



Revolutionizing the Accounting Curriculum: Optimizing Accountant Competencies through Data Technology, Blockchain, and Artificial Intelligence from the Perspective of Accounting Students at the University of Mataram in Industry 5.0

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ARTICLE INFO

Keywords: Industrial Revolution 5.0, Accountant Competencies, Data Technology, Blockchain, Artificial Intelligence

Received : 16, January

Revised : 30, January

Accepted: 25, February

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ABSTRACT

The industrial revolution 5.0 marks significant changes in the integration of advanced technologies, such as data technology, blockchain, and artificial intelligence (AI), into business processes. This study aims to explore the influence of these technologies on accountant competencies among accounting students at the Faculty of Economics and Business, University of Mataram. Using a quantitative approach, this study collected data from students to analyze the relevance of technology integration in the accounting curriculum on students' future accounting competencies. The results showed that all technological variables studied had a positive and significant influence on accountant competence, emphasizing the importance of curriculum adaptation to meet the growing demands of the industry. This research is expected to contribute to the development of a more responsive and relevant accounting curriculum in the digital era.

INTRODUCTION

The industrial revolution 5.0 marks a new era in industrial development, characterized by the integration of advanced technologies such as artificial intelligence (AI), blockchain, and big data analysis in production and business processes. This transformation not only changes the way companies operate, but also has a significant impact on various sectors, including higher education, especially in accounting. In this context, the accounting curriculum needs to adapt in order to meet the demands of the competencies needed in the digital era, which is beneficial to increase their confidence and competitiveness in facing the world of work through mastery of relevant skills (Dewanti, 2017).

In recent years, the development of information technology has fundamentally changed the way accountants work and the practice of accounting. One of the key components of this change is data technology or data analytics, which enables the efficient collection, processing, and analysis of financial information. Data technology gives accountants the ability to analyze large datasets, identify patterns, and make fact-based decisions. A concrete example of the application of data technology is the use of analytics software such as Tableau and Power BI which are data analysis tools used in accounting to help visualize and understand sales and cost data, enabling better decision-making through in-depth analysis (Cainas et al., 2021). With advanced analytics tools, accountants can improve report accuracy and reduce the risk of errors, which is important in modern accounting practices.

In addition, blockchain technology offers greater transparency and accountability in recording financial transactions. The high decentralization and authentication characteristics of this technology provide more security, reduce the risk of data manipulation, and prevent fraud that can harm company financial data (Sari, 2024) (Setyowati et al., 2021) (Arwin et al., 2023). In addition, the application of blockchain in accounting in Indonesia is to increase transparency, reduce fraud rates, simplify tax administration, and encourage the government to develop regulations and standardization needed for effective implementation (Kautsar Nugraha & Sasongko, 2024). Blockchain technology can improve the investment bank reconciliation process by eliminating the validation and investigation of accounting information from various databases, thereby saving time and costs and presenting real-time reports (Luthfiyyah & Dewayanto, 2023). However, there are blockchain challenges to be faced in the accounting field, including vulnerability to cyberattacks, such as Distributed Denial of Service (DDoS) and Sybil Attacks, indicating the need for innovation in more robust security solutions. In addition, although blockchain technology offers efficiency and accuracy in financial data management, challenges related to data integrity and transaction security remain, especially in the face of increasingly complex cyber threats (Alvina et al., 2024).

Artificial Intelligence (AI) enables faster and more accurate data processing, which in turn facilitates better decision-making in financial management. Artificial Intelligence (AI) has emerged as an important technology in the accounting and finance industry, optimizing business processes and improving operational efficiency, while also addressing traditional issues through advanced

statistical models and machine learning techniques (Yi et al., 2023) (Judijanto et al., 2024). However, according to (Mohammad et al., 2020) artificial intelligence (AI) is predicted to transform the accounting industry by automating daily tasks, enabling faster and more accurate decision-making, potentially replacing 25% of accounting jobs by 2025, shifting the focus from monotonous tasks to data analysis, and requiring changes in the accounting curriculum to cover programming and AI subjects to improve the productivity and skills of accounting professionals. The challenges of using artificial intelligence (AI) in accounting include data reliability, difficulty in implementation, concerns about security and privacy, changes in professional roles, and regulations and compliance that must be adhered to. Thus, the integration of this technology should be considered to be applied in the accounting curriculum in order to prepare students to be ready to face challenges in the increasingly complex world of work.

