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# **How does blockchain affect the established sharing economy services (SES)?**

Master thesis 15 HEC, course INFM10 in Information Systems

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ABSTRACT (MAX. 200 WORDS):

In the last two decades, dominant business models in the economy have turned to aggregating the resources of people to provide services to consumers through a platform. Airbnb, Uber, and Amazon are a few examples in sharing economy services (SES) business employing this model. Blockchain is set to disrupt these giants by facilitating direct access between users and service providers in a secure and decentralized pattern, without a need for a trusted intermediary. This study aims to make contributions to the Information Systems (IS) field by researching the effect of blockchain based SES from a business model and trust perspective through an exploratory research. Findings indicate that although there are conceptual benefits claimed by blockchain based SES at this stage, they do not have immediate potential to disrupt established SES giants as the way they operate today. Based on this research, we suggest key factors in relation to value proposition, profit formula and trust relations which can guide blockchain based SES platforms to be disruptive in near future. Moreover, we urge researchers to further explore this research phenomenon by raising novel questions to provide more effective and sustainable solutions.

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# 1 Introduction

*This chapter primarily presents the background on present state of knowledge on established sharing economy services (SES), blockchain based SES, and motivations of this study. Problem area with research question, purpose, and the limitations are reflected subsequently. Definition section is given to facilitate understanding of key concepts used in the research.*

## 1.1 Background

As technological developments have advanced and global trade has become more prevalent, the relation between customer and the provider has changed and hence business models have undergone fundamental transformation in many industries (Teece, 2010). Considering the significance of Information and Communications Technology (ICT) in today's business, companies that embrace innovation in their business models are set to gain competitive advantage (Nowiński & Kozma, 2017). In the last two decades, dominant business model in the economy has turned to aggregating the resources of people to provide services to consumers through a platform which is the sole asset of these type of organizations (De Filippi, 2017). Airbnb, Uber, Amazon, and Spotify are a few examples of platforms which operate as intermediaries between buyers and sellers, owners and renters, and service providers and users.

The economy in which the aforementioned companies operate is called sharing economy. Services provided in sharing economy can be defined as activities performed in such a way that consumers grant each other temporary access to under-utilized physical assets (idle capacity), possibly for money, such as cars, homes, tools, and clothes (Markendahl et al. 2018). People can employ to collaboratively make use of under-utilized assets to reduce transaction costs, in which they can benefit from renting goods at lower cost or with lower transactional overhead than buying or renting through a traditional provider (Sun, Yan, & Zhang, 2016). Mainly due to the Internet and other ICT developments, these sharing services are offered through an online platform regardless of the users' location (Hamari, Sjöklint, & Ukkonen, 2016). To add to these technology advancements, blockchain has emerged since 2008 (EIT Digital, 2019) as an alternative infrastructure for sharing services. Blockchain is considered third generation of technology, an industry and innovation accelerator delivering computing anywhere, real-time, and allowing organizations to deploy and consume computing resources in shared communities (Underwood, 2016). Blockchain is a distributed ledger technology which offers a consensus validation mechanism through a network of computers that facilitates peer-to-peer transactions without the need for an intermediary or a centralized authority to update and maintain the information generated by the transactions (Rennoek, Cohn, & Butcher, 2018). This new technology, like Internet, is an open and global but more importantly fast, trustworthy, and transparent system allowing companies and individuals making transactions to cut out the middleman, and hence reducing the cost of transactions (Underwood, 2016).

Although sharing economy giants like Airbnb or Uber are among the most valuable and largest companies by revenue, their business model faces criticisms because, the value generated by the participants are not equally re-distributed among all those people who have

contributed to the value production; the profits are captured by the large intermediaries who operate these platforms (De Filippi, 2017). Drescher (2017) foresees those industries that acts as a middleman between producers and consumers of immaterial goods or digital products and services are more vulnerable to be replaced by the peer-to-peer systems that are seen as threat to intermediaries. Discussing the significance of network effects in driving the value creation, Bharadwaj et al. (2013) highlight the growth of multi-sided digital platforms for example, eBay, Airbnb, and Uber and how they disrupted the way the transactions were conducted in their respective industries. However, the authors assert that with the emergence of blockchain economy, these established digital platform business models are facing competition from newer business models driven by blockchain. Blockchain based business models come from existing companies and also from startups with a newer organizational design called decentralized autonomous organizations (DAOs) where the agreed-upon transactions are autonomously enforced based on the rules defined in smart contracts (Beck, Müller-Bloch, & King, 2018).

As Nowiński and Kozma (2017) state, developments in technology bring changes to business models and the organizations' abilities to deal with these technological developments to re-invent their business models determine their competitive advantage. Thus, the importance of embracing a dynamic business model becomes significant for organizations and therefore organizations demand innovative business models based on new technologies (Nowiński & Kozma, 2017).

## 1.2 Problem area

Current business landscape of sharing economy has silo-like platforms with several disadvantages for the users and owners of the assets and there exists an information asymmetry which may be even intended by platform owners, to use it to their advantage for collecting fees in return of providing platforms (Hoffen, 2017). Also, there are increasing negative reactions to the business practices of leading SES companies on the ground that they do not reflect the original vision of sharing economy, instead, the only motivation that these companies have is making profits by operating with unregulated ways and breaking the rules that their competitors have to obey (Hill, 2015; Slee, 2017 cited in Apte & Davis, 2019). According to Zhang (2019), centralization of power on the Internet by corporations and states in the past two decades has returned the question of decentralization to the forefront. At this point, Drescher (2017) expects that blockchain's ground breaking infrastructure could affect this business model by facilitating direct access between users and service providers in a secure and decentralized pattern, without a need for an intermediary. Peer-to-peer information system driven by blockchain technology, that connects the owner and the user of resources (Drescher, 2017) where users are charged lesser or no fees to use the platform (Bee Token, 2018) is emerging. Based on this, new organizations have sprung up in the past couple of years that have potential to threaten and/or transform existing technology giants' business models (Yuan & Wang, 2018) which were once considered as disruptive in their market.

Yuan and Wang (2018) discuss blockchain as a key enabler for the next generation of sharing economy, a significant step towards economic disintermediation. The authors highlight that the centralized online platforms that serve as a middleman in most of the sharing economy applications including Uber and Lyft impose surge pricing and have risk of privacy leaks. Therefore, the authors believe that the blockchain-powered sharing economy with a potential

to create completely decentralized and disintermediated model with a secured, immutable, and peer-to-peer stored and shared ledgers for transactions, can represent the future of shared economy. For this reason, Yuan and Wang (2018) consider that the blockchain technology has great potential to disrupt established SES platforms with a profitable business model which is experimented by different firms currently.

As Risius and Spohrer (2017) state, despite the great expectations, there is currently a paucity of knowledge regarding where and how blockchain technology is effectively applicable and hence application-oriented contributions to blockchain research are limited, disconnected and focused on certain topics such as financial or supply chain systems. The authors also urge the researchers to make contributions to blockchain research field, particularly regarding value creation and management (Risius & Spohrer, 2017). Highlighting the discrepancy between what we have and what we need to have alerted us to identify problem area that we want to contribute (Webster & Watson, 2002). Thus, we aim to explore how blockchain driven SES disrupt the established SES in today's market with the research question stated below.

### *1.2.1 Research question*

Having discussed the capabilities of blockchain in the background section, and the reasons we wish to conduct our research in the problem area section above, we propose to study the following research question:

- How does blockchain based sharing economy services (SES) affect the established SES?

## **1.3 Purpose**

According to Recker (2013), the goal of IS research can be to better explain an IS concept or collect data on a phenomenon that lacks or has no data. The purpose of this study is to explore elements of blockchain based SES that may have potential to affect established SES platforms. Blockchain is an innovative technology seeking for use cases other than financial systems, even in them how and why questions are not answered properly (Glaser, 2017). On the other hand, a prevailing perception started to occur among academia and business world that this new technology created only a hype and never met the expectations associated with it (Avital et al. 2016; Notheisen, Hawlitschek, & Weinhardt, 2017; Risius & Spohrer, 2017). Therefore, we seek to explore blockchain based SES' effect on established SES by asking how and why questions. As a result, with the findings of this study, we aim to motivate academia to explore further by raising novel questions in this field and help IS practice to provide more effective and sustainable solutions. In this sense, the study aims to contribute to the IS field with the help of empirical data and analysis.

## **1.4 Delimitation**

As the use cases of blockchain are still evolving and wide, we limited our scope to study blockchain driven SES, an emerging and profitable business (PwC, 2015). Peer-to-peer

ridesharing is one of the five key sectors of the sharing economy (PwC, 2015) and one of the successful application scenarios of blockchain (Yuan & Wang, 2016). Therefore, we used popular peer-to-peer SES, Uber and Airbnb as examples of established SES. Coming to the choice of illustrative examples for blockchain based SES, we choose La'Zooz and Slock.it's USN because; La'Zooz, a blockchain based ride-sharing application is set to challenge Uber (De Filippi, 2017; Pick & Dreher, 2015) and Universal Sharing Network (USN) of Slock.it, a blockchain based SES, aims to challenge many sharing platforms including Airbnb (Schiller, 2018) as explained in detail under section 2.7. Therefore, this paper attempts to discuss the SES platforms from use case point of view only. Limitations to research methodology are presented in the section 3.2.6.

## 1.5 Definitions

### 1.5.1 *Sharing economy services*

Sharing economy services (SES) is a new way of doing business that use cloud-based technologies to match customers with service providers and in this information-intensive services sector Airbnb, HomeAway, Uber and Lyft are some of the most successful, well-known and fastest growing SES platforms (Slee, 2017 cited in Apte & Davis, 2019).

### 1.5.2 *Blockchain*

Blockchain is a decentralized database and a tool to achieve integrity in distributed systems (Drescher, 2017; Warburg, 2016) with a capability to facilitate validated, tamper-resistant transactions that are consistent across a large number of network participants and hence create a single truth for all network participants (Beck et al. 2018).

### 1.5.3 *Smart contract*

Smart contract is a system which stores information, processes input data, produces outputs and performs action automatically if certain predefined conditions are met (Buterin, 2014).

### 1.5.4 *Decentralized autonomous organizations (DAOs)*

DAO is a logical extension of smart contract which is “*a long-term smart contracts that contain the assets and encode the bylaws of an entire organization*” (Buterin, 2014, p.1). A DAO is completely autonomous in an open source environment where decision making is carried out by a pool of smart contracts and/or autonomous agents that are linked together, endowed with an initial capital to promise decentralized, transparent, secure, and auditable transactions (Aste, Tascia, & Di Matteo, 2017). Shermin (2017) further simplifies DAO as a complex form of a smart contract that runs according to a set of token rules written in the code to govern a group of people with shared interests and goals without the need for human intervention.

### 1.5.5 Cryptocurrency

European Central Bank defines virtual currency as “*a type of unregulated, digital money, which is issued and usually controlled by its developers, and used and accepted among the members of a specific virtual community*” (European Central Bank, 2012, p.13).

Cryptocurrencies are virtual currencies with three key features:

First, they are digital, aspiring to be a convenient means of payment and relying on cryptography to prevent counterfeiting and fraudulent transactions. Second, although created privately, they are no one’s liability, ie they cannot be redeemed, and their value derives only from the expectation that they will continue to be accepted by others. This makes them akin to a commodity money (although without any intrinsic value in use). And, last, they allow for digital peer to-peer exchange (Bank for International Settlements, 2018, p.95).

## 2 Literature Review

*This chapter showcases the key literature related to the research area and starts with business model literature with particular focus on most relevant definitions to research phenomena and its elements. This part is followed by review of business model innovation, disruptive technology and blue ocean strategy approaches which are extremely related to our research phenomena due to their novelty and potential in relation to our research question. After we give general understanding about business model and its supporting approaches, we narrowed down the literature review to sharing economy services business model. Since this study focus on exploring effect of blockchain based SES, literature in this field is a key foundation for this study. Later, we present the blockchain technology basics, some prominent illustrative examples of blockchain based SES, and literature on trust in relation to the sharing economy and blockchain technology. The literature review chapter ends with our research model summarizing the key concepts of the literature review chosen for empirical data collection and analysis part of this study.*

### 2.1 Business Model

Despite the fact that the advent of business models dates back to the first economic activities in barter societies, it was started to be discussed explicitly in academia and business world after the growth of the Internet and e-commerce in the mid-1990s, since the way in which companies capture value has changed fundamentally with Internet based services (Teece, 2010; Zott, Amit, & Massa, 2011; Wirtz et al. 2016). Teece (2010) states that the Internet has facilitated a new, free, and transparent way to deliver value to the customer with easy access to vast amounts of information which increased customer power as compared to before. As a result of this, many traditional companies started to review their value proposition and therefore their business models (Teece, 2010).

