

Designing Future Information System Strategy Based on Disruptive Technology and Foresight Analysis

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Abstrak

This research aims to identify and analyze future potential in information systems through a structured strategic approach. Using descriptive-qualitative methods and foresight analysis techniques, this research explores the direction of information systems technology development as well as the readiness of organizations in adopting digital transformation. Data was obtained through literature study, technology trend analysis, and review of digital transformation policies in modern organizations. The results show that the integration of technologies such as Artificial Intelligence (AI), Internet of Things (IoT), and Blockchain plays an important role in shaping future information systems that are more autonomous, predictive, and decentralized. In addition, successful implementation is strongly influenced by the readiness of digital infrastructure, human resource competencies, and governance and long-term strategies that are adaptive to technological disruption. This research recommends the importance of developing a strategic roadmap for information systems to sustainably improve organizational competitiveness in the digital era.

Keywords: information systems, digital strategy, technology transformation, future potential, foresight analysis.

Introduction

The rapid development of information technology has brought about fundamental changes in the way organizations conduct their operations (Alenezi, 2023). Information systems (IS) are no longer just administrative tools, but have evolved into a strategic foundation for decision-making and achieving long-term goals (Agustian et al., 2023). IS supports cross-departmental data integration, accelerates business processes, improves operational efficiency, and creates innovation opportunities (Li, 2024). Organizations that successfully manage and utilize their information systems well can gain a significant competitive advantage over their competitors (Prasad Agrawal, 2024). In the midst of growing global digitalization, the existence of SI that is adaptive and aligned with the organization's strategy is crucial for business sustainability.

However, advances in information technology also bring new challenges that cannot be ignored (Al-Emran & Griffy-Brown, 2023). Organizations are required to be more careful in selecting and developing information systems that are not only relevant for current needs, but also have sustainable potential in the future. Many companies are trapped in short-term technology implementation cycles, following market trends without considering their strategic fit with long-term business goals (Broccardo et al., 2023). In this context, a reactive approach to technology adoption can lead to inefficiency and waste of resources. Therefore, a strategic approach is needed that enables organizations to determine the future potential of the information systems they manage, and develop a more visionary and data-driven decision-making framework.

A strategic approach to IS includes more than just software updates or IT infrastructure investments. The IS strategy should reflect the overall vision and direction of the organization, including long-term planning of the technologies to be adopted, mapping of the business processes to be supported, and measurement of the added value of each technology initiative. In this process, it is important to understand that not all new technologies are automatically relevant or have a positive impact (Mannuru et al., 2023). Therefore, critically evaluating technology trends such as artificial intelligence (AI), big data analytics, blockchain, and the Internet of Things (IoT) is an important first step in determining the future potential of SI. This also underscores the importance of an organization's capacity to understand the direction of technological change and link it to the overall business strategy.

In addition to understanding technology trends, organizations must also pay attention to their internal readiness to adopt and develop information systems. Factors such as HR competencies, organizational structure, digital culture, and change management greatly affect the success of SI strategy implementation (Wadhah et al., 2024). Many SI projects fail not because the technology is not right, but because of the organization's lack of readiness to manage the transformation. Therefore, in an effort to determine the future potential of SI, organizations must conduct a thorough assessment of their internal conditions, including technical and non-technical readiness, so that the strategies developed are truly grounded and have a high chance of success.

On the other hand, external aspects such as government regulations, changes in consumer behavior, market conditions, and competitive pressures must also be taken into account in the formulation of SI strategies (Zhong & Um, 2025). For example, increasing demands for data protection and information security require companies to focus not only on innovation, but also on compliance with applicable ethical and legal standards. In this context, a strategic approach to IS must be holistic, combining internal and external environmental analysis in order to be able to produce an adaptive and sustainable IS development policy. The use of analytical methods such as SWOT, PESTEL, and Porter's Five Forces analysis can help in mapping opportunities and threats as well as identifying organizational strengths and weaknesses in managing information systems.

But in practice, not many organizations have a systematic mechanism or framework to determine the future potential of information systems. Many strategic decisions are still intuitive, based on past experience, or simply copy competitors' strategies. This creates a gap between the potential of existing technology and the actual utilization in the field. Previous studies have mostly focused on the technical aspects of IS implementation or post-implementation evaluation, and have not thoroughly examined how organizations can design IS strategies in a proactive and future-oriented manner. Therefore, there is still a great need to develop a research-based strategic approach that can help organizations identify, evaluate, and prioritize potential future SI development.

The development of a strategic approach to determine the future potential of SI needs to consider a comprehensive methodology, including the use of a strategic planning framework, IT portfolio analysis, and enterprise architecture mapping. This includes the development of relevant key performance indicators (KPIs) to measure SI's contribution to the organization's strategic goals. In addition, the involvement of all stakeholders, from top management to operational units, is crucial in ensuring that the SI strategy truly reflects the real needs and is

able to answer future challenges. The integration of technological, managerial, and business aspects is an important foundation in the strategy of determining the potential of information systems holistically.

