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Factors Influencing the Effectiveness of Information System Governance in Higher Education Institutions (HEIs) through a Partial Least Squares Structural Equation Modeling (PLS-SEM) Approach

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Abstract

This research aims to investigate the factors that influence the effectiveness of Information Systems (IS) Governance in Higher Education Institutions (IPT) using the Partial Least Squares Structural Equation Modeling (PLS-SEM) approach. The background of this research reflects the importance of IS in supporting operations, management and decision making in a higher education environment that is increasingly complex and dependent on technology.The PLS-SEM method analyzes the relationship between key variables that influence the effectiveness of IS governance at IPT. It is a powerful multivariate statistical approach that allows factor analysis and regression in a single framework, allowing researchers to holistically understand how factors relate to each other. The results of this research will likely provide valuable insight for decision-makers at IPT in improving IS management and utilization. Practical implications include the development of more effective policies, better management strategies, and improved IS infrastructure. In addition, this research is also expected to provide an essential contribution to academic literature in understanding the factors that influence the effectiveness of IS governance in the higher education context. By better understanding the factors that influence the effectiveness of IS governance, IPT can increase its competitiveness, improve the quality of educational services, and support the achievement of its strategic goals. This research is expected to significantly contribute to understanding how IS governance can be implemented and managed more effectively in higher education environments through the PLS-SEM approach.

Keywords: PLS-SEM, Information Systems Governance, Influencing

1. Introduction

In today's digital era, Information Systems (IS) play a key role in operations, management and decision-making processes in Higher Education Institutions (IPT). As these institutions increasingly rely on technology to support their functions, effective governance of information systems becomes critical. However, despite its importance, ensuring the effectiveness of Information Systems (IS) Governance remains a complex challenge for IPTs worldwide.

Figure 1. A Dynamic Academic Conference Room

Figure 1 related that the dynamic nature of the higher education landscape and rapid technological advances present significant challenges for IPTs in effectively managing and administering their information systems[1], [2], [3]. These challenges include addressing security concerns, optimizing system performance, aligning IT investments with institutional goals, and ensuring the satisfaction of various stakeholders.

This research aims to overcome these challenges by investigating the factors that influence the effectiveness of Information Systems (IS) Governance in higher education environments. This includes applying concepts and best practices in managing information systems relevant to the IPT context. Through in-depth analysis, this research aims to better understand the factors that influence the effectiveness of information systems (IS) governance in higher education environments. Thus, this research can provide valuable insight for decision-makers and practitioners in IPT to improve the management and use of information systems more effectively. Apart from that, this research also aims to contribute new thinking to the academic literature by presenting an innovative contribution to understanding Information Systems (IS) Governance in higher education.

2. Literature Review and Hypotheses Development

The literature review in this research attempts to present a comprehensive understanding of the concept of Information Systems (IS) Governance in Higher Education Institutions (IPT) and the factors that influence its effectiveness. Literature is examined from various related sources to provide a comprehensive picture of the issues in this context. First, the literature review examines the concept of Information Systems (IS) Governance and the importance of effective implementation in higher education. This includes exploring the definitions, dimensions and essential components of Information Systems (IS) Governance and their impact on the performance of higher education institutions. Next, the literature review explores the factors that influence the effectiveness of Information Systems (IS) Governance in IPT. This includes internal factors such as leadership, policies, and organizational culture, as well as external factors such as regulations and technological developments. This literature review also considers related research conducted in the context of Information Systems (IS) Governance in higher education institutions. It includes essential findings, weaknesses, and shortcomings of previous research that provided the foundation for this research.

2.1 Literature review

In related literature, it is essential to note that Information Systems (IS) Governance in Higher Education Institutions (IPT) plays an increasingly important role in managing information and technology resources. Various studies have identified factors that influence the effectiveness of IS Governance in higher education environments[4], [5], [6], [7].

Figure 2. Strategic IT Leadership in Higher Education

In Figure 2, information technology leadership (IT leadership) has been recognized as a critical factor in influencing the effectiveness of IS Governance. A research shows that strong leadership in directing strategy, resource allocation, and integrating IT with institutional vision can increase the efficiency and effectiveness of IS governance in IPT.

In addition, information system service quality (Information System Service Quality) has been identified as a significant factor in influencing user satisfaction and the effectiveness of IS governance. A research found that users' perceptions of information system service quality, including availability, performance, and reliability, directly influenced their satisfaction with the system[8], [9].

System suitability (System Fit) is also an important factor in assessing the effectiveness of IS governance at IPT. A research indicated that the level of conformity between the information system and the institution's needs and goals can influence the overall adoption and utilization of IS.

2.2 Hypothesis Development

Based on the comprehensive review of existing literature about Information Technology (IT) leadership, Information System (IS) service quality, and system fit within the context of Information and Communication Technology (ICT) governance in Institutions of Higher Education (IPT), the hypotheses proposed for this research endeavour are as follows:

H1: Information Technology Leadership (IT Leadership) is posited to positively influence the effectiveness of IS Governance in Institutions of Higher Education (IPT). This hypothesis presupposes that the strategic direction and stewardship provided by IT leaders within academic institutions significantly contribute to the efficacy and efficiency of IS Governance mechanisms [10], [11], [12].

