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Validating a Multi-Dimensional Instrument for **Evaluating HRIS User Satisfaction: A Pilot Study in Brunei's Public Sector**

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Abstract

This paper reports findings from a pilot study to discover the reliability and validity of a survey instrument to assess the level of user satisfaction with Human Resource Information Systems (HRIS) in Brunei's public sector, Sistem Sumber Manusia (SSM) platform. The objective was to confirm that the concepts used in the study were clear, reliable and valid before gathering all the data. Based on the SERVQUAL, the Information Systems Success (ISS) model and an integrated construct of Security Quality, the instrument possesses six dimensions: Service Quality, System Quality, Information Quality, Security Quality, User Satisfaction and SSM platform as a moderating context. A survey questionnaire was administered to 43 public servants across various ministries. All the Kaiser-Meyer-Olkin (KMO) measures surpassed the important threshold and the factorability of the correlation matrix was confirmed by the Barlett's Test. The findings show an excellent level of internal consistency (Cronbach's alpha > 0.7), high sampling adequacy (KMO = 0.792), and clear construct validation via EFA. Three of the items in the Security Quality questionnaire lacked strong factor loadings, which were subsequently revised to improve clarity and contextual relevance. Evidence reveals that the instrument is statistically sound, appropriate for the context and methodologically rigorous. The factor structure validates the instruments preparedness for full-scale data collection and PLS-SEM subsequent analysis. This validation reinforces Brunei Vision 2035's digital governance objective and aids in the development of secure e-HRM and citizen-trusted platform.

Keywords: Brunei Vision 2035, e-HRM, HRIS, ISS model, Security Quality, SERVQUAL, SSM website.

1. Introduction

The rate of digitalization of public sector services in Southeast Asia has increased urgency to have credible and excellent performing Human Resource Information Systems (HRIS). In Brunei Darussalam, this change is grounded in Brunei Vision 2035 which focuses on institutional efficiency, technology, and secure digital governance. The Sistem Sumber Manusia (SSM) is one of the country's most important digital initiatives, an e-Government HR program aimed at simplifying applications to leave, payroll, performance appraisals and civil servants' managements. With digital transformation which affecting administrative tasks, it is important to assess the usefulness and experience of the users with the digital tools to support their sustainability and respond to user needs (Alshehri & Drew, 2010; Shareef et al., 2011).



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Although adoption of SSM is an improvement toward Brunei's e-HRM vision, success of the platform relies greatly on user satisfaction and perceptions of its quality and security. There are also classic models like SERVQUAL and the Information System Success (ISS) model that form the bases of how systems deliver, but these often lack contemporary concerns regarding cybersecurity, trust with the users and institutional set-up.

In response to this gap, this study proposes and validates a multi-dimensional survey instrument to integrate the well-established classical construct (service quality, system quality, and information quality) with a novel dimension Security Quality. However, the accuracy of the findings in an empirical study depends on how reliable and valid the instruments are used (Devellis & Thorpe, 2021). If the questionnaire items are not checked in a pilot study, mistakes might affect for both scientific and practical interpretation (Hair et al., 2019). Therefore, the present pilot study examines the reliability, construct validity, and clarity of the instrument to determine if the instrument can be used in large scale data collection and SEM through SmartPLS. The validated instrument will serve to bolster Brunei's larger agenda of seeing to it that public digital systems are not only operatively sound but also trusted, secure, and aligned with national development goals.

2. Methodology

2.1 Research Design

This survey study used a cross-sectional design to assess whether a newly made instrument for measuring Brunei's public servants' perceptions of the Sistem Sumber Manusia (SSM) platform is reliable. To make sure the instruments clarity, construct validity, and internal reliability, a pilot study was conducted prior to full-scale data collection. The design was grounded in established methodological frameworks for instrument validation, incorporating Exploratory Factor Analysis (EFA) and reliability testing using Cronbach's Alpha. This design enabled the identification of low factor loadings items and facilitated refinement prior to the main study, enhancing the robustness and interpretability of subsequent empirical findings.

2.2 Research Sampling and Procedure

A purposive sampling strategy applied for this study to recruit participants who engaged with SSM system within the government. A total of 43 public servants representing various ministries in Brunei Darussalam. The sample contained the number of participants expected for a pilot, being about 12 to 30 of the size (Ying et al., 2023), Bujang et al., (2024) highlight 30 participants needed to established reliability questionnaires. Additionally, some literature indicates minimum of 40 participants is often acceptable for pilot test to observe preliminary outcomes effectively (Platt et al., 2013). The selection of the participants based on professional roles and digital engagement with the SSM platform, to ensure the content relevance and experiment alignment. Participants were informed about the survey through communication channels and participated on a voluntary basis.

