

The Role of Information Technology in Supporting Accountant Profession in the Era of Industrial Revolution 4.0

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Keywords: Industri 4.0, Information Technology, Digital Technology, Digital economy, Big Data, Cloud Computing.

Abstract: The purpose of this study is to identify the role of information technology in supporting accountant profession in the era of Industry 4.0. The method used in this study is a descriptive analysis. The results of this study indicate that information technology through the application of digital data technologies such as the Internet of Things, AI, Cyber-Physical Systems in the industry helps accountants in carrying out their work in the Industrial 4.0 era. The study provides an understanding, advice and recommendations to the accountant profession about how information technology in Industry 4.0 works, helps the tasks undertaken by accountants and directs the capabilities that accountants should have in facing the Industry 4.0 era. The research enhances the prior works in the area of accountant's tasks, not a job by discussing ways of how the information technology could support tasks of accountant in the era of industry 4.0. Since the world is moving towards the industry revolution 4.0 (IR 4.0), many technological infrastructures have been developed. Hence, a new study discussing these new states of the art is needed, to ensure the competence of accountant's to-do their jobs. This study is essential to satisfy the new needs of the industry due to the emerging IR 4.0. this study only discusses the role of information technology as a supporting tool for the accountant. Our next research will further discuss the role of the accountant in industry 4.0.

1 INTRODUCTION

The presence of the fourth Industrial Revolution (often referred to as Industry 4.0) is predicted to be the most powerful driver of innovation over the next few decades, which triggers the next wave of innovation. Various applied technologies in Industry 4.0 emerged, including advanced robotics, artificial intelligence, internet of things, virtual and augmented reality, cyber-physical systems, additive manufacturing, and distributed manufacturing. The use of this technology is changing business processes and business models that are applied in various industries (Dorleta, Jaione, and Ignacio, 2017).

The main concepts of Industry 4.0 are digitalisation, optimisation and personalisation of production, automation and adaptation, human-machine interaction, value-added services and automatic data exchange and communication. The full integration of information, communication technology and automation technology in future factories in Industry 4.0 is implemented to increase productivity, efficiency and effectiveness of

operations in each value chain and production process. The concept of Industry 4.0 is an industrial process for adding value and knowledge management (Ślusarczyk, 2018). (Weyer, Schmitt, Ohmer and Gorecky, 2015). (Paprocki, 2016).

In the Industrial 4.0 era, the development of digital technology increased and penetrated various fields of industry. This development provides opportunities as well as challenges in the economic, social, technical, environmental, political, and regulatory fields (Hecklau, Galeitzkea, Flachsa, and Kohl, 2016). The world economy has changed because of the significant development and application of this technology. The integration of information and communication technology in this era creates opportunities for the growth of the digital economy how economic values are created changes fundamentally in the digital economy. In the digital economy, economic and business activities are carried out digitally through the internet and web-based markets (Zimmermann, 2019). (Berisha-Shaqiri and Berisha-Namani, 2015).

The Indonesian Ministry of Research, Technology and Higher Education states that the 4.0

industrial revolution brought changes to the adjustment of work done by humans, machines, technology and processes in various fields of the profession including accountants. Gerd Leonhard, a futurist, stated that the threat of the digital era is that the globalisation era will eliminate around 1 - 1.5 billion jobs during 2015-2025. This loss of work is due to the replacement of work that was initially done by humans with automatic machines. Therefore the way of working and accounting practices must be changed in order to improve service quality and global expansion through online communication and the use of cloud computing. Cloud computing and big data for accounting data are needed in the era of the digital economy. In the era of the digital economy, the volume of information will continue to grow and require cloud computing as its infrastructure (Fariantoi, 2019).

The role of accountants in the era of the digital economy will change. In the era of the digital economy, the role of accountants has shifted from recording transactions to financial analysis. Accountants must be aware of the development of emerging information technology and strive to continue to improve capabilities in accordance with the development of information technology and can continue to survive in this digital economy era. Accountants must be able to understand the support of information technology in supporting their profession in the digital age. This understanding will direct accountants in learning the technology needed.

