

The Conceptual Model of Digital Technologies Application in Supporting the Accounting Profession: Industrial Revolution 4.0 Era

Luluk Muhimatul IFADA¹, Sri SULISTYOWATI¹, Yunita AWANG², Azuraidah TAIB², Shazalina Mohamed SHUHIDAN², Zaiza Norsuriati Zainal ZAKARIA²

¹Dept of Accounting, Faculty of Economics, Universitas Islam Sultan Agung, Indonesia, luluk.ifada@unissula.ac.id, sulistiyowati@unissula.ac.id

²Universiti Teknologi MARA (UiTM) Cawangan Terengganu, Malaysia, yunita@uitm.edu.my, azura015@uitm.edu.my, shazalin@uitm.edu.my, zaiza676@uitm.edu.my

Abstract

This study examines the accounting profession that cannot be replaced by technology. As industry 4.0 develops, it raises concerns that the accounting profession will end in the digital era. Accountants must prepare more maturely to face their main competitors, namely technology and programmers. This study aims to identify the role of technology as a supporter of the accounting profession by examining the influence of digital technology and the impact of the industrial revolution 4.0 on the accounting profession. Additionally, this study observes the role of management accountants in moderating the relationship of digital technology and the impact of the industrial revolution 4.0 on the accounting profession. This study used an exploratory quantitative approach. The population of this study involved accounting students and accounting educators from public and private universities in Central Java, Indonesia. The method used is the non-probability sampling method based on specific criteria with regression analysis techniques. This research is expected to increase competence due to technological complexity so that the accounting profession can successfully meet future challenges.

Keywords: Industrial Revolution 4.0, Accounting Profession, Digital Technology, Management Accountant

Introduction

In this twenty-first century, all activities are not far from technology. It can be observed at almost every intersection of social life, digital technology affects all aspects of traditional to modern, from the economy to culture. It can facilitate all aspects of activity, including education, business, and work (Mardiana 2015). The rapidly changing technology, economy, and thinking in the public sector require government officials to change in understanding technology. It is to obtain accurate, fast, and up-to-date information due to technological developments for all professions that have become a necessity, not just an option.

Like other professions, the accounting profession has also changed and developed due to digitalization and technological developments. This updated technological development has made the workload of accountants easier. They used to complete their work with traditional methods (such as paper, receipts, registrations, declarations, notifications, etc.), and now it has become modern using a computer system. Thus it eases the accountants and is considered efficient (Gulin et al 2019). This era accommodates business intelligence, which develops technological disruption due to the millennial generation (Bhimani and Willcocks 2014). It rises to a new name called the digital economy, which will directly affect the automation of accountants' decision-making processes (Eka 2013).

In the digital era and technological developments, the digital economy has opened up new possibilities while simultaneously increasing risk according to individual responses. The maximum use of technology can reduce individual tasks as operators and experts in business and professions (Pan 2016). Internet technology has also changed people's view of obtaining information, including the accounting profession in its accounting and financial functions (Payne 2014). The current phase of technological progress has a significant impact on the development of accounting. The flow of information technology runs so fast as if it is chasing time.

In 2018, research from the Russian Foundation for Basic in Economics about accounting in the future in the modern information society explained that the accounting profession would not disappear. However, it will experience rapid

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changes in technology as a professional accountant-analyst (Prasad 2015). Furthermore, according to (Rosi and Mahyuni 2021), the probability that robots will replace the accounting profession is 95 percent. This large percentage is due to the development of robotics and data analytics which have taken over the primary work of accountants (Moll and Yigitbasioğlu 2019). Undoubtedly, the accounting profession is most affected by technological developments and globalization at the forefront of the professions. It is a fact that the next generation of accounting professionals is digitalization and technology. Many digital systems did not exist ten years ago but are now actively used in the accounting profession (Tekbas 2018).

As Lucas et al (2013) emphasized, the use of computer system technology has become a common thing, especially after the 4.0 revolution era, which demands the use of the internet in all things. The leading technologies of skill change are technological innovations such as the Internet of Things and Internet of services, cloud technology, big data, robotics, artificial intelligence (AI), and 3D-Printing (Chartered Global Management Accountant 2014). The study by Al-zoubi (2017) describes cloud computing technology integrated with applications in the accounting field. It can help increase the effectiveness of accounting work such as data analysis, supporting predictive tools, decision-making support software. It will support the company's business in analyzing, controlling, and assisting during making management accounting decisions regularly and on an ongoing basis. Furthermore, Rückeshäuser (2017) explained that the use of big data and artificial intelligence (AI) in the 4.0 era facilitates automatic data collection and more diverse data, not only financial but also non-financial data. This stage is the most important and responsible because it redefines the function of accountants.

