 0.7, indicating a high degree of internal consistency.

To assess the validity of the measurement model, both convergent and discriminant validity were examined. Convergent validity was assessed using the Average Variance Extracted (AVE) (Hair et al., 2010). For all model constructs, the AVE values exceeded 0.5, indicating adequate convergent validity. Discriminant validity was evaluated using the Fornell–Larcker criterion. According to Fornell and Larcker (1981), discriminant validity is supported when the square root of the AVE for each construct exceeds its correlations with other constructs. As shown in Table 3, the square root of the AVE (diagonal values) for all model constructs was greater than the corresponding inter-construct correlations, thereby confirming strong discriminant validity for the proposed model.

Table 2. Average variance extracted, composite reliability and Cronbach's α statistics.

Constructs	Items	Loadings	AVE	CR	CA
Intrinsic information quality (IN)	IT1	0.745	0.704	0.904	0.858
	1T2	0.865			
	1T3	0.886			
	1T4	0.852			
Contextual information quality (CQ)	CQ1	0.762	0.660	0.939	0.926
	CQ2	0.716			
	CQ3	0.823			
	CQ4	0.850			
	CQ5	0.865			
	CQ6	0.866			
	CQ7	0.794			
	CQ8	0.813			
Representational information quality (RQ)	RQ1	0.806	0.704	0.943	0.929
	RQ2	0.885			
	RQ3	0.910			
	RQ4	0.850			

	RQ5	0.823			
	RQ6	0.761			
	RQ7	0.831			
Accessibility information quality (AQ)	AC1	0.792	0.664	0.907	0.871
	AC2	0.792			
	AC3	0.898			
	AC4	0.882			
	AC5	0.693			
Information Quality (IQ)	IQ1	0.921	0.820	0.901	0.783
	IQ2	0.890			
User Satisfaction (US)	US1	0.865	0.776	0.945	0.927
	US2	0.926			
	US3	0.913			
	US4	0.853			
	US5	0.844			

Table 3. Analysis of discriminant validity

Constructs	IN	CQ	RQ	AQ	IQ	US
IN	0.839					
CQ	0.644	0.813				
RQ	0.589	0.800	0.839			
AQ	0.552	0.703	0.770	0.815		
IQ	0.660	0.675	0.668	0.694	0.906	
US	0.560	0.811	0.773	0.764	0.707	0.881

Hypothesis testing

After establishing the validity and reliability of the measurement model, the structural model was tested to evaluate the proposed hypotheses and assess the theoretical relationships developed in the study. The coefficient of determination (R^2) was used to assess the model's predictive accuracy. The model explained a substantial proportion of the variance in users' behavioral intention ($R^2 = 0.61$ and $R^2 = 0.50$), indicating strong predictive power. The results of the path analysis—including standardized beta coefficients (β) and R^2 values—are presented in Figure 3.

Information quality was found to have a significant positive effect on user satisfaction ($\beta = 0.82$, $p < 0.001$), thereby supporting H1. In addition, intrinsic data quality showed a substantial positive relationship with overall information quality ($\beta = 0.40$, $p < 0.001$), supporting H2. In contrast, contextual and representational data quality did not significantly influence information quality, as indicated by their respective beta coefficients ($\beta = 0.12$, $p > 0.05$; $\beta = -0.01$, $p > 0.05$). Therefore, H3 and H4 were not supported.

Finally, accessibility was found to have a significant positive effect on information quality ($\beta = 0.48$, $p < 0.05$), supporting H5. The outcomes of all hypotheses tested are summarized in Table 4.

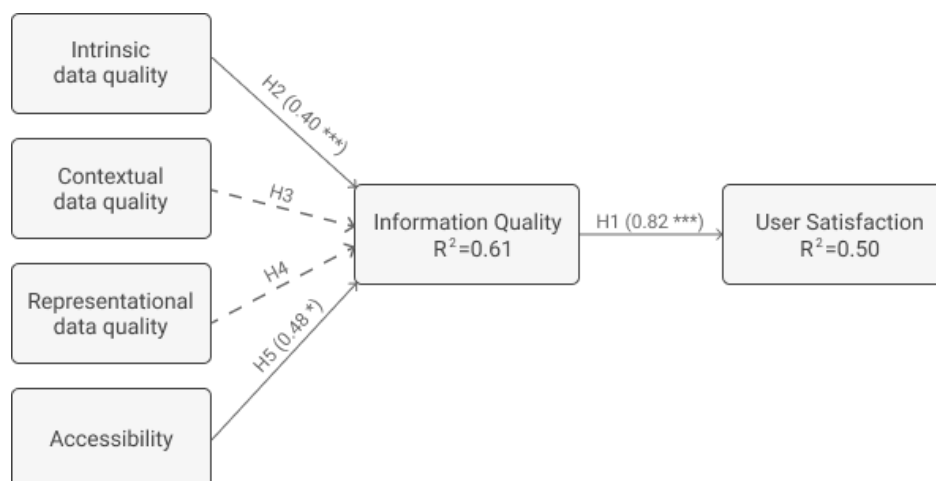
Figure 2. Summary of results Note: * $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$

Table 4. Summary of results

Hypothesis	β	T-Value	P Value	Result
H1: information quality $\rightarrow$ user satisfaction	0.82	18.337	0.000	Supported
H2: Intrinsic data quality $\rightarrow$ information quality	0.40	3.963	0.000	Supported
H3: Contextual data quality $\rightarrow$ information quality	0.12	0.711	0.477	Not supported
H4: Representational data quality $\rightarrow$ information quality	-0.01	0.055	0.956	Not supported
H5: Accessibility data quality $\rightarrow$ information quality	0.48	2.386	0.017	Supported

DISCUSSION AND IMPLICATION

Discussion

The findings suggest that the overall status of Saudi e-government websites is positive and that the information provided is perceived as valuable. More than 70% of participants indicated that the information is easy to access and locate. Additionally, the majority of participants consider the content on Saudi e-government websites to be straightforward. According to Liu et al. (2010), website visitors typically spend less than one minute on a webpage, which aligns with the current length of material presented on e-government websites. In the present study, the length of information is also rated as average, reflecting designers' awareness of users' reading capacity, which is estimated at approximately 120 words per page (Nielsen & Budiu, 2013).

