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A Quality-Focused Evaluation Framework of Customer Satisfaction for Mobile Services Application: A Case Study from Jordan

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Abstract

This study introduces a novel evaluation framework designed to assess customer satisfaction with the Jordanian SANAD mobile government application, bridging critical gaps in existing research. The framework is grounded in three key quality aspects derived from the literature and validated by domain experts: performance quality, content quality, and design quality. Each aspect includes specific factors for evaluating customer satisfaction with the SANAD application. The performance quality aspect assesses reliability, ease of use, navigation, and gestural design, while content quality focuses on the accuracy of goal descriptions, information quality, quantity, and credibility. Design quality, the third aspect, considers layout, graphics, visual appeal, and customization options. Through a comprehensive survey of 163 respondents, this framework's effectiveness is quantitatively demonstrated by examining the relationship between these aspects and customer satisfaction metrics. This research is particularly valuable for government agencies and application developers, offering a structured, user-centric approach to improve mobile government applications. By optimizing customer satisfaction, this framework aims to drive the adoption and effectiveness of mobile government services in Jordan, with potential applicability to similar global initiatives. This study contributes a scalable, practical model for evaluating and enhancing mobile government applications, making it a valuable resource for future advancements in mobile e-governance.

Keywords: *Content Quality, Design Quality, Performance, SANAD M-Government Application, Mobile Application.*

1 Introduction

The Jordanian government has developed the SANAD mobile application to provide a range of digital services to citizens and residents of Jordan [1]. According to recent SANAD statistics, there have been over 5 million hits and over 3,250,000 downloads. [1]. It is popular among urban populations, especially in Amman, Irbid, and Zarqa [1]. The app

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aims to improve accessibility to government services and reduce the need for physical visits to government offices. SANAD provides a wide range of services such as accessing and paying bills for utilities, applying for government services such as passports and driving licenses, renewing vehicle registration, paying traffic fines, and accessing health and education services. The app also allows users to track the status of their applications and receive notifications when they are ready for collection. A news section with the updated information on government services and events, a currency converter, and a weather forecast are just a few of the useful features that SANAD offers in addition to enabling access to government services. Users must download the SANAD app and register using their national ID number. The software can be downloaded for free from Google Play and App Store and is available in Arabic and English. According to statistics, the majority of users are between the ages of 25 and 45 because of their work and business needs [1]. Digital literacy is an obstacle for adults over 50, which has led to a reduced rate of adoption and broad use [1]. Men are more likely than women to use SANAD. Overall, SANAD is a practical method to access government services in Jordan, and its availability in both Arabic and English makes it accessible to a wider range of users through Information Communication Technology (ICT). The delivery of services through m-government is time and cost-effective, enabling users to access the services from anywhere as long as they have a mobile device with an internet connection. Therefore, this type of electronic services will be beneficial to all SANAD users in Jordan, including Jordanian citizens, visitors, investors, and government officials. The government's overhead costs are also reduced when m-government is used. In other words, the government also will benefit from SANAD application.

2 Related Work

2.1 E-Government

E-government delivers government services via the internet and electronic devices to increase efficiency and citizen involvement. It offers faster delivery of services at lower cost through mobile technology. The development of the internet has an impact on social and political advancements through electronic portals [2]. However, implementing e-government comes with risks, particularly in developing nations. A crucial component of the success of e-government is the utilization of ICT and the acceptance or satisfaction of citizens [3]. Government activities require simple access to data sources and suitable software structures [4], [5]. Data source integration and standardization are crucial. Training, communication campaigns, and change management plans can rectify issues faced in the public sector. The government must be responsive to citizens' needs and improve access to official documents [6]. Response can happen after analyzing measures of citizen satisfaction. This could highly lead to efficient e-government that can provide users with more convenient and cost-effective service delivery channels, empowering society and improving resource utilization.

2.1 SANAD Application

The increased use of mobile phones necessitates improved accessibility, quicker delivery, and higher-quality services [7]. Due of research interest in both the real and virtual worlds, mobile services can meet user demands at any time and from any location [7]. The Jordanian government is evaluating all available systems, although there are difficulties because of the country's ongoing change in economics. The success of a service is determined by customer satisfaction and SANAD is playing a critical role in the digital transformation of the Jordanian government, that makes it an essential candidate for customer satisfaction evaluation [1] [8],[9]. A structured evaluation of SANAD can improve public participation and offer suggestions to decision-makers. The Department of Lands and Survey in Jordan is also accessible through the SANAD app, which is the only app for consumers to access government services. The SANAD app authenticates users for safe access to digital services, such as complaints and real estate sales. By 2022, more than 400 government services will be available via the app, and non-Jordanians can register as guests and activate their digital identities [7].