Problem Formulation

The current literature shows that in addition to overcoming the problem of significant infrastructure developments, adaptation in business management is also needed (Petrovna Elena and Mizikovskiy 2018). The increasing complexity due to comprehensive networking and digitization requires new forms of management accountants to meet the challenges of the future successfully. The main reason is that digital technology will increase the availability of various kinds of information in the economic field. Companies will face challenges in filtering information from this vast data. In the current era of digitalization 4.0, the role of Management Accountants (MA) is a new opportunity and a tool to improve performance in the accounting profession (Rückeshäuser 2017). It highlights social skills such as collaboration, customer orientation, and competence to solve problems.

Moreover, knowing cloud technologies, big data, robotics, artificial intelligence (AI) is crucial (Yazdifar and Tsamenyi 2005). The role of the MA is as a navigator for company management because jobs with a high repetitive character have a high possibility of automation where the ability to adapt is needed. Yazdifar and Tsamenyi's (2005) research results evaluated that IT or systems knowledge will be one of the most needed MA skills, while broad business knowledge and interpretative skills will remain relevant.

Technological developments change business. It makes not many human resources needed in business, including accounting staff, due to limited skills and knowledge that turn traditional systems into automation systems with accounting software (Ni Made 2021). It resulted in the underestimation of the accounting profession regarding the impact of technology on the work of accountants. The main reason is that it aims to provide evidence of the changing role caused by the increasing digitization of the business environment. Therefore, it must prove that this role shift has occurred in recent years. Therefore, the purpose of this study is to answer the research questions:

RQ1: What is the impact of technology on the accounting profession?

RQ2: What is the impact of the environmental 4.0 industrial revolution on the accounting profession?

RQ3: Can management accounting moderate the relationship between digital technology and the disclosure of the accounting profession?

The Industrial Revolution 4.0 is where all control and management systems are revised into a digital system. It will impact minimizing human intervention, and the risk will belong to the digital world. On the other hand, the accounting profession will also develop and experience changes due to technological developments. These changes include the activities of accountants and client expectations. The development of technology and digitalization allows the renewal and transformation of the accounting profession. In this case, accountants are required to act as equipped professionals where they must have the skills to analyze the risk, solve and set long-term goals to maximize the benefits of the technology. Thus this research attempts to expand the literature in several ways. First, this research focuses on investigating how the role of the MA can be a potential moderator in the development of digital technology and the 4.0 revolution that affects the accounting profession. This study is different from the previous studies, which only examined the accounting profession in digital technology (Bakulina et al 2020), the role of accountants in revolution 4.0, the challenges in the era of society 5.0 (Yazdifar and Tsamenyi 2005), and the changing role of MA in the industrial 4.0 era in Germany (Bakulina et al 2020). Second, it contributes to the accounting profession related to technological developments and contributes to science both as a comparison and replication material to conduct further studies regarding the accounting profession in dealing with technology in the era of the industrial revolution 4.0. Third, the sample taken is teaching staff and accounting students at

public and private universities in Central Java, which can be used to consider the accounting profession in optimizing the role of accountants.

Literature Review

Theoretical framework

The theoretical framework for this research is based on two theories; the first is the diffusion of innovation theory (DIT) Rogers (1976) and the second is the reasoned action theory (RAT) by Fishbein and Ajzen (1975) which was used in previous research by Damerji and Salimi (2021). Both theories explain the adoption of technological innovations. The DIT addresses technology diffusion primarily at a macro organizational level, while RAT addresses technology acceptance and adoption at a micro individual level. These two theories intersect with technological developments at educational institutions, such as universities, that rely on the accounting curriculum and require knowledge and proficiency in accounting, auditing, and digital technology skills. Thus, the development of digital technology and the rapid emergence of industrial revolution 4.0 affect the ability and readiness of the accounting profession. Therefore, it plays an essential role for accountants in preparing and improving technology skills necessary in careers and facing future challenges.

Digital Technology

Digitalized infrastructure development eases human activities in accessing financial and accounting products and services (Drianus 2018). Technology can create artificial intelligent products (African intelligence). It helps management that has been supported by hardware to support decision-making (Wijaya 2021). Based on previous literature, technological change creates big data and digitization (Bhimani and Willcocks 2014), business analysis (Lucas et al 2013); international controller (Bughinet al 2019), industry 4.0 (Roozen et al 2019), and cloud technology (Strauss et al 2015). These infrastructures are often used to emphasize the drivers of changing roles in the accounting profession (Richins et al 2017).

The exponential growth and development of information are swift. Based on Natalia Paranoan et al (2019) modern society considers technology not a threat but a practical and sophisticated offer readily accepted by the general public. According to Rosmida's (2019) research on the transformation of the role of accountants in the digital era, they must have a strategy to prepare for revolution or change. The benefits of collaboration between accountants and technology at the pace of innovation with the value of digital services complement each other. The concept allows all devices to communicate and determine further actions (Richins et al 2017). Devices that use IoT modules can be controlled and monitored remotely via the internet. Technological developments can eliminate the tasks borne by human activities and replace them with intelligent robotics (Ślusarczyk 2018).

