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Mapping Determinants of Success through Information Systems in Higher Education: A Structural Equation Modeling Approach

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Research Article

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Abstract

Background/purpose. This research aims to identify the key factors influencing the successful implementation of information systems in universities, especially in Indonesia. The main focus of the research is on work efficiency, collaboration, decision-making, and output quality in the context of university information systems.

Materials/methods. The study used Structural Equation Modeling (SEM) method to analyze the data. The research sample consisted of 412 respondents, including university faculty, students, and administrative staff. The analysis was conducted to measure the influence of various factors on system quality, user satisfaction, and operational performance.

Results. The findings showed that management support had the strongest influence on system quality (path coefficient = 0.77, $p < 0.001$) and user satisfaction (path coefficient = 0.72, $p < 0.001$). User experience (path coefficient = 0.80) and ease of use (path coefficient = 0.70) also significantly influenced positive perceptions of the system, which contributed to improved operational performance (84.8%, rated "excellent") and collaborative effectiveness (83.3%, rated "excellent"). However, the quality of the system's output remains a challenge, with only 50% of respondents rating it "excellent".

Conclusion. Improved features, especially in automated data analysis and report generation, are needed to optimize academic and administrative outcomes. Management support is needed to improve higher education outcomes. The implications of the study emphasize the importance of management's role in supporting system implementation, as well as the need for more in-depth feature development to support improved output quality.

1. Introduction

A common theme in high-end university platforms, especially along with the use of information systems as agents for innovative academics and administrations as their role in higher education changes around the world. The process of technology adoption is not only a technocratic adaptation but also a need to strengthen operational efficiency, increase institutional transparency, and increase world competitiveness in the higher education sector (Pereira et al., 2022; Rainer et al., 2020). Along with the increasing need for evidence-based decision-making and organizational improvement, the effective use of information systems has become a key driver of the success of education management (Demircioglu & Karamgul, 2021; Gajda et al., 2019, 2021). Education management information systems function as everyday tools, but they also have a strategic function in helping to further strengthen the efficiency, productivity, and transparency of the system (Fedorova & Skobleva, 2020; Szymkowiak et al., 2021). As a result, information systems in higher education institutions have changed from just complementary subsystems to core subsystems for future-oriented organizational management.

Despite the promised benefits, the implementation of information systems in universities, especially in Indonesia, is still quite challenging. The goal to make this process successful, as identified in the literature, is that there is still support from management, user engagement, technical infrastructure readiness, and training effectiveness (Crompton & Burke, 2023; Dwivedi et al., 2020; Fedorova & Skobleva, 2020; Szymkowiak et al., 2021). However, these studies often examine specific empirical cases or specific technical aspects without a thorough conceptualization that creates an integrated outline of the relationships between important factors. In addition, SEM is rarely applied to examine the complex relationships between organizational, technical, and user-related factors in higher education in Indonesia. The purpose of this study is to fill the gap in the use of SEM to develop an integrative model that determines the most important determinant of the successful implementation of information systems in the context of higher education.

Therefore, this paper has two practical and theoretical focuses by presenting a new framework based on existing theories, namely the Technology Acceptance Model (TAM), the Integrated Theory of Technology Acceptance and Use (UTAUT), and the DeLone and McLean Information Systems with the aim of improving the acceptance and use of technology. Using SEM analysis on large user data sets (faculty members, students, and administrative staff), the authors provide evidence-based suggestions that can be applied by higher education institutions (Burić & Kim, 2020; Chen et al., 2020; Idoga et al., 2022). The study provides insight into how management support affects system quality, user satisfaction, and organizational outcomes. The insights are anticipated to shed light on institutional leaders' level of understanding of how to formulate appropriate policies for the integration and utilization of information systems in a rapidly changing educational environment. Beyond theoretical contributions, the study has provided prominent practical implications for university administrators and policymakers. By outlining the interactions between the key elements that affect the implementation of information systems, universities will be able to take a more thoughtful approach to the usefulness of information technology and, at the same time, ensure their investment in technology has contributed positively to the provision of quality educational services. Therefore, this research has the potential to offer a significant contribution to scholarship and education management practices in the era of education globalization.

2. Literature Review

a. Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) is one of the most recognized theories about technology adoption by individuals and organizations. The second decade of the 21st century began with a new paradigm in the form of perceived usefulness (PU), the perception of simplicity of use as

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a key attribute that has an important role in determining the acceptance of technology among users (Al-Adwan et al., 2023; Jang et al., 2021). This postulation is built on the basis of the Theory of Reasoned Action (TRA) through the Technology Acceptance Model (TAM), where the ease of usability and perceived usability of a system is positively related to user acceptance (Alfadda & Mahdi, 2021; Yuen et al., 2021). Using this model, he researched the accessibility of existing information systems (IS) based on perceived convenience and real value for their users in higher education, such as students, teachers, and administrative staff.

