

BLOCKCHAIN ACCOUNTING

**CLAIMING PROFESSIONAL LEGITIMACY THROUGH
DISRUPTIVE NARRATIVES**

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Blockchain accounting: claiming professional legitimacy through disruptive narratives

Abstract:

Purpose – This thesis aims to explore how and why accounting firms engage in adopting emerging, potentially disruptive technologies such as blockchain as part of their professional domain. While previous research has addressed blockchain's potential impact on accounting systems, the current study focuses on its institutional implications.

Design/methodology/approach – This thesis builds upon a qualitative case study of the Big 4 accounting firms. Primary and secondary data is gathered in the forms of interviews and professional publications. The lens of *institutional work* is applied when analyzing how individual actors influence institutions and with what intentions.

Findings – We find that firms strive to claim professional legitimacy in the field of blockchain by constructing a *narrative of disruption* as institutional work with the intention to maintain the institutionalized role of accounting. Further, we find that normative pressures stimulate blockchain adoption and mimetic forces minimize organizational and strategic differences between the Big 4.

Originality/value – This thesis contributes to the emerging literature on blockchain's impact on the accounting profession. Further, the thesis contributes to the accounting literature on professional domain change as the case of blockchain presents a unique tension between commercial opportunity and technological threat to auditors' institutionalized role as trust providers in the financial system. This study also extends the accounting literature on institutional work as it shows how *educating work*, *mimetic work* and *construction of identities* interrelate and are enacted with multiple institutional intentions.

Keywords:

Accounting and auditing, Blockchain, Digital technology, Domain change, Institutional work

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1. Introduction

Blockchain has the potential to powerfully disrupt many aspects of how businesses and economies work; even how societies are organised. Blockchain goes to the core of the role of trust in markets – an area that is central to PwC’s purpose. (PwC, 2019)

Blockchain, being one of the most debated new technologies of the current decade, is positioned to transform many industries, including the accounting industry (Fanning & Canters, 2016; FAR, 2019). The global blockchain market is expected to grow from USD 1.8bn in 2018 to a staggering USD 23.3bn by 2023, with a compounded annual growth rate of 80.2% (MarketsandMarkets Inc, 2018). Similar to other emerging technologies like artificial intelligence, software robotics and big data analytics, blockchain has come to play one of the leading roles in the quite ambiguous, vaguely defined, and highly lucrative story of *digital disruption* (Omoteso, Patel & Scott, 2010; Canning, Gendron and O’Dwyer, 2018). The distributed decentralized ledger has the technological potential to automate manual processes, combine and create synergies between separate value chains and, most importantly, *de-humanize* the factor of *trust* (Dai & Vasarhelyi, 2017).

Since 2016, the Big 4 accounting firms have actively invested in blockchain technology and frequently interacted in its related community (Kokina, Mancha & Pachamanova, 2017). The firms have respectively set up blockchain labs, centers of excellence, recruited field experts, created new job descriptions and spent substantial resources on educational and marketing efforts. At a first look, the Big 4’s engagement in blockchain technology does not appear surprising, for several reasons. First, blockchain has the potential to increase operational efficiency through automatic validation of audit trails and decreased human involvement in accounting and auditing. Second, from the perspective of accounting consultants, blockchain posts new opportunities for billable hours as clients implement the technology. Finally, professional domain expansion is far from unfamiliar to the large accounting firms. During the past decades, the accounting firms have expanded their domains to include various consulting practices (Malsch & Gendron, 2013), risk management services (Hayne & Free, 2014), new media communication (Suddaby, Saxton & Gunz, 2015) and sustainability assurance (Farooq & de Villiers, 2019).

However, blockchain presents accounting firms with a paradox-like tension. While they embrace this technology as a means to stay relevant and ultimately survive in a competitive market, they do so knowing that the very same technology could ultimately threaten their

fundamental role in society (Dai & Vasarhelyi, 2017) as trust providers to financial information. Trust does not just underlie their core commercial offerings, like auditing and assurance services, but serves as the foundation of their societal purpose. As blockchain provides digital trust without human involvement, it is likely that the nature of the accounting profession will change and that it could become less relevant or even redundant if the technology is fully adopted on a societal level. Thus, the digital *trust-machine* of blockchain posts a “grand challenge” (George, 2016) to the contemporary role of accountants and auditors (Association of Chartered Certified Accountants [ACCA], 2016).

It is essential for accountants and academics in the field to pay attention to how accounting firms are affected by and adapt to digital innovation and emerging technologies, not just for the sake of understanding the technologies themselves but, more importantly, for the sake of understanding the institutional dynamics impacting how the firms operate. As the Big 4 have grown larger over time, society’s dependence on them to provide assurance and trust to economic information has also increased. Especially in an era where their role appears to change more rapidly than ever before, critical monitoring through scientific research is vital to bring clarity to the increasing complexity of these entities.

The research of the current study is situated at the core of the call for research expressed by the International Federation of Accountants as it aims to “reveal strategic responses to and proactive strategies on changes in digital technology” (Islam, 2017). In order to understand the reasoning, vision and purpose of the Big 4’s entrance into emerging technology domains, we ask the individuals representing the organizations *why* and *how*. Although we, in the current study address blockchain technology, the developed contributions are probable to increase the understanding of the accounting firms’ interaction with other emerging technologies with the potential to impact auditing and accounting practices as well.

The literature on domain change in accounting has until now focused on domain expansion rather than *potential domain disruption* as new domains previously studied have not directly competed with the established, traditional values and services of the firms. In the unique case of blockchain, accounting firms are forced to balance domain expansion and domain protection. Thus, the tension presented by blockchain reveals a gap in the current accounting literature. The current study will attempt to fill this gap by answering the following research question:

How and why do accounting firms engage in adopting emerging, potentially disruptive technologies such as blockchain as part of their professional domain?

Through an iterative abductive process (Dubois & Gadde, 2002), we apply the lens of *institutional work* developed by Lawrence and Suddaby (2006), defined as “the broad category of purposive action aimed at creating, maintaining and disrupting institutions,” to identify how the Big 4 accounting firms, through the work of their individual professionals, engage in institutionalizing blockchain technology and related practices. More specifically, we research how accounting firms engage in professional domain expansion as institutional work. In previous qualitative research, institutional work has proven a solid theoretical vehicle to analyze various forms of institutional change in the accounting domain (Malsch & Gendron, 2013; Goretzki, Strauss & Weber, 2013; Hayne & Free, 2014; Suddaby et al., 2015; Canning & O’Dwyer, 2016; Farooq & de Villiers, 2019). We perform a multiple case study by interviewing professionals from the Big 4 accounting firms with a direct or an indirect relationship to the blockchain-related work of the firms. Further, we perform a qualitative content analysis of the firms’ professional publications addressing blockchain (such as white-papers, industry research articles, press releases and news articles) to better understand how the firms interact with their external environment.

The current study directly contributes to the existing accounting literature in three main ways. First, we address accounting domain change in a unique setting, not yet explored, thereby expanding domain change to *potential domain disruption*. Accounting research in such a setting is probable to become even more relevant in the future as the trend of domain disruption through emerging technologies is likely to continue. Also, we contribute to the emerging stream of accounting research within the field of blockchain. While previous accounting research on blockchain has focused on its potential impact on accounting practice and systems (Fanning & Centers; Dai & Vasarhelyi, 2017; Coyne & McMickle, 2017), the current study takes the perspective of the individuals and contributes by showing how accountants address the emerging technology and how their professional roles are impacted.

Secondly, we show how accounting firms balance the outlined tension by creating a *narrative of disruption by blockchain*, maintained through normative pressures (DiMaggio & Powell, 1983). Normative pressures are created and maintained in the external environment as the narrative is distributed through external interactions such as professional publications, conferences, workshops and client meetings. However, the created normative pressures are also felt among the accounting firms as auditors perceive the need to adjust their practices in order to stay relevant in a changing auditable environment. Further, mimetic forces minimize organizational and strategic differences between the Big 4

Third, we show how accounting firms, through forms of institutional work theoretically associated with *creating* institutions (Lawrence & Suddaby, 2006), strive to *maintain* their institutionalized role as trust providers in the financial system. Our findings strongly indicate that categories and forms of institutional work should not be limited to predetermined categories (Hayne & Free, 2014; Canning & O'Dwyer, 2016) or considered as isolated, but rather as highly interrelated and mutually dependent (Empson, Cleaver & Allen, 2013). Thus, through the case of blockchain in accounting, we also make propositions to the still emerging literature on institutional work, which we identify as subjects for further research.

The current study will be structured as follows: section 2 reviews previous literature on domain change and expansion in accounting, along with the theoretical context of institutional work; section 3 presents the adopted method of the current study; section 4 presents the empirical findings and the analysis thereof; section 5 discusses the findings through the lens of institutional work; and section 6 concludes the current study, summarizing its contributions and limitations along with suggestions for future research.

2. Literature review

In the following section we will present: (1) a background on blockchain and the current discussion about its application within accounting as it is necessary to outline the potential impact of the technology on accounting firms; (2) a review of previous literature on institutional work and the theoretical concept itself; (3) a review of previous literature on domain change in accounting; and (4) the theoretical framework of the current study. Given the extensive interrelationship between the literature on institutional work and domain change in the developed theoretical framework, the review will outline the concept of institutional work before shifting focus to the application of domain change in accounting.

2.1. Background: blockchain and accounting implications

Blockchain has a chance to be a transformative technology. It will change, at the minimum, the way financial firms perform many of their activities. (Fanning & Centers, 2016)

In 2009, an anonymous group of developers (Nakamoto, 2009) published the white-paper *Bitcoin: A Peer-to-Peer Electronic Cash System*, introducing the virtual currency known as bitcoin. Supporters have argued for several benefits compared to traditional fiat-currencies, as bitcoin constitutes a system that is more flexible, more private and less amenable to regulatory oversight than other forms of payment (Böhme, Christin, Edelman & Moore, 2015). However, while bitcoin has been used for electronic payments, it has mainly constituted a trading commodity for financial speculation (Glaser, Zimmermann, Haferkorn, Weber & Siering, 2014), and over time, blockchain, the disruptive technology backing the digital currency has come to garner comparatively more attention. Blockchain constitutes a decentralized public ledger that provides a secure infrastructure (Dai & Vasarhelyi, 2017) for storing and exchanging information. It is a database which maintains a continuously growing amount of data records that are immune against revisions since information that has been inserted into the ledger cannot be changed (Fanning & Centers, 2016). The database is always growing as “blocks” of information are added to the previous blocks in order to create a “chain” where every new block includes a date stamp with a reference to all the information in the preceding blocks.

According to Fanning and Centers (2016), blockchain holds several advantages as a technology. First, it is constructed and upheld by a peer-to-peer network that cannot fail – if there is a failure in one part of the system, the other parts will continue to operate. Secondly, as the entire

documentation is digital it can easily be applied to many different applications. Thirdly, all transactions on the blockchain are visible to all its participants, increasing auditability and trust. Lastly, changes to the blockchain are very difficult to make and in the rare case when a change occurs, it will be clearly visible to all other users. Given these advantages, the technology has the potential to eliminate third parties providing trust and lower transaction costs. Consequently, since its establishment, blockchain has evolved from a secure monetary transaction system into an entire ecosystem of emerging technologies (Dai & Vasarhelyi, 2017).

