

# THE EFFECT OF ARTIFICIAL INTELLIGENCE ON THE ACCOUNTING PROFESSION

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**Abstract:** *Artificial intelligence (AI) is a part of digital technology that contributed to accounting professions. A survey conducted by Sage proven that 55% of 3,000 accountants from US, UK, Canada, Brazil, Spain, France, Australia, Ireland plan to use artificial intelligence in the next five years. However, many developing countries are still left behind in adopting the technologies. A survey conducted with over 1,050 Malaysian Institute Accountants members, response that 87% of them are never use or rarely use artificial intelligence. Economic Transformation Plan has acknowledged that the accountancy professions are among the main characters in transforming Malaysia into a high-income nation by 2020. Nevertheless, there is a severe gap between the supply and demand of professional accountants to boost the supply of accountants from 33,000 to 60,000. Despite the increase attention on the artificial intelligence, little is known on the consequences of a towards accounting professionalism. The ability of artificial intelligence in performing better job quality and efficiency has been proven in many professions including engineering, medicine, law and nursing. However, digitalisation of the accounting system is still in its early stage compared to other industries.*

**Keyword:** *Artificial Intelligence, Job Efficiency, Job Quality and Accounting Profession*

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## Background of the Study

Over the years, accounting has seen a number of advancements, with the last significant one being the invention of double-entry bookkeeping more than 500 years ago. The 21<sup>st</sup> century heralds Information and Communications Technology (ICT) – based technologies that have changed ways of doing business in many industries. Accounting is transcending traditional

ways of entry and preparation of accounting books to automation. The 21<sup>st</sup> century is the age of automation and accounting happens to be one of the industries at the forefront. Accounting automation addresses the total lifecycle of accounting, not just as part of a firm's financial management department. This indicates that software performs the entirety of the accounting process, including the recording, processing, and interpretation of transactional data, with little to no reliance on human transactional inputs made manually (Emetaram & Uchime, 2021).

Artificial intelligence covers a number of interlinked technologies including speech and image recognition, data mining, semantic analysis, and machine learning. AI is still in its very early stages of adoption for broad society changing use. This partially caused by the cost related to the adoption of the needed technologies and also lack of technical know-how within companies. However, the huge potential rewards of using AI technologies make it all worth it for the companies (Emetaram & Uchime, 2021).

### **Problem Statement**

The ability of digital technologies in performing better quality and efficient jobs has been proven in many professions including engineering, medicine, law and nursing. However, digitalisation of the accounting system is still in its early stage compared to other industries. Digital technologies, particularly artificial intelligence is important in accounting professionalism. The existence of artificial intelligence is part of digital technology that significantly contributed to accounting professions. A survey conducted by Sage entitled "The Practice of Now by Sage" proven that 55% of 3,000 accountants from across the globe (US, UK, Canada, Brazil, Spain, France, Australia, Ireland) plan to use artificial intelligence in the next five years. Coupled with that, Free Agents's, The Future of Accountancy demonstrates that 96% of accountants believe that either all or some accountancy work will be automated by 2022.

Chandi (2018) highlighted that job tasks in accounting professionalism will be fully automated by 2020. Despite high expectation on the usage of artificial intelligence in accounting profession, many developing countries are still left behind in adopting this technology. In Malaysia, a survey conducted by Malaysian Institute of Accountants between July to September 2017 with over 1,050 MIA members, response that 87% of them are never use or rarely use digital technology artificial intelligence. In order to enhance the digital technologies in Malaysian accounting professionals, Malaysian Institute of Accountant (MIA) has developed the MIA digital Technology Blueprint that which aims to guide the accounting professionals in developing the action plans that are appropriate for their environments. This study is worth conducting as Economic Transformation Plan (ETP) has acknowledged that the accountancy professions are among the main characters in transforming Malaysia into a high-income nation by 2020. On the contrary, there is a severe gap between the supply and demand of professional accountants to boost the supply of accountants from 33,000 to 60,000 to meet the projected goal by 2020.