Accounting Profession

According to the (FASB) Financial Accounting Standards Board, accounting is a service activity that provides quantitative information to make economic decisions. In PSAK 1, the objective of financial statements is to provide information about financial performance, financial position, and cash flow entities that benefit some report users for making economic decisions. According to the International Federation of accountants, the accounting profession is those who have expertise in the accounting field, including the work of public accountants, government accountants, finance, and trade (Dianita and Mirna 2016). An accountant profession must be professional and able to transform into the 4.0 revolution by increasing mastering skills, insight, being open to change, and maintaining good values also ethics to contribute. Furthermore, the competence of the accounting profession must be improved by mastering non-financial data such as data analysis, information technology development, and leadership skills. The use of cloud-based accounting data will affect the use of big data. Accordingly, the accounting will integrate non-traditional financial information in modern systems. Accountants who are experts in providing financial information make information technology a basic need because of the rapid changes and massive technological developments (Dianita and Mirna 2016). Additionally, an accountant will be strategic and consultative. Thus they have to be aware of the industrial revolution 4.0 development by resembling the opportunities.

The Role of Management Accountant

Management control and accounting is an essential part of every organizational activity. Its involvement in management decision-making, designing planning and management performance systems, and providing financial reporting and control expertise to assist management in formulating and implementing organizational strategy is also crucial (Gebhardt et al 2015). The information provided by the Supreme Court will enable internal users to make effective decisions and contribute to increasing the efficiency and effectiveness of the accounting profession's performance. Management accounting has evolved from focusing on cost determination and financial control to value creation through adequate resources. The role of the MA also changes in line with changes in management accounting techniques (Caglio and Dittilo 2021). It includes the use of automation, real-time sensors, and other modern technologies to transform business processes, achieve business value as information systems and develop more data to be available (Roth 2016). Overall, the typical tasks and activities of controlling and the role of MA in supporting managerial decision-making processes are expected to be

changed through advanced technologies such as big data, the internet of services, and cloud technology (Roozen et al 2019). Data analysis is increasingly vital for the controlling profession due to tasks on cost accounting such as product and target costing, reporting, analysis, and performance management.

Hypothesis Development

Digital Technology Affects the Accounting Profession

Information technology makes a fundamental right in determining the competitiveness and ability of companies to improve performance in the future. IT resources become a consideration for managers for future success (Devaraj and Kohli 2003). It impacts on accounting being a discipline for disclosure of accurate financial information. The IT development increases the accounting function's dependence on technology in conducting business transactions (Gelinas, 2006). Computerized accounting work is no longer limited to book-keeping but includes internal control and providing information analysis (CIMA et al 2015). The continued development of IT is likely to affect various aspects of accounting (Lord 2004). In addition, IT developments automatically change the recording of journal evidence and financial reporting based on reporting requirements of applicable standards (Warren et al 2015). Companies can take advantage of IT by modifying business models to automate business by combining technology, such as management systems and the internet supply chains (Pan and Seow 2016). Al-zoubi (2017) added that sales information could be sent and received directly from customers and processed automatically through a computing system. It also can ensure information transparency when transactions between parties are in progress. Thus, utilizing IT will save costs incurred by the company. Accordingly, technology can affect the accounting profession.

H1: Technology has a positive effect on the accounting profession

The Industrial Revolution 4.0 Affects the Accounting Profession

The industrial revolution 4.0 is a term that describes technological advancements connected to provide a foundation for the increased digitization of the business environment (Davies 2015). Industry 4.0 is supported by data collection processes improvement through transistors in integrated circuits. It has a capacity of 2 times every two years or Moore's Law, which can reduce the cost of digital electronics (Deloitte 2021). The central concept of Industry 4.0 is an increase in network connectivity using the Internet of Things. It is in a network of physical devices or objects to collect and exchange data offered via the internet. The industrial revolution 4.0, over time, developed massively. The use of accounting using technology will impact efficiency in energy, time, and costs. For example, a company leveraged Artificial Intelligence technology to help automate accounting work for small and medium-sized businesses (Gelinas 2006). In this case, the customer will send an invoice to the company. It will be digitized, encrypted, and then recorded as proof of the transaction according to accounting standards (Ni Made 2021). In addition, the development of the industrial revolution 4.0 with its improvements is increasingly influential in issuing accurate and precise financial reports on the use of technology in the accounting field. Based on (Khanh 2018) research, some traditional jobs such as accountants will lose their profession. It does not require human labor anymore because digital applications replace them. Wahyuni (2020) showed that the role of accountants could be replaced from bookkeepers to experts in providing financial data or as data analysis. Therefore, accountants must be able to master technology to carry out their duties in the future. It results in the 4.0 industrial revolution has a positive effect on the accounting profession.

