

The Impact and Role of Digital Technology in Optimizing Business Administration in the Industrial Era 4.0

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Abstract

Digital transformation has become a key factor in improving the efficiency, productivity, and competitiveness of companies. This study aims to analyze the impact and role of digital technology in optimizing business administration in the Industry 4.0 era. This study uses a qualitative descriptive approach by collecting data from various secondary sources, such as journals, articles, and industry reports related to the application of digital technology in business administration. The results of this study indicate that digital technology has an important role in optimizing business administration in the Industry 4.0 era. The use of technologies such as automation, cloud computing, and data analysis can improve operational efficiency, productivity, and business scalability. Digital technology also accelerates more accurate decision making, increases customer satisfaction, and facilitates data management and financial administration. In addition, this technology opens up opportunities for innovation and development of new business models, which provide competitive advantages and strengthen the company's position in an increasingly competitive global market.

Keywords: Digital Technology, Business Administration, Industry 4.0, Digital Transformation, Optimization

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1. Introduction

In the 21st century, the world is entering an era known as the "Industrial Revolution 4.0," a major transformation driven by the rapid development of digital technology (Berliana et al., 2020). Referred to as the Industrial Revolution 4.0, this era is characterized by the integration of advanced technologies such as robotics, artificial intelligence (AI), and the Internet of Things (IoT), which not only automate various aspects of human life but also change the way we work, interact, and carry out our daily activities (Tahar et al., 2022). As one of the most significant technological revolutions, Industry 4.0 is projected to be a major driver of global innovation in the coming decades, having a major impact on various sectors, including manufacturing, healthcare, education, and business (Wahyuni, 2020). This transformation creates great opportunities for efficiency and productivity, but also demands rapid adaptation in skills and strategies to face emerging challenges.

The development of technology and digitalization has given birth to various sophisticated

software systems that are capable of automating business monitoring, analysis and optimization functions. This system leverages artificial intelligence, big data, and machine learning algorithms to provide deep insights in real-time, enabling faster and more accurate decision-making (Maesaroh et al., 2022). For entrepreneurs in this era, understanding the impact of digitalization is key to staying relevant and competitive. Rapid changes in technology require a strategic approach in integrating software into business models (Priyatna, 2024). In addition, entrepreneurs need to build strong digital literacy, both for themselves and their teams, in order to optimize the potential of available technology. This step includes investing in training, improving infrastructure, and collaborating with technology experts to ensure effective implementation. Furthermore, entrepreneurs must also be responsive to market trends and consumer needs that are increasingly influenced by technology (Aksenta et al., 2023) .

The current digital transformation is an unavoidable change, making it inevitable for entrepreneurs to face it with a wise and strategic attitude. Digitalization not only affects the way of working, but also redefines the administrative process in the business world (Wibowo, 2024). One step that can be taken is to optimize the use of digital administration technology to create a more efficient and effective business environment. Digital systems offer a variety of tools that can simplify work processes, from data management to analytical-based decision making (Salbiah & Nasution, 2024). This allows companies to increase productivity, reduce operational costs, and minimize errors that often occur in manual systems. Therefore, entrepreneurs need to strategically integrate digital technology into their business models to ensure smooth operations that support company goals (Purbasari & Sukmadewi, 2024).

Business administration, which is responsible for managing and organizing company operations, is now undergoing a major transformation in the digital era. Administrative processes that were previously carried out manually, such as organizing documents, monitoring performance, and controlling operations, have now shifted to a system that is fully integrated with technology (Zebua et al., 2023). By using modern software, companies can manage various aspects of their business faster and more accurately. For example, cloud-based systems allow data access from anywhere and at any time, while workflow automation speeds up the completion of administrative tasks (Sepriano et al., 2023). This transformation not only increases efficiency but also provides flexibility for companies to adapt to changing market dynamics. By optimally utilizing digital technology, business actors can build a strong foundation to face future challenges while creating added value for the company and its customers (Harto et al., 2023).