Some past studies (Sutton, Holt, & Arnold, 2016; Sun & Medaglia, 2019) had highlighted the negative impact artificial intelligence adoption instead of the positive impact. The reason is because there is a lack of literature focusing on the impact of artificial intelligence adoption within the accounting industry. It is hoped that the current study will be able to fill the gap by investigating, in particular, how the adoption of artificial intelligence may affect the accounting profession of Malaysia.

### **Research Objectives**

General research objective:

1. To investigate the effect of artificial intelligence on the job efficiency in accounting profession.
2. To investigate the effect of artificial intelligence on the job quality in accounting profession.

Specific research objectives derived from the general research objective:

- 1a. To investigate the effect of artificial intelligence in financial accounting on the job efficiency in accounting profession.
- 1b. To investigate the effect of artificial intelligence in tax accounting on the job efficiency in accounting profession.
- 1c. To investigate the effect of artificial intelligence in management accounting on the job efficiency in accounting profession.
- 1d. To investigate the effect of artificial intelligence in auditing on the job efficiency in accounting profession.
- 2a. To investigate the effect of artificial intelligence in financial accounting on the job quality in accounting profession.
- 2b. To investigate the effect of artificial intelligence in tax accounting on the job quality in accounting profession.
- 2c. To investigate the effect of artificial intelligence in management accounting on the job quality in accounting profession.
- 2d. To investigate the effect of artificial intelligence in auditing on the job quality in accounting profession.

### **Research Questions**

General research questions are:

1. What is the effect of artificial intelligence on the job efficiency in accounting profession?
2. What is the effect of artificial intelligence on the job quality in accounting profession?

The following specific research questions derived from the general research question:

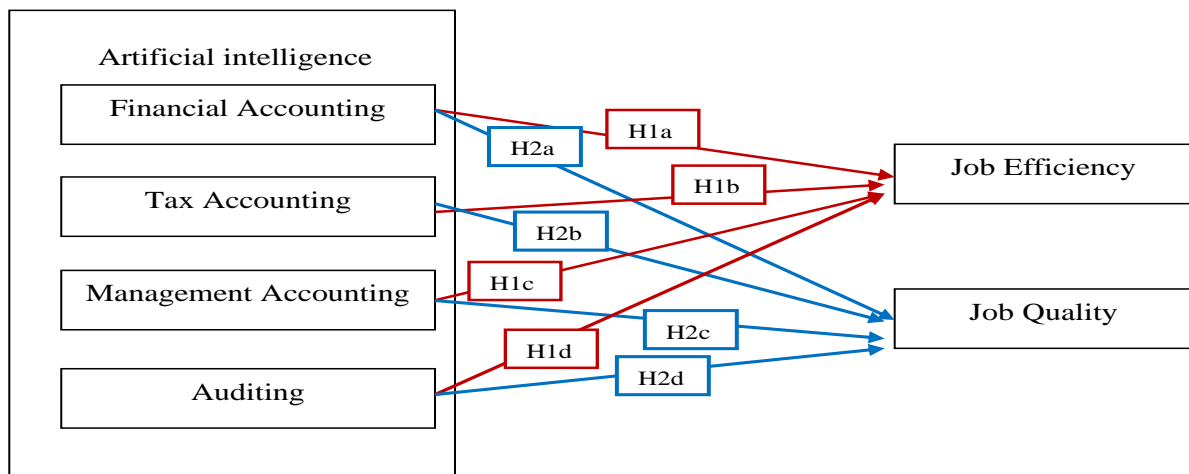
- 1a. What is the effect of artificial intelligence in financial accounting on the job efficiency in accounting profession?
- 1b. What is the effect of artificial intelligence in tax accounting on the job efficiency in accounting profession?
- 1c. What is the effect of artificial intelligence in management accounting on the job efficiency in accounting profession?
- 1d. What is the effect of artificial intelligence in auditing on the job efficiency in accounting profession?
- 2a. What is the effect of artificial intelligence in financial accounting on the job quality in accounting profession?
- 2b. What is the effect of artificial intelligence in tax accounting on the job quality in accounting profession?
- 2c. What is the effect of artificial intelligence in management accounting on the job quality in accounting profession?
- 2d. What is the effect of artificial intelligence in auditing on the job quality in accounting profession?