This makes the Technology Acceptance Model (TAM) suitable for this research because external constructions, such as management support, training, and technological infrastructure, which can influence the user's perception of the usability of the system and the convenience over time, are easily accommodated. This will reflect an increase in the perception of information systems, leading to higher adoption and utilization rates after higher education operations provide mandatory training and comprehensive technical support. Thus, the Technology Acceptance Model (TAM) provides a theoretical context for the exploration and determination of key characteristics for the acceptance of the dissemination of information systems in higher education.

b. Unified Theory of Acceptance and Use of Technology (UTAUT)

The Integrated Theory of Technology Acceptance and Use (UTAUT) is an extension of previous models of technology acceptance, including TAM. According to Upadrista (2021), this model is built to form four formative constructions that serve as the basis for shaping intentions and behaviours regarding the use of technology: performance expectations, business expectations, social influence, and enabling conditions. (Aytekin et al., 2022; Williams et al., 2015). It is specifically related to social influences and conditions that can facilitate behavioural intentions to use information systems in college, as well as hypotheses that enter individual use. So, technology adoption is heavily based on peer pressure and organizational technical empowerment.

In addition, UTAUT categorization takes into account the influence of variable moderation (i.e., age, gender, experience, and readiness for change) that will shape the relationship between important constructions and user behavior (Dwivedi et al., 2019). By providing a broad overview of the different types of users that exist in a particular case of higher education it allows for a deeper exploration of how user differences, such as differences between types of technology between technology students compared to staff, produce a variety of spillover effects that ripple through the institution and are capable of producing a variety of outcomes that affect the success or non-absorption of such information systems. Therefore, this study describes a broader and more subtle perspective on the supporting and inhibiting elements of education 4.0 acceptance from the perspective of UTAUT-based educational institutions.

c. DeLone and McLean Information Systems Success Model

The DeLone and McLean Information Systems success model is one of the most popular frameworks that model success. The model was first introduced in 1992 and revised in 2003, highlighting six dimensions that affect the overall success of information systems: system quality, information quality, quality of service, usage, user satisfaction, and net impact (DeLone & McLean, 2003). This model is widely featured in IS research and serves not only as a technical component but as a means to understand the users involved with the technical component. Therefore making it very relevant to this study. In relation to highly educated users, the quality of the system and the quality of the information of the information system are important aspects to feel supported by the system used and the technology that is integrated with respect to the added value of the system.

In addition, the DeLone and McLean models highlight the importance of user satisfaction and system usage, as an indicator of the success of the implementation of the information system. In

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higher education, a functional information system must allow users (students, faculty, and staff) to engage with the necessary information smoothly. This model allows researchers to study the relationship between system quality, system usage, and information system value on user satisfaction and technology use (Alzahrani et al., 2019; Yakubu & Dasuki, 2018). Therefore, this model provides a solid basis for holistic assimilation towards the successful adaptation of information systems.

3. Methodology

Among various higher education institutions in Indonesia, the current study adopts a quantitative methodology using structural equation modeling (SEM) techniques (Kline, 2023), to identify the linkages between factors that influence the successful implementation of information systems. Data were collected using a structured survey questionnaire among 412 participants, including lecturers (120; 29.1%), students (200; 48.5%), and administrative staff (92; 22.4%) from three large-scale universities in Indonesia. The stratified random sampling method is used to select participants in such a way that each member of the selected group gets a proportional portion in each group. The demographics of the respondents showed almost the same gender division (52% male, 48% female) and the same variation across age groups (20 to 60 years), which represented diverse backgrounds in the use of information systems in universities. Survey instruments are built on existing frameworks, such as the Technology Acceptance Model (TAM) and the Information Systems Success Model (DeLone & McLean, 2003). The instrument consists of 25 items, which are grouped into five constructs: management support (five items), system quality (five items), user satisfaction (five items), ease of use (five items), and user experience (five items). Each item is measured on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Examples of items include "Management provides sufficient resources for system maintenance" (management support) and "The system interface is intuitive and easy to navigate" (ease of use). Similar studies selected indicators based on relevance and previous validation (De Winter & Dodou, 2010; Joshi et al., 2015).

A test of 30 respondents was conducted to test the survey instrument to determine its clarity and relevance. Reliability was evaluated through Cronbach's alpha score, and all constructs outperformed the 0.70 limit recommended above, indicating internal consistency. Confirmatory Factor Analysis (CFA) is used to evaluate the validity of the construct, and all factor charges are higher than 0.60 (Hair et al., 2017). The results show that the measurement model is suitable for subsequent SEM analysis. Structural Equation Modeling (SEM) was used to analyze the data using AMOS version 26. SEM is used to validate the research model and to test the relationship between latent variables. Conventional indices are used to evaluate model fit (χ2, RMSEA, CFI, and TLI). The RMSEA result must have an index of less than 0.08 and a CFI/TLI greater than 0.90 (Kline, 2023). The mediation effect in the model is represented by the route coefficient generated by the SEM and measures how strong the relationship between the variables of interest is as well as the overall level of fit for the model, as determined by several indices (Chi-square, RMSEA, CFI, etc.) (Kline, 2023; Nicolas et al., 2020). In SEM, path coefficients are used to assess the predictive relationships between variables, and multiple model fit indices, such as Chi-square, RMSEA, and CFI, are evaluated to ensure the overall adequacy of the model. The final stage is visualization with Julius AI technology.

