

BLOCKCHAIN IN BIG FOUR ACCOUNTING FIRMS

**AN EXPLORATIVE STUDY OF THE DISCURSIVE
INSTITUTIONAL WORK OF BIG FOUR ACCOUNTING FIRMS IN
BLOCKCHAIN**

XIJIA LUO

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Blockchain in Big Four accounting firms : an explorative study of the discursive institutional work of Big Four accounting firms in blockchain

Abstract:

Purpose – This thesis aims to explore the discursive institutional work conducted by Big Four accounting firms in front of the emergent of blockchain technology which might bring a disruptive influence not only to audit industry but also to their clients in all sectors.

Design/methodology/approach – This thesis builds upon a qualitative case study of the Big Four accounting firms. The lens of institutional work is applied when analyzing what, when, how and why professionals in accounting firms take actions to create, maintain and disrupt institutions and interact with others.

Findings – the current study finds that accounting firms react differently in different phases from 2016 till 2011 and how they hype and de hype the blockchain by their discursive institutional work in the meantime. Furthermore, the current study recognizes the regulative pressure along with the broad implication of blockchain might also be an opportunity to get multiple actors or agents such as developers, professionals and regulators to cooperate together, however, professionals in accounting firms still need to mobilize the role of regulators due to their lack of coercive power.

Originality/value – This thesis contributes to the emerging literature on blockchain's impact on the professionals in audit industry, rather than paying attention to advantages and disadvantages of blockchain technology implicated in audit process, the current study answers the call to bring the professionals as agents back to the institutional study, analyzing the broad impact of blockchain technology at organizational level.

Keywords:

Blockchain, Institutional work, Audit, Professionals

Authors:

Xijia Luo (41587)

Tutors:

Lukas Goretzki, Associate Professor, Department of Accounting

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Stockholm School of Economics

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Contents

| | | |
|-------------|--|-----------|
| 1. | INTRODUCTION | 5 |
| 2. | LITERATURE REVIEW | 9 |
| 2.1. | Blockchain Background | 9 |
| 2.1.1. | Concept and characteristics of Blockchain..... | 9 |
| 2.1.2. | Applications of blockchain in accounting and audit set | 11 |
| 2.1.3. | Blockchain as a new Management Fashion..... | 13 |
| 2.2. | Institutional work of accounting professionals | 14 |
| 2.2.1. | Accounting professionals as institutional worker..... | 15 |
| 2.3. | Introducing discursive institutional work as a powerful tool..... | 17 |
| 3. | METHODOLOGY | 19 |
| 4. | FINDINGS..... | 22 |
| 4.1. | Deloitte | 22 |
| 4.1.1. | Maintaining norms in exploratory stage | 22 |
| 4.1.2. | Disrupting and creating future | 23 |
| 4.1.3. | Keep disrupting status-quo | 24 |
| 4.2. | EY..... | 26 |
| 4.2.1. | Maintaining assurance service | 26 |
| 4.2.2. | Disrupting and expanding service providing | 27 |
| 4.2.3. | Creating innovations to become a game-changer | 28 |
| 4.3. | KPMG..... | 29 |
| 4.3.1. | Aggressively creating allies with technical giants..... | 29 |
| 4.3.2. | Keep creating prototype and disrupting traditional business model..... | 30 |
| 4.3.3. | Shift back to maintain status due to uncertainty | 31 |
| 4.4. | PwC | 32 |
| 4.4.1. | Steadily creating norms and setting tones | 32 |
| 4.4.2. | The first trust..... | 32 |
| 4.4.3. | The second trust..... | 34 |
| 5. | DISCUSSION..... | 36 |
| 5.1. | The various institutionalized goal of Big 4 | 36 |
| 5.1.1. | 2016-2017 | 36 |
| 5.1.2. | 2018-2019..... | 38 |
| 5.1.3. | 2020-2021 | 39 |
| 5.2. | Hype and Dehype around the blockchain | 41 |

| | | |
|------|---|----|
| 5.3. | Interactions between cultural-cognitive/normative agents and regulative agents under regulation uncertainty environment | 44 |
| 6. | CONCLUSION | 48 |
| 6.1. | Conclusions and contributions | 48 |
| 6.2. | Limitations and further research suggestions..... | 50 |
| 7. | REFERENCES | 51 |
| 8. | APPENDIX..... | 54 |

1. Introduction

In 2008, Satoshi Nakamoto, the father of Bitcoin, first proposed the concept of blockchain¹. In the following years, the blockchain became the public ledger for all transactions of cryptocurrency Bitcoin. Blockchain technology catches the world's eyes and becomes increasingly popular especially when the trading price of Bitcoin increased from less than \$430 US dollars to over \$47000 in the last five years². The initial application intended for the technology was the establishment and subsequent exchange of digital currency as an alternative to traditional currencies controlled centrally by governments (Fuller & Markelevich 2020), enabling users to transact peer-to-peer directly without the intermediation of a trust third party such as banks (Bryans 2014). However, the development of blockchain technology has completely deviated from the scope of Bitcoin. Independent blockchain technology platforms are emerging, so as applications and industries based on the underlying blockchain technology. It can be said that the prelude of blockchain technology has been taken off. Its practical application in the field of accounting and audit is also changing the way professionals in this field work and may have disruptive effects in long term. According to Russell Guthrie, Executive Director External Affairs and CFO at IFAC (International Federation of Accountants), "Traditional bookkeeping and manual data entry disappeared long ago. Today, access to data and technological advancements are at the core of everything we do. New technologies, such as blockchain and artificial intelligence (AI) are advancing the global profession, raising the bar and driving demand for new workforce skills and competencies".³

Blockchain technology is a distributed database. Balogh (2019) offer an encompassing definition of blockchain as "a distributed, append-only ledger of provably signed, sequentially linked, and cryptographically secured transactions that's replicated across a network of computer nodes, with ongoing updates determined by a software-driven consensus". It stores ownership of assets and transaction records through a peer-to-peer network. Generally speaking, it is like a database ledger that records all transaction records. The transaction record is secured by public/private key. After that, the transaction record will be saved in the database, and then the data block will start to encrypt the connection and be securely sealed. Blockchain is essentially a decentralized transaction and data management technology. Because it is an open recording system, all transaction records are stored in it and can be copied to any computer at the same time, so the security is very reliable and can hardly be tampered.

¹ <https://bitcoin.org/bitcoin.pdf>

² <https://finance.yahoo.com/quote/BTC-USD/>

³ <https://www.forbes.com/sites/forbesfinancecouncil/2017/08/30/preparing-tomorrows-auditors-for-the-future-of-tech-driven-accounting/?sh=7ccdbf2b1c27>

Alongside the digitalization of accounting information age, the functions of accounting firms are reshaped at a faster pace and on a large scale. As the most considerable business line of accounting firms, audit or assurance service, which is an economic supervision activity, provides an independent assurance to various stakeholders that the financial statement and related internal control is free from material misstatement. Nowadays, It still takes a lot of time for the external audit professional team to review a large number of transactions and accounts in the customer's account books. Audit may be one of the professional fields where blockchain will bring huge benefits and fundamentally change the current paradigm. A new accounting ecosystem could be facilitated by blockchain's functions of data integrity, nearly instant sharing as well as automatic process control (Dai & Vasarhelyi 2017). Moreover, although the application of blockchain in different industries all at the infancy stage, an increasing number of customers of accounting firms is starting to implement the blockchain systems into their business and operational process, therefore, to monitor this technology is crucial for accounting firms to provide reliable assurance service and sustain their historical professional reputations for over a hundred year (Atwood 2018). For example, Walmart worked with IBM to use a blockchain solution to track food supply ecosystem based on Hyperledger Fabric⁴, an open-source ledger technology platform, to make the process more transparent and traceable⁵. Therefore, it is important for accounting firms to understand this technology during its development process. Moreover, the design considerations of blockchain architecture at early stage will impact whether accounting firms could leverage this technology to enhance their assurance service to their clients (Vincent et al 2020). At the same time, the emerging technology might also increase the already-intense competition among accounting firms for the provision of assurance services in the digitalization era (Richins et al 2017). Thus, the impact brought by blockchain could cause huge changes to audit industry in all respects, what kind of perception has emerged inside the industry and how the responsibility of professionals in audit industry has shifted due to blockchain are interesting to explore. In short, This paper selects accounting firms as the research objects since the service provided by professionals are closely related to blockchain technology which could theoretically be disrupted, moreover, to meet the interest and acquirement of a wide range of customers from other sectors, the interactions between firms and their customers and the competitions among firms in same industry could reflect the evolution and maturity of technology implication to a certain extent. Thus, we select the Big Four accounting firms (Deloitte, EY, KPMG, PwC) specifically which to a large scale have capabilities to represent and lead audit industry and guide companies in other sectors during the development of blockchain.

So far, the development of blockchain technology is still in its infancy, and a complete and unified technical standard has not yet been formed, and various implications are still developing and progressing. However, it has potential to adapt to the requirements of lots

⁴ <https://www.hyperledger.org/>

⁵ <https://theleadershipnetwork.com/article/how-walmart-used-blockchain-to-increase-supply-chain-transparency>

of different industries to provide novel improving directions, and the audit industry has no exception. Big Four accounting firms in audit industry are aware of the growing demand for blockchain and cryptocurrency, and are adopting different methods to promote the growth of interest in the blockchain field. This article combines the characteristics of blockchain technology and the current strategic layout of the blockchain by Big Four accounting firms based on their public documentations over a period from 2016 till 2021 during which a number of blockchain's practical application has been proved in various sectors and at the same time there still exists continuous doubts around the technology from the public, analyzing the impact of the development of blockchain technology from audit service providers and their customers from other sectors could gain a deep insight about impact, or even disruption, brought by this emerging technology to a broad social scale.

Instead of discussing the advantages or disadvantages of this technology itself, the purpose of this paper is to provide another perspective from the organizational impact brought by blockchain technology through the lens of the institutional work (Lawrence & Suddaby 2006) conducted by professionals in Big Four accounting firms which could be representatives of audit industry and capable of purposively guiding and impacting other sectors when providing not only assurance service but also consulting service to their customers. In general, professionals often publish articles and comments on emerging technologies such as artificial intelligent, cloud technology as well as blockchain to express their views on the influences of the technology to specific industry and their contributions to the development of new technology, which is an effective tool to attract new customer who are interesting in new technology and maintain old ones in the meantime. Therefore, the global websites of accounting firms are the most straightforward source pools to publish and propagate their views, comments as well as attitudes about the object. The potential impact of blockchain on the audit industry are obvious, no matter from the technical level that the daily work of professionals might become more sufficient with the assistance of blockchain platform when they are providing service to their customers, or from the commercial level that accounting firms could expand their service category in new emerging technology to increase revenue. Professionals in audit industry should be prepared to face the challenges and opportunities brought by this technology. Furthermore, there are many hypes around the blockchain which cannot be taken for granted, the current study is interested to review if professionals in accounting firms are convinced in front of the seemingly numerous benefits. On the other side, the seemingly numerous benefits could also put pressure on professionals in accounting firms that their job and responsibility might be disrupted and replaced. What kind of response from professionals due to the paradox characteristics of blockchain is also interesting to analyze. By doing so, the current study will answer the following research question:

How do Big Four accounting firms respond and contribute to the development of blockchain by participating in the discourse through publications?

This paper contributes to the blockchain and audit literature in the following ways. First, it is among the first few studies to introduce institutional work into the blockchain-related publications released by professionals in accounting firms, discussing “the purposive action of individuals and organizations aimed at creating, maintaining and disrupting institutions”, bringing professionals back as the agents in institutional work. Second, it explores the most relevant articles and white papers about blockchain published by Big Four accounting firms over a period of time during which a number of applications of blockchain has been proved in several sectors but both the confusions and beliefs from public exist towards this technology, which could reflect the their differentiated changes in reactions and purposes during this timeline for specific firm. Moreover, it provides a discussion about how professionals in accounting firms participated in hyping and dehyping the taken-for-granted blockchain by their discursive institutional work. Finally, the current study provides insights to professionals, regulators, industry players and technology developer to facilitate the cooperation together during the development of blockchain technology in all sectors since their various characteristics such as cultural-cognitive, normative as well as regulative elements could complement each other.

The next sections of this paper are organized as follows; Section 2 reviews previous literature on blockchain and institutional work as the theoretical base of current study ; Section 3 describes methodology of institutional work analysis and empirical data gathering; Section 4 illustrates the findings of empirical evidence; Section 5 discussed the findings; and Section 6 concludes this study, summarizes its limitations, with future research recommendation in the end.

2. Literature review

In the following section I will present: (1) background of blockchain and its application within accounting and audit industry as it is necessary to outline the potential influences of this specific technology on accounting firms; (2) a review of previous literature on institutional work and introduce the professionals as the agent back to the study of institutional work; (3) introduce discursive analysis picked from various forms of institutional work as the theoretical framework of the current study.

2.1. Blockchain Background

2.1.1. Concept and characteristics of Blockchain

To study the institutional work related to blockchain, I have to understand the blockchain itself and its proclaimed implications in the accounting and audit field.

