

## The Impact of Artificial Intelligence on Accounting Profession in Indonesia (Literature Study)

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### ABSTRACT

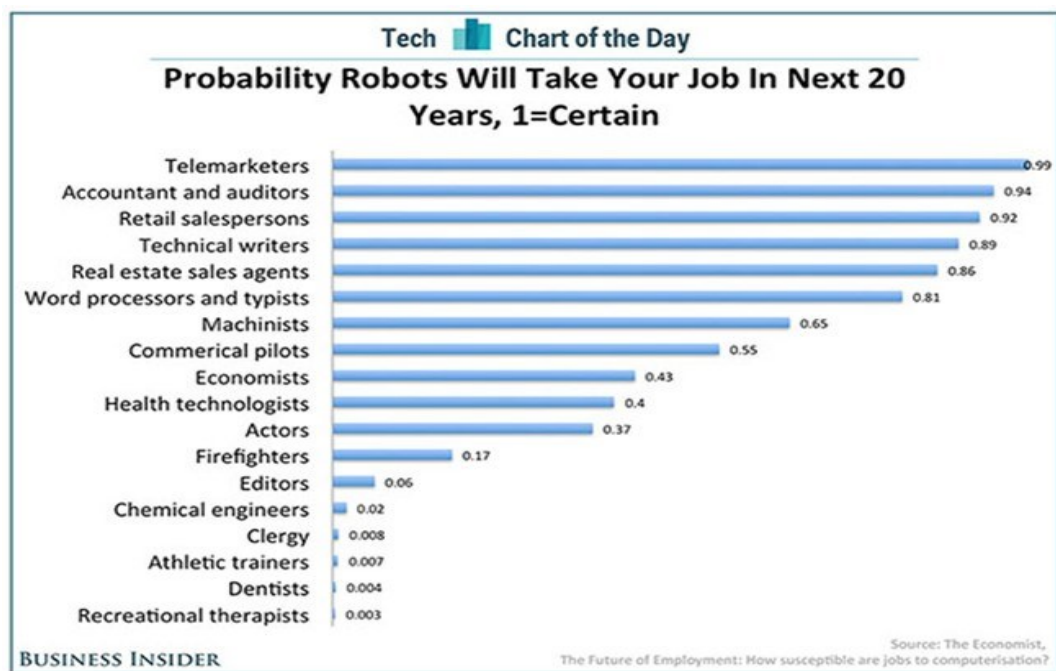
Artificial Intelligence (AI) is a form of technological exploitation used when dealing with digital developments. Currently Artificial Intelligence (AI) has entered the accounting industry that must be faced by accountants. This study aims to analyze the Impact of Artificial Intelligence on the Several research results have not shown consistent results regarding the Impact of Artificial Intelligence on the Accountant Profession in Indonesia. The research method used is qualitative, namely content analysis paper from the Google Scholar database and interviews using the Focus Group Discussion technique. The results of this study indicate that Artificial Intelligence has a positive impact on the accounting profession in Indonesia where from the 20 selected articles there are 5 research themes on the impact of Artificial Intelligence on the accounting profession, namely Artificial Intelligence on the Public Accountant Profession, Artificial Intelligence on the Management Accountant Profession, Artificial Intelligence on Sharia Accounting, Artificial Intelligence on Accounting Education and Artificial Intelligence on Accounting Information Systems. From the results of this study, there are 2 research themes that need to be examined further, namely Artificial Intelligence related to Islamic accounting and Artificial Intelligence related to accounting information systems.

**Keywords:** Artificial Intelligence, Accountant Profession

## INTRODUCTION

Artificial Intelligence is the idea of today's advanced data-based technology. Artificial intelligence is simulated in machines that are programmed to resemble the process of human intelligence and imitate its behavior so that the system can now think like humans systematically and faster so that it can produce output instantly. According to ICAEW (2018), artificial intelligence has expanded its scope although it cannot replace the need for expert knowledge and critical thinking skills. *Artificial Intelligence* (AI) which is useful for making human work easier and more efficient in terms of time and energy.

