The Effects of Internet Service Criteria on Institutional Performance

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ORIGINAL STUDY

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ABSTRACT

Internet service today greatly affects individuals, companies, and organizations around the world, as the Internet contributes to many things such as facilitating procedures, reducing effort, and saving time. The instability of the Internet system is a major obstacle to the successful implementation of institutional plans, leading to many workflow problems, including delays in providing services to citizens and insufficient communication between the components of the institution. It also leads to a lack of information needed for decision-making, which negatively affects customer satisfaction and operational efficiency. There is a gap in the literature regarding the evaluation of the relationships between Internet service criteria and institutional performance. The Iraqi Martyrs Foundation (IMF) sponsors up to one million citizens from the families of martyrs, which necessitates working on automating operations to accommodate these huge numbers. This study aims to investigate the effects of Internet service criteria on the performance of the Iraqi Martyrs Foundation. The study included developing a survey questionnaire to collect data from relevant stakeholders (technicians, engineers, managers, administrators, buyers, and users) and analyzing it using structural equation modeling. The results indicated support for the hypotheses that criteria such as quality of service, reliability, responsiveness, and experience have a direct impact on organizational performance, while the hypotheses that security and price have an impact on organizational performance were rejected. The resulting model could help improve the performance of the IMF by defining clear criteria for Internet services.

1. Introduction

By enhancing performance and increasing institutions' value, Internet service has been shown to have an impact on organizational effectiveness and performance [1]. In this study, the term "performance" refers to the result/output achieved by an organization, process, team, or individual [2]. Performance evaluation is widely recognized as a vital component of effective management and is becoming increasingly relevant in public service management. Existing literature agrees that performance encompasses several dimensions [3], and in this study, the focus is on internal or operational performance [4]. Performance improvement is the result of an

integrated approach to organizational performance, which also contributes to the sustainability of the organization, increases its overall capabilities and effectiveness, and provides customers and stakeholders with ever-increasing value [5].

There are several measures of performance, including financial and non-financial [6]. It remains a central focal point for every organization and this extends to government organizations [7]. A key strategy recognized for enhancing the quality of public services involves the strategic adoption of Information and Communications Technology (ICT). The ICT industry has experienced substantial growth in recent years and is poised to continue expanding in the foreseeable future [8]. According to [9], the

evolving landscape of the ICT sector demands a more structured formalization of ICT-related roles and professions.

Preliminary analysis indicates that the Iraqi Martyrs Foundation (IMF) faces a major challenge in maintaining the stability and efficiency of the Internet service due to its growing operational demands. Given that Internet service supports essential functions such as facilitating procedures, reducing effort and saving time [10], its stability is especially critical for institutions like the IMF, which supports over one million families of martyrs [11]. According to [12], the instability of the Internet system is considered a significant impediment to the successful implementation of institutional plans, resulting in numerous workflow issues, including delays in citizen services and inadequate internal communication.

Internet service quality is typically determined by several criteria, including quality of service, security, reliability, prices, responsiveness, and user experience. The six criteria mentioned above were selected for this study due to their widespread global usage in recent times, allowing innovative concepts to be developed through research [13]. As a result, selecting a service provider can be difficult as selecting the best service depends on a variety of criteria and their attributes [14–16].

Although some studies investigated the process of internet service criteria and the performance of the organization [1, 17], there are clear shortcomings concerning the Internet service criteria and its impact on the performance of the organization. This shows that it is essential for a structured framework to support informed decision-making when selecting Internet service providers (ISP) [18, 19]. This problem arises in the IMF, as there is no organized process for selecting suppliers and the selection process is based on the personal opinions of the decision maker. Consequently, the problem may worsen if the decision maker leaves, affecting the organization's performance in the long run [18].

The main objective of this study is to examine the impact of Internet service criteria on organizational performance in the IMF. By engaging a broad group of stakeholders (including technicians, engineers, managers, administrators, buyers, and users), this research contributes to the empirical literature on ICT services and institutional performance. Prior studies have highlighted both the direct and indirect effects of supplier selection on organizational performance, whether positive or negative [20, 21]. The remainer of this paper is organized as follows: Section 2 provides a relevant literature review. Section 3 outlines the proposed methodology. Section 4 presents the application results and discussion, while

Table 1. Repeated ISP selection criteria for the period 2001–2022.

Criteria	Repetition in literature	Rank
Quality of service	38	1
Reliability	38	1
Performance	35	3
Security	23	4
Price	22	5
Expertise	17	6
Connection speed	13	7
Responsiveness	10	8
Stability	8	9
Customer Loyalty	7	10

Section 5 concludes the paper, summarizing key insights and their applications.