However, although digital technology offers many benefits, its implementation also presents no small number of challenges. Companies often face obstacles such as resistance to change, lack of digital literacy among employees, and high costs for initial investment in technology infrastructure (Rohman & Kustiwi, 2024). In addition, the successful implementation of digital technology also requires a deep understanding of how to integrate technology into business processes without disrupting existing operations. Therefore, in-depth research is needed to identify effective strategies in dealing with these challenges (Wahyuni et al., 2024).

This study is here to analyze the impact and role of digital technology in optimizing business administration in the Industry 4.0 era. The main focus of this study is to examine the extent to which digital technology can improve efficiency and productivity in the administration process, while identifying potential challenges that arise during the transformation process. This study also aims to provide guidance for business actors in utilizing digital technology optimally to support the sustainability of their business. The results of this research are expected to provide real contributions, both theoretically and practically. Theoretically, this research can enrich the literature on digitalization of business administration in the Industry 4.0 era. Practically, the findings of this study can be a guideline

for companies and entrepreneurs in designing effective digital transformation strategies. Thus, this research is not only relevant to the academic world, but also provides direct benefits to the business world which is facing challenges and opportunities in the ever-evolving digital era.

2. Research Design and Method

The method used in this study is a descriptive research method with a qualitative approach, which aims to understand and explain in depth the phenomena related to the impact and role of digital technology in optimizing business administration in the Industry 4.0 era. Qualitative research is an approach that is oriented towards natural phenomena or symptoms, where data collection is carried out by observing and analyzing real conditions that are relevant to the research context (Sugiyono, 2016). This approach is fundamental and naturalistic, so it is not carried out in a laboratory, but rather through information gathering in the field or from credible data sources. In this study, the data sources used are secondary data in the form of literature, scientific journals, articles, books, and other documents related to the topic of digitalization of business administration. This secondary data is analyzed to understand how digital technologies, such as artificial intelligence, automation, and big data, have been implemented in various business sectors to improve efficiency and productivity. This study also explores the challenges and opportunities that arise from the use of digital technologies, so as to provide a comprehensive picture of the role of technology in changing the way business administration works in the modern era.

3. Results and Discussion

The Impact of Digital Technology in Optimizing Business Administration in the Industrial Era 4.0

In an era of increasingly connected digital technology, the business world has undergone significant changes. The traditional approach to managing and operating a company is no longer the only determinant of success, but also involves the use of digital technology to drive innovation, growth, and business development (Istiqamah, 2023). The rapid advancement of technology has changed people's lifestyle patterns from conventional systems to modern systems that are more practical and adaptive. Various technologies that have been created have made society increasingly dependent on their use. In addition, increasingly advanced technological developments have also influenced people's perspectives, making them more open and have broader insights (Prabowo et al., 2023). All of these changes are the result of the increasing use of the internet in modern society.

There are a number of impacts of the presence of digital technology in optimizing business administration in the Industry 4.0 era. Below the author has summarized some of them.

Operational Efficiency

Digital transformation in business administration in the Industry 4.0 era has had a significant impact on the operational efficiency of companies. The use of digital technology allows many administrative processes that were previously done manually to be automated, saving time and effort. This automation covers various aspects, such as transaction processing, inventory management, customer data tracking, to daily operational supervision. With digital technology, companies can reduce the risk of human error, speed up task completion time, and improve data accuracy. This not only supports smooth operations, but also increases customer satisfaction through faster and more reliable services.

For example, in inventory management, digital technologies such as barcode systems and RFID (Radio Frequency Identification) allow companies to track inventory in real-time. This makes it easier to manage stock, reduce excess or shortage of inventory, and optimize the supply chain. Additionally, in the

financial aspect, modern financial management software can help companies monitor cash flow, prepare financial reports, and analyze performance efficiently. By adopting digital technologies, companies can not only reduce operational costs, but also strengthen their competitiveness in an increasingly competitive market. This operational efficiency is one of the main factors in creating a productive and innovative business environment.