4. Results

a. The Relationship between Management Support (LD) and System Quality (KT)

The results of the SEM analysis revealed significant relationships between the main variables in the model, as summarized in Figure 1. The model showed a good fit index with RMSEA = 0.045, CFI = 0.96, and TLI = 0.95, indicating a relevant research model. We also include the Chi-square value (χ^2) and the degree of freedom (df) for full transparency. The results of the calculation showed that $\chi^2(224) = 548.23$, $p < 0.001$, which indicates that the model is still acceptable given the large sample

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size. The results showed that management support (LD) had the strongest impact on system quality (KT) (path coefficient = 0.77, $p < 0.001$), followed by user satisfaction (KES) (path coefficient = 0.72, $p < 0.001$). User experience (IA) also had a strong effect on user satisfaction (KES) (path coefficient = 0.93, $p < 0.001$) and system quality (KT) (path coefficient = 0.80, $p < 0.001$). Ease of use (MW) showed a moderate effect on system quality (KT) (path coefficient = 0.70, $p < 0.001$) and user satisfaction (KES) (path coefficient = 0.55, $p < 0.001$). In addition, user perceptions of system outcomes (MAG1-MAG4) indicated that the system was highly effective in improving work efficiency (MAG1) (84.8% rated "excellent") and collaboration (MAG2) (83.3% rated "excellent"). However, the output quality (MAG4) was rated lower, with only 50% of respondents selecting "excellent." This finding underscores the need for further enhancement of the system features to improve the quality of the output.