2. Literature review

Internet services are considered today as a necessity for work and daily activities, not as a source of entertainment or a luxury only [22–24]. Regarding the Internet sector, many studies have examined many quantitative and qualitative criteria that have a role in Internet service quality in many countries [23–27]. In the study by [20], several Internet service criteria were investigated, such as tangibles, responsiveness, reliability, empathy, and assurance. The results indicated that tangibles, reliability, and responsiveness, respectively, were of high importance in the Internet sector. [28] discussed the criteria of service quality, prices, employees, physical evidence, and customer satisfaction. The results indicated that service quality has a direct impact on customer loyalty toward the Internet service, and that providing high-quality service has a positive impact on customer satisfaction. Criteria such as cost, bandwidth, quality of service, security, and reliability were investigated in the [29] study. The results of the questionnaire indicated that choosing an Internet service is affected by price, followed by bandwidth/speed, reliability/security, and quality of service, respectively. Although many studies have examined the Internet service criteria, there is difficulty in determining specific criteria for the selection process because the selection process is based on customer requirements, and thus a trade-off is sometimes made between the selection criteria [30]. In a comprehensive literature review by [31], which examined the criteria repeatedly discussed in the literature during 2001–2022, criteria such as quality of service, security, reliability, price, responsiveness, and experience were found to be among the ten most frequently mentioned criteria in the literature, as shown in Table 1.

Based on the table above, criteria such as quality of service, reliability, performance, security, prices and

experience consistently stand out as central subjects across the majority of articles, underscoring their critical significance in the landscape of the Internet sector. These recurring subjects highlight the key aspects that have garnered considerable attention in the literature, emphasizing their fundamental role in shaping discussions and research within the field.

3. Methodology

3.1. Hypotheses

At present, technologies including the Internet of Things (IoT), Cloud Computing, Big Data, and Artificial Intelligence (AI), have been instrumental in enhancing the digitization of firms. These advancements offer numerous benefits, notably improving performance, ensuring quality, and facilitating cost reduction [32, 33]. Consequently, it has become necessary for institutions to implement clear and specific criteria concerning Internet service. Internet service use is linked to enhanced organizational effectiveness and success in contexts characteristic of developing economies [33]. In the study by [34], they concluded that Internet service has a significant positive impact on the performance of institutions in developing countries. Therefore, the research hypotheses are presented below:

3.1.1. Quality of service (QoS)

The increasing links between quality and institutional performance indicate that service quality is one of the most important aspects of generating competitive advantage in the long term [35]. According to [36], Quality of Service (QoS) is defined within real-world performance measures as the ability of a data network to ensure reliable delivery of services such as voice, video, and data. Higher levels of QoS enhance the implementation of high-priority services. [37] defined QoS as "the overall evaluation of a specific service firm that results from comparing that firm's performance with the customer's general expectations of how firms in that industry should perform." Numerous studies link service quality to increased institutional performance [38–40]. According to [41], service quality is commonly utilized to evaluate the effectiveness of an information system by determining whether it successfully delivers the necessary services to end users. The measurement method for QoS is released by the European Telecommunications Standard Institute (ETSI) [42]. As the service industry undergoes continual growth, and awareness of public service expectations increases, institutions find themselves compelled to improve the quality of services. This imperative arises from the need to elevate their competitiveness

in the market and augment their profitability [43]. In response to the expanding scope of the service sector and evolving consumer expectations, organizations are increasingly emphasizing the enhancement of service quality as a strategic imperative for sustained success [44]. According to [35], quality is one of the crucial criteria in developing long-term competitive advantage because managers increasingly link quality to institutional performance. Based on the above, the following hypothesis was proposed.

H1. Quality of Service (QoS) has a significant impact on institutional performance.

3.1.2. Security (SE)

Despite the vast benefits of the Internet and computing, their rapid expansion also brings complex threats [45]. When using an Internet services, customers should feel safe [46, 47]. Many researchers [48–50] emphasize various warnings regarding the improper use of consumer personal information. To make consumers feel secure, providing security for customer interactions should be a top consideration for Internet service criteria [29]. Enforcing strong cybersecurity policies protects sensitive data by ensuring its confidentiality, integrity, and availability while preventing unauthorized access by cybercriminals [51]. The relationship between sustainable ISP choice and security criteria has been mentioned in the study [52]. The connection between security and performance, particularly in modern systems, is a noteworthy topic. However, it has rarely been explored in the literature [53]. Institutions are increasingly recognizing the importance of information security and software architects can enhance operating systems by including security requirements [54].

The relationship between security and performance is an interesting issue, especially in modern systems. Scenarios that investigate security and performance are rarely addressed in the literature [53]. Prior research has underscored the significance of IT services, information security, and information sharing in ensuring organizational success [55–57]. However, the relationship between information security and organizational performance has been explored less compared to that between IT service infrastructure/information sharing and organizational performance [58]. Information security performance significantly influences customer trust. In his examination of security and control activities in financial institutions, [59] observed that internal security activities, including enterprise-level security activities, significantly impacted ERP performance. Another study by [58], revealed that investing in information security within the security industry enhances transaction stability and contributes to improved outcomes

in the various sectors. Based on the above, the following hypothesis was proposed.

H2. Security has a significant impact on institutional performance.

