



## Analysis of the Role of Information System Management in Overcoming the Negative Impact of the Development of Science and Technology in the Globalization Era in the Education System

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### ARTICLE INFO

*Keywords:* Science and Technology, Information Systems Management, Education in the Globalization Era

*Received :* 5 June

*Revised :* 22 July

*Accepted:* 22 August

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### ABSTRACT

This study focuses on the problem of the role of information system management in overcoming the negative impacts of the development of knowledge and technology in the era of globalization in the education system. This research was conducted using descriptive analytical methods and qualitative approaches, through technical case studies at leading schools in Pangandaran Regency, West Java Province. This study produced the following conclusions: (1) Behind the very crucial role value, the development of science and technology in the era of globalization, has challenges and threats in the form of uncontrolled negative impacts, including supporting the occurrence of character crises, crises of local cultural wisdom values and crises of faith for religious communities; (2) Information system management in facing the negative impacts of the rapid development of science and technology in the era of globalization, has the following main roles: (a) data and information security; (b) information management; (c) control and supervision of technology use; (d) improving the quality of human resources; (e) optimizing decision making; (3) In implementing information system management in the education system, it is necessary to develop strategies that focus on four main pillars: strengthening governance, strengthening security, strengthening literacy movements, and strengthening innovation. These strategies complement each other and must be implemented in an integrated manner. Therefore, information systems management also plays a role in ensuring that the use of scientific and technological developments in the era of globalization brings maximum benefits with minimal risks

## **INTRODUCTION**

The era of globalization is a period in which the world has become increasingly integrated and interconnected in various aspects, such as economic, social, cultural, and technological. This process is driven by rapid advances in knowledge, information and communication technology, and scientific transportation, making geographical boundaries less relevant. In the era of globalization, the world feels increasingly connected in all aspects of life. This creates significant challenges and opportunities, especially for the world of education. Education must be able to adapt to produce human resources ready to compete in the global market. Furthermore, in the era of globalization, education and the development of science and technology (IPTEK) mutually influence each other, creating new challenges and opportunities. Despite the benefits and conveniences it brings to human life, education today faces several problems, including poorly controlled negative impacts, particularly in developing countries like Indonesia.

## **LITERATURE RIVIEW**

In the context of 21st-century education, information and communication technology (ICT) has become an inseparable element of the learning process (Asep Saepul H., SM Ganjar, & Meti H., 2024). The development of the Industrial Revolution 4.0 era and the implementation of the Independent Curriculum further strengthen these demands, where the use of ICT is seen as a crucial tool for improving the quality of learning. The presence of technology not only plays a role in improving the quality of education but also in expanding students' access to sources of knowledge more broadly and equitably. Therefore, the integration of ICT in education is a strategic necessity that supports the achievement of learning that is relevant to the demands of the times. The development of science and technology in this century demonstrates the increasing urgency of implementing Management Information Systems (MSI) in education (Asep Saepul Hidayat & Reti S., 2024). Cowell, as quoted by A. Rohman and A.S. Hidayat (2023:32), explains that a management information system is a system consisting of a group of individuals, guidelines, and data processing devices that function to monitor, store, and manage data from the organizational environment. This system obtains data from transactions and operational activities, then filters, organizes, and presents it into useful information, especially for managers at all levels of the organization. The primary purpose of this system is to support the decision-making process, streamline communication, and increase the effectiveness of managerial and operational activities within an educational institution.

The main problems posed by the negative impacts of the development of science and technology in the current era of globalization, based on preliminary research conducted by the research team in this study, include a crisis of national character, the character of local and national cultural values, and, more dangerously, the threat of a crisis of faith (aqidah), namely the decline of faith values, religious order, and the noble values of the religious law embraced by the Indonesian nation. Therefore, a school management system is needed that can keep pace with developments in science and technology while also maintaining

and building a strong national character, local cultural wisdom, and strengthening faith and religious potential in accordance with the religion of each individual. Revitalizing the role of information systems management can serve as a strategy in a quality education management system, but it must also be able to act as a form of control to avoid potential negative impacts.

