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Cloud Accounting: The Development Accounting Information System in Industry 4.0 in Indonesia

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ABSTRACT

The digitalization era of Industry 4.0 in Indonesia has significance roles in business sectors and accountancy in which they are progressing and developing. Future accountants are expected to equip upgraded-skills due to the globalization and digitalization of Industry 4.0. The trend of emergence technologies in accounting information system is Cloud Accounting. Hence, the digital transformation of the accounting information system is important for accountants to be fully aware that traditional accounting system will be gradually replaced to more digitalized accounting system. This paper focuses on the needs of Cloud Accounting and the extent of the development of accounting information system in Industry 4.0 in Indonesia. The research methodology of the study is qualitative analysis. Interview, questionnaire and focus group discussion were conducted to gather information from views of accounting business providers, practitioners, and accountants. Published journals of related topic were also examined to get viewpoints of the researchers. The results show that 90% of the respondents agree that accounting information system has evolved to more digitalized accounting system in Industry 4.0. Future accountants will have more challenging accountancy roles due to the digitalization on accounting information system in which digitalized accounting information system will take over with the advancement of technology through education and higher education should prepare future accountants by knowledge of Cloud Accounting in the curriculum of accounting study program

Keywords: Accounting information system, Cloud Accounting, Digital Transformation, Industry 4.0

INTRODUCTION

Fourth generation of industrial revolution become a major leap forward in the industrial sector where the information and communication technology are fully utilized. Neither production process and across industries value chain creates new business models on a digital basis to achieve higher efficiency and better product quality. However, some companies still use

traditional methods and less utilize the technology in their business process. Therefore, it hampers the company's performance which data processes are relatively slow, prone to errors thus, lead to incredible information and the occurrence of misuse or fraud. One of the processes that can help to develop the accuracy of information and improve decision-making by implementing accounting information system. Accounting information system defines as collecting, recording, storing, and processing accounting to produce information for decision makers [1]. This involved people and technologies to collect, record, store, and process data to produce the information that needed to make decision. Since industry 4.0 impact to all business sector, therefore, accounting information system is evolved gradually from traditional to technology-based system [1] [2]. Furthermore, the evolution of accounting changes the expectation of the clients and the accountant. People ready to do less paperwork as they need to focus on what they are passionate on the things they want to do. This also means that people will need to depend on technology that will help their work in a more integrated method. One of current technological trends is the fast development of cloud technology [3]. Cloud is web-based storage data which can be accessible anywhere anytime with internet connection. Cloud accounting is way to access and process data online using web browser. Data is stored in the cloud on a remote server that is not on the company's site. Traditional accounting runs on desktop computer with software installation while cloud accounting is a service provider which requires no installation and maintenance software on desktop computer. Cloud accounting requires less maintenance, completes backup, updates financial information automatically and provides financial reporting in real-time. Working on the cloud will give the opportunity to save the time that we spend working on tedious, time-consuming tasks and allow us to focus on growing businesses [4]. Hence, cloud accounting is the transformation of the utilization of accounting information system for all businesses.

Indonesia has been entering the new era of Industry 4.0 which marked by the increasing connectivity, interaction, as well as more convergent people, machines, and other resources as the result of information and communication technology advancement [5]. The readiness of Indonesia to face the challenges of Industry 4.0 is supported by the roadmap of Industry 4.0. Making Indonesia 4.0 which was officially launched by the Indonesian President Joko Widodo in 2018 that stated the industry 4.0 has given Indonesia an opportunity to achieve the highest rank of global economies by 2030 [7]. Although Indonesia is already in the stages of industry 4.0, there are facts based on observation that most businesses and companies are still used to working with traditional bookkeeping while business demands are more heightened. It is important to understand the importance of cloud accounting in business context to improve and enhance the information system speed which can be fully managed and easily accessible by accountants. It is also crucial to convince people to switch to cloud accounting rather than conventional accounting when the development of cloud-based system application in Indonesia is happening and progressing. Therefore, it is necessary to conduct the research by collecting studies on the development and the needs of cloud-based system application for accounting in Indonesia. In addition to this, one general research question arises why cloud accounting is needed to the industry 4.0. Based on this research question, two research objectives come out from the study, firstly, to identify the needs of cloud accounting system adoption in Indonesia and secondly, to determine the extent of development of cloud-based system application in Industry 4.0.