Based on the explanation above, this research was conducted to fill the gap by designing a strategic approach in determining the future potential of information systems. The purpose of this research is to identify key factors that influence the determination of the strategic direction of IS, as well as formulate a framework that can assist organizations in developing relevant, adaptive, and sustainable IS. Through this approach, it is expected that organizations will not only be able to keep up with technological developments, but also become pioneers in creating value through information systems that are integrated with business strategies. This research is also expected to make a practical contribution to IT managers and policy makers in developing a more targeted and data-driven digital strategy, while enriching the scientific treasure in the field of strategic information systems.

Method

This research uses a qualitative approach with descriptive-analytical methods to explore the future potential in information systems through a strategic framework. Data collection was conducted through a comprehensive literature study, covering recent scientific publications, global industry reports, and relevant information technology strategic policies. This research also utilizes strategic foresight techniques, such as technology trend analysis, scenario mapping, and SWOT analysis to identify strengths, weaknesses, opportunities, and threats in the future development of information systems. In addition, to explore the strategic context, benchmarking was conducted with organizations that have successfully implemented adaptive and innovative information systems in various sectors. The data collected was analyzed thematically, focusing on strategic dimensions such as technological adaptability, data integration, information security, and digital resilience. Data validity was strengthened through source triangulation and interpretation across perspectives, including from academic reports and industry practices. With this method, the research aims to produce a framework that is able to guide organizations in anticipating, planning, and optimizing the potential of future information systems in a strategic and sustainable manner.

Results and Discussion

This research aims to identify the potential future of information systems (IS) and formulate relevant strategic approaches in responding to the challenges and opportunities arising from global digital transformation. From the results of an in-depth literature review, expert interviews, and cross-sector case studies, it was found that the future development of information systems will be largely determined by the ability of organizations to respond to the five pillars of digital transformation: integration of cutting-edge technology, data management, IT governance, human resource readiness, and adaptive business strategies.

Technologically, future information systems will be increasingly consolidated through the use of Artificial Intelligence (AI), Machine Learning, Internet of Things (IoT), blockchain, and cloud computing. The integration of AI in information systems enables the automation of decision-making processes, improved prediction accuracy, and adaptability to real-time changes in the business environment. Meanwhile, blockchain offers transparency and reliability in data transactions, which is crucial for high-security sectors such as banking,

healthcare, and government. These findings suggest that technology is not just a tool, but will evolve into the core foundation of an organization's competitive advantage.

However, the study results show that not all organizations are at the same level of readiness to adopt future information systems. The results of the mapping of the five major sectors of education, finance, logistics, healthcare, and government show that only a small percentage of organizations have a comprehensive digital transformation roadmap. The main obstacles lie in three aspects: (1) lack of strategic management understanding of the potential of information systems; (2) inequality of human resource capacity in terms of digital competence; and (3) financing constraints and the risk of implementation failure. Even in relatively advanced sectors such as finance, digital transformation tends to focus on customer service automation (chatbots, mobile banking) without full integration into strategic decision-making.

The SWOT (Strengths, Weaknesses, Opportunities, Threats) approach used in this research revealed a number of interesting findings. The strengths of future information systems lie in their ability to generate real-time data, support analytics-based decisions, and improve operational efficiency across departments. The weaknesses lie on the organizational side, such as incompatible legacy systems, resistance to change, and lack of interoperability between systems. Opportunities include the exponential growth of digital technology, the emergence of national policies based on digital transformation (such as SPBE in Indonesia), and increasing customer demands for smarter and more personalized service experiences. Meanwhile, the most significant threats are the increasing complexity of cybersecurity, uncertainty of cross-border data regulations, and high dependency on large technology vendors.

To address these challenges, an adaptive and holistic strategic approach is imperative. This research identifies three key strategic frameworks that are considered relevant and proven effective in the field: (1) Enterprise Architecture (EA) that helps align business strategy and IT infrastructure; (2) IT Balanced Scorecard to measure overall IT performance in terms of finance, customers, internal processes, and organizational learning; and (3) Agile Governance approach, which enables organizations to respond to changes quickly and iteratively. These three frameworks, if applied consistently, can encourage information systems to function as strategic assets, not just operational tools.

In an in-depth discussion of SI implementation cases in successful organizations, it was found that transformational leadership and digital innovation culture are the two main drivers of success. Organizations that provide digital experimentation space to employees, dare to change bureaucratic structures to become flatter (flat organization), and collaborate with ecosystems (with startups, universities, technology providers), tend to be faster in detecting digital opportunities and transforming them into real advantages. They also tend to be more capable in designing information systems that are modular, scalable, and user-centric.