Accounting students at the Faculty of Economics and Business, University of Mataram are the subject of this research because they are the generation that will enter the workforce in the midst of the growing industrial revolution. Understanding students' views on the integration of technology into accountant competencies in the accounting curriculum will provide insight into the relevance and effectiveness of the current curriculum in creating the required competencies. The competencies needed in the industrial era 5.0 include data analysis capabilities, understanding of data technology, blockchain, and skills using AI in information processing (Adrian & Totok Dewayanto, 2024). A curriculum that is able to integrate these technologies is expected to equip students with the necessary skills to adapt quickly and efficiently in a changing work environment.

However, educational institutions are faced with the challenge of designing a curriculum that not only teaches theory, but also relevant and applicable practices. The implementation of relevant and applicable practices, especially in the form of technology in the accounting curriculum, is essential to ensure the relevance of education and prepare students for digital transformation, despite challenges such as crowded curriculum, lack of resources, and privacy concerns. (Adrian & Totok Dewayanto, 2024). This requires collaboration between academics, industry practitioners and other stakeholders to ensure that the curriculum developed addresses the needs of a dynamic job market. This study aims to explore the views of accounting students regarding the importance of technology integration on accountant competencies in the accounting curriculum. Through this analysis, it is hoped that useful recommendations can be found for the Faculty of Economics and Business, University of Mataram to improve and optimize the existing curriculum to produce graduates who are competent and ready to compete in the era of the Industrial Revolution 5.0. In addition, this research is also expected to contribute to the development of the accounting curriculum at the national level, in line with the demands of globalization and the rapid development of technology.

This research includes several important points to be identified and analyzed. First, this research focuses on the competencies that accounting

students consider important in facing challenges in the era of the Industrial Revolution 5.0. Furthermore, this study also explores students' views regarding the relevance of the integration of data technology, blockchain, and AI in the current accounting curriculum to the competencies of accountants among accounting students of the faculty of economics and business at the University of Mataram. In addition, the obstacles faced by students in applying modern technology in accounting practice are also in focus. This research will assess the extent to which the existing accounting curriculum at the Faculty of Economics and Business, University of Mataram has accommodated the integration of technology in learning. It is expected that this research can collect recommendations from students to optimize the accounting curriculum to be more relevant to industry needs.

Thus, this research is expected to make a significant contribution to the development of accountant competencies in students and even the development of an accounting curriculum that is more adaptive and responsive to the needs of the growing industry.

LITERATURE REVIEW

Data Technology in Accounting Competency

Data technology in accounting refers to the use of tools and systems to collect, analyze, and interpret financial data. This includes analytics software, databases, and programming techniques used to improve the efficiency and accuracy of financial reports. Data technology includes various tools and methods used to collect, analyze, and interpret data. Information technology plays an important role in accounting by increasing efficiency and accuracy in data processing, thereby reducing the risk of human error and improving the quality of financial reports (Apriadi et al., 2024). In the context of accounting education, the utilization of data technology is becoming increasingly important because it helps students understand and apply complex data analysis concepts.

The implementation of analytical tools in the accounting curriculum not only improves students' understanding of financial data, but also the practical skills required in data analysis. Students trained in the use of data technology are better able to make data-driven decisions, which is an essential skill in modern accounting practice. In addition, the use of data technology also allows students to work with large and complex datasets, giving them practical experience that can be applied in the world of work.

H1: There is a significant positive effect of data technology on accountant competence among students.

Blockchain on Accounting Competencies

In research conducted by (Parjuangan et al., 2022) and (Fuadi Tanjung & Wati, 2023) said that blockchain is a technology that runs computer code that contains agreement enforcement and runs automatically. The ability of blockchain to maintain data durability with the hash method provides opportunities in various fields, such as data security, permanent data storage, and consistency. Blockchain offers transparency and security in recording transactions, which is crucial in accounting (Sari, 2024). An understanding of

blockchain can improve accountants' skills in managing and reporting financial information. The ability to work with blockchain systems becomes a valuable asset for accountants, which can improve the efficiency and accuracy of financial reports (Mustika et al., 2024). The development of technology, especially blockchain underlying cryptocurrencies and smart contracts, is expected to increase the efficiency, speed, and security of transactions, thereby changing the role of accountants in designing validation rules, minimizing tax errors, reducing audit costs, and enabling real-time financial reporting, as well as demanding the development of new competencies in technology and data analysis. (Pramono, 2020) (Mahdani et al., 2024). Research from (Nugrahanti et al., 2023) found that 48% of respondents from multinational companies in Jakarta reported the adoption rate of blockchain technology as 'High', indicating the significant potential of this technology in accounting practices.