In spite of the pervasive use of the term “business model” by managers, consultants or scholars from various fields, it is very difficult to find an established and agreed meaning of it (DaSilva & Trkman, 2014). At that point, among many articles and research that we reviewed, we prefer to employ the definitions provided by Teece (2010), and DaSilva and Trkman (2014). According to Teece (2010, p.173), “*A business model articulates the logic and provides data and other evidence that demonstrates how a business creates and delivers value to customers. It also outlines the architecture of revenues, costs, and profits associated with the business enterprise delivering that value*”. This business model definition is more appropriate for our study because it defines in other words how an enterprise will deliver the promised benefit to customers and how it will capture the value in revenues, which is the focus area of our research in blockchain based SES. Teece (2010) emphasizes the importance of the power of a business model creating competitive advantage making it hard to imitate by competitors through hard-to-replicate systems, processes and assets. These were important components that we referred to while elaborating business models of blockchain based sharing services. More importantly and more related to our research, Teece (2010) highlights a fact that technological innovation by itself does not create a successful business, unless it has intriguing value proposition with reasonable price, that turns technological achievement into commercial success. Blockchain is considered third generation technology after Internet,

so every application of this groundbreaking innovation, as emphasized by Teece (2010) for business models, must have commercially viable architectures for revenues and for costs in order to be successful

Moreover, DaSilva and Trkman (2014) define business model as “*a specific combination of resources which through transactions generate value for both customers and the organization*” (DaSilva & Trkman, 2014, p.382). The authors use the transaction cost economics theory as the base of a business model, since the advent of Internet has enabled business activities with low transaction costs by eliminating many intermediaries as in online booking and ticket sales of airline companies. Since the blockchain technology introduced a novel disintermediation which is studied in this thesis, we firmly believe that this definition should be taken into consideration too.

According to Johnson, Christensen and Kagermann (2008), in the composition of a business model there are four interdependent building-blocks that create and deliver value. The authors indicate that the first and most important of all is value proposition which is something that the company provides a better solution to a problem that customers confront. As the importance of the solution for customers increases and as the customer satisfaction level decreases with existing solutions, this is the most fertile environment for a company aiming to offer a better value proposition than others (Johnson et al. 2008). Second building-block, the authors define is profit formula consisting of revenue model, cost structure, margin model and resource velocity. Although revenue model has been used as the synonym of business model, a revenue model alone does not showcase how the value is created and captured by a company, it is only one of the components constituting business model (DaSilva & Trkman, 2014) and defines the way for a company to collect money in return of this value proposition (Johnson et al. 2008; DaSilva & Trkman, 2014; Dubosson-Torbay, Osterwalder, & Pigneur, 2002). A company can generate revenue from subscription fees, advertising and sponsoring from other firms, commissions and transaction fees from provided services, revenue sharing with other firms and by traditionally selling a product or a service (Dubosson-Torbay et al. 2002). For Internet enabled business models, as Dubosson-Torbay et al. (2002) highlight an appropriate pricing strategy that is suitable with the nature of the product or service and aiming at the highest price the customer is willing to pay are very crucial for a successful revenue model. From the other components of profit formula, Johnson et al. (2008) state that the cost structure defines the fixed or ongoing expenditure for resources needed by the business model and margin model shows the specific amount planned to collect from each transaction. The authors depict third building-block as key resources which are the assets such as human resources, technology, equipment, patents, and brand required to deliver value to targeted customers. Dubosson-Torbay et al. (2002) state that in the networked economy the important thing for companies to focus on their core business, and hence they do not invest in resources and assets that are not related to it. Final building block defined by Johnson et al. (2008) is key processes. For the authors, these depicts ways of delivering the value to the customers. In other words, by defining who will do which task in order to provide the desired output, processes clarify how transactions are executed within an existing business model (DaSilva & Trkman, 2014).

## 2.2 Business model generation

As Zott and Amit (2010) argue, the creation of the business model does not only determine the future success of firms rather, it is the integral part of newly established firms' survival. Sometimes there is no market for planned value proposition to be offered, and so entrepreneurs must build their organizations and design its business models very carefully to execute transactions in a market which is not ready to be performed in yet (Teece, 2010). Johnson et al. (2008) propose a three-step business model generation formula, first one of which is creating customer value proposition by seizing the opportunity to satisfy a real customer need. Second step is designing a profit formula by designating how this need will be fulfilled in exchange for desired profit (Johnson et al. 2008). And the third step stated by authors is identifying key resources and processes by integrating these two fields providing customer value in a unique way to satisfy need perfectly.

Additionally, Zott and Amit (2010) define an activity system which is the set of interconnected activities consisting of the engagement of key resources to achieve a specific goal, which can be also called key processes. The authors suggest four drivers to make these processes create value proposition: novelty, lock-in, complementarities and efficiency. Novelty is “*the adoption of new activities (content), and/or new ways of linking the activities (structure), and/or new ways of governing the activities (governance)*” (Zott & Amit, 2010, p.221). The second drive, the authors identify is lock-in which is defined as the power to keep stakeholders such as users attracted to service or product provided by company. The authors claim that the customers may prefer to continue to use service/product because of switching costs, or network externalities derived from the structure, content and/or governance novelty. As a third drive, the authors mention complementarities which mean bundling activities with other activities to generate more value. Efficiency refers to organized activities in order to reduce transaction cost (Zott & Amit, 2010). For example, the authors claim that some of the low-cost airlines do not provide activities such as on-board catering or seat assignment in order to offer more efficient and cheaper service.

Instead of the technology providing great opportunities for customers and/or society, lack of an appropriate business model to capture value may be the case for the firm, unless the firm itself or the competitors discover a suitable business model (Chesbrough, 2010). As Chesbrough (2007, p.12) clearly stated “*Today, innovation must include business models, rather than just technology and R&D. Business models matter. A better business model often will beat a better idea or technology*”. For this reason, organizations must work seriously on business model generation. It requires a strong commitment to trial and error to find best business model through experimentation (Chesbrough, 2010). Chesbrough (2007) proposes a Business Model Framework (BMF) to help companies determining where their current business model stands and then defining next steps for more advanced business model. According to this framework, we assume that Type 4 and Type 6 are the business models that suit the SES platforms that we researched. Chesbrough (2007) states that in Type 4 business model, the company is aware of the external technology and has started to try them in business development. At this stage, the authors highlight that these businesses can work with consultant companies or acquired startups that have expertise in that specific technology. Researchers believe that some of the established intermediary companies such as Chinese ride-hailing application Kuaidi Dache (Tian, 2018) and Spotify illustrated in the section 2.7, have employed this business model type recently.



According to Chesbrough (2007), in Type 6, the business model is more open and adaptive model than Type 4 which is enabled by experimentation with one or more business model variants. The author claims that such experimentation can take various forms such as acquisition of small startup companies or creating internal teams to experiment this new technology that are not yet ready for commercialization. At this juncture, the researchers think that the Type 6 business model is convenient for blockchain based sharing services, because in Type 6 firms, key suppliers and customers become part of planning processes of the company and hence, technical and business risk may be shared among them (Chesbrough, 2007) as in some blockchain based sharing services' organizational structure, DAOs (see Beenest and La'zooz use cases in section 2.7).

### 2.3 Disruptive technology

Johnson et al. (2008) state, if massive potential customer groups who cannot enter a market because of the expensive or complicated existing solutions, then this is a unique opportunity to design a business model reaching large masses with democratized products in emerging markets. When it comes to disruptive technology, we have to make reference to Christensen's (1997) famous book *Innovator's Dilemma*. He describes disruptive innovations as straightforward, often simpler, cheaper, frequently more convenient to use than prior approaches. According to the author, these technologies offer a very different and new customer value proposition that is less than what established products offer, and for this reason, these underperformed technologies in comparison to available products and services are valued only in emerging markets (Christensen, 1997).

Christensen (1997) also highlights that existing technologies give customers more than they need and ready to pay, so established companies making investment in disruptive technologies, according to him, is not a rational financial decision because of three main reasons. The first reason the author states is, disruptive technologies are simpler and cheaper, and they generally promise lower margins and profits. The author states the second reason as, since the disruptive technologies typically enable new markets to emerge, the established companies wait for marketing research and numbers, to decide entering these new markets that is still not available at that time or it may turn out to be totally wrong. The final and third reason the author states is, that the target group of a disruptive technology is typically the least profitable customers in a market and therefore, managers in most companies aiming for greater profitability and growth promise are rarely able to find a good cause for investing in disruptive technologies (Christensen, 1997).

As related to arguments mentioned above, Christensen (1997) defines the innovator's dilemma as accessing least information about market, because it is an emerging and unpredictable market, but on the other hand having the strong first-mover advantages in the case of entering market. Disruptive technologies generally achieve something considered impossible previously, thus, neither technology owners/providers nor customers have an opinion about usage or the value of the product (Christensen, 1997). This discovery process, according to the author, would take time and once the disruptive technology satisfies the customers in its new market, it can then invade the established technology practitioners with devastating speed. Additionally, the author introduces the term "agnostic marketing" for discovering the emerging markets for disruptive technologies. Christensen (1997, p.165) argue, when "*rates of performance improvement that have exceeded the rates of performance*

*improvement that the market has needed or was able to absorb*” which can also be called a “*performance oversupply*”, where there is an opportunity for a disruptive technology to emerge. The author expects that this occasion changes the competition by altering customer’s choice from the already-used service to a more convenient, reliable and cheaper one.

Christensen (1997) emphasizes few points to help innovators who try to cope with innovator’s dilemma. The first pointer the author states is that the disruptive technologies may seem impractical today, but they may meet customers’ needs tomorrow. For this reason, the author asks innovators that they should observe what customers do, instead of listening to what customers say. The second pointer stated by the author is that the resource allocation matter which means that if needed funding and human resources can be found, the success rate increases. The third pointer of the author is that the disruptive technologies fail if they answer the needs of current, mainstream customers and hence, disruptive innovation should find and address undiscovered needs of customers. The fourth pointer suggested by the author is that the new markets require different capabilities and hence, the innovators should not eschew failure and multiple trial for success. Fifth and last one is that the disruptive technology startups have greater advantage, compared to established big companies, which is that this new market is their playground and has significant entry barriers for established companies, because disruptive technology endeavors is about doing something that simply does not make sense for the leaders of established companies to do (Christensen, 1997).

As stated by Wessel (2017), today’s disruptive technologies are different from the ones Christensen (1997) mentioned in his book. In addition to the fact that they are asset-light and financed by equity instead of debt, they can easily fund their innovations and absorb losses better than established companies (Wessel, 2017). For this reason, we firmly believe that characteristics of disruptive technology highly match with the business idea that blockchain based SES companies trying to commercialize. We support or refute this in detail with our findings in the analysis and discussion section.

## **2.4 Blue ocean strategy**

As mentioned earlier, disruptive technology needs a new and emerging market to develop and hence it is crucial to address blue ocean strategy proposed by Kim and Mauborgne (2005). The authors define two types of oceans which are red and blue; red oceans are the known industries in which all the companies operate with defined rules to surpass their competitors by taking bigger share from the demand. According to the authors, these oceans are red because of the crowd, fierce competition and scarce profit prospects. The authors state that the blue oceans are the unknown marketplaces in which demand is created but there is no competition yet and there is a great opportunity for growth and profit. Blue oceans can be discovered both by new companies, once as Airbnb or Uber did, and established companies by exceeding the boundaries of red oceans (Kim & Mauborgne, 2005).

Kim and Mauborgne (2005) further state, when supply surpasses the demand in the market, profits decrease and differentiating becomes harder, hence opportunity for blue ocean emerges. This opportunity, the author states, is mostly seized by established companies within red oceans of existing industries. According to the authors, these companies focus more on creating value for customers by reducing cost and simultaneously increasing value instead of aiming to be better at competition. For this reason, a successful blue ocean strategy can be

accomplished, if only a company's utility, price, and cost activities are properly aligned (Kim & Mauborgne, 2005).

## 2.5 Sharing economy business model

In the current context, sharing economy can be defined as “*the monetization of underutilized assets that are owned by service providers (firms or individuals) through short-term rental*” (Kumar, Lahiri, & Dogan, 2018, p.2). In the sharing economy, there are three participants creating a triadic platform-based service (Kumar et al. 2018) whereby the end customer enters into agreement with an intermediary firm (e.g. Airbnb, TaskRabbit), but the service is provided to the end customer by another company which contracts with this intermediary firm (e.g. a homeowner, driver) (Apte & Davis, 2019). Here, intermediary firms provide only platform, all service exchange occurs between service provider and the end customer who can either be businesses (B2B) or individuals (B2C or C2C) (Kumar et al. 2018; Apte & Davis, 2019). For this reason, as Apte and Davis (2019) state, the intermediary platforms, i.e., the SES, need to have a unique value proposition to attract both end customer and service provider, otherwise these two participants, the service provider and the end customer, can disintermediate the firms by establishing direct relationship.

We believe that the established intermediary platforms have created a value network by bringing demand and supply together on the same platform, which would otherwise require tremendous time and effort for each individual to establish on their own. Moreover, all sharing services platforms are cloud-based, so they are readily accessible at any time and from anywhere in the world (Apte & Davis, 2019). Apte and Davis (2019) further emphasize that easy payment process both for customers and service providers powered by embedded online payment system has had a significant positive impact on these platform's growth. Additionally, through two-way feedback mechanism, intermediary firms altered the trust structure among service provider and user (Pavlou & Gefen, 2004) which is further discussed in the section 2.8.

Sharing Economy has evolved from a niche phenomenon to an independent economic sector due to the disruptive business models of established intermediary firms like Airbnb, Lyft or Uber (Löbbers, Hoffen, & Becker, 2017). Löbbers et al. (2017) further attribute their success to the business model on value proposition as well as diversified business. The authors highlight that the primary drivers for an individual to participate in sharing economy is value proposition of these companies which appeal to both service provider and end users. Moreover, instead of mass target, Uber for instance segments its market and customers to provide variation of services such as UberX, UberBlack, UberCargo (Löbbers et al. 2017) and this segmentation, as the authors highlight, is an important reason for the success of these companies, helped them with clear customer definitions. Coming to the diversified businesses activities of the digital business models, these companies are engaged not only function as match maker but other allied activities, just as Airbnb's city tours that can be booked to complement a trip (Löbbers et al. 2017).

