

Digital Transformation of Accounting in the Industrial Revolution Era 4.0

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Abstract

The Industrial Revolution 4.0, marked by the accelerated adoption of digital technologies such as the Internet of Things (IoT), artificial intelligence (AI), big data, and other technologies, has significantly impacted various business sectors. One sector that has been fundamentally affected is accounting, which has had to adapt to these changes to remain relevant and efficient in an increasingly complex and dynamic business environment. This study aims to understand and analyze how digital transformation in the Industrial Revolution 4.0 era has affected the field of accounting. The research method used is descriptive-qualitative research. This research reveals that digital transformation in accounting, supported by technologies such as IoT, artificial intelligence, big data, and others, brings operational efficiencies through automation, increases the accuracy of financial data, and drives deep data analysis. Collaboration and communication are also enhanced through a cloud-based platform. However, data protection and privacy are important issues in the digital era. In the Industrial Revolution, 4.0, technologies such as big data analytics, AI, IoT, cloud computing, and blockchain are bringing fundamental changes, enabling accounting to be more proactive, using data analysis for better predictions and customer service, and more intelligent and responsive decision making. Digital transformation continues to change the landscape of the accounting and financial industry, making careful use of the potential of the digital age.

Keywords: Digital Transformation; Accounting; Industrial Revolution 4.0; Internet of Things; Artificial Intelligence; Big Data; Cloud Computing; Blockchain

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Introduction

The development of Industrial Revolution 4.0 began prior to the pandemic, with many companies investing in the IT sector. The process of expediting digital transformation has gained even more momentum due to the pandemic. Factors like social distancing have necessitated a shift towards digital processes (Firdaus et al., 2021), leading to a significant transformation known as double disruption. These changes present a resilience challenge for companies. To endure and thrive, companies must embrace adaptability in these shifts. An essential aspect involves adjusting to societal changes, including the shift in consumer behavior toward digital transactions (Putri et al., 2021). Organizations amass substantial data as contemporary business operations transition into the digital realm. Effectively addressing this gap requires a suitable organizational response. Consequently, organizations must implement a strategic approach encompassing two key strategies: a digital business strategy, which governs how an organization manages its business model, and a digital transformation strategy, which signifies the transition from the traditional analog era to a fully digital one (Ismail et al., 2017).

When organizations experience digital transformation, several changes must be adjusted, including organizational structure, organizational culture, leadership, and employee roles and abilities (Tulungen et al., 2022). However, in this transformation process, companies may need help with their ability to adapt effectively. The two main risks identified are organizational inertia, where the organization is reluctant to change because it is comfortable with current conditions, and employee resistance, where employees refuse to adapt to these changes (Rahmayana et al., 2023). To overcome this challenge, accounting is crucial in helping organizations create the right strategic response. First, accountants who understand technological developments can be a source of information about the latest technological developments. With this understanding, accounting can prepare the correct strategic response by identifying opportunities and overcoming risks associated with digital transformation (Maharsi, 2000).

Accounting is vital in using Big Data and Data Analytics in value creation. By leveraging big data and sophisticated data analysis, accounting can help organizations become more agile and responsive to changing markets and business environments. Data Analytics can also assist in identifying trends, understanding customer behavior, and optimizing overall business operations (Muhson, 2010). In addition, accounting can also play a role in structural changes when digital transformation occurs. They can help organizations use the latest technologies to improve business process efficiency, reduce operational costs and increase employee productivity. Accounting can also assist in developing better reporting and control systems to ensure that companies comply with applicable regulations and accounting standards (Zunaedi et al., 2022).

Accounting is a crucial aspect of managing a company's finances, and digitization has provided an excellent opportunity for this field to increase the efficiency and effectiveness of its processes (Fauziyyah, 2022). One of the areas where digitization has had a significant impact is in the processing of payables and receivables. With the adoption of digital systems, companies can automate payment and invoicing processes, reduce the risk of human error, and speed up overall workflow. This helps improve cash flow management, reduces payment waiting times, and increases customer satisfaction (Kurniawan et al., 2023). In addition, digitization has also penetrated the procurement process. By using e-procurement solutions and electronic platforms, companies can simplify and automate procuring goods and services (Ritchi, 2011). This helps increase efficiency, reduce costs, and speed up response time to customer or internal department requests. In addition, using data analytics, accounting can conduct a more in-depth analysis of spending patterns, assist in making strategic decisions regarding procurement, and identify potential further savings (Wang et al., 2016).