2.3 Acceptance Testing

Acceptance testing plays a crucial role in ensuring customer satisfaction in the use of e-government applications like SANAD. It acts as a feedback channel for Jordanian citizens, as the customers of the app, and helps to refine SANAD, making it more user-centric for higher customer satisfaction. For example, acceptance testing helps identify performance bottlenecks and poor quality of design or content. Accordingly, this alerts the assigned designers and developers in SANAD to improve the current version with respect to the given feedback through the acceptance testing.

Different types of acceptance testing exist, such as Alpha Testing, Beta Testing, Field Testing, Business Acceptance Testing (BAT), User Acceptance Testing (UAT), Contract Acceptance Testing (CAT), Regulations Acceptance/Compliance Test (RAT), and Operational Acceptance Testing (OAT) [10], [11], [12]. The testing phase is a crucial stage in the software engineering life cycle because it allows engineers to interact with end users, get useful feedback from them, and understand the system from every perspective. Acceptance testing is the process of conducting a number of tests on a system or product to make sure it functions as intended and meets user expectations. TAM, which is a very common acceptance model and has been employed in many studies. However, TAM does not offer sufficient information on user behavior acceptability, as reported by Aloudat, Michael, Chen, and Al-Debei in [13]. Many researchers have examined, tested, and analyzed TAM, and several studies have used it to evaluate the public sector. Information quality was identified as the primary factor of information system performance by the Information System (IS) performance Factor model [13]. The IS Success Factor Model supports ERP [14], which defines and measures software development through a number of factors. Library research also used the model to determine the relationship between service quality and other factors, and the findings showed how important the service is.

3 Proposed Model and Hypothesis

Based on the Information Systems (IS) Success Model and expanded to fill in research gaps in m-government [15], the study presents a novel framework (Fig. 1, "Proposed

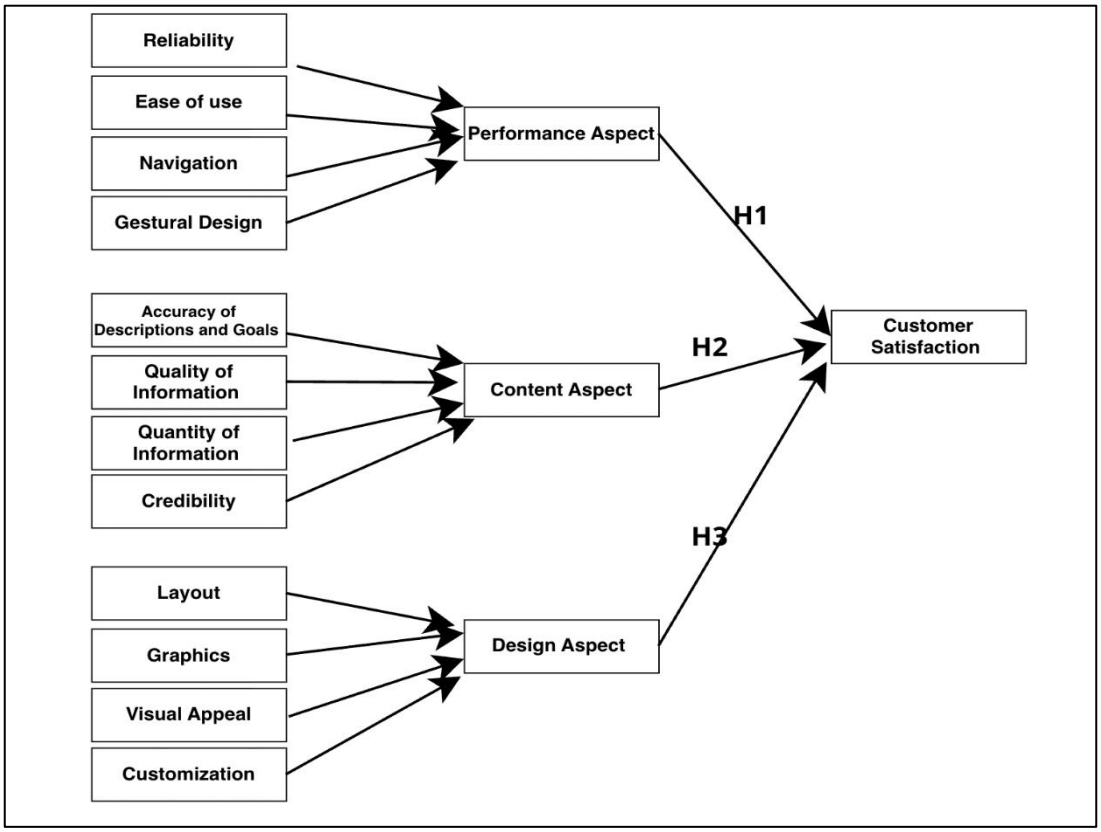

Fig. 1 The Proposed Quality-focused Framework for Evaluating Customer Satisfaction

