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RESEARCH ARTICLE

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Business on Chain: A Comparative Case Study of Five Blockchain-Inspired Business Models

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Abstract

Blockchain technology, despite its origins as the underlying infrastructure for value transfer in the era of cryptocurrency, has been touted as the main disruptive force in modern businesses. Blockchain has the capacity to chronologically capture and store transactional data in a standardized and tamper-proof format that is transparent to all stakeholders involved in the transaction. This, in turn, has prompted companies to rethink preexisting business practices, thereby yielding a myriad of fascinating business models anchored in blockchain technology. In this study, we advance contemporary knowledge of business applications of blockchain by drawing on the theoretical lens of the digital business model and value configuration to decipher how pioneers in this space are leveraging blockchain to create and capture value. Through a comparative, multiple case study approach, we analyzed five companies in mainland China that have rolled out blockchain initiatives. From our case analyses, we derived a typology of five blockchain-inspired business models, each of which embodies a distinctive logic for market differentiation. For each business model, we offer insights into its value creation logic, its value capturing mechanism, and the challenges that could threaten its longer-term viability. Grounded in our findings, we discuss key implications for theory and practice.

Keywords: Blockchain, Digital Business Model, Value Creation Logic, Value Capturing Mechanism.

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1 Introduction

Current legal, political, and socioeconomic systems are founded on contractual obligations, commercial exchanges, and transactional records (Iansiti & Lakhani, 2017). Together, they document events and identities, engender trust in transactions, and govern interactions among commercial entities, governmental institutions, trading partners, individuals, and society at large (Iansiti & Lakhani, 2017). However, in light of the challenges posed by the digital economy on data integrity and veracity (Teichmann, 2018), trust-based governance structures, which underlie conventional transactions, are no longer adequate to cope with growing calls for data security. Consequently, it is inevitable that both scholars and practitioners have

been drawn to blockchain as a technological advancement for accomplishing trustless transactions (Risius & Spohrer, 2017).

Fundamentally, blockchain is a distributed ledger technology that is regulated through a consensus mechanism and secured with cryptography (Nakamoto, 2008). In its most primordial form, blockchain comprises a growing list of transactional records (or blocks) that are connected via cryptography. Each block in a blockchain contains a cryptographic link to its previous block together with the timestamps and transactional data of all transactions recorded on the block. Because blockchain epitomizes a peer-to-peer network that collectively adheres to a standardized protocol for authenticating and inscribing transactions onto a block, the integrity and veracity of transactional data can be protected against retroactive alteration (Risius & Spohrer, 2017). To retroactively alter transactional data that has already been inscribed onto a block, there must be consensus among the network majority to modify all subsequent blocks, an almost impossible task once the blockchain network has grown sufficiently large in size. For this reason, blockchain, by design, is virtually immutable due to its resilience to data manipulation. By virtue of its immutability, blockchain has the potential to displace trust-based intermediaries (Tapscott & Tapscott, 2016). Indeed, the benefits of blockchain have been acknowledged across sectors spanning banking (Guo & Liang, 2016), finance (Tapscott & Tapscott, 2016), government (Ølnes, Ubacht, & Janssen, 2017), and supply chain industries (Korpela, Hallikas, & Dahlberg, 2017). A report by the World Economic Forum (2015) predicts that by 2025, transactions constituting 10% of the world's Gross Domestic Product (GDP) will be recorded on blockchain.

Despite the optimism surrounding blockchain, the extent to which it has disrupted traditional business models remains a subject of intense debate. Avital et al. (2016) liken blockchain to bubble memory, which, despite being touted as the replacement for the hard disk that will eventually revolutionize the computer industry, has failed to live up to its promise. The same sentiments are echoed by Beck, Müller-Bloch, & King (2018) who contend that the ability of blockchain technology to strengthen governance and reduce coordination cost could be overexaggerated. Iansiti and Lakhani (2017) hence allege that blockchain is unlikely to be a disruptive technology that could challenge conventional business models. Rather, blockchain should be viewed as a foundational technology capable of revitalizing the infrastructure of existing socioeconomic systems (Iansiti & Lakhani, 2017). Due to the aforementioned contradictory viewpoints on blockchain, Glaser (2017) has asserted that a critical but elusive question about blockchain concerns how blockchain can be applied to generate value for businesses. Given the dearth of research in this area, we draw on the theoretical lens of the *digital business model* espoused by Al-Debei and Avison (2010) and undertake an exploratory study of blockchain companies—which we define as companies that have incorporated blockchain into their business offerings—to uncover their value creation logic and value capturing mechanisms. By disentangling the interdependency between the value creation logic and value capturing mechanism for five prominent blockchain companies, we are able to not only derive a typology of five corresponding blockchain-inspired digital business models, but also to illuminate the challenges associated with pursuing each of these digital business models. In so doing, we attempt to offer an answer to the following research question: *How do blockchain companies create and capture value through digital business models?*

The remainder of the paper is structured as follows. In the next section, we offer an overview of the unique characteristics of blockchain and its current state of research. Following this, we review the extant literature on the digital business model in order to explicate our rationale for embarking on an exploratory study of the value creation logic and value capturing mechanisms for blockchain companies. Next, we outline our case selection criteria and describe the procedures we adhered to for data collection and analysis. We then present our analysis for each of the five case companies, which, in combination, gives rise to our typology of blockchain-inspired digital business models. Finally, we conclude by highlighting the implications of our findings for theory and practice, plausible limitations, as well as avenues for future research.

2 Theoretical Foundation

2.1 Overview of Blockchain Research

Blockchain resembles a fully distributed, decentralized system that captures and stores an immutable chronological log of every transaction among actors on its peer-to-peer network. Blockchain is functionally similar to a distributed ledger that does not require any middleman for authenticating and inscribing transactional data onto the ledger (Risius & Spohrer, 2017). Instead, the blockchain is usually programmed in such a way that actors within the network are incentivized to contribute computational power to the authentication and inscription process. Therefore, in contrast to centralized transactions involving trusted third parties, blockchain guarantees the immutability, transparency, and veracity of transactional data (Yli-Huumo, Ko, Choi, Park, & Smolander, 2016). Furthermore, due to its immutability, blockchain supports the programming of smart contracts,

computerized transactional protocols devised to digitally facilitate, verify, or enforce the negotiation or performance of a contract under the supervision of all network actors (Underwood, 2016). Smart contracts not only enable transactions to be performed credibly without the intervention of trusted third parties, but they also ensure that transactions, once executed, are irreversible and traceable.

To expand its peer-to-peer network, blockchain can adopt either a permissioned or permissionless governance structure. Whereas authorization is a prerequisite for setting up network nodes on a permissioned blockchain (Peters & Panayi, 2016), network nodes could be set up anonymously and without oversight for permissionless blockchains. For instance, Bitcoin exemplifies a permissionless blockchain, in that the protocol is grounded in proof of work (PoW) and there is no entry barrier for actors to partake in the network. Furthermore, data on Bitcoin transactions are accessible and transparent to all actors within the network. Conversely, permissioned blockchains operate under the purview of a central authority or consortium in that network nodes are prescreened and selected in accordance with predefined compliance criteria. In general, for permissioned blockchains, no cryptocurrency is issued and smart contracts are employed to govern interactions among actors within the network (Xu et al., 2017)

Given its unique characteristics, it is not surprising that research into the technical aspects of blockchain is gaining momentum. Whereas a handful of studies have explored the intricate relationship between blockchain and cryptocurrencies like Bitcoin (Papadopoulos, 2015; Peters, Panayi, & Chapelle, 2015; Vigna & Casey, 2016), the bulk of research on blockchain concerns the identification and resolution of technological challenges encountered during project implementation (Yli-Huumo et al., 2016). For instance, Liang et al.'s (2017) work concentrates on the detection of threats to privacy and security that may arise from the implementation of blockchain projects, while Moyano and Ross (2017) focus on algorithmic enhancements to optimize the efficiency of blockchain architecture (Moyano & Ross, 2017).

Compared to the advances achieved in comprehending the technical properties of blockchain, there is much less progress being made in recognizing the wider implications of blockchain for businesses. Due to a paucity of studies on the business applications of blockchain, scholars are divided on the extent to which value can be appropriated from blockchain. On the one hand, blockchain proponents regard blockchain as a disruptive technology that will pave the way for novel business models centered on distributed consensus (Crosby, Pattanayak, Verma, & Kalyanaraman, 2016), and predict that much of the growth in the digital economy will be driven by the emergence of decentralized autonomous organizations (DAOs) in which smart contracts among actors in a blockchain network dictate the automated execution of transactions without the need for intermediaries (Beck et al., 2018). On the other hand, blockchain detractors counter that the technology underpinning blockchain is relatively simplistic and that too much hype is attached to it in spite of its limited business applications (Stinchcombe, 2018; Walker, 2017). Iansiti and Lakhani (2017) further note that as a foundational rather than a disruptive technology for supporting existing socioeconomic systems, the impact of blockchain might not be felt for decades. To address the knowledge gap concerning applicability, this study attempts to shed light on how value can be created and captured through new digital business models inspired by blockchain.

2.2 A Conceptual Overview of the Digital Business Model

Technology has transformed the way businesses are conducted by revolutionizing traditional market structures. Particularly, recent trends in digitalization (e.g., big data, IoT, and prevalence of mobile devices) have culminated in a market environment that is not only immensely complex and intensively competitive, but also fraught with uncertainty. For this reason, digital business models have become an indispensable aspect of strategic planning as firms devote resources to the conversion of emerging technologies into an enduring and sustainable competitive advantage over market rivals (Hamel, 2000).

Although business models have attracted substantial scholarly interest because of disruptions to traditional businesses triggered by rapid technological advances (Chesbrough, 2006), researchers remain divided on their constituent dimensions (DaSilva & Trkman, 2014). Indeed, attempts to conceptualize business models have been undertaken by scholars from fields such as economics, management, and strategy (DaSilva & Trkman, 2014), which in turn have generated theoretical paradigms such as the resource-based view of the firm (Barney, 2001) and transaction cost economics (Morris, Schindehutte, & Allen, 2005). In the age of digitalization, the emergence of digital business models has blurred the boundaries between business strategy and processes, fueling further debate on their distinction (Al-Debei & Avison, 2010; Porter, 1996; Zott, Amit, & Massa, 2011).

In this study, we adhere to Al-Debei and Avison's (2010) conception of business models as the layer between business strategy (e.g., product differentiation) and business processes (e.g., product manufacturing) that enables digital firms to formulate and execute value creation and capturing activities (Kazan, Tan, & Lim, 2015).

