

Can Blockchain Really Remove All Intermediaries?

A Multiple-Case Study in Different Industries

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Abstract

Blockchain is a disruptive and innovative technology. How will the blockchain technology disrupt different fields? Blockchain technology has disrupted the existing processes and will improve the efficiency of many operations. With improved efficiency, will blockchain remove all intermediaries in the chains? Further, will all positions of the intermediaries agree to be replaced by blockchain? Many intermediaries have demonstrated their liberal attitudes toward embracing blockchain technology. What are the intended purposes behind the ambition of the intermediaries?

The research is still in progress and will adopt a multiple-case study and summarize the research intentions into a cross analysis table. The table will briefly show the role of users and indicate whether intermediaries are necessary in the ecosystems or they transfer into new roles and create new business models after deploying the blockchain technology.

Keywords: Blockchain, Intermediaries, Disintermediation, Reintermediation

1. Introduction

1.1. Research Background and Motivation

“Blockchain is a foundational and disruptive technology, with the potential to revolutionize the nature of the interface between economic agents [19]”. In other words, blockchain is regarded as the next innovative technology that will reinvent how people work and live [20].

According to several industry research reports, blockchain can enable specific applications to create value based on the current model and drives the old business model to become faster, cheaper, more reliable, and transparent. That is, blockchain defies many rules and conventions associated with traditional organizations, and it forces the latter to ponder different methods to create value [12,22]. McKinsey [8] stated that, “companies can determine whether they should invest in blockchain by focusing on specific use cases and their market position,” and described the short-term and long-term developments of investing in blockchain. In the long term, blockchain demonstrates high potential in transforming the existing business model into a new one; however, in the short term, its initial impact will focus on operational efficiencies to be improved [8].

The long- and short-term merits of blockchain investment will be driven by the critical features of blockchain: decentralization, persistency, anonymity, and auditability. Blockchain provides similar functions in terms of storing and maintaining transactions, and third parties (also known as ledger manager) are not required. In other words, blockchain eliminates intermediaries (such as banks, custodians, and different types of trustees) that are typically third-party guarantors. Decentralized ledgers may solve the problem of

requiring a central authority to verify transactions, and every user within the blockchain network will maintain the original ledger such that it cannot be manipulated [5,26]. By removing the effort of intermediaries for maintaining administrative records and transactional reconciliations, the cost in the existing processes can be reduced and outside resources can be used as efficiently as inside resources [8,24].

Meanwhile, the core innovation provided by blockchain implies that trust is established through collaboration and code, rather than a central authority [7]. Therefore, transactions will benefit from a decentralized approach; however, for some functions, consumers still cannot access blockchain and they must be addressed through intermediaries. Examples of those functions include additional complexities and regulation, vetoing suspect transactions, providing guarantees and indemnities, and supplying a range of associated products and services [12].

Blockchain technology presents far-reaching economic and social implications. Witzig and Salomon [26] stated that, “the financial services industry is particularly ripe for disintermediation.” The following question arises, “does disintermediation by blockchain rid of middlemen addressing transactions between buyers and sellers?” They revealed that blockchain technology has stimulated the Swiss financial services industry instead of disintermediation and suggested that if incumbent businesses do not wish to perish or be replaced, actions are required; otherwise, they will be overtaken by ambitious newcomers [26]. In the financial sector where disintermediation pressures have increased and have reshaped market players’ roles [2], de Meijer [9] stated that a complete disintermediation in blockchain ecosystems does not exist.

1.2. Research Question and Purpose

The research intends to determine the following: (1) does blockchain technology remove all the intermediaries in different industries? If yes, (2) how are the new business processes performed after removing all the intermediaries? If enterprises are not disrupted, (3) which part of the functions are replaced or improved by blockchain technology and will new intermediaries emerge to create new values?

2. Literature Review

2.1. The Key Features of Blockchain

Blockchain operates in a decentralized P2P network and is defined as a decentralized, shared ledger. It can integrate core technologies such as digital signature cryptographic hash, and distributed ledger technology [30]. These core technologies bring about the following features of the blockchain.