Increased Productivity

Adopting technology in the business world not only focuses on increasing sales and profits, but also has a positive impact on human resource productivity. Technology enables companies to automate routine and repetitive tasks, such as data processing, inventory management, or performance monitoring, so that human workers can focus more on tasks that require creativity, strategy, and critical thinking. For example, an Enterprise Resource Planning (ERP) system can help integrate various departments within a company, from finance to marketing, allowing employees to access more accurate and real-time information. This increases the effectiveness of team performance in dealing with business challenges and speeds up the decision-making process.

Additionally, technology also enables more efficient and responsive communication between team members and with customers. Collaboration tools such as project management applications, chatbots, or video conferencing facilitate faster and easier interactions, reducing communication barriers that often occur in organizations. In the context of project management, the use of specialized software allows teams to monitor project progress in real-time, share updates, and resolve issues together. By leveraging technology to optimize communication and project management, companies can improve overall productivity, increase flexibility, and respond more quickly to market needs. This ultimately leads to sustainable and more efficient business growth.

Business Scalability

One of the major impacts of the digital transformation of business administration for entrepreneurs is the increase in business scalability. With the adoption of advanced technology, an entrepreneur can manage business growth in a faster and more efficient way. Digital technology allows businesses to overcome growth challenges without having to sacrifice the quality of services or products. One technology that greatly supports scalability is cloud computing, which offers very large data storage capacity and flexibility in accessing information anytime and anywhere. By using cloud computing, companies can easily manage and store large amounts of business data without having to build complex and expensive IT infrastructure. This allows for more efficient resource management, even when the business is growing rapidly.

In addition, cloud computing also allows companies to optimize collaboration and coordination between departments, as well as providing ease in accessing cloud-based applications or software needed in business operations. With larger storage and data processing capacity, companies can easily adjust their systems to support business expansion. This technology also helps increase the speed of response to market demands, optimize human resource management, and accelerate strategic decisions needed for growth. All of this contributes to improving the company's operational capabilities to be more dynamic and able to adapt to market changes more effectively, strengthening business competitiveness in the digital era.

Access to Information and Analysis

One of the positive impacts of the digital transformation of business administration is easier access to faster and more accurate information and analysis. With digital technology, entrepreneurs can access various data sources in real-time, allowing them to obtain relevant and up-to-date information in a short time. For example, through the use of cloud-based data management systems or analytics software, entrepreneurs can easily collect and analyze data from various business channels, such as sales,

marketing, and customer interactions. This fast access gives entrepreneurs a competitive advantage in making more timely and strategic decisions, increasing their ability to respond to market changes more efficiently.

Data obtained through digital technology also provides deeper insights into various aspects of business, such as market trends, consumer behavior, and company performance. By using advanced data analysis tools, entrepreneurs can uncover previously difficult-to-access information, such as customer preferences, purchasing patterns, or competitor analysis. These insights enable more valid, evidence-based decision-making that is relevant to changing market needs. With more informed and data-driven decisions, entrepreneurs can formulate more effective strategies, identify new business opportunities, and minimize potential risks. Thus, digital technology not only improves operational efficiency but also strengthens the company's competitive position in the market.

Business Innovation

Digitizing administration not only simplifies business operations, but also provides wider access for entrepreneurs to reach and utilize new technologies. With integrated digital technology, entrepreneurs can develop business innovations more flexibly and efficiently. Access to the latest software and platforms enables them to design and develop products and services that are better, faster and more relevant to market needs. This technology provides opportunities to improve product quality, accelerate the development of new services, and provide a better customer experience. In this way, digitalization plays a key role in creating added value for customers and increasing business competitiveness in an increasingly competitive market.

In addition, digitalization also allows companies to improve operational processes and create more disruptive business models in the midst of an ever-changing digital environment. By leveraging the latest technologies, such as artificial intelligence (AI), big data, and automation, companies can redesign their internal processes, reduce costs, and increase efficiency and productivity. More adaptive business processes allow companies to respond to change more quickly and effectively. This opens up opportunities to create new, more innovative business models that dare to challenge the status quo, which can ultimately change market dynamics. In the digital age, the ability to innovate quickly is key to long-term success for entrepreneurs who want to stay relevant and competitive.