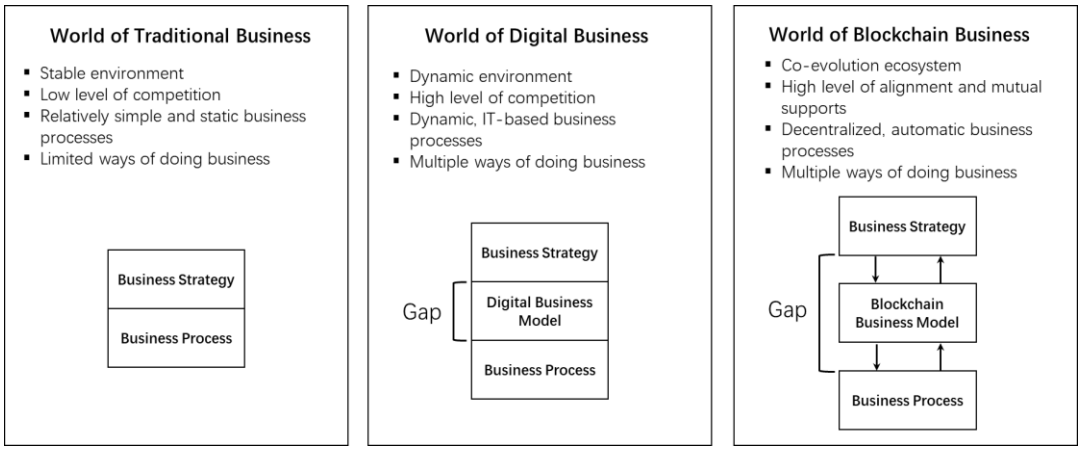

Figure 1. Impact of Blockchain on Preexisting Business Models

Conceivably, the importance of the digital business model for blockchain companies cannot be understated because blockchain has shifted preexisting business processes from being static and dynamic to being decentralized and automated (see Figure 1). This has culminated in a coevolution ecosystem among network actors that causes the business logic of blockchain companies to deviate significantly from those of traditional firms (Crosby et al., 2016). We thus turn to Al-Debei and Avison's (2010) invocation of four digital business model value dimensions as well as Fjeldstad and Snow's (2017) taxonomy of value configuration for dissecting blockchain companies.

Within extant literature, there are two primary streams of research on business models. In the first stream, management scholars have sought to explicate how core business processes are configured to create and capture value (Bharadwaj, El Sawy, Pavlou, & Venkatraman, 2013; Pitelis, 2009). In the second stream, information systems researchers have strived to open up the black box on key considerations (or value dimensions) that underlie value creation and capturing in digital environments (Al-Debei and Avison, 2010; Pagani, 2013). We therefore synthesize both research streams to derive a unified analytical lens for dissecting blockchain companies.

2.3 Value Configurations

Past studies in the field of strategic management have demonstrated how discrepancies in value configurations can lead to variations in value creation logic and value capturing mechanisms (Casadesus-Masanell & Zhu, 2013). As purported by Fjeldstad and Snow (2017), value configuration can be construed as a contingency factor that dictates the properties of all other business model elements.

Originating from the work of Porter (1985), the *value chain* is one of the most prominent value configurations within the extant literature. A value chain describes the process of transforming inputs into outputs for a firm. Specifically, it unpacks a firm's sequential process for connecting production partners (Fjeldstad & Snow, 2017) to create and deliver value to its end consumers. Porter (1990) claims that the value creation logic of the value chain is applicable to any industry. Since generic activities such as marketing and operations are valid for all industries, it is a focal premise of the value chain that firms should differentiate through industry-specific actions in order to acquire enduring and sustainable competitive advantage in the market (Porter, 1990). Nevertheless, despite the popularity of the value chain, Stabell and Fjeldstad (1998) counter that its value creation logic may not be entirely transferrable to service industries such as education, finance, healthcare, insurance, and music. Because products in service industries are intangible, the applicability of the value chain is rather limited (Peppard & Rylander, 2006). As opposed to manufacturers, production processes like procurement and inbound and outbound logistics are typically not relevant for service providers. This is especially true for digital firms such as travel portals (e.g., Expedia.com), which primarily mediate the digital sales of hospitality products between consumers and service providers. Likewise, firms, whose value creation logic revolves around the harnessing of internal competencies for problem solving (e.g., law firms), are also a mismatch with the concept of the value chain.

To address the shortcomings posed by the value chain, Stabell and Fjeldstad (1998) advanced a taxonomy of value configurations that incorporate value shop and value network into the mix. Unlike the value chain which is founded on horizontal and sequential business processes, the *value shop* is grounded in recursive feedback learning loops (Gray, El Sawy, Asper, & Thordarson, 2013). Firms operating as value shops create value by assessing current situations and then

modifying these situations through iterative learning until a desired solution can be found (Kazan et al., 2015). Conversely, firms operating as *value networks* create value by leveraging on mediating technologies to support interactions among network actors. Consequently, value networks can be characterized by their dyadic, parallel, polyadic, and/or simultaneous activities (Kazan et al., 2015) through which network actors (e.g., consumers, partners, and suppliers) cooperate to co-create value (Peppard & Rylander, 2006).

As affirmed by Fjeldstad and Snow (2017), all firms, regardless of digital or physical, should assume one of the three types of value configurations: value chain, where value is created through sequential processing of inputs into desired outputs, value network which cocreates value through mediating technologies, and value shop, which harnesses its internal competencies for problem solving. The same applies to blockchain companies. For instance, blockchain companies operating as value chains aim at transforming inputs into desired outputs in an efficient manner (e.g., producing valued market outputs such as new Bitcoins) (Kazan et al., 2015), whereas those operating as value networks offer mediating services among network actors (e.g., facilitating digital rights transfer among parties). On the other hand, blockchain companies operating as value shops offer solutions to clients (e.g., assisting in blockchain project implementations). In this sense, value configurations yield insights into the sources of value that can be tapped through digital business models inspired by blockchain. But, at the same time, due to the inclination of prior research to treat value configurations as monolithic concepts, we turn to Al-Debei and Avison's (2010) multidimensional theorization of digital business model to supplement the value configuration view of blockchain companies.

2.4 Value Dimensions of Digital Business Models

Firms operating in digital environments revolutionize preexisting business practices by constantly pushing the frontiers of technology. An example of this phenomenon can be found in the food and beverage industry. In mainland China, companies such as Ele.me and Meituan-Diaping have introduced mobile applications that integrate online and offline channels to bring about on-demand food delivery, which in turn has led to a surge in the user base of online food delivery to 295 million customers in the first half of 2017 (Shen, 2017). To guide firms in comprehending the intricacies of competing in digital environments (Zott et al., 2011), Al-Debei and Avison (2010) separated digital business models into four core elements, namely value creation logic, value capturing mechanisms, value delivery architecture, and value stakeholder network.

Management scholars such as Porter (1985) and Mol Wijnberg, and Carroll (2005) define *value creation* as a series of activities targeted at delivering novel products and services that satisfy the needs of end consumers while, at the same time, benefitting all other stakeholders involved in the process (Teece, 2010). Value creation is vital because the assurance of benefits is a precondition for fostering active and continuous participation among stakeholders. Value creation logic, in the context of the digital business model, hence encapsulates the focal activities undertaken by firms in providing digital products and services (Kazan et al., 2015).

Deskriptive Perspektive beeinflusst —> SSI Sinnvol ist, dann anzubieten

On the other hand, *value capture* in business models can be viewed as the differential between the cost incurred by a firm in creating value and the revenue retained by the firm (Bowman & Ambrosini, 2000; Pagani, 2013). In digital business models, the mechanism for capturing value denotes the logic of how firms are able to extract revenue from providing digital products and services (Kazan et al., 2015).

value delivery & value creation ähnlich im BT context

The *value delivery* architecture of the digital business model revolves around firms' resources and their configuration (Al-Debi et al, 2008). The concept of the value delivery architecture is grounded in the resource-based view that theorizes each firm as a bundle of resources (Wernerfelt, 1984). Value delivery architecture, in the context of the digital business model, accentuates how digital firms assimilate and exploit technological resources to sustain their competitive edge. As such, the value delivery architecture can be construed as a firm's structural capabilities to orchestrate its technological resources to provide digital products and services that are hard to replicate (Kazan et al., 2015).

The last dimension of the digital business model pertains to the value stakeholder network. The value stakeholder network refers to an ecosystem structured around interfirm modularity in which multiple firms are interconnected through the network to co-contribute and mediate configured components (resources) and modules to acquire value in an orchestrated fashion (Kazan et al., 2015). It depicts how firms coordinate and collaborate with their stakeholders to provide digital products and services (Osterwalder, Pigneur, & Tucci, 2005). Stakeholders include all participants who participate in firm functions, potentially including consumers, distributors, intermediaries, partners, and suppliers (Hall & Martin, 2005; Rajala & Westerlund, 2007).

Because blockchain companies, by virtue of their technological roots, are synonymous with firms competing in digital environments, the preceding value dimensions of digital business models can be applied

to disentangle the logic underlying the blockchain-inspired business models pursued by these companies. Moreover, by synthesizing the concepts of the digital business model and value configuration to arrive at an analytical lens for dissecting blockchain companies, we are able to not only shed light on the sources of value being tapped by these companies, but also unravel how the sources of value are actually being tapped with respect to the value creation logic and value capturing mechanisms of these companies.

2.5 Value Creation and Capturing in Blockchain

Though Al-Debei and Avison (2010) have distinguished among four value dimensions for digital business models, we opted to concentrate our inquiry on examining the value creation logic and value capturing mechanisms for blockchain companies. The rationale for disregarding value delivery architecture is that blockchain companies all, essentially, rely on blockchain as their value delivery architecture. For these companies, blockchain dictates and serves as the underlying value delivery architecture for connecting network actors and also determines how information and resources should flow among them. While nuances in value delivery architecture may exist across blockchain companies, they should not deviate from the fundamental principles of blockchain.

Similarly, we also exclude the value stakeholder network. Undoubtedly, the exact identities of value stakeholders will differ according to the blockchain network of each company. Nonetheless, the conceptual role played by value stakeholders within blockchain networks should be largely identical. In other words, blockchain companies are built on the idea of a distributed ledger that is maintained by a network of anonymous peers (or equal nodes). This means that the role performed by stakeholders in authenticating and inscribing transactional data onto blockchain ledgers should not vary, even if the identities of these stakeholders are entirely dissimilar. In this sense, the adoption of blockchain technology only alters how stakeholders collaborate but does not usurp their roles in the value chain.

Through the omission of value delivery architecture and value stakeholder network, we seek to offer a much more concise picture of the competitive landscape for blockchain companies: we illustrate how these companies, despite sharing comparable value delivery architecture and value stakeholder networks, innovate in terms of their value creation logic and value capturing mechanisms. Beyond this, illuminating the linkage between the value creation logic and value capturing mechanisms of blockchain companies informs practice because the creation of value must be intimately tied to its capture in order for businesses to succeed.

3 Methodology

To unravel the spectrum of value creation logic and value capturing mechanisms across blockchain companies, we subscribed to an exploratory multiple case study approach. For multiple case studies, site selection should be determined on a substantive rather than a statistical basis such that case companies are sufficiently representative of the target population (Greene & David, 1984). In light of our research objectives (Seawright & Gerring, 2008), we decided to anchor our empirical context on companies that offer blockchain-enabled business applications. Data was primarily qualitative in nature and gathered through two primary sources: interviews and public archives. Our exploratory approach to data collection is especially suited for the decentralized and dynamic innovation ecosystems in which blockchain companies currently operate (Adner & Kapoor, 2010; Iansiti & Levien, 2004).

3.1 Selection of Case Companies

To arrive at a representative sample of firms in the blockchain space, we began by approaching the People's Bank of China (PBoC) and the China Academy of Information and Communications Technology (CAICT), a scientific research institute directly under the Ministry of Industry and Information Technology (MIIT) of China, that recommended five reputable blockchain companies matching our selection criteria. All five blockchain companies work with permissioned consortium blockchains without the issuance of tokens. These case companies were deliberately selected with the intention of covering a wide range of blockchain companies that harness open-source or self-developed technologies to develop business applications for internal consumption or external utilization. The five blockchain companies of interest [1] in this study are (1) ChainArchitect (developer and supplier of enhanced blockchain architecture for external utilization); (2) ChainFinance (provider of industry-specific business application based on open-source technology for external utilization); (3) ChinaNova (provider of customized business applications based on open-source technology for external utilization); (4) ChainSecurity (developer of open-source blockchain for internal consumption); and (5) ChainDraft (provider of both self-developed blockchain and tailored business

[1] ChainArchitect, ChainFinance, ChainSecurity, ChainDraft are pseudonyms because these four companies have requested anonymity.

applications for external utilization). Notably, it is worth mentioning that ChainArchitect and ChainNova are among the first blockchain companies to pass the blockchain standard assessment in mainland China.