2.3 Data Collection Procedure

The survey was conducted online, allowing participants to respond privately on their devices anonymously. There were a number of items in the instrument in six theoretical dimensions: service quality, system quality, information quality, security quality, user satisfaction and the SSM website as moderator. All measures were scaled using a 4-point Likert sale with response options "strongly disagree" to "strongly agree".

The choice of a 4-point Likert scale purposely used to remove the neutral midpoint and force respondents



to express either agreement or disagreement. This is particularly relevant in this study where the participation in SSM is compulsory for all government employees irrespective of their level of satisfaction. With the respondents being the working civil servants in a compulsory system, the force-choice design was used to provide critics reflection as opposed to the non-committal response option.

2.4 Data Analysis Procedure

Reliability and validity were done through the use of IBM SPSS 26. The basic procedure reviewing data was to determine missing values, normality checks, and assessment of items total correlations. Exploratory Factor Analysis (EFA) was set up as Principal Component Analysis (PCA) with Varimax rotation to assess the factor structure of each construct. Factors that had eigenvalues larger than 1 were selected following Kaiser's criteria. The data was analyzed using the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's Test of Sphericity to determine how suitable it was for factor analysis. Internal consistency was checked by calculating Cronbach's Alpha and values lower than 0.70 were not considered acceptable (Devellis & Thorpe, 2021; Hair et al., 2019). Those items that had factor loadings less than 0.5 required evaluation for rephrasing them.

3. Results

Table 1: KMO and Bartlett's Test							
No. of		Constructs	KMO Test	Bartlett's Test			
Components							
2		Service Quality	0.837	0.00			
1		System Quality	0.779	0.00			
1		Information Quality	0.775	0.00			
2		Security Quality	0.725	0.00			
1		User Satisfaction	0.736	0.00			
2		SSM Website	0.645	0.00			

3.1 Kaiser-Meyer-Olkin (KMO) and Bartlett's Test of Sphericity

The Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy and Bartlett's Test of Sphericity were performed to evaluate the suitability of the dataset for Exploratory Factor Analysis (EFA). The purpose of both tests is to measure whether the constructs' correlation matrices are structured enough for factor analysis.

A KMO value above 0.6 is generally considered adequate for using factor analysis (Kaiser, 1974). A significant difference between the correlation matrix and the identity matrix (p < 0.05), as measured by Bartlett's Test, demonstrates that factor analysis should be used.

Service Quality had the highest KMO value at 0.837 and classified as meritorious. Since this value is strong, it shows the inter-item correlations are sufficient to proceed for factor extraction. There are two components during the extraction in this construct which might include several dimensions, consistently with literature in service quality models, such as SERVQUAL by Parasuraman et al., (1988).

Both System Quality and Information Quality had KMO values of 0.799 and 0.775 which put them in the middling to meritorious range. The values of each construct were suggested to have unidimensional structure and could be used to support their inclusion in the subsequent EFA. Since both constructs are represented by a single component, it shows the respondents perceived the SSM system's aspects to be aligned with each other.



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Security Quality generated a KMO of 0.725 along with two components, suggesting the items represent more than one conceptual dimension in security such as technical and perceived aspects. Other studies have also found that the users often differentiate between interface related security (e.g. visible indicators) and back-end security such as encryption protocols (Bélanger & Carter, 2008). Since the KMO is moderate, EFA is acceptable, but the presence of multiple factors shows that the scales must be further improved.

User Satisfaction has been found to be acceptable based on its KMO of 0.736 and support only by one latent variable. These types of constructs are generally written to understand how a user is overall satisfied. A good result from KMO and the extracting of just single factor are consistent with expectations and show the construct is well related.

The SSM Website having a KMO statistic of 0.645 which shows that sampling was only middling (Kaiser, 1974). Even though it works for EFA, it means the relationship among the items is weaker. It suggests that users understand the SSM Website serves dual functions possibly such as usability and visual appeal, or functional utility and informational richness. The role of this construct as moderator shows the multifactor structure should be treated with close attention in the subsequent analysis.

From the KMO and Bartlett's test results, all the constructs were statically significant (p = 0.000), confirming that the factor analysis was necessary.

In conclusion, the KMO and Bartlett's test results indicate that EFA is suitable for the pilot data. All the constructs meet the criteria for factorability, and the patterns observed are similar results found in previous literature on information systems and e-government platforms.