Albeit the discourse of blockchain eliminates intermediaries (Rennock et. al. 2018), based on the SES definitions stated by the authors (Kumar et al. 2018; Apte & Davis, 2019), we argue that blockchain based SES are replacing traditional platform intermediaries with a different kind of intermediary model, since they continue to provide platform for users. In this model,

intermediary firm facilitates more trustworthy relations with unchangeable transaction history and less hierarchy with decentralized infrastructure (Drescher, 2017) leading to price reduction for customers.

Apte and Davis (2019) make useful recommendations for sharing economy platform companies, which can be readily utilized by blockchain based sharing services. The first one the authors state is, forming a supplier base for attracting customers which is crucial for platform's success, because suppliers are the key reason for customers to join the platform. The second one the author state is, service delivery process is quite important for customers, so companies should provide efficient processes which encompasses immediate service delivery, matching process, etc. The third and last one, the authors state is, to foster trust with high service quality and good customer experience. This can be achieved through various services provided on the platform such as feedback mechanism, photos of service providers and 7/24 customer support center (Apte & Davis, 2019).

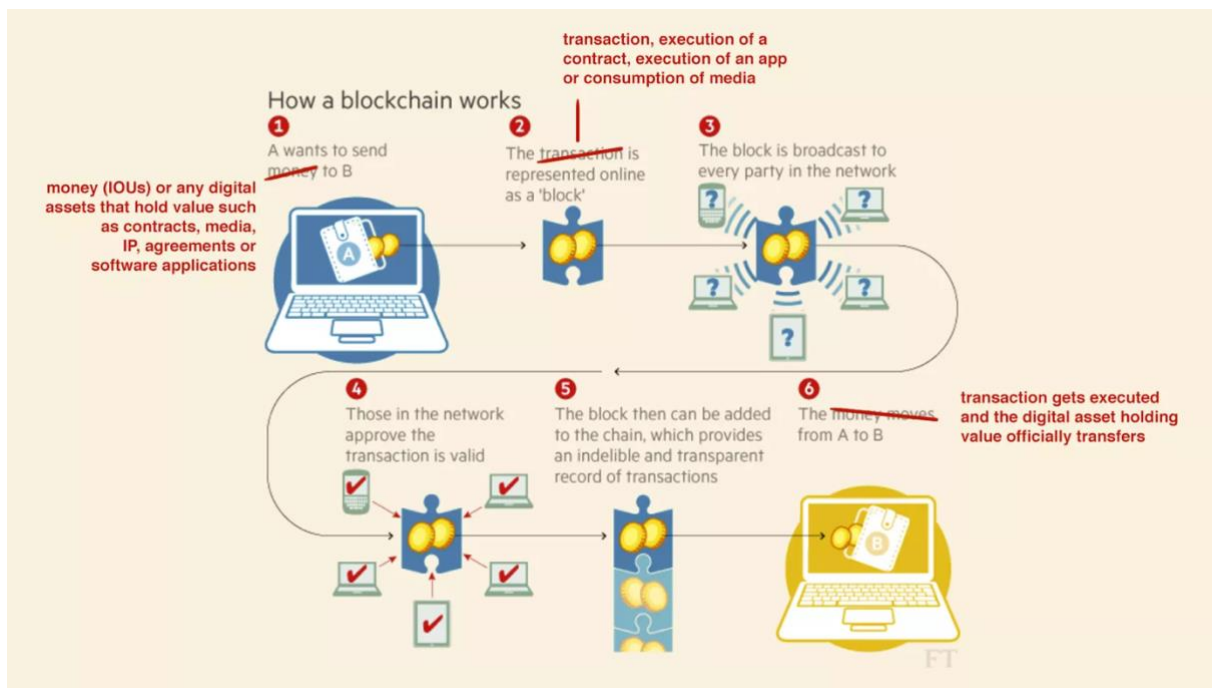
## 2.6 Blockchain technology

According to EIT Digital (2019), ownership defining documents like contracts and transactions are increasingly digitized but making them available, transparent among the required entities with data security has been a challenge. At this point, blockchain is set to enable data security and transparency while documenting these transactions in a decentralized, secure, transparent and irreversible way; thus, it represents an important milestone in the development of secure, decentralized distributed ledger technologies (EIT Digital, 2019). Additionally, Drescher (2017) in his study explains the importance of data integrity in a software system, as a valuable aspect which ensures that the data used and maintained by the systems are complete, correct and free of errors, and when it is missing, it could lead to problems like loss of data, access to system by unauthorized users etc. For this reason, the author considers blockchain as a driver to enforce data integrity in IS field.

Blockchain is becoming an important technology and it is considered as important as how Internet was once considered, due to its impact on society and business (Beck et al. 2018). Two types of blockchain networks are discussed in the literature each having its own merits and challenges (ICO Development Blog, 2019). The author states the first one being, public blockchain, an open-source network to which anyone with computing power can join. The second one being, a private blockchain, a closed network which requires permission from existing members or a smart contract to gain access to join the network (ICO Development Blog, 2019).

According to Beck et al. (2018), consensus mechanisms requires nodes in the network to validate new transactions and this way they keep the database consistent with possibility of receiving economic incentives. The authors state that the most common consensus mechanisms being proof-of-work and proof-of-stake. Proof-of-work, according to the authors, requires nodes to solve a computationally expensive cryptographic puzzle and the one that first solves the puzzle gets to validate the next block, besides getting a reward with cryptocurrency. The authors state that the proof-of-stake is another consensus mechanism that gives nodes higher cryptocurrency which means larger stakes with higher probabilities to be chosen to validate the next block and hence in this case, if the node misbehaves, the stake may

be destroyed to discourage malicious behavior (Beck et al. 2018). Burgdorfer (2017) shows a sample transaction using blockchain as shown in the Figure 2.1 below.



**Figure 2. 1:** How blockchain works

(Burgdorfer, 2017)

Furthermore, EIT Digital (2019) describes the stages of blockchain development as follows: In 2008, a pseudonym “Satoshi Nakamoto” created the concept for a cryptocurrency and in January 2009, first use case of blockchain technology, Bitcoin, marked the first generation blockchain, blockchain 1.0. Bitcoin found its use in financial sector and in the application areas of proof of origin (EIT Digital, 2019). Next major work in blockchain technology came in 2014, when Ethereum blockchain with smart contracts which was a significant innovation of blockchain 2.0, was released marking the second generation blockchain, blockchain 2.0 (EIT Digital, 2019). Ethereum found its uses for example in Internet of Things (IoT), supply chain management and smart grids in the energy (EIT Digital, 2019). We are now experiencing third generation of blockchain technology where there is a prospect to take away power from intermediaries and transfer it to the commons and build a digital society (Zhang, 2019).

According to Zhang (2019), decentralization emerges as a socio-technical solution for failures in central planning by adding more power to the individuals by setting stage with right technological conditions for organizations and society to follow. Therefore blockchain has ability to “*automate the labor of institutional trust to the cryptographic infrastructure of the network, securing by algorithmic consensus and computational work, rather than the physical, political and emotional labor involved in forming and maintaining social institutions... smart contracts bind individuals via the insurance of executable code, rather than a social contract per se.*” (Zhang, 2019, n.p.).

## 2.7 Blockchain based business models

By being trust-free and democratized, blockchain technology provides business transactions among people without the need for a trusted intermediary; hence, transaction process can be automated by software working with smart contracts which do not need human involvement in order to be performed (Sun et al. 2016). We discussed below some of the widely mentioned blockchain based SES to strengthen the understanding of blockchain use cases in SES market.

*Slock.it* is one of the companies who utilized blockchain and smart contracts technology (Weiß, 2017). The author states that this company offers a revolutionized sharing economy platform by automating the contractual process of renting real objects (apartments, cars, bicycles, washing machines etc.) within the Ethereum public blockchain (Weiß, 2017). Users can easily discover useable devices, pay, rent and use them with a private key managed by the Slock.it app (Slock.it, n.d.). Based on the smart contracts, company's app enables its users to open and close a lock, which can include door, bike or washing machine lock, for a predefined amount of time after the specified fee in the contract have been paid (Weiß, 2017). Moreover, in this universal sharing network the landlord or service provider does not pay any commission to Slock.it for their service, because the person renting pays the money directly to the party who rented the good or service (Furtkamp, 2017). However, Slock.it ran into a controversy when "The DAO", an automated venture capital fund that raised \$162 million through a crowd sale was hacked (Yurcan, 2017). Though the hacked value was subsequently rolled back, it left a question on one of the selling points of blockchains, its immutability (Yurcan, 2017).

*BeeNest* is the home sharing service of Bee Token which is developed by several ex-Uber programmers calling their solution as the future of home sharing (Kundu, 2019; Schiller, 2018). Schiller (2018) states that the platform has same features with Airbnb, such as uploading attractive photos, showing user ratings and reviews, and defining hosting rules. In contrast to Airbnb and as similar to Slock.it app, there is no fees for hosts to rent out their accommodations (Bee Token, 2018). However, instead of paying in dollars or euros, BeeNest accepts its own token, Bee Tokens, for payments and if guests prefer to use other tokens such as bitcoin or ether, BeeNest platform charges them a fee of 1% or 2% (Bee Token, 2018). BeeNest also tries to attract newcomers into its ecosystem by allowing them to use fiat currencies for a commission of 3.99% (Bee Token, 2018). In addition to this currency fee, revenue generation from licensing its technology to other startups is part of BeeNest's revenue model (Schiller, 2018).

*La'zooz* is one of the best blockchain application in sharing economy and transportation industry, which is a real-time ride-sharing app and considered as "blockchained version of Uber" (Yuan & Wang, 2016). The authors describe La'Zooz platform as an open-source, worldwide, decentralized ride-sharing network which will challenge and revolutionize established private transportation systems that have large numbers of unused empty seats and cargo space. Additionally, just like blablacar, private car owners can share their empty seats with others traveling the same route through La'zooz's app (Yuan & Wang, 2016). The platform, also enables riders to switch between several vehicles on their way to destinations with a multi-hop solution, aiming to offer more matching rides that covers users' different transportation needs (Yuan & Wang, 2016). Compared with such platforms as Uber and Lyft, absence of a centralized decision-maker prevents customer dissatisfaction and some risks

(e.g., surge pricing, privacy leaks, etc), since La'zooz is decentralized, community-owned-and-managed transportation network (Yuan & Wang, 2016).

Yuan and Wang (2016), also dissect underlying rationale of La'zooz from information technology systems perspective. The rationale is presented as follows: (1) Smartphones and computers of La'zooz users can be registered as one of La'zooz's computing nodes called road miners, if they prefer. (2) These nodes constitute a community-maintained crypto ledger, in which all real-time data is verified and stored, and through it all transactions, schedules and ride-sharing executed. (3) La'zooz creates a peer-to-peer network with an innovative consensus algorithm called "proof-of-movement" which motivates road miners to drive with La'zooz app running on their smartphones or computers by rewarding them with tokens called "zooz" (1 token = \$0.01USD) that can be used to pay for ride-sharing and other transportation services. (4) As the distance driven increases, road miners earn more zooz tokens. (5) This consensus mechanism builds a local social transportation network fed by road miners' transportation data along the way. (6) As a complementary feature to the decentralized platform, various algorithms enable to make specific decisions without human intervention such as service activation in specific region where the number of active users exceeds the "critical mass", etc. According to Yuan and Wang (2016), La'zooz is a DAO where formal decision is made by the community consisting of users whose weight in voting is different because of user's contribution to the community that is also decided with public voting process held once a month. As the authors stated, apps like La'zooz and ArcadeCity which is another blockchain based ride sharing application, take the social transportation industry to the next level and will reshape the future of sharing economy (Yuan & Wang, 2016).

Digital business models use technology to create new values; both for technology companies as well as traditional asset-heavy players who wish to transform their businesses digitally (Weill & Woerner, 2013). The three illustrations discussed earlier in this section are blockchain driven business models. In the following part, we illustrate one example on how an existing intermediary company utilizes blockchain technology to transform its business model.

In 2017, Mediachain Labs has announced that "the core team behind the open source Mediachain protocol, has been acquired by Spotify to further the streaming leader's journey towards a more fair, transparent and rewarding music industry for creators and rights owners." (Mediachain Labs, 2017, n.p.). Mediachain Labs is a blockchain startup that specializes in decentralized, peer-to-peer database development to connect applications with media and the information about it, as well as an attribution engine for creators, and a cryptocurrency that rewards creators for their work (Perez, 2017). Perez (2017) states that Spotify, particularly was interested in this small company because Spotify paid over \$20 million to music publishers, in addition to a \$5 million penalty in 2016 as a result of a licensing dispute with the National Music Publishers Association (NMPA) in the U.S. over unpaid royalties. NMPA claimed that Spotify had not mechanical licenses for a large number of songs on its service to reproduce a musical work, whereas Spotify defend itself by pointing out lack of authoritative database that covered all existing music rights (Perez, 2017). Founder of Mediachain created a solution for this problem with a shared metadata network with properties including, a decentralized network, unique ID resolution, easy interoperability, attribution, scalable, cost efficient and performant data storage and ownership data (Walden, 2016). Thus, Spotify, instead of building out a centralized database with music rights information for only itself, with a decentralized database will solve attribution, empower creators and rights owners, and

enable a more efficient and sustainable model for music streaming industry (Perez, 2017). Moreover, The Open Music Initiative (OMI), consisting of 200 members including Sony, Music, Warner, as well as YouTube, Netflix, Spotify, and Viacom revealed that it considers blockchain as a foundational technology to modernize royalty payment mechanisms (Granados, 2018). With this smart acquisition, Spotify has acted in furtherance of its market standing rather than waiting for a blockchain based SES that would possibly undermine its business over years.