3.2 Data Collection

Data on the five case companies were collected through both primary and secondary sources. Before approaching the case companies, we read publicly accessible news articles and press releases in order to acquire background information on these companies. Once we were familiar with the background for each of the five case companies, we contacted managers at these companies and were granted permission to perform on-site visits between September 2017 and December 2017, during which time we conducted the first round of semistructured interviews with senior executives from the five case companies, including three CEOs (ChainArchitect, ChainFinance, and ChainNova), one founder (ChainDraft), and one general manager (ChainSecurity). During our trip to ChainFinance, we also arranged group interviews with clients from the banking industry to gain a holistic picture of how value is created for the latter. As senior executives, interviewees are not only well-versed in the value creation logic and value capturing mechanisms of their respective blockchain companies, they are also well-acquainted with the market environment in which their companies operate and the hurdles encountered in pushing for blockchain-enabled business applications.

Data from the first round of interviews were filtered through our analytical lens, which, in turn, prompted subsequent rounds of interviews from January 2018 to August 2018 to clarify issues of ambiguity arising from our interpretation. Data collection was concluded only when theoretical saturation had been reached and no fresh insights could be gleaned from further conversations with the interviewees. In total, we conducted 43 interviews with 31 informants amounting to 1,963 minutes of interview data. All interviews were audiotaped. Additionally, we requested and gained access to the official online channels of each blockchain company where we were able to extract archival data such as technical white papers as well as product and service pages. Appendix A offers a detailed breakdown of our data sample for analysis.

3.3 Data Analysis

Interviews were initially transcribed verbatim in Chinese and then translated into English by one of the authors. All transcripts were then checked against the audiotaped interviews for accuracy by two senior researchers and an independent bilingual professional (Squires 2009) in order to preserve informants' original meaning and intent.

After a methodical inspection of our primary and secondary data, comprehensive case narratives were drafted to outline the business model underpinning each of the five blockchain companies with particular emphasis on their value creation logics, their value capturing mechanisms, and the main challenges confronting each company. Alongside the case narratives, we also formulated a graphical representation of the business model for each blockchain company. This, in turn, enabled us to visualize how value is exchanged among actors within the network ecosystem for each blockchain company. Next, we employed the thematic analytic technique to analyze the transcribed interviews (Boyatzis 1998). In thematic analysis, codes were generated inductively from the raw data. Our inductive analysis centered on deciphering the way that value is created and captured by each blockchain company and identifying the challenges it faces. In the first round of coding, data were content analyzed by one of the authors to ascertain the blockchain-enabled business application offered by each case company and to discern how value can be appropriated from these business applications. These coded themes were then mapped to preexisting concepts in digital business model research. Cross-case analysis was also performed to compare and contrast business models across the five blockchain companies. To ensure rigor in our data analysis, we applied a differentiated role strategy (Adler & Adler, 1988). The other co-authors played the role of devil's advocate by generating alternative interpretations and counterarguments to the coded themes (Adler and Adler 1988). Whenever disagreements arose, codes were revisited and discussed until we reached consensus. This iterative data analytical procedure was concluded when all authors agreed on the conceptual interpretation of the coded themes. We present thematic coding examples in Appendix B.

4 Case Analysis

4.1 ChainArchitect Technology Company, Ltd.

ChainArchitect Company, Ltd. (ChainArchitect), a developer of blockchain architecture, was inaugurated in August 2016. From the beginning, the company identified a major bottleneck in the business application of blockchain. Compared to existing transactional infrastructures, blockchain is constrained by the speed with which transactions can be processed. As the CEO of ChainArchitect explains:

> *Blockchain can only record 7 transactions per second, and this speed is much lower than the requirement of the real business environment. Moreover, it is just the beginning of digital currency and we can*

> *expect requirements to ramp up in the future.... Today, transactions in Alipay and WeChat peak at 180,000 and 200,000 transactions per second (tps) respectively, but we anticipate that the number of tps will grow become much higher, along with the development of the digital currency. This is because apart from transactions among human parties, a greater number of transactions will take place between machines and software with the introduction of digital currency. Therefore, one of the biggest challenges then will be how we can maintain the robustness and security of transactional data when confronted with this huge number of transactions.*

Given the abovementioned bottleneck, ChainArchitect focuses on enhancing the current capabilities of the blockchain architecture to support unlimited and high-frequency concurrent transactions electronically. Its core business is anchored on the ledger1.0 system, a new generation open-source distributed ledger technology that was officially released in June 2017. ChainArchitect owns the proprietary intellectual property rights of the ledger1.0 system and claims that this technology represents a quantum leap by evolving the distributed ledger technology from single ledger to a tree-structure ledger. As explained by the CEO of ChainArchitect:

> *Our innovation is the framework we proposed.... The structure in our ledger technology is totally new. It is a multichain structure and will be our future direction.... We proposed a tree-based blockchain and we call it distributed account book.... We proposed a multichain, organic structure that can sustain a peak rate of 300 thousand tps...but we will keep working on improving the performance of blockchain to make it usable in most environments*.

Figure 2 depicts an illustrative example of the Ledger1.0 tree-shaped network with three layers and 13 blockchains. If trading partners are on the same blockchain (e.g. ☍00), transactional data are recorded in the subchain only. Alternatively, if trading partners are on separate blockchains (e.g., ☍00 and ☍001), transactional data are inscribed on both subchains synchronously. By applying a multilayer design, the ledger1.0 system not only permits trading among actors located on separate blockchains, but it also significantly bolsters the overall trading capacity through horizontal and vertical network expansions.

Value Creation Logic: By developing its own blockchain architecture, ChainArchitect is able to offer an open innovation platform that is layered on top of its proprietary infrastructure and allows other organizations to develop their own customized business applications that leverage the Ledger1.0 ledger system. For instance, ChainArchitect has collaborated with the People's Bank of China (PBoC), the central bank of the People's Republic of China with the authority to formulate monetary policy and to regulate the financial institutions in mainland China, to lay the foundation for a large-scale deployment of distributed ledger technology in the field of financial services. As clarified by the CEO of ChainArchitect:

> *We have worked together with the People's Bank of China on a project about cross-bank money transfer in Jiangsu. It is mainly about information sharing of serial numbers on Renminbi (RMB).... There are similarities in money transfer between individuals and banking institutions. First, it is a point-to-point situation and, second, the aims of this action are confirmation and information sharing. Therefore, it is natural to deploy blockchain technology in this situation. We established a connection from the central bank to every bill circulating in the economy such that all information pertaining to each bill can be viewed through our distributed account ledger.... What we have accomplished is much more than just identifying fake currencies. What we could achieve is the ability to trace every single bill in the economy, not only between banks but also between retailers and customers*.

In this sense, ChainArchitect creates value by innovating on the blockchain architecture as a platform technology and cooperating with third parties to develop customized business applications. ***Value Capturing Mechanism***: By providing an open-innovation platform that is tightly coupled with its own proprietary blockchain architecture, ChainArchitect is able to capture value as the nexus for realizing innovation in the era of distributed computing. As envisioned by the CEO of ChainArchitect:

> *Open source is the trend. I believe that all software will embody properties of open innovation in the future. The same applies to the blockchain because it is a system built on the trust of multiple parties.... It has the potential to become a standard protocol layer that relies on the internet for value exchange. Therefore, the more basic the technology is, the more open and innovative it should be.... We have a general solution. Whether you are an e-commerce platform, a financial institution, or a social media platform does not matter. You can utilize our solution.... What we are providing is a*

basic and general solution. Regarding the application or service layer, we can customize it based on specific business scenarios, but at the core it is the same. We will not develop a whole blockchain system just for you. You can utilize our solution as a foundation and develop the application or service layer by yourself.

Challenges: Based on this, it is apparent that ChainArchitect is pursuing a variant form of *value shop* by delivering a generic platformized solution with core technological components that circumvent the current limitations of the blockchain architecture in supporting the transactional needs of modern business applications and peripheral elements that can be customized to fit the requirements of distinct organizations—what we labeled a *platformer* strategy. By positioning itself as the base for spawning future innovation, ChainArchitect has the promise to steer the development of the entire blockchain ecosystem. But, at the same time, to deliver on this promise, ChainArchitect is keenly aware that the solution it offers must be compatible with legacy systems of organizations and, at times, workarounds will have to be devised to assure interoperability. As the CEO of ChainArchitect admits, with regards to the project on cross-bank money transfer with the PBoC, the

biggest challenge in this project is the integration of the blockchain and the current banking system. We have encountered problems with standards and some other issues.... Therefore, what we have done is record the serial numbers of bills and maintain the infrastructure for information sharing, the scanning of the serial numbers is accomplished by the banks themselves.

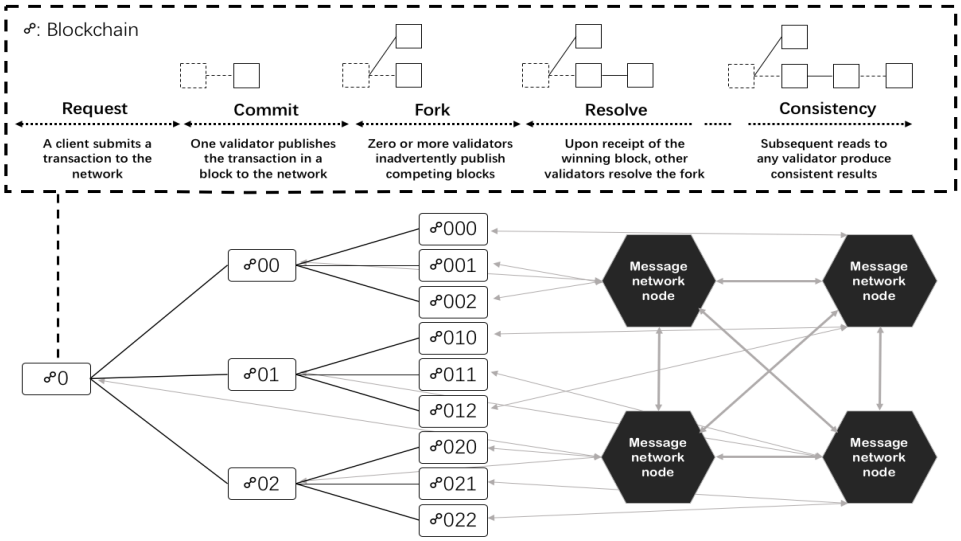

Figure 2. Example of Ledger1.0 Network with Three Layers and 13 Blockchains

4.2 ChainFinance Technology Company, Ltd.

The ChainFinance Technology Company, Ltd. (Chainfinance) was inaugurated in October 2016 and set up its headquarters in Beijing. It is a professional service provider that applies blockchain to the digital management of RMB. Its core business revolves around the RMB interbank transfer system, which encompasses both bill governance and cash management. Through conducting market segmentation research and "user-centric" operational analyses, ChainFinance can pinpoint unfulfilled market needs of commercial banking institutions and regulatory authorities in terms of interbank transfer and RMB cash management.