The audit process has also undergone significant changes with digitalization. Digital audit technology enables more efficient and accurate data collection, processing, and analysis. Data well documented on digital platforms can be accessed in real-time so auditors can identify risks and material findings more quickly. Auditors can also use data analysis technology to track suspicious transactions or potential irregularities, increase the effectiveness of the audit process, and improve the quality of financial reports (Suryani et al., 2021). In addition to accounts payable and receivable processing, procurement, and auditing processes, accounting can contribute to many other areas of an organization experiencing digitization. For example, accounting can utilize artificial intelligence technology and predictive analysis to project financial forecasts, assist in budget planning, and identify business trends and opportunities that can support company growth (Perdana, 2020).

This study examines digital transformation's impact on the accounting field in the Industrial Revolution 4.0 era. This study investigates how digital technologies such as the Internet of Things (IoT), artificial intelligence (AI), and big data have changed how accounting is done and see their impact on company financial information's productivity, accuracy, and transparency. The benefit of this research is that it provides valuable insights for academia, accounting practitioners, and companies in dealing with digital change. The findings of this research will assist in making strategic decisions, increasing the efficiency of accounting processes, and understanding the changes needed to stay competitive in this increasingly digital era.

Research Design and Method

This type of research is descriptive-qualitative research. Research with a qualitative approach emphasizes process analysis of inductive thinking processes related to the dynamics of the relationship between observed phenomena and always uses scientific logic. Research

that uses a qualitative approach aims to explore or explain the meaning behind reality (Darmalaksana, 2020). Researchers are based on reality or events that take place in the field. While the method in this study uses descriptive methods. The illustrative method examines the status of a group of people, an object, a set of conditions, a system of thought, or a class of events in the present. This descriptive research aims to make a systematic, factual, and accurate description of the facts, characteristics, and relationships between the investigated phenomena (Ramdhan, 2021). The qualitative research method was chosen because the writer wanted to describe the digital transformation of accounting in the era of the industrial revolution 4.0.

Data collection can be done using primary data sources and secondary data sources. The author collects preliminary data from informants and data in the form of documentation related to the research theme. While secondary data is obtained from books, journals, and other research results related to the discussion in this study. The data analysis technique in this study is descriptive. Descriptive analysis, namely activity or information analysis, focuses on document research by describing in detail and systematically the data obtained from the literature, interviews, and the field and then analyzing it, which finally concludes.

Results and Discussion

The Impact of Digital Transformation in The Accounting System

Digital transformation has had a significant impact on accounting science. Technological developments such as the Internet of Things (IoT), artificial intelligence (AI), big data, and other technologies have fundamentally changed how accounting is done.

Efficiency in operations

Digital transformation has become the primary catalyst in changing the world of accounting. In the past, the accounting process, which consisted of data entry, transaction recording, and financial report generation, often took hours or even days because everything was done manually. However, accounting software, financial management systems, and other automation tools can control these processes more efficiently and accurately (Zamzami et al., 2021). One of the main benefits of automation of the accounting process is the reduced time required for routine tasks. Data entry that used to take a lot of time and was potentially prone to human error can now be done quickly and accurately by integrating accounting software with relevant data sources. Transactions can also be recorded automatically based on predefined rules, thereby reducing the risk of errors and increasing process efficiency. With routine tasks automated, accountants have more time to focus on data analysis and strategic decision-making. The financial data collected from the automation process provides deeper insight into the company's financial performance. This analysis enables accountants to identify trends, opportunities, and challenges in a company's finances, which can assist in

developing more innovative and targeted business strategies. Thus, the accountant's role is more as a financial consultant who describes views and helps management make better decisions.