## 2.8 Trust

According to Belk (2007), sharing as an alternative to private ownership has been defined “the act and process of distributing what is ours to others for their use as well as the act and process of receiving something from others for our use” (p.127) and it happens between two or more parties who experience benefits and cost of sharing. Belk (2007) also states that sharing is a voluntary activity, however it is not based on contractual binding. Sharing properties, time, tools, etc. with family members, neighbors or totally strangers requires trust, which is the main difference from traditional economic exchange (Belk, 2009).

Botsman (2016) refers to the term trust leap which occurs when we take the risk to do something that we have not done before. She asserts that in order to leap from uncertainty to certainty area, people need trust. Botsman (2016, 4:33) defines trust as “a confident relationship to the unknown” by which people get rid of uncertainty and put faith in strangers through the pattern of climbing the trust stack (See Figure 2.3). Botsman (2016) creates a trust stack where people first have to trust in the idea, so that they believe this idea is something that can be tried. The second step, as the author states, is to establish trust in the platform where people know that the platform is secure and trustworthy enough to provide support to users when they need. Studies show that higher levels of trust towards the platform significantly increase users’ and service providers’ sharing intentions (Hawlitschek, Teubner, & Weinhardt, 2016). On the third level, Botsman (2016) argues, people have to trust the other participants on the platform who can be users or service providers. When we looked at the history, we found that trust has evolved in four significant phases; local, institutional, platform and distributed (Lenz, 2019) as shown in the figure 2.2 below.

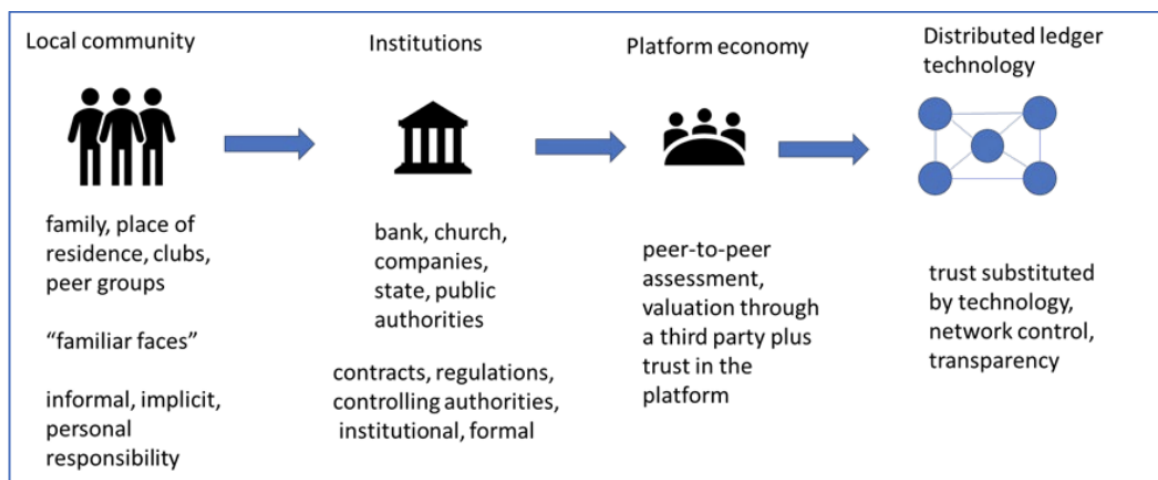
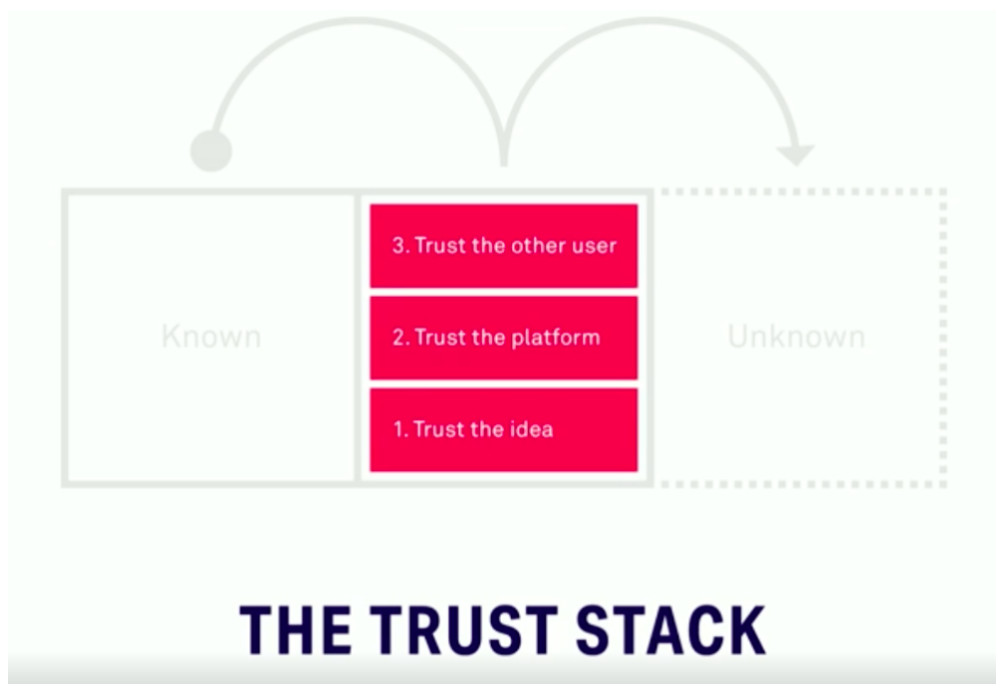


Figure 2. 2: Trust shift in society



(Lenz, 2019)

According to Botsman (2016), at the local level, people needed to know each other personally or through some reference in order to involve in an exchange activity. Later, people needed institutions (Botsman, 2016), because as Douglass North (1991) states, institutions are the products of human beings created to lower uncertainty in exchange by defining rules and standards and hence to foster trust. Relationships were established with the help of institutions, such as banks and public authorities (Botsman, 2016). In the third stage, people put their faith on platforms to perform economic transactions, for example trust through peer reviews on SES platforms (Botsman, 2016). Currently, we are witnessing trust enabled by blockchain technology (Warburg, 2016). This, as Warburg (2016) believes, will eliminate the need for a third party or a trusted intermediary to facilitate the exchange. So, blockchain technology is expected to change our trust stack by enabling us to trust the other person in the traditional sense (Botsman, 2016). If this happens, for the first time in history, trust will be established not by economic or political institutions or intermediaries, but by the technology alone (Warburg, 2016).



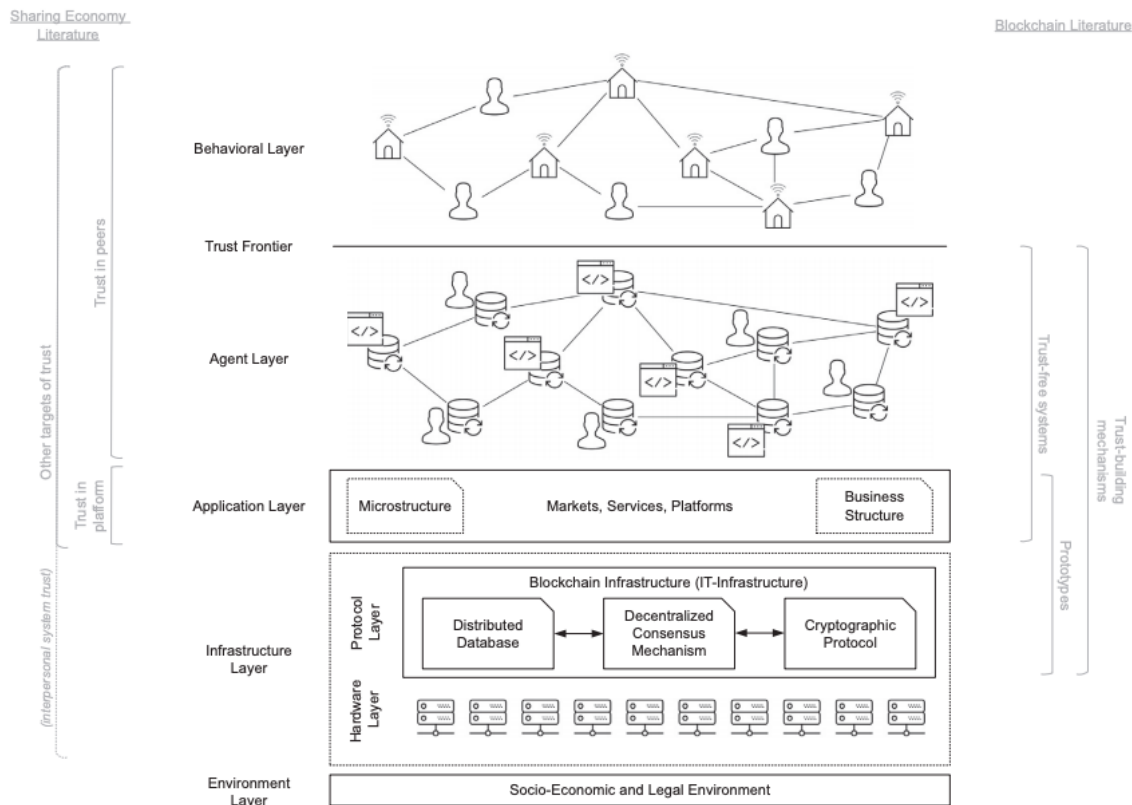
**Figure 2. 3:** The Trust Stack

(Botsman, 2016)

Warburg (2016) states that blockchain reduces uncertainty and establishes trust through three main activities that we need certainty in our everyday transactions. In the first case, Warburg (2016) finds that people are used to lower uncertainty about who they are dealing with and blockchain allows to create an open, global system on which any attestation about any individual from any source can be stored *“to create a user-controlled portable identity... that help facilitate trade or interaction.. by revealing the cryptographic proof that these details exist and are signed off on.”* (Warburg, 2016, 7:00). Second uncertainty, Warburg (2016) states, is lack of transparency in the interactions for which blockchain technology enables to create a decentralized database by which each participant of network can easily validate, and

monitor transactions and they interact with each other without a need to trust each other. Third uncertainty people want to lower is, reneging for which blockchain technology has introduced smart contract which verifies that all the conditions have been met without a third-party enforcer (Warburg, 2016).

However, despite the fact that there is less attention to trust in the blockchain context than the trust in the sharing economy in the IS field, the notions of trust for the sharing economy and for blockchain technology differ considerably (Hawlitschek, Notheisen, & Teubner, 2018). Notheisen et al. (2017) introduce the blockchain engineering framework to analyze and design the pivotal elements of blockchain platforms and surrounding factors. It consists of four layers; the environment layer, the infrastructure layer, the application layer, and the agent layer. The authors describe the four layers as: (1) The environment layer is the base layer formed by legal, social and economic constraints encircling the field of application. Building on this layer, (2) the infrastructure layer incorporates the technological structure of the blockchain system including protocols and hardware running the system. (3) The application layer is realization of the features and rules in the form of a platform, service or market that facilitates the analyses of market outcomes, application performance, and the characteristics and behavior of the interacting economic agents in the agent layer. Hawlitschek et al. (2018) assert that trust-free concept of the blockchain technology can be collected under the boundaries of the blockchain engineering framework, particularly under the combination of technological features of infrastructure layer and application layer. Since the actual interaction of agents mostly take place in real world in sharing economy, transfer of information about these real-world interactions to the agent layer create a problem in trust-free system discourse of blockchain technology (Hawlitschek et al. 2018). For this reason, the authors built a new level named, behavioral layer, that is separated from the agent layer by a trust frontier (See Figure 2.4). The authors believe the importance of this layer, because the sharing economy based on human interactions in the real world cannot be degraded into technical transactions and information generated within its own boundaries, which makes trust-free promise of blockchain technology harder to claim. On the other hand, the authors agree that blockchain based lock solution of Slock.it and reputation system relying on a community-based evaluation process may help to create a trusted interface in blockchain ecosystem.



**Figure 2. 4:** Extended Blockchain Engineering Framework

(Hawlitschek et al. 2018).

## 2.9 Research model

Research model presented below (see Table 2.1) was created based on the literature review explained in the previous section to guide the research process. The model includes research constructs that are identified as significant to answer the research question. We identified two main themes and five sub-themes which further have key considerations in order to collect relevant data serving main themes and sub-themes.

