

## Blockchain: exploring its impact on the business models of Australian accounting firms

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### Abstract

*The paper reports on a study that investigated the impact of blockchain technology on the business models of accounting firms in Australia. Using semi-structured interviews with a range of stakeholders including audit partners from big-4 accounting firms in Australia, the study found that firms are building their resources and competencies and offering blockchain-related services as value proposition despite a formative ecosystem. This ecosystem is characterized by clients' reluctance to use blockchain platforms for financial reporting systems, a lack of direction on applicable accounting standards, no consensus on blockchain standards and absence of appropriate governance structures.*

**Keywords:** Blockchain, business models, accounting firms

### 1. Introduction

Blockchain technology can dramatically change accounting work and provide opportunities for the accounting profession. Blockchain offers a reliable, low-cost way to record and validate financial and operational transactions (Basden and Cottrell, 2017) and an create a decentralized public ledger with a secure infrastructure to allow unfamiliar parties to transact (Dai and Vasarhelyi, 2017). Big-4 accounting firms such as PwC, Deloitte and KPMG are investing in blockchain. PwC (2016) claims that blockchain is the next-generation business process improvement software. Deloitte (2016) states that it will improve collaboration, transparency and productivity, and KPMG (2018) expects it to disrupt existing business models and create significant economic value for the industry.

However, technology by itself has no agency and value is generated only when it is used through changes to business models (Chesbrough and Rosenbloom, 2002). Business models moderate the link between emerging technologies such as blockchain and business success (Baden-Fuller and Haefliger, 2013). They need to be reconfigured to respond to disruptive technologies

(Demil and Lecocq, 2010; Teece, 2010). Established firms, though, often suffer from their unwillingness and inability to change their business models (Al-Debei and Avison, 2010).

This paper analyses the potential impact of blockchain technology on the business models of accounting firms. It addresses a need for empirical research on the effects of blockchain on accounting firms and practices (Schmitz and Leoni, 2019). While there are many claims of blockchain's potential benefits and opportunities, they are under-investigated and empirical evidence is very limited (Dai and Vasarhelyi, 2017; Kokina et al., 2017; Carlin, 2019; Chiu et al., 2019; Frizzo-Barker et al., 2020). To address its purpose, the study deployed semi-structured interviews with a range of stakeholders, including audit partners from first and second-tier firms, representatives from accounting and blockchain professional bodies, and blockchain developers. Data was analyzed using Demil and Lecocq's (2010) RCOV (resources/ competencies, organizational system, and value proposition) business model framework.

The study found that accounting firms are offering assessment of risks and control systems to clients that are building applications on blockchain platforms and advice on accounting for cryptocurrencies. Despite client reluctance to use blockchain for financial reporting, a lack of accounting and blockchain standards, and, governance structures, firms are adapting their business models to respond to blockchain. This study contributes to the literature by amplifying Greenwood and Suddaby's (2006) work and Demil and Lecocq's (2010) RCOV framework.

### 2. Literature review

#### 2.1 Blockchain and accounting

A public blockchain is a decentralized ledger that provides a secure infrastructure for transactions among unfamiliar parties without central authority (Dai and Vasarhelyi, 2017; Tan and Low, 2019). Data or records

are aggregated into blocks, which are linked together through hashes, allowing tampering of existing records to be identified (Tan and Low, 2019). A secure infrastructure, however, does not eliminate the issue of whether unfamiliar parties can be trusted. A system based on smart contracts which are mathematically defined and with mechanically enforceable rules (Kwon, 2014), also does not prevent fraud. Unscrupulous rules could still be encoded on blockchain platforms (Bradbury, 2015). Hence, an alternative are private permissioned blockchains because there is differentiated access to data with known parties (Yermack, 2017). For instance, IBM announced that it has developed a fully integrated enterprise-ready blockchain platform designed to accelerate the development, governance, and operation of a multi-institution network (IBM, 2017).