Data accuracy and integrity

Financial data accuracy is critical to preparing reliable and relevant financial reports. With a computerized accounting system, accountants can quickly prepare financial reports that comply with applicable standards and regulations. Data that has been integrated automatically into the system ensures that the information presented in financial statements is timely and accurate. This reliable financial report helps management make the right decisions and gives confidence to stakeholders such as investors, creditors, or regulators (Komarasari, 2017). In addition, financial data stored in a computerized accounting system also facilitates analysis and reporting. Accountants can easily track and analyze financial trends over time, detect potential business problems or opportunities, and provide more brilliant strategic advice to management. Real-time and integrated financial information also allow the company to quickly take corrective steps if there are sudden economic or business conditions changes.

Data analysis and modeling

Digital transformation has ushered in a new era in data analysis in accounting, opening exciting opportunities for companies to optimize their financial performance. With data analysis techniques such as big data analytics, data mining, and machine learning, accountants can process large and varied amounts of data with unprecedented accuracy and speed. Financial data collected from various sources can be thoroughly processed to identify patterns and trends that have significant implications for the company (Liu, 2020). This data analysis provides valuable insights for better business decision-making. Accountants can find links between financial and operational factors that impact company performance. The analysis results can assist management in developing more effective business strategies, knowing relevant market trends, and optimizing resource use. Thus, companies can formulate action plans that are more targeted and make decisions based on data, not mere speculation or intuition.

Collaboration and Communication

Digital transformation has brought more effective collaboration in the accounting world by presenting cloud-based accounting systems and collaborative applications. Previously, physical boundaries and geographic distance limited access to financial data and business reports. However, with the adoption of cloud technology, accountants, management, and other stakeholders can easily access real-time financial information from anywhere, anytime. This collaborative platform enables teams to work together synergistically, share data and communicate more efficiently, increasing efficiency and productivity. Better

collaboration also affects the decision-making process within the company. With real-time access to financial data and business reports, management can make faster and more informed decisions. Integrated and updated information helps avoid errors due to outdated or incomplete data. Accountants can collaborate with management to analyze data in depth, highlight important aspects, and provide valuable insights to support strategic business decisions.

Data Security

Financial data security is a top priority for companies in the digital era. With increasing reliance on technology and broader access to data, the risk of misuse or data leakage is also growing. Companies must be cautious in managing, storing, and securing their financial data to avoid falling into the wrong hands or being misused by irresponsible parties (Elisabeth, 2019). Misuse or leakage of financial data can have severe repercussions for a company. A data security breach can result in financial loss, reputational loss, and even lawsuits. In addition, when customers' financial data is compromised, consumers' trust in the company can be destroyed, negatively impacting long-term business relationships. Therefore, financial data protection and compliance with privacy regulations such as GDPR are critical. Digital transformation requires serious efforts to ensure financial data security and customer privacy. Companies must adopt the latest technological security measures, such as data encryption, dual authentication systems, and real-time security monitoring. In addition, companies must have strict policies and procedures for managing financial data and provide appropriate training to employees to be aware of the importance of maintaining data confidentiality and security.

Digital Transformation of Accounting in the Industrial Revolution Era 4.0

Big Data Data Analytics and Visualization

Digital transformation in the Industrial Revolution 4.0 era has significantly impacted the accounting sector, primarily through applying Big Data, Data Analytics, and Data Visualization technologies. In the past, accounting was often limited to processing financial data that was limited in scale and time. However, with advances in technology and the growth of enormous amounts of data from various sources, accounting has changed to become more dynamic and proactive. Applying Big Data in accounting allows companies to collect and manage large, complex amounts of data quickly and accurately. The data collected includes financial transactions, customer records, operational data, to external data from various sources such as social media and financial markets. With proper data analysis, companies can identify valuable patterns and trends, identify potential opportunities and risks, and support more innovative and timely business decision-making processes (Handoko et al., 2020). In addition, Data Analytics plays a crucial role in understanding financial data more deeply. This data analysis technique allows accountants to extract new insights and knowledge from

financial data, identify problems, and optimize a company's financial performance. With powerful Data Analytics tools like machine learning algorithms and artificial intelligence, accountants can perform predictive analysis to anticipate market or customer behavior changes and identify potential business process improvements.