## **METHODOLOGY**

This research is a scientific work using descriptive analytical methods with a qualitative approach through a case study conducted at a leading school in Pangandaran Regency, West Java. This study aims to describe and analyze the role of information systems management in mitigating the negative impacts of scientific and technological developments in the era of globalization on the education system. According to Creswell (in Satori, 2009: 24), qualitative research is an investigative process focused on understanding social or human problems through different methodological traditions. Researchers build a complex, holistic picture by analyzing language, reporting detailed informant perspectives, and conducting studies in natural settings. Similarly, Lexy J. Moleong (2007: 6) explains that qualitative research seeks to comprehensively understand phenomena experienced by subjects, such as behavior, perceptions, motivations, and actions. Sugiyono (2005: 63) further states that data collection in qualitative research typically occurs naturally, utilizing primary and secondary data, expert opinion, and techniques such as participant observation, in-depth interviews, and documentation.

## **RESULT**

### **1. Negative Impacts of Scientific and Technological Developments in the Era of Globalization on the Education System**

Based on data and information reviews, all informants in this study agreed that scientific and technological developments should not be avoided, but embraced, as they are a consequence of the times and circumstances. However, if not handled carefully, they can lead to uncontrolled negative aspects, especially among the school-age youth. Some of the main problems facing the world of education today include: (a) the emergence of a national character crisis; (b) the emergence of a crisis in local cultural values; and (c) the emergence of a crisis of religious faith.

#### **National Character Crisis**

The character crisis among Indonesia's young generation is a complex and profound issue, influenced by various factors, from the social environment and family to technological developments. This poses a serious challenge for the future of the nation. Several key factors contribute to this crisis:

- 1) The negative influence of social media, where the unstoppable flow of information through social media and the internet exposes the younger generation to foreign cultures, such as hedonistic and individualistic lifestyles, which sometimes conflict with the nation's noble values. Negative content and hoaxes can also undermine morals and ethics.

- 2) The weakening of role models. The younger generation needs role models, whether from parents, teachers, or public figures. However, frequently reported cases of corruption, abuse of authority, and other unethical behavior can weaken their faith in the values taught.
- 3) Educational disorientation, meaning an education system that focuses too much on academic aspects and quantitative values often neglects the education of national character values. Moral and ethical lessons become merely memorized theories, rather than something internalized and applied in daily life.
- 4) The role of the family is weakening, such as in the case of busy parents, supervision and communication within the family is often reduced, even though the family is the first and most important environment in instilling moral values, good manners and empathy.

This character crisis has far-reaching and dangerous impacts on the nation, including: (a) threats to national identity; (b) an increase in deviant behavior, especially among the younger generation; and (c) a weakening of nationalism or the spirit of nationalism. Some examples of behavior among the younger generation that could indicate the erosion of noble character. This behavior often arises from various factors, such as the influence of social media, lack of supervision, and shifting values in society include:

- 1) Behavior that shows little respect for others, such as verbal and cyberbullying, using social media or text messages to mock, threaten, or spread gossip about others. This behavior demonstrates a lack of empathy and respect, demeaning parents or teachers, or a lack of ethics and daily behavior. Individualistic attitudes, such as a refusal to participate in social activities or community service, and only caring about one's own interests without regard for others
- 2) Irresponsible behavior, such as plagiarism and academic cheating, inability to manage emotions, and disregard for rules and norms.
- 3) Behavior influenced by a consumerist and hedonistic culture, such as flaunting wealth on social media, and living extravagantly and disregarding the struggle and values of life.

If not addressed promptly, these behaviors can erode the noble character that should serve as the foundation for the nation's future generations. Furthermore, a character crisis is a condition in which a nation's moral, ethical, and noble identity begin to fade, especially among its younger generation. This crisis is characterized by various negative behaviors that reflect a low level of national character..

### **Crisis of Local Cultural Wisdom**

The crisis of cultural wisdom is a complex and multidimensional problem, arising from various factors in the era of globalization. This is evident in the erosion of traditional values and local wisdom in people's daily lives. The main factors contributing to this crisis are: (1) the flow of globalization and popular culture; (2) the lack of education in cultural preservation; (3) shifts in values and lifestyles; (4) lack of role models. This crisis has broad and dangerous impacts on the lives of the younger generation, including: (1) a weakening of national

identity; (2) a declining sense of togetherness and mutual cooperation; (3) the loss of local solutions.

The crisis of local cultural wisdom is a phenomenon in which people, especially the younger generation, begin to abandon or ignore the values, traditions, and practices inherited from their ancestors. The following are some concrete examples of this crisis in various aspects of life: (1) a crisis in traditional agricultural systems; (2) the loss of noble cultural wisdom values considered noble and true; (3) the shift in the values of noble cultural wisdom by the attitudes and behavior, character, and morals of the younger generation; (4) a crisis in ethics and manners; (5) the erosion of local cultural wisdom and ancestral characteristics; and a crisis in environmental preservation.