The development of technology, especially blockchain, is expected to increase the efficiency and security of transactions, change the role of accountants in validation and reporting, and demand the development of new competencies in technology and data analysis.

H2: There is a significant positive effect of Blockchain on the competence of accountants among students

Artificial Intelligence (AI) on Accounting Competency

Artificial Intelligence (AI) in accounting refers to the use of algorithms and computer systems to perform tasks that would normally require human intelligence, such as data processing, analysis, and decision-making. AI has the potential to revolutionize accounting practices by automating routine processes and improving the accuracy of analysis. According to (Juniardi, 2024), the application of AI in accounting can reduce manual workload and allow accountants to focus on strategic analysis. In addition, AI can assist in detecting patterns and anomalies in financial data, providing accountants with deeper insights. Thus, skills in using AI technologies are becoming increasingly important for accountants to improve their competitiveness in the job market.

H3: There is a significant positive effect of Artificial Intelligence on accountant competence among students.

Conceptual Framework

In the ever-evolving digital era, the integration of technology in various fields is inevitable, including in the world of accounting. This study aims to explore the significant positive influence of data technology, blockchain, and artificial intelligence (AI) on accountant competencies among university students. In this context, accountant competencies include not only a basic understanding of accounting principles, but also skills in using relevant tools and technologies to analyze and interpret financial data.

Amidst the ever-increasing complexity of data, data technology plays an important role in helping accounting students develop the analytical skills needed to make informed and data-driven decisions. In addition, blockchain, as a secure and transparent record-keeping technology, provides students with new insights in auditing and validating transactions, which is essential in modern

accounting practices. Meanwhile, artificial intelligence offers the potential to automate routine processes, allowing students to focus on more in-depth and strategic analysis.

Thus, the conceptual framework of this research not only aims to test hypotheses regarding the relationship between technology and accountant competence, but also to provide a broader understanding of how accounting education can be adapted to the increasingly complex needs of the industry. This research is expected to make a significant contribution to the development of a more relevant and effective accounting curriculum, as well as preparing students to become competent accountants who are ready to face challenges in the world of work. The following is the conceptual framework of this research.

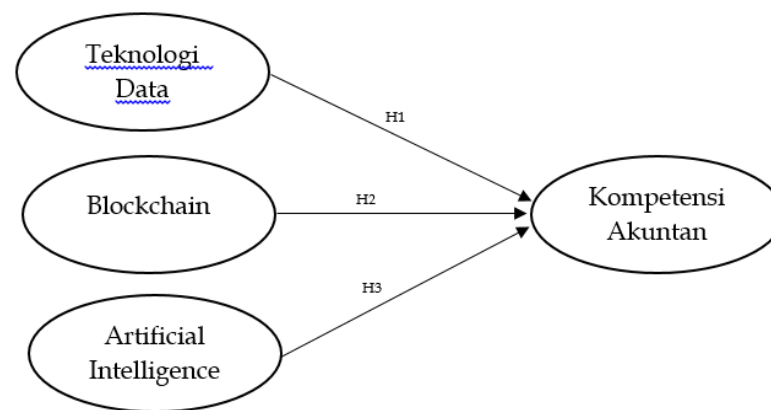


Figure 1. Conceptual Framework

METHODOLOGY

This research methodology aims to explore the influence of technology integration, particularly data technology, blockchain, and artificial intelligence (AI), on accountant competencies among university students. The research method used in this study is a quantitative method with a survey approach. This study collected and analyzed numerical data through a questionnaire designed to explore the influence of technology integration, such as data technology, blockchain, and artificial intelligence (AI), on accountant competencies among university students. The survey method allows for the efficient collection of data from many respondents, thus facilitating a more in-depth analysis and generalization of the research results.