In the world of e-commerce, online retailers have taken a step forward in providing a personalized and enjoyable experience for every consumer. Using data analysis technology, they can offer product recommendations tailored to consumers' preferences and shopping behavior. Data Analytics and Big Data techniques allow online retailers to collect, process, and analyze extensive data from internal transactions and even data from social media. Data visualization is a crucial element in accounting digital transformation. Big and complex data is often elusive and difficult to explore. Data visualization technology can turn financial data into interactive, easy-to-understand graphs, charts, and dashboards. This enables accountants and management to understand financial information better, present more attractive and informative financial reports, and make decisions based on more precise and comprehensive visual information. Data visualizations provide a significant advantage in assisting the discovery of relationships and anomalies in the decision-making process. By transforming data into a more understandable visual representation, users can make more informed decisions, gain deeper insights, and respond quickly to changes. Data visualization has become essential in supporting intelligent and responsive decision-making in various fields, including business, science, and government.

Artificial Intelligence / Machine Learning

Digital transformation in the Industrial Revolution 4.0 era has brought revolutionary changes in the accounting world by utilizing artificial intelligence (AI) and machine learning. In the past, accounting was often done manually, with a high risk of human error. However, with AI and machine learning technology, the accounting process becomes more automated, accurate, and efficient (Hasan, 2021). Artificial intelligence (AI) and machine learning enable accounting software to learn and adapt to the data provided. AI systems can analyze financial data, identify patterns, and even accurately predict financial trends. In addition, machine learning technology also enables the system to perform tasks such as transaction classification, error correction, and automatic recording quickly and accurately. The main advantages of using AI and machine learning in accounting are high efficiency and accuracy. By automating processes, accountants can save valuable time previously spent on routine tasks such as data entry and transaction recording. Instead, accountants can focus on deeper data analysis and make smarter strategic decisions. In addition, AI and machine learning also help deal with the complexity of large and varied financial data. In the digital era, the amount of data that continues to increase and comes from various sources is increasingly complex. AI and machine learning can help accountants process big data and identify relevant patterns, providing

deeper insights into a company's financial performance.

Some leading banks have adopted artificial intelligence (AI) technology to improve customer service. For example, the Bank of Tokyo Mitsubishi uses AI in its customer service. With AI technology, this bank can provide faster and more precise solutions for customer questions and problems. AI systems can learn from previous customer interactions and identify patterns and trends in customer service requests. Banks can provide more personalized and relevant responses, increasing customer satisfaction. Meanwhile, HSBC, one of the largest global banks, adopted face identification technology in their mobile application. Using facial recognition technology, HSBC customers can access their accounts more quickly and securely. The facial identification process eliminates the need to enter a password or PIN, thereby increasing security and convenience for users. This technology also helps prevent fraud and unauthorized access to customer accounts, as only authorized users can access the application using their facial identification.

These two innovations are examples of how technology continues to improve customer service and experience in the banking industry. The use of AI in Bank of Tokyo Mitsubishi customer service provides an advantage in increasing interaction with customers, while HSBC's face identification feature offers higher security and a more straightforward process for users of their mobile application. By continuously adopting the latest technology, these leading banks show their commitment to providing better services and taking advantage of the potential offered by the digital era.

Internet of Things and Cloud Computing

The Internet of Things (IoT) and Cloud Computing have brought revolutionary changes in banking and the financial industry. Various connected devices can send and receive real-time data through the Internet of Things, allowing banks to gather more affluent and more accurate information about customer behavior and needs. For example, through sensors installed in connected ATMs or debit cards, banks can better monitor transaction activity, identify customer spending patterns, and even predict their financial needs (Fahlevi & Purnomo, 2023). In the case of Cloud Computing, banks can store and manage financial data more safely, efficiently, and on a larger scale. In the past, banks often faced obstacles in storing large and physically complex financial data. However, with Cloud Computing, banks can store their data in a secure, centralized data center that can be accessed from anywhere with an internet connection. Data security is guaranteed through strict encryption protocols and layers of security so that the risk of data leakage or misuse is significantly reduced.

