

Impact of E-government on Institutional Performance: Fostering Sustainable Higher Educational Practices.

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ABSTRACT:

This study explores the role of e-government services in enhancing institutional performance, with a specific focus on Northern Border University (NBU). E-government initiatives have transformed public sector operations globally by improving accessibility, transparency, and efficiency. This study employs the E-GOVQUAL model, a widely recognized framework for evaluating the quality of e-government services, and assesses key dimensions such as interactivity, information quality, ease of use, support quality, functionality, privacy, and aesthetics. Through a structured questionnaire targeting NBU employees and faculty members, the study examines how the quality of e-government services impacts institutional performance. Ten questions on institutional performance and 21 questions based on the E-GOVQUAL model are formulated. The data were organized and analyzed by using Smart PLS software. The findings reveal that all dimensions of e-government services have a statistically strong positive effect on institutional performance, with strongest factors being information quality, interactivity, and web functionality. The study underscores the importance of optimizing e-government services to improve institutional efficiency, reduce transaction times, and increase user satisfaction. By providing insights into the impact of e-government on institutional outcomes, stakeholders understand the ongoing efforts to enhance public sector performance through effective digital transformation.

Keywords: E-government, GOVQUAL, Northern Border University, public service, institutional performance

1. Introduction

Current environmental

E-government is a global phenomenon which attracts the attention of practitioners, scholars, and citizens on a global scale. It enhances the infrastructure of information systems (IS) and information technology (IT) to provide public service and administrative services to public (Carter et al., 2022). Several studies have examined the idea and implementation of e-government in various countries worldwide. Many other studies investigated the impact of e-government on institutional and organizational

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performance. However, there have been very few studies conducted on the impact of e-government on institutional performance in Saudi Arabia according to the best of the authors' knowledge. Globally governments use technological capabilities to produce huge quantity of data to comprehend complicated social and economic issues, meeting citizens' needs more effectively, and enhancing the relationships between organizations and citizens as well as private sector enterprises. It further improves decision-making by allowing governments to make better choices using accurate data. (Alajmi, et al., 2020). Saudi Arabia's government has issued several polices and laws to empower e-government application in different institutions across the Kingdom of Saudi Arabia and these legislative efforts can be seen from the Saudi Legislation for e-government through royal decrees. The key legislations are the Royal Order Decree No. (7/ B/2427), that authorized the Ministry of Finance to continue in the establishment of e-government program in Saudi Arabia. The other legislation is the Royal Decree No. (7/ B /33181) that offered the Ministry of Information Technology the authority to implement e-government policies in Saudi Arabia (Yamin and Mattar, 2016). The study of Hassan (2024) revealed that most of the Saudi public institutions mainly ministries possess electronic websites, but 41% of these ministries do not implement perfectly all features of e-government. In addition, there are some challenges confronting the application of e-government services in Saudi Arabia according to the citizens and government perspectives. Also, there are extra challenges of weak IT infrastructure, poor public knowledge about e-government, the information security and privacy systems are under development and scarcity in the number of qualified IT and government service experts. Additionally, there are some factors that directly affect the success or failure of e-government in Saudi Arabia, these factors include resistance to e-government change, and the main cause of such resistance is the fear of employees to lose jobs. Culture is another challenge faces e-government development in developing countries including Saudi Arabia. Globally ICT infrastructure with its servers and networks is considered as an important element of e-government implementation and diffusion. It assists government organizations to interact and facilitate the daily effectively (El-sofany et al., 2012). Alajmi, et al., (2020) stated that despite the fast growth in the Saudi Information Communication Technology (ICT) market, indicators have shown that the adoption of e-government services still has been slow.

The present study intends to examine the impact of e-government services on institutional performance through using E-GOVQUAL multiple-item scale which is widel used in e-government studies (Yuhefizar; 2024; Chen, 2020; Sensuse; 2020; and Sá, 2016). Different items of this scale are used to measure the quality of e-services and how they impact institutional performance.

