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Research Paper

Framework for Assesting the Performance of Hierarchical Organization in Adoption of Higher Education Information System

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Abstract

Adopting and successfully implementing information systems in higher education is essential to improve administrative processes and communication and support academic activities. However, the hierarchical nature of these organizations poses unique challenges that need to be addressed for the effective adoption of information systems. This study proposes a framework for assessing the performance of hierarchical organizations in effectively implementing information systems in universities. This framework provided a structured approach to assessing the performance of hierarchical organizations in the adoption of information system success in higher education institutions. This framework considered the various dimensions influencing the successful adoption of information systems in hierarchical organizations. This dimension includes leadership support, communication channels, organizational culture, and resource allocation. This study aimed to provide a structured approach for evaluating and adopting information systems at various levels of the organizational hierarchy. A structural equation model using a quantitative method and Smart Partial Least Square are utilized for data analysis. Using a population of 121 respondents, data was collected using a questionnaire instrument used the Google Form link Banten Province higher education leadership level. Secondary data was obtained using documentation studies and literature studies. The limitations of this study are limited by a small sample size, making it challenging to generalize findings to a broader population of higher education institutions. Further, organizational culture plays a vital role in the adoption of technology. The framework may need to sufficiently address the influence of cultural factors on the acceptance and performance of information systems within hierarchical organizations. The research results show that by leveraging this framework, institutions can enhance their information system adoption processes and ultimately improve their effectiveness in utilizing information systems for academic and administrative purposes.

Keywords: *Framework, Hierarchical Organization, Higher Education, Information System Success, SEM-PLS*

INTRODUCTION

In the current digital era, the effective adoption and utilization of information systems (IS) are vital for the success and competitiveness of higher education institutions (HEIs). These systems enable institutions to streamline administrative processes, enhance teaching and learning experiences, and improve organizational performance. However, the adoption and success of IS in HEIs often involve complex hierarchical structures, which pose unique challenges in assessing and measuring their performance.

This study presented an extensive framework for assessing the performance of hierarchical organizations in IS adoption within the context of higher education institutions. The framework aimed to provide a structured approach for evaluating the effectiveness and efficiency of IS adoption across various levels of the organizational hierarchy, including top management, middle management, and end-users.

Improving information systems is crucial for a higher education institution to compete and survive in the world of education (Kurniawati, Naimah and Wurjaningrum, 2021), (Yulianti, Sridadi and Lestari, 2022). Each plays an asynchronous role in organizational hierarchies and management

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operations (Angriani *et al.*, 2020), (Ilham *et al.*, 2021), (Zhang and Yu, 2022). The use of IS in higher education has become necessary (Rapanta *et al.*, 2020). If the information system in an organization has good quality, then the organization will run well (Fu *et al.*, 2022). Using the DeLone and McLean IS Success models is one technique to evaluate the effectiveness of the information systems model (Sardjono *et al.*, 2022), which will be considered the DeLone and McLean Framework Model, which can be utilized to assess and quantify the factors influencing information system success in organizations.

The success of the information system used in an organization is one of the crucial missions of the organization (Tallon *et al.*, 2019). Organizational hierarchy support is needed to ensure a system gets the funding and resources it needs to be successful (Mikalef and Gupta, 2021). Top management support can raise the quality level of knowledge and affect the commitment of each individual to an organization (Muhammed and Zaim, 2020). Therefore, this study suggests an interdependence model between temporal and causal categories. Thus, this study will provide an overall picture of organizational hierarchical culture based on the success rate of higher education information system assessments. Researchers adapt, adopt, and combine the two examples into a new model used explicitly in information systems' prosperous development and fulfilment. In connection with the above objectives, two research questions were then asked to guide the implementation of the research, namely:

RQ1: What is the most effective framework for assessing the performance of hierarchical organizations in adopting of higher education information systems?
RQ2: How to integrate the information system adoption model in higher education institutions?

LITERATURE REVIEW

The DeLone and McLean Information Systems Success Model

Known as the parsimony model, a good model is comprehensive but uncomplicated (Marsh *et al.*, 2020) Using the concepts and findings of earlier research that DeLone and McLean have studied (DeLone and McLean, 2003). Constructed a parsimony model known as the DeLone and McLean Information Systems Success Model (D&M IS Success Model) (DeLone and McLean, 1992), illustrated in Figure 1.