Other challenges in the use of blockchain technologies are large computational resources and a level of knowledge and skill to maximise its capability (Deloitte, 2016). Adopting blockchain requires major changes to organizational processes and large investments in codifying smart contracts. An ecosystem has to be created whereby organisations will maintain their data in a public or limited private domain, work collaboratively in an open share environment, and invest in the integration of blockchain applications with other systems such as ERP and data warehousing (Dai and Vasarhelyi, 2017).

Blockchain nonetheless is viewed as an innovative business technology (Deloitte, 2016; Ferrer, 2016), which could revolutionize the way, *inter alia*, that ownership of assets is transferred, and ledgers of financial and non-financial information are maintained. Access to clients' blockchain ledgers could result in a marked increase in the efficiency and cost-effectiveness of audit engagements of accounting firms (Schmitz and Leoni, 2019). This study will explore whether accounting firms are harnessing the potential benefits of blockchain technologies. How if at all, will challenges and changes brought about by blockchain impact on their business models?

## 2.2. Technologies and business models

Technologies by themselves do not have agency. A business model defines how organizations create value (Zott et al., 2011). Through a business model, technologies are able to generate value and influence firm performance (Chesbrough and Rosenbloom, 2002; Gronum et al., 2016). They can change the way businesses operate and the performance metrics along which firms compete (Zott et al., 2011). A business model is a “*system of interdependent activities that transcends the focal firm and spans its boundaries*”

(Zott and Amit, 2010, p. 216). It is the “architecture of the value creation, delivery and capture mechanisms” of a firm (Teece, 2010, p.172), articulating a logic to support a firm's value proposition. Priem et al. (2012) stated that redesigning a business model is particularly challenging for service firms. Poor configuration of assets and processes, cognitive inability of managers to understand the value potential of new technologies, and an existing business model are examples of key challenges to this task (Chesbrough, 2010; Doz and Kosonen, 2010; Svejenova et al., 2010).

Accounting firms too have recognized that information technology (IT) is a key driver of their productivity (Banker et al., 2002). IT enables firms to automate routine auditing tasks and improve work collaboration within audit teams, which then may enhance their assurance service delivery (Bierstaker et al., 2001; Banker et al., 2002; Janvrin et al., 2008). Accounting firms have been spurred to innovate by clients who heavily invest in information technology (Banker et al., 2005). Firms typically assist clients in computerizing their information systems, which incentivizes them to use sophisticated IT as well. Use of advanced technology by firms allow them to make significant productivity gains (Chari et al., 2008).

Client use of blockchain technology for instance, may change the offering of firms by significantly changing the documentation and verification tasks in financial audits, thus making them redundant (Maclver, 2016). This could assist in operational efficiencies and facilitate effective compliance with regulations. Thus, it has the potential to change firms' business models either by affecting the value delivery of financial statement audits or costs of resources and competencies (Teece, 2010; Nowinski and Kozma, 2017). This suggests that business models act as crucial moderators in the link between new technology development and business success (Baden-Fuller and Haefliger, 2013).

Henderson and Russell (2005), however, counter that productivity growth for firms is a factor of four distinct components—efficiency change, technical progress, IT capital accumulation, and human capital accumulation. The cognitive ability of employees to understand and unlock the value potential of new technologies is key in generating productivity growth (Chesbrough and Rosenbloom, 2002). High-quality human resources are equally important as sophisticated IT for accounting firms (Blokdiik et al. 2006). It is primarily IT and human capital rather than efficiency change or technical progress that contribute to productivity growth Chang et al. (2011).

It is equally important to recognize the impact of technological innovations on the entire ecosystem (Massa et al., 2017). To illustrate, a number of chemical companies creating bioplastics did not include societal

actors in their efforts to define sustainability. Consequently, they faced significant risk to their efforts to sustain value propositions (Iles and Martin, 2013). The energy sector on the other hand, recognized that a large infrastructural change at the industry level was required in its ongoing transition from fossil fuel economy to clean production economy. This resulted in the creation of whole new systems and business models at both industry and firm levels (Johnson and Suskewicz, 2009). Similarly, blockchain works at its full potential only in an eco-system that offers maximum value to its participants. In the financial auditing industry, the eco-system would include accounting firms, standard setters, and regulatory bodies. Previous studies focused on efficiency change, technical progress, IT and human capital investment to assess value creation and productivity growth in firms (e.g. Banker et al., 2002, 2005; Chang et al., 2011). However, as Massa et al. (2017) observed, one has to look beyond the firm to assess the impact of technology on business models.