In 2018, McKinsey Global Institute (MGI) showed that the main reason for global job loss is the continuous development of information technology, robotics, computerization, and other automation technologies. In everyday life, we can see that cashier jobs are decreasing because automation technology with RFID or new radio identification technology is now being adopted by retail companies around the world. In addition, bank employees and manufacturing industry employees are also decreasing. On the other hand, jobs such as software engineers, nutritionists, surgeons, finance and business, mathematics and computing and agriculture are increasing. Research results from Business Insider state that the jobs of accountants and auditors will be taken over by robots/computers in the next 20 years. This condition is depicted in the following graph:



**Figure 1**  
**Graph of the probability of jobs being taken over by robots.**

This graph shows that accountants and auditors are 94% likely to have their jobs taken over by robots/computers, second only to telemarketers (Business Insider 2018).

In the era of Revolution 4.0, artificial intelligence entered the accounting industry. Artificial intelligence (AI) is a form of technological exploitation used by accountants when dealing with digital developments. The implementation of the use of AI has been used by the largest accounting companies in the world such as EY and Deloitte, which both use AI. AI can be very helpful in auditing, risk management, conducting supplier reconciliations, and assisting in trend analysis.

Wilson & Sangster (1992) documented that since computers and automation were introduced in the third industrial revolution, low-skill accounting jobs such as transaction recording have been replaced by technology in the United Kingdom. In the United States, low-tech, repetitive jobs such as some accounting jobs ended up being automated during the third (Goldin & Katz, 2008) and fourth (Forbes, 2018) industrial revolutions.

As technological developments demand accountants to have new skills to survive, Ramaj (2014) and Okubokeme et al. (2020) show that technological developments have not been balanced by an increase in the mastery of technology by accountants, especially in developing countries. In Indonesia, the accounting profession has also been influenced by technological developments. Many companies and organizations in Indonesia have used AI in their accounting processes, so the need for accountants who have skills and knowledge about AI has also increased. The Association of Chartered Certified Accountants in 2016 stated that in the next decade, the accounting profession will evolve significantly, and accountants must be able to collaborate with technology and think more strategically.

Based on the information disclosed above, the purpose of this paper is to find out how Artificial Intelligence (AI) impacts the Accounting Profession through a literature study based on previous studies that discuss the impact of Artificial Intelligence on the accounting profession.

## LITERATURE REVIEW

### a. *Artificial Intelligence (AI)*

Artificial Intelligence was created by John McCarthy and is an experimental branch of computer science that follows its goal of creating intelligent machines that can perform various tasks using their intelligence (Yadav, A, 2017). Artificial Intelligence is a technology that allows machines to perform tasks that normally require human intelligence. Thus systems that think like humans (rational thinking systems) and systems that act like humans. In another perspective, artificial intelligence is seen as the ability of a device to perform activities that should only be expected from the human brain (Deloitte, 2017)

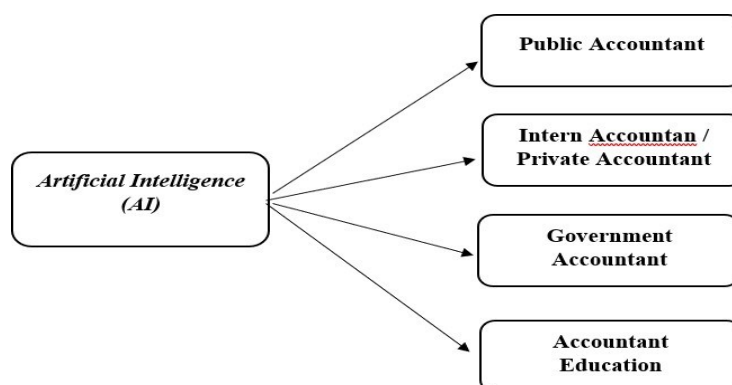
### b. *Accountant Profession*

The accounting profession is related to the work of collecting data, analyzing and presenting financial information. Based on their profession, accountants are divided into several groups, namely:

- a. Public accountant s an accountant who carries out independent audit functions on the financial reports of companies or other organizations and provides services to parties who require them.
- b. An internal accountant or private accountant is an accountant who works in a particular company or organization (as an employee).
- c. Government accountants are accountants who work for government agencies.
- d. Accountant education is an accountant who is responsible for accounting education, namely teaching, compiling accounting education curricula, and conducting scientific research in the field of accounting.