LITERATURE REVIEW & HYPOTHESIS DEVELOPMENT

Industry 4.0

The Industrial Revolution 4.0 has impacted changes towards work in humans, machines, technology, and processes in various professional fields, including the accounting profession. These changes also have a significant impact on the development of accounting. [8] emphasized that people will be more connected to mobile devices with unlimited access to knowledge, processing power and storage capacity. According to [9], as the technology is advancing in Industry 4.0, it will gradually impact on accounting practices. Accounting practices will evolve through the deployment of industry 4.0 and accountants will be facing a bigger challenge in the digitalized accounting system. Industry 4.0 has the role of digital transformation to business and social networks. All networks and interfaces will be in the range of IoT, services, data, and people in the future. There are four characteristics of Industry 4.0 which have changed the capacity in industry and manufacturing: vertical networking, horizontal integration, through-engineering across the entire value chain and exponential technologies [10]. Accurate and reliable analysis are the two occurrences in the revolution of Industry 4.0. As machines will eventually replace humans in factories and businesses, it will also impact on the role of accountants who will face challenge of efficiency in human resources and focus on the long-term strategies [11].

Accounting Information System & Cloud accounting

Information is data that has been managed and processed to give meaning and improve the decision-making process [12]. As it plays its role, users make better decisions as to the quantity and quality of information improvement. Information is also data sets which have important values that can be as a support to be used as guidelines for decision-making in businesses. [13] defines that accounting information system is a system that collects and processes data transactions and submits financial information to internal and external parties. [14] Accounting information system is a computer-based method to trace accounting activity with the application of IT resources. According to [15], the information system is the set of formal procedures by which data are collected, processed into information, and distributed to users. It consists of three major subsystems namely, Transaction Processing System, General Ledger System and Financial Reporting System and Management Reporting System. In addition to this, accounting information system focuses on five cycles such as revenue cycle, expenditures cycle, human resources cycle and production and finance cycle [16]. All the transactions in the cycles will be saved in the database of accounting information system

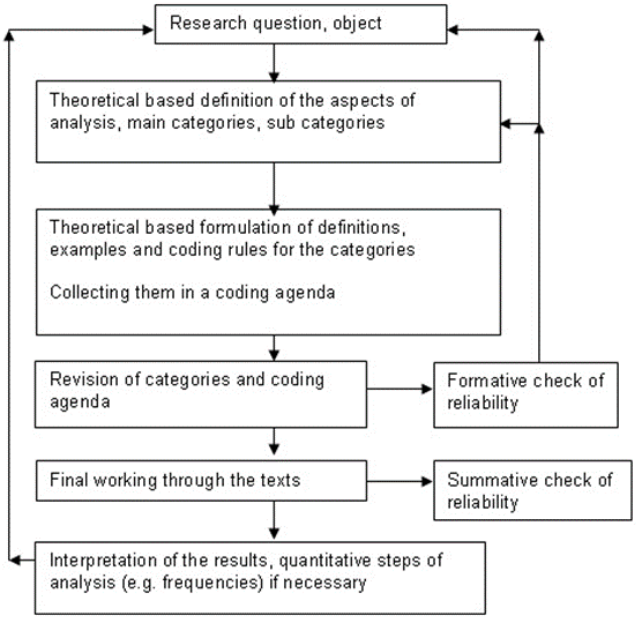
In order to provide financial information, companies apply accounting information system in the cloud system which means all the financial transactions are recorded and stored on the internet and can be accessed anywhere and anytime through service providers of cloud application. [17] Cloud system or cloud computing is on the demand delivery of computing services that do not need the active management by the users of the service. Cloud accounting is the transformation of accounting applications and modernized-business environment solution [18]. In addition, cloud accounting is considered in business model as a service. Cloud accounting is merely named as ‘online accounting. In addition, cloud accounting is the utilization of cloud computing in internet to build a virtual accounting information system which is cloud computing together with accounting become cloud accounting [4]. At the same time, Cloud accounting provides greater access to real-time data for businesses anywhere whereas business information is accessible as long as there is internet access [5].