Model and Hypotheses") to assess customer satisfaction with the SANAD m-government application. Three main quality aspects—performance, content, and design—are proposed by the model as aspects that influence consumer satisfaction. Each aspect is operationalized by means of certain factors. Performance quality aspect covers reliability, ease of use, navigation, and gestural design; content quality aspect assesses accuracy, information quality, quantity, and credibility; and design quality aspect evaluates layout, graphics, visual appeal, and customization. The hypotheses (*H1–H3*) are visually represented in Fig.1 through labeled arrows connecting these constructs to customer satisfaction. For instance, *H1* (Performance → Satisfaction) is depicted by an arrow from "Performance Aspect" to "Customer Satisfaction," reflecting the hypothesis that technical reliability and intuitive navigation enhance customer satisfaction, as reported by previous studies on system quality [16]. *H2* (Content → Satisfaction) tests the assumption that accurate and credible information drives engagement, as per previous research [15], while *H3* (Design → Satisfaction) evaluates the impact of UI elements like layout and customization, aligning with UI design principles [17]. The model was developed using a rigorous four-step process that conformed with the research standards for software engineering[18]:

1. *Literature Synthesis*: A review of 25 studies on m-government and software quality (e.g., ISO/IEC 25010, 2011 [19]; [13]) identified recurring constructs. The IS Success Model [15] provided the foundational framework, while gaps in addressing design quality for m-government apps were addressed by integrating UI/UX principles.
2. *Expert Validation*: Three domain experts (software engineering, e-governance) assessed the relevance of aspects and factors. Adjustments included consolidating "gestural design" within performance quality to reflect SANAD’s touch-centric interface.

3. *Pilot Testing*: A preliminary survey (n = 30) refined measurement items. For example, "navigation" was rephrased from "ease of menu access" to improve clarity.
4. *Statistical Validation*: Exploratory Factor Analysis (EFA) confirmed strong factor loadings (> 0.7) for all aspects, ensuring dimensionality aligned with the theoretical expectations [20].

In Fig. 1, reliability, ease of use, navigation, and gestural design are factors that measure the performance aspect. Factors that measure the quality of content aspect are accuracy of description and goals, quality of information, quantity of information, and credibility. The quality of the design aspect is identified through the factors of layout, graphics, visual appeal, and customization. These overall contribute to measuring the customer satisfaction of the m-government app.

1. Performance in the context of this study, the measure of how well mobile-based applications deliver accessible, reliable, and user-friendly e-government services, while meeting technical standards and satisfying customer's needs. In this study, performance is the first aspect for predicting the quality of the application. Accordingly, four factors were used in this study to examine SANAD mobile application's performance quality namely: reliability, ease of use, navigation, and gestural design.

2. Content quality aspect refers to the information quality that affects mobile application quality, where the application should present high-quality information to the user. This can be informed in its feedback feature, references, measures, and so forth. The information must originate from a reliable source, and all documents must be comprehensive and accurately describe the software's layout and intended use. Therefore, the current study used four factors to assess the content quality of the SANAD mobile application: accuracy of descriptions and goals, quality of information, the quantity of information, and credibility.

3. Design quality aspect refers to the extent to which a mobile government service's structure, interface, and interaction design ensure usability, accessibility, consistency, and conformance to users' requirements and expectations. The user interface design should consider the locality principle. For instance, on the screen, linked operations should be placed logically near one another. Also, the layout should be designed to improve performance. For example, in Microsoft Office the most frequently used menu options are displayed by default. As a result, users are freed from having to browse an excessive number of unnecessary menu items. The performance of apps may also be impacted by implementation design. Multi-threaded applications generally show better interactive performance with the comparison to single-threaded applications, even though the former is usually challenging in implementation [21]. The study proposes a model based on a review of previous studies on IS, user interface design principles, and good practices in the development and evaluation of mobile applications. Accordingly, three hypotheses are proposed as below.

H1: Perception of high performance of the mobile application will increase customer satisfaction [22] [23] [24],

H2: Perception of high-quality content of the mobile application will increase customer satisfaction [23] and

H3: Perception of high-quality user interface design of mobile applications will increase customer satisfaction [23], [25].