3.1.3. Reliability (RE)

The ability of an ISP to fulfill obligations and provide correct information about services is referred to as reliability [48, 60]. [61] also described reliability in the context of software as the absence of errors or defects that could result in incorrect operations, data loss, or system failure. According to [62], one of the things customers should consider when choosing an ISP is reliability. Reliability optimization is crucial for modern systems as complexity, automation, and connectivity grow. It helps reduce failure costs, minimize downtime, enhance customer retention, and maintain a competitive edge [63]. Important measurement outcomes and value gains suggest that reliability can have an impact on institutional performance and success. Moreover, increasing quality may lead to enhanced operational performance [64]. According to [65], the provision of highly reliable network communication services is crucial, particularly for enterprise applications that demand a heightened level of reliability from the system. An integral metric in this context is the outage probability, which quantifies the likelihood of the data rate dropping below a predefined value. Additionally, improved operational performance might result from superior service quality [57, 66]. Organizational reliability is defined as the exceptional ability of an organization to consistently produce collective outcomes of a certain minimum quality [67]. [68] refined this definition, emphasizing that reliability stems not from organizational stability but from the continuous management of fluctuations in both job performance and overall management interactions.

Furthermore, researchers have highlighted the importance of "cognitive processes" and introduced the concept of "mindfulness" in achieving high-reliability performance [69, 70]. High Reliability and Vigilance Theory have evolved in response to the ongoing quest for improved organizational performance. Perrow's NAT initiated research in High-Reliability Theory (HRT), suggesting that organizational strategies can effectively mitigate the risks associated with complexity, tight coupling, and technology [71]. According to HRT, changes in organizational culture, employee mindset, policies, procedures, and organizational awareness can largely prevent the frequency and severity of failures [70]. Reliability in HRT is not the outcome of organizational stability but the ability to maintain error-free processes and results by managing fluctuations [68]. The contribution of reliability to organizational performance and competitiveness has been addressed by various researchers. [72] examined the relationship between reliability and competitive advantage, finding that greater knowledge management capabilities are significantly associated with increased competitiveness. Numerous studies emphasize the hybrid approach between Human Resources (HR) and Information Technology (IT) in knowledge management has a statistically significant impact on both competitiveness and financial performance [73, 74]. The assumption is that thoughtful collaboration among employees reduces or eliminates the risk of failure in knowledge management processes and infrastructure capabilities, positively impacting organizational performance, a central focus of HRT theory [70]. Based on the above, the following hypothesis was proposed.

H3. Reliability has a significant impact on institutional performance.

3.1.4. Prices (PR)

[75] considered that price criteria represent a key element in retaining customers and acquiring new ones when selecting an ISP. Studies have shown that price is an important criteria used by organizations in the decision to choose an ISP [76]. In terms of performance, performance is often affected by pricing issues [77]. Decision-makers must take into account the fact that clients may not accept expensive services, even if they are of high quality [78].

The price criterion, regarded as a crucial component within a firm's broader strategic priorities, is a key driver of performance outcomes [79, 80]. Despite the awareness among managers regarding the paramount importance of pricing in organizational success, the practical implementation often falls short, with managers frequently relying on ineffective pricing rules and neglecting the integral role of pricing in the holistic design of their organizations [81, 82]. Consequently, a pressing challenge in practical scenarios revolves around the strategic approach to enhancing firm performance through a nuanced understanding and effective application of price criteria. Numerous studies have underscored the profound influence of pricing issues on the overall effectiveness of institutions [77]. The complexity of pricing adds an additional layer to managerial decisions, particularly as managers must navigate the delicate balance between service quality and customer acceptance; high prices may be met with resistance regardless of service quality [78]. Based on the above, the following hypothesis was proposed.

H4. Price has a significant impact on institutional performance.

3.1.5. Responsiveness (RS)

According to [60], responsiveness refers to the ability of a company's employees to provide prompt services to consumers. The responsiveness component has been ranked as one of the most important indicators of service quality [83]. The consumer may notice the provider's integrity in action thanks to responsiveness. Thus, positive and trustworthy communication with a service provider depends on responsiveness [47]. In terms of performance, quick responses to all customer requests enhances job performance and a company's competitive advantage [39]. Responding quickly to any perceived customer request enhances business effectiveness [84].

According to [40], the dynamism of the global business environment is characterized by turbulence, leading to a swift shortening of product life cycles and the continuous introduction of new products. Consequently, it becomes imperative for businesses to be responsive to customer demands. For small and medium-sized enterprises (SMEs) to effectively compete on a global scale and establish themselves as key players, their products must exhibit competitiveness in terms of both quality and cost. Additionally, they must remain attuned to customer demands to ensure that products are consistently available. Responsiveness plays a vital role in raising the organization's competitive advantage, as the rapid response to any perceived customer demand improves work performance [39]. According to [84] responding rapidly to any perceived client requirement improves work performance. Research findings by [40] found that responsiveness to customer demand, along with attention to the social and economic dimensions of partnerships had a significant and positive impact on the organizational performance of SMEs. Based on the above, the following hypothesis was proposed.