Our first theme is business model. We examine business model, because as emphasized in literature review, it is considered most important factor in success of a business, sometimes even more important than the new technology itself (Chesbrough, 2010). For this reason, we will examine business model of blockchain based SES to explore its potential to affect existing SES platforms. Under business model theme, we have two sub-themes; value proposition and profit formula. We decided to employ these two themes because technology or business idea needs intriguing value proposition with reasonable price in order to be commercially successful (Teece, 2010). Value proposition and profit formula are two building blocks of business model that are considered as the most important ones among others (Johnson et al. 2008). Additionally, Zott and Amit (2010) propose four drivers to create value proposition: novelty, lock-in, complementarities and efficiency, which we used to arrive at key considerations for the value proposition theme. Furthermore, disruptive technologies are described as straightforward and cheaper than prior approaches and they offer a very different

and new customer value proposition that is less than what established products offer (Christensen, 1997). Blue Ocean Strategy is another literature that we utilized while constructing our research model, since the strategy includes creating value for customers by reducing cost and simultaneously increasing value and hence a successful blue ocean strategy comprises of alignment of company's utility, price, and cost activities (Kim & Mauborgne, 2005). It is also argued that success of existing SES depends on their business model on value proposition, because the primary reasons for an individual to participate in sharing economy is value proposition of these companies (Löbbers et al. 2017). For this reason, we believe that having value proposition and profit formula as subthemes is the best choice to find answer to our research question.

Our second theme is trust which represent to put trust on blockchain based SES. Since we are focusing on sharing economy due to the reasons explained in the Chapter 1, considering trust as a main theme would be necessity since any type of sharing requires trust (Belk, 2009). We explore trust in blockchain based SES from Botsman's (2016) trust stack perspective through 3 sub-themes; trust in the idea, trust in the platform and trust in the user. Because, if the users trust the idea to try it, then they would trust the platform if it is secure to conduct the transaction with a trusted service provider (Botsman, 2016). As Hawlitschek et al. (2018) highlight, in SES the actual interaction of parties mostly takes place in real world, hence authors create behavioral layer that is separated from other layers with a trust frontier in order to show the significance of trust factor in blockchain based SES platforms. Thus, in addition to exploring the key technological features like transparency, privacy and security of blockchain as key considerations, we also explore the behavioral layer in the form of network consensus as a key consideration.

In order to get deeper insights about sub-themes and subsequently about themes, we defined key considerations based on the literature on sharing economy business model (section 2.1), blockchain (2.6) and blockchain based business model (2.7). Furthermore, we were able to analyze the data thoroughly due to these key considerations by grouping every relevant information under related sub-theme. Thus, we aim to collect and analyze data based on the research model summarized in the Table 2.1 below.

<b>Effect of blockchain on sharing economy services</b>			
<b>Theme</b>	<b>Sub-Theme</b>	<b>Key considerations</b>	<b>Supporting literature</b>
<b>Business Model</b>	Value proposition	-Benefits and challenges of blockchain technology for sharing economy -Effects of blockchain technology on established SES -Future of blockchain based SES	Chesbrough (2010) Teece (2010) Johnson et al. (2008) Zott and Amit (2010) Christensen (1997) Kim and Mauborgne (2005) Yuan and Wang (2016) Kumar et. al (2018) Apte and Davis (2019)
	Profit formula	-Factors impeding blockchain implementation by companies -The effect of currency type on customers	Löbbers et al. (2017) Christensen (1997) Kim and Mauborgne (2005)

		-The effect of commission on user attraction -Shortcomings of profit formula of blockchain based SES	Chesbrough (2010) Teece (2010) Yuan and Wang (2016) Kumar et. al (2018) Apte and Davis (2019)
<b>Trust</b>	Trust in the idea	-Use cases on blockchain -Cryptocurrency as payments -Regulatory developments -Disintermediation and trust shift	Botsman (2016) Belk (2009) Hawlitshcek et al. (2018) Hawlitshcek et al. (2016) Warburg (2016) Lenz (2019) Yuan and Wang (2016) Pavlou and Gefen (2004) Zhang (2019)
	Trust in the platform	-Accountability, privacy, transparency in transactions -Availability of support and service quality	Botsman (2016) Belk (2009) Hawlitshcek et al. (2018) Hawlitshcek et al. (2016) Warburg (2016) Lenz (2019) Yuan and Wang (2016) Pavlou and Gefen (2004) Zhang (2019)
	Trust in the user	-Security & Network consensus	Botsman (2016) Belk (2009) Hawlitshcek et al. (2018) Hawlitshcek et al. (2016) Warburg (2016) Lenz (2019) Drescher (2017) Beck et al. (2018)

**Table 2. 1:** Research Model

## 3 Research Methodology

*This chapter explains the rationale of the data collection and data analysis process guided by research model above, that is used in study of the research question. Chapter ends with research quality and ethics to ensure acceptable standards for the empirical study.*

### 3.1 Research approach

Blockchain being a novel technology (Nowiński & Kozma, 2017), we choose to collect information from experts with professional experience in blockchain technology. We choose qualitative research method since we will be collecting interview data (Bhattacharjee, 2012) and analyzing the expert opinion in the form of text or words (Recker, 2013). Insights from these experts and literature review helped us to explore blockchain based business models to add strength to the body of knowledge (Recker, 2013). We studied concepts on blockchain technology and blockchain use cases in sharing economy from available literature to gain in-depth knowledge as this benefits a qualitative research (Recker, 2013). We chose interpretive research paradigm as we attempted to understand the phenomenon of interest in a certain context (Recker, 2013). We tried to make sense of the collected data through inductive reasoning (Recker, 2013) and arrived at conclusion from a set of findings. We explored the blockchain based SES and therefore we had narrowed the problem domain (Recker, 2013) which helped us to focus and complete the research within the stipulated thesis time period.

### 3.2 Data collection

We conducted literature review as described in the following two sections. Interview data on business model and the role of trust on blockchain based SES were obtained through telephonic and email interviews from experts working with blockchain technology. Interview guide used for data collection is listed in Appendix 1.

We constructed an interview guide as described in section 3.2.3 and used this guide while reaching to all of our respondents and more or less kept this interview guide same for all interviews except for illustrative examples, that are specific to their organization or industry of work, to gain respondents' perspectives influenced by their organizational contexts (Schultze & Avital, 2011). Summary of interview details, including interviewee role, date and time of interview, mode of data collection is listed in the Table 3.1.

#### 3.2.1 Literature review process

To conduct blockchain and sharing economy related research in the field of IS, we follow the guidelines of Webster and Watson (2002), Bhattacharjee (2012), and Recker (2013) and the steps of literature research is described in the section 3.2.2 and summarized in Figure 3.1. We focused on literature on blockchain in sharing economy context. In the first step, we conducted a separate review on blockchain technology to have general understanding of blockchain technology and blockchain based SES platforms. In the second step, we reviewed

relevant studies in management and IS field on business model and related innovation strategies connected to sharing economy intermediary firms. In the third step, we reviewed literature on key aspects of trust in blockchain networks and analyzed all the relevant literature within a joint analytical framework. In doing so, we identified a research framework to collect empirical data through interviews, analyze and discuss the effect of blockchain based SES on established SES.

### *3.2.2 Literature search and selection*

To achieve our research objective, we collected published scholarly blockchain and sharing economy papers from 17 databases covering the most important IS journals and conferences, and adjacent fields, as well as the industry reports from the consultant and research company's website to review them under the themes that we considered relevant to our research questions. In addition to this, we made an Internet search to find web articles to have a solid grasp on these two attracting research areas, since the research context is a rapidly growing, innovative and relatively young field. We also searched for business models, because our themes highly related with business model generation, innovation and disruption. Based on combinations of the search terms blockchain and sharing economy with business model, we conducted a title/ abstract/ keyword search. This resulted in an initial set of 1705 sharing economy as well as 1300 blockchain-related articles.

The retrieved articles were analyzed based on title, abstract, and keywords by focusing on the relevance to our research question and related themes -business model and trust- stated previously. In our literature search on blockchain, we had to exclude many papers that is related to use cases or applications in financial sector, supply chain management or transportation solutions which return crowded result list. On the other hand, considerable amount of paper on business model and trust was disregarded, since these two notions were only briefly mentioned and not addressed in greater depth. As a result, 19 sharing economy and 40 blockchain-related articles were considered for further review. With forward and backward search on Google Scholar and LUBSearch, this list was extended to 68 articles, as illustrated in Figure 3.1.

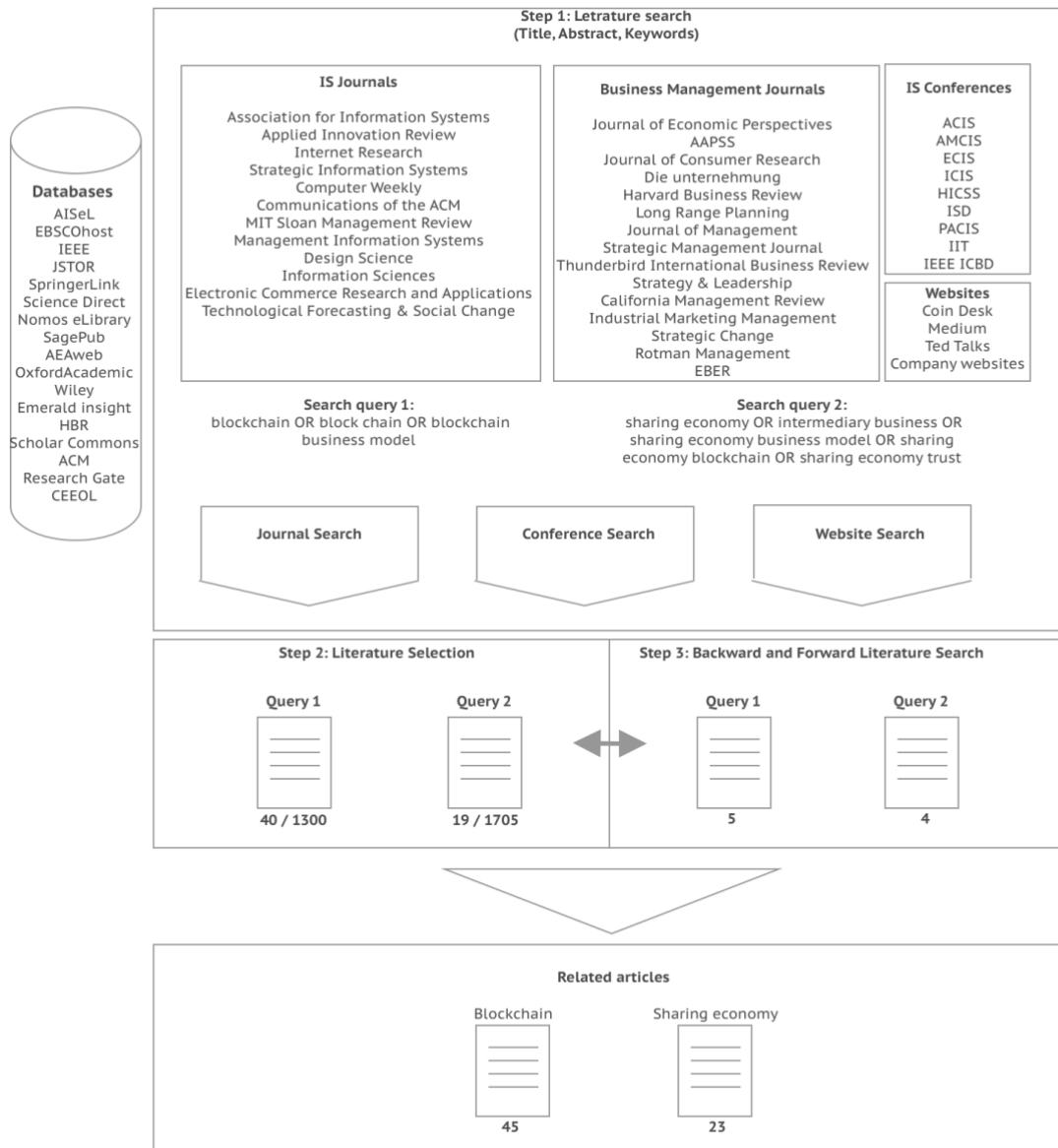


Figure 3. 1: Steps in the literature search and selection

### 3.2.3 Construction of interview guide

After getting an initial understanding on blockchain and its use cases in the sharing economy services context, we identified the problem area for our study and the research question. This helped us to develop the interview guide for data collection. We used social media, particularly LinkedIn, to search for blockchain experts and tried to establish communication through this platform and personal communication through email. We prepared an interview guide with university name, course of study, thesis topic, full name of researchers, professor guiding the thesis work, and literature references for illustrated example SES. In this guide, we included high level questions on our research themes as shown in Appendix 1. This guide also carried various consent options available for the interviewee to choose from, followed by a thanking note.



### 3.2.4 Respondent selection

Unit of analysis shapes what data to collect (Bhattacharjee, 2012) and the ways of gathering it. Blockchain based SES being the unit of analysis in our study, and the field is relatively new, interviews were planned with experts from both SES and non-SES digital platform companies to have a reasonable unbiased interview data. Respondents were chosen with either one or combination of these skills; technical or functional knowledge on blockchain from SES platform companies, technical or functional knowledge on blockchain with experience in working in blockchain based projects, founder or co-founder of blockchain based startups/companies. We chose seven respondents through convenience sampling (Bhattacharjee, 2012). This kind of theoretical sampling strategy (Bhattacharjee, 2012) helped us to reach to the experts who met our selection criteria to provide the information on the research constructs. Additionally, this approach tried to maintain reliability of research by not asking questions that respondents are not very familiar with (Bhattacharjee, 2012). Interviewee details are shown in Table 3.1.

A brief professional profile of the selected respondents;

**Respondent 1 (Rsp1):** Head of Products for an insurance start-up, a brokerage intermediary company operating in India and Singapore. He is involved in a project on workflow automation of an insurance tool that has a blockchain infrastructure. During his previous experience at MetLife which has an innovation center called LumenLab, he developed a customer facing application with a blockchain technology where he gained core expertise on this technology (Appendix 2; Rsp1: 10).