### 2.3. Business models of accounting firms

The business models of accounting firms shifted in the 1980s and 1990s when first-tier or big-4 firms adopted the organizational form of multidisciplinary practice (Greenwood and Suddaby, 2006). Multidisciplinary practice is distinctive along a number of dimensions including strategy, human resource management, knowledge management and underlying values. It is characterized by the provision and cross-selling of a diversified range of services to clients who tend to be large by professionals with expertise in specific industries, a diverse multi-professional workforce, and formal and centralized knowledge systems.

Mid-tier accounting firms, instead invoke a mix of dimensions from a cravat-style organizational form and multidisciplinary practice (Lander et al., 2013). The cravat-style form is characterized by the provision of a narrow range of services to clients who vary in size by professionals who are generalists, a unitary professional workforce, and informal networks of knowledge. Professional services are considered a craft with underpinning values of collegiality, consensus and professional autonomy. However, in regard to the dimension of underlying values there appears to be, at least convergence in pursuing accountability for performance using profit-sharing schemes (Sweeny and McGarry, 2011; Coram and Robinson, 2017). Malsch and Gendron (2013) commented that firms push their work jurisdictions while reaffirming claims to professional legitimacy. Hence, they recruit experts in other disciplines thus expanding the services that they

can offer clients (Lawrence and Suddaby, 2006; Suddaby et al., 2009). Claims to professional legitimacy are reaffirmed because non-audit services are considered as improving financial statement audits (Berardino, 2000 as cited in Suddaby et al., 2009). Indeed, multidisciplinary specialist teams that are supported by global knowledge management databases, and common industry-specific work programs and training apparently increase client perception of audit quality (Carson, 2009). The link to this study's purpose is that Australian accounting firms with global networks may well be able to respond to anticipated disruptions from audit clients' use of blockchain technology because they can draw on knowledge and expertise from other locations.

### 3. Theoretical framework and methodology

To address the study's purpose, we interviewed stakeholders including audit partners from first- and second-tier accounting firms in Australia. The Resources, Competencies, Organization and Value Proposition (RCOV) business model framework by Demil and Lecocq (2010) (explained below) were identified *a priori* to develop interview questions. It also provided a structure to which empirical data were classified allowing an analysis of the ways in which accounting firms have responded to blockchain technology.

Though scholars of business models use different terminology, proposing and adopting a range of business model frameworks, there is convergence on the components of a business model (Saebi et al., 2016). Demil and Lecocq's (2010) framework is considered appropriate for this study. It views business model innovation as an organizational change process and identifies the different organizational capabilities and processes to enable this change process. Deploying the core components of resources (R) and competencies (C), organizational structure (O) and value propositions (V) to identify changes to the business model is also particularly helpful because it allows comparison across firms (Siggelkow, 2007). To protect the identity of the firms and informants, however, the paper does not present responses by specific firms.

Resources include both physical (e.g., equipment) and human (e.g., skilled labour) and can be bought, leased/hired or internally developed. Once assimilated in operational activities and bundled with other resources, they could also gain a distinctive role. Competencies are the abilities and knowledge staff individually, and organizations collectively develop to enhance, recalibrate or radically change products and services. Organizational structure encompasses the value chain of organizational activities, and the value

network of relations organizations have with external stakeholders. These stakeholders include suppliers, customers, competitors, governments, regulators, and professional organizations. Value propositions are embodied by products, services, and other transactions that organizations offer not only to its customers but also suppliers, competitors or sponsors.