H5. Responsiveness has a significant impact on institutional performance.

3.1.6. Experience (EX)

Prior experience influence preferences, attitudes, behavior and intentions when choosing a supplier [85]. Clients should be fully aware of the experience of ISPs during the selection process [75]. Regarding operational performance, the previous experience criterion shows high validity in various areas for performance indicators [86]. According to [87], there is a gap in the literature regarding the impact of experience on institutional performance.

Despite the role that experience plays in the improvement of system performance, limited discourse exists in the literature regarding its direct correlation with overall system performance [87]. [86] propose that measures of experience exhibit a high degree of

validity when employed as performance indicators across diverse fields. Their findings shed light on the multifaceted nature of experience in influencing and predicting performance outcomes. This suggests that understanding and incorporating varying levels of expertise can significantly contribute to the enhancement of system performance, a dimension that merits more comprehensive exploration within the literature. Based on the above, the following hypothesis was proposed:

H6. Experience has a significant impact on institutional performance.

The conceptual framework of this study is constructed by incorporating the most significant and frequently cited criteria identified in the existing body of literature. These criteria have been further validated and endorsed by experts from the IMF, ensuring their relevance and applicability to the research context. Specifically, the framework includes key factors such as quality of service, security, reliability, prices, responsiveness, and experience. Each of these elements is treated as an independent variable within the study, while the institution's performance is considered the dependent variable. The relationship between these variables and their impact on institutional performance is represented in Fig. 1.

3.2. Questionnaire design and data collection

The primary data for this study was collected using a questionnaire tool. Most of the questions employed a checkbox format, making it relatively easy to tabulate or record responses and evaluate the resulting data [88]. The questionnaire was developed based on validated instruments from previous research in the field [26, 28, 62, 89, 90]. According to [91, 92], to promote the use of content validity and accuracy, researchers should seek expert advice throughout the peer review process so that findings can be generalized. A committee consisting of nine experts, including academic experts and experts from the Internet and communications sector, was assembled to arbitrate the questionnaire. Semi-structured interviews were conducted with these experts to validate the questionnaire's components. As a result, the research structure, question sequencing, and the appropriateness of measurement tools were confirmed. Revisions addressed incorrect options, grammatical errors, ambiguities, and complex language.

The questionnaire comprised four sections: personal information, Internet service criteria, provider selection, and organizational performance. All elements in this study were measured using a Likert scale with five points ranging from "strongly disagree" (1) to "strongly agree" (5) [93].
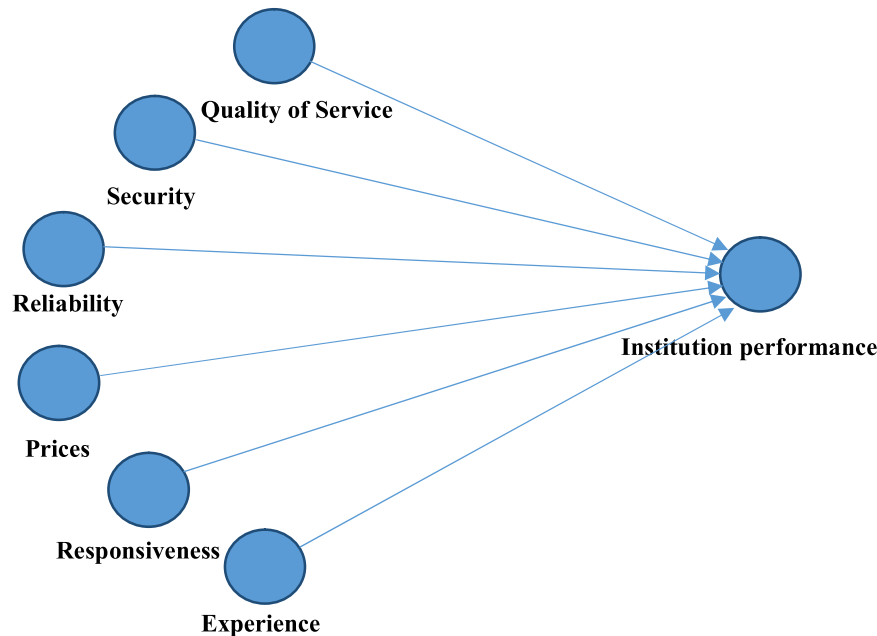
Fig. 1. The conceptual framework.

The questionnaire was translated into Arabic and distributed to 361 stakeholders within the IMF, including technicians, engineers, managers, administrators, buyers, and users. A total of 305 responses were collected. After removing 25 responses due to duplication and missing data, 280 valid responses remained for analysis. Statistical Package for Social Sciences (SPSS, version 23) and SmartPLS (version 4) were used for data analysis.