The proposed framework is novel as it combines needed real-world practicality with a special attention on mobile government apps, that are customized for Jordan's particular requirements. In contrast to traditional models that generalize usability or ignore mobile-specific features, it focuses on three pillars—performance (i.e., smooth navigation and touch gestures), trustworthy content that can be translated into accurate and credible information, and intuitive design that is shown in the customizable layouts and in simplicity. Jordan's SANAD app targets local concerns like reducing the digital divide for older citizens or determining why men use the app more frequently than women by using user feedback input. What makes it truly novel is its built-in "learn-as-you-go" approach. Acceptance testing enables developers to make improvements to the software based on actual customer feedback and preferences, transforming theoretical concepts into functioning solutions. This is not only a list; rather, it is a roadmap for governments to develop applications that the public trusts and utilizes, blending cultural understanding, mobile abilities, and citizen inputs into a single adaptable tool.

4 Research Methodology

4.1 Research Design

This study employed a descriptive-analytical approach [26], integrating descriptive and inferential methodologies to systematically evaluate the relationships between SANAD's quality aspects (performance, content, design) and customer satisfaction. The descriptive component characterized user demographics and perceptions of SANAD's quality through quantitative summaries, while the analytical component tested hypotheses via statistical modeling to infer causal relationships [27]. The framework aligns with Babbie's (2020) principles of social research, emphasizing systematic observation and hypothesis validation [26]. Variables were identified through a descriptive method, involving a synthesis of 25 prior studies on m-government quality and validated by three domain experts to ensure alignment with SANAD's operational context [15], [16]. This process, as outlined by Creswell [27], ensures exploratory rigor in variable selection without experimental manipulation.

4.2 Survey Design and Validation

The survey instrument was designed following established guidelines for software engineering research [28]. A structured questionnaire operationalized three key constructs—performance, content, and design quality—using 5 Likert-scale items (1 = *Strongly Disagree*, 5 = *Strongly Agree*). Items were derived from the *IS Success Model* [15] and *ISO/IEC 25010 standards* [19], with adaptations to reflect SANAD's functionalities (e.g., "SANAD operates without crashes" for reliability). To ensure validity, the questionnaire underwent expert review (three scholars in e-governance) and pilot testing ($n = 30$), yielding Cronbach's α values exceeding 0.85 for all constructs [29]. Ambiguous terms, such as "gestural design," were rephrased based on pilot feedback to enhance clarity.

4.3 Data Collection and Analysis

Three hundred SANAD users in Jordan's major cities (Amman, Irbid, and Zarqa) were selected at random using a stratified sampling technique; they accounted for 85% of the app's user base [1]. The final sample included 163 valid responses (54.3%), meeting the

threshold for exploratory factor analysis (KMO = 0.89) [30]. Demographic analysis revealed a majority of male respondents (71.25%) and public-sector employees (39.3%), reflecting SANAD's adoption trends [31]. Non-parametric statistical methods were applied after the *Kolmogorov-Smirnov test* confirmed non-normal data distribution ($p < 0.05$ for all variables; [32], [33]. *Exploratory Factor Analysis (EFA)* with Varimax rotation validated factor loadings (> 0.7), confirming construct dimensionality [20]. *Path analysis* (AMOS v.26) tested hypotheses derived from literature:

- *H1* (Performance → Satisfaction): Strongly supported ($\beta = 0.709$, $CR = 11.686$, $p < 0.001$), aligning with DeLone and McLean's (2003) findings on system quality [15].
- *H2* (Content → Satisfaction): Not significant ($\beta = 0.03$, $p = 0.638$), contrasting prior studies, potentially due to SANAD's standardized service content [16].
- *H3* (Design → Satisfaction): Partially supported ($\beta = 0.199$, $p = 0.005$), with layout ($CR = 2.347$) and customization ($CR = 4.757$) as key drivers, consistent with Haglund and Mood's work on UI design [17].

4.4 Validity Threats and Limitations

Although the study offers valuable information, there are a few limitations to consider. *Internal validity* was challenged by sample bias, including overrepresentation of males (71.25%) and public-sector employees (39.3%). Future studies should employ gender-stratified sampling to mitigate this [34]. *External validity* is limited to urban Jordanian users; rural populations and cross-cultural contexts were excluded. *Factors validity* was strengthened through EFA and expert reviews, but this could be further enhanced by integrating security and privacy factors, which were omitted due to scope constraints [35]. Future research must use longitudinal methods since the cross-sectional design also makes it impossible to draw conclusions about causality.

This structured approach ensured methodological rigor, enabling the translation of qualitative user feedback (e.g., complaints about visual clutter) into quantifiable metrics for iterative SANAD improvements.