During the past decades, digital technology has radically affected most traditional industries and businesses. Today, digitalization is often even argued to be the *raison d'être*¹ for many corporates as it redefines business processes and product utilization (Zhang, L., Pei, D. & Vasarhelyi, M., 2017). Disruptive technologies often lead to cheaper and simpler products with new, interesting features that radically alter industries. Most industries have dealt with disruptive technological change since the industrial revolution, but the accounting industry has been lagging (Deloitte, 2016) with double-entry bookkeeping having constituted the standard since the 15th century. According to Canning et al. (2018), auditing faces many challenges, including: the introduction of data analytics and robotic process automation; the influence of cloud-based audit technologies; the commodification of audit practice through offshoring; the impact of the emergence of blockchain technologies; and the future role of cognitive computing in audit processes (Association of Chartered Certified Accountants [ACCA], 2016; Ball, 2017; Thomson Reuters, 2017). Given emerging information technologies such as blockchain, business measurement (accounting) and assurance (audit) will inevitably change and move more toward automated processes to continue to stay relevant to enterprises and stakeholders (Zhang et al., 2017). Traditional auditing, based on the audit of paper-based income statements on an annual or quarterly basis (Dai & Vasarhelyi, 2017), simply cannot provide the demanded real-time assurance required, due to the manual nature of its procedures and the lack of tools to effectively analyze and monitor large amounts of transactional data (Alles, Kogan & Vasarhelyi, 2002; Vasarhelyi & Halper, 1991).

Dai and Vasarhelyi (2017) emphasize that accounting and assurance could be one of the industries in which blockchain could bring the most benefits and fundamentally change current structures. By adopting blockchain technology, companies could create new accounting information systems that record validated transactions in secure ledgers. The accounting entries between two trading partners could more easily be compared, while maintaining data privacy,

¹ French for “the reason for being”

which in turn could significantly reduce the reliance on auditors for testing financial transactions (Fanning & Centers, 2016). Blockchain could, along with other emerging technologies, dramatically change the current audit paradigm, and therefore promote a new generation of auditing (Dai & Vasarhelyi, 2017).

However, the possible benefits and challenges that blockchain could contribute to the accounting domain are still under-explored. Even though literature from other fields has explored many potential applications of blockchain, there is limited research on utilization of the technology within accounting and auditing (Dai & Vasarhelyi, 2017). Sheldon (2018) argues that while the reality of the benefits of blockchain is several years ahead, it is important to also consider what issues currently facing the accounting profession could be alleviated with blockchain. Despite the fact that many are positive about blockchain as a new tool, there is also criticism of the emerging technology. Coyne and McMickle (2017) have identified several flaws which hinder the implementation of blockchain as a financial reporting tool, such as confidentiality and security breaches in private applications of the technology. Consequently, we cannot conclude that blockchain technology actually will have a disruptive impact on the field of accounting. However, what we can conclude is that there is an intense strategic interest in the technology from the big accounting firms and, as we will show, the work conducted by these actors presents a unique opportunity to generate theoretical insights.

2.2. Setting the theoretical scene

2.2.1. Institutional work

Institutional theory has gained wide acceptance as a theoretical posture (Scott, 2008) and has influenced accounting and organizational research for many years. Scott (2001, p. 48) defines institutions as “social structures that have attained a high degree of social resilience”. Scott’s definition emphasizes cultural-cognitive, normative and regulative elements, that along with connected activities and resources provide meaning and stability to social life. Although support for this view has remained strong on a macro-theory level, recent literature has emerged, arguing for frameworks more well-adjusted to micro-level research agendas (Lawrence et al., 2011; Empson et al., 2013; Canning & O’Dwyer, 2016). The concept of institutional work was first theorized by Lawrence & Suddaby (2006) in an effort to “bring back individuals into institutional theory” (Lawrence, Suddaby & Leca 2011; Lawrence, Leca & Zilber, 2013; Suddaby et al., 2015). Since then, institutional work has gained traction as it constitutes a counterpoint to the established agency-oriented framework of institutional entrepreneurship

(DiMaggio, 1988), which advocates a small number of highly powerful actors as architects of social change who create, maintain, disrupt (and destroy) institutions through stirring conflicts. Supporters of institutional work argue that not all change is initiated by “hyper-muscular institutional entrepreneurs” and that the framework does not account for the bottom-up perspective of institutional change. More surprisingly, the research on institutional entrepreneurship has further been criticized for neglecting individual actors in favor of organizational actors and institutional dynamics (Hardy & Maguire, 2010; Empson et al., 2013), despite its theoretical potential for studying individuals.

Institutional work was first defined by Lawrence and Suddaby (2006, p. 216) as “the broad category of purposive action aimed at creating, maintaining and disrupting institutions,” but has also later been described by Lawrence et. al. (2011) as “the practices of individual and collective actors aimed at creating, maintaining and disrupting institutions,” more clearly emphasizing the importance of the individual actors. The words *purposive* and *aimed at* mirror the view of institutions as products of specific mental or physical actions, adopted from Jepperson’s (1991) definition of institutions. Jepperson (1991) argues that institutions are patterns of organized established procedures and sequences that are supported by specific mechanisms of control. Jepperson’s definition enables a view of institutions as constructions of individuals’ actions, rather than as social structures. This perspective stimulates research on how institutional processes affect organizational and individual actions and correspondingly, how organizational and individual actions affect institutions. Empson et al. (2013) argue that “the concept of institutional work (...) offers an opportunity to advance the micro-sociological foundations of institutional theory by ‘inhabiting institutions with people, their work activities, their social interactions and meaning making processes’ (Hallet, 2010, p. 52), to develop a deeper understanding of ‘lived experience and how this connects with the institutions that structure and are structured by these experiences’ (Lawrence et al., 2011).” Institutional work facilitates such research by highlighting “the awareness, skill and reflexivity of individual and collective actors” and by adopting a view on “institutions as constituted in the more or less conscious action of individual and collective actors” (Lawrence & Suddaby, 2006, p. 219).

As defined, institutional work influences institutions with various purposes: to *create* institutions; to *maintain* institutions; and to *disrupt* institutions. Creating institutions include activities aimed at establishing rules, rewards and sanctions. Maintaining institutions include supporting, repairing and recreational social functions to uphold the institutional rigor. Disrupting institutions include activities aimed at weakening the mechanisms constructed to maintain the institution. Within each of these broad categories, Lawrence and Suddaby (2006)

define several forms of institutional work that have been observed in previous literature. Table 1 summarizes and briefly describes the forms of institutional work that have been observed within the categories outlined by the authors.

Table 1: Forms of 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, auditing 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.

While Lawrence and Suddaby (2006) initially theorized and portrayed the three categories of institutional work as a sequential process, enacted by “institutional workers as coherent entities acting consistently upon a single clearly identifiable institution” (Empson et al., 2013), the collections of more recent empirical evidence indicate several distinct variations from this perspective. First, institutional work aimed at creating, maintaining and disrupting institutions

often occurs simultaneously rather than in sequential order (Empson et al., 2013; Hayne & Free, 2014; Farooq & De Villiers, 2019). Second, the categorization of institutional work into creating, maintaining and disrupting institutions seldom holds. The empirics show that most of Lawrence and Suddaby's (2006) categorized work forms are used with multiple intentions. Empson et al. (2013) identify advocating work conducted with the purpose to disrupt institutions and Canning and O'Dwyer (2016) observe enabling work conducted with the purpose to create institutions. Third, as the current study will develop, categories and forms of institutional work should not be considered as isolated activities, but rather as highly interrelated and mutually dependent.

2.2.2. Insights from empirical applications

The preceding literature on institutional work has mainly focused on expanding and refining the theoretical framework of institutional work. However, a valuable and recognized stream of research has been published on practical applications of the framework. In reviewing the previous literature, we have identified a selection of concepts that the current study will build upon and develop further: (1) sedimentation (Empson et al., 2013); (2) hybridized professional groups (Hayne & Free, 2014); and (3) work rejection (Canning & O'Dwyer, 2016).

Empson et al. (2013) examine the “corporatization” of large international law firm partnerships by examining the institutional work conducted mutually and independently by managing partners (the executive manager of the firm) and management professionals (a professional not trained within the field of law, often with an accounting background and often titled as a CFO or COO). The authors highlight the importance of these individuals' social positions through their formal authority, specialist expertise and social capital. They find that understanding the social positions of the individuals is crucial to understanding how the individuals engage in institutional work, as they can leverage their variations to successfully implement change. As the partnership-based organizational structure of law firms remains similar to that of accounting firms, the work of Empson et al. (2013) has frequently been referenced to in institutional work studies within the accounting domain (Canning & O'Dwyer, 2016; Aburous, 2018). The study is especially interesting as it introduces the concept of *sedimentation* to institutional work: how individuals mutually and simultaneously engage in institutional work to create, maintain and disrupt institutions to gradually integrate an emerging institutional logic into an established institutional logic.

Hayne and Free (2014) generate further insights to the dynamics of multi-faceted groups of individuals engaging in institutional work by examining the institutionalization of Committee of Sponsoring Organizations' (COSO's) accounting-based enterprise risk management (ERM) framework. The authors introduce and define the concept of a *hybridized professional group* as a collection of people derived from heterogeneous sources. They argue that blended groups of accounting professionals with various backgrounds, occupations or day-to-day employment construct especially powerful constellations to impact institutions through coordinated institutional work. The concept of hybridized professional groups addresses Lawrence et al.'s (2011) call for research in distributed agency, referred to as "a significant group of actors conducting coordinated or uncoordinated activities employed to effect change," (Hayne & Free, 2014) and played an important role in explaining why COSO's ERM framework became the dominant framework for accounting-based risk management. Key to the successful introduction of the framework was how COSO managed to leverage its existing status as a "thought-leader" in the field of corporate governance to construct a similar identity in the field of risk management.

Canning and O'Dwyer (2016) examine "efforts by individuals to instigate institutional change in the regulation of accountants". They investigate how different forms of institutional work interact, mutually reinforce and displace one another as individuals attempt to reconfigure the regulatory field within an Irish independent oversight authority. First, the authors introduce the term "work rejection" which is used to explain how individuals initially reject various forms of work but over time convert to accepting them and eventually embrace them. Secondly, they find that socio-political factors facilitated successful impact of institutional work, rather than restrain it (Caramanis et al., 2015), indicating that the outcome of institutional work is closely related to the institutional context to which workers adhere. Finally, the authors find that shifting institutional logics had a major impact on the interrelations between different forms of institutional work through the professional accounting bodies' reluctance to regulatory change.

2.2.3. Accounting domain expansion and shifting professional roles

Recently, the topic of institutional and professional domain expansion and change within accounting has received much attention in prestigious journals. In reviewing the emerging stream of literature, our focus is domain change initiated due to disruptive technology or entrance of new practices and how it impacts the institutional dynamics of the individual actors.

