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TECHNOLOGY INFRASTRUCTURE CHALLENGES IN THE DIGITAL ERA

Mahendra Adhi Nugroho
Faculty of Economics and Business, Yogyakarta State University, Indonesia
(mahendra@uny.ac.ic)

Salsabila Arisha Wardani
Faculty of Economics and Business, Yogyakarta State University, Indonesia
(secondauthor@email.com)

R. Andro Zylio Nugraha
Faculty of Economics and Business, Yogyakarta State University, Indonesia
(androzylio@uny.ac.id)

Annisa Kusumawati
Faculty of Economics and Business, Yogyakarta State University, Indonesia
(annisakusumawati.2022@student.uny.ac.id)

ABSTRACT

Introduction/Main Objectives: Social inequality is a deliberate result of urban areas having adequate internet access to technological knowledge while rural communities and affluent groups lack the necessary infrastructure and resources. Limited access to the internet is not high-speed and inadequate, increasing inequality and injustice in society. **Background Problems:** The development of the times makes humans must be ready for change. One of the things needed is technological infrastructure. **Novelty:** There is no research related to the importance of technology infrastructure in dealing with. **Research Methods:** This research uses a qualitative research type and literature study approach that conducts a literature review on recent developments in technology infrastructure, challenges in the digital age, and their impact on organizations. Literature studies can provide a robust framework and a deep understanding of the research topic. This data is obtained from various sources, such as articles, journals, and books. **Finding/Results:** List the empirical finding(s) and write a discussion in one or two sentences. **Conclusion:** The results and discussion in this study are to protect against cyber threats, and data protection must be a top priority for organizations, such as data encryption, firewalls, and sophisticated security software

Keywords: Internet, Digital technology, Data Security, Digital Era, Technology Infrastructure

INTRODUCTION

Technology is defined as the knowledge of how to fulfill specific human goals in a way that can be specified and reproduced. (Zhang et al., 2024). Technology development is a critical driver in the manufacturing industry's transition to a circular economy as a path to sustainability (Parolin et al., 2024). Not only does this technological transformation bring about profound changes in people's lives, but it also poses significant social challenges. One of the first emerging issues is the widening digital divide between individuals and communities. Access to technology and digital resources is unequal, especially for those from lower economic strata or remote areas. (Sudiantini et al., 2023).. The development of information and communication technology (ICT) has had a significant impact on human civilization. However, this development has been uneven, so the digital divide remains a severe problem. In Indonesia,

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the digital divide is particularly pronounced between more developed and less developed regions and between urban and rural areas. (Jayanthi & Dinaseviani, 2022022)..

The digital age brings complex challenges with increasingly sophisticated technological advancements. Although technology continues to evolve, inequality of access to technology remains a pressing issue, especially in developing countries where limited infrastructure and high costs hinder access to technology. This disparity can increase social tensions. People who do not have access to technology feel unequal in opportunities and information. In addition, overuse of technology can negatively impact mental and emotional health, such as digital addiction, feelings of anxiety, and depression. (Santoso et al., 2023).
The digital divide is a complex issue that arises from multiple factors, including socioeconomic disparities, geographic location, age, race, and gender. These gaps perpetuate inequality by limiting access to educational resources, employment opportunities, essential services, and civic participation. Bridging these gaps has become an urgent challenge as the digital world increasingly shapes our daily lives, and access to technology becomes a prerequisite for full engagement in society. (Haniko et al., 2023).

Digital technology has also revolutionized operations in various industries (Qi et al., 2024). Technology infrastructure plays a crucial role in ensuring the success of digital transformation and the development of the digital economy. (Aulia et al., 2023).. A reliable network enables fast and efficient access to databases and applications, while good connectivity allows users to access information from various locations easily. A well-managed database stores critical information such as customer, transaction, and inventory data that must be kept intact to keep the data accurate and secure. In facing the era of digital transformation that accelerates technology adoption, understanding and mastering technology security is essential (Hoshmand et al., 2023).

Based on this background, researchers want to know how vital technology infrastructure is in facing the challenges of the digital era. Challenges in the digital era include various things, from changes in people's lifestyles to transformations in how businesses are run. Reliable technology infrastructure is the main factor to overcome these challenges. In facing challenges in the fast-changing digital era, technology infrastructure must be able to adapt to evolving needs and can be expanded easily to accommodate rapid growth.