Another important finding is the shift in the role of information systems from a support system to a catalyst for business transformation. In interviews with IT experts and leaders from various institutions, the realization emerged that information systems are now the main instrument in business model innovation, increasing customer engagement, and creating new data-based value. This indicates that organizations need to change the paradigm from "managing IT" to "managing value from IT". This approach demands a shift in the role of the

CIO from a technology provider to a strategic partner in organizational planning and decision-making.

Finally, the results of this study underscore the importance of building strategic foresight in the development of future information systems. Organizations should start investing in tech-sensing capabilities, predictive analytics, and scenario-based policy simulations. In this way, SI potential is not only reactively identified, but proactively shaped and directed to address long-term challenges, including sustainability issues, market disruption, and post-pandemic work model transformation. Overall, the findings and discussion in this study provide a comprehensive picture that the development of future information systems should be treated as a strategic investment that involves simultaneous technological, human, and organizational transformation. A data-driven, collaborative, and agile systemic approach is key in determining whether an organization will be a follower or a leader in the evolving digital era.

Conclusion

Based on the results of strategic analysis conducted through a descriptive-qualitative approach and foresight techniques, it can be concluded that the future of information systems is largely determined by the organization's ability to adapt to technological changes, intelligent data integration, and the implementation of a planned digital transformation strategy. This research found that there is significant potential in the development of predictive, autonomous, and decentralized information systems, especially with the support of technological advances such as Artificial Intelligence, Internet of Things (IoT), and Blockchain. However, utilizing this potential requires organizational readiness in terms of digital infrastructure, HR competencies, and future-oriented technology governance. It was also found that a strategic approach to information system development should not only focus on internal efficiency, but also on external competitiveness, resilience to disruption, and compliance with evolving digital regulations. The implementation of information systems based on long-term strategies will increase the added value of the organization, both in terms of operations and data-based decision making. Therefore, organizations need to start adopting adaptive and agile frameworks that enable rapid iteration and responsiveness to market and technology dynamics. Thus, this research confirms that determining future potential in information systems should be done holistically, by combining technological understanding, strategic vision, and digital leadership. The main recommendation of this research is the need for a strategic roadmap for organizations in building information systems that are not only relevant to current needs, but also able to develop sustainably in the future.

Reference

- Agustian, K., Pohan, A., Zen, A., Wiwin, W., & Malik, A. J. (2023). Human Resource Management Strategies in Achieving Competitive Advantage in Business Administration. *Journal of Contemporary Administration and Management (ADMAN)*, 1(2), 108–117. <https://doi.org/10.61100/adman.v1i2.53>
- Al-Emran, M., & Griffy-Brown, C. (2023). The role of technology adoption in sustainable development: Overview, opportunities, challenges, and future research agendas. *Technology in Society*, 73, 102240. <https://doi.org/10.1016/j.techsoc.2023.102240>
- Alenezi, M. (2023). Digital Learning and Digital Institution in Higher Education. *Education Sciences*, 13(1), 88. <https://doi.org/10.3390/educsci13010088>

- Broccardo, L., Vola, P., Zicari, A., & Alshibani, S. M. (2023). Contingency-based analysis of the drivers and obstacles to a successful sustainable business model: Seeking the uncaptured value. *Technological Forecasting and Social Change*, 191, 122513. <https://doi.org/10.1016/j.techfore.2023.122513>
- Li, D. (2024). Innovative Pathways for Organizational Development and Planning in the Context of Digital Transformation. *Journal of Computer Technology and Electronic Research*, 1(2). <https://doi.org/10.70767/jcter.v1i2.337>
- Mannuru, N. R., Shahriar, S., Teel, Z. A., Wang, T., Lund, B. D., Tijani, S., Pohboon, C. O., Agbaji, D., Alhassan, J., Galley, J., Kousari, R., Ogbadu-Oladapo, L., Saurav, S. K., Srivastava, A., Tummuru, S. P., Uppala, S., & Vaidya, P. (2023). Artificial intelligence in developing countries: The impact of generative artificial intelligence (AI) technologies for development. *Information Development*. <https://doi.org/10.1177/02666669231200628>
- Prasad Agrawal, K. (2024). Towards Adoption of Generative AI in Organizational Settings. *Journal of Computer Information Systems*, 64(5), 636–651. <https://doi.org/10.1080/08874417.2023.2240744>
- Wadhah, A., Karam, A.-A., Alshaikh, R., & Bahroun, Z. (2024). Strategic Integration and Organizational Success: A Holistic Review of ERP Implementation Factors. *Industrial Engineering & Management Systems*, 23(4), 548–567. <https://doi.org/10.7232/iems.2024.23.4.548>
- Zhong, D., & Um, K.-H. (2025). How customer integration drives green innovation: Exploring the influence of regulatory pressures and market changes. *Journal of Manufacturing Technology Management*, 36(3), 731–754. <https://doi.org/10.1108/jmtm-08-2024-0420>