- **Decentralization.** A transaction can be interacted with peers directly without an authentication by a third party. A launched transaction is broadcasted through the entire network and blockchain reward mechanism encourages all users (called miners) to validate transactions. In addition, smart contracts also automate some processes that originally controlled by a middleman. Decentralization is possible to bring about the cost efficiency [31].
- **Auditability.** A validated transaction is recorded into existing blockchain chronologically. Users can track and verify the previous transactions easily by accessing any node in the distributed network. A blockchain technology can enhance the transparency and traceability of the data recorded in the distributed shared ledger [31].
- **Persistency.** An invalid transaction is not admitted by honest miners, because everyone will synchronize and keep a ledger after validation of transactions. There is nearly no possibility that someone can rollback or delete the status of transaction in the blockchain. It means one invalid transaction could be detected immediately [31].
- **Security and Immutability.** Thanks to the technology of cryptographic hash and consensus mechanism, a shared ledger in a blockchain is tamper-proof and provides a historical version of the truth. Trust will be generated with consensus mechanism in the

transacting process. As a result, it is impossible for users to tamper a validated record, unless users have power to control the majority of computational power in the blockchain [4].

- Anonymity. For preventing the exposure of personal identity, users can generate an address to replace their true name when they launch a transaction. Privacy preservation will be protected on transactions in in public blockchain [31].

2.2. Blockchain Deployed Applications

As Zheng et al. [30], Pilkington [19], and Puthal et al. [20] stated, with the advantages mentioned above, blockchain has been deployed to almost all fields where data needs to be shared among multiple parties and data consistency is required.

- Financial Industry

Blockchain first used for bitcoin clearly demonstrates that blockchain technology represents an approach for achieving the ownership of digital goods. Owing to the principle of decentralized, transparent, and instant access to information, this may be the reason that blockchain technology is suitable for development both within and outside the financial sector [13]. The existing capital market infrastructure is slow, expensive, and often requires multiple-party cooperation. Moreover, blockchain divides the functions of saving and money transferring and demonstrates some advantages for financial services such as clearing, instant settlements of assets, remittances, cross-border payments, currency exchange, and risk management. Blockchain also facilitates the financial industry in building in a secure and reliable P2P financial market [16,21,30].

- Supply Chain Management

Many companies have no or little information on their entire upstream or downstream suppliers. According to Francisco and Swanson [11], supply chain transparency implies information available to end users and firms in a supply chain at any time. Pilkington [19], and Abeyratne and Monfared [1] mentioned that blockchain provides groundbreaking solutions that can enhance the transparency and visibility of their suppliers.

In the supply chain, blockchain can be used for asset tracking (physical assets), and it enables ownership records to be kept in a shared, consensus-based, and immutable ledger. Blockchain creates a formal registry where users can identify and monitor the possession of a commodity throughout the supply chain. It will facilitate the supply chain to improve transparency and traceability issues [1,19].

- Healthcare Industry

Shared healthcare data are essential for improving the quality of healthcare services. As a result, interest in adopting blockchain technology to healthcare information technology has emerged. In the short term, blockchain applications in healthcare will focus on data validation, auditing, and authorization. However, the security, decentralization, and scalability of blockchain technology must still be considered in the long term. However, a distributed system of disintermediation has resulted in high potential for innovating the existing processes in healthcare [3].

Blockchain offers various application possibilities in patient-generated health data. For example, Healthbank, a global Swiss digital health startup, has adopted a new and radical approach for handling data transactions and sharing personal health data. In recent years, plans to implement blockchain technology that stores patients' data in Healthbank's blockchain securely have been proposed. For Healthbank users, they can save their data on the platform safely and render them available for medical research. Therefore, Healthbank has become a unique data-trading platform that provides new opportunities in patient-oriented research [13].