2. Theoretical Background

2.1. E-government dimensions.

The key dimensions of the E-GOVQUAL scale are include the following:

a). **Interactivity and Personalization:** This dimension focuses on the system's ability to provide personalized services that meet users' needs and allow flexible and responsive interaction. The questions extracted from this dimension will assess how effectively the system can adapt to individual user requirements.

- b). Information Quality: This dimension examines the accuracy, timeliness, and clarity of the information provided on government websites. The evaluation will focus on the availability of information and its sufficiency and comprehensiveness for users to complete their tasks.
- c). Ease of Use: This dimension refers to the simplicity and convenience of navigating and usage of electronic services. It evaluates the design of the website that allows users to complete the required processes without making significant effort or time consumption.
- d). Support and Assistance Quality: This dimension measures the level of support provided to users when they encounter problems while using e-services. It includes the quality of technical support, immediate assistance, and the availability of effective communication channels to resolve problems.
- e). Available Functions on the Website: This dimension evaluates all necessary functions that are available to users during their visit to the e-government website. In addition to ensure that the pages and functions of the website operate without errors or interruptions.
- f). Privacy and Security: Privacy and security are critical in any electronic system. This dimension assesses users' confidence regarding the safety of the site and the protection of personal information. Moreover, it measures the users' feeling about data security while using the services.
- g). Aesthetics: Aesthetics pertain to the visual attractiveness of the website design. This dimension evaluates users' satisfaction with the overall appearance of the website, including the images and illustrations.

2.2. Institutional performance.

The relationship between institutional performance and e-government services in public institutions is obvious (Mensah, 2020). E-government services address the digitalize government processes to become more accessible and efficient (Ndou, 2004). They enhance institutional performance by improving service delivery, transparency, reducing costs, and facilitating communication with the public (Kulal et al., 2024).

Moreover, e-government services improve institutional performance, on the other side the institution can operate efficiently, respond to citizens' needs more effectively, and use the available data to make rational decisions (Ciborra, 2005). Conversely, poor e-government services can hinder institutional performance by causing delays, creating confusion, and reducing public trust. Effective institutional performance often leads to improvement in the activities of the firms and projects (Sciarelli et al., 2020). In this context the study investigates the electronic service in the Northern Border University NBU and how it measures the overall institutional performance.

The main purpose of this study is to investigate the impact of e-government in the institutional performance in the Saudi Arabia with special reference to the NBU. Furthermore, this study investigates the quality of services that affected by the application of the Saudi e-government policies. Also, the article addresses the major constraints that face digital services.

3. Study hypotheses.

To fulfill the main goal, of this study at the Northern Border University (NBU) the hypotheses are set as follows:

H1: Interactivity and Personalization is a factor that has an impact on the institutional performance in the Northern Border University in Saudi Arabia.

H2: Quality of Information is one of the factors that have an impact on the institutional performance in the Northern Border University in Saudi Arabia.

H3: Ease of Use is one of the factors that have an impact on the institutional performance at the Northern Border University in Saudi Arabia.

H4: Support and Assistance Quality is one of the factors that have an impact on the institutional performance in the Northern Border University in Saudi Arabia.

H5: Available Functions on the Website is one of a one of the factors that have an impact on the institutional performance in the Northern Border University in Saudi Arabia.

H6: Privacy and Security is one of a one of the factors that have an impact on the institutional performance in the Northern Border University in Saudi Arabia.

H7: Aesthetics is a factor that has an impact on the institutional performance in the Northern Border University in Saudi Arabia.

3.1 Methodology.

The study adopted a descriptive methodology to explore foundational knowledge related to the provision of electronic services through e-government and their influence on institutional performance, as aligned with the study's problem and variables. A quantitative approach was utilized, employing a structured questionnaire as the primary data collection tool to evaluate the quality of online services and their impact on institutional performance. The questionnaire was developed following a comprehensive review of relevant literature to ensure its validity and relevance. Data collected from the survey were analyzed using the Partial Least Squares Structural Equation Modeling (PLS-SEM) technique to derive insights and test the proposed relationships.