Backed by the Ledger1.0 system from ChainArchitect and guided by a provincial Branch of the PBoC, ChainFinance has successfully applied blockchain to bring about the simultaneous flow of information on serial numbers of circulating bills as well as streamline physical delivery and accounting procedures during interbank transfers (see Figure 3). RMB is the legal tender currency of mainland China, and each bill can be identified by a unique serial number. Through the launch of a centralized database documenting the serial number of each bill in circulation, the movement of currency in financial markets can be monitored and tracked by regulatory authorities such as the PBoC. In turn, the PBoC is able to efficiently and effectively manage cash flows in and out of the treasury. As articulated by the CEO of ChainFinance:

Our project is mainly guided by the No. 10 and No. 14 documents [directives] issued by the People's Bank of China.... The PBoC requires each clearing center to package 100

> *banknotes as a bunch, 10 bunches as a bundle, and 20 bundles as a bag. Each bunch, bundle, or bag comes with its own unique identifier, and commercial banking institutions can obtain the serial numbers of banknotes contained in a package by scanning its identifier and uploading the SFN file to the database of the Money Management Department. Once the cash has been cleared by a releasing bank and the data successfully uploaded, the receiving bank can gain access to the information and authenticate the banknotes being transferred. This eliminates the need for duplicating the cash clearing process. Through monitoring the flow of banknote data online, the Cash Allocation Division can ascertain supply-demand patterns among commercial banking institutions and allocate cash accordingly.*

Value Creation Logic: By assuring transparency during interbank transfers, ChainFinance endows commercial banking institutions with augmented competencies in managing cash flows, minimizing transaction costs, and optimizing cash balances and interest earned. By the end of 2017, ChainFinance had received orders from more than 10 branches of PBoC and 100 commercial banking institutions with the transaction volume in the launch city exceeding RMB ¥1 billion daily. The merits of the blockchain-enabled interbank transfer system are aptly surmised by the CTO of ChainFinance:

> *Banks [in the city where the project was launched] have already approached us because they have the demand. [By implementing the blockchain-enabled interbank transfer system], banks can first benefit from supervising employees to make sure that regulations are being followed. Another benefit is precise cash demand. For instance, one bank may estimate that they need RMB ¥1 million for operations. But to safeguard against the possibility of insufficient cash, they may demand RMB ¥2 million in cash from the PBoC. Consequently, about RMB ¥1 million is wasted. Besides, banks typically have no idea about their cash inventory [and] the cash demand of commercial banking institutions does not fall under the purview of the PBoC. [For this reason], the system [blockchain-enabled interbank transfer system] is actually a win-win because commercial banking institutions can maximize their benefits by making full use of the cash, whereas the PBoC can enforce greater oversight.... Another implication is precise cash allocation. Previously, the amount of cash and inventory flows were based on experience. Information was not shared, which is bad for bank performance. So how can one accurately allocate the cash? The unique serial number on bills can be employed to track where the money goes and how much has been used. Financial statements can be generated automatically. With accumulated big data, commercial banking institutions can effectively reduce their operating costs.*

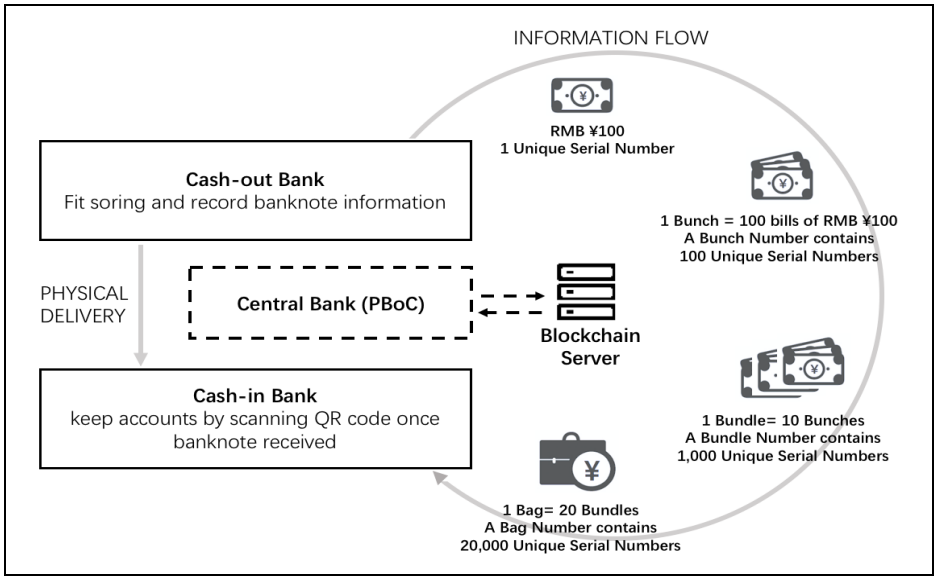

Figure 3. Blockchain-Enabled Interbank Transfer System

In this sense, ChainFinance creates value by dislodging incumbents from conventional value chains through blockchain-enabled services. Because transactional information on interbank transfers are automatically inscribed onto the blockchain and can be viewed by all parties involved, both the PBoC and commercial banking institutions no longer have to rely on one another for managing cash flows.

Value Delivery Mechanism: ChainFinance can capture value through leveling the playing field for market players by easing interbank transfer for commercial banking institutions. As stipulated in regulations imposed by the PBoC, commercial banking institutions have to undergo a full clearing process for each interbank transfer with fees incurred for each clearing. Through migrating the clearing process onto the blockchain, commercial banking institutions are able to reduce the costs associated with interbank transfers. As explicated by the CEO of ChainFinance:

> *One issue is the supervision of cash transfers in P2P transactions. Another issue is that the PBoC must supervise full clearing [of each transaction] for commercial banking institutions.... [Blockchain] can address these issues through interbank transfer. Maybe in the future, the system can be deployed in conjunction with digital currency to replace transfer checks completely. In terms of the PBoC's supervision of full clearing among commercial banking institutions, the operator or validator could then transfer money without adhering to the clearing process in order to save time and effort. This is not permitted according to the PBoC's regulations. Our system could solve this problem appropriately. Bank executives from a neighboring city have visited us and been inspired by our project.... They want to reduce business costs because the clearing process among the nine commercial banking institutions in their city is commercialized and they have to continually pay one another for clearing processes. They hope that blockchain can mitigate these costs*.

Challenges: The above quotes show that ChainFinance is pursuing a variant form of *value network* by delivering a blockchain-enabled interbank transfer system that strives to supplant the clearing and supervisory roles of incumbents, which we label as a *disintermediator* strategy. But, at the same time, due to the threat of rendering incumbents obsolete, it is natural that ChainFinance would encounter resistance from market players embedded within conventional value chains. As acknowledged by the deputy director of the provincial PBoC branch, *"governmental support is important.... From the very beginning, during the pilot implementation, not all banks were willing to collaborate*." The same sentiments were echoed by the section chief of the provincial branch of the PBoC:

> *There was organizational inertia. They are happy with their current circumstances. Why bother changing them? Those banks with large amounts of cash withdrawn from circulation will have to undertake extensive modifications to their business processes. Besides, employees responsible for full clearing are less receptive to new things because they are usually older and less educated education levels*.

4.3 ChainNova, Ltd.

ChainNova, Ltd. (ChainNova) is a leading high-tech company that was co-founded in August 2016 through a joint venture between the capital group of a listed corporation in mainland China, Zhongnan Construction (SZ: 000961), and PeerNova, a technology corporation based in Silicon Valley. It later merged with a high-tech startup, Phoenix Tree. Headquartered in Beijing, ChainNova's core business centers on harnessing blockchain to revamp the practices of traditional industries through tailored applications. To stay at the forefront of the blockchain revolution, ChainNova has built a team with a strong technical background in big data, distributed systems, and networking solutions. Furthermore, the company has ties to Peking University, the top research institution in mainland China, which they exploit to piggyback on partnerships between industry and universities to gain access to the latest innovations in the area of financial technology. Last but not least, ChainNova is also a member of Hyperledger, the global enterprise-oriented blockchain community, and possesses a variety of platform resources to support open source development.

With expertise across a wide range of technologies, ChainNova is able to deliver blockchain solutions that are tailored specifically to the requirements of individual organizations. As stated by the CEO of ChainNova:

> *Another competitive advantage of our company is that our relationship with Hyperledger is very strong. Whether Hyperledger or IBM, they are very supportive in the development of base technology. Furthermore, ChainNova is a member of R3. What's more, we also have other platform resources, including Cuneiform that is developed by our shareholder PEERNOVA. Basically, these technical platforms were constructed to adapt to different business scenarios. They*

> *all have limitations and none of them are amenable to all business scenarios. Faced with such a situation, our product is designed to fit with various fundamental technologies such that it can provide better services to users.*

Value Creation Logic: Because the concept of blockchain is unfamiliar to most organizations, ChainNova creates value by assisting such organizations in isolating business practices for which blockchain can truly make a difference and delivering the eventual solution. Recently, ChainNova has cooperated with another listed company in mainland China, Beidahuang Group (SH: 600598) to construct an agricultural product traceability platform on the basis of their data (see Figure 4). This, in turn, gives rise to a certification and supply traceability system for agricultural products that is founded on blockchain. As clarified by the CEO of ChainNova:

> *Beidahuang is a listed company who owns the largest grain production base in China. Rice produced in the northeastern part of China is famous for its quality and is very popular in the domestic market. Beidahuang, supported by Heilongjiang Production and Construction Corps, owns more than 10 million acres of land and has equipped hundreds of farmers with IoT sensors. We are now cooperating with them to construct the rice traceability system.... The Blockchain Farm project is aimed at providing end consumers with safe and traceable rice via blockchain technology.... Our core objectives in the project are to (1) achieve quality assurance of the production process and the ensuing products; (2) facilitate logistical distribution, and; (3) boost farmers' real income.... A good example is the Qixing farm. By equipping the farm with a large number of sensors, it can generate information from breeding to growth, to storage to grain processing, to transportation and sales. There are more than 150 links in the production chain and all of them are recorded by our system.... The system does not just solve the food safety problem, it also translates into a replicable business model.... From concept to application, we expend effort to position the traceability system as a benchmark for influencing the standard setting.*

Value Capturing Mechanism: Though ChainNova excels at delivering tailored applications that revolutionize preexisting business practices of traditional industries, it is also keen to capture value by replicating these blockchain-driven business practices in other sectors. For instance, ChainNova is contemplating ways of transferring lessons learned from the rice traceability system to product traceability scenarios in general. As explained by the CEO of ChainNova:

> *We hope we can exploit the traceable feature of blockchain to help traditional industries in China transform and innovate.... By employing the blockchain, we can create (1) a set of systemic standards for product traceability such that these standards can be duplicated and promoted in other areas, (2) an e-commerce platform with traceability components to guarantee the quality [of products offered], and (3) a business cooperation platform which combines the blockchain with IoT devices and best industrial practices.*