2.3. Intermediaries in the Chains

Traditional post-trade processes exhibit problems such as multiple intermediaries operating across the trade cycle, utilization of legacy technology, and fragmented reconciliation data architectures. Owing to complex and inefficient post-trade processes, de Meijer [9]

suggested the re-engineering of incumbent business models; however, blockchain technology will become a disruptive method to overcome these problems.

Is the disruptive innovation of blockchain a threat or an opportunity? According to de Meijer [9], blockchain technology may threaten the necessity of many players in the current security trading cycle, and some of them will become partly or completely obsolete. In the blockchain ecosystems, the existing players start to increase their alerts and attempts to transform their positions in the marketplaces. Further, new participants have started to view blockchain technology as a window of opportunity.

In a similar case, Zamani and Giaglis [29] considered that decentralization-based technologies will imply that the roles of intermediaries may reduce considerably but these intermediaries will still be useful within a blockchain-enabled environment rather than a complete disintermediation.

Additionally, they foresaw three different outcomes including disintermediation, reintermediation, and cyber-mediation. First, in the disintermediation outcome, the existing intermediaries will be out of the value chain, and blockchain will create an internet of trust, where a traditional trusted third party will be decreased. Next, in the reintermediation outcome, the traditional intermediaries attempt to build upon their expertise, experience, and market positioning to obtain new business opportunities to maintain their existence. Finally, in cyber meditation, new intermediaries enter the market and offer previously unthinkable services to transacting parties in a distributed ledger technology (DLT) network. That is, new roles of intermediaries will serve as DLT service providers, offering blockchain as a service (BaaS) [29].

Blockchain as a service (BaaS) partnerships refer to a model or an approach for the provision of DLT systems or services that allows for the replacement of back-end systems of many firms and organizations who wish to use blockchain. Technology companies such as BaaS service providers host the computing infrastructure, typically in a cloud environment and using the necessary codebase for DLT systems. One example, R3, a blockchain start-up, offers BaaS and wishes to execute financial transactions instantaneously across the global private network [10,14]. Another example, Microsoft Azure Blockchain Workbench, a collection of Azure services, facilitates developers in quickly deploying blockchain applications and share business processes and data with other organizations. Microsoft Azure Blockchain Workbench allows deployers to focus on building business logic and driving business processes with smart contracts [18]. As an example, 3M uses Microsoft BaaS as a new approach to secure the supply chain. Oscar Naim, 3M Lead Software Architecture Specialist [17] said: “We were looking for a way to reduce risk in our internal systems, but as we worked with Azure Blockchain, we saw an opportunity to create a service that we could monetize as a whole new line of business.”

Witzig and Salomon [26] proposed the following: “The financial industry is particularly ripe for disintermediation.” Simultaneously, they focused on how blockchain will affect the Swiss financial services industry. According to their survey, they observed that the Swiss Confederation has ratified an institutional amendment, and the amendment aims to facilitate the market-entry for fintech-startups (who attempt to create new values from blockchain technology). That is, the Swiss government agrees that blockchain technology can result in innovation and has thus allowed for new participants. By evidence, Witzig et al. [26] predicted that blockchain technology will stimulate the Swiss financial services industry, instead of creating a disintermediation.

3. Research Methodology

3.1. Research Approach and Process

The research will adopt a multiple-case study and aims to determine whether industries adopting blockchain technology will change the intermediaries' roles and this could potentially affect their business processes.

Yin [27] defined the case study research method as “an empirical inquiry that investigates a contemporary phenomenon within its real-life context.” According to Tellis [25], Zainal [28], Baxter and Jack [6], a qualitative case study methodology is suitable for

researchers. Further, they presented the details and complex phenomena through the complete observation, reconstruction, and analysis of the cases under investigation. Additionally, a multiple-case study will be conducted to explore the differences and similarities among different cases such that researchers can predict similar results across cases.