The rapid development of Artificial Intelligence (AI) can have a huge impact on the accounting profession, where the use of AI in accounting will be able to change the role of accountants from data collectors to data analysts. In addition, there is also a change in the skills needed by accountants, no longer just accounting competencies but also

must be skilled in using technology. On the other hand, this will also be able to increase the productivity of accountants' work. Based on this theoretical study, the conceptual framework can be described as follows:



**Figure 2; Conceptual Framework**

## RESEARCH METHOD

This study uses a qualitative research method, namely content analysis of papers from the Google Scholar database and interviews using the Focus Group Discussion technique. Content analysis of papers is used to obtain mapping and main themes discussed in the Google Scholar database over a certain period for further analysis of their contents (content analysis). Focus Group Discussion (FGD) is used to obtain the perspectives of academics in the accounting profession regarding their understanding of the themes discussed in this paper review.

The papers selected in this review come from a search on the Google Scholar database using the keywords Artificial Intelligence or Accountant Profession in the period 2020 to 2023. The search process uses the help of the Publish or Perish application. In the first stage, the author searched for papers in the Google Scholar database with the keywords "Artificial Intelligence or Accountant Profession" 528 papers were found that matched the search keywords. After going through the process of reading the title, abstract, and keywords, 126 papers were still relevant. Furthermore, in the final stage, the author obtained 20 papers as papers reviewed in this research. Furthermore, the author also conducted interview techniques using the Interview/FGD method to understand the opinions of economic academics on the theme discussed. Interview/FGD data analysis used Miles Huberman data triangulation. Activities in the analysis include data reduction, data presentation (data display) and conclusion drawing and verification (conclusion drawing/verification).

## RESULTS

Analysing the research map related to Artificial Intelligence with the Accounting Profession in Indonesia in the last 4 years on the Google Scholar/Scopus database. Paper search results based on keywords Artificial Intelligence or Accountant Profession 20 papers were selected with the following data:

**Table 1**

### 20 Relevant Papers

No.	Author	Title
1	Kruskopf, S., Lobbas, C., Meinander, H., Söderling, K., Martikainen, M., & Lehner, O. (2020).	Digital Accounting and the Human Factor: Theory and Practice. ACRN Journal of Finance and Risk Perspectives.
2	Azzahra, B (2021)	Accountant 4.0: the driving force of corporate sustainability value through artificial intelligence & tech analytics in a disruptive era
3	Ahyani, H. (2021)	The Comparison of Sharia Auditing and Sharia Accounting in the Era of Industrial Revolution 4.0
4	Esmawati, E., Fitriyaningsih, F. (2021)	<i>E-Cefit Test</i> (Certification Test) as a Support for the Accounting Profession in Facing the Era of Artificial Intelligence
5	Nurrisqi, K., Sari, RC (2021)	The Effect of Framing Negative Media and Self-Development Motivation on Student's Self-Efficacy in the Issue of Shifting.
6	Saraswati, A M., Nugroho, AW (2021)	Challenges and Problems of the Accounting Profession in the Competitive Era for Generation Z
7	Zaleha, P A., Novita, N (2021)	Impact of Information Technology, Professional Ethics on Auditor Performance
8	Adawiyah, DA (2022)	Auditor's Behavior in Response to the Emergence of Artificial Intelligence in the Audit Process
9	Alghafiqi, B (2022)	The Impact of Artificial Intelligence Technology on the Accounting Profession
10	Deaz, A S., Riadi, S (2022)	Analysis of Knowledge, Skills, Attitude of Accounting Graduates in the Industrial Era 4.0
11	Dewa, MM C., Kharisyami, PWY., Navael, LD (2022)	The Role of Accountants in Facing Economic Digitalization Towards the Era of Society 5.0
12	Ernis, P D., Pirdaus, P (2022)	The Impact of Artificial Intelligence Technology on the Accounting Profession
13	Fauziyyah, N (2022)	The Effect of Digitalization on Management Accounting
14	Fadli, Z., Jumiadi, A W., Ariyani, D (2022)	Implementation of RI 4.0 with the Adoption of Extensible Business Reporting Language (XBRL) and Its Impact on Audit Reporting Lag at the Indonesia Stock Exchange ...
15	HS, A T., Machfudi, M., Azizah, CYN. (2022)	The Influence of Information Technology Advances on Accounting Developments
16	Pebrina. E T., Novitasari D., Sukriyah S. (2022)	The Role of Accounting Information Systems in the Industrial Revolution 4.0 Era
17	Riadi, S (2022)	Digitalization Era: How Is the Future Of Accountants?