Based on the aforementioned problems, the researchers are interested in investigating the role of information technology in supporting the accounting profession in the industrial era 4.0. The discussion about the role of information technology in supporting the accounting profession in the Industrial era 4.0 in this article formulates the question: what is the influence of the industrial revolution on the accounting profession? What is the role of information technology in supporting the accounting profession in the industrial era 4.0? What skills should accountants learn about the support provided by information technology in the industrial era 4.0?

2 THEORETICAL REVIEW

2.1 Industrial Revolution 4.0

The Industrial Revolution 4.0 is a term that emerged at the Hannover trade fair in Germany in 2011. This

term emerged as an initiative of the German government to promote Germany as a global leader in technological innovation. Subsequently, several publications that defined Industry 4.0 emerged and became popular. The concept of industry 4.0 in several countries generally has the same goal, which is to increase competitiveness in global markets due to the development of digital technology in various industrial fields (Bartodziej, 2017).

The industrial revolution 4.0 was marked by the emergence of five leading technologies to be implemented as a new business model solution and had a significant impact on the supply chain, namely internet of things (IoT), artificial intelligence, advanced robotics, enterprise wearables, and additive manufacturing (Li, Hou, Yu, dan Yang, 2017).

2.2 Information Technology

Information technology is the hardware and software needed to process data and other information. Information technology includes all technologies used to create, process, transmit, store, exchange and use information in all forms. Accountants who have different roles depending on the functions performed must always be up to date with technological changes and must comply with recognised international standards (Zenuni, Begoli, and Ujkani, 2014).

2.3 Digital Economy

The term digital economy refers to various economic activities that use digital information and knowledge as the main factors of production. The internet, cloud computing, big data, financial technology, and other new digital technologies are used to collect, store, analyse and share information digitally and to change existing social interactions. Tapscott first introduced the concept of the digital economy in 1998, which is a sociopolitical and economic system that has the characteristics of an intellectual space, including information, various information access instruments, information capacity and information processing. The components of the digital economy that were identified for the first time were the ICT industry, e-commerce activities, digital distribution of goods and services.

2.4 Big Data

Gartner defines big data as data that has three attributes, namely volume, variety, and velocity.

Volume is related to the size by which data growth reaches volumes of tens of terabytes to several petabytes. Variety means the type or type of data, which includes various types of data both data that have been structured in a database or unorganised data in a database such as text data on web pages, voice data, video, click streams, log files, and etcetera. Velocity is the speed at which data is generated and how fast the data must be processed in order to meet user requests.

2.5 Cloud Computing

Cloud Computing is a combination of the use of computer technology and cloud-based Internet Storage development. Cloud Storage is a metaphor of the internet, as storage media are often depicted on computer network diagrams. Cloud Computing applies a computational method. Namely, capabilities related to information technology are presented as a service. Users can access cloud computing via the internet without knowing what is inside, expert with it, or have control over technological infrastructure (Santiko, Irfan, Rosidi, Wibawa, and Seta, 2017).

3 METHODOLOGY

The research design used in this study is a descriptive analysis method. The descriptive analysis describes the world or phenomenon. Descriptive analysis is used to answer questions about who, what, where, when and to what extent. The purpose of descriptive analysis is to identify and describe trends and variations in populations, make new measurements of crucial phenomena, or describe samples in studies aimed at identifying causal effects. Descriptions play an essential role in the scientific process in general and educational research in particular.

Questionnaires are used to collect formal data from accountants via Google form. Samples were chosen based on purposive sampling with the criteria graduated from Accounting major and works as educator accountants, internal accountants, public accountants, government accountants/auditors, management accountants, business analysts, entrepreneurs and corporate finance. Data collected from the final survey was analysed.

4 RESULT AND DISCUSSION

4.1 Result

Respondents are accountants who work as educator accountants, internal accountants, public accountants, government accountants/auditors, management accountants, business analysts, entrepreneurs and corporate finance. Questionnaires were sent to more than 5 Whats Up Accountant Groups. The number of accountants who became respondents was as many as 286 people.

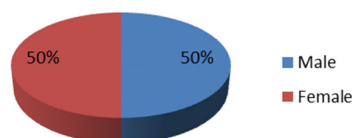


Figure 1: Sex of Respondents

Figure 2 shows that of 286 accountants invited to participate, 78 submitted surveys for a response rate of 27,27%. Of the 78 respondents, 39 (50%) reported their gender as female and 39 (50%) as males.

Table 1: Gender and Type of Accountant.