Technology Infrastructure

Community activities that emphasize the inefficiency of their organizational activities with the structures used to support them with physical form are also called infrastructure. (Sekarsari, 2019). In the organization, information technology is one of the crucial resources for excelling in the current era of globalization. Technology Infrastructure is an investment in hardware, software, and services such as consulting, education, and training that are shared throughout the company or all business units. Technology Infrastructure includes hardware such as mainframe computers, servers, laptops, and PDAs, while software such as operating systems and applications have many functions; besides, there are also databases to store important data. (Maisharoh & Ali, 2020).

Challenges in the Digital Age

One of the critical challenges is infrastructure readiness. Many organizations, especially in remote areas or developing countries, face technological infrastructure limitations such as poor internet connections and inadequate hardware. In addition, the existing infrastructure may not be compatible with the new technology to be integrated, requiring expensive upgrades or replacements. Security and privacy are significant concerns when integrating technology. With the increasing risk of cyberattacks, organizations must implement adequate security measures to protect their data and systems. In addition, managing and protecting personal data is

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becoming increasingly complicated with the growth in the amount of data collected and stored. (Yahya, 2024). The factors that influence the challenges in the digital era are:

a. Changes in Consumer Behavior

With better access to the internet, consumers are now more educated and informed. With the internet, they can easily search for and compare products, services, and prices. Consumers actively seek information and inspiration through the Internet. This includes product search, comparison, and purchase. In e-commerce, trends have changed consumer patterns from offline to online shopping, affecting business strategies. Consumers increasingly rely on mobile devices, such as smartphones and tablets, to conduct product searches, compare prices, and make purchases. This situation encourages marketing strategies focusing more on the mobile device user experience.

b. Global Competition

Broad market access through the digital age allows companies from all over the world to compete openly. Digital competition allows companies from all over the world to compete in a more open and connected market. Companies compete not only with local competitors but also with global players who can quickly enter local markets. Technology has reduced entry barriers for new businesses, leading to many start-ups that seek to disrupt established industries. Competition comes not only from large companies but also from innovations made by smaller, more flexible start-ups.

c. Cyber Security Threats

Cybersecurity threats are one of the main challenges that must be faced in an increasingly connected digital era. Several cyber security threats are increasingly widespread, namely:

d. Malware Attack

Malware such as viruses, worms, and trojans can infiltrate a computer system or network and cause damage, data theft, or take over control of the system.

e. Phishing and Spear Phishing

Phishing attacks involve attempts to obtain sensitive information, such as passwords or financial information, by posing as a trusted entity. Spear phishing is a more targeted attack targeting specific individuals or organizations with more customized information.

f. DDoS (Distributed Denial of Service) attack

DDoS attacks aim to make network services or resources unavailable to legitimate users by streaming massive internet traffic to a target website or server.

g. Data Breach

System hacks that result in unauthorized access to personal or sensitive data, such as credit card or identity information, can harm companies and consumers and damage a company's reputation.

h. Ransomware Attack

Ransomware is malware that encrypts the victim's data and then demands a ransom payment to obtain the decryption key. This attack can cause huge financial losses and significant operational disruptions for organizations.

i. Software Vulnerability Exploitation

Software that is out of date or vulnerable to attacks can be exploited by attackers to enter a system or network, steal data, or spread malware.

j. Privacy Breach

Unauthorized data collection and use by companies or third parties can threaten the privacy of individuals and lead to severe legal and reputational consequences for companies.

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The Role of Technology Infrastructure in Addressing the Challenges of the Digital Age

Appropriate information technology infrastructure is essential for organizational success in the digital era. This technology infrastructure has a central role in facing the challenges of the digital era, namely:

a. Electronic Business and Commerce: Information technology development has changed how businesses operate. E-commerce allows companies to have online stores, facilitate electronic transactions, and reach global markets more easily. Efficient inventory management, finance, and customer management systems are supported by information technology.
b. Online Education and Learning: E-learning and online courses provide wider and more flexible access to education. With online platforms, individuals can learn from anywhere and anytime, according to their needs.
c. Digital Health and Telemedicine: Information technology is essential in efficient and affordable healthcare. Telemedicine enables remote consultations with doctors via video or phone, making it easier for patients to get medical care without visiting a healthcare facility physically.

METHOD, DATA, AND ANALYSIS

The third part of the manuscript, "Method, Data, and Analysis" is designed to describe the nature of the data. The method should be well elaborated and enhance the model, the approach to the analysis and the step taken. Equations should be numbered as we illustrate. This section typically has the following sub-sections: Sampling (a description of the target population, the research context, and units of analysis; the sample; and respondents' profiles); data collection; and measures (or alternatively, measurements).