18	Amdanata, D., Burhan, B., Seswandi, (2023)	Are Accounting Students Ready to Face Artificial Intelligence in Accounting?
19	Jumali, E (2023)	The Role of Islamic Accounting in the Development of Islamic Finance in the Digital Era
20	Nazar, M R., Ariani., I Natania, LP., Al-fikri, DT (2023)	The Influence of the Digital Era on the World of Accounting

## DISCUSSION

Based on the results of the review of 20 selected papers, it was found that in 2022 there were 10 articles (the most) and in 2020 there was 1 article (the fewest papers). In terms of publication trends, each year publications with this theme are increasingly interesting to study, in early 2023 the number of articles reviewing this theme was already 15% so it is still possible to increase. This can be seen in the following table 2.

**Table 2**  
**Paper Description by Year of Publication**

Year	F	%
2020	1	5
2021	6	30
2022	10	50
2023	3	15
		100

Based on the search results that the author did with the keywords Artificial Intelligence or Accountant Profession. From 20 selected papers, it was found that publications in the form of international journals were 5 papers (25%) and publications in the form of national journals were 15 papers (75%). This can be seen in the following table 3:

**Table 3**  
**Paper Description by Publication Type**

Publication Type	F	%
International Journal	5	25
National Journal	15	75
		100

Based on the methodology, it was found that there were several uses of research methodology, including qualitative methods as many as 10 papers, quantitative methods as many as 9 papers and using mixed methods as many as 1 paper. This can be seen in the following table 4

**Table 4**  
**Paper Description based on methodology**

Research Design/Methodology	F	%
Qualitative	10	50
Quantitative	9	45
Mixed	1	5
		100



## Qualitative Descriptive

Based on the data collected from 20 selected articles, research on *Artificial Intelligence* to the accounting profession is divided into 5 (five) themes, namely, *Artificial Intelligence* to Public Accountant Profession, *Artificial Intelligence* to Management Accountant Profession, *Artificial Intelligence* to Sharia Accounting, *Artificial Intelligence* to Accounting Education and *Artificial Intelligence* to Accounting Information System. Research that fits the theme can be identified by the author as follows:

### 1. *Artificial Intelligence* to Public Accountant Profession

Table 5

Articles with the theme: *Artificial Intelligence* against Public Accountant Profession

No.	Title	Author	Year
1	Impact of Information Technology, Professional Ethics on Auditor Performance	Zaleha, P.A., Novita, N	2021
2	<i>E-Cefit Test</i> (Certification Test) as a Support for the Accounting Profession in Facing the Era of Artificial Intelligence	Esmawati, E., Fitriyaningsih, F.	2021
3	Auditor's Behavior in Response to the Emergence of Artificial Intelligence in the Audit Process	Adawiyah, DA	2022
4	Implementation of RI 4.0 with the Adoption of Extensible Business Reporting Language (XBRL) and its Impact on Audit Reporting Lag at the IDX	Fadli, Z., Jumiadi, A W., Ariyani, D	2022

Based on the table above, 4 (four) articles were found about *Artificial Intelligence* to Public Accountant Profession. Research Results, Zaleha, P.A., Novita, N (2021) show that auditors feel great benefits when implementing information technology consisting of artificial intelligence with its usefulness can help analyze big data quickly and reduce errors. Then with the use of large storage scalability and can adjust to the needs and flexibility of data use. In terms of professional ethics, the existence of Artificial Intelligence can support and improve auditor performance with the basic principles formulated by the Indonesian Public Accountants Association (IAPI).

In line with the research results Zaleha, P.A., Novita, N (2021), the results of Adawiyah's research (2022) also stated that the emergence of Artificial Intelligence in the audit process can make work more effective. Today, artificial intelligence and machine learning automate bookkeeping, reconciliation, and more. Next research results Esmawati, E., Fitriyaningsih, F. (2021) stated that accountants agree that the *E-Cefit Test* (Certification Test) is very important as a support for the accounting profession in facing the current digital era. Certification as a form of recognition of the competence possessed by accountants.

From the results of these studies, we can see that *Artificial Intelligence* can help the work of accountants in carrying out the audit process. So that the accounting profession can be carried out effectively, especially supported by the existence of a certificate that shows competence in accordance with the provisions set.