3.3. Data analysis

The statistical analysis of the data will be discussed in terms of quantitative procedures and computing approaches. The selection of statistical tools is aligned with the research questions. The data in this study will be processed using SPSS version 23 and Smart PLS. Structural Equation Modelling (SEM) will also be used to explain the correlations between the study variables. SEM is widely used for analyzing cause-and-effect relationships among latent constructs [94]. The researcher assessed the questionnaire's ability to establish validity and reliability through a reliability analysis [95].

SEM is considered a powerful technique for issues such as electronic supplier selection because it simultaneously combines both structural models and measurements in statistical testing [96]. Once the measurement model is validated, SEM enables the identification and visualization of the connections between constructs. It also provides a comprehensive explanation of the relationships between independent and dependent variables [97]. Overall model fit is a primary consideration when evaluating a structural model [98]. After establishing the model fit, the focus shifts to examining the magnitude, direction, and importance of the estimates of the hypothetical variables, which are shown in the path diagram using single-headed arrows.

The study's proposed structural equation model, which was based on expected correlations between the variables reported and measured, is supported in the final section. The PLS approach was used in the model of this study to test the research hypotheses. PLS-SEM is assessed in two processes. The first stage involves evaluating the (external) measurement model. The second step evaluates the (internal) structural model. The convergent validity of the measurement model is evaluated using composite reliability, item factor loadings, and average variance extracted (AVE) [99]. The discriminant validity of the measurement model is evaluated using the Fornell-Larcker criterion and the cross-loading criterion [100, 101]. To analyze the data with SmartPLS, a conceptual model was developed to define the latent variables, their measurement indications, and the relationships between them.

4. Results and discussions

Assuming that the data were normal, all 280 responses were statistically analyzed using SPSS 23. Any sample size larger than 30 is normally distributed [96].

Table 2. Descriptive results for internet service criteria.

Variables	Measurement Items		Mean	SD
Quality of service	QS1	The service quality provided meets the specifications and requirements of your organization	3.05	1.320
	QS2	Constant download or upload speed at peak times	3	1.427
	QS3	Speed in transferring data from one site to another within the organization (Intranet)	3.4	1.392
	QS4	Is the provider's commitment to international quality standards important?	3.02	1.478
	QS5	The service does not stop in case of maintenance	3.14	1.467
	QS6	There aren't any interruptions from time to time	3.2	1.458
	QS7	There is alternative in case of service interruption	3.05	1.533
	Average		**3.123**	**1.44**
Security	SE1	The institution must own a protected Internet service.	3.14	1.259
	SE2	Providing adequate protection for the network against cyber attacks	3.69	1.248
	SE3	It is important to protect the operating systems and data center in the institution	3.03	1.435
	SE4	The Provider provides adequate protection for the Customer's personal information	3.58	1.326
	SE5	All transactions are secured between the provider and the institution	3.66	1.222
	Average		**3.42**	**1.298**
Reliability	RE1	The provider keep its promises	3.1	1.273
	RE2	The provider provides reliable hardware/equipment	3.66	1.148
	RE3	The provider provides the correct service at the first time	3.1	1.212
	RE4	The provider have the ability to handle customer complaints	3.05	1.246
	RE5	The amount of information exchanged between the provider and the customer	4.11	1.259
	Average		**3.404**	**1.227**
Prices	PR1	The price schedule must be adhered to as part of the agreed contract.	3.1	1.071
	PR2	The fees for repair works/bids and engineering services are reasonable.	3.11	0.877
	PR3	The provider offers competitive prices for products, equipment and services	3.05	1.213
	PR4	Any possible future price increase during the contract period must be agreed upon before selecting the supplier.	3.07	1.037
	PR5	The provider clearly sets the price for the cost of maintaining or adding new sites	4.08	1.147
	PR6	Availability of free capacity in addition to the agreed capacity	3.83	1.313
	PR7	The provider offers free for internal data transfer (intranet) capacity between enterprise sites	3.97	1.275
	PR8	The provider provides free training courses for the employees of the organization	3.94	1.223
	Average		**3.519**	**1.145**
Responsiveness	RS1	Products, equipment and services must be delivered in a timely manner.	3.3	1.073
	RS2	A quick response time is required in dealing with a customer's request.	3.06	1.037
	RS3	The supplier shall provide short delivery times for the product.	3.02	1.175
	RS4	Early intervention to prevent problems from getting out of control.	3.17	1.149
	RS5	The ability to quickly handle customer complaints is important.	3.05	.877
	RS6	The provider must inform the organization when exactly it will provide the services	3.8	1.120
	RS7	Treating all customers as the same regardless of whether they know someone in the company	3.77	1.117
	Average		**3.31**	**1.079**
Experience	EX1	Having experience is necessary to provide Internet service.	3.73	1.148
	EX2	There is vision for the future in terms of technology.	3.05	1.595
	EX3	Ensure the provision of modern devices and equipment for the institution.	3.79	1.227
	EX4	The supplier has the experience to deal with and solve the problems.	3.9	1.175
	EX5	The provider has the necessary expertise in modern operating systems and communications.	3.86	1.174
	EX6	It is necessary to have a crew with great technical experience.	3.03	1.561
	Average		**3.56**	**1.314**

4.1. Descriptive analysis

The descriptive analysis focused on respondents' views on Internet service criteria and institutional performance, measured using a five-point Likert scale. The mean scores for all variables exceeded the mid-point (3), while standard deviation values above 1 indicated diverse opinions as shown in Tables 2 and 3.