Suddaby et al. (2015) investigate professional domain change in the Big 4 accounting firms by looking at the institutional work related to the emergence of *New Media* (internet and social media such as Facebook, Twitter and LinkedIn). Their study is especially interesting since it shows that domain change can occur not because the new domain constitutes a new practice area, but rather as it can constitute a catalyst for change in how accountants can legitimately claim professional expertise. The authors find that three forms of institutional work activities, interactively contribute to domain change: boundary work; rhetorical work; and the construction of the embedded actor. Boundary work was observed in quite an ambiguous manner: social media was in fact inculcated within the boundaries of the accounting firms, but clear boundary work was conducted in order to separate new media expertise from accounting professionalism; social media executives were hired, but none were trained in the field of accounting; and they were given great autonomy in both formulating strategic direction and in their day-to-day work, despite their frequent (although one-way) communication with clients. Further, the authors observe an acceleration of commercialism through the rhetorical work of the social media executives' posts in social media. Accounting ethics were out-weighed by commercial messages and the construction of the embedded actors, which refers to the "effort to construct the individual accountant as an agentic actor in the profession."

The work of Malsch and Gendron (2013), highlights a "conflict between commercial innovators and guardians of the professional tradition," through investigating the experimental processes in which Big 4 accountants seek to expand their professional domain through institutional innovation. More specifically the authors stress the struggle of "opposition in practice between the habitus of experts recruited to expand the range of services and the traditional dispositions of auditors". The authors identify institutional work that seeks to reinforce and maintain the institutionalized legitimacy of the accounting profession while simultaneously strengthening commercial logics on an organizational and individual level. Malsch and Gendron introduce the concept of *institutional experimentation* which problematizes institutional work as a fragile and unpredictable process due to a tension between traditional professional culture and commercial logics. Their work is important since it shows that institutional experimentation constitutes a key feature of institutional work as it enables incumbents to observe which domain expanding initiatives hold commercial value and potential for justification of institutional legitimacy in a trial-and-error setting.

Farooq and de Villiers (2019) study the competition in the field of sustainability assurance between accounting providers and non-accounting providers. The empirical setting holds many similarities to the current study as accounting providers compete with non-accounting providers

in expanding and institutionalizing their professional domain. The authors find that the accounting providers adopt several forms of institutional work in their efforts to claim professional legitimacy and steer market adoption to their proposed sustainability assurance framework: educating; mimicry; disassociating moral foundations; and embedding and routinizing. Among these, educating and mimicry play especially interesting roles, relevant for the current study. *Educating* work is conducted with the purpose to increase understanding and stakeholder acceptance for the preferred assurance framework of the accounting providers. Other than just informative efforts, the accounting providers engage in guiding sustainability reporting managers in developing information systems adapted to the preferred framework. *Mimicry* is adopted by associating sustainability assurance with the established practices of auditing. Mimicry serves an institutional purpose for several reasons. First, it serves to claim professional legitimacy among the powerful stakeholders proclaiming sustainability assurance. Second, it serves to generate internal acceptance for the sustainability assurance practices among auditors. Third, by associating sustainability assurance with the taken-for-granted financial audit practices, the audit firms can leverage their social capital to gain a competitive advantage over non-accounting providers.

2.2.4. Normative pressures and isomorphic forces

While institutional work provides a great foundation for analyzing *how* actors change institutions, it often fails in explaining *why* actors act the way they do. Although the scope of the current study might be too narrow to exhaustively explain such a psychologically and socially complex question, we do not wish to stand unequipped in analyzing the motivations behind why individuals influence institutions. DiMaggio and Powell (1983) ask the question: “What makes organizations so similar?” In reaching the conclusion that actors make organizations increasingly more similar as they act to change them, the authors suggest three isomorphic forces as explanatory factors: coercive, mimetic and normative pressures. In accounting research, normative and mimetic pressures have proven a solid theoretical vehicle in explaining the forces motivating individual actors to engage in institutional change (Fogarty, 1992; Järvinen, 2006). In the context of institutional work, Farooq and de Villiers (2019) argue that highlighting the “pressures that influence actors” is a vital element in analyzing how actors purposively create, maintain and disrupt institutions (Lawrence & Suddaby, 2006). In the current study, *normative pressures*, as a force stemming from increasing professionalism, will play an important role in explaining the commercial logics behind the Big 4 firms’ initiatives to claim professional legitimacy. Normative pressures are often assumed to be preexisting natural elements, constantly affecting how institutions interact with the external environment

and change. DiMaggio and Powell (1983) theorize that “the more uncertain the relationship between means and ends the greater the extent to which an organization will model itself after organizations it perceives to be successful.” In the empirical setting of the current study, we will focus on how these pressures are created and maintained in the professional domain of the Big 4 accounting firms. The isomorphic forces are especially interesting to the current study given that blockchain leads to interdependency between organizations when constructing validating networks while surrounded by great uncertainty about its disruptive effects.

2.3. Theoretical framework and motivation

Lawrence et al. (2013) express a concern that previous studies on institutional work have been too narrowly focused on the institutional outcomes that the work produces. They argue that “focusing on these questions using these methodological approaches limits our ability to uncover and understand the messy day-to-day practices of institutional work”. Given the infantile status of blockchain as an emerging technology in accounting, our study will naturally focus on the institutional work in itself, as the outcomes are still to be discovered. The request for research on *current* issues in accounting has also more recently been expressed by Canning et al. (2018) who quotes The International Federation of Accountants (Islam, 2017):

Despite ongoing efforts by (...) academic researchers, there is a surprising gap in research that deals with the changes that will impact accountants and professional accounting organizations. Future research should drive (...) collaborations between inter-disciplinary academic researchers in order to reveal strategic responses to and proactive strategies on changes in digital technology (...) and associated stakeholder expectations.

Conducting research on domain change in accounting related to blockchain technology presents a unique setting in two ways. First, the family of previous literature on domain change in accounting, has with few exceptions (Suddaby et al., 2015), despite the rhetoric, focused on expansion rather than disruptive change in that the domains studied have constituted new areas of practice such as: various consulting practices (Malsch & Gendron, 2013); risk management (Hayne & Free, 2014); and sustainability assurance (Farooq & De Villiers, 2019). What makes blockchain technology different as a new domain is that it simultaneously constitutes a potential for accountants to claim legitimacy in new areas of professional expertise and a threat to the current institutionalized practices of accounting and auditing (Dai & Vasarhelyi, 2017). Consequently, it simultaneously constitutes an opportunity for domain expansion and a threat of disruptive change to the current accounting domain.

Secondly, the case of blockchain, compared to previous domain change in accounting, presents a more complex setting for strategic planning and execution. Malsch and Gendron (2013) specifically stress that the Big 4 accounting firms, as “dominant agents of the traditional market of financial audit” constantly face two interrelated challenges: (1) an emergence of new competition; and (2) a decrease in profits. Further, they argue that the big accounting firms have two options to approach these threats: (1) to focus on their current domains to defend their dominant positions; *or* (2) to focus on the margins of the field to expand the current domain to new areas of professional services and profit sources. In the case of blockchain, these two options are not mutually exclusive, but rather inseparable and interrelated as blockchain has the potential to disrupt the current audit paradigm (Dai & Vasarhelyi, 2017). Combined, the paradox-like tension between expansion and disruption and the complex strategical setting presented by blockchain technology, presents us with a gap in the current accounting literature on domain expansion and change.

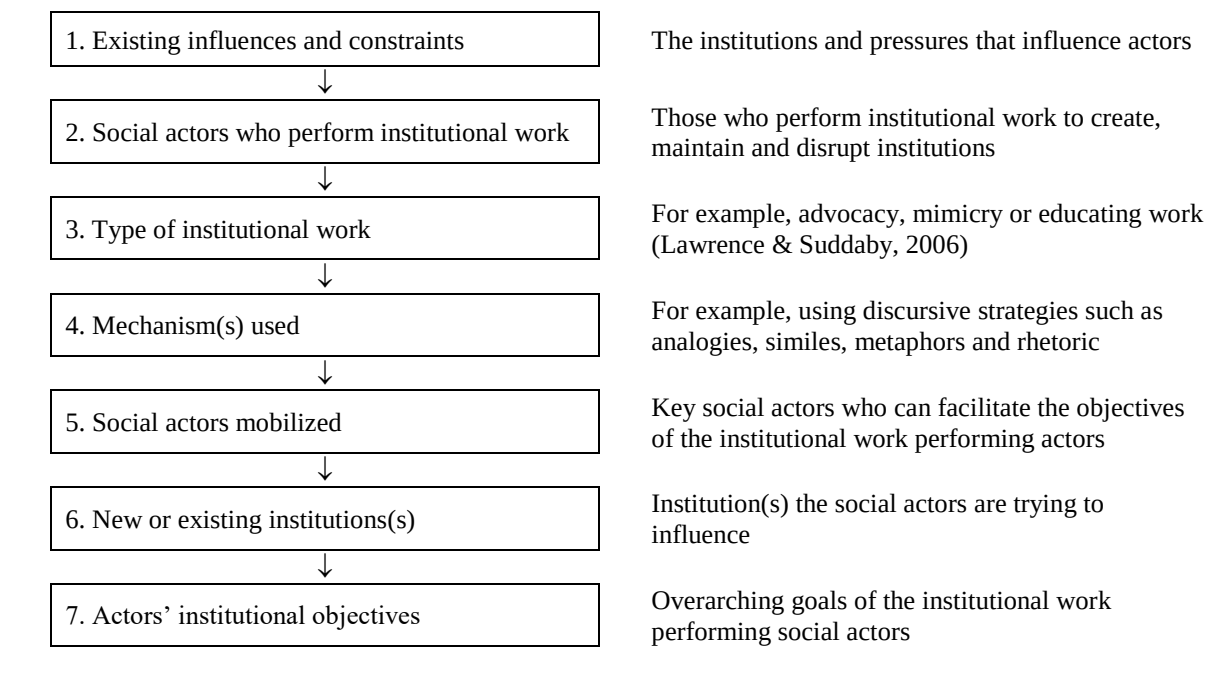
Through conducting the current research, we have two main objectives. The first is to address the International Federation of Accountants’ call for research on “strategic responses to and proactive strategies on changes in digital technology” within accounting. The second is to contribute to the existing literature on domain change in accounting by conducting research in an empirical setting that presents a unique technological development to the accounting profession through blockchain. The current study will seek to meet these objectives by answering the following research question:

How and why do accounting firms engage in adopting emerging, potentially disruptive technologies such as blockchain as part of their professional domain?

In order to answer our research question, we base our analysis on Lawrence and Suddaby’s (2006) framework of institutional work but, given the paradox-like tension presented by blockchain technology, we must also widen our method theory to account for the complex social aspects of distributed agency when facing various interests among institutional workers. Thus, we will incorporate the concepts of: (1) sedimentation (Empson et al., 2013); (2) hybridized professional groups (Hayne & Free, 2014); and (3) work rejection (Canning & O’Dwyer, 2016) to deepen our analysis. Further, we draw upon conclusions from previous research on domain change and changing professional roles of accountants and auditors (Malsch & Gendron, 2013; Hayne & Free, 2014; Suddaby et al., 2015; Farooq & De Villiers, 2019). We adopt our course of analysis from Farooq and De Villiers’ (2019) model, presented below in figure 1, in order to ensure inclusion of important aspects such as *existing* influences

and constraints in the form of *normative pressures* (DiMaggio & Powell, 1983), the social actors who *perform* institutional work and the institutions aimed to be influenced by institutional work.