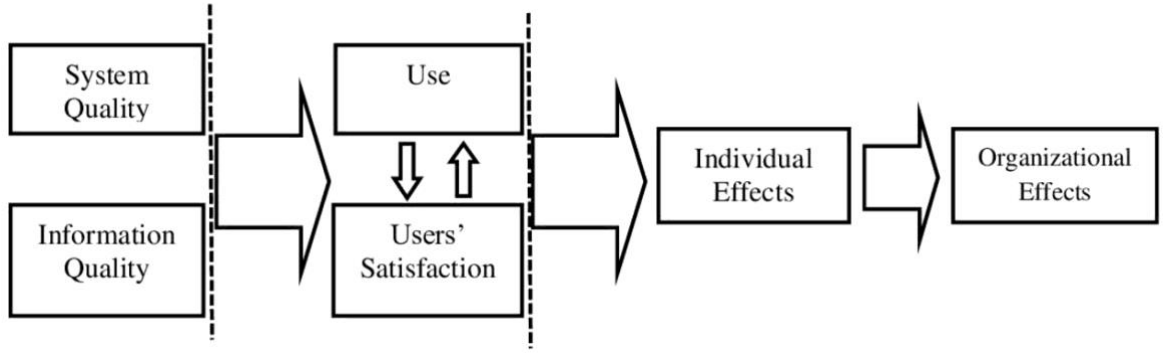

Figure 1. Model for IS Success DeLone and McLean 1992 [25]

The reliability of six success indicators for information systems is shown in the DeLone and McLean model. These are the six measurement components of this model: 1) System Quality, 2) Information Quality, 3) Use, 4) User Satisfaction, 5) Individual effects, and 6) Organizational effects. The basis for this success model is the processes and constructive relationships of the model dimensions. These six factors determining whether an information system is successful are measured collectively in this model rather than individually, with each element influencing the others.

Information System Success Measurement

The DeLone and McLean information system success model proposes that the system quality measures technical success, the information quality measures semantic success, and the use, user satisfaction, individual impact, and organizational impact assess success effectiveness (DeLone and McLean, 1992). Many measurements are used to evaluate the effectiveness of information systems (Dina, Sabilla and Kartono, 2019), (Firmansyah, Herdiana and Yuniarto, 2020), (Haerani, Rahman and Kamelia, 2022)-(Yuniarto and Herdiana, 2018) no one measurement is better than another. In the DeLone and McLean model, six primary dimensions are used to measure the factors determining whether information systems are thriving, including system quality, information quality, service quality, system utilization, user satisfaction, and net benefits (DeLone and McLean, 2003). The Delone and Mclean model is successful because it is a simple model and is often used in testing information systems, especially to find out how successful the system under study is (Sardjono *et al.*, 2022).

RESEARCH METHODOLOGY

Research Design

The study is quantitative, and it explained to be used specific instruments. The mechanism employed in this study is the survey method to get data regarding Cameron's theory and the IS success DeLone and McLean adoption framework model. The stages carried out in the research findings such as Figure 2.

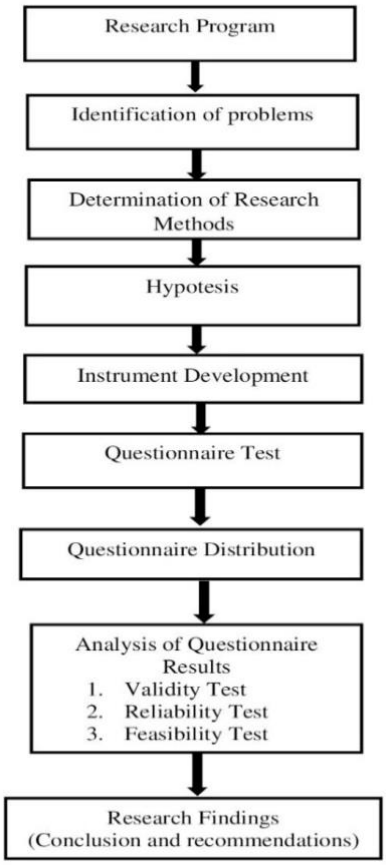

Figure 2. Analysis Flow

The description of the research shown in Figure 2 phase can be converted into research

objects by identifying the issues that will be investigated in this investigation, where the research that becomes the object of this research is the performance of the hierarchical organization in information system adoption.