3.2. Study population and sample.

As highlighted by (Hair, Black, Babin, & Anderson, 2010) determining an appropriate sample size depends on the specific requirements of the data analysis method. This study utilized PLS-SEM, which is particularly suitable for smaller sample sizes (Marcoulides & Saunders, 2006). The survey was administered to participants from Northern Border University, including faculty, staff, and students, to assess the relationships between the seven independent variables outlined in the hypotheses and the dependent variable, institutional performance.

3.3. Data collection.

A structured questionnaire was employed as the primary data collection tool to examine the perceptions of faculty members, employees, and students at Saudi universities regarding the quality of online services and their impact on institutional performance. The survey was conducted over one month, starting on September 1, 2024. To ensure content validity, the questionnaire items were reviewed by experts, and a pre-test was performed, with suggested revisions incorporated. All constructs were measured using multi-item, 5-point Likert scales ranging from 1 (strongly disagree) to 5 (strongly agree).

3.4. Data analysis and findings.

Descriptive statistics were conducted to examine the dataset for missing values, outliers, normality, and errors, confirming no significant issues. All questionnaires were distributed electronically, accompanied by an explanation of the study objectives. While the data showed a potential for non-normal distribution, PLS-SEM, which is robust to such conditions, was utilized without transformation. Bootstrapping with 5,000 samples was performed in Smart PLS to approximate normality, as per established guidelines (Hair et al., 2014). The proposed model was subsequently evaluated through measurement and structural model analysis following standard protocols (Hair et al., 2010).

3.5. Assessment of the measurement model.

The measurement model was validated through a systematic evaluation of reliability and validity. Three iterations were conducted to achieve acceptable values for Cronbach’s alpha, Composite Reliability, and AVE. Weak indicators with factor loadings below the 0.707 threshold were removed, as detailed in Table 1 and Figure 1.

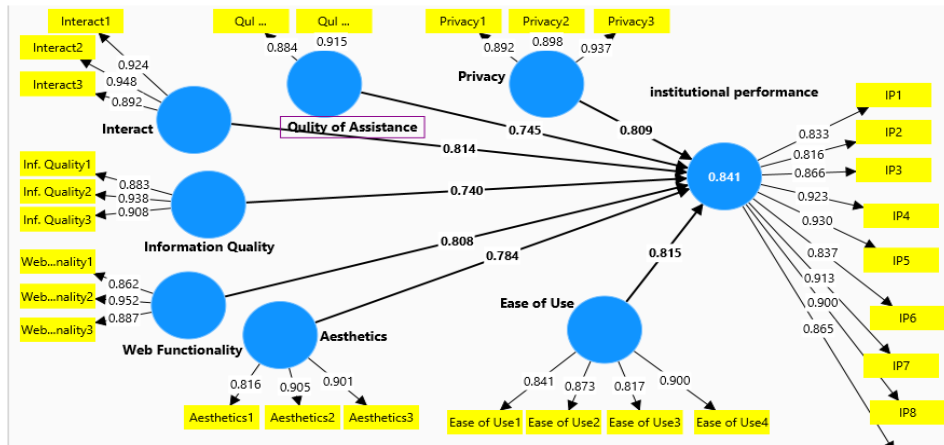


Figure 1: The Model Measurement.

Source :Outputs of Smart PLS 4.0

Table 1: Outer loadings

Variables	Outer loadings
Aesthetics1 <- Aesthetics	0.816
Aesthetics2 <- Aesthetics	0.905
Aesthetics3 <- Aesthetics	0.901
Ease of Use1 <- Ease of Use	0.841
Ease of Use2 <- Ease of Use	0.873
Ease of Use3 <- Ease of Use	0.817
Ease of Use4 <- Ease of Use	0.900
IP1 <- institutional performance	0.833
IP2 <- institutional performance	0.816
IP3 <- institutional performance	0.866
IP4 <- institutional performance	0.923