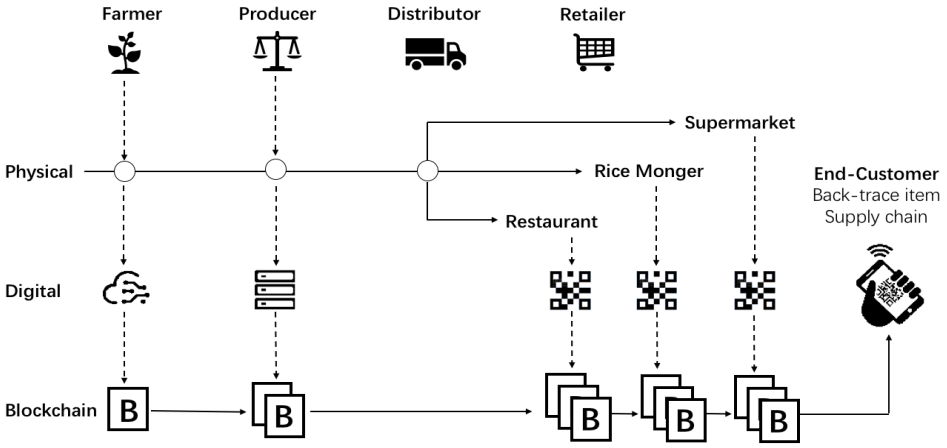

Figure 4. Blockchain-Enabled Traceable Rice System

Challenges: The quote above indicates that ChainNova is pursuing a variant form of *value chain* by delivering tailored applications that upend preexisting business practices in traditional industries, which we label as a *transformer* strategy. Yet, variations in business practices across organizations restrict the transferability of lessons learnt. As confessed by the director of the Product Department, the "*first step is to understand the industry... we are not farmers and we do not understand agriculture despite having constructed the rice traceability system.... It is definitely hard to convince the industry if no one understands the process...it takes time.*" The CEO of ChainNova further reinforced:

> *We are not in a rush to achieve profitability.... It is because our priority is to find a suitable business scenario for nurturing blockchain technologies. Our vision for future society is to replace centralized governance structures with distributed ones.... At present, the blockchain is in its maturing stage and a more reliable approach would be to find a suitable business scenario and take advantage of the technology to push industry to create real value.... As a matter of fact, most people are not familiar with blockchain and they can only get to know the technology indirectly via actual business applications. Therefore, our current thinking is to find a business scenario where industry can benefit from deploying blockchain in the near to medium term, like 1-2 or 3-5 years. We will then expend effort to implement the blockchain solution as a replicable business model. For example, in the case of Beidahuang, 10% of total grain output in China is produced there and the usefulness of blockchain can be easily verified through its scale. It is the same in the area of finance. We are trying to find a business scenario that can benefit from deploying blockchain. Suitable business scenarios rather than the project will always be our starting point*.

4.4 ChainSecurity, Ltd.

ChainSecurity, Ltd. (ChainSecurity) is the financial subsidiary of a Chinese e-commerce company with headquarters in Beijing. The e-commerce company is a member of Fortune 500 and a key competitor to the Tmall run by Alibaba. With annual growth of 50%, it currently has over 260 million active consumers. In terms of trading volume, the average compounded growth rate is 152% per year for the past 12 years. Drawing from their experience in e-commerce transactions and risk-control management, ChainSecurity was inaugurated in September 2012 to exploit the proprietary data resources of the company's e-commerce platform in order to offer sophisticated financial solutions in areas of asset management, consumer credit, payment, and supply chain financing. ChainSecurity harvests a vast array of consumer and transactional data to build complex credit and risk-control models that enable the company to offer almost-instant credit line approvals for low-risk individuals and companies. As the chief product officer of Structural Finance Department relates:

> *Our positioning is to become a technological company that offers services to financial institutions. Why? First, the market potential is enormous with numerous finance institutions in China. For example, the current banking system necessitates that millions of commercial banking institutions are scattered across China to provide services to local communities. However, these banking institutions are confronted with a lack of qualified technical talent. ChainSecurity has the capability to fill this gap. We have a strong background in both toB and toC scenarios. Besides, we are not only experienced in consumer and supply chain financing, we also have expertise in electronic payment and wealth management.... [For the past couple of years], we have been trying our best to harness advanced technologies to augment the customer experience in every possible way. Through years of operating in this space, we have now entered the strategic transformation phase where we would like to draw on our capabilities to create value for others such as banks and other financial institutions. To date, we have cooperative arrangements with more than 400 banks, 100 financial institutions, and 60 insurance companies.... In contrast to most Chinese enterprises who favor a closed-loop system in order to acquire and/or maintain a monopolistic position in the value chain, we prefer to keep our solutions open, empowering financial institutions to achieve their objectives by supplying either capital and/or technical resources*.

Value Creation Logic: Due to its background in supply chain optimization, ChainSecurity is uniquely positioned to create value by harnessing the technological capabilities of blockchain to bolster benefits for multiple parties involved in conventional value chains. An area that has been peddled by

ChainSecurity to be a key beneficiary of blockchain applications, is that of asset-backed security[2] (ABS). Since mid-2017, ChainSecurity's ABS cloud platform and Jianyuan Capital have been collaborating to issue a car finance lease ABS project whose entire process is mapped onto a blockchain. As explained by the chief product officer of the Structural Finance Department:

> *We discovered that ABS is the best business scenario for blockchain application. First, pricing ABS by a data-driven method has a natural advantage. Second, securities are not standardized, and keeping track of transactions among a massive number of participants would be extremely tedious. Third, sellers and buyers do not trust each other.*

Figure 5 depicts major challenges associated with the conventional means of issuing ABS. The infusion of blockchain into ABS business applications hence aids in overcoming the hurdles outlined in Figure 5. As highlighted by the chief product officer of the Structural Finance Department:

> *We landed two small-sized projects where lending and payback information is uploaded to the blockchain via ChainSecurity Payment. This guarantees the truthfulness of asset performance because the information cannot be manipulated. We are now cooperating with several small-scale but reliable consumer finance companies that may not have a strong corporate credit rating.... These small-scale consumer finance companies face formidable challenges in raising capital due to high costs. We purchase their assets in a way that we can trace each trading detail. For example, we employ a powerful database engine to assess an applicant's [e.g., small-scale consumer finance company's] repayment ability and default probability when the application is submitted. If the applicant meets our standards, we will purchase its corresponding asset packages and transfer the loaned capital into the applicant's account. This creates a closed-loop cash flow system. We also rate these asset packages and resell them to investors with varying risk preferences.*

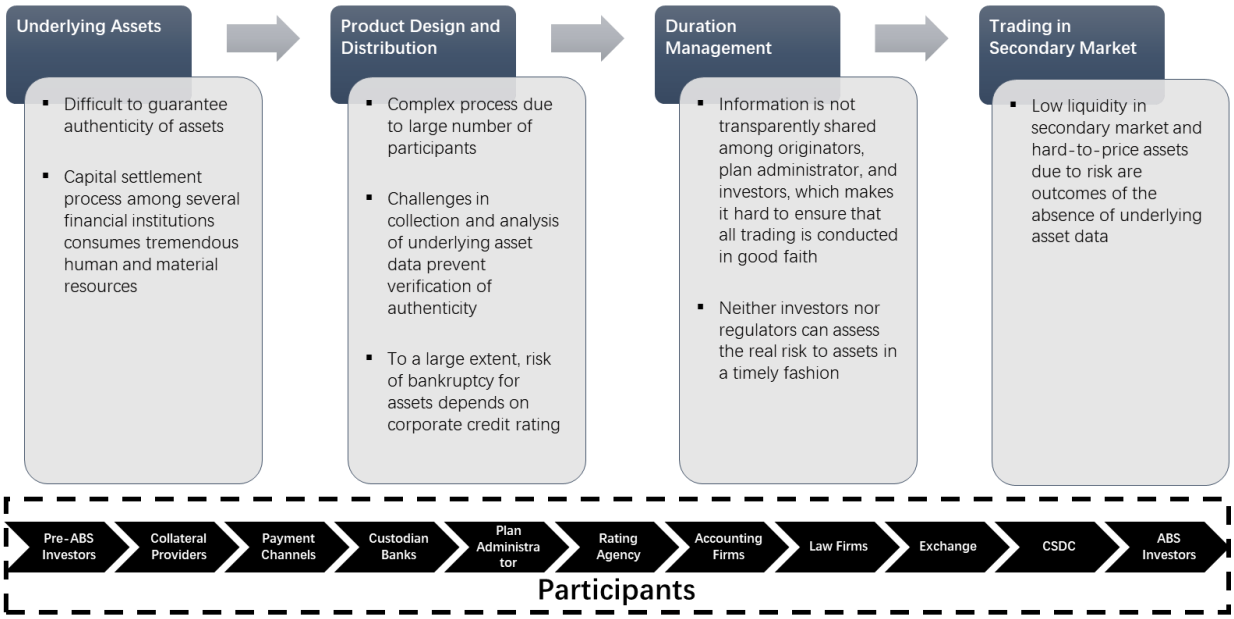

Figure 5: Overview of Traditional System for Issuing Asset-Backed Securities (ABS)

[2] An asset-backed security (ABS) is a financial security collateralized by a pool of assets such as loans, leases, credit card debt, royalties or receivables. For investors, an ABS is an alternative to investing in corporate debt. With the exception that the underlying securities are not mortgage-based, an ABS is similar to mortgage-backed securities. See https://www.investopedia.com/terms/a/asset-backedsecurity.asp#ixzz5B6Jl3YsS.

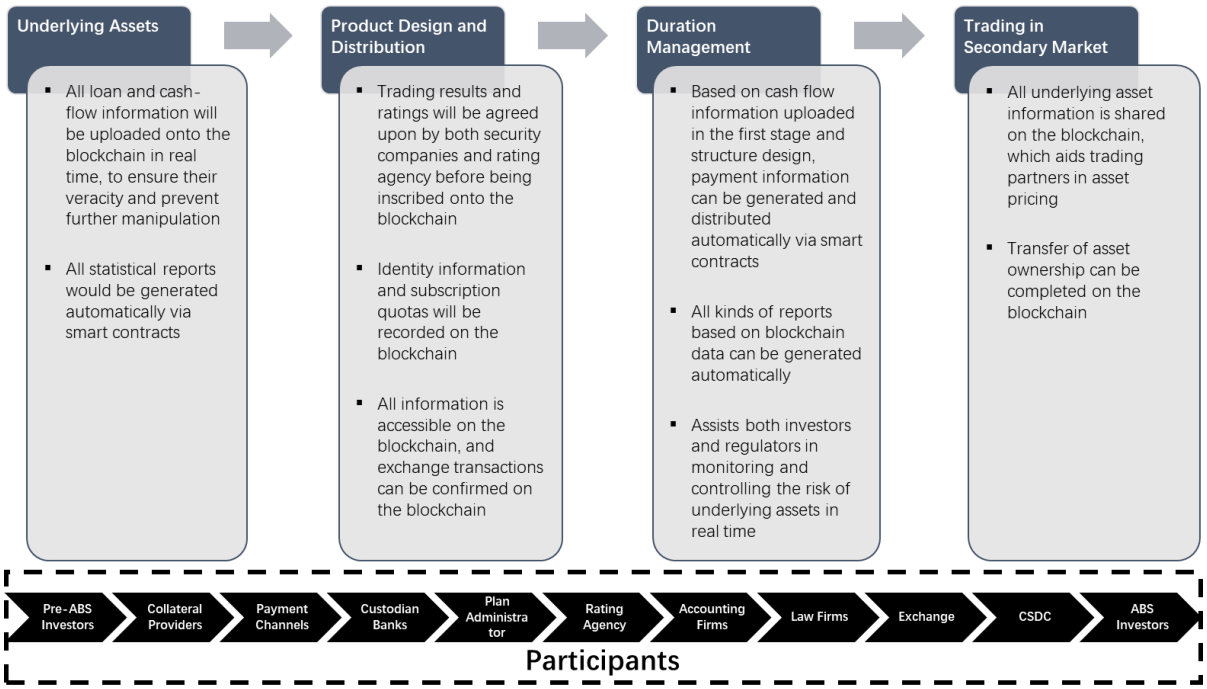

Figure 6: Overview of Blockchain-Enabled System of Issuing Asset-Backed Securities (ABS)

Conceivably, the blockchain-enabled ABS solution offered by ChainSecurity benefits each party in the value chain differently. As clarified by the chief product officer of Structural Finance Department:

> *Benefits would differ for each participant. For example, for originators, the system offers a financing channel through which they can separate their assets from those of their credit clients. Besides, through the blockchain, originators can enjoy a reduction in financing costs since each asset is registered in the blockchain and the whole process is completed on the chain. As for investors, one advantage is that the blockchain system can provide a better understanding of asset risk. Through more precise pricing of assets, in relation to their risks, investors can estimate profits more accurately and reduce their investment risk.*

The merits of the blockchain-enabled ABS solution are summarized in Figure 6.