Data Collection

A questionnaire was used to collect most of the data instrument used a Google Form at the level of higher education leaders in Banten Province. The questionnaire was compiled from Vankatest research and has a five-point Likert scale ranging from 'strongly disagree' to 'strongly agree' (Abbas, 2020). A sample of 121 participants was used in this investigation through a non-probability convenience sampling technique from 30 universities in the region. Meanwhile, secondary data was obtained using documentation studies and literature studies. The use of questionnaires is the primary method for data collection. The questionnaire results will be translated into figures, tables, statistical analyses, descriptions, and conclusions (Mardiana, Tjakraatmadja and Aprianingsih, 2018). Validity testing is carried out before the questions are tested on those used as research subjects (Tang *et al.*, 2020).

Proposed Research Framework

The proposed conceptual structure is based on research combining and reformulating theoretical models (Cameron and Sine, 1999). The proposed study form is shown in Figure 3.

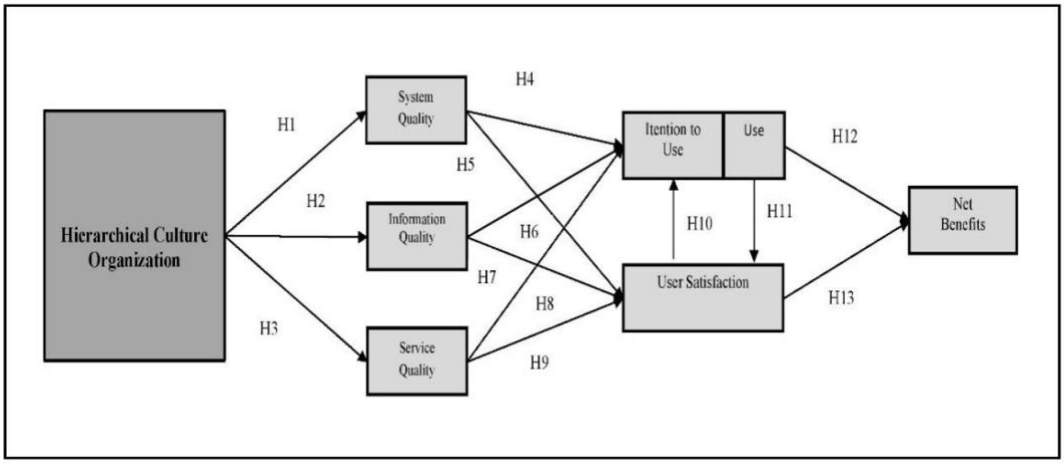

Figure 3. Proposed Research Model

Figure 3 arranged according to the level of organizational readiness to implement and use information systems in tertiary institutions so that institutions can be said to be ready to use information systems. The model obtained is based on merging organizational hierarchies (Cameron and Sine, 1999), and model adoption DeLone and McLean (DeLone and McLean, 2003) will describe the research variables' interactions (Luo *et al.*, 2022). Based on Figure 3, this research model consists of eight variables and 13 relational hypotheses. The proposed research model described above will explore the effectiveness of organizational hierarchy, its adoption, and the successful application of the IS model in the context of higher education institutions. The main constructions in this investigation are shown in Table 1.