H2: Industrial Revolution 4.0 has a positive effect on the accounting profession

The Role of Management Accounting (MA) in the Effect of Technology on the Accounting Profession

The role of accountants and management in the influence of digitalization technology on the accounting profession can be a bridge in decision making and the ease of accessibility of the accounting profession. It shows that IT knowledge is one of the most needed MA skills. In addition, MA is considered to have extensive business knowledge, decision making, and team performance from the perspective of soft skills, technical knowledge, and predictive tools (Prifti et al 2017). Seufert and Oehler (2016) also explained the role of management accounting is to provide insight and as a controller in making critical decisions due to the development of infrastructure and IT within the entity. More specifically, Gebhardt et al (2015) described the role of the MA as competencies in statistical methods such as regression, time series, or clustering that will be needed to integrate the field of data scientists into the accounting profession. Whereas Becker (2011) indicated digital/IT-based evaluation programs would automate many tasks in traditional accounting, the role of MA controllers is crucial in predictive analysis in the future.

Meanwhile, Caglio and Ditillo's (2021) research results show that MA's role complements the entity's performance. In making analysis, MA is faster and getting management recommendations that will lead to a planning approach in identifying and anticipating market changes. Furthermore, according to Al-zoubi (2017), the impact of computing on certain factors in the economic concentration system in companies is specifically presented, such as setting up an

accounting organization, financial activities, documentation, accounting books, financial reports, users, procedures, also software and physical infrastructure. The results of this study indicate that applying computing to accounting allows companies to rearrange the accounting system in an integrated and fast manner because it is not affected by geographic location (Al-zoubi 2017). MA studies are oriented towards management accountants communicating and integrating IT developments in the accounting profession (Graham et al 2012). It is possible because the role of the MA can save costs caused by job reductions due to IT developments and assist accountants in interpreting complex data. Hence, the hypothesis is:

H3: The role of the Supreme Court is to strengthen the effect of digital technology on the accounting profession.

The Role of Management Accountants (MA) in the Effect of the Industrial Revolution 4.0 on the Accounting Profession

In accounting, along with technological developments, controlling and management accounting (MA) is greatly influenced by the increasing digitization and automation of business processes, the introduction of digital products, and new business models (Bhimani & Willcocks 2014). Bhimani and Willcocks (2014) explained that the role of the MA will be faced with a new type of role, which must be active as a business analyst and data scientist, not only as a provider of financial information. The role of this development is a consequence of the effect of the industrial revolution 4.0, such as Big Data. It is referred to as one of the main drivers of changing roles to control performance and obtain information (Payne 2014). In addition, the main technology from driving other technology innovation skills such as cloud technology, artificial intelligence, IoT (Lucas et al 2013) has turned from traditional to modern transaction recording that must be carried out by controllers and MA (Graham et al 2012).

The role of Big Data is the main trigger for changes in the controlling profession, as studied by Payne (2014), focusing on controlling business activities. Big data helps accountants understand the company's assets and current conditions according to the fair value of applicable accounting (Warren et al 2015). Big data can also provide a new form of intangible assets valuation that is not included in the balance sheet, such as customer base, human resources, and vendor base (Warren et al 2015). It can be tracked at any time and disseminated to stakeholders to improve disclosure. In addition, considering IoT as new data sources via sensors embedded in the software and physical infrastructure can complete financial accounting tasks, such as measuring the health of an asset. It uses to select a more appropriate depreciation method (Liu and Vasarhelyi 2014). The role of management accountants in the development of revolution 4.0 is crucial for controlling and supervising accountants in carrying out internal tasks in financial reporting, analysis, and decision making (Appelbaum et al 2017). Thus, in addition to following the development of information technology, an accountant in this digitalized era should adapt to technology. It aims to create value increasingly leading to digital services and equip himself with various knowledge (Caglio and Ditillo 2021). Collaboration is a key factor in creating added value for accountants concerning the growth of conventional businesses and startups. Therefore, the role of management accountants strengthens the influence of the 4.0 revolution on the accounting profession.

H4: The role of MA strengthens the effect of Industrial Revolution 4.0 on the accounting profession