Cloud accounting is the combination of cloud computing and accounting by utilizing web server to construct virtual-accounting-information-system [19]. According to [20], cloud accounting services consists of three models namely, Infrastructure as a Service (IAAS), Platform as a Service (PAAS) and Software as a Service (SAAS). IAAS typically provides access to network features, virtual computers and dedicated hardware, and data storage space, PAAS focuses on application deployment and management. It does not need to manage infrastructure such as hardware and operating systems and it is more efficient and SAAS is a form of complete cloud computing service, run and managed by the service provider. This cloud service is managed by third party for the service and infrastructure. [21] Cloud technology has four types of cloud deployment models. The deployment models are differentiated based on type of implementation, type of hosting and authorized access such as, public cloud, private cloud, hybrid cloud and community cloud. Public cloud is located on the premises of the CSP that offers cloud services over the internet. Resources are shared between multiple users and usually it is known as multitenant cloud. Private cloud is not shared by any other individual/organization. It has the highest security and control level when private network is being utilized. It is also known as Internal Cloud. Hybrid cloud is the combination characteristics of Public Cloud and Private Cloud. It allows data sharing and applications between Public and Private Cloud environments and community cloud is shared by users of the same industry or by those who have common goals. It is built after the computing needs of a community due to some factors including compliances and security policies.

METHODOLOGY AND RESULT ANALYSIS

Methodology

This research uses qualitative analyses by using five methods as research framework namely: ethnography, narrative, phenomenological, grounded theory, and case study [22]. The unit analysis of the study is accounting service providers and cloud-based system located in Tangerang and Jakarta. It analyzed the needs of cloud accounting adoption in Indonesia and the development of AIS in Industry 4.0 through in-depth interviews and focus group discussion to share their experiences and opinions. The question develops that relate to research objective. Such questions are, what is industry 4.0 in accounting the impact of industry 4.0 towards accounting and role of accountancy, will Cloud Accounting replace the traditional accounting in the future in Indonesia, is Cloud Accounting important in education, how fast Indonesia is catching up with cloud technology. The questionnaire also was developed in order to support qualitative finding. The results of data collection were explored through summarizing approach. The final stage was interpretation of the result to achieve objective finding of qualitative research.



Source : Cresswell [22]

The research comes up with two parts of findings through Questionnaire and Focus Group Discussion. The researchers used Focus Group Discussion (FGD) as "a way of collecting qualitative data, which essentially involves engaging a small number of people in an informal group discussion (or discussions) [23]. Focus group discussion also considered open forum to research participants, and this setting is useful for participants to discuss perceptions, ideas, opinions, and thoughts [24]. First finding is from questionnaires distributed to 100 respondents randomly to accountants, practitioners, academics, clients, accounting associations and service provider. Questionnaire survey was divided into 4 scales from "Strongly Disagree (SD)", "Disagree (D)", "Agree(A)", "Totally Agree (TA)" and it was distributed to 100 randomly accountants, practitioners, academics, clients and service provider including for non-cloud accounting practitioners

Result Analysis

Based on Focus on Group Discussion, the study finds six points exploration. Firstly, The evolution of AIS in Industry 4.0. Secondly, The impact of Industry 4.0 towards accounting and role of accountancy. Thirdly, The importance of Cloud Accounting for accountants. Fourth, Accurate as the Example of Cloud Accounting Service Provider. Fifth, Pros and Cons of Cloud Accounting. Finally, the Importance of Cloud Accounting in the Accounting Curriculum. Table 3.1 below shows result qualitative findings on FGD.