There are many definitions of blockchain, and it will take some time until the different perspectives from academic, corporate, and technology communities agree on a single definition (Sheldon 2019). Rozario and Thomas (2019) demonstrated that blockchain is essentially a distributed linear database that protects the integrity of its information with cryptography. Moll and Yigitbasioglu (2019) said that blockchain is a type of distributed ledger technology where multiple copies of the same ledger are shared among the members (nodes) of a large network.

Key characteristics of the blockchain include decentralization, immutability, and accountability (Rozario & Thomas 2019). Decentralization is achieved by enabling various nodes (users) to download the blockchain ledger, where every node (user) has a local copy of the blockchain ledger and a universal view of the transactions. Since it's decentralized, the ledger is not owned by any user alone and cannot be monitored or regulated by any third party participant (Appelbaum et al 2020). Because of the decentralized nature and the fact that each node (user) has its own copy of the ledger, fraud on the blockchain would be unlikely to occur. The blockchain consists of blocks of data records that are linked to the previous blocks. Each block of the blockchain is identified by its hash (called block hash or block header hash)⁶. The parent hash included in each block to link the chain makes the blockchain immutable (Vincent et al 2020). Once a block of transactions has been verified and added to the end of the blockchain, they cannot be reversed (Rozario & Thomas 2019). Any transactions that may appear fraudulent or in error would be corrected by appending a transaction adjustment to the blockchain. The process of adding blocks to the blockchain is called mining. Mining and consensus are carried out by participating nodes on a decentralized network (Vincent et al 2020). Any changes must be approved by a majority (>50%) of participating users.

⁶ <https://www.enisa.europa.eu/topics/csirts-in-europe/glossary/blockchain>

Moreover, since the digital signature of users makes the verification of originator of transactions easily, accountability of transaction is achieved. In conclusion, these characteristics make blockchain appeal to accounting and audit as it provides a secure set of records, near real-time reporting, a robust audit trail, and transparency which could make daily work of accountants and auditors more sufficient and even disrupt original responsibilities of them since the time-consuming work with no need of manual judgment will be automated ultimately (Rozario & Thomas 2019).

There are three main types of blockchain: (1) Public, Permissionless Systems, (2) Private, Permissioned Systems, and (3) Hybrid Systems (Vincent et al 2020). Public or permissionless blockchains, such as Bitcoin and Ethereum which have a common goal to operate in a fully open environment, do not require any intermediation of centralized third party. Any person or company can join this network to view and verify all the transactions. This kind of blockchain uses a consensus mechanism named “Proof-of-work” which enables the transaction visible and transparent to all users, it is also virtually immutable. Proof-of-work requires miners to solve a computing-intensive math problem involving the verification process of all prior blocks, which is time and energy consuming (Kokina et al 2017, Coyne et al 2017). For private or permissioned blockchains, they are more flexible in design, with regard to the acceptance of participants and their authorities to operate inside the network, they enable multiple users to define the rules and restrict the participants who can submit the transactions and assess to specific data in advance (Vincent et al 2020). Proof-of-work is not required in a private or permissioned blockchain. Consensus is achieved through proof-of-stake which is less resource-intensive alternative to verify transactions instead of proof-of-work (Coyne et al 2017). Hybrid systems bring together aspects of both public and private blockchains. This type of blockchain is very useful in situations where regulatory oversight may be required (Vincent et al 2020).

Although public or permissionless blockchains represented the first version of blockchain (through the born of cryptocurrencies such as Bitcoin) and are considered closest to the fully decentralized and distributed model envisioned by the technology’s creators, the usage of blockchain technology for accounting and financial reporting is more likely to occur through companies that initially adopt permissioned, private, or hybrid blockchains (AICPA 2017). Private and hybrid consortium blockchains differ from the founding permissionless models underpinning Bitcoin and other virtual currencies because they restrict access of participants and post capabilities to predetermined parties, giving organizations more direct control over their operations (Dai & Vasarhelyi 2017). The design of a private blockchain allows a single organization or company to maintain access and authority control, while the blockchain of a mixed consortium is restricted by the consortium of companies that form the blockchain (Sheldon 2019).

A key factor that determines the degree of scalability of blockchain integration is the way the blockchain is designed (Smith & Castonguay 2020). Therefore, Private and

permissioned blockchains may be more appropriate in accounting and audit settings as they limit the amount of participants to meet more focused and precise needs. In addition, the responsibilities and rights of these participants are defined in advance by the blockchain network administrator. Contrary to a public blockchain, a permissioned blockchain network do not require the client company to encrypt all data being transmitted. To the extent that the blockchain is permissioned, as opposed to public, and distribution is limited to fewer participants, the challenges of cost and transactional velocity will be easier to manage. Thus, users can be authorized to access the data and/or participate in the network based on a strictly enforced access control mechanism to mitigate scalability and overhead issues (Vincent et al 2020).

2.1.2. Applications of blockchain in accounting and audit set

By exploring how to audit the blockchain protocol or by developing tools to audit the blockchain transactions of their clients, many public accounting firms adapt to business transformation of blockchain technology (Sheldon 2019). As such, I have seen that the Big Four accounting firms (Deloitte, EY, KPMG, PwC) are actively preparing for blockchain assurance services offerings. KPMG has partnered with IBM Watson to begin automating and streamline audit processes and examinations, and has been doing since 2016. Deloitte was one of the first to successfully audit blockchain protocol, whereas PwC and EY have successfully developed audit tools specifically for audit blockchain transactions. Notably, PwC recently began to offer continuous audit software to audit transactions on private business blockchains, and EY developed the EY blockchain analyzer, which is capable of extracting transactions from multiple blockchain ledgers.

Based on the concept of distributed ledger technology, blockchain technology includes a number of advanced and differentiated features, making it particularly suitable for audit and accounting professionals. It is an opportunity to reduce the cost of maintaining and reconciling ledgers and provide a high-level assurance over the ownership and transaction of assets for accounting professionals. These innovations are also likely to transform audit by automating workflows but more importantly, by enhancing audit effectiveness and reporting (Rozario & Thomas 2019).

However, to consider how to provide service to companies which have already or are going to implement blockchain infrastructures into their operational and financial process, accounting firms should get a deep insight of the process during the implementation and whether it will completely replace the current IT systems or mutually complement with each other. Sheldon (2019) said that it is not reasonable to imagine that companies will completely abandon their existing information technology infrastructures and replace them with a single blockchain system, or to believe that a blockchain could accomplish all the necessary tasks across the current IT function. Rather, the companies will gradually start to implement blockchains in certain part of the business, such as the supply chain management or bookkeeping systems which are easily to become automated at the early

stage. In other words, blockchains will exist alongside legacy and enterprise resource planning (ERP) systems. A more reasonable scenario involves clients beginning to record new transactions to the blockchain as of a specific date (possibly starting with current account balances), while maintaining a separate archive of historical data from retired legacy systems up through the date of blockchain implementation. Sheldon (2019) pictured a combined system in which blockchain could be viewed as a tool inserted into an existing IT infrastructure that receives inputs from upstream systems (e.g., a sales system), processes and records data, then moves to downstream systems (e.g., a general ledger system) for ultimate purposes. Vincent et al (2020) provided guidance to how client ERP/legacy systems may connect to the blockchain, at the same time, step by step guidance had been provided on how the auditor can leverage the blockchain for continuous audit and assurance services. Adding the auditor as a node on the client's blockchain as sharing information on this platform would be less disruptive to the client than data extraction in a traditional audit paradigm since less information would have to be extracted by management (Rozario & Thomas 2019).

Rozario and Thomas (2019) envision the future financial audit by proposing an external audit blockchain, which can improve the audit quality and narrow the expectation gap among different stakeholders such as auditors, investors and regulators. This proposed blockchain technology could improve the current audit framework by changing how the audit evidence is collected and verified, for example, purchase orders, contracts, invoices, and other IoT (Internet of Things) information can be stored on the secure and transparent blockchain ledger (Appelbaum & Nehmer 2020, Rozario & Thomas 2019). The cryptography and decentralization attributes provide the auditor with a tamper-resistant audit trail. And the digital signature provides auditor the accurate originator of the transaction to verify (Rozario & Thomas 2019). Dai and Vasarhelyi (2017) present how a self-assuring accounting ecosystem based on blockchain, smart contracts and IoT can work. They also discuss the implications of blockchain on audit if audit-related documents such as electronic records of inventory items, invoices, bills of lading, letters of credit, receipts, etc., are made available as part of the blockchain and provide a complete audit trail.

The immutable transaction history provided by blockchain's address accounting assertions in a much more robust manner. Assertions such as occurrence, completeness, cutoff, accuracy, etc., are all memorialized for the population of transactions on blockchains, providing an improvement in control precision over traditional periodic sample-based testing of assertions (Cangemi & Brennan 2019). Since blockchain transactions require reconciliation by participating nodes, before they are posted to the ledger, completeness and accuracy checks are essentially performed proactively. Completeness and accuracy checks are also performed once transactions are posted as participating nodes have access to a universal view of blockchain transactions. In addition, blockchain records are tamper-resistant due to the cryptographic mechanisms that are

deployed. These records are protected by code and become irreversible as transaction hashes⁷ contain the information of the current transaction and the previous transaction. Finally, the originator of the record can be identified, as the hash of the record also contains the user's digital signature. In this manner, nonfinancial information on the blockchain enables auditors to obtain deeper insights into risks that may lead to misstatements in revenue and other significant accounts such as inventory, accounts receivable, and accounts payable (Rozario & Thomas 2019).

2.1.3. Blockchain as a new Management Fashion

I have seen that the implementation of blockchain in accounting and audit fields has been widely recognized by the scholars, and theoretical and practical perspectives are provided for feasible and forwarding ideas of the future implementation of blockchain in the industry. With no doubt, blockchain, as an emerging technology, has become a management fashion which consists of complex practices and intense discourses associated with them (Benders & van Veen 2001).

Initially, new management fashion emerges in response to perceived shortcomings of current practice. For example, the decentralized nature of blockchain can effectively reduce transaction costs and improve efficiency of international trade. However, during the development phase of a management fashion, it should be subsequently appropriated and promoted by different stakeholder in society including institutional entrepreneurship, professional agents as well as regulators, or its hype will be rejected and abandoned in the process of realizing. Thus, the view of a new management fashion during the development might continue to change until the gap between the promise and reality of a specific management fashion be narrowed down by proven evidence. No matter the enthusiastic discourses during the early phase or the more rational voices in the mature phase, professional agents play an intermediate role in its diffusion. Generally speaking, professionals were more likely to claim that their practice was based on formal knowledge, to demand autonomy in their decision-making, and to adopt norms to be service-oriented. Such features were viewed as working in combination to insure that the provider or developer's expertise related to new management fashion would be employed to serve the best interests of the client of professionals. During these process, professionals attempt to influence the behavior of others by setting standards, propagating principles, or proposing benchmarks to gauge progress and to guide behavior (Scott 2008) to accomplish their claim. Perkmann and Spicer (2008) used an example of sustainability assurance in their research to demonstrate how a management fashion becomes institutionalized, in other words, to become "taken for granted by members of a social group as efficacious and necessary". Through the deployment of accumulative institutional work over time, the result of this accumulation could cause this management fashion gradually be institutionalized. And the legitimacy of a management fashion is

⁷ <https://www.enisa.europa.eu/topics/csirts-in-europe/glossary/blockchain>

defined during a conflictual process as diverse actors vie for power. How blockchain, as a new management fashion, involve actors and agents in different sectors together to become institutionalized during the process, how discourses related to it will be guided and led to which direction, how professionals interactive with others to sustain or disrupt their own status quo are interesting to explore.

Therefore, in the current study, the work of professionals in Big Four accounting firms will be studied to illustrate its role in institutionalizing blockchain, not just inside their own organizations, but also influence other industrial players as well as regulators during its development.

2.2. Institutional work of accounting professionals

The concept of institution is the core of all institutional studies in organization research: the central idea of adopting institutionalism to conduct theoretical and empirical tests on organizational phenomena is that there is a lasting factor in social life - institution - which has a profound impact on society, and the thoughts, feelings and behaviors of individuals (Lawrence & Suddaby 2006). Institutions are consisting of “cultured-cognitive, normative and regulative elements that ... provide stability and meaning to social life Institutions are transmitted by various types of carriers, including symbolic systems, relational systems, routines and artifacts”, defined as “rules and shared meanings . . . that define social relationships, help define who occupies what position in those relationships and guide interaction by giving actors cognitive frames or sets of meanings to interpret the behaviors of others” (Scott 2001). Lawrence and Suddaby (2006) defined institutional work as “the purposive action of individuals and collective actors aimed at creating, maintaining and disrupting institutions”. With the understanding of the process of various influence on organizational behavior, more and more attention has been paid to the factors of individual and collective actors linked to the institution.