Constructs	Eigenvalues	Total Variance	Cronbach's Alpha	Item
	>1	(%)		
Service Quality	5.664	68.91	0.91	10
	1.195	-		
System Quality	3.704	61.74	0.869	6
Information	3.734	62.24	0.872	6
Quality				
Security Quality	4.975	58.29	0.837	13
	2.688			
User Satisfaction	3.512	70.25	0.892	5
SSM Website	2.466	75.54	0.728	5
	1.311			

3.2 Exploratory Factor Analysis (EFA) and Reliability Testing Table 2: EFA and Reliability Testing

The Exploratory Factor Analysis and reliability testing assist respondents' insights into the underlying structure and internal consistency of the survey constructs. According to Kaiser's criterion, the eigenvalues obtained were greater than 1 variance and the total variance reflect the proportion of variance accounted for by selected components. Finding of discriminant validity made when the correlation is under 0.7. as this indicates shared variance is no greater than 49% (Cheung et al., 2023). In other words, the amount of variability that is common between the two constructs is under 50%. To put it another way, the amount of two shared constructs (<50%) is lower than the unshared variance of each construct (>50%) (Cheung et al., 2023).



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al., 2023). The Cronbach's Alpha was used to measure internal consistency, with minimal acceptable reliability value at 0.70 (Hair et al., 2010).

Service Quality shows the eigenvalues of 5.664 and .195 which explained 68.91% of the variance. It exceeds the 60% common recommendation found in social science. High Cronbach's Alpha (0.910) demonstrates that the 10-item scale is very reliable in both its concept and its statistics. Two aspects found in this research show that service quality in e-government literature has multiple aspects, with some focus on procedures and others on results (Parasuraman et al., 1988).

According to System Quality, there was only one factor (eigenvalue of 3.704) explaining 61.74% of the variance. The high measure of 0.869 for Cronbach's Alpha suggests that all items in the survey are internally reliable. This shows that the construct is cohesively perceived by users, possibly involving dimensions such as system functionality, reliability, responsiveness, which are traditionally grouped under the system quality metrics in IS success models (W. H. Delone & Mclean, 2003; W. Delone & McLean, 1992).

Information Quality only had one factor with an eigenvalue of 3.734 and accounted for 62.24% of the total variance. The scale is internally reliable with Cronbach's Alpha of 0.872, suggesting that the six items gauge the same concept. This reflects the users' perceptions of content accuracy, completeness, and timeliness on the website.

Evaluation of Security Quality showed a pattern with two factors with eigenvalues of 4.975 and 2.688 and explained 58.29% of the variation. The Cronbach's Alpha of 0.837 presenting the consistency among the elements is good. Based on the dual factor solution, the respondents may interpret security having two dimensions such as perception of feel safe and by observation by noticing padlock. The three items (SC3, SC10, and SC11) had weak loadings (< 0.5) due to limited cybersecurity awareness. To make the scales easier for users to understand, the items were reviewed to better match for non-technical users, consistent with item refinement practices (Devellis & Thorpe, 2021).

User Satisfaction dimension had a strong eigenvalue (3.512), demonstrating that it accounts for most of the variance (70.25%). With a Cronbach's Alpha of 0.892, the questionnaire is considered extremely reliable. These satisfaction questions seem to represent the overall feelings and acceptance of the SSM system.

A two-component model was found on the SSM website, with eigenvalues of 2.466 and 1.311 and 75.54% of variance explains how the five items are related. Its Cronbach's Alpha came out to be 0.728, an acceptable number for research f this type, though chances are it could be better in later research. The structure shows that the respondents differentiate factors related to ease of use and to overall appearance. Overall, the EFA results confirm that every construct features a good and reliable factor structure. The findings confirm that the instrument used is psychometrically valid.

4. Conclusion

This pilot study clearly indicates that the survey designed for SSM assessment in Brunei Darussalam's public sector is valid and applicable. The psychometric properties of the six constructs were satisfying and excellent, based on the data obtained. Exploratory Factor Analysis showed the main factors and Cronbach's Alpha demonstrated that the items within each construct were all consistent.

Notably, the multidimensionality findings in Service Quality, Security Quality and SSM Website constructs highlight complex nature of user interaction with the e-government systems. Given the weak impact of three Security Quality items, it is evident that item phrasing should be easy for users to



understand particularly in non-technical environment. These findings allow for immediate changes and helped to improve the construct clarity and contextual alignment.

In general, the pilot demonstrate that the instrument is suitable for the main study. Performing the preliminary validation process contributes not only to methodological rigor but also ensures the futures analysis will be based on reliable and interpretable data. At this point, it represents a critical step in strengthening the empirical assessment of e-government system with in Bruneian civil service context.

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