Table 3.1. Qualitative Findings on FGD

Item	Exploration	Finding
1	The evolution of AIS	Accounting information system has evolved into digitalized system impacted from Industry 4. 0 which accountants will not do the double entry manually aligns with the advancement of technology. Traditional accounting will gradually be replaced with automated accounting system supported by the technology in the digitalization era such as tools for invoicing will be done by computers.
2	The impact of Industry 4.0 towards accounting and role of accountancy	The technology impacted by the fourth industrial revolution in the perspective of accounting will be such as: Data Analytics, AI, IoT, Blockchain, Cloud Computing. In role of accounting, the most impacted in accounting from Industry 4.0 will be Data Analytics or Big Data. Data analytics is related to relational databases in accounting information system whereas historical data and accounting transactions are managed and analysed including auditing. Another important impact of Industry 4.0 in the role of accountancy is Cloud computing. Cloud Computing is accounting information system using cloud-based technology as the cloud centre, where users can access, manage, and audit the data if it is connected to internet
3	The importance of Cloud Accounting for accountants	The transition from desktop accounting to cloud accounting is happening and it is crucial for accountants to prepare this challenge. Accountants who have not been adjusted to the technology stack will face more difficulties in their roles comparing to accountants who have aware of the transitioning due to globalization and digitalization era. Accountants need to be equipped with hard skills analytics such as SQL Query, Tableau, Power BI to be able to analyse data in large number.
4	Accurate as the Example of Cloud Accounting Service Provider	Accurate as accounting service provider stated that as Indonesia is also catching up with the advancement of technology, cloud-based accounting information system will be increasingly demanded and accessed by most users in businesses whether they are from small business or large companies. Accurate accounting service provider is optimistic that even though Accurate is still considered as on-going development of technology impacted from Industry 4.0, it is unquestionably that not only technology of cloud-based accounting information system will be accessed and utilized by public users or businesses, but it will develop soon to android platform with just simply 'click by finger'
5	Pros and Cons of Cloud Accounting	Cloud-based accounting information system has given beneficial such as accuracy data, faster data entries and up-to date data, integrated and centralized system, easy-to-access mobile, human resources efficiency and cost saving. However, it has challenges in security issues such as account hijacking, hacked API and interfaces, broken authentication, compromised credentials and data breaches including the stable internet connection.
6	The Importance of Cloud Accounting in the Accounting Curriculum	Accountants with basic IT knowledge are crucial to utilize accounting online in maximum capacity. It is unarguably that future accountants should have knowledge of IT and analytics to perform better in their roles utilizing cloud-based accounting. Accounting students should be given knowledge of cloud technology concept and the difference between on-premises accounting and online accounting although both share the same business aspects. Accounting students should also be provided with hands-on practices in cloud accounting and knowledge in relation to the collaboration between web-based accounting with other technology in Industry 4.0 such as Artificial Intelligence or Data Analytics.

To support finding qualitative study, questionnaire survey was conducted. The questionnaire survey distributed to accountants, practitioners, academics, clients, and service provider including for non-cloud accounting practitioners The result shows that ninety percent out of hundred percent have supported and given their answer to the needs of cloud accounting in Indonesia and the transformation of AIS in industry 4.0. Table 3.2 shows result descriptive analysis from survey.

Table 3.2. Descriptive Analysis

No	Question	Survey Finding (%)	
		Agree	Disagree
1	Cloud Accounting is the web-based application of accounting software which can be accessible anywhere anytime with internet connection.	64	27
2	Cloud Accounting will gradually replace traditional accounting in Industry 4.0. Traditional accounting is what accountants do on desktop computer with software installation while Cloud Accounting is a service provider which requires no installation and maintenance software on desktop computer.	51	31
3	Indonesia is accelerating digital transformation as Industry 4.0 has big impacts to all business sectors. Some impacts of business transformation are Big Data and Data Analytics which indirectly requires the changes in the role of accountancy.	47	40
4	Cloud Accounting comes with automation capabilities that allow bookkeepers or accountants, to maximize efficiency and save more time, enable them to devote more time and resources to the growth of the business	54	35
5	Cloud Accounting supports green environment program and has the ability to integrate with other cloud solutions which will enhance the power and improve the efficiency of cloud accounting technology stack	54	33
6	Cloud Accounting has challenge concerns of security threats such as account hijacking, hacked API and interfaces, broken authentication, compromised credentials and data breaches	50	34
7	More expertise in cloud accountants is sought for and faced by businesses today. As the increasing workload being stored in the cloud, it becomes essential for businesses to provide additional training for accountant staffs	50	35
8	Cloud Accounting is part of big investment for a business. Another challenge in Cloud Accounting is cost management as sometimes it is hard to define and predict costs and quantities	34	35
9	Accountants will find Cloud Accounting can help to manage their bookkeeping easily, automatically updates financial data and provide real-time financial reporting	58	28
10	Accountants must prepare and familiarize themselves to be equipped with cloud platform services to assist the business process to achieve their goals	53	36