This study primarily relied on data from semi-structured interviews, which allowed access to in-depth responses from the study's participants (Palys, 1992), including their observations and opinions on, and involvement with the use of blockchain technology. The authors adjusted to prompts from participants and modified the tone, order and structure of interview questions to stimulate comprehensive responses (Qu and Dumay, 2011). There were 28 informants representing a range of stakeholders including big-4 and second tier accounting firms, user organizations, blockchain developers and professional accounting bodies, who held senior positions in their organizations which made them the most appropriate respondents.

An interview guide helped ensure that all dimensions of the business model were covered while allowing space to pursue participants' responses (Qu and Dumay, 2011). Interview data are available only to the authors and were digitally recorded then transcribed. Transcripts were sent to participants for their review before commencing analysis. Using qualitative procedures (Huberman et al., 1994), interview materials were analyzed, and transcripts coded by authors independently according to RCOV framework and results compiled.

## 4. Findings

This section presents the study's findings on the impact of the blockchain technology on each of the business model components of resources and competencies, organizational systems, and value proposition.

### 4.1. Resources and competencies

**4.1.1. Human capital.** The cognitive ability of managers and staff to understand and unlock the value potential of new technologies is vital in redesigning business models (Chesbrough and Rosenbloom, 2002; Priem et al., 2012). However, Australian accounting firms face a challenge with blockchain technology because, *"accountants are not thinking about blockchain, and probably (are) a generation away from them"* (Respondent 6). A senior partner wondered: *"they are all quite good users of technology, but are they able to effectively understand the underlying mechanics and operations of the technology and what could go wrong*

*or how it could be used, so that we'd be able to place some reliance on it?"* (Respondent 17).

As noted by a respondent, *"there is a shift in the market towards requirements and specifications beyond an initial 'must have a degree' or 'must be an accountant' to – 'must have a degree, must be an accountant, must have three years' experience, but must also have proven skills in technology; and then there are a lot of what we call hybrid skills - including around certain new technologies – data science, analytics, artificial intelligence, cloud computing and blockchain"*. (Respondent 24).

Accounting firms are responding to unlock the value potential of technologies by firstly developing hybrid competencies in accounting, business and technology that support and enable business. In the words of a senior partner: *"We have this vision of creating that hybrid auditor which is someone who understands the accounting and the business side of a client but also is able to translate that into the technology that's needed to – not just support but enable that business"* (Respondent 26)

To make the hybrid auditor a reality, accounting firms are investing in resources and building capabilities to service clients operating in a technology-enabled environment. There are three approaches. A first approach is developing skills in-house through scaling up training of employees. In the process, as explained by a respondent, *"we're pulling people out of audit and other areas and putting them in over the course of the next five years"* (Respondent 16). Realizing that not everyone is interested to be upskilled and develop blockchain competence, another big-4 firm is offering *"a basic level to really get people into some of the emerging technology"* (Respondent 26). Further, a senior partner citing the challenges of learning new competencies commented that *"there was probably people who do not really want to get their hands dirty; as it was hard, a bit difficult."* (Respondent 28).

A second approach is learning by sourcing expertise from the firm's global network. For instance, an Australian accounting firm who had an audit client who was trading cryptocurrency sought help from its global network. A senior partner observed, *"it was a lot of effort; now we've got a much more consistent system that does that, mostly out of Japan, because in Japan, cryptocurrency exchanges are required to be audited at least for certain things."* (Respondent 14). Interestingly, initial capabilities are built in locations where there are cryptocurrency exchanges that require assurance of cryptocurrency transactions. Indeed, knowledge of, competency in, and specific work programs on blockchain technology developed by global accounting firms could be shared across jurisdictions and

potentially increase client perception of audit quality (cf. Carson, 2009).

A third approach is entering into partnerships with technology firms. These firms are not only investing in developing technology platforms, but also skills to enable audit engagements of clients who might operate on blockchain platforms. A big-4 firm stated that *“we do have one or two (partnerships) with consulting firms who are consulting in blockchain”* (Respondent 17).

As accounting firms have adopted elements of multidisciplinary practice (Greenwood and Suddaby, 2006), it is now common to have multi-disciplinary teams for audit engagements. A senior partner said: *“we have people from various teams - we got legal teams specializing in this. We have got risk and audit methodology teams together again. So, we’re all trying to sit together, to challenge the assertions and risks we are trying to protect against because we want to make sure this is a true and accurate reflection of the numbers.”* (Respondent 26).