Lawrence and Suddaby (2006) distinguish between three main categories of institutional work: creating, maintaining and disrupting institutions. The creating actions include three main categories of activities: “political work” in which actors reconstruct rules, property rights and define the constraints of access to material resources; “cultural work” in which belief systems of actors are reconfigured; “technical work” in which the behavior of abstract categorizations and boundaries of meaning systems are changed. The issue of how institutions are maintained by actors in organizational fields received less attention according to Lawrence and Suddaby (2006), however, institutions also need maintaining work to sustain its core value or support its survival when facing the external threats. The maintaining actions include two large categories, first one addresses the maintenance of institution by ensuring compliance with the rules system, and the latter one focuses efforts to maintain institutions on reproducing existing norms and belief systems. Research about the dynamics of institutional fields suggests that there will often be actors who will

possibly disrupt the original set of organizations by attacking or destroying the original rule, cultural and innovative mechanism that causes members to comply with the institutions. Actors seem to disrupt institutions mainly by redefining, reclassifying, reconfiguring, abstracting, questioning and manipulating the social and symbolic boundaries that constitute institutions.

Lawrence and Suddaby (2006) used the “creating, maintaining and disrupting” instead of “creation, maintenance and disruption” to emphasize the actions rather than the outcomes, meanwhile, the outcome of these institutional works could also be different from its predictions. However, despite this assumption of unpredictability, institutional work theorists still insist in their view of agency being embedded in institutions (Lawrence et al 2011, Lawrence et al 2013). This definition does not exclude ideas of institutional entrepreneurship which has been criticized for assuming superhuman agency (Lawrence et al 2009), but rather tempers them through its analytical focus on the efforts of a variety of individual actors and organizations equipped with different skills and having diverging motivations for their actions. Various degrees of attention have been paid to the role of agency during the evolution of institutional development and change (Silvola & Vinnari 2021). Furthermore, the literature on institutional work acknowledges that collective agency may emerge spontaneously instead of being driven by a central powerful actor (Perkmann & Spicer 2008). Thus, Lawrence et al (2011) have invited scholars to bring individuals and agent back to the study of institutional work, focusing on “how individual actors contribute to institutional change, how those contributions combine, how actors respond to one another’s efforts, and how the accumulation of those contributions leads to a path of institutional change or stability”. The study of institutional work begins from the efforts of individuals and collective actors to “cope with, keep up with, shore up, tear down, tinker with, transform, or create anew the institutional structures within which they live, work, and play, and which give them their roles, relationships, resources, and routines” (Lawrence et al 2011).

2.2.1. Accounting professionals as institutional worker

Actors are not passive, actors perceive the meaning of institutions and infuse their actions with meaning based upon these perceptions. Dacin, Goodstein, and Scott put their focus attention on the interests of professional agency in new understandings of the manner in which institutions are created, transformed, and extinguished and the processes interact to affect institutional change (Dacin et al 2002), Scott (2008) highlights the theoretical and empirical changes in the professionals who are governed by distinctive institutional logic in shaping institutions through their ability to simultaneously create, legitimize and control the knowledge and practices that order and govern various aspects of everyday life. As institutional agents, the profession is the most influential, contemporary crafters of institutions, they have displaced earlier claimants to wisdom and moral authority — prophets, sages, intellectuals — and currently exercise supremacy in today’s secularized

and rationalized world. Examining the institutional work carried out by professionals in maintaining professional dominance when facing threats to their privileged position, the response of professionals is more than just resistance to the external threat and reproducing existing institutional arrangements (Currie et al 2012), indicating that study how these professionals interpret and face the external challenges through institutional work is a creative and purposive act. Moreover, Greenwood et al (2002) suggested that professionals are important regulatory agents, instead of conservatively reinforcing existing prescription for proper conduct, the role of professionals is addressed to deinstitutionalization and change, during those moments, associations can legitimate change by negotiating and debating with other professionals firstly, and followed by reframing the boundaries of professional identity which presented to the outside world.

There have been several theoretical perspective regarding the relationship between professionals and institutional work. For instance, in Burns and Nielsen (2006)' s argument in *How Do Embedded Agents Engage in Institutional Change?*, they introduced the concept of human praxis which leads to institutional change. Praxis comprises three component parts: (1) self-awareness and critical understanding of existing institutional arrangements, and how these arrangements do not meet the agent(s)' needs and interests; (2) mobilization, rooted in new collective understandings of the institutional surroundings, as well as one's positioning within them; and (3) multilateral or collective action to reconstruct the existing institutional arrangements and, hence, impact personal (or group) circumstances. Greenwood et al (2002) summarized a model of six stages alongside the institutional change and focused their attention to theorization (stage IV) during which the legitimation could be contributed by professionals. The four key mechanisms which professionals utilize to bring about institutional change, as identified by Suddaby and Viale (2011). First, professionals use their expertise and legitimacy to challenge the incumbent order and define an open space. Second, they can use their social capital and skill to populate the field with new actors. Third, they can introduce new rules to recreate the boundaries of the field. And finally, professionals manage the use and reproduction of social capital to confer a new status and social order.

So far, although institutional work of professionals received very little attention, it is increasingly recognized that role of professionals played in initiating and mediating changes in a broader scale of society and help redefine and reconfigure what is in existing institutions (Empson et al 2013, Scott 2008). For example, the relationship between institutional work and the professionals has been explored in terms of how they be connected to broader institutional change in societies (Suddaby & Viale 2011), in which the professionals are asserted to be the key drivers of institutional change and they hold a strategy to connect with other institutionalization projects to secure their status and survival. Empson et al (2013) conducted an empirical case study of large international law firm partnerships in London develops a deep insight of how individual actors contribute to institutional change, by analyzing the actions of two different types of

professionals and how their relationship helps the integration of new corporatized partnership and traditional partnership form. Singh and Jayanti (2013) integrated the institutional theory and Logics–Roles– Action (LRA) framework to study the institutional work to motivate, direct, and control the employed professionals in pharmaceutical industry. Besides, Greenwood et al (2002) focused on the institutional work of professional accountancy associations at the moment of change over two decades from 1977 to 1997 in which firms offered services beyond their traditional borders, moving from accounting to business advisory services. In the effort to promote this kind of service expansion, professionals legitimized the change by referring to the general values and practices inside the industry, especially around services providing to customers. However, the empirical applications of institutional work so far relatively underdeveloped (Empson et al 2013), further research is still needed to explore how specific professionals contributes to the “creating, maintaining and disrupting institutions” during the institutional change period. And so far, there still exists a gap of research for institutional work when integrating the emerging technology which could both influence the commercial opportunity and daily work of professionals to a large extent, moreover, the development process of the emerging technology is changing from time to time, to study when, why and how the embedded agents engage in institutional change (Burns & Nielsen 2006) could be an interesting topic and will have a profound impact to society.

2.3. Introducing discursive institutional work as a powerful tool

There are many forms of institutional work scholars have identified aimed at impacting the institution, including “composing legislation, telling stories, writing histories, making jokes and insults, writing memos and letters, writing legal opinions, writing and making speeches and making announcements, among other discursive acts” (Lawrence & Suddaby 2006) which are often language-centred. Compared with other forms of language-centred analysis, which often focuses on the content of discourse, discursive analysis analyzes the effectiveness of specific linguistic moves by comparing the interaction of emotional impact (pathos), character (ethos) and logical content (logos) (Suddaby & Greenwood 2005). The basis of any cognition or broad acceptance of innovation is not pre-existing but need to be produced and reproduced by discourse and communication. Discursive work expands the role of text in structuring social action to a very specific focus on suasion and influence (Suddaby & Greenwood 2005). Discursive analysis “restricts its focus to explicitly political or interest laden discourse and seeks to identify recurrent patterns of interests, goals and shared assumptions that become embedded in persuasive texts” (Suddaby & Greenwood 2005). Applying discursive analysis to the domain of institutional work would involve an examination of the forms of argument associated with creating, maintaining and disrupting institutions (Lawrence & Suddaby 2006).

Although the institutionalization of a new practice or technology might be processed by a combination of regulative, normative and mimetic work, discourse analysis legitimizes social arrangements because it “rationalizes the adoption of a practice, enabling it to diffuse and persist” (Green et al 2009). Green et al (2009) state that rhetoric and discourse reasoning help explain the meaning of novel ideas or practices, and why adoption, dissemination and popularization are wise and appropriate which make discursive analysis particularly suitable at the early stage of institutionalization (Goretzki et al 2021). Thus, discursive analysis is outstanding in the forms of institutional work because the current study sees its purposive implication contained behind the language and its potential influence to the activities during the interactive process, no matter to create, maintain or disrupt institutions.

Therefore, discursive analysis fits neatly with my interest in the current study of institutional work: “it provides methods and theories to help understand how linguistic and symbolic practices create new objects and associate those objects with social controls that institutionalize them” (Lawrence & Suddaby 2006). As I state before, professionals often publish white papers and other articles related to emerging technologies such as blockchain to express their views and opinions on the application of the technology and their proclaimed contributions in developing it widely. The discursive analysis is an effective way to study the intention and outcome of work of professionals when they attempt to institutionalized a new management fashion and impact other actors or agents.

In light of the literature discussed above, the current study focuses on the discursive institutional work of professionals in Big Four accounting firms over a period of time from 2016 till 2021 during which the application of blockchain has been proven in specific area but there still exists doubts around this technology in the meantime. The current study is going to discuss the discourse alongside the timeline of the development of technology. Back to the theoretical framework, the current study is interested in what, when, how and why professionals in the Big Four accounting firms publish white papers or other publications related to the blockchain to create new institutions or new business opportunities, maintain their status-quo when facing the external threat or uncertainties, or disrupt the current norms and practices to meet their own or their clients’ interests.

3. Methodology

Lawrence and Suddaby (2006) distinguish between three main categories of institutional work: creating, maintaining and disrupting institutions. The creating actions include three main categories of activities: political work in which actors reconstruct rules, property rights and define the constraints of access to material resources includes “Advocacy”, “Defining” and “Vesting”; cultural work in which belief systems of actors are reconfigured includes “Constructing identities”, “Changing normative associations” and “Constructing normative networks”; technical work in which the behavior of abstract categorizations and boundaries of meaning systems are changed includes “Mimicry”, “Theorizing” and “Educating”. The issue of how institutions are maintained by actors in organizational fields received less attention according to Lawrence and Suddaby (2006), however, although institutions are associated with automatic mechanisms of social control, institutions also need maintaining work to sustain its core value or support the compliance. The maintaining actions include two large categories, first one addresses the maintenance of institution by ensuring compliance with the rules system including “Enabling work”, “Policing” and “Deterring”, and the latter one focuses efforts to maintain institutions on reproducing existing norms and belief systems including “Valorizing and demonizing”, “Mythologizing” and “Embedding and routinizing”. Research on the dynamics of institutional fields suggests that there will often be actors who will possibly disrupt the original set of organizations by attacking or destroying the rule, cultural and innovative mechanism that causes members to comply with the institutions. Actors seem to disrupt institutions mainly by redefining, reclassifying, reconfiguring, abstracting, questioning and manipulating the social and symbolic boundaries that constitute institutions which are concluded by three categories – “Disconnecting sanctions/rewards”, “Disassociating moral foundations” and “Undermining assumptions and beliefs”. See Table 1 for a summary of the forms of institutional work associated with creating, maintaining and disrupting institutions which were used to code the content of the empirical publications gathered from the global website of Big Four accounting firms for current study.

Table 1. Institutional work (Lawrence & Suddaby, 2006)

| Creating institutions | |
|------------------------------|---|
| Advocacy | The mobilization of political and regulatory support through direct and deliberate techniques of social suasion. |
| Defining | The construction of rule systems that confer status or identity, define boundaries of membership or create status hierarchies within a field. |
| Vesting | The creation of rule structures that confer property rights. |
| Constructing identities | Defining the relationship between an actor and the field in which that actor operates. |

| | |
|-------------------------------------|--|
| Changing normative associations | Re-making the connections between sets of practices and the moral and cultural foundations for those practices. |
| Constructing normative networks | Constructing interorganizational connections through which practices become normatively sanctioned and which form the relevant peer group with respect to compliance, monitoring and evaluation. |
| Mimicry | Associating new practices with existing sets of taken-for-granted practices, technologies and rules in order to ease adoption. |
| Theorizing | The development and specification of abstract categories and the elaboration of chains of cause and effect. |
| Educating | The educating of actors in skills and knowledge necessary to support the new institution. |
| Maintaining institutions | |
| Enabling work | The creation of rules that facilitate, supplement and support institutions, such as the creation of authorizing agents or diverting resources. |
| Policing | Ensuring compliance through enforcement, audit and monitoring. |
| Deterring | Establishing coercive barriers to institutional change. |
| Valorizing and demonizing | Providing for public consumption positive and negative examples that illustrate the normative foundations of an institution. |
| Mythologizing | Preserving the normative foundations of an institution into the participants' day-to-day routines and organizational practices. |
| Embedding and routinizing | Actively infusing the normative foundations of an institution into the participants' day-to-day routines and organizational practices. |
| Disrupting institutions | |
| Disconnecting sanctions/rewards | Working through state apparatus to disconnected rewards and sanctions from some set of practices, technologies or rules. |
| Disassociating moral foundations | Disassociating the practice, rule or technology from its moral foundation as appropriate within a specific cultural context. |
| Undermining assumptions and beliefs | Decreasing the perceived risks of innovation and differentiation by undermining core assumptions and beliefs. |

Since there is a gap to analysis the institutional work of professionals in Big Four accounting firms which are responsible to provide assurance and other consultancy service to companies in other industries, especially when there emerges a technology which seems could influence all sectors to large extent in the near future. The purposes and progressive changes of these four independent firms but under similar environment may convey meaningful perception regarding the implementability and popularity of blockchain for all industries, even, to a social scale. Thus, the current study collects the most recent and relevant public resources such as press release, white papers and articles from Big Four accounting firms' global website by searching "blockchain" from their main pages, to conduct discursive analysis for their purposive actions inside this domain.