First, based on the reviewed literature in chapter 2, “Intermediaries in the chains,” intermediaries in the chains are possible and reasonable. The research selects four enterprises among different industries as a study target and uses a designed open question to conduct an in-depth interview. Next, to render the research objective clearer and more specific, secondary qualitative data are collected to corroborate with the results of interviews. (Appendix A: An open question) Subsequently, after all interviews are completed, the results will be organized, and experts will be invited to provide suggestions for process revision to the four enterprises. Finally, the conclusion of the research is expected to provide insights for future studies and industry applications. Table 1. shows the detailed description of the research process.

Table 1. Description of the Research Process

Phases	Why	How	Result
Literature Review	To understand how blockchain operates and key features of the technology; ensure the possibility of intermediaries in blockchain ecosystems.	Review the existing related studies and industry reports; summarize the features of blockchain and the possibility of intermediaries in the chains.	Enhanced the research motivation and viewed the problems more clearly.
Case selection and preparation	To select the appropriate cases and design an open question for the interview.	Collect information from website or experience services provided by enterprises that implement blockchain technology.	Determined which cases are suitable and designed an open question. Revised the designed questions in interviews based on company background.
Multiple-case study	To determine whether industries implementing blockchain applications will affect the intermediaries and processes of these enterprises.	Conducting an in-depth interview with selected enterprises (Appendix A: Questionnaire)	Raw findings of a multiple-case study.
Cross analysis	To determine the differences and similarities across cases.	Perform an in-depth analysis of interviews and secondary data; summarize the cross analysis into a table.	Clearly observed the transformation of intermediaries and understood the intention of enterprises’ <u>process re-engineering</u> .
Expert interview	To verify the results of cross analysis.	Invite experts to provide suggestions based on the cross-analysis result.	Ensured that enterprises among different industries applied blockchain more accurately.
Conclusion	To provide the basis for future studies.	Summarize the results of cross-analysis and expert suggestions.	Finalized the conclusion and suggested further observations.

3.2. Data Collection

Selection Criteria

For case selection, five enterprises in Taiwan will be interviewed. First, the selected enterprises as research targets are representative firms with high competitiveness in different industries. Next, they are dedicated to innovating their business processes or creating a new business model by blockchain technology. Subsequently, they must have already implemented blockchain into applications. Next, the data of selected cases can confirm the differences between the traditional processes and the new processes that are deployed using blockchain. Further, the intermediaries in companies fulfill some functions and can also be startups that create new business models. Therefore, a startup company that is dedicated to solving phenomena in society with blockchain technology will be selected. Finally, for data collection, the interviewees are willing to attend the interview and share their experiences.

Case Description

Data are collected by interviewing experienced managers who have engaged in their companies' blockchain technology implementation of the selected cases. Each manager is interviewed and has discussed the blockchain technology implementation of their firms, the impact after implementing blockchain, and the critical factors of implementing blockchain. The details of the five studied companies are as follows, and the description of the selected cases is summarized in Table 2.

- **Company A – Startup A**

Startup A considers that by utilizing technology, a more open, fair, and prosperous environment will be created. The Market of Startup A is a technology-leading e-commerce platform that connects producers, small farmers, and consumers. For scaling up the digital economy for small farmers, Startup A started to help the farmers recording their manufacture processes through blockchain technology in order to enhance consumers' the sense of trust on farmers.

- **Company B – Hospital B**

On August 30, 2018, Hospital B launched the "Health Medical Blockchain Platform" and the "Smart Chain Passport" to improve the efficiency during transferring. People can obtain their medical information within 24 hours. Most importantly, processes of referrals don't need to apply hard copies of medical records from Hospital B, and they can naturally authorize medical records to other hospitals or clinics to significantly improve the accuracy and convenience for doctors' diagnosis.

- **Company C – Startup C**

Startup C established in 2015, and an NPO startup is committed to social welfare transparency and advocates the features of blockchain to the public. The platform created by Startup C is the first platform in Taiwan based on blockchain technology and used for crowdfunding. Various types of crowdfunding proposals about charity can be written into the blockchain and traced by the public.

