

Accounting and Its Challenges in the New Era

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Abstract—This study aims on providing the impact of industrial revolution 4.0 on accounting systems. This review paper provides the challenges into 4 (four) issues that are real-time accounting, big data, intellectual capital (IC) and accounting practitioners. This study elaborates that the existence of disruptive era changes the traditional accounting by pushing it to declare the real-time accounting and not only rely on the periodic information, as the revolution deals more with high-volume of data which is called big data that require an up to date information in a complex set of software. The new accounting also has to deal more with how to process the huge number of data that mostly unstructured and they have to be reported in the financial reports in order to be an important information to make a decision. Moreover, the new accounting has a challenge of measuring the intangible assets including IC that will be a majority assets of high-tech companies in the new era. All issues have pushed the accountants to improve their capability and knowledge not only in the traditional accounting but also in business specialist and IT.

Keywords—*accounting; big data; real-time accounting; intellectual capital; accounting practitioners*

I. INTRODUCTION

Industrial revolution 4.0 has been identified as a comprehensive digitalization and linkage of production processes, starting from the customer's order, through the creation of production processes, to downstream product services [1]. The context of Industry 4.0 is not only the maximizing the IT support process, but also a self-organized value-creation networks leads the economics interactions.

The key element of Industry 4.0 is digitalization in all business operation and big data is being popular tool in offering a new ways of optimization [2]. Bienhaus and Haddud found that digitization of procurement process provides benefits to the business activities such as supporting daily business and administrative tasks as well as decision-making process [3]. Digitalization also provides an opportunity to create new business models by producing new innovation in products and services. Strange and Zucchella briefly described that the implementation of high level of technology might disrupt the global value chains (GVC) in four specific issues that are the existence of the Internet of things, big data analytics, robotics and 3-d printing [4]. The manufacture companies worldwide consider the challenges in the future ahead, such as the increase of high-skilled labour demand and the unclear

distinction whether their output is considering as a product or a service. Since the implementation of Industry 4.0 requires to adopt an advanced technology, several industries such as automotive in China acts positively although requires more a guidance for the management [5]. The China automotive industry believes that adopting the advanced technology provides a great advantage to their companies therefore, they are eager to perform.

The development in all industrial sectors in disruptive era impacts to the accounting rules and accounting profession. Since the digitalization plays an important part on the business, accounting will deal with more intangible assets, human resource and technology that might swift the concept of traditional accounting. Accounting profession have to deal with the development of Internet society when people do not need accountant as well as other professionals such as lawyer, doctor, teachers, and many more [6]. Since the accounting have to deal with big data and technology, it swifts the rules of accounting from conventional to the modern one. The swift of accounting practices will be the focus on this study by providing the literature review including the debate.

II. LITERATURE REVIEW

The development of business model requests several issues in accounting to adjust their concept. In this study, 4 (four) points will be discussed, that are the real-time accounting, big data, intellectual capital and accounting practitioner.

A. Real-time Accounting

According to CPA Australia, accounting is a process of recording, processing, analysing, and summarising transactions of a business and communicating that information to decision making [7]. The financial reports traditionally present information based on the historical data that useful for decision making for stakeholders, such as potential investors, creditors, suppliers and customers [8]. Since the business is entering the new economy, the information based on the historical data might have less attention. The business community in the new era of the real-time enterprises requires more information that is up to date that capture a complex set of enterprise software products and services. They require a new business accounting that is called a real-time accounting [9].

B. Big Data

According to Gartner, Inc. big data is high-volume, high-velocity and high-variety information assets that demand cost-effective, innovative forms of information processing for enhanced insight and decision making [10]. Facebook, Ebay, Youtube, Instagram, twitter, Snapchat are the examples of big data technology. Gandomi and Haider also described that high-volume refers to the magnitude of data, since a new business model works with a huge amount of datasets, and several experts mentioned that datasets over one terabyte (equal to 1500 CDs/ 220 DVDs/ 16 million Facebook photographs) as a big data. The high-velocity refers to the rate at which data are generated and the speed at which it should be analyzed and acted upon, whereas the high-variety refers to the structural heterogeneity in a dataset. The existence of big data in the disruptive era is undeniable. It changes the information life cycle from the traditional to the modern one by dropping several process such as acquisition, classification, conversion, indexing and searching as well as adding several process, such as collection, sifting, synchronization, pre-processing and monitoring [11]. The changing of the life cycle information to the big data analysis required modification of the assessment, storage and analytics.

The existence of big data also changes accounting process significantly. Since the big data mostly consists of unstructured data which generated from audio, video and image, the traditional software and database system of accounting cannot analyse properly to be created financial reports [12]. Big data changes the perspectives of accounting by providing real-time accounting and leaves a periodic basis [13]. IT is possible that in the future, the accounting data will not be stored but will be implemented in the system that need to be accommodated for in an organization's accounting information system.

C. Intellectual Capital (IC)

IC is defined as the possession of knowledge, applied experience, organizational technology, customer relationships, and professional skills with a competitive edge in the market [14]. Sydler breakdowns IC into three categories, which are human capital, structural (organizational) capital, and relational (customer) capital [14]. Human capital consists of knowledge, expertise, skills, experience, competence, creativity, teamwork capacity, loyalty, training and education, problem-solving capability, attitude, loyalty and the motivation of people. Structural capital consists of intellectual properties consisting of patents, licenses, trademarks, etc. Relational capital is the value of a firm's relationships with people and organizations with which it conducts business.