Learning how to mine is an important competency required in auditing a client using blockchain technology, our study observed. A respondent notes that it is challenging to uncode the hash to get relevant information out. He therefore asserts that *“the auditor has to understand how this mining works because miners are the one who actually verify these transactions”* (Respondent 23).

Blockchain skills are evolving and are more intertwined with other skills. Respondent 22 stated that skills in developing a chain code is less of specialized skill than people thought it would be and is morphing into other areas. He observes that *“an AI developer can be quickly reskilled to work on a blockchain project, and that front-end development is a generic industry skill set and not blockchain specific”* (Respondent 23). But for the consulting skill set, he observes that *“the team has to understand the technology and know-how to help clients get the best out of technology to push through transformational things,”* and that the consultant really *“have to immerse himself in what’s going on in the industry and how it works in the different dynamics that are emerging.”* (Respondent 22).

**4.1.2. IT capital.** Sophisticated IT, along with high-quality human resources are recognized as key drivers of productivity by the accounting firms (Banker et al. 2002; Chari et al., 2008). Firms must build additional computing resources in order to provide audit services to clients on a blockchain platform. There are additional costs associated with the membership in blockchains, access and maintenance. A senior partner observed: *“It took up a huge amount of computer space for the data, we actually had to go and buy a whole separate server just to put the Bitcoin blockchain on it. And at that time,*

*it was much smaller than if you had to go and download it now, although server capacity is getting a lot cheaper.”* (Respondent 14). By the very nature, distributed ledger technology (DLT) implies significant additional record keeping due to increase in volume of transactions (Deloitte, 2016). This may necessitate additional computer resources for both audit firms and clients.

Overall, accounting firms are developing human resources and competencies to respond to disruption to audit services by blockchain technology. The multi-disciplinary organizational form of accounting firms allows them to respond faster by investing in human and IT capitals.

## 4.2. Organizational system

Massa et al. (2017) advised to look beyond the firm to assess the impact of technology on business models. An organizational system for Australian accounting firms encompasses clients, standard setting bodies, regulatory institutions, and technology developers. The first three stakeholders will be discussed below. The view of technology developers is presented in Section 4.3.

**4.2.1. Clients.** While Respondent 24, quoted below views IT capital as driving productivity, as discussed in Section 4.1.2, research showed that human and IT capitals are the real drivers. This technology specialist points out that *“every business now is a technology business, driven and supported by efficiencies in human process management; it is no longer a human-centric business made more efficient by technology.”* (Respondent 24).

Respondents observed that the big four banks in Australia have started exploring blockchain technology but not yet for their mainstream products or transactions. Though they have all got blockchain projects underway, one respondent observes that *“none of them have really looked at seriously deploying blockchain to solve some of the bigger issues in banking.”* (Respondent 7).

Governments also adopt technologies, but its use for government services, however, is premature (DISER, 2020). As noted by respondent 22, *“it is not because governments do not see the value or its potential, but that it will take them time (probably ten years) to use it everywhere.”*

Additionally, there is a view that Australian organizations are reluctant to change technologies in general and more so if they impact their financial statements. As noted by a respondent, *“Australia is notorious for waiting for everybody else in the world to spend the money before they adopt”* (Respondent 16). Respondent 26 notes that *“a lot of clients are really*

nervous about changing any technology that impact their financial statements.” It was not surprising that for Australian accounting firms, audit clients using blockchain technology “are a minority in this niche” (Respondent 18) and that “we may have one or two of our clients that are utilizing blockchain where we are doing the audit.” (Respondent 17).

As Respondent 22 said, fully reaping the benefits of blockchain technology will require a different way of collaborating, which entities are hesitant to do: “They haven’t historically collaborated in the way that blockchain facilitates and enables. They don’t necessarily actually rely on each other’s data to do business.” This new type of collaboration is new to Australian businesses.