Empirical Research Model

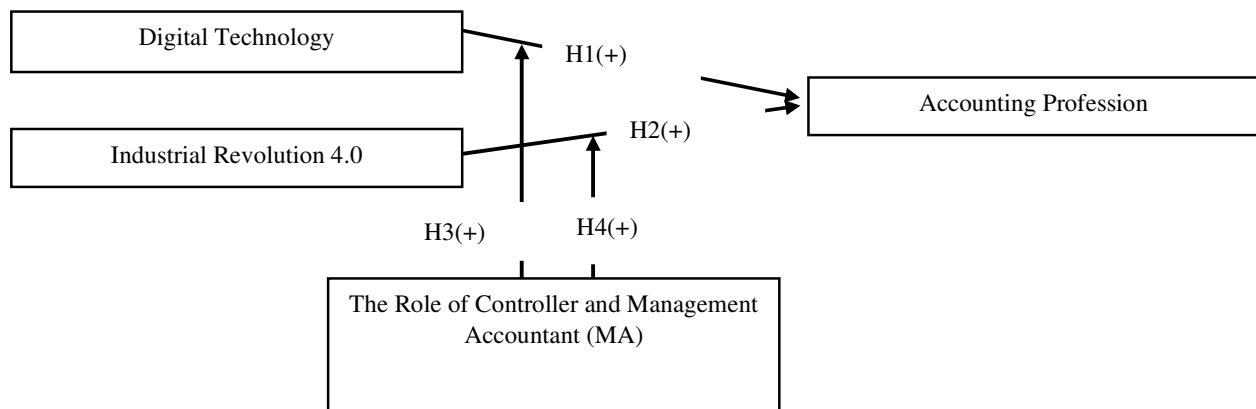


Figure 1: Empirical Research Model

Method and Procedure

Population and Sample

Population

Sugiyono (2017) suggested population as a generalization area consisting of; objects/subjects with specific qualities and characteristics. It is determined by the researcher and taken into conclusion. The research population is the total number of units of analysis whose characteristics can be predicted and at least has more or less the same characteristics. The population in this study are all accounting educators and accounting students in Central Java Province, both public and private universities. The population of this study is infinite in number; therefore, it is necessary to draw a research sample.

Sample

The sample is part of the number and characteristics possessed by the population. Sampling in this study uses non-probability sampling because non-probability sampling can provide beneficial information in a population. Further, the method uses purposive sampling based on specific considerations (judgment sampling) as the basis for sampling. Judgment sampling involves various research subjects with the best position or is most advantageous in providing information (Sugiyono 2017). Respondents needed to fill out the research questionnaire are accounting educators and students in Central Java Province.

Research Setting

The research approach used in this research is quantitative. According to (Creswell 2012), quantitative research is a type of educational research. The researcher decides what to research, formulates specific questions, limits questions, collects measurable data from participants, analyzes numbers using statistics, and conducts impartial investigations in objective ways. Quantitative research requires the study of a sample of a population that relies heavily on numerical data and statistical analysis. This quantitative study adheres to the epistemology of positivism, aiming to test the established hypotheses in terms of observable behavior (Sugiyono 2017).

Measurement of Variables

The measuring instrument in this quantitative study is in the form of a questionnaire. The data are obtained in answers from accountants, educators, and accounting students. This quantitative research used the multiple regression analysis methods because there is more than one independent variable. The multiple regression analysis models designed in this study consist of two independent variables: digital technology (X1) and industrial revolution 4.0 (X2). Meanwhile, the role of controllers and Management Accountants (MA)(Z) is a moderating variable. The dependent variable is the accounting profession (Y).

Digital technology is measured by adapting the scale developed by Teng et al (1995) used in a previous study by Oyewo et al (2020). Respondents were asked to rate their information systems on a 5-point tapered scale from 1 (very low) to 5 (very high) in terms of (i) accuracy, (ii) precision, (iii) reliability, (iv) completeness, and (v) relevance. Furthermore, the industrial revolution 4.0 era is proven to impact the accounting profession, as reflected by the study of Merlina and Nuraini (2020), measured through a scale based on accounting understanding. It makes the accountants understand more complex problems such as the rapid development of the industrial revolution 4.0 and led to a better level of moral reasoning.

The role of management accounting as applied in this study is the intensity or strength of management accounting activities in the management accounting department or finance function. The role of management accounting (MA) is measured using the GMAP framework (Oyewo et al 2020). Respondents were asked to rate the intensity of doing certain activities on a scale of 1 ("never") to 5 ("very extensive"). The scores were additively combined to get the MA index for each company.

Research Place

This research is conducted in Central Java Province. One of the reasons for choosing Central Java is that this province statistically has many educators from public and private universities. Based on Indonesia statistics data, the number of Universities and Lecturers (State and Private) under the Ministry of Research, Technology, and Higher Education or the Ministry of Education and Culture in 2020/2021 amounted to 21,020. Meanwhile, the number of students in universities (public and private) is 572,837. Many lecturers and students show the significant role and contribution of the accounting profession in the development of digital technology, especially in Central Java. In this case, it is according to the assumption that the researcher has a great attraction and a strong correlation with the development of digitalization and the accounting profession.

Research Time

This research is conducted from June 2021 to May 2022 by going through research stages. It includes observation, submitting research proposals, making and testing research instruments, distributing questionnaires, and analyzing research data.

Data Collection Method

The data used in this study is primary data, which are obtained by distributing questionnaires. It is in written questions given to the subject under study to collect the required information (Burhanuddin 2013). Questionnaires will be distributed online to respondents via social media such as LINE, WhatsApp, Instagram, and E-mail with the help of the Google form feature due to the COVID-19 pandemic and reach wide coverage in Central Java. The main advantage of using questionnaires is that they can be distributed simultaneously and do not require a long time. Researchers also get facts related to research problems, namely the influence of digitalization and the 4.0 industrial revolution on the accounting profession. However, there is a weakness in distributing the questionnaire online; namely, dual input can occur. In dealing with this, the author asks respondents to voluntarily fill in the telephone number to ensure that this does not happen.