Figure 1: Model for analysis of institutional work (Farooq & De Villier, 2019)



3. Method

In the following section we will discuss research design, data collection and data analysis.

3.1. Research design

The genesis of the current study emerged from an interest to investigate how blockchain might impact the institutionalized practices of accounting and auditing. While adoption of new technologies often results in disruption to current practices, we do not assume any specific form of impact from blockchain on accounting firms. In researching how accounting firms embrace blockchain as a new domain, we strive to construct a theoretical framework which enables unbiased analysis of domain change and expansion. Thus, we conduct our research through an iterative abductive process (Dubois & Gadde, 2002), to keep an open mind toward our observations. The iterative abductive process is materialized as we deductively develop propositions from current theory, test them against empirics to then finally inductively use empirical insights from the gathered data to fill the gaps in the theoretical framework. Through this iterative process, we have strived to develop a theoretical framework well suited to explore domain change in accounting without bias toward any specific theoretical posture.

Since previous research on the topic of blockchain and its effect on accounting and auditing is limited, it has been important to gather rich and detailed data to explore questions of *how* and *why*. Consequently, an explorative qualitative approach is adopted. As the study aims to address changes to professional domains in accounting, we focus on the elite accounting institutions (Suddaby et al., 2015) commonly referred to as the Big 4: Deloitte, KPMG, PwC and EY. Previous studies have shown that these firms assume a leading role when it comes to change in the accounting profession (Greenwood, Suddaby & Hinings, 2002; Suddaby et al., 2007). For each organization, the aim has been to study the impact blockchain has had on the way individuals perform their work and whether the firm has dedicated specific resources to explore the technology further.

While the study has been based out of Sweden, we find it necessary to extend the scope outside of Sweden as we find that the Big 4's key blockchain competence and initiatives seldom is sufficiently represented in one single country. Therefore, we have kept an open mind and requested interviews with non-Swedish accounting professionals when our findings have indicated that those perspectives have been necessary to construct a sufficiently strong empirical base. Directly represented in the current study are Big 4 partnerships located in Sweden,

Denmark, the Netherlands and the U.K. Indirectly represented are Australia and the U.S. (interviewees who have relocated from these countries to Sweden).

3.2. Data collection and analysis

In the remainder of the study, all Big 4 firms will be anonymized as well as the research participants representing the firms. The firms are randomly denoted as Firm A, Firm B, Firm C and Firm D (with exception for section 4.1.1.) and the interviewees are referenced to by a non-specific version of their professional title.

3.2.1. Primary data: semi-structured interviews

The allocation of interviews between the firms was made with the purpose to maximize prerequisites for qualitative analysis of differences and similarities between the Big 4. Due to the scope of the current study, we decided to focus our data gathering on two of the firms to ensure sufficient richness to the gathered empirics. After introductory interviews with all firms and analysis of available secondary data, we identified Firm B and Firm D as the most appropriate accounting firms to focus on in order to highlight potential differences in how they engage with blockchain. Other combinations of firms would also have been appropriate but access to interviewees was provided more freely by Firm B and Firm D. However, we want to highlight that as the data collection progressed, we found that the similarities identified between the firms were far greater than the differences and the contributions made in the current study are likely to be significant for all four firms. The gathered empirics were continuously analyzed as the interviews were conducted and we found that after meeting 17 interviewees, the data was sufficient for us to be able to identify interesting themes and findings.

In total, 15 in-depth semi-structured interviews have been conducted with 17 individuals employed by the Big 4 accounting firms - 2 with Firm A, 6 with Firm B, 2 with Firm C and 7 with Firm D. Interviewees were contacted through a process of snowball sampling (Patton, 2002), where research participants were introduced to the authors by existing participants. A detailed overview of the interviews conducted is provided in the Appendix. In conducting the interviews, a semi-structured approach was chosen in order to provide structure when using a pre-determined set of broad questions (Rowley, 2012) covering themes relevant for the research topic, whilst it would allow for a deeper elaboration on certain matters and new insights through follow-up questions (Fontana & Frey, 2005). This approach has also been found appropriate given the restricted research period which did not allow for follow-up interviews. (Bernard,

1988). The open-ended questions which were prepared beforehand, enabled the generation of reliable, high-quality information. All interviews were structured in the same manner and a common interview guide was used. However, the interview guide was used as a general basis for discussion and new insights which were brought forth during the interviews were elaborated further on to reveal underlying tensions and findings.

To establish a connection and common ground, each interview began with a presentation of the authors and a description of the study, to make sure that the interviewees were aware of the research topic. However, to avoid influencing the interviewees in a certain direction and to maintain the exploratory nature of the study, the research question was not specified. In two of the 15 cases, the interviewees asked to see the questions in advance. In those cases, only the six main questions were sent, excluding the detailed specifics of the interview guide. For the remaining interviews, the interview guide was not distributed beforehand to ensure a more flexible discussion.

The 15 interviews took place during March and April 2019 and lasted between 27 and 85 minutes with an average duration of 54 minutes. 11 interviews were carried out face-to-face at the organizations' respective headquarters in Stockholm and four were conducted over Skype or Google Hangout with interviewees located in the UK, Denmark and the Netherlands. In the first interview that was carried out with Firm C the recording was interrupted due to technical difficulties and thus only about 20 minutes out of 75 was recorded. However, very thorough notes were taken during the interview.

Both authors were present during 14 out of 15 interviews – one primarily responsible for leading the interview and asking follow-up questions and the other one taking detailed and exhaustive notes and recording observations. This approach enabled the authors to generate complementary insights from their different perspectives which increased the likelihood to gain new insights (Eisenhardt & Bourgeois, 1988; Eisenhardt, 1989). After approval from the interviewees, all interviews were recorded, enabling the interviewers to focus on the discussion and follow-up questions rather than solely on taking manual notes. Follow-up questions made it easier to investigate areas previously unknown, which is necessary in the development of new theoretical concepts (Bryman & Bell, 2007). Additionally, the tape recordings allowed for the opportunity to listen through the interviews afterwards and make detailed transcripts which were used when constructing the analysis of the empirics.

In terms of language, nine interviews were conducted in Swedish. This was considered important for the interviewees' comfort and ability to speak freely. The remaining interviews were conducted in English, as the interviewees did not speak Swedish. For the interviews conducted in Swedish, it has been necessary to translate the transcribed material.

As the interviews were conducted, the findings and empirics were continuously interpreted in order to find interesting themes and underlying tensions which could be elaborated further on in coming interviews. Thus, data collection and data analysis were parallel and iterative processes, which helped in evaluating possible directions to further expand the literature (Dubois & Gadde, 2002; Lukka, 2014; Lukka & Modell, 2010). After each interview, the data was discussed among the authors in order to uncover important themes or findings. Post-transcription and discussion, key phrases and quotes were manually coded by empirical themes and forms of institutional work in Microsoft Excel spreadsheets. The empirics were thereafter analyzed using the developed theoretical framework which gave a deeper understanding for how the themes were linked and influenced each other. The data analysis involved a continuous move between the data, the empirical themes and the relevant literature.

3.2.2. Secondary data: professional publications

In generating insights to how actors purposively create, maintain and disrupt institutions it is important to include a perspective on the external communication and rhetoric adopted by these actors (Suddaby et al., 2005). Under the scope of the current research, we find that the external communication has played a key role in expanding the Big 4's professional domains in the case of blockchain. Thus, professional publications authored by the Big 4 firms have been analyzed through content analysis in order to generate an understanding of the institutional intentions and normative pressures that lie behind the external communication. In total, 28 publications have been analyzed, all obtained online. The analyzed publications have been published in a large variety of formats including firm website content, industry research articles, white-papers, education material, blog posts, debate articles, and press releases. While interviews were focused mainly on Firm B and D, the analyzed publications have been equally distributed between the Big 4 firms. A detailed overview of the analyzed publications is provided in the Appendix.

4. Empirics

4.1. Context

4.1.1. Big 4 investments in blockchain

From blockchain's inception in 2009, the Big 4 accounting firm's engagement in the emerging technology is a relatively recent observation. With the exception of Deloitte's launch of the blockchain division Rubix in 2014, it was not until 2016 that the remainder of the firms were invested to some extent. Figure 2 below outlines a selection of the firms' investments over time from 2014 to 2019.

Figure 2: Timeline of blockchain related initiatives

	Deloitte	EY	KPMG	PwC
2014	- Launches the blockchain division Rubix			
2015				
2016	- Opens first blockchain lab in Dublin - Installs Bitcoin ATM in Toronto	- Launches start-up challenge to explore blockchain solutions for digital identities and energy trading	- Launches Digital Ledger Services with Microsoft for financial institutions	- Sets up new global tech-team - Launches Vulcan to enable use of digital assets in banking and commerce
2017	- Starts to offer ICO services - Opens second lab in New York	- First to accept Bitcoin as payment for services - Launches EY Ops Chain to facilitate commercial use	- Launches joint venture with Microsoft to build use-cases to showcase with clients	- Explores blockchain in the food industry with Alibaba
2018	- Launches first global blockchain survey of 1,000 executives - Reports that 74% see a compelling business case	- Releases Blockchain Analyzer that gathers client audit data - Focuses on identifying risks in the cryptocurrency market	- Helps to develop first blockchain-based airline loyalty program as a digital wallet	- Trains 1,000 staff members in blockchain over two years - Partners with VeChain Network
2019	- Assists insurance conglomerate RBA Alliance to accelerate blockchain application - Partners with VeChain network	- Releases zero-knowledge validation technology to advance blockchain privacy	- Announces alliance with Guardtime to provide blockchain enabled services to clients	- Releases Smart Credentials to validate job candidates - Top recruiter in blockchain according to Indeed (2019)

In reviewing the firms' various initiatives, it becomes evident that the similarities outweigh the differences, but some differences do exist among the firm. While KPMG and EY have adopted a mostly internal strategy in developing services in-house or through closed partnerships, Deloitte and PwC have to a larger extent focused on acquisitions, participation in blockchain ecosystems and use-case development with clients. EY and KPMG have further taken more of a risk assessment focus when advising clients in implementing the technology, while PwC and Deloitte act more aggressively in developing and implementing the technology. However, EY stands as the sole entity to have developed a blockchain-platform used for auditing and assurance services through the Blockchain Analyzer tool. PwC has been reported to top the recruiting league according to the world's largest recruiting platform Indeed (2019), closely followed by the other Big 4 firms. All Big 4 firms have to some extent been involved in the cryptocurrency space with separate ICO advisory divisions, often located in Crypto Valley in Zug, Switzerland.