The path analysis results indicate that intrinsic and accessibility data quality dimensions have the strongest influence on information quality, making them a higher priority than the other proposed variables. The analysis also confirms a significant relationship between information quality and user satisfaction. This finding aligns with prior research (Wang & Liao, 2008; Dwivedi et al., 2011; Floropoulos et al., 2010), which reported that higher levels of information quality lead to greater user satisfaction. Similarly, Shahzad et al. (2021) found a positive relationship between information quality and user satisfaction. In addition, Bernauer et al. (2020) emphasized the importance of information quality to citizens, noting that users are generally intolerant of low-quality information.

Consistent with previous studies (Alshehri et al., 2012; Mohammadi & Abrizah, 2015), accessibility was also found to significantly influence information quality. Rasool et al. (2019) identified accessibility as one of the most highly valued dimensions of information quality. According to a study by Meyen and Willshire (1997), over 62% of user concerns regarding information quality were related to intrinsic and accessibility dimensions—supporting the findings of the present study.

Conversely, the findings related to H3 and H4 do not support a significant relationship between contextual and representational data quality and overall information quality. This result is consistent with the findings of Meyen and Willshire (1997), who reported that contextual and representational quality were among the least concerning to users, with only 24% citing concerns related to contextual quality and 14% to representational quality.

Theoretical implication

This research has demonstrated that user satisfaction with e-government services is achieved when the quality of information provided by governmental organizations aligns with users' needs. A key contribution of this study lies in the identification of specific information quality indicators that influence citizens' satisfaction as information consumers of e-government websites. While previous literature has examined information quality indicators in non-e-government systems, there remains a notable gap in empirical research on how these factors affect user satisfaction when e-government websites serve as the primary source of information.

Moreover, the findings of this study may differ from those in the existing literature due to its focus on the Saudi Arabian context, where cultural factors may shape users' preferences for particular dimensions of information quality.

Practical implication

This study has several practical implications for the Saudi government, particularly in relation to website and content design. A primary consideration is the quality of information. To ensure that citizens derive maximum benefit from e-government services, the information provided must be accurate, credible, objective, secure, and accessible.

Given the ongoing digital transformation of public services and the government's increasing reliance on technology to improve service delivery and citizen engagement, it is essential to rigorously apply user experience principles. Since information is the primary medium through which the government communicates with the public, the delivery of accurate and reliable content is critical.

The significance of providing timely, trustworthy, and accessible information has become even more apparent in the context of the COVID-19 pandemic. During such public health crises, governments are expected to guide and inform citizens through clear updates, health guidelines, and policy recommendations.

CONCLUSION

E-government has transformed the way governments communicate with citizens and deliver public services. E-government websites must prioritize the quality of the information they provide, ensuring that it is credible, accurate, accessible, objective, and easy to understand. Citizens and residents rely heavily on the information disseminated through these digital platforms.

This study examined the quality of information on Saudi e-government websites and its influence on user satisfaction. It also identified key information quality indicators as perceived by Saudi citizens and residents. The research was guided by the well-established data quality framework developed by Wang and Strong (1996), which served as the foundation for identifying the dimensions of information quality that influence user satisfaction with e-government services.

The survey analysis revealed that intrinsic data quality and accessibility are the most influential factors affecting the overall information quality of Saudi e-government websites. The results provide empirical evidence that these dimensions of information quality positively impact user satisfaction.

This study contributes to the existing literature on information quality in the context of e-government by offering new insights and validating a conceptual model grounded in prior research. The proposed model presents a valuable framework for future studies aiming to explore the relationship between information quality and user satisfaction in similar digital governance contexts.

LIMITATION AND FUTURE WORK

Several limitations were identified in this study. First, the data collected may not be representative of all regions of Saudi Arabia, as the majority of participants were citizens and residents of the Riyadh province. Consequently, the sample may not fully reflect the broader Saudi population, potentially introducing sampling bias into the results. Additionally, since the study was conducted exclusively in Saudi Arabia, the findings may not be generalizable to other national contexts due to cultural and contextual differences.

Second, the research focused specifically on evaluating information quality on e-government websites. However, the rapid advancement of digital technologies has led to the emergence of new forms of digital governance, such as mobile government (m-government), which is considered a subcategory of e-government (Althunibat et al., 2021). As this study did not explore m-government platforms or other digital service channels, its narrow scope constitutes a limitation.

Future research should consider applying the proposed measurement model across different countries and governance contexts to enhance the generalizability of findings. Further studies are also recommended to explore a broader range of e-government services, including mobile platforms. Moreover, based on this study's demographic analysis, e-government users vary in age, educational background, and nationality. Future research could examine how these demographic variables influence user satisfaction with e-government services in relation to information quality.

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