The research population consists of all students of the accounting study program, Faculty of Economics and Business, University of Mataram, class of 2020-2023 who are actively registered in the 2023 academic year. The sample was taken using the slovin method, resulting in 277 students selected through a population survey, in which every member of the population participated in the study, so that the data obtained covered all relevant variables. Respondents were students who had completed a minimum of two semesters of study to ensure relevant experience in accounting learning and technology use.

This study uses primary data obtained through a questionnaire specifically designed for this study. This data is expected to provide an accurate picture of student perceptions of the use of technology in accounting learning. The data

analysis used is SmartPLS 4 statistical software, which will be used to understand the relationship between technology and accountant competence, and provide insights for the development of a more relevant curriculum in accounting education in the digital era.

RESEARCH RESULTS

Respondent Description

This research was conducted by distributing questionnaires to accounting students at the Faculty of Economics and Business, University of Mataram. The results of the sampling data obtained when distributing questionnaires were 279 people. The following is the respondent data consisting of accounting students of the Faculty of Economics and Business, University of Mataram.

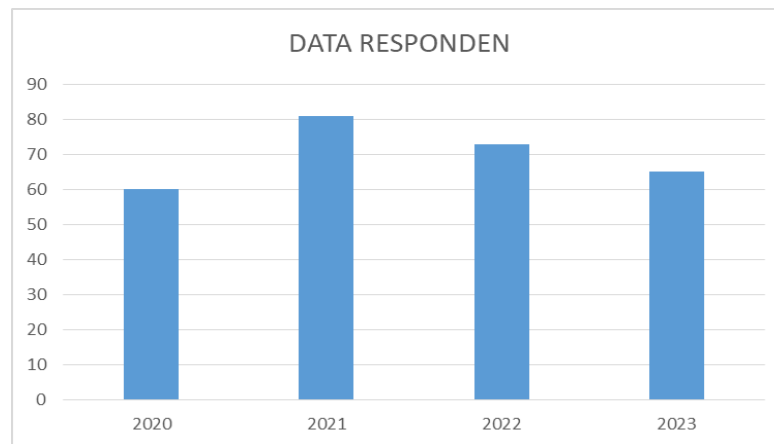


Figure 2: Percentage of the number of respondents.

Of the 279-responder data, there were 60 students from class 2020 (22%), 81 students from class 2021 (29%), then 73 students from class 2022 (26%) and finally 65 students from class 2023 (23%).

Validity Test

At this stage of the analysis, an information validity test is carried out to ensure that the research instruments used in the survey of accounting students can measure the variables that have been determined. In the convergent validity test, namely the average variance extracted (AVE), the output of the estimation results is measured from the correlation between the indicator score (instrument) and its construct (variable). Indicators are considered valid if they have a correlation value ≥ 0.50 (Haryono, 2016).

Table 1. AVE Results of Convergent Validity Test

	Average Variance Extracted (AVE)	Ket.
Artificial Intelligence	0.593	Valid
Data Technology	0.588	Valid
Blockchain	0.721	Valid
Accountant Competency	0.632	Valid

The AVE value of each variable is artificial intelligence (AI) of 0.593, data technology of 0.588, Blockchain of 0.721 and Accountant Competence of 0.632. This means that these three variables can be categorized as valid.

Table 2. Fronell Larcker Discriminant Validity Test Results

Variables	Artificial Intelligence	Blockchain	Accountant Competency	Data Technology	Ket.
Artificial Intelligence	0.770				Valid
Blockchain	0.498	0.849			Valid
Accountant Competency	0.660	0.469	0.795		Valid
Data Technology	0.605	0.511	0.699	0.767	Valid

Based on the discriminant validity test table, it can be seen that the root AVE value of the artificial intelligence (AI) variable is 0.770, blockchain is 0.849, data technology is 0.767, and accounting competence is 0.795 has a value > from the correlation value with other variables, it can be concluded that all variables are declared discriminant valid.

Reliability Test

In this stage, the data is tested with Cronbach's alpha and composite reliability, which if the value of both shows high results or the value of Cronbach's alpha and CR ≥ 0.70 then these results will indicate good reliability for the measured construct.