Profesi	% Total	% Male	% Female
Educator Accountant	50%	35%	15%
Internal Accountant	4%	3%	1%
Public Accountant	10%	6%	4%
Government Accountants / Auditors	15%	14%	1%
Management Accountant	0%	0%	0%
Business Analyst	4%	3%	1%
Entrepreneurs	4%	4%	0%
Corporate Finance	13%	5%	8%

Table 1 shows that the majority of respondents in this study were accountant educators consisting of 35% men and 15% women. The least respondents were business analysts and internal accountants. Each consists of only 7% of men and 0 women.

Table 2: Gender and Age of Respondent.

Age of Responden	% Total	% Male	% Female
20 - 30 tahun	24%	9%	15%
31 - 40 tahun	26%	10%	15%
41 - 50 tahun	41%	24%	17%
51 - 60 tahun	9%	6%	3%
> 60 tahun	0%	0%	0%

Table 2 shows that most respondents in this study were in the age 41-51 years old of 24% men and 17% women. The fewest respondents were in the age 51-60 years old. It consists of 6% of men and 3% women.

4.1.1 The Effects of the Industrial Revolution on Accountants

Based on the data obtained from the questionnaires, the outline can be presented major findings obtained are:

Approximately 47% and 49% of respondents agreed and strongly agreed respectively due to the emergence of the industrial revolution 4.0, the workings and practices of accountants need to be changed to improve service quality and global expansion through online communication and the use of cloud computing (Figure 2).

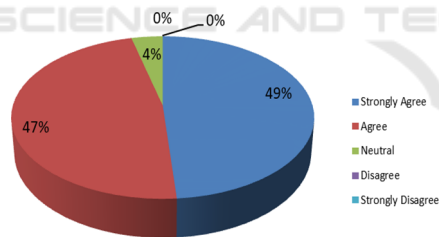


Figure 2: Changes in Accountants' Work Methods and Practices

Figure 2 also shows that 4% of respondents were neutral that the workings and practices of accountants need to be changed to improve service quality and global expansion through online communication and the use of cloud computing.

Approximately 60% and 36% of respondents agreed and strongly agreed respectively that in the Industrial 4.0 era, information technology which was defined as hardware and software now turned into digital data technology (Figure 3).

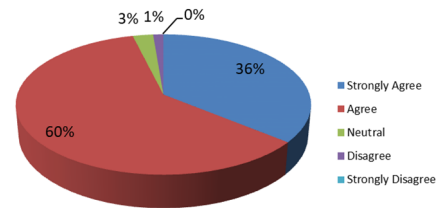


Figure 3 Changes in information technology from hardware and software to digital data technology.

Figure 3 also shows that 3% of respondents were neutral with the statement that information technology has changed from hardware and software to digital data technology and the other 1% of respondents disagree.

Approximately 41% and 55% of respondents agreed and strongly agreed that in the Industrial 4.0 era, accountants should have the ability in terms of data analysis, information technology development, and leadership skills. (Figure 4).

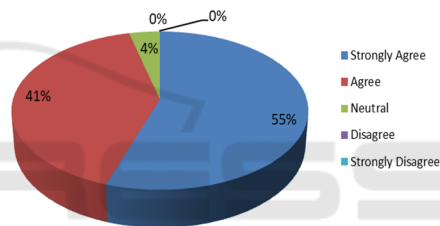


Figure 4: Accountant's ability in data analysis, data analysis, IT development, and leadership skills.

Figure 4 also shows that 43% of respondents were neutral that the accountants should have the ability to data analysis, information technology development, and leadership skills.

Approximately 63% and 30% of respondents agreed and strongly agreed that the Industrial Revolution 4.0 resulted in the full integration of information, communication and automation technology in future factories (Figure 5).

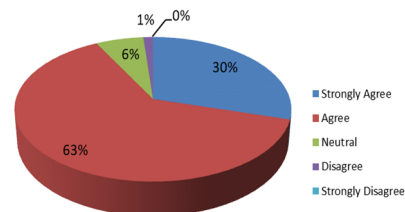


Figure 5: Industry 4.0 led to full integration of IT, communication and automation in the future factory.

Figure 5 also shows that 6% of respondents were neutral and 1% disagreed that Industry 4.0 is causing full integration of information, communication and automation technology in future factories.