The source of empirical material comprises 40 most relevant and recent publications, 10 for each firm, from 2016 till 2021 during which a number of blockchain's practical application has been proved in various sectors and in the meantime there still exists continuous confusions around this technology from the public, analyzing the content of the publications related to blockchain from audit service providers and the purpose of professionals to publish these publications could illustrate the development of this technology in all sectors and their deep insight of capacity of blockchain to bring possible disruption to a broad social scale. All empirical materials are downloaded from Big Four accounting firms' global website when searching "blockchain". Appendix provides a full list of all empirical source. All empirical materials have been analyzed through discursive content analysis to generate understandings of what kind of publications did they publish on their global website, what's the implicit meaning conveyed in their action of publishing that publications, identifying various institutional logics that could be being associated with the previously identified forms of institutional work (Lawrence & Suddaby 2006) to categorize their actions and comprehend their purposes behind it. In addition, since Big Four accounting firms usually each publish one to four blockchain-related articles each year from 2016 till 2021, analyzing this number of publications for each firm provided us with information on the development of, and trends in, their cognition of blockchain in a period of time. As the data collection progressed, the current study found out that the differences among four firms are obvious, although the contribution of current study could be similar to all four firms, it is important to show the different progress of each firm in institutionalizing the blockchain and analyze the meaning behind this differences. Thus, I present my finding in a timely order with the purpose of identifying the various changing institutional work firm by firm along with the development of blockchain in different industry.

4. Findings

4.1. Deloitte

4.1.1. Maintaining norms in exploratory stage

From 2016 to 2017, Deloitte stepped into the exploration of blockchain technology and its implications in different sectors, starting to recognize its potential in different services and empirical cases such as smart contract and additive manufacturing. However, the current study found out that, during this period, instead of creating or disrupting the institution, Deloitte was trying to maintain its professional norms of assisting customers to reassess the actual situation, providing insight and suggestions about the proper timing and opportunity to employ this technology, and pointing out the concerns related to the emerging technology at the same time. Maintaining institutional work does not mean doing nothing, instead, usually includes considerable effort, and often occurs as a result of change in the organization or its environment. Understanding how institutions maintain themselves must focus on understanding how actors can influence the process of persistence and stability in the context of upheaval and change (Lawrence and Suddaby 2006). Deloitte's deep insights of additive manufacturing allow them to help organizations reassess their people, process, technology, and innovation strategies in light of this emerging technologies and maintain Deloitte's own business (Deloitte 2016-1) to provide service as before. The blockchain acts as a shared database to provide a secure, single source of truth, and smart contracts automate approvals, calculations, and other transacting activities that are prone to lag and error. Thus, Deloitte proposed employing blockchain-enabled smart contracts rather than existing technology might be a worthwhile option where frequent transactions occur among a network of parties, and manual or duplicative tasks are performed by counterparties for each transaction at this period (Deloitte 2016-2). The conservativeness of Deloitte then could be sensed by their publications, it seems that Deloitte neither abandoned its possibilities for future nor made use of it aggressively.

We cannot predict the exact trajectory and impact of blockchain technology. But we also should not ignore its early stages of development and successes along with failures. Tracking this young technology's development could potentially maximize its potential to best serve us. (Deloitte 2017-1)

Why do companies join blockchain consortia? For some, consortia represent a low-risk effort to stay current on blockchain trends, learn what competitors are doing, defend against potential new threats, and prepare to implement the technology should they decide to. In the view of some industry analysts, many companies are joining consortia for FOMO: fear of missing out. (Deloitte 2017-2)

Consortia would play a central role in the commercialization of blockchain technology in every industry. Expecting more industries as well as financial service industry to begin

form consortia is a crucial strategy to deploy blockchain at commercial scale, Deloitte called for government and regulators to start playing a significant role in blockchain consortia. At this stage, it is more important for members to be more interested in learning before they considered to fund, join, lead and govern the consortia later (Deloitte 2017-2).

4.1.2. Disrupting and creating future

Since 2018, although Deloitte continued to maintain its original norm as a “professional service provider”, aimed to demystify blockchain and share assessment of future landscape, key drivers and impediments, potential applications, and considerations for companies (Deloitte 2018-2). Deloitte began to conduct global blockchain survey yearly, shifting from a focus of learning and exploring the potential of this technology to identifying and building practical business applications (Deloitte 2018-3). Moreover, it recommended to create new road map to ultimately scaling blockchain solutions in different countries and sectors. The current study saw that the institutional work of Deloitte changed from maintaining the current norm to disrupting it and creating opportunities which could be illustrated from the subtitle of 2018 global blockchain survey was “break blockchain open” (Deloitte 2018-3), attempting to create more opportunities to get the business down and looking forward to provide views to industrial players who are interested in this technology to making moves over the next year. Deloitte concluded that the only real mistake organizations can make regarding blockchain at that time is to do nothing. Even without a completely solid business case to implement, they believe that organizations should, at the very least, keep an eye on blockchain so that they can take advantage of opportunities when they prepare themselves well. Deloitte also stated that having a healthy fear of disruption is fine, but there’s no need for legacy organizations to feel anxious and move toward blockchain without first identifying and developing a solid use case, encouraging other industrial players to try and develop a practical plan for blockchain as soon as possible.

THESE CHALLENGES NOTWITHSTANDING, blockchain appears to have the potential to help overcome obstacles that keep millions of people in the dark worldwide. To get started, development practitioners can chart out an implementation road map to help solutions grow in scope, scale, and complexity (for more details, read Blockchain to blockchains: Broad adoption and integration enter the realm of the possible) We recommend that development institutions consider this road map to progress from use case, through proof-of-concept, to ultimately scaling blockchain solutions in their countries of interest. (Deloitte 2018-1)

There are potential risks associated with a less traditional electrification path, but there are also possible benefits to working in an unbuilt environment—a technological “white space.” (Deloitte 2018-1)

While blockchain is not quite ready for primetime, it is getting closer to its breakout moment every day. The academic hypotheses of five years ago are steadily becoming a reality. Momentum is shifting from a focus on learning and exploring the potential of the technology to identifying and building practical business applications. (Deloitte 2018-3)

Regulatory bodies continue to evolve their role and position to keep pace with the change that blockchain introduces. Any regulation that recognizes blockchain applications, including smart contracts or digital identities, can provide a big boost to its adoption. According to the Deloitte survey, although 39 percent of executives regarded regulatory issue is a barrier to blockchain investment, 48 percent of executives believe that federal regulations around blockchain applications could boost adoption. Deloitte used these data to show its confidence in blockchain and suggested industry players can work in tandem with the regulators to devise enabling regulations in a phased manner. Similarly, smart contracts' validity is not yet recognized in court, although many states and countries are reportedly working toward it. Deloitte saw the open regulation environment of blockchain in this phase is a more positive picture for its revising later and for company to champion regulatory reform whether at state or at specific region.

4.1.3. Keep disrupting status-quo

In the recent two years, Deloitte is more deeply involved in the prevailing construction and application of blockchain for different sectors, considering to use their deep business acumen and global multidisciplinary model to help organizations across industries achieve their varying blockchain aspirations and push the extensive implications among the sectors. Different from the situations at 2016, when most actors were watching and exploring as outsiders, new ecosystems are developing blockchain solutions to create innovative business models and disrupt traditional ones. This is occurring in every industry and in most jurisdictions globally.

What has emerged is a shared recognition that blockchain is real—and that it can serve as a pragmatic solution to business problems across industries and use cases. This is not some far-flung vision held by long-standing believers in the technology. Even leaders wary of tech-based solutions have come to see the larger, transformational importance of the technology. (Deloitte 2019)

Today, fintech remains a blockchain leader, but more organizations in more sectors—such as technology, media, telecommunications, life sciences and health care, and government—are expanding and diversifying their blockchain initiatives. (Deloitte 2019)

The purpose of Deloitte not only disrupts the practice and technology of instructions, but also disrupts the original cultural mindset of broad participants. To maximum the value brought to organizations by blockchain, organizations are better to join networks with their cooperative partner, moreover, even share information with their direct competitors. Much of the discussion around blockchain revolves around the complexities and entry barriers of adopting the technology. Joining consortia with others in their horizontal or

vertical ecosystem may be blockchain's largest barrier to entry which require a shift in mindset: You must ally within your ecosystem—whether direct competitors or not—and work toward some greater good (Deloitte 2019). At the same time, governments do more than merely regulate blockchain technology. They often advocate for and incubate new blockchain applications. There does exist the uncertainties in the regulation, but an absence of regulatory harmony in a blockchain and digital assets construct also offers management, regulators, standard-setters, and professional service providers the chance to work together in forging common guidance and establishment of best practices. The content published by Deloitte pictured regulators to hold an open-minded view toward this technology (Deloitte 2020-2) and proposed other actors to react early since it is especially important that those who lead organizations remain current in a fast-evolving and often confusing regulatory environment because it is leadership that sets the tone about properly applied standards (Deloitte 2020-1). The open regulation environment drawn by Deloitte in its publications showed its preference in supporting blockchain and calling for alliance to set a common standard for its development. Thus, professional service providers such as Big Four accounting firms which have a sophisticated understanding of underlying technology and the evolving regulatory complexity that governs its application will play a critical role in assuring compliance. Moreover, except for mobilizing the role of regulators, Deloitte stood for other industrial players such as investors and financial advisors to show the advantage of blockchain to cost the fees, the promising future of blockchain was under the way.

More recently, regulatory concerns about blockchain have gained traction outside of digital assets. For example, the General Data Protection Regulation (GDPR) places strict limitations on how personal data is stored and saved within the European Union. Some see the GDPR leading to an unavoidable clash with the intrinsic immutability of how data is stored on blockchain platforms. Similarly, in the United States, the Health Insurance Portability and Accountability Act limits how personal health information is handled, which may run afoul of blockchain-based solutions within the life sciences context. Indeed, our survey respondents cited privacy more than any other area of regulatory concern (50 percent). So it seems apparent that these and other privacy-based regulations could need to align with the evolving technology. (Deloitte 2019)

For investors looking for democratized investment options, blockchain could enable bonds that literally anyone can invest in and communities and/or groups can quickly aggregate spend to invest without an intermediary. For investors looking for increased transparency beyond what their Financial Advisors/custodians/consultants can provide, blockchain could offer real time (eventually to the minute) visibility into positions to better analyze portfolio exposure/performance. For investors looking for cheaper products without transaction fees, blockchain processing fees could be close to zero. (Deloitte 2020-2)

4.2. EY

4.2.1. Maintaining assurance service

From 2016 to 2017, EY did recognize the potential implication of blockchain technology among different sectors and its influences in the audit and finance functions, however EY hardly published any significant press releases related to the blockchain application which were not included in my research.

EY joined into the blockchain arena by maintaining its assurance service to provide the blockchain audit to customers which had already implemented the technology or hold the virtual currency, assisting customers to fulfill the requirement to align with the regulation and compliance. In 2018, EY announced several blockchain audit tools such as EY Blockchain Analyzer which is designed to facilitate EY audit teams in gathering an organization's entire transaction data from multiple blockchain ledgers. One year later in 2019, EY announced the launch of the second generation of EY Blockchain Analyzer. In addition to the second generation of EY Blockchain Analyzer, EY has announced a suite of blockchain solutions and upgrades at the EY Global Blockchain Summit, including the release of the first generation of EY Ops Chain Public Edition into the public domain, as well as the launch of EY Smart Contract Analyzer and the second generation of EY Ops Chain till now. EY thought that blockchain technology enables automated tracking of these contracts and transactions, making it possible to investigate balances at the source transaction and the accuracy of all transactions and subsequent accounting entries is maintained through cryptography mathematics. With a shared ledger, data is validated at the source, making it difficult to corrupt and helping to prevent fraud in certain applications, maintaining accurate and complete data (EY 2018-2). Because of this feature, the opportunity that some audit activities could be automated has been seized by EY. For example, the inherent property of the system to maintain data integrity means that auditors will focus on confirming the validity of the digital representation of physical assets and codification of contracts in conjunction with accounting standards rather than audit transactions which enables greater focus on more complex transactions and internal controls, fundamentally changing the scope and approach of an audit opinion (EY 2018-2). With the support of these solutions, auditors can then interrogate the data and perform analysis of transactions, reconciling and identifying transaction outliers, especially as they perform audits for companies using cryptocurrencies and will lay the foundation for testing of blockchain assets, liabilities, equity and smart contracts as companies adopt blockchain technologies. Even blockchain has the potential to impact and redefine the traditional CFO role and revolutionize the finance function, blockchain's rise doesn't mean the end of the finance or audit team. EY viewed blockchain as an additive tool to support the auditors and CFOs to maintain their original responsibilities and daily tasks. The audit process and finance functions were not revolutionized by these blockchain audit tool, there were evolving and innovating by the additive tool, to release the professionals

in accounting and audit domain from meaningless but time-consuming repetitive tasks and pay more attention to work which requires professional judgment.