Selection criteria met - Technical or functional knowledge on blockchain with experience in working in blockchain based projects

**Respondent 2 (Rsp2):** Cyber security and privacy senior manager with experience in developing and implementing security, privacy and regulatory and compliance strategy for various clients in Financial services, Technology and Healthcare industries. He focuses on security and privacy risks related to emerging technologies including Cloud, Blockchain, IoT and Artificial Intelligence and has been a trusted advisor for C level executives to assist with regulatory and compliance issues (personal communication).

**Respondent 3 (Rsp3):** Senior Global Program Manager in Tetra Pak. He has 15+ years of experience in program/project management, digital transformation, shared services and outsourcing in both end user and consulting environment. He was involved in an initiative in identifying use cases where Tetra Pak can leverage on blockchain technology to gain competitive advantage. (Appendix 4; Rsp3: 2, 12 & personal communication).

Selection criteria met - Technical or functional knowledge on blockchain with experience in working in blockchain based projects.

**Respondent 4 (Rsp4):** Founder of a startup in India that works on blockchain applications for the public sector. Currently, his company works on a blockchain based project that can track authenticity of distilled and bottled water. He is also working on a business application based on blockchain that can be used for registering sale deeds in India (Appendix 5; Rsp4: 4).

Selection criteria met - Founder or co-founder of blockchain based startups/companies

**Respondent 5 (Rsp5):** A Blockchain Consultant at Centigo, Co-Founder of Safello, Swedish Bitcoin Association and Satoshi Square Stockholm. He has over 5 years of experience within blockchain and bitcoin. He is working with companies educating and developing partnerships, strategies and new business areas within bitcoin and blockchain technology (LinkedIn profile description).

Selection criteria met - Technical or functional knowledge on blockchain with experience in working in blockchain based projects & Founder or co-founder of blockchain based startups/companies

**Respondent 6 (Rsp6):** Researcher in IoT and blockchain industry (LinkedIn profile description).

Selection criteria met - Technical or functional knowledge on blockchain from SES platform companies.

**Respondent 7 (Rsp7):** Continuous Improvement and Operations Lead of an SES platform company in South East Asia with high-level understanding of blockchain technology and its potential applications (Appendix 8; Rsp7: 1).

Selection criteria met - Technical or functional knowledge on blockchain from sharing services platform companies.

### 3.2.5 Interviews

Interviews are commonly used data collection method for qualitative studies (Bhattacharjee, 2012) and in this study, in addition to structured interviews, semi-structured interviews supported us to capture rich and detailed data (Recker, 2013) in a conversational manner. This also helped us in seeking clarifications in understanding the concepts in an appropriate context (Recker, 2013). A variant of structured and semi-structured telephonic interview was conducted. We choose semi-structured interview because, this type of interview is less-intrusive, helps to explore and learn more about research phenomena, which benefit us as student researchers. Additionally, this form of interview, as Recker (2013) suggests, could help interviewee to discuss sensitive issues such as trust discussed in this research (Recker, 2013). Interview guide was designed and sent to the respondents before telephonic interviews just to allow respondents to be prepared for the sake of obtaining as much as information. The questions have been carefully structured in order to avoid influencing any answers by the way the question is phrased, thereby we aim to collect unbiased and reliable primary data.

During interviews, we began with general introduction and adoption level of blockchain just to make the interviewees more comfortable to discuss, an approach as suggested by Recker (2013). This was followed by more specific questions on value propositions of newer business models based on blockchain technology and how they operate to gain trust which was more on a conversational format, an approach suggested by Kvale and Brinkmann (2009). We ensured confidentiality of disclosure of information by requesting interviewees if it is agreeable to record the interviews either through prior consent via email or just before the start of interviews. Moreover, we informed respondents that we store transcripts/records confidential and secure and they will be used for thesis purpose only. We attempted to employ the craft of good interviews by using mirroring technique, by taking words and phrases the respondents used in their answers, in constructing subsequent question or comment (Myers & Newman, 2007). Besides the recorded transcripts, we also took notes which assisted us in mirroring technique during the interview.

Three respondents (Rsp5, Rsp6 and Rsp7) choose to provide their data in writing and emailing back, because they wished to answer our questions at their convenient time. For these respondents, we elaborated the interview guide and as suggested by Bhattacharjee (2012) we ensured questions are easy to read and understandable for them to provide their response in a meaningful way. Instead of sending highly structured interview questions, as Bhattacharjee (2012) suggests, we designed open-ended interview questions to collect as much and as diverse qualitative data as possible that can help generate the best possible insights about the research constructs. The consent options were included at the end of the questions for the respondents to choose from before they email back their data.

Summary of interview details is shown below in Table 3.1. The opinions of the interview respondents were analyzed and discussed in reference to literature review in the Chapter 5.

<b>Respondent</b>	<b>Designation, Location</b>	<b>Date</b>	<b>Document reference</b>	<b>Type of interview</b>	<b>Duration (mins)</b>
Rsp1	Head of Products, Singapore	2019-04-28	Appendix 2	Teleconference (Skype)	80
Rsp2	Cyber Security and Privacy Senior Manager, California	2019-5-5	Appendix 3	Teleconference (Whatsapp)	55
Rsp3	Program Manager, Tetra Pak Singapore	2019-5-7	Appendix 4	Teleconference (WebEx audio)	60
Rsp4	Startup Founder, India	2019-5-14	Appendix 5	Teleconference (Skype)	52
Rsp5	Blockchain Consultant, Co-Founder of Safello and The Bitcoin Association of Sweden, Sweden	2019-5-2	Appendix 6	Email	N/A
Rsp6	Developer, Germany	2019-5-7	Appendix 7	Email	N/A
Rsp7	<u>Continuous Improvement Lead</u> , Singapore	2019-5-15	Appendix 8	Email	N/A

**Table 3. 1:** Interview respondents

### 3.2.6 Research limitation

Three out of seven respondents provided interview data through email. Email interviews limited us to get deeper insights from these respondents, although it gave the advantage of lesser time to collect data. Our interview data is from experts from both SES and non-SES companies. While this kind of respondent selection helped us to collect unbiased data, their exposure to SES business models could be limited.

## 3.3 Data analysis

Data collection was carried out based on the themes and sub-themes listed in Table 3.2 and 3.3. The collected data was subjected to the following process:

- Transcribe the interview data
- Code the transcription
- Analyze the data and present the findings

### 3.3.1 Transcribe the data

The recordings of the interview were transcribed with the support of a tool “otranscribe”. This tool helped us to playback the audio at an adjustable speed to transcribe as accurately as possible. These transcriptions were marked with line number to assist the researchers to ensure traceability while using quotes and references from interviews in findings and data analysis.

### 3.3.2 Code the transcription

In order to organize and structure the collected data, we used coding technique, which is the process of assigning labels, related to predefined concepts, to the parts of qualitative data to transform data into meaningful information (Recker, 2013). Key considerations relevant to the sub-themes are listed as keywords. Each keyword is then assigned a label. Since we had a manageable data, we were able to read through all the transcripts and assign the codes manually in the each of the transcript file. Table 3.2 and 3.3 show the coding system used in the study.

THEME: Business Model: Coded as <b>BM</b>		
<i>Key considerations</i>	<i>Keywords</i>	<i>Code</i>
Benefits and challenges of blockchain technology for sharing economy	Benefit, Challenge, Problem	BNF, CHL, PRB

Effects of blockchain technology on established SES	Effect, Impact, Disrupt, Improve, Intermediary	EFC, IMC, DST, IMP, INTER
Factors impeding blockchain implementation by companies	Impede, Adoption, Prevent	IMD, ADP, PRV
The effect of currency type on customers	Crypto, Payment, Currency	CRP, PYM, CUR
The effect of commission on user attraction	Commission, Token	COM, TK
Shortcomings of profit formula of blockchain based SES	Transaction, Profit, Revenue	TRAN, PRF, RVN
Future of blockchain based SES	Future, Startup	FTR, STR

**Table 3. 2:** Codes for business model theme

THEME: Trust: Coded as <b>TR</b>		
<i>Key considerations</i>	<i>Keywords</i>	<i>Code</i>
Use cases on blockchain	Use case	USE
Cryptocurrency as payments	Cryptocurrency, Payment, Currency, Credit card	CRP, PYM, CUR, CRDCD
Regulatory developments	Regulation, Regulator	REG
Disintermediation and trust shift	Intermediary & Intermediaries, DAO, Smart contract, Uber, Airbnb, Dispute	INTER, DAO, SMRT, SEC, UBR, AIRB, DISP
Accountability, privacy, and transparency in transactions	Accountability, Privacy, Transparency	ACC, PRI, TRA
Availability of support and service quality	Manage, Speed	MNG, SPD
Security & Network consensus	Security, Network	SEC,NTW

**Table 3. 3:** Codes for trust theme

### 3.3.3 Analyzing the data and recording the findings

We choose to analyze one sub-theme at a time by grouping the findings of all relevant key considerations under the sub-theme. We defined these key considerations for each subtheme, because it helped us to utilize best the unstructured data. All the relevant codes of key considerations relevant to the sub-themes are run through each transcript and the findings are listed. Interviewee's quotations are listed in findings wherever researchers find it relevant. The findings are listed in Chapter 4.

### 3.4 Scientific quality and research ethics

**Research validity:** Interview guide attached in Appendix 1 was constructed based on the research question and this formed the basis to collect the interview data. The criticism around qualitative research on reliability and validity of interpretive inferences (Bhattacharjee, 2012) were addressed by transcribing the interview data as accurately as possible. Validity is about consistency between the collected data and the research constructs (Recker, 2013). To obtain a content validity, the transcribed data was subjected to coding and analysis as described in the data analysis section.

**Research reliability:** We had respondents from both SES and non-SES platform businesses and therefore, we choose to interview respondents according to those research key considerations that they are most experienced in. This helped us to maintain reliability of research by not asking questions that respondents are not very familiar with (Bhattacharjee, 2012). In presenting the key findings from the empirical data, quotes from the interviewees and references were provided with traceability to interview transcription. Respondent's professional file is described in the section 3.2.4 to assist readers in approaching the findings against the expert's background.

To maintain rigor in interpretive research, we transcribed interview data (Bhattacharjee, 2012) and added the transcription as part of this study. We described in detail the coding procedures (Bhattacharjee, 2012) and professional profile of respondents to ensure credibility of our work. The interview transcriptions were emailed to the respondents to confirm findings (Bhattacharjee, 2012) and with this way we ensure confirmability of our research work. We urge readers to consider the delimitations and research limitations before applying the findings in a similar context.

**Ethics:** Klein and Myers (1999) proposes a set of principles for the evaluation of interpretive field research in information systems, which applies to conduct and evaluate interpretive research of hermeneutic nature. Authors stated that these principles do not have to be used all together, but they are interdependent, so we cannot select random principles in order to evaluate or conduct our interpretive research. Since we also conducted semi-structured interviews with blockchain experts in diverse locations which includes interpretivism, it was helpful to refer to these principles in order to ensure quality. These principles can be summarized as follows (Klein & Myers, 1999):

- The fundamental principle of hermeneutic circle suggests that human understanding iterates between the meaning of the part and the whole that they form. In our research, we had an understanding stemming from the specific meanings of blockchain use cases and their aggregate meaning for whole blockchain based SES, their disruptive potential and future.
- The principle of contextualization suggests that researchers should show social and historical background of constructs under investigation in order to understand present situation. In our research, it was vital to understand how blockchain based SES create value proposition and earn trust and how they impact established SES. For this reason, we asked general background questions about this technology which had some grey areas such as data privacy, scalability, and interoperability (Underwood, 2016) followed by illustrative examples from blockchain based SES.

- The principle of interaction between the researchers and the subjects suggests to be critical towards the construction of data which is always shaped by researchers' and subjects' interpretivism. Brinkmann and Kvale (2005) propose that the real has to be described, not constructed or formed, therefore the researcher should learn to thicken events to act morally. Thus, they suggest that there are ways to achieve this: contextualize, narrativize, and focus on the particular example (Brinkmann & Kvale, 2005) which are described by authors as follows: Contextualize is to describe events in their context. Thick description situates an event in a context and the skilled qualitative researcher understands the peculiar features of the interview context, and specific ethical issues that can be generated by this context. Narrativize is to form a convincing narrative that situates an event temporally which means looking at a situation with its temporal and narrative context in order to judge and act morally. If the interviewer has never met the interviewee before and does not know her larger life story, then it is ethically wise to be lenient about ethical interpretations. Focus on the particular example means portraying the particular case in such fine detail that the philosophical discussion of cultural relativism appears redundant (Brinkmann & Kvale, 2005). In our research, in order to produce ethically acceptable and quality work, in addition to suggestions by Brinkmann and Kvale (2005), we followed widely accepted steps within the scientific community presented by Bhattacharjee (2012). Those are described as follows: (1) Voluntary participation and harmlessness: Interviewees were informed that their participation is voluntary, and they could withdraw at any time without any negative consequences. (2) Anonymity and confidentiality: We provided the consent option available for the interviewee to choose from as part of the interview guide shared with them before the start of the interview. Therefore, we did not use interviewees' names and identity against their will which can violate their interests and future well-being. (3) Disclosure: we were open and transparent about the purpose of our research and why we are conducting the interviews by sending interview guide and giving background information in advance, which contained university name, department, course of study and researchers' full name. (4) Analysis and reporting: We complied with the ethical guidelines while analyzing and reporting data. We presented findings with traceability to interview transcription without making any manipulation or misleading changes.
- The principle of abstraction and generalization suggests relating findings and interpretations to general concepts. We expect that our findings will be a contribution to fellow researchers and practitioners in IS field.
- The principle of dialogical reasoning suggests a requirement for sensitivity to possible contradictions between the assumptions guiding research and actual findings. We had assumptions based on previous studies that blockchain can have extensive application in sharing economy. We therefore followed an objective approach to ensure validity and reliability of research to present the findings.
- The principle of multiple interpretations proposes that there can be multiple interpretations even if same events or interviews are observed. This principle was valuable for our research, since we were two student researchers with different backgrounds in education, professional experience and culture. In order not to affect the interpretation we discussed the findings and conclusion aligned with literature to arrive at the conclusion and create this report.