### **Crisis of Religious Faith**

A crisis of faith, or crisis of aqidah, does not always manifest itself in the form of open rejection of religion, but often appears in the following symptoms: (1) Skepticism and apathy, or doubts about the truth of the Quran and Hadith, or an indifference (apathy) toward matters of religion and worship; (2) merely carrying out meaningless rituals, where worship such as prayer, fasting, or the pilgrimage is performed solely out of habit or tradition, without understanding its meaning and purpose; (3) moral and ethical degradation, namely the emergence of deviant behavior such as promiscuity, drug abuse, or decreased respect for parents and teachers, which indicates the fragility of the values of faith that should serve as a moral bulwark; and (4) the phenomenon of poor faith, where people feel empty and hollow even though they have wealth and social status. They seek happiness in material things which actually further distance them from inner peace.

A crisis of faith is a condition in which the foundation of a person's faith is shaken or even lost, so that belief in the fundamentals of Islam becomes weak. Here are some real examples of a crisis of faith that often occurs in the modern era: (1) Shirk and syncretism, This incident is the most fatal form of crisis of faith. such as: prioritizing paranormal strategies in life, greeting other religions on holidays, materialism and hedonism, namely a modern lifestyle that emphasizes worldly pleasures can erode faith; (2) Excessive skepticism and rationalism. Where advances in science and philosophy make some people begin to doubt religious teachings that cannot be proven scientifically. For example: doubting the power of Allah, considering religious teachings illogical, not feeling guilty after committing sins, blaming Allah's destiny and others.

## **2. The Role of Information Systems Management in Mitigating the Negative Impacts of Scientific and Technological Developments in the Era of Globalization on the Education System**

Based on the analysis of several data reductions in this study, information was obtained regarding the role of information systems management in mitigating the negative impacts of scientific and technological developments in the era of globalization on the education system. Information systems management plays a crucial role in mitigating the negative impacts of scientific and technological developments in the era of globalization. Information systems

management helps organizations and individuals manage information strategically so they can utilize technology optimally while minimizing the associated risks. Some of the key roles of information systems management in addressing the negative impacts of rapid scientific and technological developments include:

#### **Data and Information Security**

Globalization and the rapid development of information technology increase cybersecurity risks, such as hacking, data theft, and malware attacks. Information systems management plays a role in designing and implementing robust information security systems to protect sensitive data. This includes the use of encryption, firewalls, intrusion detection systems, and strict access policies to prevent data leaks or misuse.

#### **Accurate and Reliable Information Management**

In the digital era, the spread of fake news (hoaxes) and disinformation is rapid and massive. Information systems management helps organizations ensure that the information they use and disseminate is accurate and verified. This is achieved through structured database management, the implementation of data verification systems, and human resource training to distinguish between valid and invalid information. This ensures that decisions based on accurate data can minimize errors and losses.

#### **Controlling and Supervising Technology Use**

The misuse of technology, such as gadget addiction, negative content, and cyberbullying, has significant negative impacts. Information systems management helps create a framework and policies for responsible technology use. For example, in educational or corporate settings, information systems management can implement systems to monitor internet usage, block malicious websites, and provide digital education to users.

#### **Improving the Quality of Human Resources**

Globalization demands that individuals possess relevant digital skills. Otherwise, a digital divide will arise, exacerbating social and economic inequalities. Information systems management plays a role in identifying the need for new skills and designing effective training programs. This way, human resources can adapt to new technologies, increase productivity, and reduce the risk of being left behind by advances.

#### **Optimizing Decision Making**

With massive volumes of data (big data), managers often struggle to make informed decisions. Information systems management provides systematic data analysis and decision support tools (DSS). These systems process raw data into relevant and easily understood information, helping management make more strategic, rapid, and measurable decisions. This is crucial for facing intense and dynamic global competition.

### **3. Developing Information Systems Management Strategies in the Era of Globalization in the Education System**

Information systems management plays a crucial role in addressing the negative impacts of scientific and technological developments in the era of globalization by implementing strategies focused on governance, security, and responsible use. This strategy ensures that technology is used for good, not harm.

It also avoids and controls the influence of negative aspects and instead plays a role and directs positive and beneficial impacts.

Based on the data reduction analysis of the research results, several key information systems management strategies exist to mitigate the negative impacts of scientific and technological developments, including:

#### **Establishing a Technology Governance Policy**

Organizations must establish clear technology use policies for all members. This includes rules on digital ethics, the use of social media in the workplace, and the management of personal data. This policy helps prevent technology misuse such as cyberbullying, the spread of hoaxes, and privacy violations.