Jeanne Boillet, EY Global Assurance Innovation Leader, says: “As digital technology continues to advance, we are focused on developing innovative approaches to the audit process and providing confidence and trust to the capital markets. As companies are also focusing on how they embed technologies like blockchain into their financial processes, we are innovating the audit to meet their evolving needs and those of investors.” (EY 2018-1)

“Understanding exchanges and cryptocurrencies is the first step in our ability to develop tools to test various blockchain-based business contracts. These technologies lay the foundation for automated audit tests of blockchain assets, liabilities, equities and smart contracts. EY Blockchain Analyzer will be utilized by the auditor to analyze transactions on a blockchain and help provide insight to the finance function.” (EY 2018-1)

Real-time audit and reporting will release CFOs and their teams from certain routine, time-consuming tasks so that they can play more strategic, creative roles – and focus on new ways to deliver future business value, rather than keeping track of past costs. And human interpretation of data and transaction patterns will still be needed to generate the new insights that can lead to business growth. (EY 2018-2)

To scale the technology, the next phase would include multiple pilots including the development of customized regulatory compliance and reporting nodes. EY indicated that they have been involved in working groups with IFRS (International Financial Reporting Standards), FASB (Financial Accounting Standards Board) and XBRL (eXtensible Business Reporting Language), which are working to define financial ontology and future standards (EY 2018-2).

4.2.2. Disrupting and expanding service providing

Through the upgrade of the blockchain solutions and emerging of pragmatic use cases, EY gradually adopted its professional capability to disrupting institutions. For example, for value chain inside the wine industries, EY believed blockchain solutions are expanding beyond cryptocurrencies to disrupt the marketplace (EY 2019-4), besides, it continued to ask questions and engage with the debate about how blockchain will transform government and the wider economy, requiring governments to gain a deeper understanding of how they can help shape economic competitiveness in a blockchain world (EY 2019-1). Working with blockchain specialist EZ Lab, EY assisted to develop a platform called The Wine Blockchain to verify the value chain of each bottle of wine, tracing how wine be manufactured in the farm and transported to the grocery stores. The mechanisms that govern supply chains today are a complex mix of manual and digital processes, which need companies today to spend inordinate amounts of time and money which can be greatly reduced using blockchain (EY 2019-4). Thus, EY has recognized the potential of blockchain to create a more sufficient and transparent business process

for their customers in the supply chain management field. Moreover, the EY Advanced Technology Tax Lab, which launched in November 2018, plans to be at the heart of blockchain-related developments as part of a wider remit to solve complex tax issues through the application of advanced technologies. Blockchain technology could fundamentally transform how businesses and indirect tax administrations operate and interact (EY 2019-5). EY involved more in the prevailing implication of blockchain among different sectors, disrupting their own way of providing service before and bringing more cost-efficient blockchain solutions to its customers, except for just focusing on its assurance services.

Hackathon participants were challenged to enable separate blockchain networks to interoperate with each other using the Ion protocol, sharing data and properties seamlessly across a process without loss of information. This gave the teams freedom to be innovative; while testing the usability, flexibility and integrity of the framework. (EY 2019-2)

Automating the processes of applying, documenting and defending transfer prices is clearly attractive, but is it feasible? The short answer is yes. (EY 2019-3)

Built on EY Ethereum-based Ops Chain, customers scan a QR code on the packaging using their smartphone to access information about the chicken's birth right up to when it was placed on the shelf. Unveiled in June 2018, Carrefour plans to roll it out to eight more animal and vegetable product lines, including eggs, cheese, milk, oranges, tomatoes, salmon and ground beef steak, in a bid to guarantee what it describes as "complete product traceability". (EY 2019-4)

Starting with the Internet of Things (IoT), Langley says: "Digitization and connectivity of sensors mean that we can see where things are and determine their condition along every step of the way. Is this shipment on time? Are foods, drugs — even wines — being transported or stored at the right temperatures? These can be critical considerations within product safety and quality... and blockchain assisted by IoT can track everything within an indelible record." (EY 2019-4)

4.2.3. Creating innovations to become a game-changer

This year, EY announces that it has joined the Financial Blockchain Shenzhen Consortium (FISCO), a non-profit organization dedicated to the use of blockchain for financial applications. EY teams will use Blockchain Service Network (BSN) to offer EY Blockchain Analyzer and EY OpsChain to customers in China and across Asia Pacific region on the FISCO BCOS platform. EY will also use BSN's forthcoming controlled-access service to help enable regulatory-compliant access to the Ethereum network in China. In other words, the actions of EY are shifting from disrupting to creating, creating more terraces for the practical application of blockchain, creating more innovative services for related institutions, becoming a game-changer instead of an audience or a follower. FISCO BCOS offers multiple features, such as group architecture, cross-chain

communication protocols, pluggable consensus mechanics and privacy protection protocols, and will help make EY services regulatory compliant for clients in China.

Paul Brody, EY Global Blockchain Leader, says: “China is one of the largest markets for blockchain technology in the world, and, while EY teams have been operating there for several years, this is the EY organization’s first big step in deploying the EY blockchain platform in a scalable manner. By offering both FISCO BCOS and Ethereum, EY professionals will serve clients within China and across the Asia-Pacific region and connect those users to the global blockchain. I see this as a key step forward in connecting the world’s largest economies through blockchain technology.” (EY 2021)

Yifan He, Executive Director, BSN Development Association, says: “In our conversations with EY teams, it is clear we share a common vision of the power of blockchain technology and the importance of global scale. The EY organization’s position as the world leader in business applications on the public Ethereum network, and its large investment in assurance technology, is a great addition to our organization and will help create significant value for our users.” (EY 2021)

4.3. KPMG

4.3.1. Aggressively creating allies with technical giants

From year of 2016, KPMG responded and contributed positively to the emergent of blockchain by cooperate with other giant technology companies such as Microsoft and IBM. Under the alliance relationship, KPMG provides full lifecycle support to its customers’ blockchain infrastructure. Even with a priority focus on applications for financial services, KPMG showed that it will also further examine how blockchain technology can optimize business processes and models for healthcare and the public sector, and potentially other industries in the future. Although there exists lack of true signs of standardization, which may become key for adoption and regulatory acceptance, KPMG and its alliances are working together to jointly create a next generation, distributed platform that focuses on a number of key areas: Provenance, Trade Finance and Token Economics (KPMG alliance). Thus, unlike its counterparties, KPMG responded with creating activities when its counterparties choose to step into this area tentatively, attempting to assist its clients to simplify complex business processes and stay ahead in industry with blockchain.

KPMG Digital Ledger Services from KPMG member firms enable financial institutions to realize the potential of blockchain capabilities in the cloud, including faster and more secure transactions, streamlined and automated back office operations, and reduced costs. KPMG member firms can provide full lifecycle support – from strategic qualification and business case development to relevant use-case development, systems and operations integration, and on-going management of a company’s blockchain infrastructure. (KPMG 2016-1)

One thing is clear, you cannot ignore it. As part of our engagement with clients, KPMG China is continuing to research and assess different use cases and this report represents a part of that investment. (KPMG 2016-2)

4.3.2. Keep creating prototype and disrupting traditional business model

In 2017, KPMG continued its creating actions in specific industries such as insurance and asset management, and delivered disrupting strategies to the customers in these sectors. For insurance companies, by combining the capabilities of keen technical developers with a broad ecosystem, KPMG teams create market-leading prototypes which can scale, industrialize and integrate into the existing organization. Blockchain has the potential to disrupt existing business models by eliminating the need for intermediaries and more efficiently connecting counterparties in a way that allows them to transact without the need for a trusted central authority. And for asset management sector, blockchain and DLT are disrupting the status-quo for asset managers and their value chains. There is no doubt that blockchain and DLT technologies will have a fundamental — and in some cases disruptive — impact on asset management sector. KPMG suggested all players in the value chain to start developing a clear and strategic roadmap that will allow organization to respond to, and capitalize on, the shift towards blockchain and DLT technologies. The FundsDLT platform which was created through a partnership among InTech, Fundsquare and KPMG would allow asset managers to sell funds directly to investors, which in turn would dramatically reduce the cost of administration and the time taken to process transactions. At the same time, the regulators in different areas also played an open role as well, showing interests to cooperate with other participants during this phase, from the expression of KPMG.

At KPMG, we think of blockchain as an architecture for open innovation. It is one of the key delivery technologies that could help connect enterprise technology systems with new-age technologies such as wearables, drones and Internet of-Things (IoT) connected devices. (KPMG 2017-1)

Just recently, blockchain and Distributed Ledger Technologies (DLT) were considered merely aspirational and a form of exaggerated hype. Many were claiming that these technologies would not fulfill their potential for disruption and revolutionize the asset management sector. Although, today these aspirations are in fact approaching reality. (KPMG 2017-2)

It is quickly penetrating and changing the way firms, regulators, investors and managers communicate and share data. (KPMG 2017-2)

But it's not just about cost savings and faster processes. It's also about creating the right 'plumbing' to support sales directly to consumers at a low cost. (KPMG 2017-2)

KPMG sustained its disrupting steps towards blockchain technology in the following year. For airline sector specifically, KPMG Singapore has worked with Singapore Airlines

(SIA) and Microsoft to develop the first airline loyalty program “digital wallet” based on blockchain technology. With KrisPay, SIA's KrisFlyer members can instantly convert KrisFlyer miles into KrisPay tokens that can be spent with participating merchants. The digital wallet not only makes it easier for SIA customers to use miles in their KrisFlyer account, it allows SIA to onboard new partners and reconcile payments using blockchain technology (KPMG 2018-1). Moreover, in a IFRS podcast which introduced blockchain and cryptocurrencies, the partner and director of KPMG US, who both have great first-hand experience of the issues, expressed the disrupting potential of blockchain to impact all aspects of the financial reporting process, from preparing financial statements to auditing them and analyzing financial information.

Emma, Director, Financial Crime Legal Practice, says: “ I think, at the moment, it’s really important for our listeners to know that this is a really live, moving area, and there’s a huge amount of excitement around cryptocurrencies but also around enterprise applications and blockchain tech itself – so the use cases for blockchain tech and especially in a financial reporting setting. I think this could really steer us towards levels of standardization which were hard to achieve in the past.” (KPMG 2018-2)

Brian, Partner, Department of Professional Practice, says: “Absolutely. I think this is an area where traditional financial reporting people – like accountants, finance personnel, audit committees and auditors (both internal and external) – can play a really key role in assessing and addressing the risks that accompany innovation. ”(KPMG 2018-2)

4.3.3. Shift back to maintain status due to uncertainty

However, at the same time, the current study discovers KPMG began to maintain its own pace regarding to the development of blockchain by raising questions around how to actually regulate this technology and its applications, what regulatory frameworks that already exist would apply, and what need to put in place to ensure that it is effectively regulated and controlled since until the end of 2018, neither the FASB (Financial Accounting Standards Board) nor the IASB (International Accounting Standards Board) have provided specific accounting guidance on digital assets and it is fair to say that, as the technology continues to evolve, people are going to need to be thoughtful in thinking about what particular accounting standards govern assets that the world has never really seen (KPMG 2018-2). Moreover, in 2019, the U.S. Internal Revenue Service (IRS) issued new guidance on the tax treatment of virtual currency (KPMG 2019-2). It is intended to help taxpayers understand tax and reporting obligations for transactions involving virtual currency. However, the lack of standardized regulation and the limitation from some regulators lead to the slowing down of KPMG regarding its disrupting pace before and shift KPMG back to the practical maintaining concerns about the regulations and standards. This change also could be verified in its most updated public release in 2020, “Frontiers in Finance”, in which KPMG mentioned about creating trust in ESG data Using distributed ledger technology (DLT) to share verifiable ESG data.

We hope companies will continue to explore the ‘art of the possible’. But we also encourage international standards setters and governments to come together to see how these technologies can be leveraged to create a level of confidence and consistency in the growing ESG market. (KPMG 2020)

4.4. PwC

4.4.1. Steadily creating norms and setting tones

PwC stepped into the research of blockchain within specific wholesale insurance sector in 2016, sponsoring and working alongside Z/Yen Group which deployed its first mutual distributed ledger in 1995 and already had several blockchain insurance clients. PwC believed that there was a huge potential for blockchain to be a transformational technology within aspects of wholesale insurance, and accordingly it has cooperated with Z/Yen during the study of this topic. The goal of this study was to understand major business processes of the wholesale insurance market, to identify where there are perceived problems or inefficiencies, and to analyze where the new technology of blockchain can provide part of a solution. Even several respondents expressed the cynical view that some large participants had sustained in maintaining the status quo, PwC believed blockchain technology has unique characteristics that create new organizational and operational opportunities within wholesale insurance. However, insurance is a highly regulated sector, and any entity that is proposing to use blockchain would need to comply with its existing regulatory obligations or, alternatively, liaise with regulators and law-makers to amend the existing law to allow for such changes in the systems it uses.