**4.2.2. Standard setting bodies.** Standard setting is a slow process, as noted by respondent 1, it “is a very complex business and is generally difficult and time consuming to arrive at consensus.” The slow and process is compounded by the complexity due to the involvement of a number of organizations such as - ISO (International Organization for Standardization), ITU (ITU Telecommunication Standardization Sector), IEEE (Institute of Electrical and Electronics Engineers Standards Association) and the need for consensus among groups of people from countries, languages and different experts’ with views (Respondent 8).

The process of setting standards (for blockchain) is also at an early stage. Respondent 8 added that: “the initial standards being defined is on some basic “foundational things like terminology, high-level reference architectures for these platforms, some standards around the nature of smart contracts. We have not got to the point of defining data standards or detailed protocol standards yet. So, I think that is much further in the future.” (Respondent 8). Another observed that, “standards boards are not keeping up with technology; they are still working on glossary for technology, so they are definitely way behind” (respondent 28).

The lack of standards, however, is not considered a barrier to adopting blockchain technology although formal standards can spur innovation in its use. See the observation by a respondent below: “Standards can help. But you don’t always need standards. If we look at the internet, the internet was created based on informal standards, ad hoc standards. So, there are ways in which de facto standards or multiple computing standards can move towards harmonization over time. But formal standards can help establish a common basis for innovation.” (Respondent 8).

Notably, there are not yet dedicated accounting standards on cryptocurrency transactions and that “there is no evidence that standard setting bodies such as IFRS

(International Financial Reporting Standards) are doing anything on this matter.” (Respondent 7). It is difficult to create financial statements if you don’t know what accounting standard applies, and how our financial records look like (Respondent 10). On accounting for cryptocurrencies, there is debate whether it is a financial instrument or intangible. “But at the moment, the accounting standards don’t really handle it as a currency.” (Respondent 16).

By our informants’ accounts, the lack of blockchain and accounting standards has not impeded the adoption of blockchain and trading of cryptocurrencies in Australia. Formal standards, however, are viewed as helpful to facilitate further innovation and comparability of financial reporting practices.

**4.2.3. Regulatory bodies.** The comment below captures two debates around regulating blockchain. “There are challenges about how you regulate when it’s across boundaries. But there was talk at one stage saying, “Well, if we had a blockchain, we don’t need a regulator, right?”. They are saying, “Well, it’s got these two intermediaries and you’ve got nothing, in between, do we even need a regulator? I think people are going to need to know that blockchain is safe, it’s secure. So, I am not sure where that role sits.” (Respondent 2).

Firstly, a global instead of a national response may be required for a regulatory framework because transactions transcend national borders. Secondly, while public blockchain purportedly provide a secure infrastructure for transactions among unfamiliar parties (Dai and Vasarhelyi, 2017; Tan and Low 2019), an issue is whether parties are trustworthy. Unscrupulous rules could be encoded on blockchain platforms (Bradbury, 2015), hence developing regulations may be required. However, regulating different transactions on blockchain platforms is complex.

Depending upon the complexity and wider application of the blockchain, it may be necessary to create new regulatory framework for each context which may further accentuate the complexity. As observed by respondent 6, “the blockchain is the next much more complex version of ledgers which transact data, identity platforms transact identity data, financial platforms transact financial data. So, which regulatory framework do you apply to a technology that can handle multiple at the same time? and so the gap between progression and eventual regulation increases.” (Respondent 6). It is also important for regulation to be technology neutral and dynamic and that our legislation is fit for purpose (Respondent 2).

Presently, it appears that there is not much appetite for regulatory bodies to legislate to regulate blockchain enabled transactions and assets. However, there is activity among regulators in Australia. The Australian

Treasury released an issues paper on the opportunities and risks arising from initial coin offerings (ICOs) (Treasury, 2019). The Australian Transaction Reports and Analysis Center (AUSTRAC) amended the Anti-Money Laundering and Cash Terrorism Financing Act to capture digital wallets, expand definition of e-currency to include digital currencies, and regulate activities of digital currency exchange providers (AUSTRAC, 2018). The Australian Securities and Investments Commission (ASIC) released information and guidelines on the evaluation of DLT, ICOs and crypto assets (ASIC, 2019). Similarly, the Australian Taxation Office (ATO) provided guidance about the potential application of the Corporations Act 2001 to businesses that are considering raising funds through ICOs, and, on the tax treatment of crypto currencies (ATO, 2019).

