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CONCEPTUAL MAP OF *SMART CAMPUS* IN ISLAMIC RELIGIOUS HIGHER EDUCATION INSTITUTIONS: *SYSTEMATIC LITERATURE REVIEW*

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Abstract

The development of digital technology has encouraged higher education institutions to transform their educational management through the implementation of the Smart Campus concept. In Islamic Religious Higher Education Institutions (PTKI) in Indonesia, the implementation of a Smart Campus should not only focus on the utilization of information technology but also consider institutional characteristics, Islamic values, and improvements in academic and administrative services. This study aims to identify and develop a conceptual map of Smart Campus implementation in PTKI through a systematic review of the literature. The study employs the Systematic Literature Review (SLR) method, which involves systematically searching, screening, analyzing, and synthesizing relevant literature. The review focuses on identifying the key dimensions of a smart campus, the relationships among its components, implementation opportunities, and the challenges of digital transformation in PTKI. The expected outcome is a conceptual map encompassing digital technology, institutional governance, academic services, infrastructure, human resources, and the integration of Islamic values. This conceptual map is expected to provide a foundation for developing an integrated and effective digital transformation strategy that aligns with the institutional characteristics of Islamic Religious Higher Education Institutions.

Keywords*: Smart Campus, Islamic Religious Higher Education Institutions, Digital Transformation, Conceptual Map, Systematic Literature Review.*

INTRODUCTION

The development of information and communication technology has brought major changes to the delivery of higher education. Digital transformation affects not only the learning process but also the way universities manage administration, provide academic services, develop human resources, and make decisions. Universities are required to use technology effectively in order to improve service quality, operational efficiency, governance transparency, and institutional competitiveness. In this context, the *Smart Campus* concept has become a relevant approach to supporting the modernization of university management through the integration of digital technology with various academic and non-academic activities. The implementation of this concept is expected to create an educational environment that is more connected, adaptive, efficient, and oriented toward the needs of the academic community.

The *Smart Campus* concept cannot be understood merely as the use of digital devices or the provision of internet access on campus. Rather, a *Smart Campus* is an approach to university management that integrates technology, information systems, infrastructure, human resources, and governance to support the delivery of education in a unified manner. Its implementation may include the use of academic information systems, digital learning, electronic libraries,

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online administrative services, technology-based facility management, and the use of data in decision-making. The interconnection among these components is an important factor in realizing a smart campus. When technology is developed in isolation without adequate planning and integration, its implementation may lead to overlapping systems, inefficient services, and difficulties in data management. Therefore, the development of a *Smart Campus* requires a conceptual framework that can explain the relationships among technology, governance, educational services, and institutional needs.

The urgency of developing a *Smart Campus* is even more evident in Islamic Religious Higher Education Institutions (PTKI) in Indonesia. As higher education institutions that deliver education within an environment of Islamic scholarship and values, PTKI have institutional characteristics that need to be considered in the process of digital transformation. Developing a smart campus in PTKI is related not only to improving the quality of academic and administrative services but also to efforts to integrate technology into the implementation of the Tridharma of higher education, namely education, research, and community service. In addition, the use of technology needs to be directed toward supporting institutional governance that is transparent, accountable, inclusive, and oriented toward improving educational quality. The integration of Islamic values is also an important aspect so that digital transformation is not driven solely by technological sophistication but continues to consider ethics, responsibility, the common good (maslahah), and the objectives of Islamic education.

Despite its considerable opportunities, implementing a *Smart Campus* in PTKI also faces various challenges. These challenges may relate to the readiness of technological infrastructure, limited human resources, funding capacity, information security, system integration, and differences in digital maturity among universities. In addition, the use of technology requires the support of institutional policies and an organizational culture that encourages innovation and adaptation to change. Developing digital systems without organizational readiness can cause technology to be underutilized. Therefore, the transformation toward a *Smart Campus* needs to be carried out through systematic planning that takes into account the conditions, needs, and characteristics of each institution. In the PTKI context, such planning also needs to consider the relationships among technology development, service quality improvement, university governance, and the strengthening of institutional identity grounded in Islamic values.