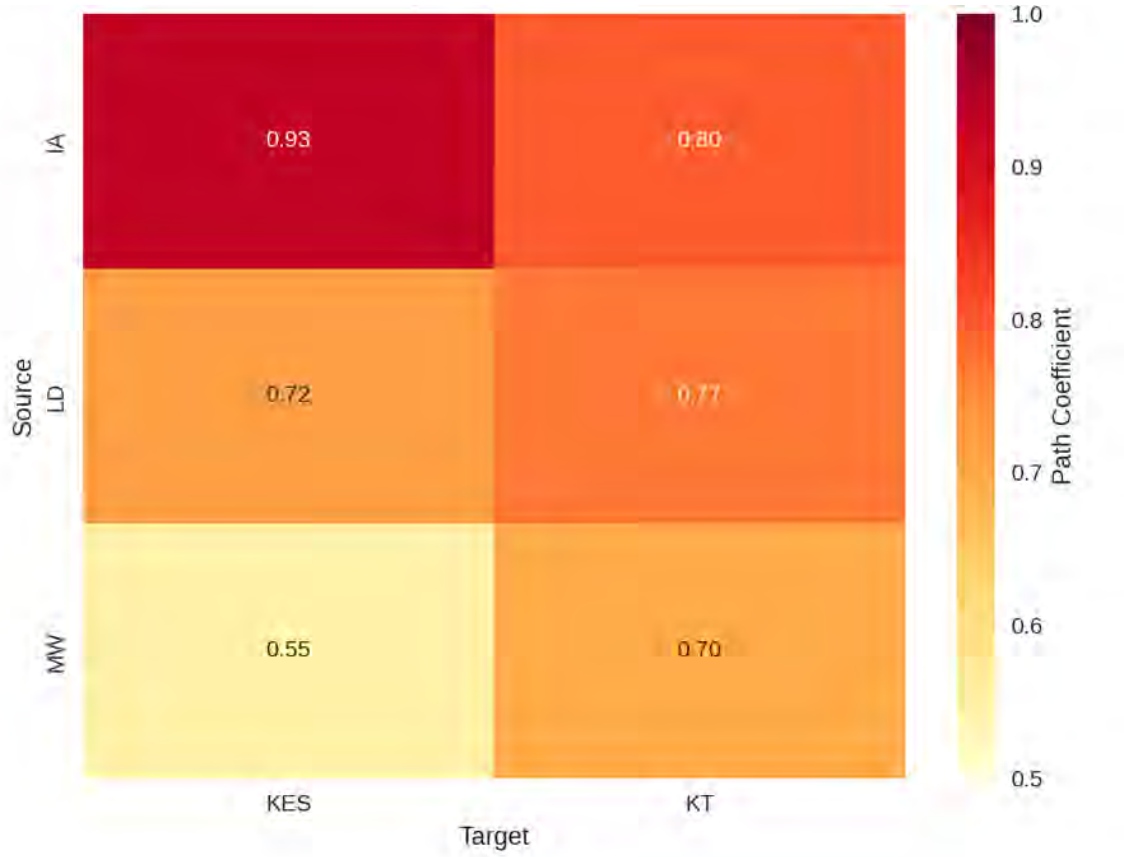

Figure 1. Heatmap of Coefficients

For this, management support has a very strong influence on system quality ($\beta = 0.77$, $p < 0.001$) as well as user experience on satisfaction ($\beta = 0.93$, $p < 0.001$). However, output quality (MAG4) received a lower rating with only 50% of respondents rating it as "very good". It needs to be investigated further to understand the factors that cause this assessment to be lower compared to other aspects of the system. For this reason, some possible causes that can affect the user's perception of the quality of the output include:

- **Limited analytical features:** The system may not provide adequate data analysis tools, so users feel undersupported in data-driven decision-making.
- **Reporting flexibility:** Reporting options that are less flexible or cannot be customized according to academic and administrative needs can lead to dissatisfaction.
- **System usability:** Users may have difficulty accessing and using reporting features if the system is not intuitive enough or has a high learning curve.

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To address this issue, further research needs to be conducted to identify specific obstacles faced by users and explore potential solutions, such as improved data analysis features, adjustments to report formats, and improved interface design to make them more user-friendly.

Figure 1 shows that management support (LD) and user experience (IA) are key determinants for improving system quality (KT) and user satisfaction (KES), as indicated by the highly significant path coefficients. Management support not only provides a strategic foundation through optimal resource allocation but also promotes users' psychological acceptance of the system. Meanwhile, superior user experience acts as a catalyst, which strengthens the user's perception of the system's reliability and value, which shows the dominance of IA as the variable with the highest influence. Nonetheless, ease of use (MW) is still considered relevant as a moderate component that supports technology adaptation, especially in environments with limited digital literacy (Abbasi et al., 2021; Birnbaum & Snowdon, 2003; Chatterjee & Bhattacharjee, 2020). As such, these findings confirm the need for a holistic approach that integrates the managerial, technical, and user experience dimensions to ensure the successful implementation of the system while providing insights for the development of theories in the study of information technology and strategic management.

b. The Relationship of Management Support, User Experience, and Ease of Use to System Quality and User Satisfaction

The path analysis in this SEM model is designed to identify significant relationships between management support, user experience, ease of use, system quality, and user satisfaction. For this reason, this approach aims to understand the main mechanisms that affect the successful implementation of information systems in organizations. For this purpose, the results of SEM analysis show that management support (LD) has a significant influence on system quality (KT), with a path coefficient of 0.77 ($p < 0.001$), on user satisfaction (KES), with a path coefficient of 0.72 ($p < 0.001$). These results show that strategic support from management, such as adequate resource allocation and commitment to system maintenance, greatly affects the positive perception of the system. This is because effective management support includes resource allocation and alignment of the organization's vision with the goals of the information system implemented. User experience (IA) had a significant influence on KT (path coefficient = 0.80, $p < 0.001$) and KES (path coefficient = 0.93, $p < 0.001$). Respondents with previous experience using similar systems showed higher levels of satisfaction, supporting the theory in the Technology Acceptance Model (TAM), which emphasizes the importance of perceived ease of use. This analysis also highlights that user experience has a greater impact on satisfaction than system quality, suggesting the importance of developing intuitive and user-friendly features. In addition, enhancements to interface modules based on user feedback can significantly improve user experience. Figure 2 provides a visual representation of the SEM model, showing the direction and strength of the relationships between the main variable.