4.1.2. Investment rationale

The rationale for the Big 4 accounting firms' entrance into the blockchain space is a multifaceted one. We observe a coherent opportunistic mindset amongst the firms towards the technology, but we also find evidence of an awareness of its potential drawbacks. One of the most observed arguments is that blockchain-related services constitute a potential for the accounting firms to expand their revenue streams through the creation of new services but also a simultaneous threat to the existing revenue streams if proactive action is not taken to address the technology:

I think it is a new source of revenue. Any new emerging technology will just change the way you do business and if you don't change with it you will start losing money. So, this is an emerging revenue line for [Firm C]. (Firm C, Developer, Interview 3)

A key consequence of the structural setting of Big 4 accounting firms is that increases in revenue due to innovation are dependent on innovation in the external environment. Our findings indicate that auditing firms will not increase their revenues by changing their auditing systems, organization or procedures but must interact with external societal stakeholders to achieve innovation. Thus, in the case of blockchain, this is materialized by the firms' focus to achieve innovation through client interaction:

Our strategy in Sweden has been that all types of innovation should be conducted in a client-facing environment. You cannot drive innovation if you don't do it in client-facing situations. (Firm A, Senior Manager, Interview 2)

Right now, we are situated on a downward slope on the [blockchain] life-cycle so it is really about finding the right application... So, I believe that the investments are made because we think there is a payback in a number of years... that we can get large projects. There is quite large money in these projects ... and the more companies that find the right application, the more we can work with them. (Firm B, Partner, Interview 5)

However, among the blockchain leads, there is also skepticism about the hype of the technology and questions are starting to arise regarding its potential:

We know that the blockchain technology works, it has been proven over and over again ... but why does it not fly then? If we have known this for five years as a society really? During the first five years they knew, the early adopters ... who made fortunes on bitcoin, they were the first, but then it has broadened to us ordinary people. (...) If digitalization is moving so fast, why is it [blockchain] not moving any faster? (Firm A, Partner, Interview 2)

I think that the hype around blockchain – it is way too much. It is a very interesting technology in the sense that it can standardize transactions, simplify transactions ... but thus far, I think that it is far too expensive. It is hard to get a large number of players in the ecosystem to gather around 'what constitutes a standardized transaction?'. (Firm D, Director, Interview 6)

Although differences in personal opinions exist between individuals, it remains evident by reviewing the data gathered in the current study and the vast amounts of Big 4 initiatives outlined above, that the firms engage and invest in blockchain as a potential new service offering. As a network dependent technology, the potential value of blockchain services can only be realized if the Big 4 succeed in engaging external stakeholders in the ecosystem. Thus, we find that the accounting firms face two interrelated challenges when investing in blockchain: (1) generating understanding of, and belief in the technology among the targeted stakeholders; and (2) claiming professional legitimacy in the domain of blockchain. The current study will address how the Big 4 firms strive to tackle these two challenges and with what institutional intentions. We identify that the work conducted by the firms is addressed through three main spaces which are described and analyzed in detail below: (1) professional publications; (2) client facing work; and (3) internal competence enhancing work.

4.2. Professional publications and the blockchain narrative

“Getting information off the Internet is like taking a drink from a fire hydrant.” (Mitchell Kapor, Date unknown)

To stimulate innovation in the blockchain space, the Big 4 accounting firms publish extensive amounts of white-papers, articles, research publications and education material on their websites and social media:

I would say that the fact that you go into their publications and see how much emphasis they [Big 4 accounting firms] put in this particular area, is telling you that they realize the importance of letting the market know we can do this. It's like anything, it's so new, you rely on the word of mouth and social media and publications that you do to let people know that this completely new technology we are actually good at and can show you. (Firm C, Developer, Interview 3)

As we will show, these publications play a key role in the institutionalization of blockchain as a new technological domain within accounting by constructing a narrative of technological disruption caused by blockchain. Further, firms engage extensively in physical blockchain events such as workshops, seminars and conferences where they invite clients and other stakeholders to participate to communicate and discuss the narrative. The professional white-papers paint a fairly non-nuanced picture of blockchain as a truly disruptive force that cannot be ignored, and the extensive marketing efforts by the Big 4 further strengthen the narrative's message. Table 2 below presents the number of results when searching on "blockchain" on each of the Big 4 firms' global websites. Compared to the searched terms "robotics" and "audit", it provides an indicative view of the magnitude of the firms' external blockchain and digital focus.

Table 2: Search results on Big 4 firms' global websites per search term (Company websites, 2019-04-23)²

	"Blockchain"	"Robotics"	"Audit"
Deloitte	>100	>100	>100
EY	249	307	349
KPMG	123	152	1,853
PwC	109	59	353

In reviewing the publications, we identify three key themes outlined in detail below: (1) education; (2) disruption affirmation; and (3) firm credentials. Combined, these three themes outline the disruptive blockchain narrative.

Education is a central part of firm publications, and the most consecutive theme observed in the reviewed articles. The firms most often use illustrative models, images, videos and industry examples of practical application (commonly referred to as *use-cases*) to explain how the technology works on a foundational level. The extensive educational rationale is twofold, directly addressing the challenges outlined at the end of section 4.1. To address the first

²Deloitte does not disclose number of search results exceeding 100. Comparison is only made between search terms per firm respectively, as the search results include inconsistent categories of content between firms.

challenge, the professional reports and the related discussion forums build understanding for the technology among the target groups:

It's very much about (...) driving some kind of learning experience with our clients, and obviously that also benefits us as a company in terms of figuring out: okay, where is the demand? Where are people with the technology? What is the focus on and what use-cases are most interesting to them? (Firm D, Consultant, Interview 11)

Further, relating to the second challenge of claiming professional legitimacy, the second reason is naturally to legitimize that the firms hold the technological expertise by becoming the main sources of information:

From a marketing perspective it's going to be important for us to show to our clients we know everything from a technology perspective and I think it's a bit harder for firms that actually audit to change the opinion of them with the clients: that they're not just auditors. And how do you compete with IBM or Accenture that are not audit firms. They're more routed as technology players because of the fact that they're not just known as audit companies. (...) EY, KPMG, PwC have more of a need to marketing to show that they're not just audit firms. (Firm B, Consultant, Interview 13)

Through the educating work, the firms thus construct the basis of the narrative by creating awareness in, and interest for the technology. Further, the *disruption affirmation* theme shifts the focus from opportunity through blockchain to also include threat of disruption. Disruption affirmation is materialized in the publications through the use of data, use-cases and a rhetoric enhancing the potential of the technology. The firms also use quantitative data extensively to validate the technology. Data points such as future expected blockchain market size, monetary size of blockchain investments and executive survey results are frequently used:

Let's start with the numbers: In the energy sector, there are currently three big blockchain consortia, 122 blockchain startups and 44 blockchain patents. The startups already have combined investments of more than 450 million dollars, and 85 percent of them are still going strong (...) Still not convinced? It's predicted that by 2023, the market value of blockchain solutions in the energy sector will be 7.1 billion dollars. (Firm A, 2019, Publication 7)

Throughout the publications, we often observe a rhetoric expressing a sense of urgency and *riskiness of risk aversion*:

The blockchain is set to revolutionize business processes over the next five years, provided that businesses are prepared to incorporate this innovative technology. The biggest risk regarding the blockchain is... not taking any risks. (Firm D, 2017, Publication 23)

A very interesting feature is how the firms are arguing against skepticism when data indicates that there already exists resistance and misbelief towards the technology. In one of *Firm A's* research papers, it is presented that a substantial portion of respondents claimed to believe that blockchain is overhyped. This fact is dismantled already in the publication itself, claiming non-representation of start-ups and potential disruptors in the sample. The rhetoric in the most recent articles indicates a struggle to convince the market to invest in the technology and transform business model accordingly:

The devil is not in the technological details, but rather in the word just mentioned – transformation. Without a holistic transformational approach to the technology it will stay promising, not fulfilling its full potential. (Firm A, 2019, Publication 4)

The fierce competition between the Big 4 accounting firms clearly plays a part in the formation of these professional reports. Throughout the interviews, we observe an apparent consciousness of the competition between the firms and the firms go far lengths in claiming the *king-of-the-hill* position in the eyes of the clients:

There is some sort of race between the firms. Digitalization is a hot topic and obviously we want to be part of it and show that we as a firm are in the forefront of the development and position ourselves in the ongoing progress. (Firm B, Director, Interview 7)

Very often competitors want to be the first that can go to market or come out with a PR exercise that kind of says 'we are looking at this and we have partnered with XYZ in order to solve this problem,' you know there is kind of that kind of competition across the industry and across various kinds of consulting firms in order to be seen the first to market. (Firm D, Developer, Interview 9)

There is a lot of work going on, what you see among the other firms is that more than many send out information about that 'oh, we are doing this,' that is bullshit. There is no substance in it, but everyone likes to communicate to the market 'oh we are doing this, we are the first here,' it is 90% diluted juice. (Firm B, Partner, Interview 5)

As the final theme in outlining the narrative through professional publications, these *firm credentials* enhance the relevance of the Big 4 as actors in the blockchain field. Firm credentials are distributed through the professional publications in several manners. First, we observe an emphasis on the resources mobilized by the accounting firms:

Our blockchain team is supported by a global workforce of over 5,000 digital experts spread across 11 experience centers in [Firm D's] global network of firms. Our experience centers are focused on innovation and design thinking, delivering development expertise and ultimately helping you build and implement digital projects. (Firm D, 2017, Publication 22)

Further, we observe a distinct emphasis on how the more established services of the Big 4 firms can create value for blockchain related projects. The firms highlight their ability to assemble multidisciplinary teams from their various service lines such as corporate accountants, tax, legal or supply chain and industry teams such as financial industry, insurance, industrials and consumer experts. It is to a large degree stressed that companies adopting blockchain must consider aspects outside of the blockchain technicalities themselves when engaging in the technology – thereby associating the blockchain practices with the existing practices of the accounting firms:

In addition to solving business issues with blockchain, companies need to account for the complex regulatory, tax and trade, auditability, risk and compliance implications that come with any global transaction and exchange. [Firm C's] blockchain approach integrates financial management, digital transformation, and industry subject matter proficiency to provide businesses with comprehensive guidance on blockchain, from strategy to implementation. (*Firm C, 2018, Publication 15*)

Finally, the firms claim professional legitimacy by associating themselves with more tech-savvy market participants such as Google and Microsoft:

We also leverage our global alliances and relationships with leading technology providers who are focused on delivering blockchain solutions, including Microsoft Corporation, Amazon Web Services, Inc., Blockstream Corporation, Hewlett Packard Enterprise Company, and Coin Sciences Ltd., among others. (*Firm D, 2017, Publication 22*)

4.3. Driving client driven innovation

As already outlined, the accounting firms seek to achieve blockchain application, mainly through client interaction. As blockchain is dependent on a network (ecosystem) of actors to validate the information in the system, the logics behind such a strategy are apparent. However, the Big 4 have struggled with convincing the majority of actors that blockchain is worth investing in. The uncertainties about return on investment, cyber security and privacy are argued to be the main causes for the client skepticism:

The idea of the blockchain is that you decentralize the information and I do not know how many companies want to decentralize that data accounting information in the risk that they could be if that information someone gets 'decryptified' and someone can see everything that a company is doing. (*Firm C, Developer, Interview 3*)

In this context, an interesting phenomenon arises, where the Big 4 as professional services firms, dependent on changes in the external environment to achieve domain expansion and change, take on the role of *driving the client driven innovation* themselves:

So, during quite a long time, you have to educate and then you moderate seminars and events, you invite for reviewing past projects. And this is something that most firms do. (...) That is something that many clients find interesting because (...) it is not the client that brings the innovation, but us who bring the innovation. (Firm B, Senior Consultant, Interview 15)

There is a consensus amongst the firms that client-facing blockchain initiatives are mainly driven by their advisory (consultancy) divisions. It is commonly argued that it is in the nature of the advisory business to be more progressive while the audit and assurance business remains more prudent and risk averse:

Advisory is a little more explorative ... It is more in the nature of the business. In an auditing profession, you have to prove to an external party that the conclusion we came to, we can cling to a set of rules. At Advisory, we do not have those requirements, we can be a little bolder. (Firm B, Executive Director, Interview 10)

We identify three forms of client facing work adopted by the firms in order to stimulate blockchain adoption in the external environment: (1) discounted and free-of-charge blockchain projects; (2) establishing connections to existing, generally accepted practices; and (3) construction of ecosystems through partnerships.