4.5 Research Community and Sample

The research population included every member of Jordanian society included in the Jordan 2021 Statistical Yearbook published by the Department of Statistics. To increase sample representativeness, the study samples were selected at random from inside Jordan. To collect the study data, a questionnaire survey was employed, and 300 respondents were chosen to participate. With 163 valid returned responses, there was still enough data for analysis using the findings of the KMO and Bartlett's test of sphericity.

4.6 Characteristics of the Sample

The respondents' demographic information, including their gender, age, level of education, Internet usage frequency, use of m-Government applications, and participation with e-government services, was gathered through the questionnaire. Table 1 shows the results of the analysis of the data's descriptive statistics.

Table 1 shows the study's demographic profile—age (54% aged 31–50), gender (71.25% male), education (49.7% bachelor's degree), and employment (39.3% public sector)—contextualizes findings and highlights generalizability limits. Middle-aged dominance aligns with global m-government trends, where efficiency and reliability are prioritized [16]. Male overrepresentation reflects Jordan's gender disparities in tech access [34] and urging gender-inclusive design. High levels of education indicate biases in digital literacy.

This may overlook the difficulties experienced by less educated users [35]. Institutional needs may take precedence over broader customer interests due to public-sector raises [31]. These biases highlight the necessity of inclusive policies and targeted sampling to improve SANAD's accessibility for different kinds of populations.

4.7 Normality Test and Factor Loading

The statistical metrics presented in Table 2 are initial to validate the study's constructs and analytical approach. Factor loading, a standardized coefficient ranging from 0 to 1, quantifies the strength of the relationship between observed variables (e.g., "Reliability") and their underlying constructs (e.g., "Performance Quality"). Values exceeding 0.7 indicate robust correlations, demonstrating that the measured variables effectively represent their respective constructs [20]. For instance, the factor loading of 0.863 for "Reliability" confirms its significant contribution to the "Performance Quality" construct. The Kolmogorov-Smirnov (K-S) test statistic (D), a non-parametric measure, evaluates the maximum divergence between the observed data distribution and a theoretical normal distribution. Larger values (e.g., D = 0.367 for "Reliability") signify greater deviation from normality, justifying the use of non-parametric statistical methods [32]. The associated p-value reflects the probability of observing such a deviation under the assumption of normality. A p-value < 0.05 (e.g., 0.000 in Table 3) rejects the null hypothesis of normality, validating the application of non-parametric analyses [33]. These metrics collectively ensure methodological rigor: strong factor loadings (> 0.7) confirm construct validity, while significant K-S results ($p < 0.05$) justify the analytical framework. By grounding these terms in established statistical literature, the study aligns with best practices in quantitative research, enhancing the reliability and interpretability of its findings.

The study's results did not follow a normal distribution. The One Sample Kolmogorov Smirnov test was conducted to determine which statistical tests would be most appropriate. Given that the P-value for the Kolmogorov test statistic was below the significance level of 0.05, it was evident from the One-Sample Kolmogorov-Smirnov test findings displayed in Table 2 that the data were not normally distributed. Non-parametric tests were therefore more appropriate for testing hypotheses.

Table 1. Respondents' Characteristics Information (n = 163)

Respondent characteristic		**Frequency**	**%**	**Respondent characteristic**		**Frequency**	**%**
Age	18 – 30 Years	63	38.7	**Gender**	Male	116	71.2
	31 – 50 Years	88	54.0		Female	47	28.8
	51 – 70 Years	12	7.4				
Job	Public sector	64	39.3	**Education**	High school	36	22.1
	Private sector	32	19.6		Bachelor	81	49.7
	Not employee	40	24.5		Post graduate	31	19.0
	Business owner	27	16.6		Other	15	9.2
	Total	163	100		Total	163	100

Table 2. Normality Test and Factor Loading

Coding	*Questionnaire Axes*	*Factor loading*	*Test Statistic*	*P-value*
P0	**Performance**		0.210	0.000
P1	Reliability	0.863	0.367	0.000
P2	Ease of use	0.793	0.275	0.000
P3	Navigation	0.773	0.339	0.000
P4	Gestural design	0.782	0.258	0.000
C0	**Content quality**		0.157	0.000
C1	Accuracy of descriptions and goals	0.715	0.220	0.000
C2	Quality of information	0.842	0.364	0.000
C3	Quantity of information	0.885	0.410	0.000
C4	Credibility	0.802	0.415	0.000
D0	**Design quality**		0.203	0.000
D1	Layout	0.708	0.378	0.000
D2	Graphics	0.812	0.241	0.000
D3	Visual appeal	0.745	0.340	0.000
D4	Customization	0.748	0.351	0.000
SAT	**General satisfaction**		0.376	0.000

