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Citizens' electronic satisfaction factors in electronic government services: an empirical study from Kuwait

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ABSTRACT

This study investigates the dimensions of service quality provided by Kuwait's "Sahel" electronic government (e-government) application and their impact on user satisfaction among citizens and residents. Adopting a quantitative methodology based on the modified electronic government quality (e-GovQual) model, data were collected from 1,064 respondents over four weeks, assessing user experiences across usability, reliability, responsiveness, security, and efficiency dimensions. Results indicate moderate overall satisfaction, with particularly high ratings for transparency and ease of use, yet notable concerns regarding trust and data security. Satisfaction with reliability and technical support was moderate, signaling areas for improvement. The study recommends enhancing the user interface for intuitive navigation, improving real-time data synchronization between governmental entities, providing efficient technical support, and strengthening security measures to build user trust. These recommendations are crucial for advancing Kuwait's e-government effectiveness. Future research should explore causal relationships among service quality dimensions and incorporate technical assessments by information and communication technology (ICT) experts to further enhance user satisfaction.

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1. INTRODUCTION

Advancements in information and communication technology (ICT) and internet innovations have significantly reshaped modern public service delivery, facilitating the emergence of electronic government (e-government) as a crucial platform through which citizens access governmental services [1], [2]. Governments worldwide are actively investing in digital transformation initiatives aimed at developing reliable and user-friendly e-government platforms, enhancing service efficiency and transparency, and ensuring citizen satisfaction through improved public services [3], [4]. These technological innovations streamline administrative processes, increasing productivity and service quality, ultimately contributing to higher citizen satisfaction levels [5].

E-government, defined by West [6] as leveraging ICT to enable easy access to government services and information, has significantly transformed public administration practices. It enhances efficiency,

coordination, and responsiveness of governmental services, reducing bureaucratic hurdles and promoting quicker interactions between citizens and the government [7]. E-government initiatives allow decentralized service delivery, providing information in accessible formats that boost public engagement and satisfaction [8]. Nonetheless, the effectiveness of e-government systems significantly depends on user satisfaction, making continuous evaluation and enhancement of service quality imperative for governments [3]. Citizens' satisfaction has been identified as a pivotal factor influencing the adoption and sustained use of e-government services [9].

In 2021, Kuwait introduced the "Sahel" app, a unified digital platform designed to streamline e-government services for both citizens and residents. Sahel acts as a centralized hub for over 284 government services spanning 29 different agencies, facilitating electronic transactions and reducing the need for physical visits to governmental institutions. Since its launch, the app has garnered over one million users and facilitated more than 10.6 million transactions, representing a substantial step forward in Kuwait's digital transformation [10]. Despite these achievements, Kuwait's ranking in the United Nations e-government development index (EGDI) experienced a notable decline from 46th to 61st position in recent years [11]. A significant contributor to this decline has been identified as the lower readiness level of organizations in implementing digital transformation strategies and initiatives [12]. This underscores the necessity for an extensive evaluation of the Sahel app's service quality and its influence on user satisfaction, alongside an exploration of the factors contributing to this downward shift in rankings.

The primary objective of this research is to evaluate the service quality of the Sahel app and assess the satisfaction levels among Kuwaiti citizens and residents. Employing a quantitative approach, the study utilizes an adapted electronic government quality (e-GovQual) model, drawing on frameworks from previous studies by [13]–[15], to analyze critical dimensions of service quality including usability, reliability, security, responsiveness, and efficiency. This model offers a structured method for comprehensively understanding how various service quality factors affect user satisfaction.

The study employs a quantitative survey methodology targeting a diverse sample of 1,064 respondents over a four-week period, capturing a wide array of user experiences. Through this analysis, the research aims to provide actionable insights into user satisfaction with the Sahel app, contributing valuable knowledge necessary for refining and enhancing Kuwait's e-government initiatives. Subsequent paragraphs present a detailed literature review on customer satisfaction in e-government contexts, contextualizing this study within existing research frameworks and theoretical foundations. This grounding enables a deeper comprehension of the Sahel app's impact on user satisfaction and engagement within Kuwait's broader digital transformation efforts.

E-government services, which leverage ICT, have become fundamental for improving public sector efficiency and citizen engagement [16]. As noted by [1] and [17], digital platforms for government services significantly transform public administration, making services more accessible and efficient. High-quality e-government services streamline bureaucratic processes, increasing citizen satisfaction, crucial for fostering trust and loyalty in government initiatives [18], [19], [3] emphasizes that the quality of e-services significantly impacts user satisfaction.