### Research Hypotheses

Hypotheses are developed to answer specific research questions.

- H1a: Artificial intelligence in financial accounting has positive effect on the job efficiency in accounting profession.
- H1b: Artificial intelligence in tax accounting has positive effect on the job efficiency in accounting profession.
- H1c: Artificial intelligence in management accounting has positive effect on the job efficiency in accounting profession.
- H1d: Artificial intelligence in auditing has positive effect on the job efficiency in accounting profession.
- H2a: Artificial intelligence in financial accounting has positive effect on the job quality in accounting profession.
- H2b: Artificial intelligence in tax accounting has positive effect on the job quality in accounting profession.
- H2c: Artificial intelligence in management accounting has positive effect on the job quality in accounting profession.
- H2d: Artificial intelligence in auditing has positive effect on the job quality in accounting profession.

### Proposed Research Framework



### Literature Review

The framework of the proposed study was initiated with reference to Knowledge Based Theory. The theory was presented by Kogut and Zander (1992) that highlights on the importance of information and know how in creating the combinative capabilities. In this theory combinative capabilities include internal and external learning which further enhance opportunities in organizing and technological. Coupled with that, Chen, Jiao and Zhao (2016) applied Knowledge Based Theory to discover the influence of scientific knowledge on technology capability and innovative performance. Contradict from previous studies that applied this theory from organization perspective, the proposed study views it from accounting professionalism that specifically covers two (2) specific accounting areas. Besides, artificial intelligence and digitalised accounting have been incorporated in the framework to proxy the scientific knowledge in order to suit with current digital technology development.

Digital technologies are significantly affecting the professional practices at individual, organisational, national and international levels and proliferating across professional practices

from medicine, law, education to urban planning and policing (Frenwick & Edwards, 2016). Innovation has been created from this technology in every second and professional should aware on the latest development. Correspondingly, action should be taken to be in par with the changes in the global technology. Specifically, for accounting professionals many transformations have been done. Commence with the bookkeeping entries by Luca Pacioli, the journey of accounting evidenced a new achievement in this era whereby it no longer being recorded the transaction manually but rather can be done using one finger touch.

### **Artificial Intelligence**

The artificial intelligence will reduce the rigorous, tedious and painstaking nature of accounting profession and make it more of efficient consulting services (Greenman, 2017). It helps accountants add true value to their services (Duffy, 2018). Since accountant routine and repetitive tasks would be handling with artificial intelligence, they are freed from a time-consuming chore and can mainly focus on analyze and interpret artificial intelligence data as well as becoming advisory to client. Accountants can use artificial intelligence to benchmark, track and improve clients' businesses before a transaction commences (Parsons, 2018). Artificial intelligence positively influences the performance of accounting functions where accountant can use up-to-the minute information for decision making (Odoh, Echefu, Ugwuanyi, & Chukwuani, 2018). It also helps them to improve the quality of their service in the area of audit planning, internal control evaluation and identification of audit risk (Yang & Vasarhelyi, 1995). Effective artificial intelligence would bring automatic understanding of audit task processes and increased knowledge and knowledge transferability (Lombardi and Dull 2016), transform it into a high-efficiency and highly effective audit line production process (Louwers, Ramsay, Sinason, & Strawser, 2015) and will result in high levels of consistency between decision makers and between decision situations (Pieptea & Anderson 1987).

The Financial Stability Board reported artificial intelligence technology would enable accountants to focus on more valuable tasks such as decision-making, problem solving, advertising, strategy development, and leadership (FSB, 2017). Deloitte (2017) presented that RPA accelerates greater automation of process and artificial intelligence improves productivity in public sectors. Accuracy and efficiency can be increased and operating costs and time can be reduced in performing accounting tasks and process by artificial intelligence technology. Artificial intelligence can provide higher quality information by machine or deep learning, and contribute to generate more transparent accounting information (Ahn and Jung, 2018; Bauguess, 2017; Cho, Ahn, & Jung, 2018).