Reach a Wider Market

Through the digitalization of business administration, entrepreneurs have a great opportunity to expand their market reach by utilizing a wider digital platform. One of the most effective ways is to utilize e-commerce, which allows the products or services they offer to be accessed by consumers from various locations without geographical limitations. E-commerce provides an opportunity to reach a global market, increase sales potential, and open up new opportunities in markets that were previously difficult to reach. With an integrated payment system, automated inventory management, and a marketing platform that connects directly with consumers, entrepreneurs can optimize their business in the digital space and attract potential customers worldwide.

In addition to e-commerce, digital marketing and other online strategies also play a vital role in expanding market reach. Through social media, digital advertising, and SEO (Search Engine Optimization), entrepreneurs can increase their business visibility in cyberspace, reach a wider audience, and create more personalized and targeted marketing campaigns. These technologies allow companies to leverage customer data and market trends to develop more efficient and effective marketing strategies. With data-driven analytics, companies can tailor their messages to be more relevant to customer preferences, increase engagement, and build long-term relationships with consumers. Digitalization provides the ability to reach wider markets and increase product appeal in more competitive markets.

The Role of Digital Technology in Optimizing Business Administration in the Industrial Era 4.0

Digital technology in business administration can simplify the process of document management, data collection, and other administrative tasks. Digital technology can also help improve the quality of service and facilitate access to information. Here are some of the roles of digital technology in business administration:

Facilitate communication

Digital technology facilitates communication between companies and customers through various platforms that are more efficient and direct. One popular example is the use of chatbots, which allow companies to provide automated responses to customers 24/7. This chatbot can handle general questions, provide product information, and process customer complaints or requests quickly without requiring direct interaction with human staff. This not only speeds up response times, but also allows companies to handle more customers simultaneously, increasing customer satisfaction and reducing operational burdens.

In addition, email and mobile applications also play an important role in strengthening communication relationships with customers. Through email, companies can send more detailed information about products, promotions, or service updates, as well as provide customer service through email support. Mobile applications, on the other hand, provide easy access for customers to access products or services, make transactions, or communicate directly with the company. These applications are often equipped with notification features that help companies stay connected with customers in a more personal and responsive way. All of this enables companies to build stronger relationships with customers, increase loyalty, and drive business growth.

Facilitate data management

Digital technology plays an important role in data management, one of which is through the use of document management software that allows companies to organize, store, and access documents more efficiently. This software provides a digital platform that can manage various types of documents, from contracts, financial reports, to company operational records. With fast search features, automatic grouping, and version control, companies can ensure that important documents are easily accessible to authorized staff, while maintaining data security and integrity. Using document management software also helps reduce reliance on physical archives, which are susceptible to damage or loss.

Additionally, document management software allows companies to centrally manage documents, making collaboration between teams easier. Staff working in different locations or at different times can access, edit, and collaborate on the same documents in real-time. Features such as setting access rights allow companies to limit who can edit or view a particular document, keeping sensitive information confidential. Thus, digital technology not only increases efficiency in data management but also strengthens team coordination and ensures that company information remains organized and secure.

Real-Time Information Access

Digital technology provides faster and more accurate access to important information within a company, such as financial conditions, inventory status, and operational performance data. With technology-based systems such as Enterprise Resource Planning (ERP) or cloud-based inventory management systems, companies can monitor all important aspects in real-time. For example, financial reports and cash flow can be viewed immediately, allowing managers or decision makers to know the company's financial condition without delay. Likewise, inventory can be monitored directly to avoid shortages or excess stock, ensuring efficiency in the supply chain. This rapid access to information enables companies to be better prepared to face the operational challenges that arise.

Furthermore, fast, real-time access to information facilitates more data-driven decision-making, making decisions more accurate and relevant to current conditions. It also allows companies to respond

more quickly to market changes, such as changes in consumer demand, fluctuations in raw material prices, or shifts in market trends. For example, if data shows a decline in demand for a product, companies can quickly adjust production or run promotions to re-stimulate consumer interest. The speed and accuracy in accessing this information gives companies a significant competitive advantage in the face of changing market dynamics.