Data Analysis Technique

The technique used in this research is quantitative analysis research to explain the relationship between digital technology and the industrial revolution 4.0 in the accounting profession. This study uses multiple regression analysis to predict the effect of more than one independent variable on one dependent variable, either partially or simultaneously, and ensure the data meets the classical assumptions (Burhanuddin, 2013). This study also used validity and reliability tests. According to Ghozali, (2018), a validity test measures the validity of a questionnaire, whereas a reliability test is a tool to measure questionnaires with constructs or indicators.. This study uses the Statistical Package for Social Science (SPSS) with multiple linear regression analysis. The specified regression model is as follows:

$$AP = \alpha_0 + \alpha_1DT + \alpha_2IR + \alpha_3MA + \alpha_4DT*MA + \alpha_5IR*MA + \epsilon$$

AP = Accounting Profession

DT = Digital Technology

IR = Industrial Revolution 4.0

MA = Management Accountant

DT*MA = Digital Technology * Management Accountant

IR*MA = Industrial Revolution 4.0 * Management Accountant

E = error

Conclusion

To make a theoretical and practical contribution to the accounting profession and deal with the challenges of industry 4.0, the researcher proposes a research model regarding the factors affecting the accounting profession. There are three aspects: digital technology to automate business by combining technology, such as management systems and internet supply chains that affect accounting aspects. The industrial revolution 4.0, which is developing massively, impacts accounting aspects such as energy efficiency, time, and reducing digital electronics costs. As well as the role of management accountants who are considered to have extensive knowledge in decision making, team performance from a soft skills perspective and digital/IT-based technical knowledge. It is crucial in helping the challenges of the accounting profession in the future. The limitations of the study are this study still belong to a conceptual model. Therefore, it is necessary to conduct further research to develop and identify factors that can affect the accounting profession's ability. Further research is needed to handle the challenges of industry 4.0. by using quantitative methods to test the model and verify the validity of the assumptions developed in this research model.

References

- Al-zoubi, A. M. (2017). The Effect of Cloud Computing on Elements of Accounting Information System. *Global Journal of Management and Business Research: D Accounting and Auditing*.
- Appelbaum, D., Kogan, A., Vasarhelyi, M., & Yan, Z. (2017). Impact of business analytics and enterprise systems on managerial accounting. *International Journal of Accounting Information Systems*. <https://doi.org/10.1016/j.accinf.2017.03.003>
- Bakulina, G., Kalinina, G., Luchkova, I., Pikushina, M., & Gracheva, A. (2020). Transformation of the accountancy profession during digitalization of agriculture. *BIO Web of Conferences*, 17, 00188. <https://doi.org/10.1051/bioconf/20201700188>
- Becker, S. D. (2011). Experiencing Change in German Controlling – Management Accounting in a Globalized World. *European Accounting Review*. <https://doi.org/10.1080/09638180.2011.629794>
- Bhimani, A., & Willcocks, L. (2014). Digitisation, Big Data and the transformation of accounting information. *Accounting and Business Research*. <https://doi.org/10.1080/00014788.2014.910051>
- Bughin, J., O’Beirne, B., & Deakin, J. (2019). The anatomy of successful digital transformation: The role of analytics. *Applied Marketing Analytics*.
- Burhanuddin, A. (2013). Penelitian Kuantitatif Dan Kualitatif. *Afidburhanuddin.Wordpress.Com*.