The research methodology should cover the following points: Concise explanation of the research's methodology is prevalent; reasons for choosing the particular methods are well described; the research's design is accurate; the sample's design is appropriate; the data collection processes are properly conducted; the data analysis methods are relevant and state-of-the-art.

RESULT AND DISCUSSION

Implementation of technology infrastructure in addressing cyber security

A critical aspect of the research results is data security awareness. With cyber threats on the rise, data protection is becoming a top priority for organizations. Implementing security measures is an integral part of a data protection strategy to face the challenges of the digital age. Some of the security measures that can be implemented, as mentioned, include:

a. Data Encryption: Data encryption involves converting data into an unreadable format without the proper encryption key. Data Encryption provides an additional layer of protection against unauthorized access to sensitive data while the data is in storage and in transit.
b. Firewalls are software or hardware devices that monitor and control network traffic. They can help identify and block unauthorized access to systems or networks and protect against attacks such as DDoS attacks.
c. Advanced Security Software: Advanced security software, such as antivirus, antispyware, and antimalware, is vital to detect and address evolving security threats. This software should be updated regularly to ensure optimal protection against cyberattacks.

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d. Strong Authentication Mechanisms: Implementing robust authentication mechanisms, such as two-factor authentication or token-based authentication, can help prevent unauthorized access to sensitive accounts or systems.
e. Continuous Security Monitoring: Continuous security monitoring of networks, systems, and applications is essential to detect and respond to cyberattacks quickly. The monitoring involves the use of sophisticated security monitoring and security analytics software.
f. Periodic Updates and Maintenance: Software and systems should be updated regularly to fix discovered security vulnerabilities and keep up with the latest developments in security technology.
g. Security Awareness Training for Employees: Regular security awareness training can help improve their understanding of good security practices, such as avoiding phishing attacks and utilizing available security tools.

Based on the results of this study it is relevant to the findings of the researchers (Sudiantini et al., 2023) entitled the application of base 64 cryptography for website URL (Uniform Resource Locator) security from SQL Injection attacks, which states that the integrity of the encrypted URL will be better maintained because the SQL injection method cannot be applied to URLs that have been encrypted. This is the same as the research results, which state that the implementation of technological infrastructure in the face of cyber security uses secure data encryption.

The Importance of Collaboration Between the IT Department and Management in Managing Technology Infrastructure

Collaboration between the IT department and management is crucial in managing technology infrastructure. Here are some reasons why this collaboration is so important:

a. Shared Vision: The IT department and management must have an aligned vision of how technology can support business goals. By collaborating, technological decisions can be directed following the organization's strategy.
b. Security and Compliance: The IT department is responsible for maintaining technology security and compliance. Collaboration with management helps identify risks and take appropriate action to ensure data and system security.
c. Budget and Resources: Management is vital in budget and resource allocation. Collaboration ensures that technology investments are made wisely and efficiently.
d. Decision Making: Technology decisions should involve both parties. The IT department provides technical insight, while management considers the overall business impact.
e. Innovation: Collaboration allows innovative ideas to emerge. IT departments and management can work together to identify new opportunities supported by technology, such as using the latest technology or implementing more efficient solutions.

The results of this study are relevant to the researchers' findings (Alfito et al., 2024) entitled Digital Transformation: Impact, Challenges, and Opportunities for Digital Economic Growth. This research also highlights the importance of collaboration and partnership in transforming the shipping industry. Thus, this study provides an in-depth understanding of the role of information technology in management transformation in the shipping industry while highlighting the challenges faced and their practical implications.

CONCLUSION

A good technology infrastructure is a strong foundation for dealing with changes and challenges in the digital era. Organizations and individuals will find it difficult to adopt new

technologies without adequate infrastructure to enable better connectivity. A fast and reliable internet network enables access to information, collaboration, and efficient communication. Technology infrastructure also includes security and data protection systems. In a digital age prone to cyber threats, a secure infrastructure is essential to protect sensitive information and reduce the risk of data leakage. A good technology infrastructure helps improve operational efficiency. Automation, system integration, and efficient data management can reduce costs and increase productivity. A reliable technology infrastructure enables innovation and business transformation. With good infrastructure support, organizations can adopt new technologies, develop better products and services, and adapt to market changes.

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