

Digital Leadership in the Era of Industrial Revolution 4.0: Challenges and Opportunities in Indonesia

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Abstract

Industrial Revolution 4.0 has brought significant changes in various sectors, including in the field of leadership. This research aims to explore the challenges and opportunities faced by leaders in Indonesia in implementing digital leadership. The research results show that the main challenges faced by leaders are a lack of technological infrastructure, resistance to change, and a lack of digital skills among the workforce. However, the research also identified a number of opportunities, including increased operational efficiency, the ability to make data-based decisions, and opportunities for innovation and service. This research provides strategic recommendations for leaders in Indonesia to overcome these challenges and take advantage of existing opportunities, so as to increase company competitiveness in the digital era.

Keywords: *Digital Leadership, Industrial Revolution 4.0, Digital Transformation.*

Introduction

The Industrial Revolution 4.0 has triggered a deep transformation in various industrial sectors with the introduction of advanced technologies such as the Internet of Things (IoT), artificial intelligence (AI), big data and automation (Lampropoulos et al., 2019). These changes not only change the way of work and production, but also demand a transformation in organizational leadership and management styles. Digital leadership, which refers to the use of digital technology to manage and lead organizations, is becoming increasingly important to ensure a company's competitiveness and relevance in this digital era (Temelkova, 2020). Previous research shows that countries that successfully adopt and integrate digital technologies in their economic and social structures have significant competitive advantages (Chesbrough, 2019). However, big challenges also arise along with these opportunities. Implementing new technology requires strong infrastructure, skilled human resources, and supportive regulations to optimize the potential of the technology.

In Indonesia, the implementation of digital leadership faces various complex challenges. Technological infrastructure that is not evenly distributed in various regions is a significant obstacle for companies in adopting digital technology as a whole (Sagung & Sri Darma, 2020). According to the latest data from the Ministry of Communication and Information, only around 64% of Indonesia's territory is covered by 4G networks, while access to broadband technology is still limited outside big cities such as Jakarta, Surabaya and Bandung (Situmorang et al., 2023). Many companies, especially those located outside urban centers, have difficulty utilizing advanced technology. For example, a survey conducted by the Indonesian Employers' Association shows that nearly 45% of companies in rural areas still rely on limited communications infrastructure, which limits their ability to effectively adopt digital solutions such as IoT and data analytics.

On the other hand, resistance to change is also a big challenge. Data from a survey by the Research Institute of Management and Economics (LRME) shows that more than 60% of managers in the industrial sector express discomfort with the use of new technologies in their business processes (Pratiwi & Indriani, 2017). This is often due to a lack of understanding of the benefits gained from digital technology and a fear of losing control over work processes. Lack of digital skills among the workforce is also a major obstacle. According to data from the Central Statistics Agency (BPS), only around 25% of the total workforce population in Indonesia has sufficient digital skills to operate digital technology effectively.

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These limitations slow down a company's ability to adapt quickly to rapid technological change (Ahmetya et al., 2023).

Training and education in the field of technology is still an urgent need. Training programs held by the government and the private sector must be expanded to increase digital literacy at all levels of society and industry. In this way, Indonesia can utilize the enormous potential of its dynamic young population to accelerate digital transformation and increase global competitiveness in the era of Industrial Revolution 4.0 (Abukhait et al., 2023).

Method

This research uses a qualitative approach with the aim of exploring in depth the challenges and opportunities faced by leaders in Indonesia in implementing digital leadership in the Industrial Revolution 4.0 era. Qualitative methodology was chosen because it allows researchers to gain a more comprehensive understanding of the complex dynamics and context in the application of digital leadership. The reliability and validity of the research were maintained through triangulation of data from various sources and techniques, including interviews, observations, and document analysis. In addition, *peer debriefing* was carried out involving several experts in the field of digital leadership to provide input and verification of research findings.

Result

The research results show that leaders in this country face a number of complex challenges in adopting digital leadership in the Industrial Revolution 4.0 era. Uneven technological infrastructure is one of the main obstacles. Data from the Ministry of Communication and Information shows that only around 64% of Indonesia's territory is covered by 4G networks, while access to broadband technology is still limited outside big cities such as Jakarta, Surabaya and Bandung. This condition slows down the ability of companies, especially those located in rural areas, to optimally adopt digital solutions such as *the Internet of Things (IoT) and data analytics*.