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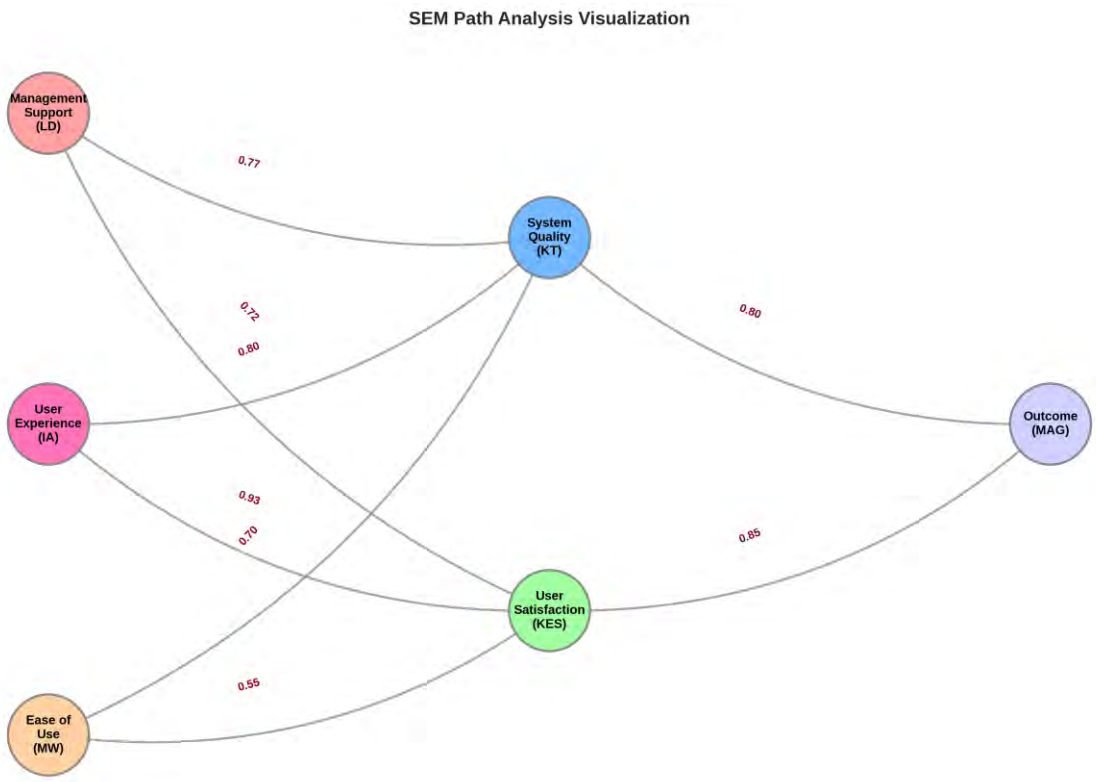

Figure 2. Visualization of the SEM Model Path for Analysis of Relationships Between Variables

Description:

Visualization of the SEM analysis path model showing the relationships between management support, user experience, ease of use, system quality, user satisfaction, and expected outcomes. Path coefficients are shown for each relationship to indicate the strength of their influence.

Based on Figure 2, Mediation analysis was carried out to test the relationship between independent and dependent variables mediated by certain variables. The results showed that user experience significantly mediated the relationship between ease of use and user satisfaction with an indirect effect of 0.35 ($p < 0.001$). In addition, system quality was also found to be a mediator between management support and user satisfaction, with an indirect effect of 0.28 ($p < 0.001$). Mediation in both relationships is partial, as the immediate effect remains significant even though mediators are taken into account in the model. Thus, these findings show that although management support and ease of use have a direct influence on user satisfaction, these influences are mostly transmitted through mediating variables such as user experience and system quality. It can be said that the information system does not meet the requirements. Because the system only has useless features. This includes a lack of understanding with respect to local needs, very few flexible reporting options, and not allowing users to perform in-depth data analysis. To address this, it is necessary to improve the system's ability to handle complex data and adapt it to the specific needs of the organization (Foster et al., 2019; Pereira et al., 2022). Another problem is the failure to engage users during the system design process. As a result, the solutions rarely match the customers' choices and needs. In addition, local challenges include, but are not limited to, a lack of technological infrastructure and inadequate technical talent, which can hinder development. In such a context, it can limit the ability of information systems to be appropriately designed and successfully implemented in practice. In addition, unstable internet access in many places also hampers the implementation of information systems connected to the internet. For this reason, we believe that system developers should work closely with local users to develop better systems that can operate in a variety of contexts. The goal is to ensure that information systems work adequately within a

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variety of frameworks, with a primary focus on developing countries and special consideration for specific tasks. Considering these factors, it is expected that information systems can be more effective in supporting decision-making and improving operational efficiency in various sectors.