Value Capturing Mechanism: The introduction of the blockchain-enabled ABS solution thus allows ChainSecurity to not only capture value by mediating exchanges among multiple parties in conventional value chains, but also to extract value from delivering game-changing solutions for these value chains. As described by the chief product officer of the Structural Finance Department:

> *[The blockchain-enabled] ABS system contains four periods: designing and building, ABS issuing, duration management, and secondary market circulation. In the designing and building period, the biggest issue is how to ensure the authentication of asset information. We apply the blockchain in this scenario by cooperating with third parties like credit institutions to register information of each transaction on the blockchain.... The second period, the issuing process of ABS, is very complicated. Because it is hard for investors to comprehend the underlying risk, we devised a program to incorporate transactional details and calculate payment order. It is a multilayer structure. Beyond this, we record each transaction on the blockchain and create a smart contract to automatically generate various transactional documents. This makes it possible for regulators to exercise diligence in monitoring transactions.... Only when all transactional information is verified will the remaining steps in the issuing processes be triggered.... The third period is duration management. It concerns how you allocate your assets before issuing ABS and confirming that the sale is strictly in accordance with the structure design. In the past, the third period depends on human actions, which come at a high cost with no*

> *guarantees. By applying blockchain, we can execute interagency operations based on smart contracts. Furthermore, by automatically generating transactional documents, human errors can be avoided such that the authenticity and accuracy of information can be assured*.

Challenges: ChainSecurity is pursuing a variant form of *value network* with the key objective of rewriting the rules of the game and reforming the way exchanges among multiple parties in conventional value chains transpire, what we labeled as a *mediator* strategy. It is inevitable for ChainSecurity to encounter obstacles in acquiring the buy-in from market players. As explained by the chief product officer of the Structural Finance Department:

> *We do not face many technical problems. Unlike artificial intelligence which demands complicated mathematical computations, blockchain is just a simple network protocol. For example, in the area of finance, virtual assets like inflows and outflows can be converted into digital information. Hence, the application of blockchain will not be too difficult.... At present, we are still exploring how to set limits of authority for all participants. It is tough to assign responsibility to each involved party due to corporate sensitivity on topics such as data confidentiality.... We want to involve all participants in the blockchain, but it might be tough to form such value chain alliances because some participants may not adhere to rules and update changes to information in a timely fashion.... Our approach involves a considerable number of players and we are devising a series of game-changing rules for the market. If every participant obeys the new gaming rules, effective risk management could be realized.... The real challenge is how we can persuade other financial institutions to adopt the solution, because only with proactive participation of these intuitions can the new gameplay eventually be accepted*.

4.5 ChainDraft Technology, Ltd

ChainDraft Technology, Ltd (ChainDraft) was inaugurated in 2016 and its core business is founded on the fully autonomous domestic consortium blockchain platform of Draftchain. [3] ChainDraft delivers blockchain-enabled network solutions for organizations that meet the requirements of enterprise applications in terms of performance, permission, privacy, reliability, security, and scalability. Focal features of Draftchain includes a high-performance robust consensus algorithm, a data failure and recovery mechanism, a dynamic membership management and privilege control, a multilevel encryption mechanism, platform monitoring, and a smart contract engine. As stated by the founder and vice president of ChainDraft:

> *Our core competitive advantage is the self-developed fundamental blockchain platform Draftchain. It is a close-sourced platform. In terms of business application scenarios and its technical route, it is comparable to IBM's Fabric and it is a consortium blockchain. We have undertaken enhancements to its functionality and performance. For example, we improved the core algorithm—the Byzantine-fault-tolerant algorithm to attain a higher throughput. Additionally, we also boosted its performance by enabling dynamic node management. In the past, whenever there was a need to add or delete new nodes, the network had to be closed, but now, we can add or delete new nodes online while updating the information synchronously. Moreover, we also strengthened cryptographic security by incorporating the SM1 cryptographic algorithm and adjusting to domestic requirements in the financial industry. There are around 20-30 people on our team who are tasked with developing and maintaining Draftchain*.

Value Creation Logic: To create value, ChainDraft focuses on advancing the next generation of trusted value exchange networks that can lead to the development of illustrative business applications and general industry solutions for the financial industry. An exemplary project for showcasing the strengths of ChainDraft, is the e-draft management system that ChainDraft codeveloped with a national joint-stock commercial bank located in mainland China. As explained by the founder and vice president of ChainDraft:

> *...planned from the second half of 2016 and launched in the first half of 2017. It is a completely new business scenario that was proposed by [the commercial bank] ....Suppose a business operator, such as company A, created an account in a banking institution and deposited a margin*

[3] Draftchain is a pseudonym, as the companies have requested anonymity.

so that a bank draft could be issued to pay for routine purchases [e.g., purchasing office tables and chairs]. The current process is that the business operator first goes to market to select the product and negotiate the price with the merchants before signing a contract. Next, the business operators submit the contract to the finance office where the payment is processed, and the merchants then deliver the goods to the company. The entire process may take weeks or even months to be completed. It is not efficient and could be expedited.... Through the deployment of our e-draft management system, a mobile phone application is provided to business operators. Business operators can issue the e-draft through the application and they can validate it by logging into their accounts. For example, a business operator could first issue an e-draft with a ¥5,000 budget for purchasing stationery. After negotiating with merchants, he/she could pay directly by allowing merchants to scan the QR code linked to the e-draft and would obtain the goods almost instantaneously. Merchants can use the e-draft to make payments to others or to withdraw cash from the bank. Notably, throughout the whole process, the e-draft functions as an accounting voucher.... The e-draft is programmed by smart contract and facilitates control to be enforced during the purchasing process. For example, if the e-draft is designated for stationery purchases, it cannot be utilized to buy any other product: payment will not be recognized if the QR code is scanned by food sellers. Furthermore, regulations pertaining to draft management [e.g., case withdrawal rules and interest rates] can be inscribed into the smart contract in advance.

Figure 7 depicts an overview of the aforementioned e-draft management system. Based on the quote above, it is apparent that ChainDraft creates value by co-innovating with organizations to develop novel applications that benefit market players. As explained by the founder and vice president of ChainDraft:

> *For the business operator who utilizes the e-draft management system, it can (1) accelerate the purchasing process and attain time efficiency, (2) conserve communication and fractional costs, (3) monitor the whole life cycle of the e-draft and obtain timely information on spending amount and account balance, and (4) increase the liquidity of their e-draft.... For the merchants, they can trace the e-draft and get to know its authoritative source. Unfortunately, at this stage, because the e-draft management system is only adopted by the initiator [bank], merchants can only withdraw cash from that bank. In the future, if other banking institutions were to join the system, merchants would be able to withdraw cash from these other banks and the liquidity of e-draft would significantly improve.*

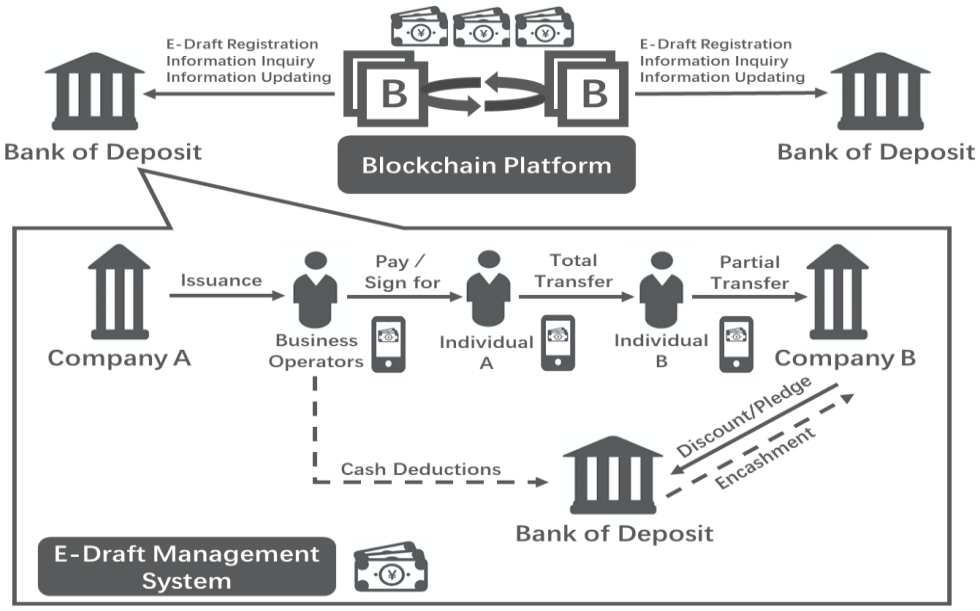

Figure 7. Overview of Blockchain-Enabled E-Draft Management System

Value Capturing Mechanism: Pursuing a variant form of *value chain*, ChainDraft works closely with organizations to cocreate service applications that operate exclusively on its self-developed proprietary blockchain platform, which we label as a *co-innovator* strategy. It is able to capture value through licensing agreements for its platform technology. Specifically, ChainDraft provides excellent support with respect to application development, maintenance, and upgrades. As stated by the founder and vice president of ChainDraft:

> *When collaborating with financial institutions, we first provide the fundamental blockchain platform through an authorizing mechanism. Then, based on Draftchain, we work with these financial institutions to codevelop the upper layer service applications. For projects demanding high levels of confidentiality, core system development will be conducted by the financial institutions themselves, we are only responsible for providing bottom layer interface and performing work on the periphery, such as developing mobile applications.... The general application development process includes (1) demand analysis, (2) program planning and setting, (3) testing, and (4) deployment.... For instance, we did not encounter any major technical problems when interfacing with the bank's original system. We supplied all kinds of API interfaces, such as Java, Python, and so on. Commercial banks can easily access our blockchain platform and utilize its functions without expending extra effort on blockchain development.... Essentially, our profit model conforms to an authorizing pattern, since organizations have to buy the licenses. As for system updates, it depends on the terms stipulated in the original contract. For example, we can promise to offer free updates, but depending on the complexity of these updates, organizations may have to occasionally share the costs.*

Challenges: Since blockchain development is still in its infancy, a significant hurdle for ChainDraft lies in convincing organizations of its value proposition. Even when convinced, organizations may only be willing to undertake experimental implementations on a much smaller scale. This, in turn, presents a challenge to ChainDraft because its business model relies on licensing agreements and the margins on investment will be much lower for small scale implementations of blockchain solutions. As explained by the founder and vice president of ChainDraft,

> *The main challenge of this project is in the early communication stage. Because blockchain is quite new, no one knows what the final product could be, and what value can be created. It takes a long time to repeatedly interact with commercial banks to pin down the business logic. In the end, we decided to break it down into smaller phases, and start with low-volume business processes such that it would not impact the majority of consumers.... Even though our company is profitable, our clients, in most cases, have yet to see profits. This is because, apart from initial outlays in developmental work, there are ongoing costs associated with maintenance.... At this early stage, organizations mainly apply the blockchain in new, small-scale business scenarios that do not yield a large volume of customers. If blockchain solutions were to be adopted for large-scale business applications in the future, they should become profitable ventures for organizations.*

5 Discussion

Blockchain, with its humble origins as the primary infrastructure for the transfer of value in cryptocurrencies, has emerged as an attractive way for organizations to chronologically capture and store transactional data in an immutable manner. In turn, this has spurred manifold possibilities in the application of decentralized and distributed computing to a wider spectrum of business practices that extends beyond currency markets. But, at the same time, the nascent stage of blockchain development implies that successful business applications of the technology continue to be elusive with most organizations embracing an optimistic but cautious outlook on its potential. To better understand the ways that organizations entering this space can create and capture value, we drew on the theoretical lens of the digital business model (Al-Debei and Avison, 2010) and value configuration (Stabell and Fjelstad, 1998). Through conducting comparative and in-depth case studies on five companies that have rolled out blockchain initiatives, we arrived at five distinct business models inspired by creative applications of blockchain (see Table 1). Furthermore, for each of these business models, we shed further light on the value creation logic, value capturing mechanism, and challenges associated with each model. In this sense, findings from this study have significant implications for both theory and practice.