#### **Improving Cybersecurity**

MSI must implement a multi-layered security system to protect data and infrastructure from cyberattacks. These strategies include: (a) Data encryption, which converts data into a secret code that cannot be read by unauthorized parties; (b) Firewalls and Antivirus, which prevent unauthorized access and malware attacks; (c) Intrusion Detection Systems, which monitor the network for suspicious activity in real time; (d) Awareness and Security Training, which educates employees on how to recognize cyber threats such as phishing and social engineering.

#### **Developing a Data Verification and Analysis System**

To combat the spread of disinformation, MSI must develop or deploy a system capable of verifying the authenticity and accuracy of data. This can be done through: (a) Big data analysis, which uses algorithms to identify suspicious patterns or inconsistent information; (b) Decision Support Systems (DSS), which provide processed and analyzed data to help management make decisions based on facts, not speculation.

#### **Strengthening Digital Literacy and User Ethics**

Low digital literacy is one of the main causes of negative impacts. MSI must be proactive in improving digital literacy through: (a) Regular training programs, namely providing training on how to use technology effectively and ethically; (b) Digital ethics education, namely instilling values such as privacy, copyright, and responsibility in using technology.

#### **Implementation of a Control and Supervision System**

MSI needs to implement a system to control and supervise technology use to prevent it from being excessive or deviating from its intended purpose, such as: (a) Access restrictions, namely blocking unproductive and potentially dangerous sites or applications; (b) Network monitoring, namely monitoring data traffic to detect anomalies or usage that does not comply with company policy.

Developing a strategy for implementing information systems management to mitigate the negative impacts of scientific and technological developments in the era of globalization is crucial. This development involves implementing a strategy focused on four main pillars: strengthening governance,

strengthening security, strengthening the literacy movement, and strengthening innovation.

### **Strengthening Governance**

This strategy focuses on establishing a clear framework for technology use. The goal is to ensure technology is used ethically and responsibly, including: (a) Strengthening clear usage policies, where government authorities establish detailed regulations and policies regarding the use of technology and data. This includes rules on privacy, digital ethics, and employee responsibilities in maintaining information security; and (b) Strengthening the implementation of continuous audits and compliance, where authorities (local governments) conduct periodic audits of information systems to ensure all use complies with established regulations and policies; and (c) Implementing information risk management, namely identifying potential risks arising from technology use, such as data leaks or cyberattacks, and preparing effective mitigation plans.

### **Strengthening Cybersecurity**

Information systems management must be proactive in building robust digital defenses to protect information assets from evolving threats, such as: (a) Implementing a layered security system, such as using a combination of firewalls, encryption, and intrusion detection systems to create a robust defense. Data encryption is a critical step in protecting sensitive data even if the system is successfully breached; (b) Automated incident response, namely developing systems that can detect and respond to cyber threats automatically and quickly, minimizing potential damage; and (c) Disaster recovery planning, namely preparing detailed plans for recovering data and systems after a cyberattack or other disaster. This ensures the continuity of business operations.

### **Strengthening the Digital Literacy and Ethics Movement**

This strategy focuses on developing human resources so they can use technology intelligently and responsibly. This can include: (a) Comprehensive training, namely conducting regular training for all staff, from the lowest level to management, on cybersecurity, data privacy, and digital ethics; (b) Internal awareness campaigns, namely conducting internal campaigns to raise awareness of risks such as phishing and hoaxes, as well as how to identify and report them; and (c) Scenario-based education, namely using cyberattack simulations or real-life cases to train employees so they know how to react in emergency situations.

### **Responsible Innovation**

This strategy ensures that technological innovations developed or adopted do not cause unintended negative impacts. This can be done through the following efforts: (a) Technology impact assessments, where before adopting new technology, conduct an in-depth analysis of the potential social, ethical, and security impacts. For example, before implementing artificial intelligence, assess whether there are biases that might disadvantage certain groups; (b) Ethical technology development, namely ensuring that every technology developed is designed with values such as privacy, fairness, and transparency in mind; and (c) Openness and collaboration, namely collaborating with stakeholders, including academics, government, and users, to ensure technological innovations align with societal expectations and needs.

These strategies complement each other and must be implemented in an integrated manner. Thus, information systems management acts not only as a gatekeeper but also as a guide, ensuring that the use of scientific and technological developments in the era of globalization brings maximum benefits with minimal risks.