The discounted and free-of-charge use-case projects address both of our identified challenges as it creates legitimacy for the accounting firms and provide experience from practical applications for both the Big 4 and the clients:

Externally, regarding the free-of-charge projects (...): We seek that type of legitimacy because then we can say that we had the largest project in the Nordics, and then you naturally use it to get the next one. (Firm B, Partner, Interview 5)

Similar to the famous Gillette campaign, where free cartridge razors were sent out to millions of men in order to increase sales of cartridge razor blades, the Big 4 accounting firms increase blockchain adoption through discounted projects which in turn are expected to increase the demand for additional blockchain projects and, naturally, complementary services such as tax, legal and IT-audit:

Those I work with are (...) entrepreneurs. They are great at that. Don't know squat about auditing. (...) And they do not know tax either. (...) And then what? As I mentioned with risk assurance, security aspects and such things (...) various form of consulting and advisory. When people are starting this kind of business, we often get advisory deals. (Firm D, Partner, Interview 4)

Further, the firms leverage the use-cases and facilitate the emergence of the required ecosystem environment for blockchain to reach its full potential. This work is often conducted through the “blockchain labs” or “centers-of-excellence” organized by the Big 4 firms. These *blockchain hubs* are extensively used by the firms in marketing efforts and branded accordingly: Deloitte’s Blockchain Lab; EY’s Wavespace; KPMG and Microsoft’s Blockchain Nodes; and PwC’s Blockchain Experience Lab:

A [blockchain hub] as a concept really consists of technology and people. (...) We invite customers to these wavespaces to show them real cases of things we have done in an innovative environment. The thought of these wavespaces is to bring clients, it should be external. (Firm B, Partner, Interview 5)

The construction of blockchain ecosystems through partnerships is seen as a vital element in establishing the technology. The first one of our identified challenges can ultimately only bring value to the Big 4 accounting firms if it results in an ecosystem which involves several independent parties that can validate the information contained in the chain. Without a proper ecosystem, the blockchains will only remain a temporary experimental endeavor.

If someone wants to (...) come out as a knight and shining armor with a product to solve the problem, then somebody will try and do that I guess. But ultimately, in the case of blockchain where you need multiple parties and that typically expands to multiple types of organizations around that problem you really better engaging with those entities as a whole and collaborating with them. (Firm D, Developer, Interview 9)

However, quite surprisingly, when asked about collaboration between the firms in setting up blockchain ecosystems, all interviewees agreed on that such partnerships between the Big 4 firms do not exist. Given the auditing rotation regulation and the independency requirements against self-auditing, we would suspect that collaboration would be beneficial in designing network dependent systems, containing auditable data, such as blockchain. Also, in the regard of collaboration between advisory and assurance, we identify a disconnect in that the professional groups seldom coordinate their work in relation to blockchain outside of client-facing projects:

It’s almost like 4 different subcompanies under one umbrella, we don’t really talk to assurance or use them for too much except for maybe getting an understanding of the business and how they operate. (Firm B, Consultant, Interview 13)

The knowledge gap there creates some kind of mistrust to the technology. And also, different agendas within the organization. And what the result can be is that you have a situation where there is kind of a polarized work effort. So, you have some teams or people driving an agenda quite hard but with some resistance from others. (Firm D, Consultant, Interview 11)

4.4. Shaping the blockchain auditor

At this stage it is important for us to emphasize the connection between the advisory services of the firms and the audit and assurance services. Despite the fact that the external blockchain initiatives of the Big 4 firms are primarily driven by the advisory functions, they result in changes to the corporate environment and its stakeholders that have a direct impact on the auditing and assurance functions of the accounting firms. As blockchain adoption evolves among the firms' clients, auditors are forced to expand their competence and adapt practices in order to ensure trust in financial information – and thus, to fulfill their societal purpose.

However, at the current state of blockchain adoption among clients, the technology's influence on the practices of auditing and assurance is considered *yet to be discovered*:

I see advisory putting in more time than maybe audit and assurance. Audit and assurance would like to understand how the technology works, there are great ideas on how to audit that technology but there is no client out there that I know of at this point in time that has a significant use of blockchain where a full service needs to be developed for them. (Firm C, Developer, Interview 3)

Instead, the internal work is mostly conducted with preparational intentions. The firms are experimenting with internal proof-of-concepts in order to find potential areas of blockchain application:

While we talk externally we also do need to be promoting that internally as well (...) Across the firm we have internal proofs of concept that are very short lived but subsequently turn into something that we can then potentially set up in the case of credentials project. (Firm D, Developer, Interview 9)

Further, competence development emerges as a central theme. In analyzing the educational initiatives, we find that the target group is not just clients, but the professional publications are also distributed internally to increase the blockchain competence of employees at various levels. While one of the firms has launched a multi-year training program to advance digital skills among employees, another is developing their audit graduate programs to cover one year of training within digital technologies. Educational sessions, workshops, seminars and online learning portals are distributed across the organizations to reduce uncertainty about blockchain

as a potential disruptor. However, the most specialized competence remains centralized to the blockchain hubs and internal IT development divisions. So, despite the fact that the firms spend considerable resources on educating the work force, the increased awareness also causes some employees to question their relevance in a digital age:

I would say the most competence is centralized but they have a huge mandate to push educations through the broader [Firm B] organization so I could guarantee you that all [employee count] members at [Firm B] know what blockchain is, know that it is a potential disrupting technology, know that it may impact their sort of client in certain ways and from an audit perspective may impact the way they work. (Firm B, Consultant, Interview 13)

The firm's been on a journey of education over the course of the past years and were certainly finding that a number of education type calls are reducing which is great because that means that the firm is getting it. I think that people naturally get nervous when they hear that something like blockchain might be coming in because they start to fear for their jobs. (Firm D, Senior Manager, Interview 8)

Internally, we observe how the firms mobilize social communities and reward structures to incentivize engagement with blockchain. While this is enacted in Firm D by distributing a blockchain based digital board game, Firm B has designed a knowledge ranking structure connected to blockchain and digitalization where employees are rewarded with a rank based on their digital competence and related initiatives:

If you want to educate on a larger scale we have (...) medals or badges that you get (...): bronze silver, gold and platinum. (...) to get a bronze medal you should spend at least 20 hours on reading up on facts on the subject, you should make at least x pitches to a client, you should have presented internally, you should have been in a group to spread the competence (...). Then, the requirement becomes higher the more you progress on the scale. (...) If you get up to platinum, you should be market leading really. (Firm B, Senior Consultant, Interview 15)

The role of the auditor is expected to change as technologies such as blockchain become established as part of corporates' financial infrastructures:

Accountants, to a larger extent, are going to have to be familiar with programming and code (...), how IT-architecture and databases are constructed to understand transactions. I also believe that it will mean an increasing demand towards what we today denote as tax and legal. So, auditing will also have to include large parts about contracts and auditing thereof. (Firm D, Director, Interview 6)

Thus, in addition to the educational initiatives addressing the shifting roles, recruiting decisions are to a larger extent being influenced by technological merits among candidates:

I think that one thing that's definitely true, is that we are hiring more technical competence than we used to. But I think its partially because our clients are demanding that. (...) Part of [Firm B] is hiring hard core developers and then locally I think they are looking for business people who understand technology. (Firm B, Consultant, Interview 13)

However, there exists a consensus among both auditors and advisory consultants across the firms that the societal need for auditing will remain just as important. It is argued that the auditing practices themselves are likely to change radically, but also that complex accounting situations (such as project forecasts, cost of capital estimations and goodwill impairments) will still require experience-based judgement by professional auditors:

So, all kind of judgements are going to be very hard to digitalize, but we observe a trend in that the more we can digitalize, the more time we can focus on these judgements, which are the ones that in the end create most value. (Firm A, Partner, Interview 2)

Further, another argument put forward as to why the societal need for auditors will remain is that digital systems such as blockchain will require auditing in itself. Finally, and maybe most important, the factor of trust provided by the auditing functions of the Big 4 firms, is not an objective term. As long as blockchain-based auditing is not considered as the most trustworthy practice by society, it is argued that the current auditing practices will remain unchanged:

As a firm, what we do in auditing, is trust. I mean, yes sure we can maybe think that (...) it [blockchain] provides more trust. But if you are a little more skeptical, then you will not trust it as much as you would, what to say, a paper. (Firm B, Auditor, Interview 12)

This results in that auditors currently, in their daily work actually do more auditing work when new digital practices are applied to the auditing process:

What really happens is that you get braces and straps. You end up taking all [manual] spot-checks anyway because (...) that is how it has always been done (...) without the IT-auditing. (...) You lay a bomb mat of controls rather than settling for those that you, risk based, actually needed. (Firm A, Partner, Interview 2)

5. Analysis and discussion

In this section we will apply the developed theoretical framework to analyze our empirical findings. Previous theories from research on domain expansion and institutional work are applied in section 5.1. in order to develop our academic contributions on how accounting firms engage in adopting emerging technologies such as blockchain as part of their professional domain. Further, in section 5.2. we discuss how normative pressures are created and maintained and how they influence how the Big 4 accounting firms work with blockchain and interact with their stakeholders.

5.1. Constructing the narrative as institutional work

5.1.1. The narrative

The narrative constructed by the accounting firms is signaling *radical technological disruption by blockchain*. The reviewed professional publications paint a picture of blockchain as a truly disruptive force that risks destroying business models if companies do not adapt. It stimulates companies to adjust strategies, organizations and IT-infrastructure to remain relevant for their stakeholders. As the accounting firms interact with stakeholders through professional publications, social media, conferences, workshops, seminars and blockchain projects, the narrative is created and maintained.