The factor loadings and normality test results for the SANAD m-government application's quality aspects reveal critical insights into their statistical validity and relevance, as in Table 2. Performance quality demonstrated strong individual factor loadings (> 0.7), with reliability (0.863), ease of use (0.793), navigation (0.773), and gestural design (0.782) significantly contributing to the aspect, though the overall performance construct (P0) showed a lower loading (0.210). Similarly, content quality factors—accuracy (0.715), information quality (0.842), quantity (0.885), and credibility (0.802)—exhibited robust loadings, whereas the content aspect (C0: 0.157) suggested potential refinement needs in measurement. Design quality factors, including layout (0.708), graphics (0.812), visual appeal (0.745), and customization (0.748), aligned well with the aspect, though the aggregate measure (D0: 0.203) indicated similar refinement opportunities. All variables rejected normality ($p < 0.001$ via Kolmogorov-Smirnov tests), justifying non-parametric analyses [32], [33]. General satisfaction (SAT: 0.376) reflected moderate influence from the studied aspects, implying that additional latent factors may shape user perceptions. These results, which are based on the principles of multivariate analysis [20], highlight the significance of giving high-loading elements (such as information quality and reliability)

priority for SANAD's improvement while also considering content construct measures to enhance validity.

4.8 Aspects of Validity and Reliability

The Kaiser-Meyer-Oilskin (KMO) Index and Bartlett's Test of Sphericity were performed to determine the reliability of the variables. The results showed that the technical aspect, general content, and specialized content scored 0.89, 0.794, and 0.924, respectively. KMO was 0.500, with $P < 0.05$ for all variables, denoting the adequacy of sample size for EFA evaluation. Then, EFA was carried out to check how the primary study variables were loading. Cronbach's alpha was computed to measure the internal consistency of the variables, survey, or experiment, and a higher Cronbach's alpha value means that the results are reliable. This study followed George and Mallery's 2003 recommendations for trustworthiness ratings as follows [36]: 0.9 denotes Excellent, 0.8 denotes Good, 0.7 denotes Acceptable, 0.6 denotes Questionable, 0.5 denotes Poor, and 0.5 denotes Unacceptable. As shown in Table 3, Cronbach's Alpha values for all variables were higher than 0.8. Hence, all independent variables were assured in terms of reliability. The correlation matrix highlights the relationship significance among research variables. As shown in Table 3, performance, content, interface design, and customer satisfaction all have correlation coefficients of 0.789, 0.536, and 0.643, respectively. The result showed that at 1% significance level, the relationship between variables was significant. Performance quality and SANAD application showed a significant relationship at 0.595 and 0.700, respectively

5 Results Analysis

The hypothesis and research model (refer to Fig. 1) were derived from the existing literature. This study mainly predicted that user satisfaction would be significantly impacted by the SANAD application's performance, content, and design quality. From path analysis results, this study found the high impact of the performance quality aspect and design quality aspect on customer satisfaction, with the obtained value of CR of 11.686 and 2.79, respectively, and $P < 0.05$. For the content quality aspect, it did not affect customer satisfaction significantly, with CR values of 0.47 and $P > 0.05$. The path analysis for the model hypotheses is detailed in Fig. 2 and Table 3. Results on the indirect effect test of layout, graphic design, visual appeal, and customization (as factors representing design quality) on customer satisfaction showed the following: layout, graphic design, and customization had a positive impact on customer satisfaction with CR of correspondingly 2.347, 4.525, and 4.757, and $P < 0.01$. On the other hand, the visual design had a negative impact on customer satisfaction (CR of -1.123 with $P < 0.01$). Visual design should include app characteristics like colors and placement of action buttons and icons (among others), which both affect the general outlook of the web or mobile app. In addition, the application should provide immediate feedback to the user during user-app interaction, because it is important for the user to receive affirmation of the action that the user has just executed. The user should also be updated on the recent status of background actions. For instance, immediately after the user completes the tax payment transaction, the m-Government app should notify them that the payment was successful. Lastly, the design should have features that constrain performing errors and undo an action, to ensure safe use. This study recommends improvements to Jordanian government services through m-Government,

Table 3. Hypothesis Test Results

Construct	Hypothesis	Estimate	S.E.	C.R.	P-Value	Decision
Performance	H1: Perception of high performance of mobile application will increase customer satisfaction.	0.709	0.061	11.686	0.000	Accepted
Content quality	H2: Perception of high-quality content of mobile application will increase customer satisfaction.	0.03	0.065	0.47	0.638	Rejected
Design quality	H3: Perception of high-quality user interface design of mobile application will increase user performance.	0.199	0.071	2.79	0.005	Accepted