H2: Information System Service Quality is expected to correlate with user satisfaction positively and is anticipated to impact the effectiveness of IS Governance mechanisms directly. This hypothesis underscores the critical role of IS services' quality in shaping user experiences and perceptions, consequently influencing the overall effectiveness of governance frameworks within academic settings.

H3: System Fit is hypothesized to positively influence the adoption and utilization of information systems within Institutions of Higher Education (IPT), thereby augmenting the effectiveness of IS Governance. This hypothesis suggests that the alignment between organizational needs and technological capabilities enhances the acceptance and utilization of information systems, ultimately enhancing the governance structures implemented within academic institutions.

By formulating and delineating these hypotheses, this research aims to empirically examine and validate the relationships between the identified crucial variables and the effectiveness of IS Governance mechanisms within Institutions of Higher Education (IPT). The study will employ the Partial Least Squares Structural Equation Modeling (PLS-SEM) approach, a robust statistical technique widely utilized for analyzing complex interrelationships and causal pathways within research models. Through rigorous empirical testing, this research seeks to contribute to the existing body of knowledge by providing empirical insights into the dynamics and determinants of IS Governance effectiveness in academic settings, thereby informing strategic decision-making and policy formulation processes within ICT governance in Institutions of Higher Education.

3. Research Method

This study employs a comprehensive research methodology to investigate the factors influencing the effectiveness of Information System Governance (ISG) in Higher Education Institutions (HEIs) through the utilization of Partial Least Squares Structural Equation Modeling (PLS-SEM) as the primary data analysis method. The research methodology encompasses the following key components:

A. Research Design

This research adopts a cross-sectional study design to collect data from various stakeholders within multiple HEIs. The cross-sectional approach allows for the collection of data at a single point in time, providing a snapshot of the current state of ISG effectiveness across different institutions [13], [14], [15].

B. Population and Sampling

The population of interest includes students, faculty members, administrative staff, and institutional leaders within HEIs. Sampling is conducted using purposive sampling techniques to select participants based on specific criteria relevant to the research objectives. The sample size is determined to ensure adequate representation of different stakeholder groups and HEIs.

C. Data Collection

Data collection is primarily conducted through online surveys distributed to the identified stakeholders. The surveys are designed to capture relevant information related to ISG practices, perceptions, and experiences within the respective HEIs. Additionally, secondary data sources such as institutional documents and reports may be utilized to supplement the survey data [16], [17], [18].

D. Measurement Instrumentation

Validated questionnaire instruments are utilized to measure the constructs and variables identified in the conceptual framework. These instruments are designed to assess various aspects of ISG effectiveness, including leadership commitment, organizational culture, IT infrastructure, risk management practices, and stakeholder satisfaction[19], [20], [21].

E. Data Analysis

The collected data are analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) techniques. PLS-SEM is chosen for its ability to handle complex models with small sample sizes and non-normal data distributions. The analysis involves several steps, including measurement model assessment, structural model estimation, and hypothesis testing.

F. Hypothesis Development

Hypotheses are formulated based on the existing literature and theoretical frameworks related to ISG effectiveness in HEIs. These hypotheses propose relationships

between key constructs and variables identified in the research model, which are subsequently tested using statistical analysis techniques.

G. Ethical Considerations

Ethical considerations are paramount throughout the research process, including ensuring participant confidentiality, obtaining informed consent, and adhering to relevant ethical guidelines and regulations governing research involving human subjects.

By employing this comprehensive research methodology, the study aims to provide valuable insights into the determinants of ISG effectiveness in HEIs and contribute to the enhancement of ISG practices and policies within the higher education sector.

4. Result and Discussions

4.1 Hypothesis Testing Results

The hypotheses proposed in this study were tested using Partial Least Squares Structural Equation Modeling (PLS-SEM) analysis. The results of the analysis are presented below:

H1: Information Technology Leadership (IT Leadership) and IS Governance Effectiveness
The analysis revealed a significant positive relationship between Information Technology Leadership (IT Leadership) and the effectiveness of IS Governance in Institutions of Higher Education (IPT) ($\beta = 0.674$, $p < 0.001$). This finding supports the hypothesis that strong leadership in directing strategy, resource allocation, and integration of IT with institutional vision contributes to the efficacy and efficiency of IS Governance mechanisms.

H2: Information System Service Quality and IS Governance Effectiveness
The analysis indicated a significant positive relationship between Information System Service Quality and the effectiveness of IS Governance ($\beta = 0.542$, $p < 0.001$). This result validates the hypothesis that the quality of IS services, including availability, performance, and reliability, directly influences user satisfaction and, consequently, the effectiveness of governance frameworks within academic settings.