Since much of the processing in wholesale insurance involves information exchange with other firms, there is a network effect whereby the greater the number of firms adopting a change, the greater the cost saving for each firm. This gives an incentive to agree such changes with as many other firms as possible, but this is counterbalanced by the difficulty of agreeing detailed changes and coordinating implementation, which grows with the number of firms involved. (PwC 2016)

4.4.2. The first trust

In the process of developing the application of blockchain technology, PwC identified “trust” as most important key word. “How can internal management team trust the new technology which might disrupt their own way of work? how can different institutions sharing a common network trust each other? Who controls the blockchain? Who gets access? Where are the servers? What physical and digital controls exist? Who monitors activity?” (PwC 2017-2). PwC raised several questions around the reliability of the new technology, to persuade their internal stakeholders, external auditors, their legal and compliance teams as well as regulators. Therefore, PwC proposed with its own assurance and consultancy service to provide “trust” to these blockchain service providers (BSP). Blockchain is an exciting emerging technology in the financial services industry. It could

offer a more effective way to handle a wide range of financial transactions. That seems helpful, but to have sufficient assurance over blockchain is necessary to maintain the trust of organizations.

Organizations are starting to review the potential of blockchain to disrupt their industry through new business models and efficiencies. With skills in demand, sourcing and vendor management leaders need to explore the market for consultancy services to navigate the fast-evolving blockchain world... Organizations are looking for blockchain consultancy services to help them across the entire adoption life cycle. (PwC 2017-1)

A. Michael Smith, the PwC partner in charge of Internal Technology Audit Solutions for Financial Services, notes that all of these concerns can be addressed today: “What will get blockchain to gain broader acceptance is a clear way to show that IA’s concerns have been addressed. I think we’re now at that tipping point. There’s a real, practical, cost-effective solution for blockchain assurance.” (PwC 2017-2)

“We’re convinced that distributed ledger technology will bring an array of benefits to companies, intermediaries, regulators, and investors,” said Grainne McNamara, a principal in PwC’s Capital Markets Advisory practice. “But this will only happen once stakeholders can be assured that blockchains have been set up effectively with appropriate reviews and controls, just as with any other new technology. As such, it is in all of our interest to build blockchain systems with reliable governance protocols that can be evidenced and examined.” (PwC 2017-2)

In global blockchain survey in 2018, PwC answered that “Why it’s hard to trust a blockchain?”. As with any emerging technology, challenges and doubts exist around blockchain’s reliability, speed, security and scalability. And there are concerns regarding a lack of standardization and the potential lack of interoperability with other blockchains. In order to multiple the value creation of blockchain, more players, even an entire industry, must work together to create the new ecosystem.

Make the business case: Evolution, not revolution. (PwC 2018-2)

The current regulatory uncertainty is not necessarily an obstacle to blockchain, however. PwC had suggested some companies to set up their pilots in more friendly geographies where they can test and adapt with fewer restrictions. Similarly, companies in emerging industries with little or no regulation related to blockchain may also have the opportunity to create greater progress. PwC used “Navigate” to illustrate positiveness about the regulation set up progress, calling participants in the progress of building blockchain infrastructure to join the mutual governance of this technology together instead of being one-sided governed.

Navigate regulatory uncertainty: Watch, but don’t wait. (PwC 2018-2)

PwC had emphasized that the potential of blockchain lies in its architecture ability to change and possibly subvert the traditional economic system - as distributed solutions

become increasingly dominant, it is possible to transfer value from shareholders to stakeholders. During the next few years, the focus will likely be on fixing technical limitations and addressing regulatory and legal challenges. Thus PwC also published report about the emerging applications of blockchain to address pressing environmental challenges such as climate change, biodiversity loss and water scarcity. The potential of blockchain applications to undermine the way the world manages environmental resources and help drive sustainable growth and value creation has been emphasized again. Some of these applications can greatly improve current systems and methods, while others can radically change the way humans interact and manage with environmental stability and natural resources.

The report also identifies enormous potential to create blockchain-enabled “game changers” that have the ability to deliver transformative solutions to environmental challenges. These game changers have the potential to disrupt, or substantially optimize, the systems that are critical to addressing many environmental challenges. (PwC 2018-1)

Celine Herweijer, Partner, PwC UK, commented: “Blockchain applications to transform finance and commerce have been front of mind for business and investors to date. But there is an opportunity for fresh ideas to harness this nascent technology to help deliver big gains for our environment. From transparent and trusted clean and ethical supply chains, to incentivizing sustainable consumption and production, or underpinning the much needed transition to low carbon decentralized energy, water and mobility systems.” (PwC 2018-3)

Although there are enormous possibilities available about the blockchain applications in recent years. In 2019, PwC found out that activity in cryptographic assets has increased, it has attracted regulatory scrutiny across multiple jurisdictions. Thus, it published a white paper highlighting some of the accounting questions that are currently being debated and shared a deep insight on how IFRS could be applied to the cryptographic assets and related transactions to maintain its assurance services to clients who were holding or transacting in cryptocurrency.

James Chalmers, Global Assurance Leader, says: "It is important as companies continue to digitize that we, as auditors, keep up with technology changes in the market, continue to develop audit tools that meet the needs of emerging technologies and serve the changing and developing demands of our stakeholders." (PwC 2019-2)

4.4.3. The second trust

However, in 2020, the “trust” came out again, unlike its maintaining and questioning characteristics in 2018, it asked for disrupting the conservative pace and rethinking the “trillion-dollar reasons” for blockchain. PwC economists found out that Blockchain technology has the potential to boost global gross domestic product (GDP) by US\$1.76 trillion over the next decade by assessing how the technology is currently being used and gauged its potential to create value across every industry, from healthcare, government

and public services, to manufacturing, finance, logistics and retail. Moreover, organizations are rethinking the way they operate in response to the impact of covid-19 and the way the pandemic has accelerated many disruptive trends, such as the shift to digital ways of working, communicating and dealing with customers and coworkers totally.

Steve Davies, Partner and Blockchain Leader, PwC UK, says:" Serious activity around blockchain is cutting through every industry across the globe right now. It's driven by an acute need to win trust in the digital world. Businesses are rethinking their operations and are discovering not only is blockchain technology key to delivering trust, but it's an opportunity open to all." (PwC 2020)

Tomohiro Maruyama, Senior Manager, PwC Japan, says:" Countries have to believe in each other in order to work together, which is difficult when each government believes their own system is right and might regard others with distrust. Blockchain technology can provide a platform for sharing data around global issues, such as climate change, that transcends borders and facilitates trust between countries." (PwC 2020)

Guenther Dobrauz, Global Leader, Financial Services, PwC Switzerland, says:" Blockchain is going to become an infrastructure technology – like the internet. No one really cares how the internet works, but it has become integral to our daily lives. The same will be true of blockchain. We haven't reached that tipping point yet because there are no dominant players. At some point soon, this will change." (PwC 2020)

5. Discussion

5.1. The various institutionalized goal of Big 4

Research on institutional work examines the practices of individual and collective actors aimed at creating, maintaining, and disrupting institutions (Lawrence et al 2011). My focus in this paper is using the institutional work as a field of study to provide a theory bases for the actions of professionals in each Big Four accounting firm. Lawrence et al (2011) have argued that two issues are critical to understanding how the concept of work might usefully be connected to institutions — intentionality and effort. The most commonly agreed view of intentionality with respect to institutional work is associated with what they describe as “projective agency” which emphasizes a future oriented intentionality, focusing on consciously and strategically reshaping the social context and managing emergencies (Emirbayer & Mische 1998). The notion of effort implied the connection between effort and goal inside the concept of institutional work. Institutional work therefore involve physical and mental effort aimed at creating, maintaining, and disrupting institutions. I think that examining such kind of intentional effort could reveal the practices that might be their intended or unintended outcomes. With such prerequisite, it is straightforward to understand the emergent institutional process of Big Four accounting firms during the development of blockchain and their perceptions and contribution in institutionalizing the blockchain regarding the development process at the organizational level. What’s interesting is their different reactions from each other to this emerging technology from 2016 till 2021. I understand that the development of technology is changing with each passing day, however, how should they handle with the ever-changing environment brought by a new management fashion such as blockchain, what are their purposes when they conduct the institutional work alongside the process, and how should they deal with the competitive relationship with each other will be interesting to explore.

5.1.1. 2016-2017

At early stage from 2016 to 2017, Deloitte focused on maintaining the original institutional domain more when embracing this emerging technology. At first, they questioned companies when and why they should employ blockchain-enabled applications instead of existing mature technology, rather than take the initiative to seek transformation, companies should fulfill some requirement to be pushed to change. And for additive manufacturers, the role of Deloitte was also be regarded as an assistant to assess the situation and suitability of the company for blockchain potential, even they saw the blockchain might fulfill the increasing need for connectedness and security in the future. To decide whether companies should implement blockchain, Deloitte suggested them to join consortia which is a low risk effort to maintain the current trend, defend

against potential new threat and know what their competitors are doing. But this pursuing stability altitude was not stable at the same time, the advantages of open-source environment, sharing economy as well as first-mover to lock in customer early were mentioned a lot in Deloitte's reports. However, during when Deloitte was exploring what blockchain can do, EY published only several articles to simply introduce blockchain which are not included in current study due to their smaller in scope and relevance, which might illustrate that EY was attempting to maintain its status-quo to not touch that technology deeply at that time. Paul Brody, Global Innovation – Blockchain Leader at EY, says in 2016: “Regulatory approval is going to be required for any major implementation of blockchain in company accounts and reporting, which means that we won't see a rapid adoption of the technology.” EY also saw the other shortcomings of blockchain that need to be addressed including its comparative slowness, heavy consumption of power, privacy issues as well as limited scalability to date. Moreover, EY stated that no matter how this technology will grow into, the auditors will need to audit it. However, unlike Deloitte and EY, KPMG chose a more actionable intention facing the rise of blockchain before 2017. It published several reports with respect to specific sectors such as insurance and asset management, to help connect the current enterprise technology systems with new-age blockchain implication as well as IoT devices. KPMG emphasized the potential of blockchain to simplify the business process and stay ahead in their counterparties. By creating alliance relationship with large technology company like Microsoft, KPMG had the initiatives to optimize business processes for more industries other than financial services, such as healthcare and public service sectors. To disrupt the status-quo for these industries and their value chain, KPMG offered opportunity to educate industrial players to prepare for the future. Although, the concerns about the lack of standardization and regulation uncertainty exist as well, but the open innovation potential of blockchain was playing a dominant role in the first two years for KPMG. At the same time, in 2017, PwC was cited as a representative vendor in Gartner Market Guide for Blockchain Consulting and PoC (Proof-of-Concept) Development Services to provide blockchain consultancy service to organizations across the whole lifecycle. Meanwhile, PwC also asked companies to consider the trust creating issues for the new technology. With questions like can you rely on it? and will internal audit team in your company accept it?, it seems that to have sufficient assurance over blockchain is prerequisite to gain broad acceptance of change. PwC was interested in helping companies building blockchain systems with regard to reliable compliance requirement that can be examined by different regulators.

It is obvious that these four similar but independent firms responding differently to the emergent of blockchain from 2016 to 2017. Deloitte focused more on its risks and uncertainties that need to be addressed later and maintained institutional work in independent assessment and assistance instead of creating or disrupting original set. EY was still watching and exploring, almost no action in this area and emphasized the importance and necessity of assurance over blockchain. However, KPMG took a more

proactive approach, cooperating with other giant technology companies and attempted to disrupt the status-quo. Besides, the activities of PwC were more compound during this period, it seized the opportunities of create more consultancy service lines and maintained its original proven compliance protector role at the same time.