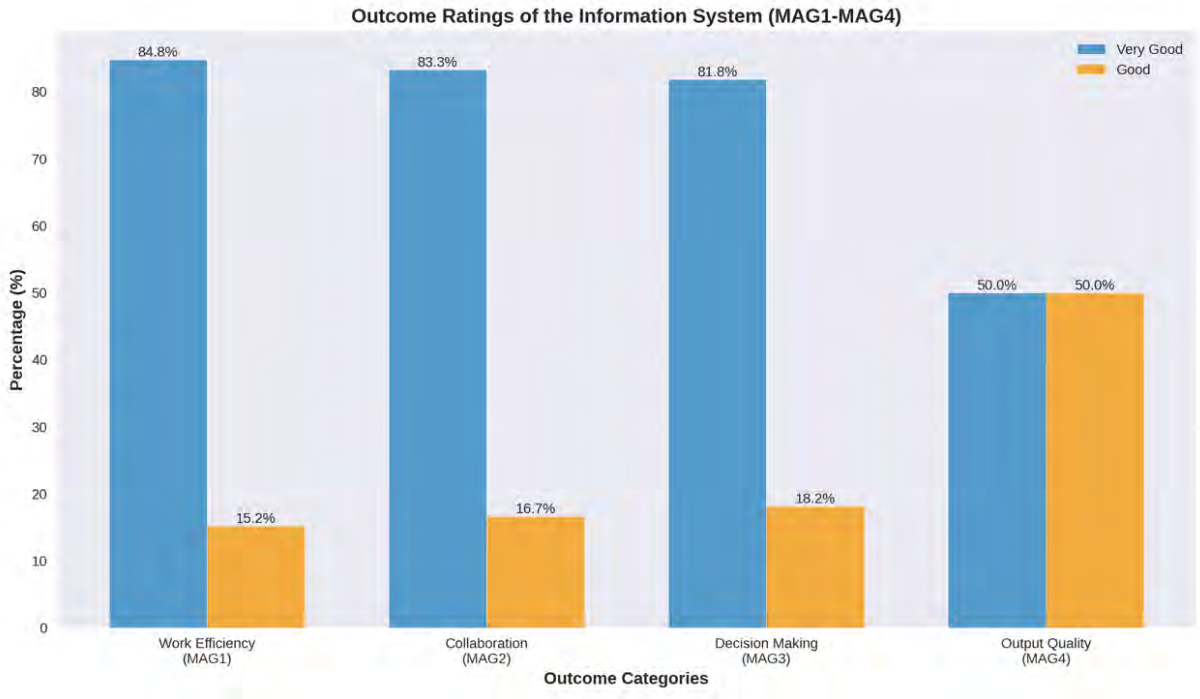

Figure 3. Outcome Ratings of the Information System (MAG1-MAG4)

Figure 3 underscores the importance of management support (in the successful implementation of information systems. Consistent support, both in the form of strategic policies and technical resources, gives users confidence to optimally utilize the system. This finding supports the results of previous research by Pereira et al. (2022) and Dwivedi et al. (2020), who emphasized that effective leadership greatly influences the success of technology adoption. Based on the results of the SEM analysis showing the significant influence of management support, user experience, and ease of use on system quality and user satisfaction, strategic measures are required to address the identified weaknesses, particularly on output quality (MAG4). Therefore, the following recommendations are proposed: However, the low assessment of output quality (MAG4) indicates a gap in the system design. This is in line with the study by Idoga et al. (2022), who noted that information systems in developing countries are often suboptimal in providing advanced data analysis features. To address this, universities are advised to.

Developing automated analytics features not only supports real-time data-driven decision-making but also improves operational efficiency in the context of dynamic college needs.

Customizable reporting modules provide users with the flexibility to generate reports relevant to operational needs, a feature that is particularly important in an academic environment with diverse reporting demands.

Involving users in the system redesign process not only increases the relevance of features but also strengthens the sense of ownership of the system, which in turn can increase user adoption rates and satisfaction.

These findings provide specific recommendations for administrators in higher education to accommodate the flexible value of information systems through the use of new innovative technologies, such as AI and ML, which have the potential to significantly improve the level and quality of outputs. The findings of this study confirm that management support, user experience, and

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ease of use are significant determinants of system quality and user satisfaction (Domingos et al., 2022; Wei et al., 2016; Wei et al., 2015). However, the gap in output quality (MAG4) indicates an urgent need to improve analysis and reporting capabilities. As a result, universities need to optimize the use of information technology in a way that promotes data-driven decision-making and ensures operational efficiency and relevance.

c. Frequency distribution of user satisfaction

User satisfaction is an important orientation in agency management (Chatterjee & Bhattacharjee, 2020; Kline, 2023). The frequency distribution results of KES1-KES6 can be found, based on the analysis, that these indicators show that the information system has succeeded in meeting the needs of users in terms of easy access,technical support, and reliability. KES1 captures overall access behavior, where 45% of respondents voted very satisfied, and 35% responded with satisfied, showing that the majority of users perceive themselves to be able to use the system easily. In addition, the technical support provided also translates into a level of satisfaction; in this case, it can be seen that 42% of respondents are very satisfied with the support compared to 40% who are satisfied. This support is important to help keep the system running smoothly and ensure any technical issues are fixed quickly for resolution, which will create an overall better user experience.