User satisfaction with e-government services is typically evaluated across multiple dimensions, including system quality (ease of use, design, reliability, and interactivity), information quality (security, accuracy, and privacy), and service quality (responsiveness, efficiency, and customer support) [20]–[23]. The system's technical capabilities, including stability and user interface design, directly affect user satisfaction [18], [21]. Information quality, particularly accurate and secure data provision, significantly influences user trust and engagement [16], [23]. Additionally, providing effective support to resolve user issues significantly boosts satisfaction levels [24].

The moderate overall satisfaction with the Sahel e-government app can be attributed to several key factors, including user interface design, service availability, user support and feedback, and privacy and security concerns. User interface design significantly influences user satisfaction, as ease of use, and accessibility are critical determinants of perceived service quality [25]–[27]. Prioritizing user-centered design enhances usability and ensures efficient navigation [28], [29]. Service availability profoundly impacts satisfaction, emphasizing the necessity of reliable and responsive service delivery [30], [31]. Furthermore, effective user support and feedback mechanisms are essential for addressing concerns and improving functionality, thus enhancing trust and user engagement [32], [33]. Concerns about privacy and security are major obstacles to user satisfaction; implementing strong security measures and clear privacy policies can help overcome these concerns and build greater trust [34]. Addressing these factors through deliberate design and careful implementation can significantly enhance user satisfaction with the Sahel app, aligning it with evolving user expectations [35], [36].

The roles of trust [37] and transparency in e-government significantly influence citizen satisfaction. Government website usage positively correlates with satisfaction and trust in government e-services [38].

Transparency, especially regarding data handling and decision-making processes, is crucial for building trust and mitigating security and privacy concerns [16], [39], [40].

Literature consistently emphasizes that service quality directly impacts citizen satisfaction and e-government initiative success [41]. System performance, information accuracy, and service quality notably influence user satisfaction [15], [42]. Research highlights the relationship between service transparency, system quality, and citizen satisfaction, suggesting higher-quality systems lead to improved user experiences and outcomes [43], [44].

While extensive research exists on general e-government service quality, specific studies on the Sahel app within the Kuwaiti context remain limited [45]. This study addresses this gap by examining dimensions influencing user satisfaction specifically through efficiency, trust, reliability, citizen support, convenience, and transparency using the adapted e-GovQual model [15]. Figure 1 shows the citizen satisfaction model adopted from e-GovQual model [14].

The main objective of the manuscript is to evaluate the service quality of Kuwait's "Sahel" e-government application and its impact on user satisfaction. The study adopts a quantitative empirical approach, using a validated and adapted version of the e-GovQual model to assess six dimensions of service quality (efficiency, trust, reliability, citizen support, comfort, and transparency). The research methodology involved a structured survey administered to a large and diverse sample of 1,064 users. Statistical analyses (descriptive statistics, t-tests, and ANOVA) were conducted using statistical package for the social sciences (SPSS). The approach is guided by a solid theoretical framework (e-GovQual model) and contributes empirical evidence grounded in user experience and perceptions.