- **Company D – Bank D**

Bank D has collaborated with the other company and developed a music distribution platform with a blockchain royalty checkout mechanism. Bank D provides the "Blockchain Payment Confirmation Service," and musicians only need to press two buttons of "request" and "confirm," and money will be transferred into their accounts, thus easing the payment process significantly, and ensuring that the payment between the musician and the music company matching the transaction on the blockchain.

- **Company E – Bank E**

Besides, Bank E implemented the " Electronic Audit Confirmation" service which adopts the features of blockchain technology like auditability, immutability, and persistency, and combines with the digital voucher and digital signature to transform original confirmation processes. So that Bank E reduces the risk of falsification, confirmation papers lost, and also saves time for auditing operations and postal deliveries.

Table 2. Description of Selected Cases

	Company A Startup A	Company B Hospital B	Company C Startup C	Company D Bank D	Company E Bank E
Main Business Service	Technology industry	Medical industry	Financial industry (Fintech)	Financial industry	Financial industry
Application	Food Traceability Management	Medical Data Management	Crowdfunding	Money Transfer, Asset Registration and Verification	Money Transfer and External confirmations
Job Title of Interviewee	Founder	CIO	Founder	Blockchain Laboratory Manager	Digital Banking Manager
Interview Time	100 min	100 min	100 min	100 min	100 min

4. Preliminary Findings

Based on Table 3 shows the intentions of these interviewed companies why they want to implement blockchain to scenarios they chose. And the research preliminarily found that most of the interviewed companies try to adopt blockchain to following reasons: (1) Blockchain as a pain points reliever: owing to the features of blockchain, it is considered as a good way to solve social issues or operation problems and enhance the transparency of data management. Company B states that using blockchain which can empower patients to use their medical records conveniently and transparently. In the future, Company B will guide patients to use blockchain health passport to record their daily life (e.g., heart rate, temperature) to gain more data in further research and medical treatment. Besides, Company B cooperates with different industries to create a new business model and ecosystem through the blockchain-based application. (2) Reaching digital transformation: the interviewees disclosed their intentions said:” most of the intermediaries in the processes still deal with the same work and digitize their operations through the blockchain systems.” (3) Advertising their companies: some companies show their ambition about using blockchain, but the blockchain systems still co-exist with the old systems to deal with some processes. (4) The public is lack of awareness of blockchain: the issue is the common challenge of the five interviewed companies, and they need to promote and educate the public what is blockchain to trigger people or enterprises to use the blockchain applications.

The research is focus on the applications in Taiwan, and blockchain technology is developing and the research will evaluate more cases to deepen the depth of the research.

5. Expected Conclusion

The research supposes the intermediaries will reinvent themselves and create new business models to maintain the necessity of their positions, though decentralization-based technologies will weaken the importance of intermediaries’ original position. The research aims to find out the new roles of intermediaries will play and adopts a multiple-case study and summarize the research intentions into a cross analysis table. The table will briefly show the role of users and indicate whether intermediaries are necessary in the ecosystems or they transfer into new roles and create new business models after deploying the blockchain technology.

After determining responsibilities of intermediaries in the chains, the research will conclude generalized patterns of implementing blockchain in industries and identify different status of intermediation existing in blockchain implementation as an insight for further development in blockchain applications.