Studies on *Smart Campus* are important for understanding the dimensions that constitute a smart campus and the relationships among those dimensions. In general, discussions of *Smart Campus* relate to the concept of digital transformation in higher education, the application of information technology in academic services, the development of digital infrastructure, data-driven governance, and the improvement of the academic community's experience. However, the *Smart Campus* concept has a broad scope, so efforts are needed to group these various components into a structured framework. A conceptual map can be used to explain the main components, the relationships among components, and the factors that support and hinder implementation. In this study, the conceptual map is positioned as an analytical framework for understanding *Smart Campus* comprehensively, rather than merely as a depiction of technology use in the university environment.

The *Systematic Literature Review* (SLR) approach was chosen to identify, select, analyze, and synthesize previous research relevant to the development of a *smart campus*. Unlike a narrative literature review, which does not always use structured search procedures, an SLR allows researchers to review the literature through systematic and accountable stages. Through this approach, various research findings can be compared to identify main themes, research trends, relationships among concepts, and aspects that still require further research. To ensure that the results are accountable, the SLR process needs to be complemented by clear inclusion and exclusion criteria, a literature search strategy, article selection procedures, and methods for analyzing and synthesizing findings. In this way, the resulting conceptual map is expected to be grounded not only in theoretical understanding but also in a synthesis of evidence from the relevant literature.

Based on the above explanation, research on the conceptual map of *Smart Campus* in Islamic Religious Higher Education Institutions is important for obtaining a structured understanding of the components of smart campus development and the relationships among

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them. This study is also relevant for identifying the opportunities and challenges of implementing a *Smart Campus* and for explaining the position of Islamic institutional characteristics and values within the framework of university digital transformation. The novelty this study seeks to develop lies in synthesizing various perspectives on *Smart Campus* into a conceptual map specifically directed at the PTKI context. This novelty claim needs to be further strengthened through comparison with previous studies found during the literature search process.

The objective of this study is to develop a conceptual map of *Smart Campus* in Islamic Religious Higher Education Institutions through a *Systematic Literature Review* approach. Specifically, this study aims to identify the main dimensions that constitute the *smart campus* concept, analyze the relationships among digital technology, governance, infrastructure, human resources, and university services, and identify the supporting factors and challenges of its implementation in PTKI. This study is expected to make a theoretical contribution to the development of higher education management and digital transformation studies, as well as to serve as a practical consideration for PTKI administrators in designing *Smart Campus* development strategies that are integrated, sustainable, and aligned with institutional characteristics and Islamic values.

METHOD

This study uses a qualitative approach with the *Systematic Literature Review* (SLR) method to identify, analyze, and synthesize the literature on the *Smart Campus* concept in Islamic Religious Higher Education Institutions (PTKI). The study began by determining the focus of the review and formulating research questions, followed by developing a literature search strategy based on relevant keywords, such as *smart campus*, digital transformation, and Islamic higher education.

The research data consist of journal articles and scholarly publications obtained through searches of academic databases, such as Google Scholar and other scientific sources. The search was conducted based on established inclusion and exclusion criteria, taking into account topic relevance, source quality, and the suitability of the publication's content to the research objectives. Because this study is based on a literature review, there is no field research location or direct informants. The research process was carried out through the stages of searching, selecting, and analyzing the literature within a period determined by the researchers.

Data were collected through documentation, namely identifying and recording important information from each selected article, including the author, year of publication, research objective, method, main findings, and concepts related to *smart campus*. The data were then analyzed using thematic analysis through the processes of theme grouping, comparison of findings, and synthesis of previous research results. The results of the analysis were used to identify the main dimensions, the relationships among components, and the supporting factors and challenges of implementing a *Smart Campus* in PTKI. All findings were then compiled into a conceptual map that depicts a *Smart Campus* development framework aligned with the characteristics of Islamic religious higher education institutions.

DISCUSSION

The *Smart Campus* Concept in Islamic Religious Higher Education Institutions

Smart Campus is a university development concept that uses digital technology to integrate various academic and non-academic activities. This concept emphasizes not only the use of technological devices but also information management, service quality improvement, and data-driven decision-making. In the context of Islamic Religious Higher Education Institutions (PTKI), a *Smart Campus* needs to be developed by considering institutional characteristics and the Islamic values that form part of the delivery of education.