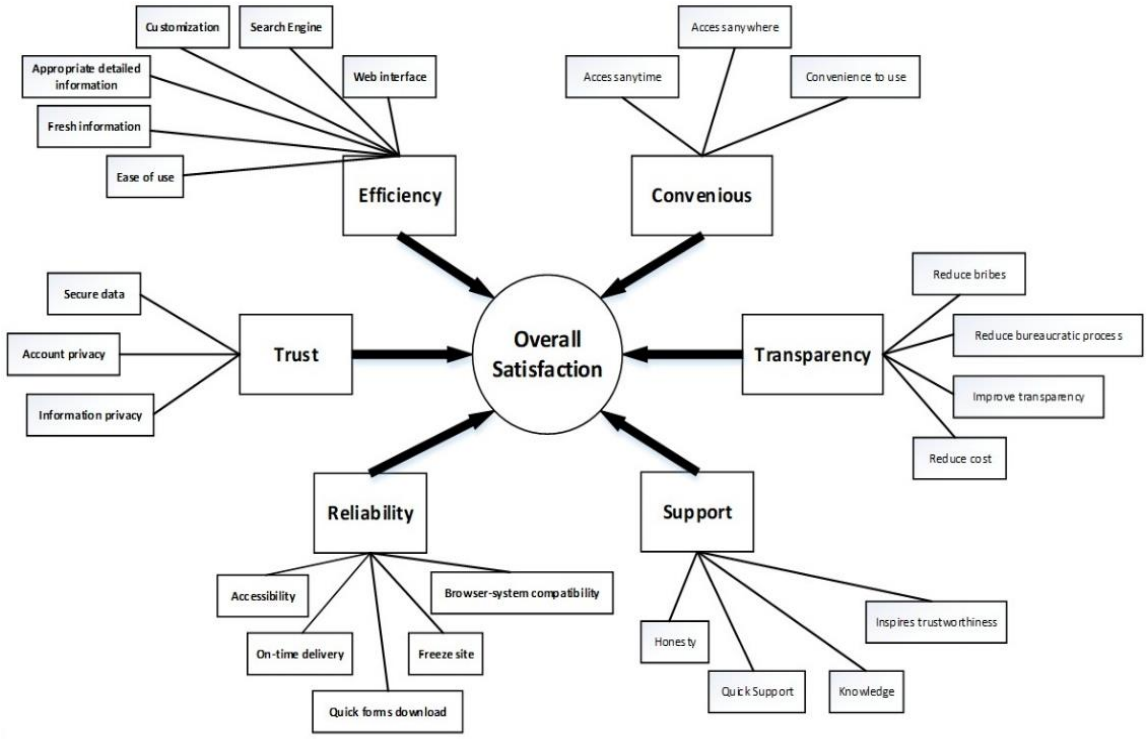

Figure 1. Citizen satisfaction model adopted from e-GovQual model [14]

2. METHOD

2.1. Research design

This study used a descriptive approach to evaluate user satisfaction with Kuwait's "Sahel" e-government application. A structured survey was developed based on an adapted e-GovQual model [14], encompassing six satisfaction dimensions: efficiency, trust, reliability, citizen support, comfort, and transparency. Each dimension was assessed using a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree), designed to capture users' perceptions across critical service quality metrics. The questionnaire for the level of satisfaction was verified through apparent validity and construct validity. A group of arbitrators reviewed the initial form of the questionnaire, and it was amended according to their suggestions. One

statement from the Citizen support dimension and two statements from the Comfort deleted, and some statements were rephrased linguistically, so the final form of the questionnaire comprised (27) statements. The consensus of the arbitrators ensures validity of the questionnaire's content. Further, to confirm the validity of the questionnaire's internal consistency, the correlation coefficients between each statement and the total degree of its dimension were calculated, and the correlations coefficients between the dimension and the total degree of the questionnaire were also calculated using the SPSS after applying it to a pilot sample including (80) individuals in addition to the basic sample. The values of the correlation coefficients between each statement and the total degree of its dimension are high ranging between (0.510-0.829), and they are statistically significant at the level of (0.01).

2.2. Sampling and data collection

Data were collected electronically (Google Docs) over four weeks' span using "WhatsApp" groups from a diverse sample of 1,064 respondents, including citizens and residents of Kuwait. The survey was available in both Arabic and English languages to accommodate non-Arabic speakers. The sample in Table 1 was demographically varied across age, gender, education, nationality, and frequency of "Sahel" app use, ensuring a representative dataset reflective of the general user population.

Table 1. Distribution of the study sample according to demographic variables

Variable		Number	Percentage
Gender	Male	762	71.62%
	Female	302	28.38%
Nationality	Kuwaiti	710	66.73%
	Non-Kuwaiti	354	33.27%
Education level	Secondary or less	154	14.47%
	Technical	266	25.00%
	University	542	50.94%
	Postgraduate studies or more	102	9.59%
Age	Less than 30 years old	258	24.25%
	30-50 years	534	50.19%
	50 years and over	272	25.56%
The number of times "Sahel" application was used	Once a month	330	31.02%
	Once a week	314	29.50%
	2-7 times a week	310	29.14%
	More than 7 times a week	110	10.34%

2.3. Survey instrument validation

The questionnaire's reliability was confirmed with Cronbach's alpha values for each dimension, ranging from 0.83 to 0.85, indicating high internal consistency. Construct validity was supported by significant correlation coefficients across dimensions, validating the model's applicability for measuring satisfaction in e-government contexts.

2.4. Statistical analysis

Data analysis was conducted using SPSS. Frequencies, means, and standard deviations were calculated to assess satisfaction levels for each dimension. Independent samples t-tests and ANOVA were applied to examine satisfaction variations by demographic factors, such as gender, age, nationality, education, and frequency of app usage.

3. RESULTS AND DISCUSSION

This section presents an integrated analysis of the study's results and discusses their broader implications for the design and enhancement of e-government services in Kuwait and similar contexts.

3.1. Overall user satisfaction

The analysis of user satisfaction in Table 2 with the "Sahel" application revealed an overall moderate satisfaction level (M = 3.38, SD = 0.77), reflecting both strengths and areas requiring targeted improvement. These results are consistent with previous studies in similar contexts, which often report moderate satisfaction levels in emerging e-government systems [19], [33]. All symbols that have been used in the equations should be defined in the following text.