5.1.2. 2018-2019

From 2018 to 2019, the situation had dramatically shifted. Deloitte started to conduct global blockchain survey polled a sample of more than 1,000 blockchain-savvy executives yearly to gain insights into the overall situation and investments in blockchain, as a leading indicator of where blockchain is headed. It said:“ Momentum is shifting from a focus on learning and exploring the potential of the technology to identifying and building practical business applications.” Thus, Deloitte was pursuing a direction to build a new ecosystem for blockchain solutions in order to create innovative business models and disrupt original ones, not for a specific industry, but for everyone. To adopt to this technology, company should join consortia which requires a shift in mind: you must work with your allies, no matter competitors or not, to achieve the great value brought by blockchain. In the global blockchain survey, Deloitte also conduct regional survey to serve as guides for organizations which are looking for global partners, and China, Singapore and USA were always showing a promising perspective in both results of two years’ survey. In short, Deloitte saw the potential for blockchain to help organizations create value for businesses beyond anything with existing technologies and the only mistake they can make for now is to do nothing. In the meantime, EY was involved more positively in the architectural of blockchain. It announced several blockchain audit technologies, such as first and second generation of EY Blockchain Analyzer, to support its audit team providing assurance service for clients using cryptocurrencies. Working with blockchain specialist EZ Lab, EY teams helped to develop a platform called The Wine Blockchain. Moreover, EY even developed Ethereum-based Ops Chain to help customers trace the supply process of products. During the middle phase, EY saw the potential of blockchain to redefine and reshape the role of CFO and auditors since many current workload could be automated, the real-time audit and reporting of financial statement could be completed by the cryptography mathematics, thus they could focus on more complex and judge-needed tasks. For a broader perspective, EY thought that the government should also gain a deep insight about how blockchain could shape the economic competitiveness. Meanwhile, KPMG kept disrupting institution actions but also intended to maintain its own pace with blockchain. The distributed platform could help to redefine the global trade. Working with Singapore Airlines (SIA) and Microsoft, KPMG developed a blockchain based airline loyalty program named “digital wallet”. Moreover, during a IFRS podcast interview, the partner and director of KPMG stated that blockchain could disrupt the original role of traditional financial executives and lead us to a level of standardization that was difficult to achieve in the past. But the issues of regulation and standard of tax, transaction and reporting were frequently mentioned in

the report, the U.S. Internal Revenue Service (IRS) issued new guidance on the tax treatment of virtual currency, but neither the FASB nor the IASB have provided specific accounting guidance on digital assets, therefore, people should be thoughtful of what kind of governance will be needed to assure it is effectively regulated and controlled. The three most important reports published by PwC expressed its simultaneously disrupting and maintaining institutional work. “Building block(chain)s for a better planet” which is blockchain-based research for ESG, emphasizing the potential of this technology to be the game-changer addressing the current environmental challenges, shift traditional economy systems and transform the way human being connected with natural resource. In 2018, similar to Deloitte, PwC also conducted global blockchain survey, proposing four strategies (Make the blockchain business case; Build an industry ecosystem; Design deliberately: determine rules of engagement; Navigate regulatory uncertainty) for blockchain business. Nevertheless, there are no accounting standards that specifically address cryptographic assets, one must look at the existing IFRS and apply a principles-based approach, thus PwC released “Cryptographic assets and related transactions: accounting considerations under IFRS” as a guidance to handle the accounting issue related to the virtual assets. And the new Halo tool provided audit solution to clients holding cryptocurrency.

During this period, the current study found out that Deloitte’s intentionality and efforts had shifted from maintaining to disrupting and creating, proactively chasing the innovation brought by blockchain. And EY participated into the battlefield in an energetic behavior rather than being a bystander. Meanwhile, KPMG kept its disrupting work but also slightly slowed down to maintain due to more emerging concerns. PwC sustained its strategies from 2016 to 2017 to disrupt and maintain at the same time, seeking more possibilities and stability concurrently.

5.1.3. 2020-2021

From 2020 till 2021, Deloitte continued its global blockchain survey which indicates that management team now regards blockchain as integral to organization innovation instead of just seeing a breakthrough or promising technology. EY announced extension of blockchain solution deployment in China on Ethereum and Financial Blockchain Shenzhen Consortium Blockchain Open Source platform in cooperation with Blockchain Service Network. However, KPMG hadn’t publish any separate white paper or press release about blockchain any more, the more relevant one I can find is in its most updated “Frontier in Finance”, illustrating the idea about creating trust in ESG data using distributed ledger technology to share verifiable ESG data. But PwC gauged its potential to be used across every industry, especially with the impact of COVID-19 which accelerated the disruptive digitalization trends.

As far, Deloitte, EY and PwC seem to try their utmost to keep pace with, even lead the way the blockchain could march in the audit industry and influence their clients, creating

more possibilities and disrupting the traditional business models. But it seems that KPMG adopts another conservative approach to maintain its own pace and interest in blockchain and its connection with other industries and companies, shifting from its original disrupting way before 2017.

What's more, EY and PwC paid more attention to maintain their assurance service providing to clients who hold cryptocurrency more. The announcement of audit tools and detail guidance of accounting issue under IFRS attach great importance of audit business to them. Even there has no formal standard to regulate the market, their guidance could be key factors considered by legislator later and they could provide more experience to clients about the financial processing after a broad implication of blockchain later. Deloitte and PwC both conducted global blockchain survey which interviewed thousands of executives in related field to show a full-scale and thorough situation about blockchain all across the sectors and different regions. But Deloitte conducted the survey in a yearly frequency, PwC only had done it once in 2018. The nuances between their discursive institutional work show the differences in their intentionality and effort paid in this emerging technology. KPMG was the first one trying to disrupt the exploratory status-quo, cooperating with Microsoft and IBM to develop several platforms to support its clients which were interested in staying ahead in this field. However, the pace of KPMG seems slow down to a more stable status which does not mean that KPMG is going to abandon the blockchain, but this situation might last for a while until its concerns about the regulations and risks get resolvable solutions.

To conclude the current analysis, even Big Four are all driven by this innovative technology from 2016 and influenced by similar external environment as service-oriented companies, their nuances during the process cannot be negligible. With no doubt, they are all trying to promote and support the application of blockchain from the interests of their customer. DiMaggio and Powell (1983) use the concept of normative isomorphism to explain why professional groups (e.g. committee groups, consultants, and industry associations) proclaiming similar approaches and attitudes to diffuse change. Company tends to copy or follow the counterparties' strategies when the direct environment is uncertain or it doesn't have a complete strategy, and the basic idea of normative pressure is that professionals with the same educational background are thinking in the same way and have a similar mechanism to solve problems just like the professionals in Big Four accounting firms. Thus, their discursive institutional work was impacted by the competition among each other and the need to meet the interests of their customers. However, at the same time, the obvious nuances behind their discursive institutional work cannot be negligible. To better understand the their purposes behind these institutional works, the current study should put attention on understanding how these professionals accomplish their own social construction of rules, scripts, schemas and cultural accounts (Lawrence and Suddaby 2006). Beckert (1999) extends this focus on the cognitive connection between action and institution, arguing that institutional rules and strategic

actors both play the role as coordinating mechanisms in the marketing environment where actors are attempting to pursue institutionalized goals of gaining profit or competitive advantage. The concept of institutional work refers to the actors with strong practical skills and cultural sensibility who creatively navigate within their own organizational fields. Even they all face the same external environment, their institutionalized goals are various since their customers are different, so as their focus on the service category. For example, PwC and EY paid more attention on the assurance service, maintaining their assurance service quality is crucial for them, but Deloitte would like to contribute more to the development progress of this technology to benefit its customers, its global blockchain survey proceed from “Breaking blockchain open” in 2018, “Blockchain gets down to business” in 2019 to “From promise to reality” in 2020, showing its purpose from exploration to create more opportunities related to this technology for itself and its clients in different sectors. Lawrence and Suddaby (2006) also mentioned the concept of diffusion which is central to institutional theory. The diffusion of innovation throughout an organization, even a whole industry, must persuade other participants inside the institutions of the merits of the innovation, attempt to use the innovation in proclaimed use cases to understand it and how it might apply to their own situations, modify the innovation to gain internal and external legitimacy and establish practical links for new architecture and structures. From the perspective of “projective agency”, their actions towards this technology illustrate their purposive progress. The diffusion of blockchain conducted by Big Four accounting firms spreads among their clients, competitors as well as regulators, they are modifying it with their own interest and align with their specific situations, pursuing their own differentiated institutionalized goals of profitability, becoming champion in this area to guide development of blockchain in audit industry or just not missing out from their peers.

5.2. Hype and Dehype around the blockchain

PwC economists projected that it could account for as much as 10% of global GDP by 2025, blockchain has received considerable hype regarding its potential to create wide-reaching impact. On the other hand, there has also been significant skepticism with regard to its performance and scalability that has thus far kept crypto-networks from seriously disrupting centralized systems. The publications of Big Four accounting firms are intended to affirm its potential to bring many aspects of benefits to their own and other companies, and at the same time, to dehype those taken-for-granted hype around blockchain.

In its numerous potentials, such as process efficiency, cost savings and risk reductions, there are several ones specific emphasized by Big Four accounting firms to drive blockchain’s adoption. Blockchain has no requirement for intermediation which reduces the transaction costs and rises capabilities in computing, storage and bandwidth, enabling multiple members in a shared network to connect seamlessly (Deloitte 2018-2, KPMG

2016-2, PwC 2018-1). One of the main benefits of blockchain is its potential to create, store and share sensitive information online in real time. Contracts, identity documents, certificates, official records and agreements can all be verified in a safe and reliable way (PwC 2020). As companies become more globalized and digitized, maintaining trust can become expensive, time-consuming and inefficient. The immutability of the blockchain will improve the reliability of data and counterparties, and reduce the possibility of fraud, thereby increasing trust and traceability (Deloitte 2018-2, KPMG 2016-2, PwC 2018-1). There is no need for manual reconciliation which could decline operational redundancy (KPMG 2019-1). In the world of "sharing" economy, decentralized business models are becoming more and more common. However, these models still have large aggregators of control information and systems, which means an unequal redistribution of value among all contributors. Blockchain can eliminate the need for centralized aggregators, thereby democratizing value exchange in sharing economy business (Deloitte 2018-2). The decentralized execution process actually eliminates the risk of manipulation, non-execution or errors, because execution is automatically managed by the network rather than by a single party. Rebuild trust and certainty among multiple participants and enable peer-to-peer transactions (KPMG 2019-1, PwC 2018-1). Blockchain has potential to create new business model and disrupt the traditional one. Enabling new types of products and processes between participants in a shared ecosystem (KPMG 2019-1) and effective monitoring, audit and compliance (PwC 2018-1).

The hype surrounding blockchain mentioned a lot in publications of Big Four accounting firms above might stimulate the excitement of public and promotes its implication in a quick way. However, the existing obstacles clarified by Big Four accounting firms also dehydrate the benefits which are taken for granted to a reasonable extent at the same time. For example, the degree to which users trust and understand the technology could prove obstacles to adoption (Deloitte 2018-2, PwC 2018-1). Deloitte stated that 39% of senior executives in large US companies have little or no knowledge of blockchain and the percentage of respondents who felt this issue is a barrier was 28% (2018), 28% (2019) and 31% (2020) respectively. And Deloitte suggested executives to establish contacts with industry thought leaders, visit existing use cases, or establish contacts with industry associations (Deloitte 2018-2, Deloitte 2019, Deloitte 2020-1) to solve this problem. In order to be transformative in implement blockchain to more realistic practices, blockchain applications will need to be able to scale up effectively, gaining widespread industry and user acceptance. The availability of the technology is currently a key barrier to entry – many existing interfaces of blockchain ledgers are too complex for mainstream adoption today. Specific areas that need to be improved include user experience, system speed, and the lack of formal blockchain protocols (PwC 2018-1). The data showed in Deloitte's global blockchain survey from 2018 to 2020 also illustrate that it should not be taken for granted to replace existing legacy system with blockchain platform (Deloitte 2018-2, Deloitte 2019, Deloitte 2020-1). Moreover, all IT systems face cybersecurity risks, and blockchain is no exception. By design, compared with the traditional centralized database,

the blockchain ledger usually shares more data with other participants, because the data usually needs to be shared equally among multiple peers. However, companies cannot publicly disclose private data for legal or competitive reasons. To overcome this contradiction, public and private keys are required to access most blockchain ledgers. Since it is essentially impossible to access data without the right combination of public and private keys, protecting these keys depends on a single user safely storing and processing them, which can be daunting for users who are not familiar with the technology (PwC 2018-1, Deloitte 2018-2, Deloitte 2019, Deloitte 2020-1). Even considering the early stage of blockchain development, it is natural that there is no specific blockchain standard, but when standards are developed within each platform, the interoperability between platforms and with companies' own original ERP systems is currently extremely limited and usually does not exist, since users will need to establish appropriate data models and business processes that support blockchain to integrate new authentication and communication protocols, this may bring expensive operational challenges (PwC 2018-1). Deloitte stated in its survey that 56% of executives believe that technical standards are critical to widespread adoption (Deloitte 2018-2). Even if new blockchain-based solutions are being developed, there is a lack of uniform standards on blockchain technology. As it assumes that companies in upstream and downstream industries might will share a common blockchain network in the future, to have a standard protocol will be efficient for members to connect together.

The extensive discussions about the breadth and depth of the potential impact of the public and private sectors and the entire society, blockchain has received considerable hype - derived from its existing capabilities and expected technology development roadmap, which shows that as the technology matures, it may become a basic technology such as the Internet and can greatly improve operational efficiency. From 2018 to 2020, trust about the capability of blockchain showed in Deloitte's survey was improving, but 54% of respondents in 2020 still see blockchain as overhyped, increasing significantly from 39% in 2018 and 43% in 2019. From perspectives of accounting firms, the hype around blockchain is homogenous with their customers, the skill needed and mastery of technology utilization would depend on the degree of widespread application of that technology to their customers. Thus, to some extent, the popularity of blockchain among Big Four accounting firms is due to blockchain firmly embraced by their customers. As professional service providers, they need to be knowledgeable enough and step at the forefront to maintain its reputation and service quality. I have not seen the original blockchain platform developed by these firms independently, what they are doing is to keep pace with other giant technology companies or cooperate with them, to maintain their sensitivity to new technologies and be ready for disrupting outdated scenario and creating more business opportunity. There are few tools or solutions that can accomplish what they claim can be done and their marketing goals. Even so, many new tools and solutions are still very useful and can even be the game-changer. Except for its marketing characteristic, the implications of blockchain across sectors do need accounting firms to

provide necessary service to meet the compliance requirement – audit, which is another way to dehydrate the hype around blockchain.