In Table 2 above, the experience criterion had the highest mean (3.56), while quality of service had the lowest (3.123), with high standard deviation values reflecting varying responses.

Table 3. Descriptive results for institutional performance.

Variable	Measurement Items		Mean	SD
Institution performance	IP1	In my institution, the quality assurance department is a professional division.	3.96	1.088
	IP2	Data security is a priority in my institution.	3.96	1.191
	IP3	My institution provides courses to improve the performance of employees periodically.	3.96	1.174
	IP4	The institution conducts tests for employees to determine the level of their performance.	3.84	1.251
	IP5	The head of my institution announces annually the general policy to raise the performance of the institution.	3.92	1.246
	IP6	My institution establishes appropriate performance rules.	3.95	1.207
	IP7	My institution is creating a program to check and process overall performance.	3.70	1.116
	Average		**3.899**	**1.182**

As shown in Table 3 above, the questionnaire results revealed an average score of 3.899 for institutional performance, exceeding the scale's midpoint of 3. This suggests that participants held generally positive views on the institutional performance improvement process. However, the standard deviation values were mostly above 1, indicating variability in the responses regarding institutional performance.

4.2. Convergent validity

Convergent validity refers to how well one measure corresponds with other measurements of the same variable. The validity of the reflected variables must be assessed [102]. The outcomes of the measurement model evaluation in terms of factor loadings are in Table 4. According to [94], every component needs to have a suggested factor loading value of 0.70 or greater. 14 items from this study were eliminated because they failed to meet the 0.7 cutoff (QS4, QS7, SE3, RE1, RE4, PR2, PR4, RS1, RS2, RS3, RS4, RS5, EX2 and EX6). The factor loading displays the variation that the variable on that particular factor accounts for. If any elements are missing, it's possible that they were eliminated because they couldn't adequately explain a certain factor's variable.

Although Cronbach's alpha is the reliability metric that is most frequently employed, composite reliability is favored when analyzing PLS-SEM [103]. A measurement model's composite reliability must be at least 0.7 to be regarded as dependable [101]. However, a composite reliability of 0.6 is also regarded to be adequate to provide dependability. The convergent validity of the measurement models is shown in Table 5.

The results indicate that the overall AVE values are more than 0.5, which is the AVE threshold value [104]. Concerning Composite Reliability (C.R.) and Cronbach's Alpha, all variables value greater than 0.7, the ideal value. Each measurement model met the requirement for convergent validity as a result.

4.3. Discernment validity

Discriminant validity is a statistical measure that evaluates the independence of several regression predictor variables [94]. It ensures that there is no correlation between the factors used to predict the outcome. In this study, Heterotrait-Monotrait Correlations (HTMT) and Fornell-Larcker criteria were used to test discriminant validity. From Table 6 below it is seen that each variable has an AVE value greater than its correlation with the other variable using Fornell-Larcker criteria [105].

In response to limitations of the cross-loading and Fornell-Larcker criteria in reliably assessing discriminant validity, [106] introduced the HTMT methodology as a new standard for use in SEM analysis. If the absolute value of the HTMT is greater than 0.85 or 0.90, there is no discriminant validity. Table 7 presents the HTMT results regarding discriminant validity. The findings indicate that each variable has acceptable discriminant validity.

As demonstrated in Table 7, all latent constructs have HTMT values lower than 0.90. The range of values is 0.167 to 0.877. This means that the latent constructs are completely distinct.

4.4. Assessment of structural model

Before assessing the structural model, the initial and crucial phase in SEM analysis involves addressing collinearity problems within the internal structural model to prevent biased or misleading regression results. According to [107], multicollinearity arises when two or more variables are not independent, and it may be assessed by calculating the variance inflation factor (VIF). A VIF value of 5 or above indicates a possible collinearity issue [98]. Table 8 presents the collinearity statistics.

Structural equation modeling is the second stage of SEM analysis. It provides a detailed explanation of the relationships between independent and

Table 4. Outer loading of elements.