IP5 <- institutional performance	0.930
IP6 <- institutional performance	0.837
IP7 <- institutional performance	0.913
IP8 <- institutional performance	0.900
IP9 <- institutional performance	0.865
Inf. Quality1 <- Information Quality	0.883
Inf. Quality2 <- Information Quality	0.938
Inf. Quality3 <- Information Quality	0.908
Interact1 <- Interact	0.924
Interact2 <- Interact	0.948
Interact3 <- Interact	0.892
Privacy1 <- Privacy	0.892
Privacy2 <- Privacy	0.898
Privacy3 <- Privacy	0.937
Quality of Assistance1 <- Quality of Assistance	0.884
Qul of Assistance2 <- Quality of Assistance	0.915
Web Functionality1 <- Web Functionality	0.862
Web Functionality2 <- Web Functionality	0.952
Web Functionality3 <- Web Functionality	0.887

Table 1 and Figure 1 indicate that all indicator loadings exceed the 0.800 threshold, confirming the reliability, composite reliability, and convergent validity of the measurement model. After completing the iterations, discriminant validity was assessed using the Fornell-Larcker Criterion and cross-loading values from the final iteration.

3.6. Evaluating the validity of measurement model.

Discriminant validity ensures that a variable's indicators are distinct from those of other variables. As per Hair et al. (2014), it is assessed using the Fornell-Larcker Criterion, where the square root of AVE must exceed the variable's correlations with others.

Table 2: Test result of Fornell-Larcker Criterion

	Aesthetics	Ease of Use	Information Quality	Interact	Privacy	Quality of Assistance	Web Functionality	institutional performance
Aesthetics	0.875							
Ease of Use	0.759	0.858						
Information Quality	0.668	0.823	0.910					
Interact	0.659	0.792	0.833	0.921				
Privacy	0.654	0.645	0.620	0.730	0.909			
Quality of	0.688	0.866	0.843	0.737	0.559	0.900		

Assistance								
Web Functionality	0.769	0.835	0.763	0.702	0.714	0.813	0.901	
institutional performance	0.784	0.815	0.740	0.814	0.809	0.745	0.808	0.877

Source :Outputs of Smart PLS 4.0

Table 2 presents the correlations among variables, with the square root of the AVE values shown on the diagonal (highlighted in blue). Each variable's square root of AVE exceeds its correlations with other variables, confirming the discriminant validity of the measurement model.

3.7. Assessment of the structural model.

The Structural Model specifies which variables are related to one another and the type of relationship between them, thereby applying structural theory. It is possible to express these correlations using regression coefficients. With regard to the data gathered from the target population, the outcomes of this model fit enable us to compare theory with reality. Structural parameter estimations should be statistically significant in the expected direction in order to evaluate the structural theory. In order to validate the structural model, the following steps were taken: (Black, Babin, Anderson, & Hair, 2010)

3.8. Assessing the significance and relevance of model relationships.

As proposed by Kwong & Wong (2013) and Hair J. J., Hult, Ringle, & Sarstedt (2014), the Path Coefficients test was used to test the hypothesized relationships. In this study, Bootstrapping produced 5000 samples, which were then used to compute t-values at significance level = 5% with test type two-tailed. The Path Coefficients and their corresponding t-values are provided in Table 3 and Figure 2 below.