- The principle of suspicion highlights the existence of biases and systematic distortions. During the interview and while creating this report, when required, we clarified the answers with extra questions to understand the data collected from respondents.



## 4 Findings

*This chapter presents the analysis of findings obtained by following the methodology described in Chapter 3. The analysis was carried out by examining opinions of the interviewees in regard to the main research themes: business model from the value proposition and profit formula perspective; and trust from idea, platform and user perspective. Some direct quotations from interview transcriptions will be used to support our findings. This chapter is structured under two main themes with sub-themes as subheadings. Findings of key consideration are listed against its relevant sub-theme.*

### 4.1 Business model

Almost all of our respondents emphasized the importance of a good business model for blockchain based services in order to survive and become successful in sharing economy industry. Additionally, they provided valuable opinions and information regarding our sub themes which are represented below.

#### 4.1.1 Value proposition

Our respondents think that blockchain technology has a benefit by the way of providing more transparency than other technologies, however some of them stated that unless transparency and in relation to it more accountability increase shareholders' value, it would not be adopted by companies (Rsp1: 18; Rsp4: 10). It is also believed that if companies plan to be more transparent, they do not need to implement blockchain technology (Rsp3: 52), but the intent in order to fulfill this demand (Rsp1: 20; Rsp3: 19, 52). One of our respondents is also believed that for example Airbnb is providing great transparency through reviews, unchangeable comments, and certain rules, so this kind of SES do not need to use blockchain technology for the sake of being more transparent (Rsp1: 33).

*“If you want to increase accountability in terms of decision making today, you could simply have certain emails being available to be read by people. you can have the database to be written by ... a few people and read by a lot more. And if you could do that, you will have that accountability. But rarely the businesses do that, because businesses hold off the self interest in mind, because sharing too much information might take away their business edge. It is not the answer. I don't think it is the blockchain, the answer is intent of people, pure and simple. If there is intent, they do not need blockchain to implement transparency and accountability. blockchain might be an easier solution to implement because of its inherent design.” (Rsp1: 20).*

Respondents also argued some other challenges that will affect negatively value proposition of blockchain based SES. It was raised that transparency, decentralization and the distributed wealth coming through decentralized network would not create same enthusiasm on every customer group around the world. For wealthy groups, it is more important to get quality service than the getting small amount of money or more transparency (Rsp1: 22).

One of our respondents highlighted that public projects such as universal basic income or direct benefit transfer are the great application areas for blockchain technology since the “*government wants to brag about transparency*” in elections (Rsp1: 22). Another respondent working at a company offering blockchain based services stated that the blockchain technology is quite appropriate for sharing economy, because it facilitates immutable ledger, non-repudiation, and transaction integrity (Rsp6: 4).

Another significant promise of the blockchain technology is disintermediation as mentioned in one of our interviews (Rsp5: 2, 4). However, it is also considered as a new type of intermediary which works with different rules (Rsp3: 42, 48).

General belief among our respondents is established SES cannot be disrupted by blockchain based SES just because this technology has a distributed system, unless blockchain based SES become more efficient than a centralized intermediary, solve legal and regulatory issues and reach technological maturity (Rsp1: 33, 62; Rsp2: 27; Rsp4: 6; Rsp5: 6). Because, existing SES offer valuable services to their customers and have economies of scale, which is the reason of these companies being behemoth and capabilities making them such big cannot be acquired overnight (Rsp1: 25). Moreover, our respondents foresee that unless existing SES face with enormous decrease in customer base as a result of a sudden event, people will not look for alternatives like blockchain based SES (Rsp1: 25). Because, business model of these established intermediaries is already working very well (Rsp1: 25).

As an alternative viewpoint, one of our interviewees said that instead of considering blockchain as a threat to sharing economy giants, blockchain can be an enabler to transform oligopolistic market structure into competitive market place, hence blockchain can be used as a common underlying platform on which different SES can operate (Rsp5: 8).

*“One could view blockchain as a threat as it to some extent makes intermediaries unnecessary, however it could also be a tool to provide a better service to customers. Instead of having segregated markets on different platforms such as Uber and Lyft, they could share an underlying blockchain infrastructure that allows actors on both platforms to connect. Intermediaries could still provide services such as escrow, vetting/rating systems or other services which might be hard to put on a blockchain.”* (Rsp5: 8).

It is believed by our respondents that there is nothing to stop companies to implement the blockchain technology other than the obscurity in terms of how they can utilize it and why they should implement it. According to interviewed experts’ opinion, companies are eager to implement the blockchain technology in order not to fall behind in competition, however the age of the technology and the blockchain technology being not solution for every business problem are the prominent factors impeding implementation (Rsp1: 25, Rsp2: 11; Rsp5: 14). Moreover, lack of interoperability between organizations and systems -blockchain based system and legacy systems- seems as a hidden factor impeding companies’ willingness to use this technology (Rsp3: 54, 56, 60; Rsp4: 6).

*“For public blockchain, the main challenge is scalability and the speed at which transactions can be processed. So, example, let us say, bitcoin can process 10 transactions/seconds but with respect to VISA, 33,000 transactions/second. So, it is a huge challenge for the public blockchain and cryptocurrency companies to scale and process like VISA. [And] unless they do it, it may not be a de-facto currency at the global level.”* (Rsp2: 13).

#### 4.1.2 Profit formula

Generally, it was emphasized that decentralization enabled by blockchain technology seems great idea, but it is possible theoretically. When it comes to real-life, especially commercial application of the technology, there seems no viable use-cases because of unsustainable revenue model, technological infancy, and utilizing customers' mobile phones as nodes (Rsp1: 64, 18, 37, 44; Rsp3: 32).

*“Centralized services have its inherent benefits. I don't think we can distribute everything... As I said... a decentralized system can ever do that [keeping all data] unless we come up with a new fundamental change in science whereby, you're doing multiple computations at the same time. So, there are certain use cases that has to be centralized only because we don't have the computing power to do it.”* (Rsp1: 60).

It was stated that established SES has reached huge volumes in customer base, so unless this new blockchain based model reaches this volume, it would never compete with the existing players' massive economies of scale (Rsp1: 25). On the other hand, most of our respondents brought forward that existing intermediaries such as Uber or Airbnb are spending a lot of money through promotions, incentives, discounts, aggressive advertising in order to attract users to their platform. For this reason, unless these blockchain startups or business models enable to execute marketing activities at similar scale, they will not be in the game for a long time (Rsp1: 29, 31; Rsp4: 21; Rsp5: 6).

As we learned from our interviews, companies are looking for blockchain application examples in their industries before investing in this technology (Rsp1: 12; Rsp3: 4, 10, 12). Because there is lack of commercial applications of the technology and companies behave timidly to become early mover (Rsp3: 12). One of the underlying causes is the cost (Rsp1: 25; Rsp4: 8). For this reason, industry giants will wait until some startups find feasible blockchain solution serving their business model, and then they prefer to acquire this small companies instead of initiating trial and error projects by burning considerable amount of money (Rsp4: 12).

*“these are going to cost money to build. Not non-significant amount. It is not a thousand or ten thousand dollars, it will possibly cost millions of dollars, much rather trust systems that have been proven overtime.”* (Rsp1: 25).

It was reflected by our respondents that it is a problem for users to be having to use virtual currency to join the blockchain based sharing services' platforms. Because, the value of a currency is not stable, it is constantly changing in exchange market, which means that the earnings through these platforms mostly will not have same value when users want to use them to shop or pay other things in real life (Rsp1: 44, Rsp2: 34; Rsp4: 8, 27). Additionally, it is argued that blockchain based services need to float their tokens in exchange market or charge commission to make even a little profit (Rsp1: 54). Therefore, it seems a dilemma needs to be solved for them.

*“It will only matter if the same currency I use in decentralized (app) allows me to go and buy bread. Unless that happens, I really do not care. I do not think any user cares for that matters. So, ... if all these networks... is created a new currency for user to transact, that is*

*not really any game change. How does it fundamentally change people lives? I do not think it does.” (Rsp1: 37).*

*“...The biggest part of cryptocurrency is anonymity and a lot of people use it because they want their transactions to be anonymous. If you don't want your transactions to be anonymous then why would you prefer to cryptocurrency...” (Rsp4: 27).*

It was confirmed that designing a zero-commission system facilitated by blockchain would have definitely positive impact on users' platform adoption, especially on the service provider side (Rsp1: 44; Rsp2: 25, 59). Nonetheless, stipulating the token usage in transactions is considered as challenge averting user adoption because of the reasons mentioned above (Rsp1: 44). Additionally, it is retrieved from the interviews that if blockchain based sharing services prefer to offer same zero commission for transactions with fiat currencies, then this business has to be charity work, because there is no way to make money (Rsp1: 44; Rsp3: 46). On the other hand, low speed transactions and high transaction cost of blockchain based SES were brought up by some customers that stand as a challenge on profit formula (Rsp2: 13; Rsp4: 8).

*“For a system there are 1000 users, tomorrow there will be 10000. The day after, there will be hundred thousand. Will my system be able to cope with the pressure? Will I keep doing all this work for free? The reason these big companies ... charges 20 percent is because they have to hire more and more people as the system grows. And as the system grows, they have to hire more and more people. So, they have to make money to hire these people.” (Rsp1: 44).*

When it comes to revenue model of blockchain based sharing services, there are major deficiencies raised by almost all of our respondents. One of them is, as we present earlier, the ambiguity of generating revenue, through zero- or less-commission model, which would be enough to run marketing campaigns, cover expenses etc. (Rsp5: 6). We found that there is not clarity about who benefit from the less or zero-commission advantage, service providers or consumers (Rsp1: 31). Although Rsp2 (29) foresees that cost for consumers will go down, there is no clarity for service provider side.

*“Now most of these startups ... created distributed network whereby a driver or a rider can come and match that rides instead of charging the 20, 25 percent..., the system will only charge, let's say less than 5 percent. Ohh great...Let's go through an example. If it is a ten-dollar ride...if the system was distributed blockchain...and instead of 20 percent, it takes 5 percent so does that mean that ride becomes from 10 dollars to 8.5 dollars. Actually not 8 dollars and 5 cents... Or is it that I as a rider, still pay 10 dollars and the driver gets 9 and a half. Ok. Or is that the ride become 10 dollar and the rider gets a little more 8 and half and the system gets 50 cents. Nobody has gone down and dog deeper into that. If that were the case, then yes... ride becomes cheaper, I as a rider will definitely go on this system. Then why will the drivers come up?” (Rsp1: 31).*

Additionally, instead of charging high percentage commissions, some of established intermediaries such as Uber are still not profitable company, since they spend considerable amount of money on marketing and technology (Rsp1: 31, 33; Rsp4: 21). So, vagueness about compensation of marketing, technology and human resources expenditure reflected as another shortcoming of profit formula of blockchain based SES (Rsp1: 31, 33; Rsp4: 21). One of our respondents mentioned that these blockchain based SES have to have processes scaling

technology and human resources as their customer base increases (Rsp1: 46). This requires complaint desk, help desk and legal and security teams that cost considerable amount of money (Rsp1: 46).

Instead of the belief about decentralized system decrease the cost, Respondent 1 said that having a system without centralized servers would not be sustainable. He explained as follows: *“the servers... they're all running on the user's mobile phone. So, the user is paying for the resources themselves. Ok. And that that could be potentially possible whereby ...you create an app that runs on customers mobile phones and driver's mobile phones and you don't have to maintain that. So, all these hundred people are doing are constantly coding and making sure the software the app is able to scale...But there you have 100 people dedicated for the altruistic nature for the rest of the world saying we will not make a single cent out of it, but we do it only for the betterment of the human society. If that happens then that will happen.”* (Rsp1: 48).

## 4.2 Trust

A trusted intermediary was favored by respondents as they found ambiguity in many of the matters concerning the operations of the decentralized SES driven by blockchain. Respondents were of the opinion that prevailing SES platforms are already transparent enough and there seems lesser problems that a newer blockchain based SES can work towards attracting users to its blockchain based SES. So, it appears that SES may not be a significant beneficiary but there are other businesses that could benefit as presented below in detail.

### 4.2.1 Trust in the idea

When we illustrated blockchain based SES examples like La'Zooz, Slock.it's USN or BeeNest, the respondents were of the opinion that the concept of economic value getting re-distributed or shared among network participants is not strong enough to attract users to these new platforms (Rsp1: 22, 25). Moreover, poorly executed business models and Proof of Concept (PoC) creates a mis-trust in the minds of regulators (Rsp6: 16) and leaders (Rsp3: 30). The concept of a decentralized SES was not trusted by respondents due to the ambiguity in several areas, such as the onboarding process for service providers (Rsp2: 21), lack of clarity in the source of funding to run the system (Rsp3: 46; Rsp5: 6), intention of developers of DAO (Rsp3: 42) operations management of the platform (Rsp3: 42; Rsp5: 6), promise of lesser transaction cost (Rsp5: 16) and lesser commission promise for suppliers to enter the network (Rsp3: 46).