The narrative is constructed by both auditing and consultancy divisions of the four firms in conjunction, but with various institutional purposes among the professional groups. Where consultants push the technology to the external environment to claim professional legitimacy in a new technological domain with commercial intentions, audit and assurance educate internally, hire competence and develop internal-use-cases to adapt to the emergence of blockchain in the auditable environment. Echoing the findings of Suddaby et al. (2015), we find that the blockchain narrative, as new media, constitutes a catalyst for change in how accountants claim professional legitimacy. However, we find that the narrative is not just a product of external communication, but a product of the combined individual activities adopted by the professional groups. While the external communication through professional publications outlines and distributes the narrative, the physical work conducted (such as hiring of key competence, external and internal educating and use-case development) constitutes the foundation on which the narrative is built. Also, in the perspective of auditors, the blockchain initiatives do not just serve to claim new professional legitimacy with the intention to expand

their professional domain to new services, but more to maintain their existing institutionalized professional legitimacy to remain relevant in a changing environment.

5.1.2. The institutional work

In analyzing the construction of the narrative, we have identified three forms of institutional work (Lawrence & Suddaby, 2006) that the Big 4 accounting firms adopt in order to claim professional legitimacy and institutional acceptance: (1) educating; (2) mimicry and (3) constructing identities.

Educating is defined by Lawrence and Suddaby (2006) as “the educating of actors in skills and knowledge necessary to support the new institution.” The need for educational activities is expressed by the Big 4 firms to reach a status of broad acceptance internally and among its clients. The educational work is further observed as the most recurring theme in the reviewed professional publications. The current study has shown that the Big 4 advisory consultants educate clients in order to generate understanding and commercial interest in the technology. As the understanding increases among the targeted stakeholders, it is argued that the commercial potential is realized gradually as the firms are hired to advise clients on blockchain use-case development and implementation. As our findings indicate that the firms have struggled with both internal and external resistance toward the technology, we observe how the educating work serves a purpose to overcome *work rejection* (Canning & O’Dwyer, 2016): how individuals initially reject various forms of work but over time convert to accepting them and eventually embrace them. As the disruptive narrative is distributed and repeated through education and various forms of workshops and seminars by the advisory function, the assurance and audit employees, less inclined to push the narrative themselves, are informed and updated on current developments in the blockchain space and have over time come to share the consultants’ opportunistic view on the commercial potential of blockchain. We find that even auditors with a more prudent attitude toward the technology itself believe that blockchain and other digital technologies will have an impact on their daily practices, even though they cling to their traditional practices while they experiment with new ones. In the same manner, we find that the distribution of the narrative explicitly serves to overcome skepticism among external stakeholders such as clients.

Mimicry is the work of “associating new practices with existing sets of taken-for-granted practices, technologies and rules in order to ease adoption” (Lawrence & Suddaby, 2006). Similar to how accounting providers in the work of Farooq & de Villiers (2019) associate

sustainability assurance with the traditional audit practices, the Big 4 accounting firms emphasize the accounting-related aspects and risks of blockchain technology through distribution of the narrative. The accounting firms highlight the risks related to their own fields of expertise in their external communication. Blockchain's potential for increasing revenues and cost efficiency, legal and tax related consequences and implications on internal audit functions are frequently discussed. As concluded by Farooq and de Villier (2019), this mimetic work enables the accounting firms to both gain internal acceptance for the domain expanding work as well as leverage their social capital and trust capital associated with the traditional services when claiming professional legitimacy among clients in new practices.

Constructing identities is the work of defining the relationship between an actor and the field in which that actor operates (Lawrence & Suddaby, 2006). While the educating efforts give legitimacy to the Big 4 as knowledge leaders within the field and the mimetic efforts define the value creating role of the firms in the field, the firms also adopt work to directly define their identity within the blockchain domain. Echoing the observations by Hayne and Free (2014), we find that the accounting firms leverage their existing identity as “thought-leaders” in the field of accounting, enhanced through the mimetic work. Further, the firms engage in boundary work (Suddaby et al., 2015) to sustain their thought-leadership position by ensuring that blockchain-related discussions and forums are situated within the boundaries of their domains. Conferences, work-shops and seminars are frequently arranged and hosted by the Big 4 and when similar events are arranged by non-accounting actors, the Big 4 strive to be represented. In this regard, the Big 4's respective blockchain hubs play a central part where clients are invited to share knowledge, interact with field experts, experiment with use-cases and formulate partnerships. Similarly, institutional work has also been observed in regulatory settings (Canning & O'Dwyer, 2016) where regulators frequently interacted with “professional accounting bodies” through various forums where the regulators strived to construct a consensual identity toward the accounting professionals to facilitate driving their regulatory agenda.

Internally, actors engage in identity construction by changing the employee perception of the firm's professional domain. The internal education, hiring of tech-savvy personnel, community construction and social reward structures enacted inside the organizations serve as methods to stimulate self-identification with blockchain technology among employees. Having a digital profile is argued to have brand value in attracting talent. The associations through partnerships with major tech players and the brand value of the blockchain hubs play an important role in constructing the identities of the firms.

5.1.3. Sedimentation through distributed agency

The distributed agency between auditors and consultants plays a central role in understanding the institutional dynamics between advisory and assurance (Lawrence et al., 2011). As Hayne and Free (2014) address distributed agency through the concept of *hybridized professional groups*, we find that the institutional work of consultants and auditors in conjunction creates and maintains the blockchain narrative, but we find no significant data points indicating any major coordination of the functions. To the contrary, while the mimetic work of the firms through the external communication signals coordination between functions, the primary data indicates an internal disconnect between the professional groups. While the advisory divisions contribute to blockchain adoption through client-facing work, auditors engage in developing their internal practices to remain relevant for the clients acting in the same external, increasingly digitalized field. Consultants strive to create externally while auditors strive to maintain internally.

This phenomenon leads to an almost perfect illustration of the conflict outlined by Malsch and Gendron (2013) between the consolidation of commercial values in accounting and the guardians of the professional tradition, represented by auditors. However, in the case of blockchain, the cause and effect are less direct, and the conflict is not necessarily about disrupting the accounting institution itself, but rather in how the domain expanding work of one professional group forces the other to adapt to a changing environment. We find that none of the professional groups intentionally strive to change their institutional setting, but rather act in accordance with the institutional logics of their respective businesses (Canning & O'Dwyer, 2016) in the face of a changing technological environment. We can thereby conclude that the narrative mainly serves a purpose to maintain the institutionalized setting of the Big 4 accounting firms, despite its message of technological disruption.

Thus, the observed work echoes the phenomenon of *sedimentation* (Empson et al, 2013): “how individuals mutually and simultaneously engage in institutional work (...) to gradually integrate an emerging institutional logic into an established institutional logic.” However, while Empson et al. (2013) argue that sedimentation emerges as a result of multiple forms of institutional work conducted simultaneously, our findings enable derivation of the same phenomena through one specific form of institutional work enacted with various institutional intentions. While educating work by the advisory functions is aimed more toward the direction of institutionalizing blockchain as a new technology within their professional domain, we find that

the assurance function is educating its workforce with the intention to defend their current professional domain as audit practices are expected to change. In the same way, mimicry and constructing identities are enacted with intentions both to create and maintain. In the empirical setting of the current study, we can thereby observe that sedimentation arises as individuals simultaneously engage in a single form of institutional work, enacted with multiple intentions, as well as when multiple forms of institutional work are adopted simultaneously.

5.1.4. Dissociating categorized intentions

In summarizing the institutional work conducted by the accounting firms in the current study, we argue that the categorization by creating, maintaining and disrupting institutions (Lawrence & Suddaby, 2006) in some ways fails in explaining how individual actors work to influence institutions. As we identify institutional work in the forms of educating, mimicry and constructing identities, enacted by the construction of *disruptive* narratives, by intentions to *maintain* accounting institutions, the categories that imply institutional intentions to the various forms of institutional work do not perfectly align with the findings of the current study. While the forms of institutional work themselves serve as a robust theoretical posture in explaining how accounting firms claim professional legitimacy and expertise (Suddaby et al., 2015) in expanding their professional domain, we must move beyond the limitations of the sequential perspective (Empson et al, 2013; Hayne & Free, 2014; Canning & O'Dwyer, 2016; Farooq & de Villiers, 2019) and dare to critically analyze the categorization (Hayne & Free, 2014; Canning & O'Dwyer, 2016) suggested by Lawrence and Suddaby (2006) to develop unbiased academic contributions.

We also find that the forms of institutional work are highly interrelated and mutually dependent. While previous researchers have claimed that institutional work of different categories interact and mutually reinforce one another (Canning & O'Dwyer, 2016), little attention has been paid to how forms of work within the same category interrelate. Through educating work, we find that the Big 4 firms both construct identities as knowledge leaders within the blockchain domain and associate taken-for-granted accounting practices with the emerging blockchain practices. The mimetic work assists in constructing identities through defining the role of the firms in the blockchain field. This further legitimizes the educational work of the firms as they leverage their social capital (Empson et al., 2013; Farooq & de Villiers, 2019) and progress in the professional domain of blockchain – resulting in a loop of interdependency and mutual reinforcement.

5.2. Normative pressures driving innovation

To conclude our analysis, we now ask: why is the observed institutional work of the respective accounting firms so similar? For an explanation of these observations, we turn to the commercial logics (Malsch & Gendron, 2013) and isomorphic forces (DiMaggio & Powell, 1983) that influence the accounting institutions.

For most commercial enterprises, it can be assumed that *normative pressures* to innovate and follow industry trends exist as a natural element of any industry (DiMaggio & Powell, 1983). Companies are under constant pressure to adopt the latest technology to produce the best products and services at the highest efficiency. While this is also true for accounting firms, such purely service oriented firms are dependent on innovation in the external environment to create new services and change practices. Auditors will not be able to audit sustainability reports unless regulators and corporations change their accounting practices (Farooq and de Villiers, 2019). There is not a purpose in formulating an accounting-based enterprise risk management (ERM) framework if potential users do not approve of risk management as a practice (Hayne & Free, 2014). Likewise, there is no purpose in advising or auditing blockchain related practices if clients are not interested in adopting the technology.

Farooq and de Villiers (2019) argue that the “existing influences and constraints” defined as “the institutions and pressures that influence actors” should provide the analytical starting point in their proposed course of analysis adopted in the current study. However, in the case of blockchain, we argue that these institutional pressures are created by the accounting firms themselves as they strive to claim professional legitimacy and, thus, cannot be assumed to preexist. The commercial logics of the Big 4 accounting firms, as found in the current study, create an incentive for the firms themselves to create normative pressures in the external environment, in order to achieve expansion of their professional domain (Malsch & Gendron, 2013). This would explain the accounting firms’ extensive investments in driving blockchain innovation in their external environment.

Sequentially, as the firms construct and distribute a narrative of disruption by blockchain, normative pressures are created that lead auditable clients to invest in the technology and communicate their endeavors. Consequently, the combined factors of fierce competition in the external environment and large uncertainty about the future impact of blockchain, create mimetic forces between corporates to engage in similar activities (DiMaggio & Powell, 1983). Thus, as the auditable corporates adopt blockchain technology as part of their IT infrastructures,

auditors identify a need to develop their audit practices. The created narrative thus leads to self-affecting consequences for the firms. Through this process, the blockchain narrative becomes mutually accepted through the institutional work of the firms – both in the external field and within the accounting domain. Consequently, the normative pressures are strengthened in the accounting industry, materialized by the intense competitive race between the firms. Through this perspective, we theorize that blockchain's relevance in the accounting domain cannot be assumed as a natural phenomenon. Rather, we argue that digital innovation such as blockchain is constructed by the combined activities of the individual actors who attempt to influence the institutions that inhabit the accounting domain.