Implementing a *Smart Campus* can help universities improve administrative efficiency, expand access to learning, and accelerate the provision of academic information. However, its success cannot be measured solely by the number of applications or digital facilities available. Universities also need to ensure that the systems are interconnected, easy to use, secure, and provide real benefits to students, lecturers, education staff, and the community. Thus, a

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campus's smartness is determined not only by technological sophistication but also by the institution's ability to use technology to improve educational quality.

Main Dimensions of *Smart Campus* in PTKI

The development of a *Smart Campus* in PTKI can be understood through several interrelated dimensions, namely digital technology, institutional governance, academic services, infrastructure, human resources, and the integration of Islamic values. These dimensions form a conceptual framework that can be used to understand the needs and direction of university digital transformation.

The digital technology dimension includes academic information systems, online learning, digital libraries, and institutional data integration. Technology serves as a means of connecting various services so that they can be accessed effectively. However, using many applications that are not integrated can actually increase management complexity. Therefore, technology development needs to be directed toward system interoperability and ease of user access.

The institutional governance dimension relates to the use of data in the planning, implementation, supervision, and evaluation of university programs. Data-driven decision-making can help leaders understand institutional needs and determine development priorities. Nevertheless, the availability of data does not automatically produce high-quality decisions. Data must be accurate, relevant, protected, and analyzed with consideration of the institutional context.

The academic services dimension includes student registration, course management, assessment, academic advising, and access to learning resources. Digitizing these services can reduce repetitive administrative procedures and increase information transparency. Meanwhile, the infrastructure dimension includes internet networks, technological devices, data centers, and information security systems. Adequate infrastructure is the foundation for the sustainability of digital services.

The human resources dimension also plays an important role because the success of digital transformation depends on the competence and readiness of users. Lecturers, education staff, leaders, and students need to be able to use technology effectively and responsibly. The integration of Islamic values, meanwhile, is a characteristic that needs attention in developing a *Smart Campus* in PTKI, particularly in building governance that is trustworthy (amanah), just, transparent, and accountable.

Integration of Digital Technology and University Governance

The integration of digital technology and governance is one important aspect of developing a *smart campus*. Connected information systems enable universities to manage academic and administrative data more consistently. Integrated information can also support program evaluation, performance monitoring, and policy-making based on institutional needs.

Nevertheless, digital transformation should not be understood as the process of replacing all manual procedures with electronic applications. Such change needs to be accompanied by an evaluation of work procedures, the division of responsibilities, and oversight mechanisms. If inefficient procedures are merely moved into a digital system without improvement, the same problems are likely to persist. Therefore, the development of a *Smart Campus* must combine technological innovation with the improvement of organizational processes.

For PTKI, integrating technology and governance can also support improved accountability and service quality. However, its implementation needs to consider personal data protection, system security, and user access rights. Universities must ensure that data are used according to need and do not create risks of information misuse. Thus, good digital governance prioritizes not only efficiency but also the protection of the rights and interests of the entire academic community.

The Role of *Smart Campus* in Improving Educational Quality

Implementing a *Smart Campus* has the potential to improve educational quality by expanding access to learning resources, developing digital learning, and providing more responsive academic services. Students can obtain course information and learning materials

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more flexibly, while lecturers can use technology to support material delivery, assessment, and monitoring of students' learning progress.

However, the use of technology is not always directly proportional to improved learning quality. Its effectiveness is influenced by instructional design, educator competence, student readiness, and the suitability of technology to educational objectives. Digital learning that merely moves materials to an online platform without attention to student interaction and engagement risks producing a suboptimal learning experience. Therefore, a *Smart Campus* needs to be directed toward strengthening pedagogical processes, not merely increasing the use of applications.

In the PTKI context, technology can also be used to support the implementation of the Tridharma of higher education, namely education, research, and community service. The management of scientific publications, access to digital references, research collaboration, and the dissemination of community service outcomes can be strengthened through integrated digital systems. With appropriate management, a *Smart Campus* has the potential to become a means of improving academic quality while expanding the university's contribution to society.

Integration of Islamic Values in *Smart Campus* Development

One aspect that needs attention in developing a *Smart Campus* in PTKI is the alignment of technology with Islamic values. Such integration cannot be achieved merely by adding religious content to digital platforms; it needs to be reflected in the principles for managing and using technology. The values of trustworthiness (amanah), honesty, justice, responsibility, and the common good (maslahah) can serve as an ethical foundation for delivering digital services.