### *Artificial Intelligence* to Management Accountant Profession

Table 6

Article with the theme: *Artificial Intelligence* towards professions Management

### Accountant

No.	Title	Author	Year
1	Digital Accounting and the Human Factor: Theory and Practice. ACRN Journal of Finance and Risk Perspectives	Kruskopf, S., Lobbas, C., Meinander, H., Söderling, K., Martikainen, M., & Lehner, O.	2020
2	Accountant 4.0: the driving force of corporate sustainability value through artificial intelligence & tech analytics in a disruptive era	Azzahra, B.	2021
3	Challenges and Problems of the Accounting Profession in the Competitive Era for Generation Z	Saraswati, A. M., Nugroho, A. W.	2021
4	The Impact of Artificial Intelligence Technology on the Accounting Profession	Alghafiqi, B	2022
5	The Role of Accountants in Facing Economic Digitalization Towards the Era of Society 5.0	Dewa, MM C., Kharisyami, PW Y., Navael, LD	2022
6	The Impact of Artificial Intelligence Technology on the Accounting Profession	Ernis, P D., Pirdaus, P	2022
7	The Effect of Digitalization on Management Accounting	Fauziyyah, N	2022
8	Digitalization Era: How Is the Future of Accountants?	Riadi, S	2022
9	The Influence of the Digital Era on the World of Accounting	Nazar, M R., Ariani, I Natania, L P., Al-fikri, DT	2023

The data in table 6 shows that research on *Artificial Intelligent* correlated to the Management Accountant profession is the most researched (9 articles) in 2020 to 2023. Most of the research conducted wanted to find out the impact of the existence of *Artificial Intelligence* towards the accounting profession and the development of the accounting world. Several studies also question the sustainability of companies with Artificial Intelligence. In addition, the role of accountants in facing current digitalization is also questioned.

Research result Fauziyyah, N (2022) shows that the influence of digitalization does not only affect management accounting in terms of managing and reporting the internal conditions of a company or organization, but more broadly. If a company wants to advance, then a digital transformation is needed in management accounting and this can be realized with the influence of several factors. In practice, the digitalization of management accountants has an impact on the implementation of more environmentally friendly accounting (paperless), more integrated and faster through technology, real-time reporting, big data, cloud computing, blockchain, AI, and others.

According to research results Azzahra, B (2021) Accountants have an important role in achieving corporate sustainability. However, with advances in technology, the existence of accountants is starting to be questioned. According to a survey conducted by Osborne and Frey in 2013, Oxford University, accountants have a 94% chance of being replaced



in the future. Based on these data, accountants are now entering a new era of disruption, as evidenced by the existence of artificial intelligence. The future of business and accountants is entering a gray area and sustainability is the most vital thing to discuss currently. To challenge the status quo, research is needed on the role of accountants as value drivers in the digital era. In the future, young accountants must act as value catalysts for businesses to ensure that every stakeholder benefits. Therefore, there are at least five strategies that accountants can prepare, namely: understanding business acumen, technology savvy, storytelling skills, fundamental data skills, and strategic thinking skills so that the accounting profession will continue to exist and not be 'disrupted' but rather a 'disruptor' in the Industrial Revolution 4.0 era.

## **2. Artificial Intelligence to Sharia Accounting**

**Table 7**

**Article with the theme: Artificial Intelligence on Sharia Accounting**

<b>No.</b>	<b>Title</b>	<b>Author</b>	<b>Year</b>
1	The Comparison of Sharia Auditing and Sharia Accounting in the Era of Industrial Revolution 4.0	Ahyani, H..	2021
2	The Role of Islamic Accounting in the Development of Islamic Finance in the Digital Era	Jumali, E	2023

Table 7 shows that research on Artificial *Intelligent* correlated to Sharia Accounting has not been widely conducted. From the observation year 2020 to 2023 based on 20 selected articles there were only 2 articles that researched this theme. The first article shows research on the comparison of sharia audits and sharia accounting, while the second article questions the role of sharia accounting in the development of sharia finance. Both articles research the conditions of the digital era.

The results of Jumali, E's (2023) research stated that digitalization has a significant impact on the growth of sharia-based accounting, especially in Indonesia because most of the business actors are Muslim. The results of Ahyani, H's (2021) research stated that examining financial reports according to sharia is a necessity for Islamic banking that applies sharia accounting in its financial records. A digital-based accounting system is very much needed in Islamic banking to support bank operations. Other research results also show that the use of financial technology in banking businesses is an opportunity to create income, especially in Islamic banking. Using financial technology will make it easier for customers to carry out their banking transactions. (Mujiatun, et al; 2022)

From the results of these studies, it is indicated that research with this theme is still needed considering that sharia accounting plays a very important role in encouraging the progress of sharia economics in a country, especially Indonesia.