Table 2. Correlation coefficients between each statement and total degree of its dimension

Statement	Correlation coefficient	Statement	Correlation coefficient	Statement	Correlation coefficient
	Efficiency		Reliability		Comfort
1	0.680**0	11	0.802**0	20	0.630**0
2	0.718**0	12	0.799**0	21	0.667**0
3	0.704**	13	0.710**0	22	0.679**0
4	0.684**0	14	0.730**0		Transparency
5	0.755**0		Citizen support	23	0.626**0
6	0.747**0	15	0.760**0	24	0.648**0
	Trust	16	0.724**0	25	0.622**0
7	0.704**0	17	0.771**0	26	0.739**0
8	0.711**0	18	0.829**0	27	0.702**0
9	0.510**	19	0.723**0		
10	0.649**0				

3.2. Transparency and comfort as key strengths

Among the six service dimensions, transparency (M = 3.71) and comfort (M = 3.69) emerged as the highest-rated, suggesting that users value the app's ability to provide clear, accessible information and its user-friendly interface. These findings align with prior research highlighting transparency and ease of use as critical drivers of e-government satisfaction [36], [30], [16]. Notably, users strongly agreed that the app improved visibility into government processes and facilitated convenient access to services across devices. These results suggest that the "Sahel" app's design successfully supports a positive user experience, fostering engagement and promoting adoption. As [25] and [28] emphasize, usability and perceived transparency are pivotal in building trust and encouraging recurrent use of e-government platforms.

3.3. Trust as a critical weakness

In contrast, Trust scored the lowest in Table 3 of all dimensions (M = 2.32, SD = 0.94), indicating substantial concerns about data privacy and security. Only 32% of respondents reported confidence in the app's data-handling capabilities. These findings echo similar concerns reported in regional studies [37], [23], underscoring that without strong privacy protections and transparent data policies, users may hesitate to fully embrace digital government services. This result is particularly important given the central role that trust plays in determining e-government adoption and satisfaction [38], [30]. The finding strongly supports the study's initial hypothesis that trust and perceived security remain underdeveloped in many emerging e-government platforms, including "Sahel".

Table 3. Means and standard deviations of satisfaction dimensions

Dimension	Mean	Standard deviation
Transparency	3.71	0.72
Comfort	3.69	0.70
Efficiency	3.68	0.74
Citizen support	3.47	0.72
Reliability	3.46	0.73
Trust	2.32	0.94

3.4. Reliability and technical support: areas for improvement

The reliability dimension received a moderate rating (M=3.46), with users expressing dissatisfaction with data synchronization across governmental entities. Delays in updating information were a common concern. These results align with findings from [43], [42], which note that inconsistent backend integration often undermines user confidence in e-government services.

Similarly, citizen support also scored moderately (M=3.47), with users highlighting deficiencies in real-time technical assistance. This gap is critical, as effective support directly influences users' ability to navigate the platform and resolve issues [32], [33]. The findings indicate that enhancing 24/7 technical support and improving backend integration should be strategic priorities for future development.

3.5. Efficiency and demographic effects

The Efficiency dimension scored relatively high (M=3.68), with users praising the app's intuitive interface and responsive design. Interestingly, the analysis revealed demographic trends, with users of lower educational backgrounds reporting higher satisfaction in efficiency and reliability. This suggests that while the app is generally accessible, more advanced users may have higher expectations regarding information depth and accuracy. These findings contribute to the literature on digital divides in e-government [29],

indicating that future design efforts should aim to balance simplicity and functionality to serve a diverse user base effectively.

3.6. Implications and recommendations

The findings of this study have several key implications:

a. Enhancing trust: building stronger data security protocols and transparent privacy policies is essential to addressing users' trust concerns — a recurring weakness across both regional and global e-government systems [19], [37], [38].
b. Improving reliability: developing real-time data synchronization and ensuring consistent backend integration will enhance reliability and reduce user frustration with outdated information.
c. Strengthening support: introducing AI-driven and human-supported 24/7 technical assistance can significantly improve user satisfaction and promote broader adoption.
d. Balancing usability and advanced features: Addressing the divergent expectations of different demographic groups requires a flexible design strategy, offering both intuitive usability for less experienced users and advanced functionality for expert users.

Overall, this study highlights that while Kuwait's "Sahel" app performs well in transparency, comfort, and efficiency, it must address significant challenges related to trust, reliability, and technical support to fully meet user expectations. These results contribute valuable insights to the evolving field of e-government service quality and offer clear priorities for future enhancement of digital government platforms in Kuwait and comparable settings.