### **Specialised Accounting Area**

Malaysia is moving forward to achieve high-income status by 2020. In achieving this vision, Malaysia is required to have 60,000 accountants by 2020 (Muhamad, Mohd. Salleh & Mohd Nordin, 2016). It has been acknowledged by Economic Transformation Plan (ETP) that accountancy profession is among the main characters in transformation Malaysia into a high nation income status. Besides accounting knowledge, the accounting professionals need to be aware on the transformation in digital technologies. Technological developments improved the way to handle accounting activities (Guney, 2014). These technologies have spread from financial accounting to management accounting, taxation and auditing. From financial accounting point of view, the advent of larger datasets, analytical methods, intelligent algorithms and the ability to measure in very small-time intervals enable financial reporting to provide more detailed and timely information (Zhang, Pei & Vasarhelyi, 2017). Another specific accounting area is auditing. Identically, the auditing task has also been facilitated by



new technologies that offer auditors with range of both financial and nonfinancial information, as well as improved audit efficiency resulting from computerization and audit automation (Trompeter and Wright 2010). Management accounting is another specific accounting area proposed to be investigated in this study. Given that management accounting involves in complicated internal process, Bredmar (2017) digitalised accounting will provide a clear picture of every step in internal process starting from order until billing which running more agile and efficient operations. Finally, the impact of digital technologies on taxation. Al Karaawy (2018) suggested that automated tax systems will be beneficial in term of fast access of information, increased creativity, virtual communication channels and increased social networking platforms.

### **Digitalised Accounting**

Digitalisation is a transforming analogue knowledge and information to become a stored digital form of knowledge and information. This provides easier access to knowledge and information in real-time and enables a global exchange between people and plugged-in digital appliances (Kane et al., 2015). Digitalisation of the accounting to be based on the new technologies that develop better and new solutions and forces accounting companies to adapt new technology and change services and products offered. Digitalised accounting tools will make the business more: automated; more accurate in details and numbers; easier access to data; more secure storage through cloud storage and scalability of the company to grow is less complicated when it comes to documentation (Southern Cross University, 2016). Digitalisation of the accounting is likely to change the market from being a supplier driven to becoming demand driven and new actors with less accounting knowledge could get an opening for entering the market (Bygren, 2016). Many companies are trying to use digitalization in their businesses and it is seen to be more companies to follow these actions, but most industries and their market actors are in general not using digitalization to its full potential (Bremann & Felländer, 2014).

### **Job Efficiency in Accounting Profession**

In the traditional accounting profession, the job duties of accounting personals are divided according to the business process, but under the circumstances of artificial intelligence, artificial intelligence will take the place of traditional accounting and auditing work, improving the work efficiency greatly, changing the method of separation of traditional accounting and auditing work, this will help accounting personnel to improve their own work quality and ability (Li & Zheng, 2018). This will also optimize the setting of accounting posts, optimize the structure layout, and change the traditional financial and practical working modes. At the same time, the artificial intelligence may appear new problems in the accounting industry, so that the targeted solutions can be brought up. As the application of artificial intelligence in the accounting industry becomes more and more extensive, the traditional accounting posts do not need so many employees, which is an obvious change. The history of computerized accounting in our country begins as early as the 1980s, so far, it has been commercialized, used by all kinds of accounting entities, forcing those originally simple accounting records and accounting work replaced by artificial intelligence, accordingly, most positions of accounting personnel are no longer needed (Li & Zheng, 2018).