	Quality of service	Security	Reliability	Prices	Responsiveness	Experience	Institution performance
QS1	0.894						
QS2	0.906						
QS3	0.903						
QS4	Deleted						
QS5	0.862						
QS6	0.897						
QS7	Deleted						
SE1		0.842					
SE2		0.936					
SE3		Deleted					
SE4		0.882					
SE5		0.853					
RE1			Deleted				
RE2			0.760				
RE3			0.926				
RE4			Deleted				
RE5			0.950				
PR1				0.776			
PR2				Deleted			
PR3				0.798			
PR4				Deleted			
PR5				0.735			
PR6				0.801			
PR7				0.778			
PR8				0.760			
RS1					Deleted		
RS2					Deleted		
RS3					Deleted		
RS4					Deleted		
RS5					Deleted		
RS6					0.895		
RS7					0.861		
EX1						0.827	
EX2						Deleted	
EX3						0.806	
EX4						0.920	
EX5						0.919	
EX6						Deleted	
IP1							0.850
IP2							0.834
IP3							0.839
IP4							0.855
IP5							0.918
IP6							0.891
IP7							0.813

Table 5. Convergent validity results.

Variables	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Quality of service (QS)	0.862	0.937	0.798
Security (SE)	0.856	0.897	0.789
Reliability (RE)	0.875	0.984	0.782
Prices (PR)	0.882	0.834	0.627
Responsiveness (RS)	0.854	0.872	0.873
Experience (EX)	0.902	0.907	0.776
Institution performance (IP)	0.940	0.941	0.759
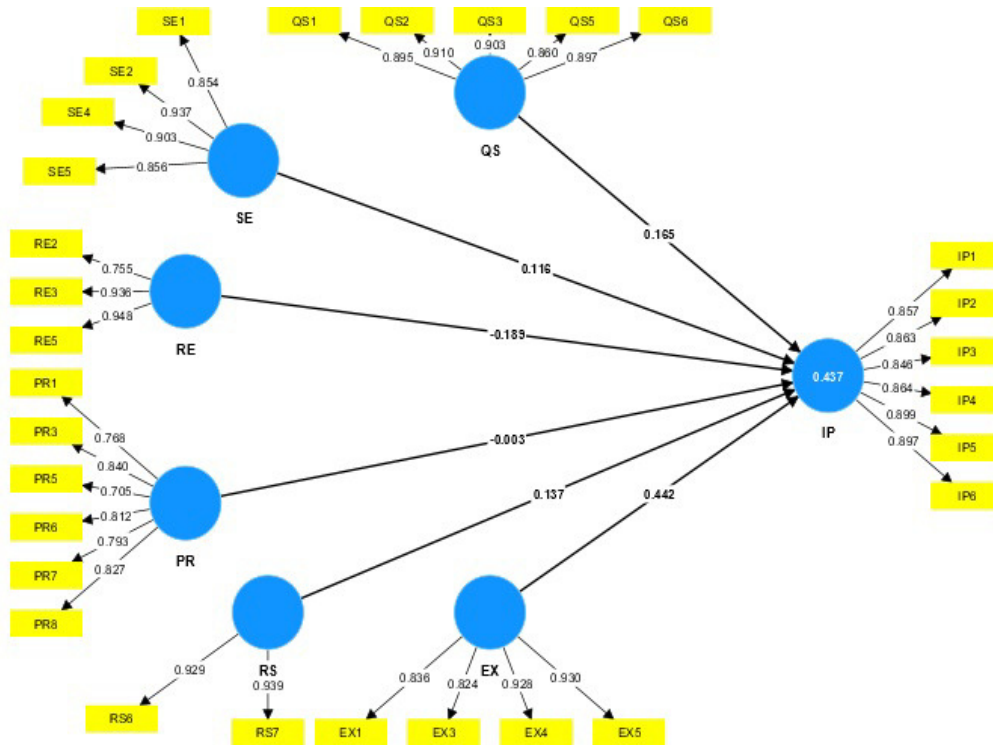
Fig. 2. Structural model.

Table 6. Fornell-Larcker criterion.

	QS	SE	RE	PR	RS	EX	IP
QS	**0.893**						
SE	0.690	**0.888**					
RE	0.438	0.467	**0.884**				
PR	0.438	0.384	0.604	**0.792**			
RS	0.433	0.527	0.375	0.349	**0.875**		
EX	0.540	0.677	0.537	0.471	0.774	**0.881**	
IP	0.460	0.512	0.227	0.230	0.537	0.611	**0.871**

Table 7. HTMT results.

	QS	SE	RE	PR	RS	EX	IP
QS							
SE	0.749						
RE	0.486	0.504					
PR	0.316	0.433	0.705				
RS	0.482	0.597	0.424	0.399			
EX	0.585	0.745	0.579	0.529	0.877		
IP	0.490	0.553	0.213	0.242	0.600	0.659	

Table 8. Collinearity statistics.

Latent Variables	VIF
QS	2.126
SE	2.568
RE	1.996
PR	1.686
RS	2.661
EX	3.804

dependent variables [97]. The overall fit of the model is the initial focus of structural model evaluation [98]. The direction, size, and importance of the fictitious parameter estimations are then highlighted and are denoted in the route diagram by single-headed arrows. The PLS approach was used in the study's model to test the research hypotheses.

We looked at the direct relationships between service quality, security, reliability, prices, responsiveness and experience, and organizational performance. The model and structural route used to analyze the direct impacts of the postulated variables are depicted in Fig. 2.