A related aspect is the governance structure of blockchain eco-systems which comprising of aforementioned stakeholders, sovereign states, technology developers, crypto currency exchanges and banks. One informant explains: *“If you look at public blockchain systems like Bitcoin or Ethereum, there is no consortia there, the mechanisms there are very different. There are software developers who are developing a software platform; cryptocurrency exchanges which are deciding whether or not to allow cryptocurrency exchange on their platforms; large holders of cryptocurrency but also stakeholders in the conversation about the evolution of the system, and there are countries as well which might also define legislation which allows – support or prohibits the use of cryptocurrencies for that platform in their country. So, a variety of different forces are at work and the evolution of this is much more complicated than the one who actually do the technical operation of the system. It is a very different governance model. It is not very well understood.”* (Respondent 8).

The governance model of a privately commissioned blockchain, however, would be different as Respondent 8 further explains: *“A group of organizations might define a consortium and collectively operate a blockchain; and have a committee with representatives from each of these organizations - like the single source of authority – used to drive governance mechanisms that look more normal.”* And if you look at companies like – Visa or MasterCard – they were originally consortia like that between – compared to the banks that defined a new organization to provide governance for new technology that would operate across banks. So that’s a kind of analogue to one of the governance forms that you can see for blockchain in future.” (Respondent 8).

The discussion here on blockchain users, developers and regulatory agencies indicate that the ecosystem is formative in Australia, and that different governance

systems apply for public and privately commissioned blockchains. The eco-system, however, transcends national boundaries (including that for private blockchains), and, indeed as discussed earlier, big-4 accounting firms draw knowledge and expertise from their global networks to address new challenges in the audit of financial statements of clients with crypto currencies and using blockchain technology.

### 4.3. Value propositions

Accounting firms are generating services relating to blockchain technology for clients. Three of these services are to build blockchain functionality, to advise on accounting for crypto-assets, and to assure control systems relating to blockchain. An informant from big-4 accounting firm states that *“we have a consulting arm that does that; we do the review, and we work with them a lot around when they build things, how did they build it with the risk and controls embedded in that design.”* (Respondent 26). Another context is where clients deal with payments in bitcoin. With the *“demand for payment increasing, audit firms see that as an opportunity and value proposition that they could offer to such clients”* (Respondent 14). Others *“might be doing a lot more assurance work in terms of control environment. I think with the blockchain technology, for people to come into that ecosystem, they’re going to want to make sure that they can rely on the controls that are set up. We will probably be involved from an auditing perspective working management in terms of what controls you have in place.”* (Respondent 10)

On assuring financial statements, blockchain developers see the potential for accounting firms to accrue efficiencies for clients that will have financial accounting systems on blockchain platforms (cf. Schmitz and Leoni, 2019). A respondent notes: *“One of the big four accounting firms during the peak season of auditing, spend about 34,000 dollars on post per week and that’s probably three months of the time. And the return rate of that is 40 percent. And they spend roughly between 40 to 60 percent of the time doing paperwork tracings and confirmations. That’s a lot of time, which – if we say reduce by half, and that extra time – are they able to give more opinion on internal controls, management letters, and things – Isn’t that more value adding than actually doing all the paperwork, and tracing, and do all that?”* (Respondent 3).

While there is no indication that accounting firms will themselves adopt blockchain technology in financial statement audits, accounting firms are looking at various digital tools, and, investigating how they could contribute to improved audit efficiencies. One senior partner state that *“we’re doing a lot of work in digital and looking at not just blockchain but many other*

tools out there to see how we can improve the quality, the efficiency and effectiveness of the audit.” (Respondent 13).