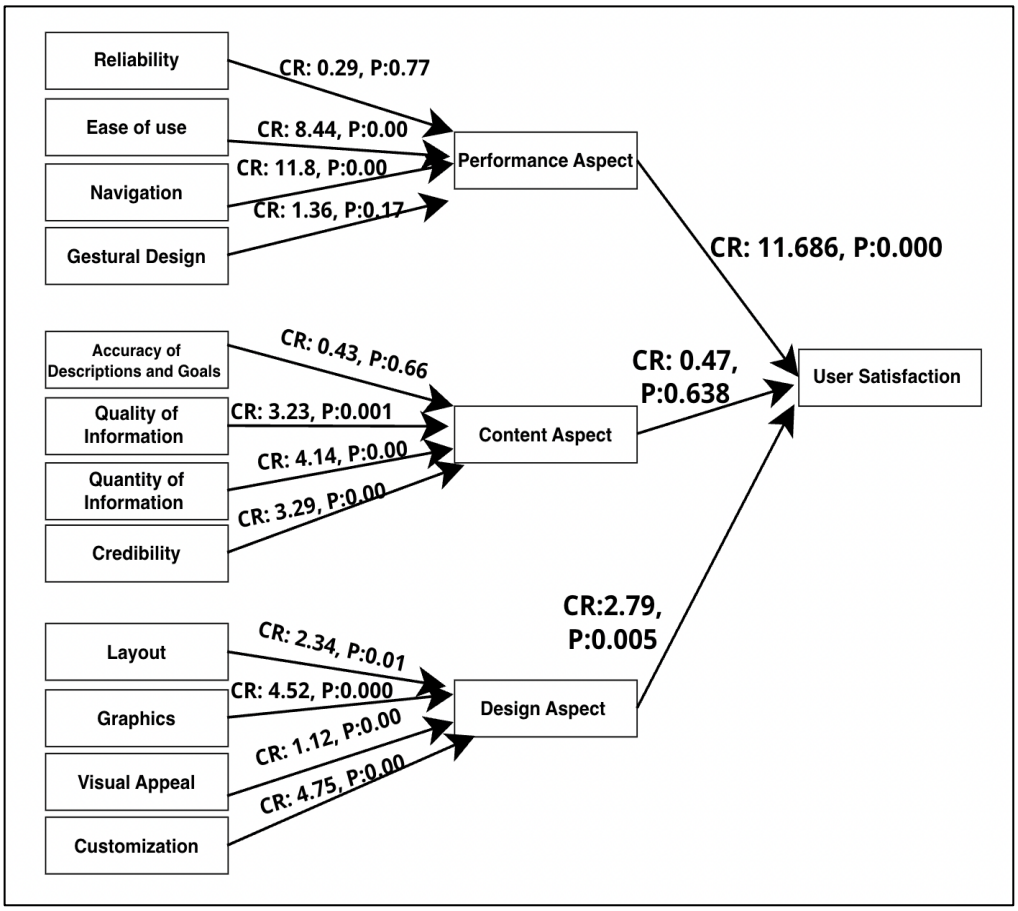

Fig 2. Hypothesis Test Results

including solutions to common issues. Findings can be used to develop quality applications and increase customer satisfaction, trust, and loyalty. Recommendations include customized content, simple visual design, user feedback, and guaranteed data protection.

6 Theoretical and Practical Implications

This study proposed a research model that involves variables drawn from multiple IS perspectives, UI design principles, and good practices for developing and evaluating mobile applications. The model could facilitate the prediction of performance, content, and user interface design of a mobile application.

To increase efficiency and reduce costs and bureaucracy, the Jordanian government is transitioning to digitalized service delivery. Through training and development initiatives, the Ministry of Digital Economy and Entrepreneurship can help the government in raising consumer satisfaction. Furthermore, consumer feedback is crucial to the development of m-Government as it assists the government to determine the most appropriate m-Government design to meet the demands of its consumers. Incorporating content that is tailored to the demands of the consumer can enhance services, which will raise the quality of those services as well. Customer satisfaction is the primary objective for any m-Government as it influences the frequency at which mobile applications are used. In this regard, the Jordanian government must keep the SANAD application up to date with the latest technology advancements. The government should also actively investigate new ways to increase user satisfaction and retention with the SANAD application, to ultimately benefit the country's economy.

The work in this research contributes to the benefit of the Jordanian government, technical professionals, and citizens as below.