The values for the coefficient of determination (R^2) for institutional performance were determined. R^2 represents the proportion of variance in the dependent variable that can be explained by the independent variables [108]. According to [98], an R^2 value of 0.75 suggests a high level of predictive accuracy, 0.50 indicates a moderate level, and 0.25 indicates a poor level. According to the aforementioned graph, institutional performance had an R^2 value of 0.691, indicating a moderate level of predictive accuracy.

Regarding the predictive relevance (Q^2), values greater than zero show the model's predictive usefulness [109]. The Q^2 value for institutional

Table 9. Hypotheses testing results for direct paths.

Hypothesis		Path Coefficient	Standard Deviation	T-Value	P-Value	Result
H1	QS→IP	0.165*	0.070	2.297	0.022	Accepted
H2	SE→IP	0.116	0.075	1.907	0.057	Rejected
H3	RE→IP	−0.189*	0.081	2.320	0.020	Accepted
H4	PR→IP	−0.003	0.066	0.394	0.694	Rejected
H5	RS→IP	0.137**	0.068	2.955	0.003	Accepted
H6	EX→IP	0.442***	0.070	5.702	0.000	Accepted

$^*p < 0.05, ^{**}p < 0.01, ^{***}p < 0.001.$

performance was 0.337, which exceeds the threshold, confirming the model's predictive relevance.

The model's Goodness of Fit (GOF) value was calculated using the following formula:

$$GOF = \sqrt{\overline{AVE} * \overline{R^2}}$$

Where GOF_small = 0.1, GOF_medium = 0.25, and GOF_large = 0.36.

For the PLS model to be validated internationally, these values are essential [110, 111]. The GOF value produced from the aforementioned calculation was 0.6434, which was higher than the threshold of 0.36. Based on the aforementioned baseline, this indicates that the model is effective. The results of the hypothesis testing conducted in this study are presented in Table 9.

The results indicate that:

1. Quality of service had a positive impact on institutional performance (supporting Hypothesis H1).
2. Security did not affect institutional performance (Hypothesis H2 was rejected).
3. Reliability had a negative effect on the institutional performance (supporting Hypothesis H3).
4. Price had an insignificant impact on institutional performance (Hypothesis H4 was rejected).
5. Responsiveness had a positive impact on institutional performance (supporting Hypothesis H5).
6. Experience had a significant positive impact on institutional performance (supporting Hypotheses H6).

5. Conclusion

This study explored the relationship between Internet service criteria, including quality of service, security, reliability, prices, responsiveness, and experience, and institutional performance. Through a comprehensive survey of 280 government employees across 18 IMF sites in Iraq, the study aimed to assess the impact of these criteria on institutional performance. Structural equation modeling was employed to test the research hypotheses and provide a deeper understanding of the relationships between the study variables. The findings revealed that quality of service, reliability, responsiveness, and experience have direct and significant effects on institutional performance, supporting the first, third, fifth, and sixth hypotheses. Conversely, the results indicated that security and prices had an insignificant effect on institutional performance, leading to the rejection of the second and fourth hypotheses. These findings highlight the importance of specific Internet service criteria in enhancing institutional efficiency while suggesting that security and pricing criteria may play indirect or contextual roles rather than exerting a direct influence.

The methodological coherence and rigor applied in this study enhance the credibility of the results, reinforcing their contribution to the body of knowledge in this domain. The insights gained are expected to influence the reconsideration and refinement of Internet service criteria, particularly in Iraq and other developing countries where institutional performance is closely tied to digital infrastructure. By identifying the key determinants of performance enhancement, the study offers valuable implications for policymakers, government agencies, and Internet service providers striving to optimize service delivery. Furthermore, the study contributes to the existing literature on the Internet sector and institutional performance, an area that has not received adequate attention in prior research. The findings serve as a theoretical foundation for future studies, opening avenues for further exploration into how different aspects of Internet service impact organizational efficiency and effectiveness. Nevertheless, this study has a few limitations. The sample was limited to an Iraqi governmental institution, so the results may not be generalizable to private institutions, which have different financial perspectives. In addition, the study focused only on the Internet sector, specifically the role of Internet service criteria in influencing institutional performance. Future research could address these limitations by investigate more diverse samples, additional mediating or moderating criteria, such as digital literacy, regulatory frameworks, and technological advancements, to develop a more comprehensive understanding of this dynamic relationship.

Overall, this study offers significant contributions to strategic decision-making processes. By highlighting the criteria that directly impact institutional performance, the findings can assist policymakers and organizational leaders in formulating data-driven strategies to enhance service quality and operational efficiency. The study also underscores the need for continuous evaluation and improvement of Internet service criteria to align with evolving technological and organizational demands. Moving forward, further research and policy initiatives should focus on refining Internet service frameworks to foster institutional growth and economic development in Iraq and similar contexts.

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Conflict of interest

The authors declare that they have no competing interests.

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