## **3. Artificial Intelligence to Accounting Education**

**Table 7**

**Article with the theme: Artificial Intelligence on Accounting Education**

<b>No.</b>	<b>Title</b>	<b>Author</b>	<b>Year</b>
1	The Effect of Framing Negative Media and Self-Development Motivation On Student's Self-Efficacy In The Issue Of Shifting.	Nurritzqi, K., Sari, R.C.	2021

2	Analysis of Knowledge, Skills, Attitude of Accounting Graduates in the Industrial Era 4.0	Deaz, A S., Riadi, S	2022
3	Are Accounting Students Ready to Face Artificial Intelligence in Accounting?	Amdanata, D., Burhan, B., Seswandi,	2023

Research with the theme *Artificial Intelligence* on Accounting Education, based on table 7 above, there were only 3 (three) articles throughout 2020 to 2023 based on 20 selected articles. This condition shows that *Artificial Intelligence* with Accounting Education is something that needs to be studied. Changes in the world of education are fundamental to preparing reliable accountant candidates who are ready to face digitalization. The education system must adapt and advance to be able to create intelligent successors to the nation who are better prepared to face existing challenges.

The results of the study by Deaz, A S., Riadi, S (2023) stated that accounting graduates must be technology literate, have basic accounting knowledge, analytical skills, communication skills, have work experience, foreign language skills, professional certification, initiative, teamwork, integrity, discipline, responsibility and respect for others. However, research results Amdanata, D., et al., (2023) This shows that technological readiness does not have an influence on knowledge of Artificial Intelligence technology in the field of accounting.

While the research results Nurrizqi, K., Sari, R.C. (2021) showed that Negative Media Framing has no effect on students' self-efficacy in Facing the Issue of Shifting the Existence of the Accounting Profession in Indonesia. However, Self-Development Motivation has a positive effect on students' self-efficacy in Facing the Issue of Shifting the Existence of the Accounting Profession in Indonesia.

From the three research results, a student must have competence in the field of accounting and must be technology literate so that they can use *Artificial Intelligence* to support his profession as an accountant.

#### 4. *Artificial Intelligence* with Accounting Information System

Table 8

Articles with the theme: *Artificial Intelligence* with Accounting Information System

No.	Title	Author	Year
1	The Influence of Information Technology Advances on Accounting Developments	HS, A T., Machfudi, M., Azizah, CYN,.	2022
2	The Role of Accounting Information Systems in the Industrial Revolution 4.0 Era	Pebrina. E T., Novitasari D., Sukriyah S.	2022

On the theme *Artificial Intelligence* with Accounting Information Systems, there are only 2 articles in 2022 that can be identified from 20 selected articles in 2020 to 2023. From the research result HS, A T., Machfudi, et al (2022) stated that the progress of Information Technology on the Development of Accounting has a very big influence, where with the existence of *Artificial Intelligence* can completing financial assignments within and artificial intelligence to automate parts of the audit process, while the results of Pebrina's research. E T., et al (2022) Business circles call this the core of the industrial revolution 4.0. This condition has an impact on the role of humans, especially the accounting profession, which will be replaced by the role of robots. Selain itu hasil penelitian lainnya menunjukkan bahwa pemanfaatan informasi akuntansi terbukti dapat

meningkatkan kinerja usaha. Ketersediaan informasi akuntansi akan berdampak pada keberlangsungan usaha (Hani,dkk; 2024)

Research results on the theme *Artificial Intelligence* with Accounting Information System prove that *Artificial Intelligence* has an influence on Accounting Information System and has interrelationships. So, the theme about this can conduct research on the above themes. Research on Artificial Intelligence is not only carried out in commercial research but can also be implemented in government. From the results of Nurmala et al.'s research in 2020, it was found that in addition to Human Resources (HR), the use of technology also affects the performance of the village government.

## CONCLUSION

From the results of the data analysis, it can be concluded that *Artificial Intelligence* has a positive impact on the accounting profession in Indonesia. This is evident from the data obtained from the results of the literature search, where from 20 selected articles that examine the impact of Artificial Intelligence on the accounting profession, there are 5 research themes, namely: Artificial Intelligence on Public Accountant Profession, *Artificial Intelligence* to Management Accountant Profession, *Artificial Intelligence* to Sharia Accounting, *Artificial Intelligence* to Accounting Education and *Artificial Intelligence* to Accounting Information System. Of the five themes, there are 2 (two) themes that still require further research, namely: *Artificial Intelligence* related to sharia accounting and *Artificial Intelligence* associated with accounting information system.

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