Approximately 51% and 44% of respondents agreed and strongly agreed that as technology became more sophisticated and present in all aspects of the business, the role of accountants shifted towards a more strategic and analytical role (Figure 6).

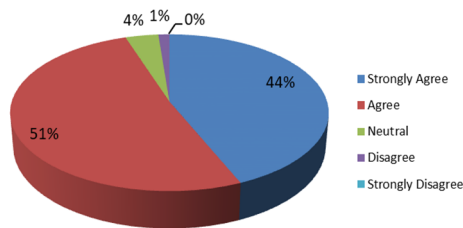


Figure 6: The role of accountants shifted towards a more strategic and analytical role

Figure 6 also shows that 4% and 1% of respondents were neutral and disagreed that the role of accountants shifted towards a more strategic and analytical role, and the other 2% of respondents disagree.

Approximately 46% and 53% of respondents agreed and strongly agreed that accountants must have the expertise needed in the industrial era 4.0 such as the use of AI-based and Big Data technology, the ability to analyse data, understanding of customer needs, the ability to use data forms, interpret data to produce information which is more meaningful for decision making (Figure 7).

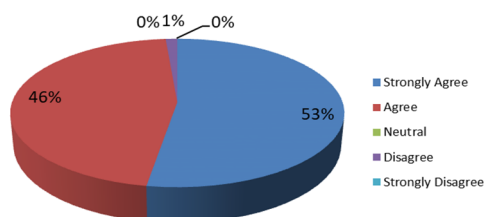


Figure 7: Accountants must have the expertise needed in the industrial era 4.0

Figure 7 also shows that 1% of respondents disagree that accountants must have the expertise needed in the industrial era 4.0.

4.1.2 the Role of Information Technology in Accounting Profession in the Industrial Age 4.0

Approximately 36% and 59% of respondents agreed and strongly agreed that the Industrial Revolution 4.0 was the convergence of information technology into the industrial world. Through the Internet of Things (IoT) and Big Data, technology can be used to collect and process data used by accountants in their function as financial information provider experts (Figure 8).

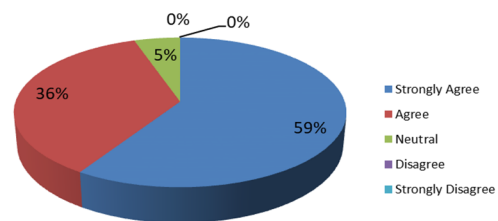


Figure 8: Industrial Revolution 4.0 was the convergence of IT into the industrial world

Figure 8 also shows that 5% of respondents were neutral that the Industrial Revolution 4.0 was the convergence of information technology into the industrial world.

Approximately 46% and 30% of respondents agreed and strongly agreed that the use of Robotics and data analytics (big data) takes over the necessary work done by accountants (records transactions, processes transactions, sorts transactions). This use increases the efficiency and effectiveness of work (Figure 9).

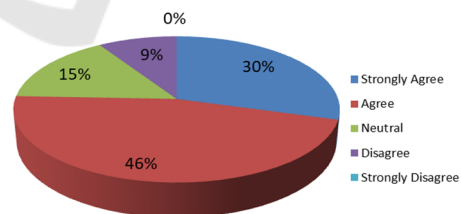


Figure 9: the use of Robotics and data analytics (big data) increase the efficiency and effectiveness of work

Figure 9 also shows that 15% and 9% of respondents were neutral and disagreed that the use of Robotics and data analytics (big data) increase the efficiency and effectiveness of works while 10% of respondents disagree.

Approximately 55% and 26% of respondents agreed and strongly agreed that technology in Industry 4.0 allows accountants to obtain data that

previously could not be obtained in real-time, through embedded sensors (Figure 10).

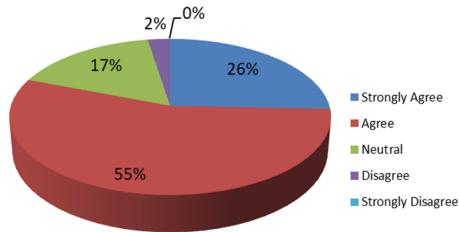


Figure 10: Technology in Industry 4.0

Figure 10 also shows that 17% and 2% of respondents were neutral and disagreed that the use of Robotics and data analytics (big data) increase the efficiency and effectiveness of work while 3% of respondents disagree.