The above theorization would also explain the lack of differences in the institutional work adopted by the firms. Although, there are differences in the type of projects conducted by the firms, we find no significant variations in how the firms engage in institutional work to expand their professional domains. As normative pressures maintain the efforts to adopt blockchain technology, mimetic forces shape the methods used by the firms to claim professional legitimacy. In all firms, we can observe: a strong pattern of educational initiatives through professional publications and internal competence development; mimetic work to associate the established practices of accounting with blockchain technology; and construction of identities through extensive interaction with the blockchain community to obtain a status of thought-leadership. We identify very similar communication channels, similar organizational structures, and structures of centers of excellence and blockchain hubs.

6. Concluding remarks

6.1. Conclusion and contributions

The current study has addressed professional domain expansion through institutional work in the case of blockchain. Previous accounting research on professional domain expansion has focused on the accounting firms' entrance into new professional territories (Malsch & Gendron, 2013), development of new auditing services (Farooq and de Villiers, 2019), adoption of new digital tools (Suddaby et al, 2015) and the regulatory dimension to domain expansion (Canning & O'Dwyer, 2013; Hayne & Free, 2014). While entrance into these domains does construct a pure expansion without risk for cannibalism on already established practices, the case of blockchain presented in the current study, is one of a more complex nature. As the firms engage in blockchain, they engage with technology theoretically capable of replacing auditors' societal function as providers of trust in the financial system (Dai & Vasarhelyi, 2017; Zhang et al., 2017). However, as it now stands as a fact that the Big 4 accounting firms engage extensively in adopting the technology and develop services based upon it, the current study has asked the following question:

How and why do accounting firms engage in adopting emerging, potentially disruptive technologies such as blockchain as part of their professional domain?

Applying our theoretical framework, through the lens of institutional work (Lawrence & Suddaby, 2006), we find that firms claim professional legitimacy in the field of blockchain by constructing disruptive narratives as forms of institutional work with the intention to maintain the current accounting institutions. We find that normative pressures are created and exercised through these narratives and that mimetic forces minimize organizational and strategic differences between the Big 4 accounting firms.

The current study directly contributes to the existing accounting research in three main ways. First of all, this study has generated empirical insights into how accounting firms engage with blockchain technology. While previous accounting research on blockchain has focused on its potential impact on accounting practices and systems (Fanning & Centers; Dai & Vasarhelyi, 2017; Coyne & McMickle, 2017), the current study takes the perspective of the individuals and contributes by showing how accountants address the emerging technology and how their professional roles are impacted. Throughout the current study, we have highlighted how auditors (assurance) and consultants (advisory) act in various manners to address the emerging

technology. While consultants perceive blockchain to be an opportunity for increasing revenue streams and thus market the technology in the external (and auditable) environment, auditors perceive it as a potential disruptor of contemporary auditing practices. Thus, blockchain causes a paradox-like tension within Big 4 accounting firms as it posts an opportunity for advisory and a simultaneous threat to the contemporary role of audit and assurance.

Secondly, we contribute to the family of literature on domain change and expansion in accounting (Malsch & Gendron, 2013; Hayne & Free, 2014; Suddaby et al., 2015; Canning & O'Dwyer, 2016; Farooq & de Villiers, 2019) by showing how consultants create a *narrative of disruption by blockchain*, maintained through normative pressures (DiMaggio & Powell, 1983). Normative pressures are created in the external environment as the narrative is distributed through professional publications, conferences, workshops and client meetings. Consequently, due to large uncertainty regarding blockchain's disruptive impact, mimetic forces between corporates further stimulate technological adoption (DiMaggio & Powell, 1983) in the auditable environment and minimize organizational and strategic differences between the Big 4. Thus, as the interest for blockchain increases, the normative pressures of the narrative indirectly impact the accounting firms internally as auditors feel the pressure to adjust their practices in order to stay relevant in a changing auditable environment.

Thirdly, we show how accounting firms act to achieve professional domain expansion through the lens of institutional work. We find that firms adopt a combination of different forms of institutional work, consisting of *educating, mimicry and constructing identities* (Lawrence & Suddaby, 2006). Educating is materialized externally through professional publications and internally through competence development, mimicry is materialized as the accounting firms associate blockchain with traditional accounting practices and constructing identities is materialized through the initiatives to become "thought-leaders" of blockchain and internally by stimulating employees to identify with the technology. We show how the distributed agency (Lawrence et al., 2011) between consultants and auditors and their multi-faceted intentions (Malsch & Gendron, 2013; Hayne & Free, 2014) echoe the findings of sedimentation (Empson et al., 2013), but also how sedimentation can arise through single forms of institutional work when enacted with multiple intentions.

While Lawrence & Suddaby (2006) categorize the observed forms of institutional work as intended to create institutions we observe how they are used by auditors to maintain the institutionalized role of auditors as trust providers in the financial system. Thereby, our findings provide support to the arguments in recent accounting literature (Hayne & Free, 2014; Canning

& O'Dwyer, 2016) that analysis of institutional work must move beyond the original authors' categorization, as given forms of institutional work cannot be assumed to adhere to predetermined categories of institutional intentions. Further, while each of the observed institutional work forms serve their own purpose in constructing the narrative, we find them to be mutually dependent and highly interrelated in claiming professional legitimacy in the blockchain domain. The current study thus indicates interesting propositions for the still emerging stream of literature on institutional work, as our findings indicate that forms of institutional work within the same category (Lawrence & Suddaby, 2006) should be considered as highly interrelated.

6.2. Limitations

A natural limitation of the current study is the ability to scientifically generalize – which is usually the case for this type of qualitative exploratory study where smaller sample sizes are used (Yin, 2014). The study is based on a limited number of interviews which may limit our ability to extend our conclusions outside our sample. Thus, it would have been beneficial to conduct more interviews but given time constraints and the access provided by the sample companies, that has not been feasible. However, the benefit of this study is that it has been based on a multiple case study approach rather than a single case study as this has generated empirics from several perspectives. Further, we have interviewed firm representatives located outside of Sweden (UK, Denmark and the Netherlands) as well as representatives located in Sweden with non-Swedish descent and international professional experience (Australia and the US). As disclosed in Appendix, most interviews have been conducted with representatives from Firm B and Firm D. Therefore, given the lack of observed differences between the firms, it would have been beneficial to conduct more interviews with Firm A and Firm C to be able to confidently draw the same conclusions for them as well.

Another limitation is the subjectivity that comes with gathering data through interviews. The aim of this paper has been to try and get a spread in the interviewees between different departments but ensure that interviewees have sufficient understanding of emerging technologies and blockchain. However, sometimes this has not been fully feasible depending on what kind of access has been obtained. Efforts have been made to minimize the risk of subjectivity such as not sending the questions to the interviewees beforehand and having both of the researchers coding the data to increase objectivity. Furthermore, triangulation of the data obtained from the interviews has been made against observations and professional publications of the Big 4 firms.

6.3. Suggestions for future research

The nascent state of current research within the field of blockchain and accounting opens up for several interesting areas of potential future research. Firstly, we would like to suggest additional research on how accounting firms engage with emerging digital technologies to address the call for research by The International Federation of Accountants (Islam, 2017). Blockchain, artificial intelligence, robotics automation and big data all present potentially disruptive characteristics to the domain of accounting. Secondly, studies could be performed on companies outside of the accounting domain to investigate if and how accounting data is obtained and reported differently due to digital technologies such as blockchain and how accounting and auditing practices might be impacted. Third, an interesting extension of the current study would be to engage in a longitudinal study to investigate how blockchain impacts the accounting domain over time and whether blockchain actually will have the impact many believe it will.

Finally, further research drawing on the extension of the institutional work framework presented in this paper would provide additional insights to understand individuals' impact on accounting institutions. Specifically, we believe that additional studies that focus on how various forms of institutional work interrelate are necessary to establish the framework as a top tier theoretical posture in accounting research. Although previous accounting research has addressed the majority of Lawrence and Suddaby's (2006) institutional work forms in isolation, most of the potential interrelationships remain unresearched. Also, as the current study has implied that forms of institutional work within the same category can be mutually dependent and enacted with multiple intentions, we suggest that studies through the lens of institutional work should challenge the original categorization to further extend the research on institutional work.

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8. Appendix

Appendix table 1: Interviews

Firm	# people interviewed	Title	Country	Interview #	Day	Time	Length (min)	Questions beforehand
Firm C	1	Manager	Sweden	1	13-mar	13:00	75	No
Firm A	1	Senior Manager	Sweden	2	18-mar	15:00	85	Yes
Firm A	1	Partner	Sweden	2	18-mar	15:00	85	Yes
Firm C	1	Developer	Sweden (from Australia)	3	22-mar	15:00	60	No
Firm D	1	Partner	Sweden	4	25-mar	13:00	52	No
Firm B	1	Partner	Sweden	5	26-mar	10:00	51	No
Firm D	1	Director	Sweden	6	01-apr	10:00	44	No
Firm B	1	Director	Sweden	7	02-apr	10:00	80	No
Firm D	1	Senior Manager	UK	8	02-apr	15:00	27	No
Firm D	1	Developer	UK	9	05-apr	10:30	35	No
Firm B	1	Executive Director	Sweden	10	08-apr	08:30	54	No
Firm D	1	Consultant	Denmark	11	08-apr	11:00	45	Yes
Firm D	1	Consultant	Denmark	11	08-apr	11:00	45	Yes
Firm B	1	Auditor	Sweden	12	08-apr	14:30	55	No
Firm B	1	Consultant	Sweden (from USA)	13	16-apr	18:00	51	No
Firm D	1	Manager	Netherlands	14	23-apr	18:00	50	No
Firm B	1	Senior Consultant	Sweden	15	26-apr	15:30	52	No

Appendix table 2: Professional publication analysis

Firm	Publication	Year	Publication format
Firm A	1	2018	Industry survey
Firm A	2	2019	Industry research
Firm A	3	2019	Website content
Firm A	4	2019	Debate article
Firm A	5	2019	Website content
Firm A	6	2019	Blog post
Firm A	7	2019	Industry research
Firm B	8	2016	White paper
Firm B	9	2018	Press release
Firm B	10	2018	White paper
Firm B	11	2018	Industry research
Firm B	12	2019	Website content
Firm B	13	2019	White paper
Firm B	14	2019	Industry research
Firm C	15	2018	Press release
Firm C	16	2018	Website content
Firm C	17	2019	Website content
Firm C	18	2019	Website content
Firm C	19	2019	Blog post
Firm C	20	2019	Third-party news article
Firm C	21	2019	Website content
Firm D	22	2017	Website content
Firm D	23	2017	Industry research
Firm D	24	2018	White paper
Firm D	25	2018	White paper
Firm D	26	2018	Third-party news article
Firm D	27	2018	Third-party news article
Firm D	28	2019	Press release