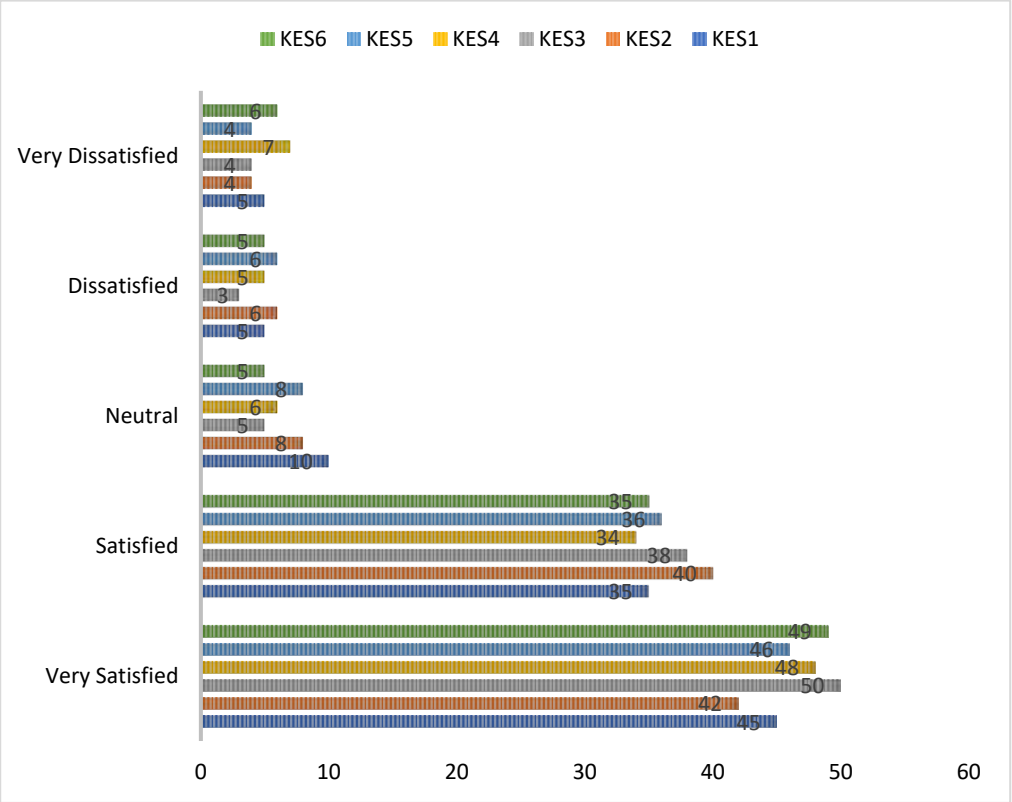

Figure 4. User Satisfaction Frequency

Figure 4 description:

- KES1 (Ease of Access): 45% of respondents are very satisfied, and 35% are satisfied with the ease of access to the system. This shows that users have smooth access to the system quickly.
- KES2 (Technical Support): 42% of respondents are very satisfied with the technical support provided, and 40% are satisfied. This proves that technical support is a significant part of the user experience.
- KES3 (System reliability): System reliability indicates that the system can provide consistent performance without major disruptions, and half of the respondents are very satisfied.

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- KES4 and KES5 (Interface and Navigation): All users are satisfied with the ease of navigation of the system interface which shows a user-friendly system design.

System reliability is an important aspect, as 50% of respondents are very satisfied, and 38% are satisfied, as shown by KES3 for user satisfaction. This means that the system can run reliably without serious outages, which is crucial to maintaining its continued use. This reliability includes not only technical factors such as network stability, scheduled maintenance, and the capacity of the system to function according to the academic and administrative operation requirements of the end user. This is because users want the system they use to be reliable in completing daily tasks, without interruptions that can impact productivity (Chatterjee & Bhattacharjee, 2020; Cullen et al., 2003; Idoga et al., 2022).

For navigation and UI, the KES5 and KES6 indicators are also high, with most subjects rating the system as easy and intuitive. KES5 showed that 46% of respondents were very satisfied with the ease of navigation, while KES6 showed that 49% of respondents were very satisfied with their overall experience in using the system. This seems to validate that creating a responsive and user-friendly interface is an integral part of a holistic user experience. This, in turn, leads to better adoption rates and satisfaction rates among our users, which offers a higher educational response rate higher than the industry average.

d. Outcome

Information systems play a vital role in supporting the varied operational, academic, and administrative activities in the higher education (Chatterjee & Bhattacharjee, 2020; Idoga et al., 2022). The measure of this system's over-user impact on the area, such as job performance, assembly, selection, and top quality, results in a lot better result. The results might be evaluated through metrics MAG1-MAG4, which correspond to the four fundamental stages in the deployment and usage of data methods. Assessing these outcomes provides deep insight into how well the system meets user needs and delivers the expected impact. The following Table 1 presents frequency distributions for the respondents' evaluations of information system outcomes: MAG1, MAG2, MAG3, and MAG4. Each outcome was graded according to two primary categories: Very good and good, corresponding to users' positive perception of the results achieved.