Table 1. The proposed model of the main construction

No.	Variable	Definition	Indicator	Symbol
1.	Hierarchical Organization Culture (HCO)	The size by which the organizational hierarchy influences the implementation of information systems	Control Monitoring Involve Punctuality Culture	HCO1 HCO2 HCO3 HCO4 HCO5

2.	System Quality (SYQ)	Measuring the quality of the system itself, both software and hardware	Easy to use Maintenance Response time Utility Security	SYQ1 SYQ2 SYQ3 SYQ4 SYQ5
3.	Information quality	The quality of information is subjectively measured by users.	Accuracy Punctuality Completeness Consistency Relevance	IFQ1 IFQ2 IFQ3 IFQ4 IFQ5
4.	Quality of Service (SVQ)	Comparison of user expectations with the actual service perceptions they receive.	Responsiveness Flexibility Utility Security Extention	SVQ1 SVQ2 SVQ3 SVQ4 SVQ5
5.	Intention of Use (ITU)	The difference between use is the use of the system, which means the use of information, and the use if the information system itself	Perceived usefulness Extrinsic Motivation Perfect for work Relative advantage Expected results	ITU1 ITU2 ITU3 ITU4 ITU5
6.	Usage (USE)	The use of the system in fulfilling the services required by users	Frequency of use Intensity of use Usage rate Specificity of use Proper use	USE1 USE2 USE3 USE4 USE5
7.	User Satisfaction (USF)	Is the response and feedback that appear from the user after using the information system.	Efficiency Effectiveness Flexibility Enough Overall satisfaction	USF1 USF2 USF3 USF4 USF5
8.	Net Benefit (NBF)	Results or benefits felt by individuals and organizations after implementing information systems	Continuity of use Continuation of services provided Continuation of use System continuity Promote service	NBF1 NBF2 NBF3 NBF4 NBF5

FINDINGS AND DISCUSSION

The results of statistical analysis consist of several stages. The first step is reflective measurement and evaluation of the structural model. Evaluation of this reflective measure is one step in evaluated the internal consistency reliability value used external loadings in Table 2, followed by assessing the reliability indicators presented. Discriminant validity involves convergence. Structural model evaluation is a phased that determines whether a hypothesis can be developed based on the research model. Next, the latent variable of the path model's endogenous latent variable, R2, is evaluated; In the final stage, the contribution of the exogenous construct to the endogenous latent variable is shown in Table 2.

Table 2. Outer Loadings

	HCO	IFQ	ITU	NBF	SVQ	SYQ	USE	USF
HCO1	0.825							
HCO2	0.813							
HCO3	0.782							
HCO4	0.753							
HCO5	0.711							
IFQ1		0.768						
IFQ2		0.891						
IFQ3		0.886						
IFQ4		0.895						
IFQ5		0.812						
ITU1			0.750					
ITU2			0.865					
ITU3			0.889					
ITU4			0.835					
ITU5			0.844					
NBF1				0.832				
NBF2				0.733				
NBF3				0.756				
NBF4				0.792				
NBF5				0.826				
SVQ1					0.755			
SVQ2					0.862			
SVQ3					0.803			
SVQ4					0.818			
SVQ5					0.798			
SYQ1						0.717		
SYQ2						0.763		
SYQ3						0.826		
SYQ4						0.813		
SYQ5						0.770		
USE1							0.718	
USE2							0.753	
USE3							0.755	
USE4							0.761	
USE5							0.863	
USF1								0.850
USF2								0.799
USF3								0.814
USF4								0.811
USF5								0.849

Based on the table above, all latent variable indicators have outer loading values above 0.70, so they can be said to be valid. Figure 4 shows the construction of the external model analysis diagram.