Higher IT adoption rate among accounting functions is attributed to the push for improved productivity among accounting professionals (Pan & Seow, 2016). In recent study, Smith (2018) concluded that artificial intelligence provides opportunities for expansion of current accounting services and creation a new service line. Accountant may no longer focus on repeating job as it will be automated instead, accountant will focus on analysing or consultant

which has competitive advantage. It indicates that accounting profession will involve with greater integration and utilization of technological forces. Chukwudi, Echefu, Boniface and Victoria (2018) were in the opinion that artificial intelligence will enhance the performance of accounting functions and eliminating certain accounting cost. The recording of transaction will be more efficient with the eliminating of redundant tasks.

### **Job Quality in Accounting Profession**

In traditional accounting positions, starting from the registration of accounting books, making of accounting vouchers, to the formation of statements, etc. Accounting personnel will have to monitor procedures and this traditional way of accounting involves a lot of manpower, financial resources, and material resources, the efficiency is low, accomplishing task will not follow a set scheduled, although it might be completed on time, it results in overtime working, long hours of work, fatigue, and mistakes; all this invariably results in the distortion of accounting information (Jędrzejka, 2019). While on the other hand, when an enterprise uses accounting software for all financial procedures, it saves time and improves the efficiency of the work. Financial personnel only need to do the auditing and accounting personnel need input data, then leave the process to the computer to complete. Even though, errors could occur when the accounting personnel tries to input the necessary data, the accounting software system will automatically report the error as a wrong data entry, which can be corrected to improve the quality of the accounting information (Jędrzejka, 2019).

Quality of accounting profession can be seen from the outcome of the job performance such as quality of financial reporting produces. Issa, Sun, and Vasarhelyi (2016) conducted comprehensive research on methodological issues in developing artificial intelligence in auditing process. Their study believes that artificial intelligence capable to automatically design the entire audit plan based on client conditions and evidences. It is embedded with self-correcting mistakes which able to improve the audit process. Owing to the importance of automation in accounting and auditing, Kokina and Davenport (2017), addressed the potential bias associated with artificial intelligence. They consider that artificial intelligence is relevant in increasing the speed, granularity and productivity by identifying anomalies in large datasets, which may be a basis for further forensic investigation. It is expected that better quality of results will be generated from this advancement.

### **Research Methodology**

To achieve the objective, a survey of close ended questionnaires will be distributed to the accounting personnel that involve in financial accounting, tax accounting, management accounting and auditing. Survey questionnaires are chosen in this study due to the ease in explaining, understanding, and generating findings represent the population at lower cost (Saunders, Lewis & Thornhill, 2012). The sample size is based on suggestion by Hinkin (1998) whereby the appropriate sample size based on the item-response-ratio is ranged from 1:4 to 1:10. It is expected that number of items from each of the variables to be 5 items. Therefore, the total number of items will be 30. This will lead to a sample size range of 40 to 300. This study aims to achieve the highest sample size which is 300. The sample location will be all the states in Malaysia. Convenience sampling will be applied as sampling technique in this study. Respondents will be approach based on their availability and convenience to answer the questionnaire. The collected data will be analysed using partial least square structural equation model (PLS SEM).

### The Impact of This Research to The Society or Industry

1. This research will impact the awareness on the necessity of digital accounting in accounting profession. The innovation evolving to smart and digital technology, will enhance the traditional ways of working in accounting profession.
2. This study is beneficial in identifying the effect of digitalised accounting to the accounting profession which crucial in nations economic. It serves to upraise the efficiency and quality of accounting profession.
3. It is expected that this study has social implication. Digitalised accounting in the area of financial reporting, taxation and auditing able to provide more transparent, efficient and quality information that required by the stakeholder including shareholders, tax agent, bankers and suppliers. Digitalised report on sustainable and corporate social responsibility which is part of financial accounting area will give assess to community on the activities conducted by firms.
4. In term of nation, this study will assist in achieving the high-income status vision by providing a study that promote accountancy profession.
5. This study is applicable in attaining the Sustainable Development Goals no 9 on industry, innovation and infrastructure. Technological progress indirectly is a solution to both economic and environmental challenges such as providing new jobs and promoting energy efficiency.

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