Table 3. Reliability Test Results

Variables	Cronbach's alpha	Composite Reability	Ket.
Data Technology	0.829	0.876	Reablitas
Blockchain	0.870	0.911	Reablitas
Artificial Intelligence	0.840	0.879	Reablitas
Accountant Competency	0.853	0.895	Reablitas

In table 3, the results show that the Cronbach's alpha value for constructs or variables of data technology is 0.829, blockchain is 0.870, artificial intelligence is 0.840 and accountant competence is 0.853. While the results of composite reliability for constructs or variables of data technology are 0.876, blockchain is 0.911, artificial intelligence is 0.879 and accountant competence is 0.895. Since all Cronbach's alpha and composite reliability values are above or ≥ 0.70 , it can be concluded that the variables have good reliability.

Table 4. R² Test Results

	R-square	Adjusted R-square
Accountant Competency	0.579	0.575

The adjusted R-Square value of the accountant competency variable is 0.575, indicating that the data technology, blockchain and artificial intelligence (AI) variables are able to explain the accountant competency variable by 57.5%. So it can be concluded that the model is considered moderate.

Table 5. Effect Size Test

	Accountant Competency
Data Technology	0.177
Blockchain	0.029
Artificial Intelligence	0.122

From table 5, it can be explained that:

1. The effect of Data Technology on Accountant Competence is 0.177, so the effect of Data Technology on Accountant Competence is considered moderate.
2. The effect of Blockchain on Accountant Competence is 0.029, so the effect of Blockchain on Accountant Competence is considered moderate.
3. The effect of Artificial Intelligence (AI) on Accountant Competence is 0.122, so the effect of Artificial Intelligence (AI) on Accountant Competence is considered moderate.

Table 6. Hypothesis Test

	Path Coefficient	T statistics	P values	Ket.
Data Technology -> Accountant Competency	0.405	5.624	0.000	Accepted
Blockchain -> Accountant Competency	0.140	1.963	0.025	Accepted
Artificial Intelligence -> Accountant Competency	0.307	5.612	0.000	Accepted

The explanation is as follows:

1. The path of Data Technology -> Accountant Competence obtained p values of 0.000 < 0.05, then H1 is accepted, namely Data Technology has a significant positive effect on Accountant Competence.

2. Blockchain -> Accountant Competence path obtained p values of 0.025 <0.05, then H1 is accepted, namely Blockchain has a significant positive effect on Accountant Competence.
3. The Artificial Intelligence -> Accountant Competence path obtained p values of 0.000 <0.05, then H1 is accepted, namely Artificial Intelligence has a significant positive effect on Accountant Competence.

Table 7. Hypothesis Test

	Average variance extracted (AVE)	R-square
Data Technology	0.588	
Artificial Intelligence	0.593	
blockchain	0.721	
Accountant Competency	0.632	0.579
Average	0.634	0.579

$$\text{GoF value} = \text{rata - rata AVE} \times \text{rata - rata R Square}$$

$$\text{GoF value} = \sqrt{0,757 \times 0,579}$$

$$\text{GoF value} = 0.606$$

Based on the calculation results, the GoF value is 0.606, indicating that the combined performance between the outer model and the inner model in this study can be classified into the large GoF category.

DISCUSSION

This study examines the effect of technology integration, specifically data technology, blockchain, and artificial intelligence (AI), on accountant competencies among accounting students at the Faculty of Economics and Business, University of Mataram. In the context of accounting education that is increasingly influenced by technological advances, it is important to understand how these technologies can improve students' ability to perform accounting tasks effectively.

One of the main aspects of this research is the validity and reliability of the instruments used. The validity test ensures that the tool used to collect data is able to accurately measure the variable in question, namely if the value of the variable is > 0.07. The results showed that the research instrument was considered valid, and the researcher could be confident that the data obtained truly reflected the perceptions and experiences of the respondents. In addition, the reliability test shows the consistency of the measurement results, where the cronbach's alpha and composite reliability values are > 0.05 which adds confidence to the data collected. In this study, the instruments used showed good results in both aspects, thus providing a strong basis for further analysis.