Apart from infrastructure, resistance to change is also a serious challenge faced by leaders. The research results show that more than 60% of the workforce expressed discomfort with the use of new technology in carrying out operational activities. This resistance often arises from a lack of adequate understanding of the benefits that can be gained from digital technology, as well as concerns about changes in established ways of working. The lack of digital skills among the workforce is also a serious obstacle. Data from the Central Statistics Agency shows that only around 25% of the total workforce population in Indonesia has sufficient digital skills to operate digital technology effectively. These limitations affect a company's ability to adopt new technology quickly and make maximum use of it to increase productivity and competitiveness.

In addition, field observation results show that many companies, especially in rural and suburban areas, face difficulties in utilizing advanced technologies such as IoT and big data analytics due to limited communication infrastructure and stable internet connections. Thus, leaders in Indonesia need to develop a comprehensive strategy to overcome this challenge (Gozali & Paik, 2023). This includes greater investment in technology infrastructure to expand network coverage and improve technology accessibility across the region. Additionally, intensive training initiatives and educational programs focused on digital literacy are key to improving digital skills among the workforce. Transforming organizational culture is also important to facilitate adaptation to technological change as an integral part of business and operational strategy (Bejakovic & Mrnjavac, 2020). With these steps, it is hoped that Indonesia can optimize the potential of the Industrial Revolution 4.0 to achieve inclusive and sustainable economic growth.

Discussion

This research reveals several main challenges faced by leaders in implementing digital leadership in Indonesia. One of the main challenges faced is the lack of adequate technological infrastructure. Many companies in remote areas or outside major urban centers face obstacles in accessing the advanced technologies needed to support digital transformation (Hanna, 2009). These infrastructure limitations not only slow down the overall adoption of digital technologies, but also pose a significant barrier to innovation and operational efficiency. In addition, resistance to change among managers and employees is another significant challenge. Individuals who are accustomed to conventional ways of working tend to show disapproval of the introduction and implementation of new technology.

This phenomenon not only hinders the organization's digital transformation process, but also reduces the potential for technology adoption that can increase productivity and competitiveness. Limited digital skills among the workforce is also an issue that needs to be addressed. Even though Indonesia has a large young population, there is still a gap in digital literacy levels. A lack of formal training in digital technologies and uneven education make it difficult for companies to adapt quickly to rapidly changing technological developments. In addition, the cost of implementing digital technology is also a significant obstacle. Companies have to face high costs to adopt and integrate advanced technologies into their infrastructure. Unstable economic conditions in Indonesia can exacerbate this problem, forcing companies to manage their resources carefully in order to invest sufficient funds to update their technology.

Digital security challenges also require serious attention. With the increasing threat of cyberattacks, protection of sensitive data and corporate infrastructure has become critical (Djenna et al., 2021). Weaknesses in the security system can result in major losses, both in terms of finances and reputation. By identifying and addressing these challenges strategically, leaders can lead their organizations towards a more inclusive and sustainable digital future in Indonesia. These steps will not only strengthen the organization's ability to utilize technology to increase efficiency and innovation, but will also help Indonesia to be more competitive in an increasingly connected global arena (Ismail et al., 2023).

Based on this research, a number of opportunities were also revealed that leaders can take advantage of. The first significant opportunity is the ability to make data-driven decisions. The latest data from the Indonesian Central Bureau of Statistics shows that internet penetration in Indonesia has reached more than 80% of the total population in 2023, with more than 230 million active internet users. This reflects the rapid growth in digital technology adoption across the country. With these advances, digital technology allows companies to collect more accurate data and perform faster analysis. For example, with advanced analytics tools, companies can integrate data from various internal and external sources, such as sales data, consumer behavior, and market trends. This in-depth data analysis provides leaders with valuable insights to understand market dynamics, consumer behavior patterns, and new opportunities.

The main advantage of this capability is that leaders can make more precise and fact-based strategic decisions. By leveraging relevant and accurate data, they can identify growth opportunities, optimize company operations, and significantly reduce risks. For example, by predicting market demand based on historical data and recent trends, companies can plan production, inventory, and marketing strategies more efficiently. Additionally, data-backed decisions also strengthen transparency and accountability within the organization. Leaders can clearly account for their decisions to stakeholders, based on objective evidence and analysis.