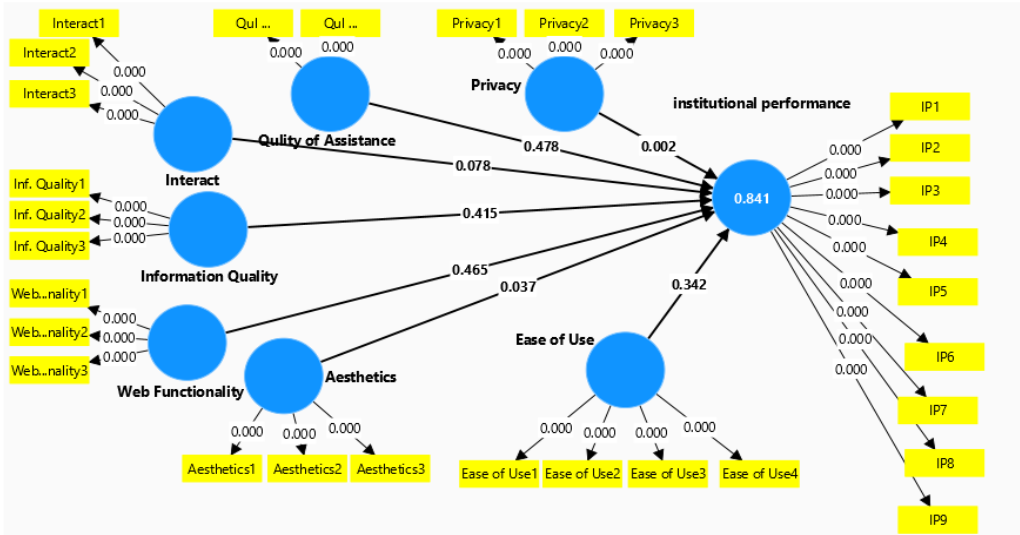


Figure 2: PLS Bootstrapping (t-values) for the study model
 Source :Outputs of Smart PLS 4.0

Table 3: Hypothesis Testing

	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values	Result
Aesthetics	0.770	0.037	20.845	0.000	Accepted
Ease of Use	0.742	0.043	17.135	0.000	Accepted
Information Quality	0.830	0.026	32.441	0.000	Accepted
Interact	0.847	0.033	25.835	0.000	Accepted
Privacy	0.824	0.045	18.209	0.000	Accepted
Quality of Assistance	0.810	0.039	20.551	0.000	Accepted
Web Functionality	0.811	0.032	25.274	0.000	Accepted
institutional performance	0.765	0.051	15.132	0.000	Accepted

Source :Outputs of Smart PLS 4.0

3.9. Findings from the Statistical Analysis.

As shown in Table 3, and Figure 2, all Path Coefficients of the sample of this study are significant; the analysis provides insights into the effects of various independent variables on institutional performance. All variables tested using the Smart PLS program show significant relationships with institutional performance, as indicated by their t-statistics and p-values. The following are the key findings:

i. Aesthetics:

The mean value for aesthetics is 0.770, with a t-statistic of 20.845 and a p-value of 0.000,

indicating a statistically significant impact on institutional performance. This suggests that the visual appeal and design of a system play an essential role in enhancing institutional efficiency and effectiveness.

ii. Ease of Use:

Ease of use has a mean of 0.742 and a t-statistic of 17.135, with a p-value of 0.000. The result is statistically significant, confirming that the user-friendliness of a system positively affects institutional performance by making processes smoother and more efficient.

iii. Information quality :Information Quality: exhibits a high mean of 0.830 and the strongest t-statistic at 32.441, with a p-value of 0.000. This demonstrates a substantial positive effect on institutional performance, highlighting the importance of delivering accurate and reliable information for operational success.

iv. Interaction:

Interaction has a mean of 0.847, with a t-statistic of 25.835 and a p-value of 0.000. The significance of this relationship suggests that effective communication and user interaction with the system lead to improved institutional performance.

v. Privacy:

The privacy factor has a mean of 0.824 and a t-statistic of 18.209, with a p-value of 0.000, indicating a statistically significant relationship. This shows that protecting users' privacy is critical for enhancing trust and, consequently, institutional performance.

vi. Quality of Assistance:

The quality of assistance has a mean of 0.810, with a t-statistic of 20.551 and a p-value of 0.000. This finding suggests that providing high-quality support services positively influences the institution's overall effectiveness and efficiency.

vii. Web Functionality:

The mean for web functionality is 0.811, with a t-statistic of 25.274 and a p-value of 0.000, demonstrating its significant positive effect on institutional performance. Efficient web functionality is crucial for maintaining smooth operations and meeting user needs.

viii. Institutional Performance:

Institutional performance has a mean of 0.765, with a t-statistic of 15.132 and a p-value of 0.000. This confirms that the cumulative effect of the variables analyzed significantly contributes to the performance and success of the institution.

4. Discussion

The study findings confirm statistically significant effect of the study variables mainly aesthetics, ease of use, information quality, interaction, privacy, quality of assistance, and web functionality on institutional performance (p-value = 0.000). These findings are consistent with several studies such as Kareem and Haseeni, (2015) which indicated the existence of a significant relationship and strong correlation between the variables of e-government and the variables of organizational performance. Moreover, Jiang *et al.*, (2016) revealed that the users' perception of aesthetics has statistically significant effects on the perceived utility and users' attitudes towards the website, which in turn influences the organization image displayed through the website. In the same line Almahamid *et al.*, (2010) found statistically significant relationship between ease of use and desire to use e-government for the purpose of collecting data and performing transactions.