D. Accounting Practitioners

Traditionally the accountant has roles handling data transaction and provide financial reports [15]. The accountants are responsible in inputting data, processing and integrating the data to be financial report that will be useful for all stakeholders. Both managerial and non-managerial accountants should have certain degree of knowledge in accounting in order to be able to analyse the accounting information. The rise of technology replaces several job of accountants, the demand of accountant is on risk. Chen et al. also described that the data

input can be conducted automatically, and under enterprise resource system, many report produces automatically which were previously prepared by accountants using software [15]. The technology also potentially replaces the process of audit trail. Therefore, there is a debate in the existence of accounting professionals in the future.

III. METHODOLOGY

This study uses narrative review approach that comparing and summarizing several literatures which consist of theories and models in order to gain a deep understanding of new roles of accounting in digital era.

IV. RESULTS AND DISCUSSION

Several arguments mentioned that traditional accounting system does not work well with digital system since the digital system requires more intangible investments than physical assets that potentially are difficult to measure and report in the financial reports [16]. The debate in measuring and reporting intellectual capital requires companies to provide more information that reliable for all investors. Several of disclosure types and lack of awareness of intangible assets lead the management to provide uninformed value that might bring a significant different in decision making [17]. One of the alternative is following the IFRS (International Financial Report Standard). IFRS mentioned that reporting IC in the financial report is voluntary if the company fail to recognize the IC as their intangible assets [18]. Liou et al. also mentioned that the International Accounting Standard No. 38 (IAS 38) states that intangible assets require companies to recognize intangible assets whether purchase or self-created if it is probable that the future economic benefits that are attributable to the asset will flow to the entity and if the cost can be reliably measured [18]. The main point is placed on the research and development issues. Research can be classified as cost and the development can be capitalized only after technical and commercial feasibility of the asset for sale or use have been established. Adopting IFRS increase the disclosure of IC in the financial report especially for high-tech companies in UK.

On the other hand, the adoption IFRS might not be a solution since the representing an intangible asset might not help investors assess the value of intangible assets [19]. Some expert also argue that the answers of IC measuring is not answered yet and they are pessimistic that the accounting regulations will take into account the possibility to capitalize the intangible assets [20]. IFRS allows company to capitalize their intangible assets that classified as development cost if the cost is spent after technical and commercial feasibility for sale or after the establishment [18]. The regulations of measuring intangible assets including IC varies in several countries. International Accounting Standard Committee (IASC) mentioned that there is no exceptional treatment of writing off goodwill against reserves in business combination and UK is one of countries that enacted this rules, whereas Denmark, Germany, The Netherlands and Switzerland still implement the old rule [17].

The debate on measuring intangible assets in the current digital ecosystem is more likely focus on the Big Data. As mentioned earlier, the structure of data set from big data that consist of audio, picture, video will be hard to be recorded on the traditional accounting system. Generally Accepted Accounting Principles (GAAP) is more likely being a static principle that are not dynamic to capture the need of reporting the big data [21]. Big data requires accounting practices to adjust their system in order to capture the huge set of data and unstructured events and report them in the financial reports which will be beneficial to the investors and all stakeholders [13]. Companies that are familiar to engage in big data analysis and visualization also have to improve the existence of human resource in their organization to enhance their knowledge of new accounting system and no longer rely on the manual entries.

The development of real-time accounting that have to face more the existence of big data and new measurement of intellectual capital (IC) requires an accountant that are not only expert in accounting but also has an expertise as business specialist [6]. An accountant should have skills as advocates in information system design and maintenance for decision makers. The aims of having knowledge in business specialist and IT specialist will definitely satisfy the information needs as well as creating a high level of internal and external decision makers. A new accountant need utilize the drill down function to track down every transaction in order of general ledgers, sub ledgers and transactions to improve the auditing of the company, therefore the traditional knowledge of accounting still being a mandatory requirement [15]. In addition, Chen et al [15] also mentioned that the knowledge on regulatory compliance is a must for a new accountant since the new accounting have to deal with contractual obligations as control objectives to facilitate discovery, along with the required supervision of any informational holds during proceedings, in the case of legal action against an organization.

V. CONCLUSION

The industrial revolution 4.0 has changed accounting system in the word in several ways. One of them is changing the traditional accounting report that demand on declaring real-time accounting and not rely on the periodic accounting system. It is also push the accounting practices to capture the implementation of big data in the business environment. Since the number of high-tech companies that operate big data in daily basis increase significantly, the accounting standard have challenge to capture the unstructured data set and provide the real-time accounting in the financial report. Thirdly is the challenge on measuring the IC, when the industrial 4.0 operates IC more. The challenge relies on the how measuring the intangible assets that mostly cannot be reported in the financial report. Last issue is the challenge of new accountants in the disruptive era, by the demand on the enhancing their proficiency not only in the traditional accounting standard but also in the business specialist and IT.

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