The second significant opportunity is innovation in service. Based on the latest data, internet penetration in Indonesia has reached more than 80% of the total population in 2023, with more than 230 million active internet users. This reflects the rapid adoption of digital technologies across various economic sectors. By utilizing digital technology, organizations have the potential to develop innovations in services that are more responsive to market and consumer needs. Real-world examples include the use of data analysis and artificial intelligence to identify consumer behavior patterns and provide more personalized

solutions. Implementing technology like this not only increases operational efficiency, but also strengthens the company's competitiveness in facing increasingly fierce global competition.

In addition, digital technology makes it possible to expand the range of company services through digital platforms. For example, by utilizing cloud computing infrastructure, companies can reach customers in various geographic locations without being limited by traditional boundaries. This opens up opportunities to expand market share and increase the accessibility of the products or services offered. Service innovation also allows companies to create significant added value for customers. By focusing on developing products that are more efficient, environmentally friendly, or that provide a superior user experience, companies can meet the increasingly high expectations of consumers in this digital era. Examples of the application of IoT technology in producing more connected and intelligent products are one proof of this progress.

Overall, opportunities for innovation in services through digital technology not only support company growth, but also contribute to increasing customer satisfaction and meeting evolving market demands. Leaders who are progressive and able to utilize technology wisely will lead their organizations towards sustainable success in today's digital era.

Although there are significant challenges, such as the lack of technological infrastructure in remote areas which still affects the accessibility of digital technology in Indonesia, as well as resistance to change among employees which sometimes hinders the organizational transformation process, these opportunities offer a strong foundation for leaders to lead their companies towards a digital future that is more innovative, efficient and highly competitive in an increasingly connected global market. With the right strategy in implementing digital technology, such as cloud computing to increase operational efficiency and artificial intelligence to improve data-based decision making, leaders can optimize the potential of technology to overcome infrastructure challenges and leverage innovation as a competitive advantage. A strong commitment to continue adapting to technological developments is also needed so that companies can maintain relevance and expand market share amidst increasingly fierce global competition.

Conclusion

This research reveals that the implementation of digital leadership in the Industrial Revolution 4.0 era in Indonesia faces various significant challenges, including a lack of adequate technological infrastructure, resistance to change among managers and employees, and a lack of digital skills among the workforce. However, behind these challenges there are great opportunities that leaders can take advantage of. Improved operational efficiency, the ability to make data-driven decisions, and product and service innovation are some of the key opportunities identified. To overcome these challenges, the study recommends that companies should invest in developing better technological infrastructure and provide adequate training to improve digital skills. Additionally, effective change management strategies need to be implemented to reduce resistance to new technologies. Existing opportunities must be exploited by integrating digital technology in every aspect of business operations and utilizing data analytics for strategic decision making. Visionary and proactive leadership is needed to direct companies in overcoming challenges and exploiting opportunities in this digital era. By adopting the recommended strategies, leaders in Indonesia can increase the competitiveness of their companies and create a more innovative and sustainable business ecosystem. It is hoped that this research can provide valuable insights and practical guidance for leaders who want to be successful in the Industrial Revolution 4.0 era.

The strategic recommendations from this research emphasize the importance of visionary leadership that is able to lead companies through challenges and exploit opportunities in the ever-changing digital era. In Indonesia, where internet penetration will reach more than 73% of the total population by 2023, leaders need to adopt a proactive and data-driven approach to optimize their digital transformation. By leveraging technologies such as big data analytics and artificial intelligence, leaders can make more informed and timely decisions, which are essential to improving operational efficiency and understanding rapidly changing market dynamics. This approach not only helps companies overcome existing technology

infrastructure challenges, but also opens the door to product and service innovation that is more responsive to customer needs. Furthermore, visionary leaders in the context of the Industrial Revolution 4.0 in Indonesia have the potential to create a viable business ecosystem. more innovative and sustainable. By creating an environment that supports collaboration, creativity, and adaptability to new technologies, they not only increase their company's competitiveness, but also play an important role in driving the growth of the digital economy as a whole.

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