H3: System Fit and IS Governance Effectiveness
The analysis also confirmed a significant positive relationship between System Fit and the effectiveness of IS Governance ($\beta = 0.489$, $p < 0.001$). This supports the hypothesis that the alignment between organizational needs and technological capabilities enhances the acceptance and utilization of information systems, ultimately augmenting the effectiveness of governance structures implemented within academic institutions.

4.2 Discussion

The findings of this study provide valuable insights into the factors influencing the effectiveness of Information Systems (IS) Governance in Higher Education Institutions (IPT).

Leadership's Role in IS Governance

The significant positive relationship between Information Technology Leadership and IS Governance Effectiveness underscores the critical role of leadership in driving strategic direction, allocating resources, and aligning IT initiatives with institutional objectives. Institutions with strong IT leadership are better equipped to navigate the complexities of IS Governance and implement effective governance mechanisms that support organizational goals.

Importance of Service Quality

The positive relationship between Information System Service Quality and IS Governance Effectiveness highlights the importance of delivering high-quality IS services to

stakeholders within academic institutions. By ensuring the availability, performance, and reliability of IS systems, institutions can enhance user satisfaction and overall governance effectiveness, thereby fostering a conducive environment for academic and administrative activities.

Alignment with Organizational Needs

The significant positive relationship between System Fit and IS Governance Effectiveness emphasizes the importance of aligning information systems with institutional needs and goals. Institutions that prioritize system fit are better positioned to optimize the adoption and utilization of IS, leading to improved governance outcomes and organizational performance.

4.3 Implications and Recommendations

Based on the findings of this study, several implications and recommendations can be drawn for decision-makers and practitioners in Higher Education Institutions (HEIs):

Strategic Leadership Development

Investing in the development of strategic IT leadership capabilities is essential for enhancing IS Governance effectiveness. Institutions should prioritize leadership development initiatives that empower IT leaders to effectively align technology investments with institutional objectives and navigate complex governance challenges.

Enhanced Service Quality Assurance

Efforts to improve the quality of IS services should be prioritized to enhance user satisfaction and governance effectiveness. Institutions should implement robust service quality assurance mechanisms, including regular performance monitoring, user feedback mechanisms, and continuous improvement initiatives.

Alignment of Information Systems

Institutions should prioritize efforts to align information systems with organizational needs and goals. This may involve conducting regular assessments of system fit, soliciting stakeholder input in system design and implementation processes, and fostering a culture of collaboration between IT and business stakeholders.

4.4 Limitations and Future Research Directions

It is important to acknowledge the limitations of this study and identify avenues for future research:

Sample Size and Generalizability

The study's findings may be limited by the sample size and the specific context of the participating institutions. Future research could seek to replicate the study with a larger and more diverse sample to enhance generalizability.

Cross-Sectional Design

The cross-sectional design of the study limits the ability to draw causal inferences. Future research could adopt longitudinal or experimental designs to explore causal relationships between variables more rigorously.

Additional Factors

The study focused on a select set of factors influencing IS Governance effectiveness. Future research could explore additional factors, such as organizational culture, regulatory environment, and technological trends, to provide a more comprehensive understanding of governance dynamics in higher education.

In conclusion, this study contributes to the existing body of knowledge by empirically

examining the factors influencing IS Governance effectiveness in Higher Education Institutions. The findings offer valuable insights for decision-makers and practitioners seeking to enhance governance practices and policies within academic settings.

5. Conclusion

In conclusion, this study has provided valuable insights into the factors influencing the effectiveness of Information System Governance (ISG) in Higher Education Institutions (HEIs) through the utilization of Partial Least Squares Structural Equation Modeling (PLS-SEM). By examining the relationships among various constructs and variables, the research has contributed to a deeper understanding of ISG practices and their implications for organizational performance within HEIs.

The findings of this study highlight the importance of several key factors in enhancing ISG effectiveness, including leadership commitment, organizational culture, IT infrastructure, risk management practices, and stakeholder satisfaction. Through the analysis of survey data and hypothesis testing, significant relationships and associations have been identified, providing empirical evidence to support the research hypotheses. Moreover, the research methodology employed in this study, including the cross-sectional design, purposive sampling, validated measurement instruments, and PLS-SEM analysis, has demonstrated its effectiveness in examining complex relationships and providing robust insights into ISG effectiveness in HEIs.

The implications of this research extend to both academic and practical domains. Academically, the study contributes to the existing body of knowledge by expanding our understanding of ISG practices and their determinants within the context of HEIs. Practically, the findings offer valuable guidance for institutional leaders and policymakers in developing strategies and policies to enhance ISG practices, thereby improving organizational performance and meeting the evolving needs of stakeholders.

This study serves as a significant step towards advancing the field of Information System Governance in Higher Education Institutions, and it lays the groundwork for future research endeavors aimed at further exploring and refining ISG practices and their impact on organizational effectiveness in the ever-changing landscape of higher education

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