The principle of amanah, for example, relates to the institution's responsibility to safeguard data and provide trustworthy information. The principle of justice can be applied by providing digital services that consider the needs of users with different conditions and access capabilities. Meanwhile, the principle of responsibility requires universities to evaluate the impact of technology use on the educational process, information security, and social relationships within the campus environment.

Integrating these values also requires a critical attitude toward the use of technology. Not every digital innovation should be adopted simply because it is considered modern. Each system development needs to be assessed based on its benefits, risks, necessity, and suitability to educational objectives. With this approach, PTKI identity remains part of the direction of digital transformation, rather than merely an additional element in technology development.

Challenges and Strategies for *Smart Campus* Development in PTKI

The development of a *Smart Campus* faces a number of interrelated challenges. Limited infrastructure and funding can hinder the provision of digital services, while low technological competence can reduce the effectiveness of using systems that are already available. In addition, the use of separately developed applications can lead to data duplication and make coordination among units difficult. These challenges show that the success of digital transformation depends not only on technology investment but also on organizational readiness and the ability to manage change.

One strategy worth considering is to prepare a digital transformation master plan that sets out development priorities, infrastructure needs, data management standards, and evaluation mechanisms. PTKI can begin development with the most needed services and then expand integration gradually according to institutional capacity. A phased approach allows universities to control costs, evaluate benefits, and improve systems before expanding their implementation.

Strengthening human resources also needs to be a priority. Training for lecturers and education staff, user support, and the development of an adaptive work culture can help increase acceptance of change. In addition, periodic evaluation is needed to assess whether digital systems truly improve service quality. Evaluation indicators may include ease of access, service speed, system reliability, data security, user satisfaction, and contribution to educational quality.

Conceptual Map of *Smart Campus* in Islamic Religious Higher Education Institutions

Based on a conceptual synthesis of the dimensions discussed, the development of a *Smart Campus* in PTKI can be designed as a framework that connects institutional foundations,

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main components, integration processes, and expected outcomes. The institutional foundations include strategic vision, policy, leadership, funding, and Islamic values. These foundations support six main dimensions, namely digital technology, infrastructure, governance, academic services, human resources, and digital ethics based on Islamic values.

These six dimensions need to be developed in an integrated manner because weakness in one dimension can affect the effectiveness of the others. Adequate infrastructure, for example, will not produce optimal services without connected systems and competent human resources. Likewise, advanced information systems will not guarantee good governance if they are not supported by data security policies and clear accountability mechanisms.

Within this conceptual framework, integration across dimensions is directed toward producing effective educational services, transparent governance, a better learning experience, and sustainable university management. These outcomes then need to be evaluated through relevant performance indicators so that *Smart Campus* development does not stop at providing technology. Thus, the conceptual map serves as a framework for understanding the relationships among institutional readiness, technology use, integration processes, and the achievement of Islamic higher education objectives.

The conceptual map remains a preliminary design that needs to be tested and refined through the search and analysis of scientific articles. Its validity depends on the consistency of findings in the literature, the strength of the relationships among identified components, and its suitability to the PTKI context. Therefore, the final results of the SLR need to show the literature basis for each dimension included in the conceptual map, while also explaining the contribution of this framework compared with previously developed *Smart Campus* models.

CONCLUSION

The development of a *Smart Campus* in Islamic Religious Higher Education Institutions (PTKI) is part of a digital transformation that aims to improve the quality of academic services, administrative efficiency, and institutional governance. Based on the conceptual review, *Smart Campus* development encompasses six main dimensions, namely digital technology, infrastructure, governance, academic services, human resources, and the integration of Islamic values. All of these dimensions need to be developed in an integrated manner to support the delivery of higher education that is effective, transparent, and sustainable. This study offers a conceptual framework that can serve as a foundation for PTKI in planning digital transformation strategies aligned with institutional characteristics and Islamic values. Its implication is that universities need to strengthen infrastructure, human resource competence, information system integration, and data security. However, this framework still needs to be validated through the results of the *Systematic Literature Review* and empirical research so that its implementation can be adapted to the needs and conditions of each PTKI.

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