In addition, accounting firms are preparing for future when clients start using blockchain technology for financial statement systems: *“At the moment what we have done is look at it so that we can build a methodology for how we would deal with that. That is why we have built all these crypto-related risk and control matrixes, we have methodologies around, we’ve looked at how we’ve done those types of clients so if someone does decide that they’re going to have these clients, we’re ready.”* (Respondent 26).

A pertinent question however is whether blockchain is currently solving an unmet accounting problem. Based on the interviews with staff from accounting firms, it seems that there is not yet a compelling imperative for blockchain technology to be widely embraced by businesses and the government. A respondent articulates this argument: *“Where is the problem that they are trying to meet? And if there is no problem, then why would businesses embrace it? So, the ASX (Australian Securities Exchange) might have a blockchain project to manage their business, but do they have it from the accounting function to use it as an accounting system? I don't think so, they'll use it for one purpose but not necessarily an internal purpose because I don't think there's a cost benefit there. The systems that they already have, provide a high-quality product for what they need. So, I'd say what is the unmet problem that blockchain is trying to solve from an accounting perspective? I'm not sure that there is one”* (Respondent 21).

According to Banker et al. (2005), accounting firms have been spurred to innovate by audit clients who heavily invest in IT. Because clients are reluctant to embrace blockchain platforms for financial statement systems, it is not surprising that accounting firms have not radically changed the value proposition of their assurance services. But they are willing to offer additional value-added consulting services on blockchain technology adoption.

## 5. Conclusions

This study assessed the impact of blockchain technology on the business models of accounting firms in Australia. It used a framework that allowed an examination of how accounting firms can change their business models through the elements of resources and competencies, the organizational system and value propositions.

Accounting firms are already providing risk consulting to clients that are building applications on blockchain platforms. The audit and assurance services

are offering advice on accounting for crypto currencies and foresee assurance services on internal control systems of blockchain applications. The organizational system characterized as lacking in technology, accounting and auditing standards, and, governance structures, has not hampered accounting firms from being proactive in designing bespoke risk assessment and anticipating changes to audit methodologies. It seems, however, that this lack of standards and governance structures has adversely impacted Australian clients since they are reluctant to use blockchain technology for financial statement systems. Hence accounting firms though they are investing in resources and competencies, seem not to have deeply reassessed their value proposition relating to audit and assurance services.

The business model of multidisciplinary practice renders firms agile. The pooling of human capital from across their range of services and deepening of human capital allow firms to pivot in response to blockchain technology. Formal global knowledge management systems accord firms, especially the first-tier firms, the ability to tap into expertise from locations across the world where regulatory requirements push firms to develop blockchain competencies. Partnerships with technology firms also enhance fluency in blockchain. Thus overall, human resource and knowledge management systems appear key factors in the ability of accounting firms to adapt their business models in response to blockchain.

This study makes two contributions. First, it confirms and amplifies Greenwood and Suddaby's (2006) pioneering work on the organizational form of multidisciplinary practice by accounting firms. The ability of accounting firms to respond to likely disruptions from technologies is greatly enhanced by its human resource management and knowledge management systems. Importantly it also allows firms to identify and address gaps in skills. An aspect of the multidisciplinary practice not highlighted by Greenwood and Suddaby (2006) but recognized for example by Carson (2009), is the global reach of accounting firms and implications for human resource management and knowledge management systems.

A second but related contribution applies to the RCOV framework by Demil and Lecocq (2010). As noted by Saebi et al. (2016), the literature on business model innovations is now converging on the components that constitute a business model. What is lacking in Demil and Lecocq's framework is an explicit overarching element such as an architecture that allows the other elements to be linked. Our study highlighted the importance of an architecture of formal human resource and knowledge management systems



particularly in contexts where technology has the potential to disrupt businesses on a global scale.

A major limitation of this exploratory study is that its findings are tentative. However, it alerted the key roles for human resource and knowledge management systems with technology disruptions. Case studies on how these systems are designed, managed and deployed would provide nuanced understanding of their roles and impact on business models. It would be informative to understand how accounting firms prioritize allocation of resources to address these disruptions, and its impact on their business models.

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