Shniekat et al., (2022) found a moderate positive relationship between Management Information System MIS and institutional performance, and performance of faculty members. Regarding the impact of e-government interaction on institutional performance Luna-Reyes et al., (2011) illustrated the significance of bidirectional relationships between institutions processes, organizational types, and the authorized technology. Similarly, Kanaan et al., (2023) highlighted the impact of privacy, security, system quality and information quality and trust in e-government services in Jordanian government universities. Likewise, Utama, (2020) demonstrated that information technology assists individuals and institutions to perform their activities and operations successfully.. Moreover, the e-government experience in Arab countries is confronted with several challenges such as cultural challenge, technical challenge, and strategic challenge (Al-Nuaim, 2009). On the other hand Athmay, (2013) said that the performance of e-government in Arab countries is below the satisfaction of the users with exception to Saudi Arabia, Bahrain, UAE, and Qatar. Based on the positive impact of e-government services on university performance the study recommends some recommendations for policymakers and institutions in Saudi Arabia context. Specifically the formulation of effective e-government policies and operational strategies are essential to implement study findings effectively and to facilitate the e-government challenges for practitioners aiming to enhance institutional performance through digital transformation.

5. Conclusion

This study promotes literature on e-government adoption in public institutions, focusing on the impact of E-government on institutional performance of the Northern Border University. The application of e-government enhances the performance of the Northern Border University efficiently and effectively in terms of aesthetics, ease of use, information quality, interaction, privacy, quality of assistance, and web functionality. Although the study focuses on the Northern Border University but the findings does not differ across Saudi universities and institutions as Alabdan, (2019) stated that electronic technology is growing slowly in Saudi Arabia but, e-services among Saudi users become popular practice due to the effective and efficient nature of e-government in various organizations. On the other hand, Zhao et al., (2014) showed that culture has negative and positive impact on e-government distribution and by different method. In addition, the rates of digital literacy, display noticeable disparities between urban and rural areas (Omweri et al., 2024).

6. Study limitations

i. Sample Representativeness:

The sample was carefully selected to include faculty members, staff, and students at Northern Border University, ensuring a comprehensive representation of relevant perspectives. However, we acknowledge that the sample may not fully capture all aspects, particularly when generalizing the findings beyond the university context.

ii. Limitations of Survey-Based Methods:

We have noted that relying on a structured questionnaire as the primary data collection tool may introduce certain biases, such as response bias or subjective interpretation of questions. The study's results are based on the participants' self-reported perceptions, which might influence the accuracy of some findings.

iii. Implications of Potential Weaknesses in the Measurement Model:

While the validity and reliability of the measurement model were rigorously assessed using established criteria (e.g., Cronbach's alpha, composite reliability, and AVE), we acknowledge the potential for latent measurement errors or biases that could affect the interpretation of the relationships between e-government dimensions and institutional performance. These limitations could stem from the reliance on self-reported data and the structural assumptions of the model.

iv. Exploration of Alternative Models:

We recognize that using alternative modeling techniques, such as Bayesian Structural Equation Modeling (BSEM), could provide additional flexibility in assessing the relationships while accounting for potential measurement uncertainties. Future research could consider employing such methods to enhance the robustness of the findings.

v. Incorporation of Mixed Methods Approaches:

To gain a more nuanced understanding of the relationships between e-government dimensions and institutional performance, we propose integrating qualitative methods (e.g., interviews or focus groups) in future studies. This would allow for a deeper exploration of contextual factors, user experiences, and unobserved variables that may not be fully captured through quantitative measures alone.

vi. 7. Future work

The researchers recommend conducting future studies using mixed methods that combine quantitative and qualitative data collection approaches. This could enhance the reliability and validity of the findings and minimize potential biases associated with survey-based methods.

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