The combination of the Internet of Things and Cloud Computing has opened new opportunities for banks to provide better and more effective customer service. With data that can be accessed in real time and stored securely in the cloud, banks can provide more personalized and targeted services to their customers. Banks can also identify new business

opportunities through sophisticated data analysis, optimize product portfolios, and make smarter strategic decisions. The Internet of Things and Cloud Computing have brought about a transformation in the world of banking. This technology combination allows more personalized services, intelligent decision-making, and efficient and secure data management. As a result, the banking industry is increasingly adaptive and responsive in facing market changes and customer demands and moving forward in the ever-evolving digital era.

Robotics Process Automation

Robotics Process Automation (RPA) has brought revolutionary innovations to the banking and accounting industry. RPA is a technology that enables robotic software to perform routine tasks previously performed by humans quickly, accurately, and without human intervention. In banking, RPA can automate processes such as identity verification, processing credit applications, and monitoring financial transactions. RPA can be used in accounting to record transactions, prepare financial reports, and process financial data (Rejeki & Sulistyowati, 2023). The main advantages of Robotics Process Automation are high efficiency and accuracy. RPA can reduce human involvement in routine tasks, minimize the risk of human error, and increase execution speed. As a result, banks and companies can save significant time, effort, and operational costs. In addition, RPA can also improve the quality of service to customers by reducing waiting times and optimizing business processes. When routine, time-consuming tasks can be automated, employees can focus on more complex, value-added tasks such as data analysis, customer service, and strategic decision-making. This helps companies increase their productivity and competitiveness in an increasingly competitive market.

Robotics Process Automation (RPA) has brought extra security benefits to the financial services industry, especially in protecting critical data. In the financial industry, customer data, financial transactions, and other sensitive information are valuable assets that must be guarded closely. Using RPA, companies can ensure that critical data processing processes are carried out with high and consistent security. Implementing RPA minimizes human interaction in data management, reducing the risk of human error or unintentional actions. This robotics can operate programmed tasks with great precision and accuracy, eliminating the risk of errors that could arise from human hands. In addition, access to sensitive data and information can also be tightly controlled through the RPA system, ensuring only authorized persons can access and manipulate the data.

Blockchain and Distributed Ledgers

Blockchain and Distributed Ledger have fundamentally changed the financial services and accounting sectors. This technology provides a new, secure, and transparent way to record, verify and manage transactions and financial data. In banking, blockchain records

transactions in a way that cannot be changed or manipulated, creating a record of transactions that can be relied upon and verified by all parties involved (Chandrasekar et al., 2021). Distributed Ledger enables decentralized data storage and distribution across multiple locations, which reduces the risk of single data center failure and ensures consistent data availability. This technology also facilitates more efficient tracking of assets and transactions, reducing the time required for verification and reconciliation processes. The main advantages of blockchain and distributed ledger are transparency and security. Every blockchain transaction and data change is recorded chronologically in blocks linked chronologically, creating an immutable audit trail. This enables all interested parties to track and verify transactions clearly and accurately. In addition, this technology also ensures data security by using strong encryption and mathematical validation, thereby reducing the risk of data theft or misuse.

In the accounting industry, blockchain and distributed ledgers can change how financial reports and audits are carried out. Financial data stored on the blockchain becomes more reliable and verifiable, reducing the risk of inaccuracy or manipulation of information. Auditing becomes more efficient and transparent, as auditors can access verified and authenticated data in real-time. Blockchain and distributed ledgers open new opportunities to optimize efficiency, security, and transparency in the financial and accounting services industry. With this technology, transaction and reporting processes become more effective, data is better protected, and customer and stakeholder trust can be increased. This transformation helps the financial and accounting services industry better in the ever-changing digital era.

Conclusions

Digital transformation in accounting, supported by technologies such as the Internet of Things (IoT), artificial intelligence (AI), big data, and others, has had a significant impact. These changes include operational efficiency, data accuracy, and integrity, data analysis and modeling, better collaboration and communication, and enhanced data security. Accounting processes that used to be manual and time-consuming are now more automated, accurate, and efficient using advanced software, automation, and data analysis. Financial data can be better processed and integrated, providing in-depth insights for strategic decision-making. However, this progress also brings challenges, especially in maintaining customer data security and privacy. The Industrial Revolution 4.0 adds a new dimension by applying big data analytics, AI, IoT, cloud computing, and blockchain technologies. This enables accountants to move from routine tasks to more in-depth data analysis, predict financial trends, and provide more personalized service to customers. The use of this technology not only improves efficiency but also results in more intelligent and more responsive business decisions. This transformation proves that the accounting and financial industry is increasingly adapting and

taking advantage of the potential of the ever-evolving digital era.