5.1 Implications for Theory

By deriving a typology of business models for blockchain companies, this study contributes to extant literature on three fronts. First, even though it is undeniable that blockchain, as a novel architecture for value delivery, holds the promise of democratizing access to information for stakeholders, knowledge gaps exist with respect to how organizations can harness the technology for building lucrative businesses. Findings from this study thus aid in bridging these knowledge gaps by deriving a typology with five distinct business models that can be pursued by organizations to appropriate value from blockchain—namely, *platformer*, *disintermediator*, *transformer*, *mediator*, and *co-innovator* (see Table 1). Whereas the platformer (e.g., ChainArchitect) competes by innovating on the base technology in a bid to increase the appeal of its own proprietary implementation of the blockchain architecture as an open platform upon which third parties can develop business applications, the disintermediator (e.g., ChainFinance) and mediator (e.g., ChainSecurity) insert themselves into conventional value chains by transforming the way transactions occur among incumbents. In particular, the disintermediator assumes a more disruptive stance by seeking to dislodge the market position of incumbents (e.g., replacement the People's Bank of China as the clearinghouse in interbank transfers), while the mediator tries to benefit incumbents by resolving inefficiencies in conventional value chains (e.g., accurate pricing and better risk assessment of asset-backed securities). Interestingly, the coexistence of both disintermediator and mediator strategies implies that blockchain may not always disrupt conventional value chains as speculated in past studies (e.g., Crosby et al., 2016; Glaser, 2017), it can also resolve inefficiencies in conventional value chains. As opposed to the three preceding business models, which create and capture value from networked economies, both the transformer (e.g., ChainNova) and co-innovator (e.g., ChainDraft) operate on a firm level, opting to collaborate with individual organizations in delivering firm-specific business applications. Of the two, the transformer is more conservative in that it does not attempt to depose of preexisting business practices, but rather, devises blockchain solutions that complement these business practices (e.g., product traceability system for manufacturers). Conversely, the co-innovator undermines preexisting business practices by conceiving parallel work systems that rival how businesses function (e.g., e-draft management system). Even though the platformer resonates with the previous characterization of blockchain technology as a catalyst for coevolution ecosystems (see Figure 1), findings from our study also suggest that blockchain-inspired digital business models can also stem from the reorganization of longstanding relationships among market incumbents (e.g., disintermediator and mediator) or the streamlining of outdated business practices (e.g., transformer and co-innovator). In this sense, we extend extant literature by recognizing the broad spectrum of value creation and capturing opportunities afforded by blockchain technology beyond the parochial focus on ecosystem (c.f., Crosby et al., 2016).

Second, this study yields insights into how each of the five business models represented in our typology captures value. Specifically, we can infer from the case analysis that each of the five business models embeds a distinctive view of how value can be captured. While the platformer is keen to corner the market by positioning itself as the standard on which future innovations can be developed, the transformer and co-innovator capture value by improving the preexisting practices of businesses, albeit via separate mechanisms. Like a consultant, the transformer works with select organizations to devise functional blockchain solutions for addressing contemporary business issues and then transfers the lessons learned to other industries facing similar problems. On the other hand, the co-innovator, by developing firm-specific blockchain alternatives to preexisting business practices, captures value through co-licensing agreements, thereby generating a steady flow of income. For the remaining two business models, the disintermediator captures value by acting as a market equalizer for players that have been disadvantaged in conventional value chains, whereas the mediator reaps its rewards through offering firm-specific benefits to each party participating in these value chains.

Last but not least, through a deeper understanding of how five companies have strived to build profitable businesses from blockchain, we were also able to ascertain challenges that threaten the longer-term feasibility of these business models. For the platformer, the greatest hurdle to its ambition of acquiring a dominant, if not monopolistic, market position in blockchain innovations, stems from its compatibility with existing infrastructures. In the absence of compatibility, the platformer will struggle to convince third parties to innovate on its platform. Expectedly, for the disintermediator and mediator, challenges are rooted in incumbents' resistance to their attempts to subvert conventional value chains. Due to the disintermediator's desire to alter how value exchanges occur in conventional value chains, it is not surprising for the disintermediator to be confronted with incumbents who question the return on investment for the new solution. For the mediator, the introduction of parallel work systems demands fundamental changes to routines that are often tough to realize due to entrenched business practices.

Table 1. Typology of Blockchain-Inspired Business Models

Business Model Dimension	Value Shop	Value Network		Value Chain	
	ChainArchitect [Platformer]	ChainFinance [Disintermediator]	ChainSecurity [Mediator]	ChainNova [Transformer]	ChainDraft [Co-Innovator]
Value Creation Logic	Value created from innovating on the blockchain increases the appeal of its own proprietary blockchain architecture as an open platform that third parties can use to develop business applications (i.e., organic, tree-based blockchain architecture with enhanced performance over traditional architectures in terms of transaction speed and volume)	Value is created through displacing incumbents from conventional value chains (e.g., an interbank cash transfer system that bypasses the People's Bank of China (PBoC))	Value is created by resolving inefficiencies in conventional value chains (e.g., originators of asset-based securities can separate their credit clients from their own assets, while investors can lower risk by valuing securities much more accurately)	Value is created from revolutionizing contemporary business practices (e.g., rice traceability system for Beidahuang)	Value is created by codeveloping rival blockchain solutions to preexisting business practices (e.g., e-draft system with a domestic commercial bank)
Value Capturing Mechanism	Value is captured by positioning itself as the primary standard on which future innovations can be developed	Value is captured by acting as a market equalizer for players who have been disadvantaged in conventional value chains	Value is captured by offering firm-specific benefits to each party participating in conventional value chains	Value is captured through formulating functional blockchain solutions for tackling contemporary business issues and then transferring lessons learned to other industries facing similar problems	Value is captured through licensing of codeveloped blockchain solutions
Challenges	Compatibility with preexisting infrastructures (e.g., standards in bank account information and sharing protocols)	Resistance from other players embedded within strategic value networks	Acquiring buy-in from incumbents to revisit entrenched business practices and adapt to new work routines	Variations in business practices across organizations reduce transferability of lessons learned	High initial investments for small enterprises due to developmental and ongoing maintenance costs

Because of their emphasis on firm-specific solutions, the transformer and co-innovator will encounter challenges pertaining to the ability of their proposed solutions to penetrate the market. Even though the transformer can attain economies of scale and scope by replicating its blockchain application across industries, the specificity of each application, given that it has been tailored to a given organization, hinders the transferability of lessons learned. In the same vein, the co-licensing value capturing mechanism can only yield rewards for the co-innovator if organizations are willing to go beyond small-scale experimentations of the proposed blockchain solution. Arguably, it is evident that this study can be heralded as a modest effort to bring clarity to the nebulous state of progress for blockchain and its implications for further theory development along the lines of how blockchain-inspired business models can be formulated.

5.2 Implications for Practice

This study informs practice in two ways. First, even though blockchain is an emerging technology with numerous opportunities for meaningful business applications, contemporary applications of blockchain still exist at an experimental stage. Consequently, this study offers an overview of prevailing business models that have manifested alongside advances in blockchain technology. For each business model, we further provide rich descriptions of the case company detailing

how value is created and captured. More specifically, as uncovered in our case analysis, value appropriation of blockchain technology can occur on three levels, namely the ecosystem as a whole (i.e., platformer), conventional value chains (i.e., disintermediator and mediator), and individual organizations (i.e., transformer and co-innovator). In this sense, findings from this study may assist practitioners, who are already operating in or who possess intentions of venturing into this space, in gaining a comprehensive view of the current blockchain ecosystem. This, in turn, helps detect unfulfilled market needs that are best served through the provision of new blockchain-enabled business applications.

Second, apart from the discovery of blockchain-inspired business models, we also describe challenges exclusive to each of the five business models that may erode its longer-term profitability. As such, practitioners, who are already operating in or who have intentions of venturing into this space, may draw on findings from this study to anticipate and stay vigilant against possible pitfalls when pursuing a certain business model. For instance, the co-innovator may have to forsake the co-licensing arrangement and switch to another revenue-generating option if it continues to face an uphill task in market penetration.

5.3 Limitations and Future Research

Admittedly, this study is constrained in its generalizability due to the analyses of five companies: Though we are fairly confident that our case companies are representative instantiations of blockchain-inspired business models (due to positive endorsement and reassurance from the PBoC and the CAICT) we do not deny that these five case companies are neither definitive nor exhaustive. In spite of our conviction that the two dimensions of value delivery architecture and value stakeholder network advocated by Al-Debei and Avison (2010) can be omitted from our analysis of the five case companies without a loss of richness, we do accept it as a limitation of this study. We therefore urge future researchers to be mindful of innovative business applications of blockchain that do not conform to the general expectations about value delivery architecture and the value stakeholder network. Moreover, we have no doubt that our work can be expanded through conducting case studies on other blockchain companies in the market, especially those operating in countries other than mainland China. It is our firm belief that the typology of blockchain-inspired business models advanced in this study can be further refined to be indicative of the wide range of value creation logics and value capturing mechanisms across blockchain companies.