Increase customer satisfaction

Digital technologies enable companies to provide more personalized experiences to customers by leveraging data-driven recommendation systems. These systems analyze historical customer data, such as purchase history, product searches, or previous interactions with a company, to suggest relevant products or services. For example, e-commerce platforms like Amazon and Netflix use algorithms to recommend products or movies tailored to user preferences. With this approach, customers feel more valued because they receive suggestions that are tailored to their interests and needs, which in turn improves their experience in shopping or interacting with the company.

Furthermore, digital technology allows companies to continuously improve these recommendation systems by leveraging machine learning and big data. In this way, companies can continuously learn from customer behavior patterns and update the recommendations provided to become more relevant over time. This process increases efficiency in managing the products and services offered to customers, reduces confusion, and speeds up the decision-making process for customers. The end result is higher levels of customer satisfaction, as they feel they are receiving faster, more accurate and more personalized service, which can drive long-term loyalty and retention.

Improving the order of financial administration

Digital technology provides convenience in improving the order of financial administration by automating various processes that were previously done manually. The use of digital-based accounting software allows companies to record and manage financial transactions more accurately and efficiently. This system can easily record every transaction, classify expenses and income, and generate financial reports automatically. This not only reduces the possibility of human error, but also ensures that all transactions are properly recorded and in accordance with applicable accounting standards. With more organized administration, companies can more easily monitor their cash flow and overall financial condition.

Furthermore, digital technology also makes it easier to calculate the amount of tax owed, which is often a complicated matter for many companies. Digital tax software can calculate the taxes to be paid by integrating the company's financial data, such as income, expenses, and types of transactions made. With this system, the tax calculation process becomes faster, more accurate, and avoids calculation errors that can cause legal problems or fines. In addition, this software can automatically update itself according to the latest changes in tax regulations, ensuring that companies always comply with applicable regulations and minimize the risk of errors in tax reporting.

Development of Innovation and New Business Models

Digital technologies provide companies with a great opportunity to design more adaptive and innovative business models. By utilizing e-commerce, companies can reach a wider market without geographical limitations. E-commerce systems enable faster and more efficient transactions, and give customers the convenience of shopping from anywhere. Additionally, artificial intelligence (AI) technology can be used to enhance the personalization of products and services, providing user experiences that are more relevant and tailored to individual preferences. Through data analytics, companies can gain valuable insights into market trends, customer behavior, and product performance, providing a strong foundation for strategic decision-making. All of this enables companies to innovate and create more targeted solutions for their customers.

Adoption of the latest technologies also creates opportunities for companies to create sustainable competitive advantages. Innovation driven by digital technology enables companies to not only survive in the market, but also to lead the market by offering products and services that are more efficient, relevant, and in line with evolving consumer needs. For example, companies that integrate AI and data analytics into their operational processes can quickly respond to changing market trends and preferences, and adjust their strategies to stay ahead of the competition. By continuously innovating through technology, companies can strengthen their position in a dynamic and ever-changing market, ensuring that they are always one step ahead of their competitors.

4. Conclusions

In the Industry 4.0 era, digital technology has had a significant impact on optimizing business administration, creating operational efficiency, increasing productivity, and supporting business scalability. The use of technologies such as automation, cloud computing, and data analysis allows companies to manage business processes faster, more accurately, and more efficiently, while opening up opportunities for innovation and expanding market reach. Digitalization facilitates better decision-making, accelerates business growth, and increases competitiveness in an increasingly competitive global market. Thus, digital technology is an important pillar in shaping a more adaptive and sustainable business future. Digital technology also plays a crucial role in optimizing business administration in the Industry 4.0 era by increasing efficiency, accuracy, and innovation. From more effective communication through digital platforms such as chatbots and mobile applications, to more organized data management and real-time information access, this technology allows companies to increase customer satisfaction, simplify financial administration, and accelerate data-based decision-making. In addition, digital technology also encourages the development of innovation and new business models, giving companies a sustainable competitive advantage. With proper adoption, digital technology can strengthen a company's position in an increasingly dynamic and changing market

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