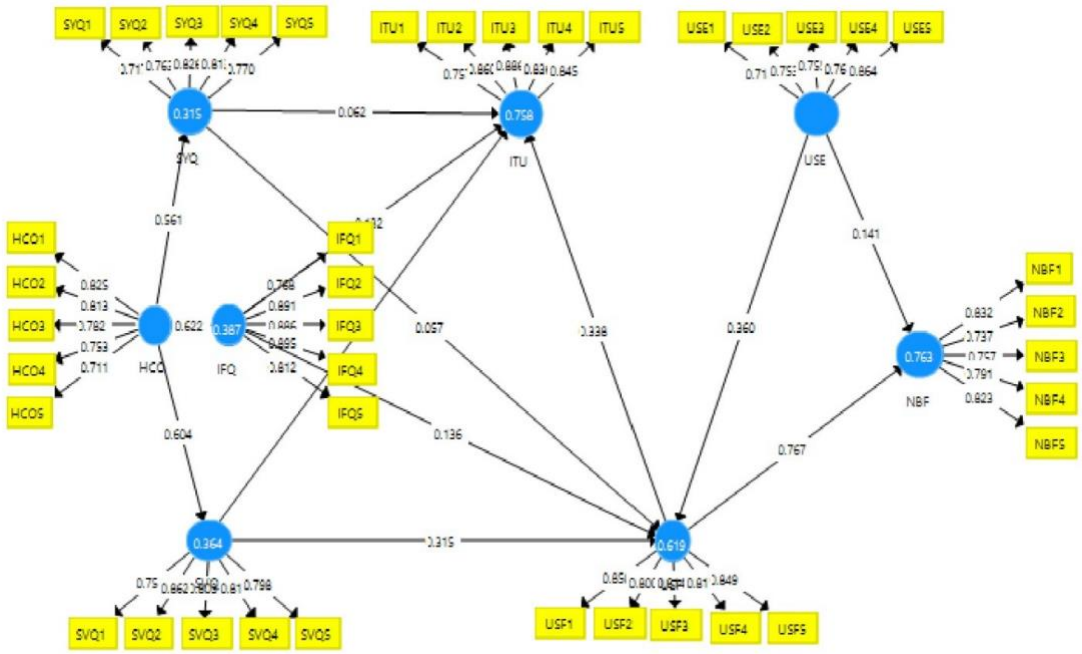

Figure 4. Outer Model Analysis

Table 3. Construct Reliability

	Composite Reliability	Cronbach's Alpha	Average Variance Extracted (AVE)	Results
HCO	0.884	0.836	0.605	Reliable
IFQ	0.929	0.904	0.726	Reliable
ITU	0.922	0.893	0.702	Reliable
NBF	0.892	0.848	0.622	Reliable
SVQ	0.904	0.867	0.653	Reliable
SYQ	0.885	0.838	0.607	Reliable
USE	0.880	0.830	0.596	Reliable
USF	0.914	0.883	0.681	Reliable

The findings in Table 3 above show that all variables have composite reliability values larger than 0.70. This shows that the reliability of internal consistency has a high value.

Table 4. R Square

	R Square	R Square Adjusted
IFQ	0.387	0.382
ITU	0.757	0.751
NBF	0.786	0.782
SVQ	0.364	0.360
SYQ	0.315	0.310
USF	0.619	0.609

Table 5. Path Coefficient Value

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values	Results
HCO -> IFQ	0.622	0.618	0.093	6.709	0.000	Significant
HCO -> SVQ	0.604	0.600	0.089	6.768	0.000	Significant
HCO -> SYQ	0.561	0.564	0.084	6.666	0.000	Significant
IFQ -> ITU	0.132	0.150	0.141	0.937	0.349	Not Significant
IFQ -> USF	0.136	0.132	0.182	0.746	0.456	Not Significant
SVQ -> ITU	0.422	0.391	0.148	2.845	0.005	Significant
SVQ -> USF	0.315	0.297	0.108	2.927	0.004	Significant
SYQ -> ITU	0.062	0.083	0.079	0.793	0.428	Not Significant
SYQ -> USF	0.057	0.076	0.116	0.495	0.621	Not Significant
USE -> NBF	0.141	0.150	0.054	2.587	0.010	Significant
USE -> USF	0.360	0.366	0.071	5.077	0.000	Significant
USF -> ITU	0.338	0.330	0.065	5.218	0.000	Significant
USF -> NBF	0.767	0.758	0.061	12.521	0.000	Significant

CONCLUSIONS AND FURTHER RESEARCH

The framework presented for assessing the performance of hierarchical organizations in the successful adoption of information systems in higher education provides a systematic approach to evaluating and improving the effectiveness of information system implementation. This framework addresses hierarchical organizations' unique challenges in higher education institutions and offers a comprehensive set of evaluation criteria. By considering various dimensions such as leadership support, communication channels, organizational culture, and resource allocation, the framework helps identify strengths and weaknesses in the hierarchical organization's ability to adopt and successfully implement information systems.

Overall, this framework serves as a valuable tool for higher education institutions to assess the performance of their hierarchical organizations in successfully adopting information systems. By leveraging this framework, institutions can improve their effectiveness and achieve better results in utilizing information systems for academic and administrative purposes.

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