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Appendix A

Table A1. Detailed Breakdown of Data Sources

Organization	Primary Data						Secondary Data		Purpose of Interview
	Informant	Breakdown of Interviews					Web Source	No. Articles	
		No. of interviews	Timing						
			1st Interview	2nd Interview	3rd Interview	Total			
Blockchain Companies									
ChainArchitect Company, Ltd. (ChainArchitect)	CEO	2	58 mins	44 mins	-	102 mins	-	36	To explore how blockchain companies who only provide fundamental technology create and capture value
	CTO	2	20 mins	47 mins	-	67 mins			
	Vice president, Government Affairs	2	20 mins	-		20 mins			
ChainFinance Technology Company Limited (ChainFinance)	CEO	3	75 mins	101 mins	108 mins	284 mins	-	27	To reveal the business logic of blockchain company that only provide customized solutions
	Project director	3	22 mins	50 mins	15 mins	87 mins			
	Director, Business Division	2	15 mins	15 mins	-	30 mins			
	Senior engineer	2	15 mins	48 mins	-	63 mins			
	Brand manager	1	20 mins	-		20 mins			
ChainDraft Technology, Ltd. (Chain Draft)	CEO	1	30 mins	-		30 mins	-	21	To detect how can blockchain companies that provide both self-developed fundamental technology and upper layer applications create and capture value
	Founder/Vice president	1	91 mins	-		91 mins			
	Vice general manager	1	99 mins	-		99 mins			
ChainSecurity, Ltd. (ChainSecurity)	General manager, Structured Finance Group	1	35 mins	-		35 mins	N/A	32	To observe how blockchain companies can create value by adopting existing Fabric Network
	Chief product officer, Structured Finance Dept.	2	68 mins	85 mins	-	153 mins			
	Director, policy Institute	1	60 mins	-		60 mins			
	Senior consultant, Patent Dept.	1	43 mins	-		43 mins			
ChainNova, Ltd. (ChainNova)	CEO	2	65 mins	81mins	-	146 mins		43	

	Director, Technical Department	1	51 mins	-	51 mins	www. chainnova. com		To examine the business model of blockchain companies that provide technical solutions by combining several open source blockchain technologies
	Director, Product Dept.	1	45 mins	-	45 mins			
	Director, Marketing Dept.	1	32 mins	-	32 mins			
	Brand Manager	1	63 mins	-	63 mins			
Banking Institutions								
People's Bank of China (PBoC), provincial branch	Deputy director, Department A	1	30 mins	-	30 mins	N/A	6	To acquire a strategic overview of the blockchain-based banknote supply chain, understand the adoption motivation, the practical challenges involved in its realization and also the measures taken to address these challenges
	Section chief, Department B	1	35 mins	-	35 mins			
	Vice section chief, Department C	1	47 mins	-	47 mins			
	Manager, Deptartment D	2	70 mins	43 mins -	113 mins			
China Construction Bank (CBC), city1 branch	Vault manager	1	20 mins	-	20 mins	N/A	N/A	To assess the receptivity of commercial banks who have already adopted the blockchain-enabled interbank transfer system and unravel changes in business processes brought about by its implementation
	Department director	1	20 mins	-	20 mins			
Agricultural Bank of China (ABC), city2 branch	Director, Personal Banking Depart.	1	35 mins	-	35 mins	N/A	N/A	
People's Bank of China, municipal branch	Director, Financial Service Dept	1	65 mins	-	65 mins	N/A	3	To examine the receptivity of the potential blockchain-enabled interbank transfer system users
	Director, Monetary Finance Office	1	24 mins	-	24 mins			
Industrial and Commercial Bank of China (ICBC), city2 branch	Director, Personal Banking Dept.	1	33 mins	-	33 mins	N/A	N/A	
	Department director	1	20 mins	-	20 mins			
Total	**31**	**43**	**1,326 mins**	**514 mins**	**123 mins**	**1,963 mins**	**3**	**168**

Appendix B

Table B1. Coding Examples

Examples of participants' words	Open coding and axial coding		Selective coding
ChainArchitect			
Value Creation Logic • *To me, blockchain is still at an infancy stage. The technology is not stable and the business environment is not prepared as well. But at the same time, it is both a challenge as well as an opportunity. Consequently, what is special about our company is that we focus on the fundamental technology. We have our own projection of the potential of blockchain as well as our own thoughts about how the technology should develop.... Our core competence is based on our own developed L0 distributed ledger system [and] we try to figure out plausible business models based on the system…. Our innovation is the framework we proposed, where a tree-based blockchain network can achieve almost 300 thousand tps.* (CEO, ChainArchitect)	Offer an open innovation platform	[Value Shop] Resolves problem posed by current blockchain architecture in recording transactions at a speed necessary for modern business applications	[Platformer] Delivering a generic platformized solution with core technological components that circumvent the current limitations of the blockchain architecture in supporting the transactional needs of modern business applications and peripheral elements that can be customized to fit the requirements of distinct organizations
• *We have worked together with a provincial People's Bank of China on a project about cross-bank money transfer. It is mainly about information sharing of serial numbers on Renminbi (RMB).... We established a connection from the central bank to every bill circulating in the economy such that all information pertaining to each bill can be viewed through our distributed account book.... What we have accomplished is much more than just identifying fake currencies. What we could achieve is to trace every single bill in the economy, not only between banks but also between retailers and customers.* (CEO, ChainArchitect)	Provide business solution based on self-developed blockchain platform		
Value Capturing Mechanism • *Our company's mission is to supply fundamental blockchain technology to aid customers in developing business applications that cater to their competitive needs and market environment.... Open source is the trend. I believe that all software will embody properties of open innovation in the future. The same applies to blockchain because it is a system built on trust of multiple parties.... It has the potential to become a standard protocol layer that relies on the internet for value exchange. Therefore, the more basic the technology is, the more open and innovative it should be.... We have a general solution, whether you are an e-commerce platform, a financial institution, or a social media platform does not matter. You can utilize our solution as a foundation and develop the application or service layer by yourself.* (CEO, ChainArchitect)	Acting as the nexus for realizing innovation Setting primary technique standards		
ChainFinance			
Value Creation Logic • *Repeated usage of the system [blockchain-enabled interbank transfer system] can lead to an accumulation of data on interbank cash transfers. In turn, this data can generate value by improving the cash demand forecasting for commercial banks. Beyond this, the system [blockchain-enabled interbank transfer system] is useful in compelling commercial banks to adhere to the clearing requirements*	Rebuilt the interbank cash transfer information network	[Value Network] Alters the network relationship among commercial banking	[Disintermediator] Delivering a blockchain-enabled interbank transfer system that strives to supplant the clearing and

stipulated by the PBoC [People's Bank of China] because data on interbank cash transfers cannot be uploaded onto the blockchain ledger unless the cash has been fully cleared. (Director, Business Division, ChainFinance) • *The system [blockchain-enabled interbank transfer system] not only reduces the regulatory expenses of the PBoC [People's Bank of China], it also enhances the supervision capability. Before the introduction of the system [blockchain-enabled interbank transfer system], the PBoC [People's Bank of China] cannot monitor the cash flow among principal banks, but now, they can obtain real-time data on interbank cash transfers effortlessly.* (Section Chief, Provincial People's Bank of China)	Disintermediation	institutions as well as between commercial banking institutions and the People's Bank of China in interbank cash transfer	supervisory roles of incumbents
Value Capturing Mechanism • *The system [blockchain-enabled interbank transfer system] not only resolves the problems in interbank cash transfer, but it also delivers other value added services. For example, in City2, commercial banking institutions combine their large amount cash withdrawal business with the system [blockchain-enabled interbank transfer system]. Customers can withdraw cash, which have been cleared and packaged properly, without having to recount it, thereby simplifying the cash withdrawal process for bank counters while reducing the wait time for customers.* (Director, Business Division, ChainFinance) • *The system [blockchain-enabled interbank transfer system] can be utilized as a pilot test for future development of legalized digital currency. Because at such an early stage, developing a system for legalized digital currency or even testing it with real money would inevitably lead to high cost and risk. In this sense, the system [blockchain-enabled interbank transfer system] is a perfect choice to experiment with, for example, how digital currency could replace check transfers.* (CEO, ChainFinance)	Enable future interorganization innovation		
ChainNova			
Value Creation Logic • *Beidahuang is a listed company who owns the largest grain production base in China.... Beidahuang, supported by Heilongjiang Production and Construction Corps, owns more than 10 million acres of land and has equipped hundreds of farmers with Internet of things (IoT) sensors. We are now cooperating with them to construct the rice traceability system.... The Blockchain Farm project is aimed at providing end consumers with safe and traceable rice via blockchain technology.... Our core objectives in the project are to (1) achieve quality assurance of production process and the ensuing products, (2) facilitate logistical distribution, and (3) boost farmers' real income.* (CEO, ChainNova)	Reintegrating the traditional rice supply chain	[Value Chain] Enables informational transparency among existing network of supply chain partners	[Transformer] Delivering tailored applications that upend preexisting business practices in traditional industries
Value Capturing Mechanism • *We hope we can exploit the traceable feature of blockchain to help traditional industries in China transform and innovate.. .... By employing the blockchain, we can create (1) a set of systemic standards for product traceability such that these standards can be duplicated and promoted in other areas, (2) an e-commerce platform with traceability components to guarantee the quality [of products offered], and (3) a business cooperation platform which combines the blockchain with IoT devices and best industrial practices.* (CEO, ChainNova)	All supply chain participants can be benefited Scalable platform solutions		
ChainSecurity			

Value Creation Logic • *We discovered that ABS is the best business scenario for blockchain applications. First, pricing ABS by data-driven method has a natural advantage. Second, securities are not standardized, and keeping track of transaction among a massive number of participants would be extremely tedious. Third, sellers and buyers do not trust each other.* (General Manager, ChainSecurity Structured Finance Department)	Restructure the ABS network Trustworthy	[Value Netwok] Restructures the interaction and flow of transactional information among originators, investors, and regulators of asset-backed securities	[Mediator] Changing the way exchanges among multiple parties in conventional value chains transpire
Value Capturing Mechanism • *Benefits would differ for each participant. For example, for originators, the system offers a financing channel by which it can separate its assets from those of its credit clients . Beyond this, through the blockchain, originators can enjoy a reduction in financing costs since each asset is registered in the blockchain and the whole process is completed on the blockchain. As for investors, one advantage is that the blockchain system can provide a better understanding of asset risk. Through more precise pricing of assets in relation to their risks, investors can estimate profits more accurately, and reduce their investment risk.* (Chief Product Officer, ChainSecurity Structured Finance Department)	Increasing transaction transparency Mediating exchanges among multiple parties		
ChainDraft			
Value Creation Logic • *Our focal technology is the fully autonomous domestic consortium blockchain platform: Draftchain. The Draftchain consortium blockchain platform delivers enterprise level blockchain solutions for enterprises, governmental agencies and industry alliance by meeting the requirements of enterprise level applications in terms of performance, permissions, privacy, security, reliability, scalability, maintenance, and so on and so forth. Key features of Draftchain include high performance robust consensus algorithm, dynamic membership management and privilege control, dynamic data failure recovery mechanism, multilevel encryption mechainism, smart contract engine, and platform monitoring. ChainDraft supplies general industrial blockchain applications like the e-draft system, data trading system, supply chain finance system and securities asset system.* (Founder and Vice President, ChainDraft)	Developing blockchain solutions for different business scenarios	[Value Chain] Enforces better governance over exchanges among payers and payees of bank drafts	[Co-Innovator] Cocreating service applications that operate exclusively on its self-developed proprietary blockchain platform
Value Capturing Mechanism • *When collaborating with financial institutions, we first provide the fundamental blockchain platform through an authorizing mechanism. Then, based on Draftchain, we work with these financial institutions to codevelop the upper layer service applications. For projects demanding high levels of confidentiality, core system development will be conducted by the financial institutions themselves, we are only responsible for providing bottom layer interface and performing work on the periphery, such as developing mobile applications.... We supplied all kinds of API interface, such as Java and Python. Institutional clients can easily access our blockchain platform and utilize its functions without expending extra effort on blockchain development.... Essentially, our profit model conforms to an authorizing pattern whereby enterprises have to buy licenses.* (Founder and Vice President, ChainDraft)	Codeveloping services		

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