Reference

- Chandrasekar, V., Wisetsri, W., & Ullah, I. (2021). URR blockchain and distributed ledger technology (DLT): the future of accounting. *Psychology and Education Journal*, 58(4), 320–323. https://www.researchgate.net/profile/C-Vijai-2/publication/351152718_URR_Blockchain_and_Distributed_Ledger_Technology_DLT_The_Future_of_Accounting/links/608a8fde299b1ad8d65aa10/URR-Blockchain-and-Distributed-Ledger-Technology-DLT-The-Future-of-Accounting.pdf
- Darmalaksana, W. (2020). Metode penelitian kualitatif studi pustaka dan studi lapangan. Pre-Print Digital Library UIN Sunan Gunung Djati Bandung. <https://etheses.uinsgd.ac.id/id/eprint/32855>
- Elisabeth, D. M. (2019). Kajian terhadap peranan teknologi informasi dalam perkembangan audit komputerisasi (studi kajian teoritis). *Methomika: Jurnal Manajemen Informatika & Komputerisasi Akuntansi*, 3(1), 40–53. <https://doi.org/10.46880/jmika.Vol3No1.pp40-53>
- Fahlevi, M., & Purnomo, A. (2023). The integration of internet of things (IoT) and cloud computing in finance and accounting: systematic literature review. 2023 8th International Conference on Business and Industrial Research (ICBIR), 525–529. <https://doi.org/10.1109/ICBIR57571.2023.10147688>
- Fauziyyah, N. (2022). Efek digitalisasi terhadap akuntansi manajemen. *Jurnal akuntansi keuangan dan bisnis*, 15(1), 381–390. <https://doi.org/10.35143/jakb.v15i1.5276>
- Firdaus, I. T., Tursina, M. D., & Roziqin, A. (2021). Transformasi birokrasi digital di masa pandemi covid-19 untuk mewujudkan digitalisasi pemerintahan Indonesia. *Kybernan: Jurnal Studi Kepemerintahan*, 4(2), 226–239. <https://doi.org/10.35326/kybernan.v4i2.1244>
- Handoko, B. L., Mulyawan, A. N., Tanuwijaya, J., & Tanciady, F. (2020). Big data in auditing for the future of data driven fraud detection. *International Journal of Innovative Technology and Exploring Engineering*, 9(3), 2902–2907. <https://akuntanmuda.com/assets/publication/51823.pdf>
- Hasan, A. R. (2021). Artificial Intelligence (AI) in accounting & auditing: A Literature review. *Open Journal of Business and Management*, 10(1), 440–465. <https://doi.org/10.4236/ojbm.2022.101026>
- Ismail, M. H., Khater, M., & Zaki, M. (2017). Digital business transformation and strategy: What do we know so far. *Cambridge Service Alliance*, 10(1), 1–35. <https://cambridgeservicealliance.eng.cam.ac.uk/system/files/documents/2017NovPaperMariam.pdf>
- Komarasari, W. (2017). Pengaruh kapasitas sumber daya manusia, pemanfaatan teknologi informasi dan pengendalian intern akuntansi terhadap keterandalan pelaporan keuangan daerah (Pada SKPD Kabupaten Bantul Bagian Akuntansi dan Keuangan). Prodi Akuntansi UPY. <http://repository.upy.ac.id/id/eprint/1277>