- Caglio, A., & Ditillo, A. (2021). Reviewing interorganizational management accounting and control literature: A new look. *Journal of Management Accounting Research*. <https://doi.org/10.2308/jmar-18-082>
- Chartered Global Management Accountant. (2014). Big Data: Readyng Business for the Big Data Revolution. *World Congress of Accountants*.
- CIMA, Strauss, E., Kristandl, G., & Quinn, M. (2015). The effects of cloud technology on management accounting and decision making. *CIMA Accountants, Management Accountants, Management*.
- Creswell, J. W. (2012). Educational research: Planning, conducting, and evaluating quantitative and qualitative research. *Educational Research*.
- Damerji, H., & Salimi, A. (2021). Mediating effect of use perceptions on technology readiness and adoption of artificial intelligence in accounting. *Accounting Education*, 30(2), 107–130. <https://doi.org/10.1080/09639284.2021.1872035>
- Deloitte. (2021). *Mewujudkan Potensi Ekonomi Digital Indonesia*.
- Devaraj, S., & Kohli, R. (2003). Performance impacts of information technology: Is actual usage the missing link? *Management Science*, 49(3), 273–289. <https://doi.org/10.1287/mnsc.49.3.273.12736>
- Dianita, Mirna, dan N. H. (2016). *No Title*. Dianita, Mirna, dan Niki Hadian. 2016. “Persepsi Mahasiswa Akuntansi Terhadap MEA 2015 Tentang Publik Profesi Akuntansi” 1 (1): 34–41.
- Drianus, O. (2018). Manusia di Era Kebudayaan Digital. *Mawa’Izh: Jurnal Dakwah Dan Pengembangan Sosial Kemanusiaan*, 9(2), 178–199. <https://doi.org/10.32923/maw.v9i2.784>
- Eka, A. G., & Wuryanta, W. (2013). Digitalisasi Masyarakat: Menilik Kekuatan dan Kelemahan Dinamika Era Informasi Digital dan Masyarakat Informasi. *Jurnal Ilmu Komunikasi*, 131–142.
- Fishbein, M., & Ajzen, I. (1975). Strategies of Change: Active Participation. *Belief, Attitude, Intention, and Behavior: An Introduction to Theory and Research*.
- Gebhardt, J., Grimm, A., Neugebauer, L. M., Zinn, H. B., & Tenberg, R. (2015). Developments 4.0 -Prospects on future requirements and impacts on work and vocational education. *Journal of Technical Education*.
- Gelinis Jr., U.J., and J. L. G. (2006). Accountants and Emerging Technologies: A Case Study at the United States Department of the Treasury Bureau of Engraving and Printing,”. *Gelinis Jr., U.J., and J.L. Gogan (2006), “Accountants and Emerging Technologies: A Case Study at the United States Department of the Treasury Bureau of Engraving and Printing,” Journal of Information Systems (20)2, Pp. 93-116*.
- Ghozali, I. (2018). *Aplikasi Analisis Multivariate Dengan Program SPSS*. Semarang: Badan Penerbit Universitas Diponegoro.
- Graham, A., Davey-Evans, S., & Toon, I. (2012). The developing role of the financial controller: Evidence from the UK. *Journal of Applied Accounting Research*. <https://doi.org/10.1108/09675421211231934>
- Gulin, D., Hladika, M., & Valenta, I. (2019). Digitalization and the Challenges for the Accounting Profession. *SSRN Electronic Journal*, (September), 502–511. <https://doi.org/10.2139/ssrn.3492237>
- Khanh, lam T. (2018). Impact Of Industrial Revolution 4.0 (Industry 4.0) To The Accounting Profession In Vietnam. *Khanh, Lam T. (2018). Impact Of Industrial Revolution 4.0 (Industry 4.0) To The Accounting Profession In Vietnam (Issue September). Htps://Www.Researchgate.Net/Publication/327933242*.
- Liu, Q., & Vasarhelyi, M. A. (2014). Big questions in AIS research: Measurement, information processing, data analysis, and reporting. *Journal of Information Systems*. <https://doi.org/10.2308/isys-10395>
- Lord, A. T. (2004). ISACA model curricula 2004. *International Journal of Accounting Information Systems*, 5(2), 251–265. <https://doi.org/10.1016/j.accinf.2004.04.004>
- Lucas, H. C., Agarwal, R., Clemons, E. K., El Sawy, O. A., & Weber, B. (2013). Impactful research on transformational information technology: An opportunity to inform new audiences. *MIS Quarterly: Management*