Approximately 56% and 35% of respondents agreed and strongly agreed that Technology in Industry 4.0 improves data quality, namely through better timeliness and accuracy and greater detail to improve efficiency, the certainty of data and other decision-making goals (Figure 11).

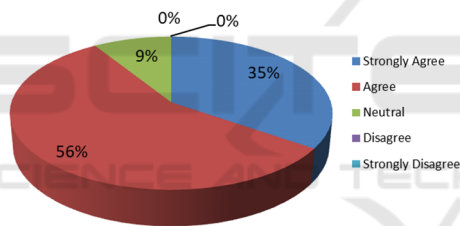


Figure 11: Technology in Industry 4.0 improves data quality

Figure 11 also shows that 9% of respondents were neutral that the use of Robotics and data analytics (big data) increase the efficiency and effectiveness of work.

11. Approximately 60% and 26% of respondents agreed and strongly agreed that the use of information technology (IT) in the audit is getting wider, namely with general audit software that is increasingly being used by public accounting firms to increase productivity in carrying out audit work (Figure 12).

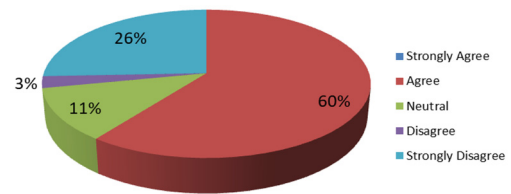


Figure 12: The use of IT in the audit

Figure 12 also shows that 11% and 3% of respondents were neutral and disagreed that the use of information technology (IT) in the audit is getting wider.

12. Approximately 64% and 27% of respondents agreed and strongly agreed that non-financial data that can be used to assist specific decisions and provide the big data analytics could provide new sources of assessment and hard evidence needed by management accountants in carrying out their work (Figure 13)

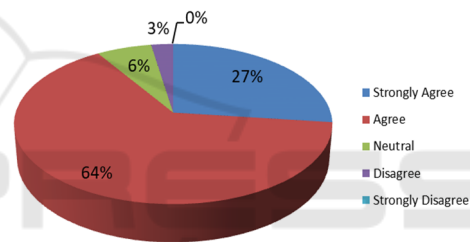


Figure 13: Non-financial data that can be used to assist specific decisions and provide big data analytics

Figure 13 also shows that 6% of respondents were neutral that non-financial data that can be used to assist specific decisions and provide big data analytics, while 3% of respondents disagreed.

4.2 Discussion

Based on data obtained from the result section shows that industrial revolution 4.0 is the convergence of information technology to the industrial world. The industrial 4.0 era produced developments in digital technology such as the Internet of Things, Cyber-Physical Systems, Artificial Intelligence, Cloud Computing, and Big Data. Industry 4.0 produces full integration of information and communication technology, resulting in automation technology in future factories. Smart robots and Artificial Intelligence will largely replace personal work. All business transactions will be carried out automatically and produce a substantial volume of transaction data that grows at high speed (big data). Big data requires

cloud computing as an infrastructure to support it. The role of accountants will shift from a bookkeeper to an expert provider of financial data or as a data analyst. Accountants must be able to analyse customer needs, financial data, and interpret data to be more meaningful for decision making. Accountants must be able to understand technology in order to carry out future tasks.

The result section also shows some capabilities that accountants should have in this industrial era include data science, data analysis, coding/programming, real-time accounting, and understanding the Artificial Intelligence model in order to adapt with technology applied in the digital era. In addition, accountants must also have the right attitude and mentality and be critical of technological developments. Accountants should try to learn new technology, attend training to obtain the required competencies and certifications to be able to survive in this industrial era.

5 CONCLUSIONS

All business transactions will be carried out automatically and produce a substantial volume of transaction data that grows at high speed (big data) and requires cloud computing as infrastructure to support it.

The role of accountants will shift from a bookkeeper to an expert provider of financial data or as a data analyst. Accountants must be able to analyse customer needs, financial data, and interpret data to be more meaningful for decision making. Accountants must be able to understand technology in order to carry out future tasks.

Some capabilities that accountants should have in this industrial era include data science, data analysis, coding/programming, real-time accounting, and understanding the Artificial Intelligence model.

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