## DISCUSSION

The development of science has driven the birth of technological innovation, which has now entered the digital era. In education, technology has become a crucial tool to support the learning process (Sudarsri Lestari, 2018). In line with Tondeur et al. (in Selwyn, 2011), digital technology in educational institutions functions as both an information medium and a learning tool. This is reinforced by Yusuf (2012), who asserts that educational technology is a systemic process to help solve learning problems.

As described above, the negative aspects, as challenges and threats resulting from the rapid development of science and technology in the current era of globalization, include the emergence of a national character crisis, a crisis in the values of local Indonesian cultural wisdom, and a crisis of religious faith. This character crisis has far-reaching and dangerous impacts on the nation, including: (a) threats to national identity; (b) an increase in deviant behavior, especially among the younger generation; and (c) a weakening of the spirit of nationalism or national spirit.

Globalization is the process of integrating global life through the internationalization of trade, economics, finance, education, culture, and other aspects. According to Princeton N. Lyman (in Wardatul Umayya Gea, 2024), globalization is characterized by rapid growth, interdependence between countries, and mutually beneficial relationships across various sectors. Globalization is continuous, transcends national borders, and is unavoidable, requiring humans to adapt. In the context of education, globalization has brought about a number of significant changes (Darwis & Mahmud, 2017).

An educational management information system (IM) integrates human resources and information technology to manage data, from selecting, storing, processing, and presenting information to support decision-making in education. The data used is empirical and verifiable (Loilatu et al., 2020). Furthermore, Rochaety (2005) emphasized that the use of information technology in educational organizations has a positive impact because it increases efficiency, reduces communication barriers, and overcomes the limitations of space and time in international activities.

The impact of implementing an educational management information system has several important implications, both positive and negative. The positive effect is organizational performance with the availability of necessary, fast and accurate information, work becomes more effective and efficient, while the negative effect is a reduction in the workforce, because work previously done by people is replaced by information and technology, as well as the influence of

external culture that is not in accordance with existing local cultural conditions (Wardatul Umayya Gea. 2024).

The implementation of information systems management can increase business process automation, improve internal and external communication, and support data-driven decision-making. Despite challenges such as resistance to change and data security issues, this study concludes that investing in information systems management and employee training can create a competitive advantage for organizations (Nazwa Rahmayani, 2025). Information systems management is designed to provide timely and relevant information, thereby supporting operational efficiency and effectiveness (Al-Faid and Lismawati, 2024). Furthermore, with an integrated system, organizations can provide better service, increase customer loyalty, and build a positive reputation in the market (Ma and Hidayah, 2024).

Kezia Laura et al. (2024) explain that the rapid development of technology in the era of globalization has brought significant changes to various aspects of life, including human resource management (HRM). Technology provides efficiency and innovation in HRM, but still requires careful management to optimize its benefits and minimize its negative impacts. Ali et al. (2024) added that the use of appropriate management information systems and technology can increase operational efficiency and improve communication, provided they are designed appropriately for the organizational context. Similarly, Nicholas Gane (in Selwyn, 2011) emphasized that the internet plays a direct role in changing daily life patterns, from how we work, access and exchange information, to building and maintaining social relationships.

## **CONCLUSION AND RECOMMENDATION**

1. Information systems management in the education system plays a crucial role, particularly in efforts to improve the quality of education across various elements of school management. Despite its crucial role, the development of science and technology in the era of globalization poses challenges and threats in the form of uncontrolled negative impacts, including a character crisis, a crisis of local cultural wisdom, and a crisis of faith among religious communities.
2. Information systems management, in addressing the negative impacts of the rapid development of science and technology in the era of globalization, has the following primary roles: (a) securing data and information; (b) managing information; (c) controlling and supervising technology use; (d) improving the quality of human resources; (e) optimizing decision-making.
3. The main strategies for implementing information systems management to mitigate the negative impacts of scientific and technological developments in the era of globalization include: (a) Establishing Technology Governance Policies; (b) Improving Cybersecurity; (c) Developing Data Verification and Analysis Systems; (d) Strengthening Digital Literacy and User Ethics. (e) Implementation of Control and Supervision Systems. Furthermore, it is necessary to develop a strategy that focuses on four main pillars: strengthening governance, strengthening security, strengthening the

literacy movement, and strengthening innovation. These strategies complement each other and must be implemented in an integrated manner. Thus, information systems management acts not only as a gatekeeper but also as a guide, ensuring that the use of scientific and technological developments in the era of globalization brings maximum benefits with minimal risks.

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