1. For the Jordanian Government

    - Enhancing Service Delivery: To improve the SANAD application quality, service level, and efficiency, the framework highlights the need to focus on performance quality and design. Better responsiveness to the demands of citizens and more effective public service delivery may result from this.
    - Enabling Data-Driven Decision: By providing structured metrics for evaluating customer satisfaction, the framework enables the Jordanian government to make informed decisions about resource allocation, policy adjustments, and future developments of m-government initiatives.
    - Increasing Citizen Engagement: Putting customer satisfaction as the highest priority for SANAD's quality aspects will improve public service trust and citizen participation, strengthening relationships between the public and government.
2. For Technical Professionals
    - Benchmarking and Improvement: Results of the study can be used by IT specialists at the Ministry of Digital Economy and Entrepreneurship to redefine approaches to addressing customer-related problems and create additional quality elements or components intended to increase customer satisfaction.
    - Project Management: The framework facilitates risk and quality management by acting as a roadmap to identify related concerns for each aspect. It acts as an inspection process for every factor and aspect by enabling the prioritization of risks associated with each aspect and initiating respective contingency plans.

- Development Recommendations: To improve engagement with users, developers should take into account the framework's recommendations, which include optimizing visual design, providing UI customization, encouraging feedback, and offering prompt responses. These characteristics are essential for increasing service utilization.

3. For Citizens
   - Feedback Support: The framework emphasizes measuring customer satisfaction through feedback, allowing iterative improvements to the application over time. Feedback enables citizens to express their opinions, suggestions, and complaints, enhancing the usability and functionality of the application.
   - Data-Driven Improvement: Structured feedback helps customize the user experience, addressing pain points and improving overall satisfaction. When users feel that their input matters, they are more likely to actively participate in using and promoting the m-government application.

The Ministry of Digital Economy and Entrepreneurship can improve SANAD's quality and effectiveness by focusing on performance quality and design aspects, leading to more efficient public service delivery and better responsiveness to citizens' needs. Structured metrics for evaluating customer satisfaction enable informed decisions on resource allocation, policy adjustments, and future m-government initiatives. The results of the study may be used by IT professionals in future research to reframe customer-related strategies and create additional quality constructs that are intended to achieve customer satisfaction using objectives and use cases. Additionally, the SANAD m-gov app can benefit from the integration of business process models to demonstrate navigation and connection of all quality elements to the strategic goals, use cases, and corresponding quality requirements [37], [38], and [39]. The framework helps to identify and prioritize use cases and risks related to each factor [40], facilitating risk and quality management processes.

Although this research presents a novel framework for evaluating the SANAD m-government application, it acknowledges several limitations. Building customer trust is crucial for driving loyalty and satisfaction [41]. Ensuring security and privacy protection is essential for increasing adoption rates and customer satisfaction [42]. A significant limitation is the small sample size, affecting generalizability and statistical power. Future studies should use larger, more representative samples, focusing on Jordanian public organizations, to increase reliability and validity. Additionally, future research should incorporate expert review methods to investigate security and privacy factors more accurately.

This study highlighted the importance of a structured evaluation framework for m-government applications like SANAD. By focusing on performance quality, content quality, and design quality, the framework provides a comprehensive approach to improving customer satisfaction. The knowledge gathered from this study can help the Jordanian government, technological experts, and citizens improve the efficiency and usability of m-government services. Continuous assessment and input will be necessary as the SANAD application develops to ensure that it remains relevant and useful in addressing the needs of Jordanians.

6.1. Limitations and Future Research

There are many limitations to this study. The first is that the study sample was small, which means that the results might not accurately reflect the views of the Jordanian population in general. Therefore, the results cannot be applied to Jordan's whole sectors or regions.

Additionally, data analysis showed that 39.3% of the study respondents were government servants, 19.6% were private sector employees, 16.6% were business owners, while 24.5% were unemployed. Notably, the use of larger populations allows researchers to identify differences, while the use of smaller sample sizes can lead to false positives and false negatives [43]. The researchers noted that people may not truthfully answer the questions, and so, the security and privacy factors were not examined as meticulously, and the model proposed was just a preliminary model. This study, therefore, recommends using expert review methods in investigating the factors of security and privacy. The use of a larger and more representative sample size is also recommended for future studies, focusing especially on Jordanian public organizations, to make the findings more reliable and valid.

7. **Conclusion**

Globalization has resulted in a dynamic business environment while bringing challenges to both the public and private sectors of the economy. Customer-focused services are now necessary because of this evolution. The government must raise the standard of its services by being equitable and transparent, and becoming digital to increase customer satisfaction and remain in the face of global competition. The content quality is not indicative of any further modifications to mobile government services. The government must, however, continuously raise the standard of its content. By enhancing the quality of its app, the government can continuously satisfy users, which will assist in achieving its long-term sustainability. It is thus important that the government implement practices and policies that will enhance the factors affecting the quality aspects of its digital services, to increase the willingness and interest of citizens towards mobile application use, and to increase and maintain the satisfaction of citizens.

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