- Kurniawan, Y. J., Herman Sjahruddin, S. E., Nuraeni, S. E., Swaputra, I. B., Astakoni, D. R. S. I. M. P., PAR, M., Luqman Hakim, S. E., Totong, A. J., Farm, M., & Arini, D. U. (2023). Digitalisasi manajemen keuangan. Cendikia Mulia Mandiri.
- Liu, X. (2020). Analyzing the impact of user-generated content on B2B Firms' stock performance: big data analysis with machine learning methods. *Industrial Marketing Management*, 86, 30–39. <https://doi.org/10.1016/j.indmarman.2019.02.021>
- Maharsi, S. (2000). Pengaruh perkembangan teknologi informasi terhadap bidang akuntansi manajemen. *Jurnal Akuntansi Dan Keuangan*, 2(2), 127–137. <https://doi.org/10.9744/jak.2.2.pp.127-137>
- Muhson, A. (2010). Pengembangan media pembelajaran berbasis teknologi informasi. *Jurnal Pendidikan Akuntansi Indonesia*, 8(2). <http://dx.doi.org/10.21831/jpai.v8i2.949>
- Perdana, A. (2020). Data analytics: keterampilan teknis akuntan dan auditor di era digital. Madza Media.
- Putri, N. I., Herdiana, Y., Suharya, Y., & Munawar, Z. (2021). Kajian empiris pada transformasi bisnis digital. *ATRBIS: Jurnal Administrasi Bisnis (e-Journal)*, 7(1), 1–15. <https://doi.org/10.38204/atrbis.v7i1.600>
- Rahmayana, L., Wulandari, I., & Sugiharto, B. H. (2023). Mengapa digitalisasi akuntansi harus dilakukan pada perusahaan UMKM: sebuah tinjauan pustaka. *Jurnal Aktiva: Riset Akuntansi Dan Keuangan*, 5(1), 43–56. <https://doi.org/10.52005/aktiva.v5i1.179>
- Ramdhan, M. (2021). Metode penelitian. Cipta Media Nusantara.
- Rejeki, S. S., & Sulistyowati, P. (2023). Automatisasi proses robotik dan dampaknya pada akuntansi. *Jurnal Riset Manajemen dan Ekonomi (JRIME)*, 1(2), 221–248. <https://doi.org/10.54066/jrime-itb.v1i2.648>
- Ritchi, H. (2011). *Arsitektur informasi untuk e-procurement persediaan maintenance, repair, and operation berbasis TOGAF dan Zachman*. Tesis, Pasca Sarjana Ilmu Komputer, Universitas Gajah Mada Yogyakarta. https://www.researchgate.net/profile/Hamzah-Ritchi/publication/288002577_Arsitektur_Informasi_untuk_e-Procurement_Persediaan_Maintenance_Repair_and_Operation_Berbasis_TOGAF_dan_Zachman/links/567d4f5a08ae051f9ae48265/Arsitektur-Informasi-untuk-e-Procurement-Persediaan-Maintenance-Repair-and-Operation-Berbasis-TOGAF-dan-Zachman.pdf
- Suryani, I. D. R., Kurniawati, E., Wulan, G. A. N., & Dinniah, H. C. (2021). Konseptualisasi peran teknologi informasi dalam praktik audit untuk membantu pengungkapan fraud di Indonesia. *El Muhasaba: Jurnal Akuntansi (e-Journal)*, 12(2), 138–156. <https://doi.org/10.18860/em.v12i2.12070>
- Tulungen, E. E. W., Saerang, D. P. E., & Maramis, J. B. (2022). Transformasi digital: peran kepemimpinan digital. *Jurnal EMBA: Jurnal Riset Ekonomi, Manajemen, Bisnis Dan Akuntansi*, 10(2). <https://doi.org/10.35794/emba.v10i2.41399>
- Wang, G., Gunasekaran, A., Ngai, E. W. T., & Papadopoulos, T. (2016). Big data analytics in logistics and supply chain management: Certain investigations for research and applications. *International Journal of Production Economics*, 176, 98–110. <https://doi.org/10.1016/j.ijpe.2016.03.014>

Zamzami, F., Nusa, N. D., & Faiz, I. A. (2021). Sistem informasi akuntansi. Ugm Press.

Zunaedi, B. N. F., Annisa, H. R., & Dewi, M. (2022). Fungsi internal audit dan manajemen risiko perusahaan: sebuah tinjauan literatur. Jurnal Bisnis Dan Akuntansi, 24(1), 59–70.