DISCUSSION AND CONCLUSION

Discussion

Based on interview from FGD shows that accounting information system have evolved into digitalized system impacted from Industry 4. 0 which accountants will not do the double entry manually align with the advancement of technology. Traditional accounting will gradually be replaced with automated accounting system supported by the technology in the digitalization era such as tools for invoicing will be done by computers [25]. The transition from desktop accounting to cloud accounting is happening and it is crucial for accountants to prepare this challenge. Accountants who have not been adjusted to the technology stack will face more difficulties in their roles comparing to accountants who have aware of the transitioning due to globalization and digitalization era [26]. Accountants need to be equipped with hard skills analytics such as SQL Query, Tableau, Power BI to be able to analyse data in large number. One of the examples of cloud accounting which has been recognized nationally in Indonesia is Accurate. Accurate is web-based accounting information system services which has two products: Accurate Desktop and Accurate Online. Accurate Desktop is manual accounting information system run on desktop installation while Accurate online is accounting information system run on web-based using cloud technology and available as accounting tool application for merchandising, services, and manufacturing sectors. The results from FGD reveal that accountants with basic IT knowledge are crucial to utilize accounting online in maximum capacity. It is unarguably that future accountants should have knowledge of IT and analytics to perform better in their roles utilizing cloud-based accounting. accounting students should be given knowledge of cloud technology concept and the difference between on-premises accounting and online accounting although both share the same business aspects. Accounting students should also be provided with hands-on practices in cloud accounting and knowledge in relation to the collaboration between web-based accounting with other technology in Industry 4.0 [27].

Furthermore, the finding of qualitative study is supported by quantitative analysis. It shows that 90% of the respondents agreed that Cloud Accounting is digital transformation revolution of accounting from traditional to more autonomous accounting information system impacted of Industry 4.0 towards businesses and role of accountancy. It is undoubtable that accountants must get to familiarize with cloud accounting for the business goals in current time and for the future. The evolution of digital transformation in accounting information system will speed up the accountant's work in more accurate, efficient, and real-time reporting [26]. Although Cloud Accounting still has issues in security and cost management, it is not limited to the possibility of accountants to upgrade their skills to the cloud-based accounting system.

CONCLUSION

The evolution of accounting information system is progressing, and Industry 4.0 has big impacts on role of accountancy as well. The advancement of technology in Indonesia is also happening in alignment with the road map of Industry 4.0 from 2018. Accountants will face a more advance technology towards the improvement and updated accounting system in Industry 4.0. One of the most emergence technology in accounting information system is Cloud Accounting. Business owners and accountants can utilize this system as accounting tool application to help and support the bookkeeping management provided by accounting service provider.

The importance of Cloud Accounting adoption into accounting curriculum for accounting students is emphasized in the study findings. Accounting students must upgrade their skills to be equipped with accounting digital transformation knowledge and practices. The awareness of evolution of accounting information system impacted from Industry 4.0 shall be embedded in curriculum of accounting study program. Cloud accounting is required to be embedded in the curriculum of accounting study program since it has become a requirement skill for future accountants, therefore the adoption of Cloud Accounting model in the learning development of accounting students are necessary and the knowledge of evolution of accounting information system shall be delivered to accounting students

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