4. CONCLUSION

This study investigated the level of user satisfaction with the "Sahel" application in the State of Kuwait, utilizing a structured questionnaire comprising 27 items administered electronically to a sample of 1,064 users over a four-week period. The results indicate that overall user satisfaction with the application is moderate. This moderate level may be attributed to key features such as ease of use, accessibility of information, user-friendliness across age groups, and the application's availability at all times. Among the evaluated dimensions, efficiency received a high rating, attributed to features including a responsive interface, user-friendly design, and a fast search engine. Conversely, the trust dimension recorded a low score, underscoring the necessity for frequent updates and enhanced security to mitigate risks such as hacking. The reliability dimension was rated moderate, largely due to efficient information provision but hindered by inadequate synchronization among governmental agencies. The application is, however, compatible with multiple device platforms, contributing to its wide user base.

Citizen support was also rated moderate; while users acknowledged the credibility of information and its usefulness, there was a notable deficiency in responsive technical support. Comfort was highly rated due to the intuitive interface and flexible accessibility. The application also promotes transparency and technological progress, yet it fails to reduce transaction costs, suggesting a need for cost optimization strategies. Demographic analysis revealed that users with secondary-level education reported higher satisfaction across most dimensions compared to those with postgraduate education, possibly due to differing expectations. Frequent usage of the application was positively correlated with increased user familiarity and satisfaction.

This research presents several novel contributions. It stands as one of the first empirical investigations into user satisfaction with Kuwait's "Sahel" application, thereby addressing a notable gap in the regional e-government literature. The study adapts and validates the e-GovQual model within the Kuwaiti socio-institutional context, demonstrating its applicability across different cultural and administrative settings. Furthermore, it identifies trust as a major weakness, while highlighting comfort and transparency as key strengths, thus providing actionable insights for policymakers and system developers. Additionally, the study offers valuable understanding on how demographic factors, such as education level, influence user satisfaction, contributing to the broader discourse on digital inclusivity and user diversity in public digital services. This study adds to current knowledge by extending the validated e-GovQual framework to a new cultural and institutional context (Kuwait), enriching the cross-national understanding of how different service quality dimensions affect user satisfaction. It highlights critical findings about Trust and data security, which are less emphasized in prior research but emerge here as decisive factors. The demographic findings contribute to the growing literature on digital divides and differential user expectations in e-government services. Finally, it offers practical recommendations that can guide both policy-makers and system designers.

Some limitations were noted in this study. For example, statistically significant differences were observed between individuals with a secondary education level or below and those with postgraduate studies regarding the dimensions of efficiency and reliability, favoring the former group. Additionally, differences

were identified in the overall degree of satisfaction and the dimensions of efficiency, trust, and citizen support, with postgraduate participants showing higher satisfaction levels.

This may be attributed to individuals with secondary education or below experiencing a higher level of satisfaction with the specified dimensions compared to those with postgraduate education. However, this assumption was not verified in this study, highlighting the need for further focused research. Notably, individuals with secondary education or below displayed positive attitudes toward the "Sahel" application due to its ease of use, attractive interface, and the ability to access information anytime and anywhere. These features, along with other functionalities, contribute to the application's appeal for this group.

The findings of this study carry important implications for future research and practice. Future investigations should explore the causal relationships between specific service quality dimensions and overall user satisfaction to deepen understanding of their interdependencies. In addition, expert-driven technical evaluations, particularly in the areas of Trust and Reliability, should complement user-based assessments to ensure more comprehensive and accurate analyses. The insights derived from this research can also inform broader digital transformation strategies within the Gulf Cooperation Council (GCC) region, contributing to efforts aimed at enhancing global e-government rankings. Moreover, longitudinal studies are recommended to examine how continuous improvements in data security, system integration, and technical support influence user satisfaction over time, thereby guiding the sustainable evolution of digital public services.

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AUTHOR CONTRIBUTIONS STATEMENT

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C : **C**onceptualization
M : **M**ethodology
So : **So**ftware
Va : **Va**lidation
Fo : **Fo**rmal analysis
I : **I**nvestigation
R : **R**esources
D : **D**ata Curation
O : Writing - **O**riginal Draft
E : Writing - Review & **E**diting
Vi : **Vi**sualization
Su : **Su**pervision
P : **P**roject administration
Fu : **Fu**nding acquisition

CONFLICT OF INTEREST STATEMENT

Authors state no conflict of interest.

DATA AVAILABILITY

Derived data supporting the findings of this study are available from the corresponding author AB on request.

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