The analysis conducted shows that all technology variables studied have a positive and significant influence on student accountant competencies. This suggests that when students better understand and apply technology in their

learning, they tend to have better abilities in completing accounting tasks. Research conducted (Satata et al, 2024) also states that the variables of data technology, blockchain, and artificial intelligence (AI) have an effect on accountant competence in accounting students. Data technology allows students to analyze and process financial data efficiently, while artificial intelligence (AI) can help them automate processes and improve accuracy in accounting work. Blockchain, although providing a slightly lower influence, is still important in increasing transparency and accountability in financial reports. From the results of respondents' answers, some students have practiced the use of blockchain technology, such as the use of ethereum, indodax, binance, and cardano. Blockchain has the potential to revolutionize accounting practices by improving data authenticity, efficiency, and accuracy through its decentralized and irreversible nature and enabling secure and transparent real-time data access (Rijal et al., 2024). The integration of data analytics, blockchain, and AI technologies in the accounting curriculum significantly enhances students' competencies by preparing them for critical data-driven decision-making in the workforce, improving the integrity and transparency of transactions, and enabling them to focus on in-depth analysis and strategic decision-making, thus being ready to contribute effectively to the challenges of an increasingly complex and technology-driven industry (Satata, et al., 2024)

This finding is in line with the existing literature, which shows that technology integration in accounting education not only improves understanding of theory, but also prepares students to face challenges in an increasingly complex world of work (Satata et al , 2024) (Romadhon & Nawawi, 2024). In the digital era, the ability to use the latest tools and technology is a key factor in accountant competence. Therefore, it is important for educational institutions to adapt their curricula to include teaching about these technologies comprehensively.

CONCLUSIONS AND RECOMMENDATIONS

This research emphasizes the important role of technology in accounting education. The integration of Data Technology, Blockchain, and AI not only improves students' competencies, but also prepares them to become competent accountants who are ready to face industry demands. In addition, this research provides valuable insights for accounting curriculum development, encouraging educational institutions to continue to innovate and adapt to the latest technological developments.

Thus, this study not only contributes to the academic understanding of the relationship between technology and accountant competencies, but also provides practical recommendations for the development of accounting education in the future. Hopefully, the results of this study can serve as a reference for policy makers and educators to formulate more effective strategies in integrating technology into the curriculum, so that students can optimally utilize technology in their learning.

ADVANCED RESEARCH

This study has several limitations that need to be considered. First, this research was conducted at one educational institution, namely the Faculty of Economics and Business, University of Mataram, so the results may not be generalized to accounting students at other institutions with different contexts. This research was also only conducted among students, not practitioners who may have more experience with the use of technology in accounting and how it affects the improvement of accountants' competencies. In addition, although the number of respondents involved is quite significant, this study only includes perspectives from students of the accounting study program, without considering the viewpoints of other disciplines that are also affected by technology integration.

Another limitation is that the measurement of accountants' competencies is subjective, depending on students' perceptions of the technology they use. This may not fully reflect their practical abilities in real-world situations. This study also does not consider external factors that may affect accountant competence, such as previous work experience and support from lecturers. In addition, potential bias in filling out the questionnaire may affect the accuracy of the data collected.

For future research, it is recommended that it be conducted across multiple educational institutions to increase the generalizability of the results. A mixed methods approach, which combines quantitative and qualitative, may also provide a more comprehensive understanding of students' experiences in using technology. Future research should explore external factors that influence accountants' competencies, as well as use objective measurements to evaluate competencies, such as practical exams or performance assessments in the work environment.

By following these suggestions, future research is expected to provide deeper insights into the influence of technology on accountant competencies. This will contribute to the development of accounting education that is more relevant and effective in the digital era, as well as preparing students to face challenges in the increasingly complex world of work.

ACKNOWLEDGMENTS

With gratitude, the author would like to express his deepest gratitude to his supervisors who have provided invaluable guidance, direction, and support throughout this research process. His expertise and dedication in guiding the author have provided endless inspiration and motivation. In addition, the author would also like to thank his beloved family who always provide moral and material support, as well as invaluable love, which is a source of strength in facing various challenges during this journey. Last but not least, I would like to express my appreciation to my friends who are always ready to help, share ideas, and provide encouragement, so that this academic journey becomes more meaningful. Your support and cooperation have been instrumental in this achievement, and I hope that we can all continue to support each other in the future.

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