Table 1. Outcome (MAG1-MAG4)

Outcome	Very Good (%)	Good (%)	Total (%)
MAG1 (Work Efficiency)	84.8%	15.2%	100%
MAG2 (Collaborative)	83.3%	16.7%	100%
MAG3 (Decision Making)	81.8%	18.2%	100%
MAG4 (Output Quality	50.0%	50.0%	100%

Based on the data displayed in the table, Outcome (MAG1-MAG4) shows that most respondents consider the university information system to be very helpful in various operational aspects. In the MAG1 (Work Efficiency) indicator, 84.8% of respondents assessed that the information system implemented greatly improved their work efficiency. This assessment shows that users feel that the system significantly speeds up task completion and makes their work more productive, while another 15.2% feel that the system contributes well but not at an optimal level. The MAG2 (collaboration) indicator also showed strong results, with 83.3% of the respondents rating the system as very

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effective in supporting collaboration between various stakeholders in the college. Better collaboration among lecturers, staff, and students is a direct result of the system's ability to facilitate communication and information exchange quickly and efficiently. The 16.7% of respondents who rated it as good also showed that there was still room for improvement, but overall, the system functioned well.

In the MAG3 (Decision Making) indicator, 81.8% of respondents considered the system to be very helpful in making data-based decisions. With rapid and accurate access to data, users feel more confident in making strategic decisions that support their academic and operational goals. In addition, 18.2% of the respondents who rated it as good reflected that some users may feel that the system could still be improved to provide greater support in the decision-making process. Finally, on indicator MAG4 (Output Quality), 50% of respondents rated the system as greatly improving the quality of outputs produced, both in academic and administrative contexts, while the other 50% rated the system as providing good results. This difference suggests that although the system generally functions well, some users may feel that the improvement in the quality of the output produced has not been fully optimized, and there is a need for further improvements in the design or features of the system. From the results shown in the table, it can be concluded that the information system implemented at the college level had a significant positive impact on the measured outcomes, particularly in terms of work efficiency, collaboration, and decision-making. However, while the results are very positive overall, the MAG4 indicator (Output Quality) shows room for improvement, particularly in ensuring that the system actually supports the improvement of the optimal quality of outcomes across all aspects of its use.

5. Conclusion

This study shows that the implementation of information systems in higher education significantly improves operational performance, collaboration, data-driven decision-making, and user satisfaction. Management support proved to be a key determinant of increased perceptions of system quality and user satisfaction, whereas ease of use and user experience strengthened the successful adoption of the system. However, the output quality still showed room for improvement, indicating that optimization of the system to support user outcomes, both academically and administratively, has not been fully achieved. This research underscores the need for an implementation strategy that not only focuses on technical aspects, but also includes organizational dimensions and user behaviour. This is important because the successful implementation of information systems is often influenced by interactions between technology, people, and work processes in the university environment. In addition, it is critical for IT teams, management leaders, and end-users to work together, as they must ensure that the system can support the needs of the institution. For this reason, the findings also underscore the need for regular reviews of the features in the system to ensure their value and usefulness for academic and administrative functions. By implementing this new technology comprehensively, educational institutions can get the most out of their information technology investments.

In conclusion, although information systems are able to improve efficiency and productivity, there is still a gap in improving user results-oriented features. Institutions need information systems to provide not only technical solutions but also to be effective tools to support decision-making processes at the institutional level. To this end, more experience-based analytics and reporting features will play a crucial role in the operational efficiency gap and quality of results. Furthermore, the study adds that the success of the system implementation is also influenced by the user acceptance rate, which can be improved through proper training and communication. Thus, the adoption of information systems must also have an institutional commitment to update or incorporate new forms of technology in line with the development of needs. Keeping in mind that a holistic approach that addresses all aspects of the system (technology, training, and system design—

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people, processes, and technology) will ensure that it is not only a system that is still relevant but also a system that truly provides added value to the user. In this way, institutions that use this system can provide greater resilience in facing challenges and opportunities in the digital age.

6. Suggestion

This study suggests several recommendations to improve the effectiveness of information systems based on existing findings. Preparation of a thorough implementation strategy, which addresses technical, organizational, and behavioral aspects of users. In addition, the output quality of the system should be improved based on features to facilitate the academic and administrative performance of user activities. This can be done by ensuring a close working relationship between the IT team, including management and end users, to ensure the system-specific needs for the institution are understood and covered. The features of the system need to be evaluated regularly to ensure that the system is functioning and supporting academic and administrative tasks. More intuitive analysis and report generation can facilitate strategic-level decision-making across the institution. To increase user adoption, better training and communication are needed. It also requires institutions to regularly and continuously update and integrate new technologies according to new needs. Technology, training, and system design are integral parts of a holistic approach to ensure not only relevance, but also added value for users. In addition, optimal management support is also very important in improving the perceived system quality and user satisfaction.

Declarations

Author Contributions. Opik Adurrahman Taufik: Conceptualization, Methodology, Software, Field study Suprapto: Data curation, Writing-Original draft preparation, Software, Validation, Field study Abdul Kadir Ahmad: Visualization, Investigation, Writing–Review and Editing. Field study Dinar Westri Andini: Field study Pramudya Cahya: Software, Validation, Field study, Onok Yayang Pamungkas: Conceptualization, writing-original draft preparation, methodology

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