Table 3. Cross-Analysis Table in Different Industries

	Company A	Company B	Company C	Company D	Company E
Q1 Why does the company want to deploy blockchain technology?	<ul style="list-style-type: none"> As a pioneer in the blockchain industry Multi-parties sharing data Multi-parties updating data Intermediaries increase cost and complexity Requirement for verification 	<ul style="list-style-type: none"> Medical data integrity Multi-parties sharing data Multi-parties updating data Requirement for verification High interactivity of transaction Intermediaries increase cost and complexity 	<ul style="list-style-type: none"> Multi-parties sharing data The characteristics of the blockchain contribute to the transparency of crowdfunding. Requirement for verification Intermediaries increase cost and complexity 	<ul style="list-style-type: none"> Multi-parties sharing data Multi-parties updating data Requirement for verification Intermediaries increase cost and complexity Timeliness of interactions High interactivity of transaction 	<ul style="list-style-type: none"> Requirement for verification Intermediaries increase cost and complexity Timeliness of interactions High interactivity of transaction As a promoter in the industries
Q2 What are opportunities for blockchain?	<ul style="list-style-type: none"> Improving efficiency for existing business process and end-user Creating new business models Empowering end-users and improving trust in transactions Enhancing security in transactional systems Bringing benefits for data management through data immutability and persistency capabilities Improving efficiency for the underlying operations or mechanism through smart contracts 	<ul style="list-style-type: none"> Empowering end-users and improving trust in transactions Improving efficiency for existing business process and end-user Creating new business models and Extending new revenue sources Bringing benefits for data management through data immutability and persistency capabilities Improving efficiency for the underlying operations or mechanism through smart contracts Improving the security of digital asset or digital identity 	<ul style="list-style-type: none"> Empowering end-users and improving trust in transactions Improving efficiency for the underlying operations or mechanism through smart contracts Bringing benefits for data management through data immutability and persistency capabilities 	<ul style="list-style-type: none"> Digital transformation Improving efficiency for existing business process and end-user Extending new revenue sources under the existing business model Creating new business models Improving efficiency for the underlying operations or mechanism through smart contracts Improving the security of digital asset or digital identity 	<ul style="list-style-type: none"> Digital transformation Improving efficiency for existing business process and end-user Creating new business models Empowering end-users and improving trust in transactions Bringing benefits for data management through data immutability and persistency capabilities Improving efficiency for the underlying operations or mechanism through smart contracts
Q3 Why does the company want to choose this application scenario to implement the blockchain?	<ul style="list-style-type: none"> People raise concerns about food safety issues. For providing healthy and safe food for infants and children. Intermediaries may lead to opaque data and increase product costs indirectly. 	<ul style="list-style-type: none"> Dispersion of medical data For better allocation of medical resources Expanding the existing industry chain and cooperating with other industries (e.g., insurance) Creating a new commercial organization 	<ul style="list-style-type: none"> As a new third party to supervise the process of crowdfunding 	<ul style="list-style-type: none"> Information flow and cash flow are not consistent in the traditional processes Develop new customers for existing payment services Alliance with different industries Traditional paperwork processes result in inefficiencies. 	<ul style="list-style-type: none"> Alliance with different industries For marketing and pursuing for more customers Traditional paperwork processes result in inefficiencies.
Part B & Part C	Part B and Part C will interview with different roles for a detailed understanding of these company processes.				
Q11 What are the challenges facing blockchain or these challenges that need to be overcome?	<ul style="list-style-type: none"> The ways of data uploading to the blockchain are not fully automated. (e.g., some types of data also need to be uploaded by human resources) People are lack of awareness of blockchain. 	<ul style="list-style-type: none"> The flexibility of smart contracts (e.g., variability in medical behavior and decision) 	<ul style="list-style-type: none"> Anonymity dilemma (e.g., Once the donors want to update the name of donor that will be a question.) People are lack of awareness of blockchain. 	<ul style="list-style-type: none"> Too much counter parties Trading speed is not fast and unsteady. (versus the traditional SWIFT system) 	<ul style="list-style-type: none"> Trading speed is not fast and unsteady. (versus the traditional SWIFT system) Arising other security issues and privacy of data (still using traditional CA credentials to verify some process)
Q12 Whether the company would like to invite other intermediaries to join the ecosystem?	<ul style="list-style-type: none"> Accreditation Bodies for food safety The government Financial industries 	<ul style="list-style-type: none"> Insurance companies Shops around the hospital 	<ul style="list-style-type: none"> The government Campuses Alumni associations of different schools 	<ul style="list-style-type: none"> Startups (e.g., health, music industry, etc.) 	<ul style="list-style-type: none"> Other banks (Peer alliance)