- Information Systems*. <https://doi.org/10.25300/misq/2013/37.2.03>
- Mardiana, S., Tjakraatmadja, J. H., & Aprianingsih, A. (2015). DeLone-McLean information system success model revisited: The separation of intention to Use - Use and the integration of technology acceptance models. *International Journal of Economics and Financial Issues*, 5, 172–182.
 - Merlina, M., & Nuraini, A. (2020). Analisis Persepsi Dosen Akuntansi Dan Mahasiswa Akuntansi Mengenai Peranan Akuntan Di Era Revolusi Industri 4.0. *JAS-PT (Jurnal Analisis Sistem Pendidikan Tinggi Indonesia)*, 4(2), 149. <https://doi.org/10.36339/jaspt.v4i2.347>
 - Moll, J., & Yigitbasioglu, O. (2019). The role of internet-related technologies in shaping the work of accountants: New directions for accounting research. *British Accounting Review*, 51(6). <https://doi.org/10.1016/j.bar.2019.04.002>
 - Natalia Paranoan, Christina Jeane Tandirerung, A. P. (2019). *PENGARUH PEMANFAATAN TEKNOLOGI INFORMASI DAN KOMPETENSI SUMBER DAYA MANUSIA TERHADAP EFEKTIVITAS SISTEM INFORMASI AKUNTANSI*. 3(2), 1–4.
 - Ni Made Kariana Rosi, luh P. M. (2021). *No 主観的健康感を中心とした在宅高齢者における健康関連指標に関する共分散構造分析* Title. (April), 6.
 - Oyewo, B., Vo, X. V., & Akinsanmi, T. (2020). Strategy-related factors moderating the fit between management accounting practice sophistication and organisational effectiveness: the Global Management Accounting Principles (GMAP) perspective. *Revista Espanola de Financiacion y Contabilidad*, 00(00), 1–37. <https://doi.org/10.1080/02102412.2020.1774857>
 - Pan, G., & Seow, P. S. (2016). Preparing accounting graduates for digital revolution: A critical review of information technology competencies and skills development. *Journal of Education for Business*, 91(3), 166–175. <https://doi.org/10.1080/08832323.2016.1145622>
 - Payne, R. (2014). Discussion of Digitisation, Big Data and the transformation of accounting information by Alnoor Bhimani and Leslie Willcocks (2014). *Accounting and Business Research*, 44(4), 491–495. <https://doi.org/10.1080/00014788.2014.910053>
 - Petrovna Elena, P. E., & Mizikovskiy, I. E. (2018). Preparing accounting information on costs for manufactured crop production. *Custos e Agronegocio*.
 - Prasad, A., & Green, P. (2015). Governing cloud computing services: Reconsideration of IT governance structures. *International Journal of Accounting Information Systems*, 19, 45–58. <https://doi.org/10.1016/j.accinf.2015.11.004>
 - Prifti, L., Knigge, M., Kienegger, H., & Krcmar, H. (2017). A Competency Model for “Industrie 4.0” Employees. *Wirtschaftsinformatik*.
 - R, D. (2015). Industri 4.0. Digitalisasi untuk produktivitas dan pertumbuhan, Pengarahan untuk Parlemen Eropa (PE 568.337) September 2015. Layanan Penelitian Parlemen Eropa. *Industri 4.0. Digitalisasi Untuk Produktivitas Dan Pertumbuhan, Pengarahan Untuk Parlemen Eropa (PE 568.337) September 2015. Layanan Penelitian Parlemen Eropa*.
 - Richins, G., Stapleton, A., Stratopoulos, T. C., & Wong, C. (2017). Big data analytics: Opportunity or threat for the accounting profession? *Journal of Information Systems*. <https://doi.org/10.2308/isys-51805>
 - Rogers, E. M. (1976). JSTOR: Journal of Consumer Research, Vol. 2, No. 4 (Mar., 1976), pp. 290-301. *Journal of Consumer Research*.
 - Roozen, F., Steens, B., & Spoor, L. (2019). Technology: Transforming the Finance Function and the Competencies Accountants Need. *Management Accounting Quarterly*.
 - Rosi, N. M. K., & Mahyuni, L. P. (2021). The Future Of Accounting Profession in The Industrial Revolution 4.0: Meta-Synthesis Analysis. *E-Jurnal Akuntansi*, 31(4). <https://doi.org/10.24843/eja.2021.v31.i04.p17>
 - Rosmida. (2019). *Transformasi Peran Akuntan dalam Era Revolusi Industri 4.0 dan Tantangan Era Society 5.0*. 7, 206–212.
 - Roth, A. (2016). Industrie 4.0 – Hype oder Revolution? In *Einführung und Umsetzung von Industrie 4.0*. https://doi.org/10.1007/978-3-662-48505-7_1
 - Rückeshäuser, N. (2017). Do We Really Want Blockchain-Based Accounting? Decentralized Consensus as Enabler of Management Override of Internal Controls. *Wirtschaftsinformatik 2017 Proceedings*.
 - Seufert, A., & Oehler, K. (2016). Controlling und Big Data: Anforderungen an die Methodenkompetenz. In *Controlling & Management Review Sonderheft 1-2016*. https://doi.org/10.1007/978-3-658-13444-0_10
 - Ślusarczyk, B. (2018). Industry 4.0 – Are we ready? *Polish Journal of Management Studies*, 17(1), 232–248. <https://doi.org/10.17512/pjms.2018.17.1.19>
 - Sugiyono. (2017). *Metode Penelitian Kuantitatif, Kualitatif, dan R&D*. Bandung: Alfabeta, CV.
 - Tekbas, I. (2018). The Profession of the Digital Age: Accounting Engineering.
 - Teng, J. T. C., Cheon, M. J., & Grover, V. (1995). Decisions to Outsource Information Systems Functions: Testing a Strategy-Theoretic Discrepancy Model. *Decision Sciences*. <https://doi.org/10.1111/j.1540-5915.1995.tb00838.x>
 - Wahyuni, T. (2020). *The Role of Information Technology in Supporting Accountant Profession in the Era of*

- Industrial Revolution 4.0*. 426(Icvhe 2018), 256–264. <https://doi.org/10.2991/assehr.k.200331.150>
- Warren, J. D., Moffitt, K. C., & Byrnes, P. (2015). How big data will change accounting. *Accounting Horizons*. <https://doi.org/10.2308/acch-51069>
 - Wijaya, R. H. (2021). Will Accounting End Soon? Suatu Tinjauan Eksistensi Profesi Akuntansi di Era Digital. *Journal of Economic, Management, Accounting and Technology*, 4(2), 130–137. <https://doi.org/10.32500/jematech.v4i2.1647>
 - Yazdifar, H., & Tsamenyi, M. (2005). Management accounting change and the changing roles of management accountants: a comparative analysis between dependent and independent organizations. *Journal of Accounting & Organizational Change*. <https://doi.org/10.1108/18325910510635353>.