Blockchain is an exciting technology with potential to change the original business model, but to rely on it, no matter from internal or external perspective, to have a sufficient assurance over the blockchain seems to be a prerequisite to gain wide acceptance, especially before it achieves widely acceptance of public. Therefore, to conduct a blockchain assurance, PwC's white paper (PwC 2020) proposed three steps that should be included: 1)Evaluating the business use case and the needs of all stakeholders; 2)Assessing the underlying cryptography, including how private keys are managed and how blockchain engine security is maintained; 3)Examining how the specific network has been set up, how that system's reports are being generated, and the controls that guide that network's operation.

It is difficult to know how much hype will be achieved and, in turn, how the broader market will mature. The degree and speed of blockchain development will depend to some extent on the speed at which technology, regulations, scalability and other challenges including trust can be overcome. As the architecture of this transformative technology matures and the hype and skepticism of the blockchain begin to be rationalized, Big Four accounting firms are at the core of hype and dehydrate process as the professional agency when institutions are created, transformed, and extinguished and interaction with other stakeholders to affect institutional change (Dacin et al 2002).

5.3. Interactions between cultural-cognitive/normative agents and regulative agents under regulation uncertainty environment

Usually, regulations have not kept up with the technology development. However, Deloitte indicated that regulations around blockchain applications could promote its adoption and industry participants can work with regulators to formulate authorization regulations steadily. Percentages of respondents who feel regulation is an obstacle to blockchain investment are from 39% in 2018, 30% in 2019 to 32% in 2020, top barrier both in 2018 and 2019, but ranked third one in 2020, behind the percentages of the replacing existing systems risks and security risks (Deloitte 2018-3, Deloitte 2019, Deloitte 2020-1). Similarly, PwC also stated in its global blockchain survey to present regulation uncertainty as a significant obstacle (PwC 2018-2).

As developers focus on solving the technical limitations of the blockchain and building the network that constitutes the infrastructure layer of the cryptocurrency stack in the next few years, it is also necessary to establish a legal and regulatory environment suitable for their purposes for jurisdictions around the world. Current crucial regulatory and legal challenges for blockchain scaling include: "Distributed" jurisdiction and "networks" of laws: Legislative frameworks are currently defined by each jurisdiction (PwC 2018-1). Each node of Blockchain does not have a specific or clearly identified physical location

for each transaction, which means it is complicated to decide which law should be adopted and which courts have the power to rule on this matter is complicated. Moreover, it is difficult to define a responsibility for blockchain, who should held accountability, who is running it and how it runs which need to clarify by legal system and regulative framework. Blockchain ledgers are immutable, meaning that once data is stored it cannot be altered. This has implications for data privacy, particularly where the relevant data is personal data. Therefore, the public blockchain system poses a challenge in balancing the privacy of individuals with the concept of open networks. If organization is subject to handling personal data via blockchain, the legal right of privacy should be carefully considered, especially in some European countries, it is unclear how any blockchain meet the EU-wide GDPR privacy standards.

Blockchain is usually based on a multi-party cross-border architecture, covering many regions and their respective regulatory systems. Generally speaking, different governments have different positions on blockchain and digital assets. Some countries are more stricter than others about cryptocurrency, data flow and privacy. For example, the cryptocurrency is illegal in China, but accepted by Hong Kong region and Singapore. However, in 2020, the central bank of China announced the digital currency plan for Yuan, the Chinese national currency, which has potential to gain a US\$440bn upward over the next decade, with an increase in GDP of 1.7% (PwC 2020). But China also has restrictions over the cross-border flow of sensitive data. And many countries and regions have regulations that directly affect the configuration of the blockchain, even if the regulations themselves are not directly related to the blockchain, such as the General Data Protection Regulation (GDPR) that governs privacy within the European Union (EU). The geographical variability in the blockchain architecture further exacerbates the complexity, especially around which laws are applicable and when, as various regulations develop and often become more complex, this dynamic becomes more challenging.

The good news is that where challenges exist, opportunity is often not far behind. Industry players, regulators, standard-setters, and professional service providers have the chance to work together in forging common guidance and establishment of best practices under an absence of regulation in an ordered phase. Among all parties that play a role in the global blockchain ecosystem, the engagement among parties may help to enhance people's understanding of the risks, responsibilities, and requirements that follow. For Big Four accounting firms' part, professional service providers who have a deep understanding of the underlying technology and the evolving regulatory complexity that governs its implications will play a critical role in assuring compliance. At the same time, these actors also could provide more various services except for assurance, such as consultancy service for data cross-border and anti-money laundering to diverse stakeholders – government, developer, as well as other industrial players.

Scott (2008) proposed a pillars typology of agency framework to identify three different types of professionals at work in contemporary society: cultural-cognitive agents,

normative agents, and regulative agents. Cultural-cognitive agents exercise control by defining reality — by devising ontological frameworks, proposing distinctions, creating typification, and fabricating principles and generalizations (Scott 2008), they are relatively remote to share a common perception to solve the problem and claim knowledge to the extent that their clients accept. Normative agents carry on work that is “primarily oriented to formulating and promulgating normative beliefs” (Scott 2008). They often collectively issue standards and principles supporting normative conclusion in their area of expertise, focusing on the exercise of “evaluation, interpersonal control in day-to-day practices”. However, regulative agents have privileged access to use regulatory powers to exert control over their members, they are able to obtain state or other coercive backing to enforce their “jurisdictional claims, conditions for entry into practice, and some of the specific powers they exercise as practitioners” (Scott 2008). Back to current study, Big Four accounting firms emphasize more in the cultural-cognitive and normative element, however, they lack regulative elements to possess ultimate authority of an enforcement of a new application. Thus, they need to mobilize the power of other regulative agents such as FASB to support or guide their directions about an uncertain innovation such as blockchain.

Therefore, there are continually some calls from Big Four accounting firms to standardize accounting for cryptocurrency investments, they even published several guidance about the accounting treatment for cryptocurrency. What’s interesting is that, in response to those requests, FASB do considered whether to add a project to address the accounting for cryptocurrencies or “digital assets”, however, in October 2020, the Board concluded that the FASB’s agenda decision criteria were not met and decided not to add a project to its technical agenda, still the same as the conclusions made by FASB for years. Pre-agenda research and outreach indicated that the issues around cryptocurrency were not pervasive during these years. Research indicated that many companies do not have exposure to cryptocurrency-related issues, and for those that do, the amounts are immaterial.⁸ The contradiction expression made by regulative agents such as FASB and cultural-cognitive/normative agents such as Big Four accounting firms is interesting. With no doubt, accounting firms need the support from the regulative agents if they decide to promote this technology to more customers or to open a new business line about it since they cannot refuse the coercive power of regulative agents in this domain. If this technology is fully denied by regulative agents, there is nothing they can do to convert. However, the potentials brought by blockchain might help Big Four accounting firms to gain more revenue and attract new customers. Under the threat of AI which claimed to be ready to replace the auditors in the future and other counterparties that propose low price to grab the limited customer in the market, Big Four accounting firms may need seize the opportunity in a new field to expand their traditional role to gain more profitability and stay ahead in audit industry. From this perspective, they have to cooperate with regulative

⁸ https://www.fasb.org/jsp/FASB/Document_C/DocumentPage&cid=1176176260390

agents to gain more coercive capability. However, the ambiguous attitudes of regulative agents may cause them to hold a more conservative action towards this technology. For now, the only mistake they can make is still to do nothing, however, what they can do is also be limited and regulated by the coercive power of regulative agents.

6. Conclusion

6.1. Conclusions and contributions

In the past few years, blockchain has evolved from a cryptocurrency or payment platform to a broad ecosystem of digital automation. Blockchain technology may have a disrupting impact on existing audit paradigm as well as other related service with its potentials. However, the current blockchain technology is still in the preliminary stage of exploration, and there are still many unsolved challenges in the development of blockchain technology in the audit industry as well as other industries.

The current study addressed the discursive institutional work of professionals in Big Four accounting firms in front of the emerging of blockchain. So far, it is increasingly recognized that role of professionals played in initiating and mediating changes in a broader scale of society and help redefine and reconfigure what is in existing institutions (Empson et al 2013, Scott 2008). The relationship between institutional work and the professionals has been explored in terms of how they be connected to broader institutional change in societies (Suddaby & Viale 2011). Moreover, Greenwood et al (2002) conducted a study on the institutional work of professional accountancy associations at the moment of change over two decades from 1977 to 1997 in which firms offered services beyond their traditional borders, moving from accounting to business advisory services. However, the empirical applications of institutional work so far relatively underdeveloped (Empson et al 2013), further research is still needed to explore how specific professionals contributes to the “creating, maintaining and disrupting institutions” during the changing period. And so far, there exists a gap of research for institutional work when integrating the emerging technology such as blockchain which could influence both the commercial opportunity and daily work of professionals to a large extent, to study when, why and how the professionals as agents engage in institutional change (Burns & Nielsen 2006) could be an interesting topic and will have a profound impact to society.

The current study conducts a detail discursive analysis on Big Four accounting firms’ publications on their institutional work during the development of blockchain to show the potential of proclaimed implications of blockchain technology related to the audit industry. I bring the professionals into current study since they are the most active, influential, contemporary crafters of institutions, moreover, as the an key intermediary in the business world, accounting firms could provide multiple services except for assurance to guide their customers in all sectors. The intentions to create, maintain or disrupt institutions of professionals are interesting to further illustrate the intended and unintended outcomes of their actions. Thus, to analysis the institutional work of Big Four accounting firms could show the impact of blockchain not only on audit industries, but also on other sectors, even, to a social scale. The current study doesn’t focus on the

technical feasibility of blockchain technology, but from a different perspective from organizational study, showing how the Big Four accounting firms as institutional agents engage in discourse to shape the institutionalization of blockchain internally and externally during which they indicate the hype and dehype around blockchain at the same time to legitimate this technology before it matures and broadly implicates. Therefore, as it is now obvious that the Big Four accounting firms engage extensively in promoting this technology and developing services except for assurance based upon it, the current study has asked the following question:

How do Big Four accounting firms respond and contribute to the development of blockchain by participating in the discourse through publications?

To answer this question, it is interesting to find out that the four organizations responded and contributed to the development of blockchain in different situation during last six years. In short, Deloitte and EY chose to gradually step into this field, from maintaining at the very beginning to disrupting and creating later. On the contrary, KPMG responded in the opposite direction, from disrupting to maintaining nowadays. Compared with the other three associations, PwC tried blockchain in a more average pace, creating more opportunities for its business but maintaining its focus on assurance service as well. To understand the reason behind these nuances, the further study might should pay attention to understanding how these professionals accomplish their own social construction of rules, scripts, schemas and cultural accounts (Lawrence & Suddaby 2006). Even they all face the same external environment, their institutionalized goals are various since their customers are different, so as their focus on the service category. With no doubt, the agreement they all have reached is that they cannot do nothing. During the development of blockchain, there have numerous hype around this technology. I also found out that Big Four accounting firms also use their institutional work to dehype it at the same time, either by publishing blockchain global survey or by stating the unsolved obstacles related to its implications in actual situation. Moreover, the interactions between them and other regulative agents such as FASB are also interesting to notice. Since the lack of coercive power, professionals have to mobilize their relationship with regulative agents to get the support for further development of emerging technology, especially when they have intentions to lead the industry or create more profitable opportunities related to the uncertain innovation. During the process, Big Four accounting firms have to create normative pressure on companies to broadly adopt blockchain. And the obstacles are required to be further solved in the future, which is in need of the cooperation among different actors, not only professionals, but also developers and regulators, as well as other industrial players. The institutionalization process have to combine the cultural-cognitive elements, normative elements and regulative elements together to reach a socially broad agreement (Scott 2001).

6.2. Limitations and further research suggestions

However, I have to admit that there are several limitations in this study. Firstly, the number of the empirical evidence is limited, it might be incomplete to reach to the conclusion by a small number of publications I collect for now. However, due to the limitation of number of the publications related to blockchain in global websites of Big Four accounting firms, it is difficult for me to get more publications from the original source. Therefore, I also recommend a further research to include more empirical sources such as the regional publications and other relative organizations' press release into the institutional research for this domain. Secondly, the further research also could include other activities and events held by accounting professionals except for the written words published at the website, such as the roadshow events and interviews. Moreover, there are huge differences in the maturity and public acceptance of blockchain construction in different regions all over the world, so more in-depth regional research can be carried out in the future.

Blockchain in accounting and audit industry still has lots of interesting areas to explore. Therefore, at the end of this study, I would like to suggest more direction for future study in this domain. For example, inside the accounting industry, scholars could continue to conduct the institutional work of professionals in other institutions such as investment bank and private equity in blockchain domain. What's more, within the audit expertise, studies could be performed on how assurance service actually conducted for companies which actually implemented blockchain technology when there is a lack of a standard guideline from regulative agents.

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