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Appendix A

Questionnaire	
<ul style="list-style-type: none"> • Default: The interviewee knows the concept of blockchain technology and how the blockchain works; Before starting the interview, a short “intermediary” description and examples based on the interviewing company will be given to the interviewees to guide follow-up interviews. 	
Part A: The Intentions of Deploying Blockchain Technology	
<ol style="list-style-type: none"> 1. Why does the company want to deploy blockchain technology? <ul style="list-style-type: none"> • Multi-parties sharing data: Multiple participants need to review the same data • Multi-parties updating data: multiple participants update the data and need to be recorded • Requirement for verification: Any action needs to be recorded and validated, and participants can trust the validity of these changes. • Intermediaries increase operating complexity and costs: decreasing the necessity of intermediaries (middleman, central authority, or data manager) reduces the redundant process, extra cost, or multiple reconciliations. • Timeliness of interactions: reducing transactions delays can have commercial benefits (e.g., reduced settlement risk and enhanced liquidity) • High interactivity of transaction: transactions created by different participants rely on each other • Others: 	
<ol style="list-style-type: none"> 2. What are the opportunities brought by the blockchain? <ul style="list-style-type: none"> • Digital transformation (e.g., traditional processes turn into electronic processes) • Improving efficiency for existing business process and end-user (including operating cost savings or power savings) • Extending new revenue sources under the existing business model • Creating new business models • Enhancing security in transactional systems • Empowering end-users and improving trust in transactions • Bringing benefits for data management through data immutability and persistency capabilities • Improving the security of digital asset or digital identity (e.g., public key cryptography) • Improving efficiency for the underlying operations or mechanism through smart contracts • Enabling smart auditing capabilities through smart contract • Others: 	
<ol style="list-style-type: none"> 3. Why does the company want to choose this application scenario to implement the blockchain? What roles does the company want to play? Please describe it. 	
Part B: Before Deploying the Blockchain Technology	
<ul style="list-style-type: none"> • If the interviewed companies are startups, they can focus on the social issues they found to describe. 	
<ol style="list-style-type: none"> 4. Please describe the original process of the application scenario and list each intermediary in the process. 	
<ol style="list-style-type: none"> 5. Can you talk about the mission or responsibilities of these key intermediaries in processes? Please give me examples of how these key intermediaries work in processes. 	
<ol style="list-style-type: none"> 6. Based on the value driven by blockchain, which intermediaries does the company want to eliminate or just transform their roles? Please describe it. 	

Part C: After Deploying the Blockchain Technology	
7.	Please describe the application scenario after the blockchain technology implementation and describe the technology improve which part of processes.
8.	Does the intermediary is transformed into another role or a new intermediary appear? Please describe it and give an example.
9.	Based on the value of blockchain you think, whether the application scenario of the blockchain meets the expected goal. Please describe it.
10.	Do you agree that the application scenario of the blockchain is a re-intermediated process? Please describe it and give an example. Before asking the question, a short description of “re-intermediated process” will be given to the interviewees.
11.	<p>What are the challenges facing blockchain or these challenges that need to be overcome?</p> <ul style="list-style-type: none"> • People are lack of awareness of blockchain. / The public lacks knowledge of blockchain. • The technology is still perceived immature. • Unable to integrate existing systems effectively (e.g., Perceived risks in early adoption may disrupt the existing industry practices) • Multiple non-interoperable implementations may lead to the information fragmentation. • There is insufficient evidence for commercial revenue and wider economic impact. • The governance of the technology is still unclear. • Uncertainty around regulation • Arising other security issues and privacy of data • Ensuring the integrity of data (e.g., Methods of uploading data may lead to the data incomplete) • Encryption technology is not fully implemented. • The flexibility of smart contracts • Others:
12.	By referring to this application scenario, whether the company would like to extend to other applications or processes in the future? Please describe it and give an example.
13.	Whether the company would like to invite other intermediaries to join the ecosystem? Please describe it and give an example.
Part D: Benefit Assessment	
• Decentralization	Example: _____
• Auditability	Example: _____
• Persistency	Example: _____
• Immutability	Example: _____
• Others	Example: _____