When respondents were encouraged to provide data to name some use cases or industries that would most likely to benefit on account of blockchain's trust claims, they indicated that blockchain is likely to disrupt the way certain transactions are conducted (Rsp2: 11; Rsp3: 20, 30).

*“the industries that have the least amount of trust or the most centralized trust structure could benefit the most.”* (Rsp5: 2).

Use cases where anonymity (Rsp1: 37), transparency (Rsp1: 25; Rsp3: 16) and security risk in managing centralized system of records (Rsp1: 39) are seen as the areas where blockchain

technology has the potential to disrupt and some of these are in government (Rsp1: 25), health care (Rsp1: 37), certification and services (Rsp1: 39), logistics and supply chain (Rsp3: 14) industries.

Rsp3 from Tetra Pak explained us couple of use cases in PoC supply chain & logistics domain: (1) Supply chain use case was about a blockchain based digital platform that can connect various value chain partners to enable food safety traceability. This use case was part of their digital transformation (Rsp3: 10) initiatives and this is expected to position Tetra Pak *“being a hardware company, meaning equipment and packaging company, is going towards a service business”* (Rsp3: 14). (2) In logistics, a blockchain based digitalized trade platform called IBM-Maersk based on smart contracts is under PoC. Talking about the applicability of blockchain for this use case, we found that this transaction is possible without use of blockchain but an attempt is being made to try a new technology (Rsp3: 28) from the aspect that blockchain could improve trust to collaborate among entities (Rsp3: 20, 48) as *“There are different entities involved in packaging who not necessarily trust each other and today they are transferring a lot of manual documents and the idea is to use blockchain to capture this information”* (Rsp3: 16).

For a user of SES, cryptocurrency as payments or the idea of token based payment system was not favored by respondents for reasons such as lack of regulations and government backing (Rsp1: 41; Rsp2: 13, 44, 46; Rsp5: 6), unknown valuation of the virtual currency (Rsp2: 34, 46, 50) and the concept that the value of these tokens are restricted to a particular network and it does not offer possibilities to use them outside this network (Rsp1: 37).

*“will that currency help me buy bread?”* (Rsp1: 44)

*“the valuation is very difficult to comprehend as a normal consumers or suppliers without knowing what it is, to build trust in the value of cryptocurrency or the currency that they are using within DAO, their native currency”* (Rsp2: 34)

We also found that due to the respondent’s background knowledge in blockchain, with a significant economic incentive and popularity, trust to use virtual currencies was also favored by some respondents (Rsp3: 72, Rsp2: 27, 40).

#### 4.2.2 Trust in the platform

A platform that has a legal backing, competitive pricing and service quality is favored (Rsp3: 48). Institutional governance and accountability are seen less relevant in the blockchain economy but according to Rsp1, Head of Products, these are still theoretical benefits (Rsp1: 18).

For a user to engage in a blockchain based SES, Rsp1 was skeptical if blockchain platform can in any way disrupt an established home sharing or ride sharing business model (Rsp1: 33, 37). Respondents felt that user is indifferent to technology infrastructure behind an SES platform as long as the interface of the application is similar to established SES platforms (Rsp2: 36), the platform is able to function efficiently (Rsp1: 62) and provide support for users (Rsp1: 46). If there is any change in any of these factors, user acceptance of a new SES application could take time (Rsp3: 70; Rsp5: 6), but when user has a value, he is motivated to trust the platform (Rsp3: 72).

*“they [Airbnb] are very transparent. Saying that this is the money you pay, this is the place you stay, these are the reviews. So, how does a blockchain really change that?” (Rsp1: 33).*

User is motivated to establish trust with platform depending on peer-peer reviews and this, according to respondents, is not going to change by users switching over to a blockchain based SES (Rsp1: 35).

Regarding availability of support services, the respondents are skeptical if the blockchain based SES platforms can provide the quality of service to match with established intermediaries due to scalability (Rsp2:13; Rsp4: 6), funding concerns (Rsp1: 48; Rsp5: 6) and the transaction speed (Rsp4: 6; Rsp2: 13). Rsp2, the cyber security and privacy manager felt that the speed of transaction in a blockchain backed SES may not match established intermediaries’ service quality. Not *“as equal as what VISA has been processing per second”*

(Rsp2: 13). Source of funding to manage the operations of these new blockchain based SES is unclear and in the light of no intermediary to collect fee to use the system, Rsp1, Head of Products, questioned the operations sustainability (Rsp1: 44) as *“just as any system grows you need to have more people managing these”* (Rsp1: 46). For the blockchain consultant, decentralized operations is a concern which is expressed as: *“With a blockchain system there is no clear administrator or operator of a system as this responsibility is distributed to all node operators.”* (Rsp5: 6).

#### 4.2.3 Trust in the user

We found that users do not have similar rights on cryptocurrency when compared to the fiat money (Rsp5: 44). Trust in credit card type transactions and the services offered by financial intermediaries are valued as one respondent had to say *“[credit] card company protects me. if there is going to be a fraudulent transaction, my credit card company will protect me. As soon as I say that I do not recognize the transaction, the credit card company look into the matter and they will fight for me to get that money back or invalidate the transaction”* (Rsp1: 40).

The decision management through smart contracts was not trusted to protect the fraudulent transaction due to lack of central bank approval for virtual currency (Rsp4: 6). The respondent cited the infamous ‘The DAO’ incident that, we found, caused distrust in the smart contract driven autonomous organizations, DAO.

*“if code is hacked...we saw in Ethereum right? because the code [that] automatically running the transactions and smart contract ... people watching the funding being stolen by hackers and they could not prevent it because they could not make the change unless all workers come together to agreement to make the change happen and stop the hacker”* (Rsp2: 19).

Lack of trusted arbitrator in blockchain based SES is likely to impact the trust relationship a user can have with service providers (Rsp1: 46). Rsp2 prefers the established ride sharing platform over a blockchain based ride sharing like La’Zooz due to safety concerns (Rsp2: 21). Established intermediaries have a dispute handling mechanism that has human intervention or help desk (Rsp1: 46; Rsp2: 40). However, in a decentralized system based on blockchain such as DAO, our findings indicate that technology will act as an arbitrator through an incentive

based dispute handling mechanism (Rsp6: 10) but this seems to deter the trust relationship that a user wish to maintain in using a blockchain based SES platform.

*“some of the service some drivers have suddenly gotten off track and gone to another place. You have to have a help desk where you can go and press SOS. And the help based on the Uber will actually contact the police” (Rsp1: 46).*

*“How are they going to evaluate the driver background? They can validate their criminal records directly taken from government records and educational records from [educational institutions] but still it is harder for me to believe that all [validation] are automated and I think they should be some human intervention especially in taking decisions like this, what endangers my life” (Rsp2: 23).*



## 5 Discussion

*The discussion was carried out by synthesizing opinions of the interviewees against the arguments found in literature in regard to the main research themes: business model from the value proposition and profit formula perspective; and trust from idea, platform and user perspective.*

### 5.1 Business model

The emphasis on importance of a good business model for blockchain based SES were made by our respondents and acknowledged as outlined in the literature (Chesbrough, 2007) that technological innovation by itself is not resulted in a successful business, unless it is supported by attractive value proposition with a reasonable price structure.

#### 5.1.1 Value proposition

We found that instead of transparency coming with blockchain technology is considered as an advantage, companies do not need this technology to be transparent. Especially when we take into account that there is no obvious demand regarding more transparency from customers or stakeholders, this advantage seems to be irrelevant in affecting value proposition of existing SES. On the other hand, it is found that prominent SES are providing enough transparency which satisfies their customers, despite some negative opinions about their business practices. This finding supports the Apte and Davis's (2019) argument about disintermediation possibility unless there is no unique value proposition, mentioned in literature review. Because, it appears that existing SES provide unique value proposition to the customers through successful intermediation, so nobody thinks about disintermediate or replace them with a new kind of intermediary. This shows us that breaking through value proposition of these SES is a challenge for blockchain based SES, since one of their most polished features is irrelevant to users. This completes the Christensen's (1997) innovator's dilemma approach in a way that the blockchain technology offering very different and new value proposition that is less than established services, is not valued in existing market, and hence needs to find an emerging market to be valued. On the other hand, disintermediation promised by the blockchain technology (Yuan & Wang, 2018) is seen as a new type of intermediary model which may make value proposition of these businesses harder to be understood by customers.

When it comes to the value proposition, we mentioned Zott and Amit's (2010) four drivers to achieve good value proposition: novelty, lock-in, complementarities and efficiency. Instead of blockchain based SES have obviously novelty drive with the adoption of platform specific cryptocurrencies to generate revenue (content novelty), with their new way of linking activities by promising elimination of intermediaries (structure novelty), and with the enablement of democratized governance model through DAO and resource sharing (governance novelty), none of these provides better value proposition than existing SES. Second drive is lock-in and blockchain based SES may attract users and prevent them to switch to other platforms with zero or near-zero commission.

If large customer groups are not satisfied with the high commissions, dynamic pricing (surge pricing) or any other existing solution of established SES platforms, then this is an

opportunity for blockchain based SES to design a business model reaching large masses with democratized products in emerging markets, and with authors' words, "to capitalize on a brand new technology by wrapping a new business model around it" (Johnson et al. 2008). As mentioned earlier, there is some negative opinions about business practices of existing SES, but this did not reach a certain scale yet for blockchain based SES to offer new solutions for unsatisfied customers. It appears that blockchain based SES need time to be valued.

### 5.1.2 Profit formula

Furthermore, striking promises of blockchain based SES such as decentralization and distributed wealth among community are considered, by our respondents, as the features which would be praised differently by various customer groups. This may lead blockchain based business models to two different venues. First, as we discussed in literature review, the best environment to come up with a better value proposition is the time in which the importance of the solution to the problem for customers increases and the customer satisfaction level decreases with existing solutions (Johnson et al. 2008). However, it is acquired from the interviews that customers of established companies appear satisfied with current services, at least they are not fully unsatisfied, so the value proposition of blockchain based sharing services seems not to address current customers' need, hence is not in the right environment to prosper for blockchain based SES. Second venue is that since disruptive technologies are simpler and cheaper, they typically target the least profitable customers in a market (Christensen, 1997). So, low income customer groups who would appreciate distributed wealth notion can be perfect market for blockchain based business models and help their survival and then expansion.

It is also found that our respondents believe that giant SES would prefer acquisition once blockchain technology reach its maturity. This supports what we found during our literature review that Spotify acquisition of blockchain startup to solve the music rights issue (Perez, 2017). In addition to this, according to Chesbrough (2007)'s BMF, we say that existing SES are under Type 4 business models since they are aware of blockchain technology and trying to utilize it through acquisitions.

According to definition of revenue model in literature review, it should clearly state the way of how company makes money (Johnson et al. 2008; DaSilva & Trkman, 2014; Dubosson-Torbay et al. 2002). From this perspective, revenue model of blockchain based business models seems as a shortcoming because of the ambiguity of their profit formula based on zero- or less commission model. On the other hand, for Internet enabled companies we addressed the importance of pricing strategy aiming at the highest price the customer is willing to pay (Dubosson-Torbay et al. 2002). The obscurity about pricing, about who will pay less, makes blockchain based SES disadvantageous against existing SES firms.

As we state in literature review, cost structure involving fixed or ongoing expenditure for resources is second important element of profit formula (Johnson et al. 2008). So, vagueness about compensation of marketing, technology and human resources expenditure is another shortcoming for blockchain based business models. Another key component of profit formula is key processes (Johnson et al. 2008) and without providing or compensating some key services such as help desk, legal center for disputes, blockchain based SES do not appear profitable and preferable by customers.

According to Zott and Amit's (2010) complementary and efficiency drive, blockchain based SES need to bundle their core services with assistance services to make business more profitable and sustainable. Since the revenue model is not clear enough to maintain the operations, this step is crucial for blockchain based sharing services. There may be an opportunity here which will compensate the paucity of these SES in generating revenue. From efficiency perspective, we can say that blockchain based SES have some areas different than traditional SES to reduce cost. One of them is that stakeholders act as decision maker, so the burden of an expensive management team does not fall on those firms.

## 5.2 Trust

We found that the trust in the idea of SES found its impediment in its payment system, being a virtual currency. However, a fiat transaction possibility from these players encourages respondents to try a new application for SES. Literature indicates that network consensus (Beck et al. 2018) is a relevant research construct for analyzing the distributed trust and its potential for a blockchain based SES.

### 5.2.1 Trust in the idea

Individuals put faith in uncertainties by going through a trust stack and the first step to climb the trust stack is to trust the idea (Botsman, 2016). Our findings indicate that the first step in the process of user engaging with a blockchain based SES is trusting the idea of payments for transactions through virtual currency. The fact that cryptocurrency is unregulated (Rsp1: 41; Rsp2: 13, 44, 46; Rsp5: 6) digital money which is accepted only in a specific virtual community (Diniz et al. 2016) and its valuation outside the virtual network is unknown (Rsp2: 34, 46, 50) are seen as a significant impediments to trust the idea of sharing services based on blockchain.

The use case discussed in section 2.7 indicates that BeeNest, a blockchain based SES are to some extent trying to attract users to pay through user's choice of virtual currency like bitcoin and any other token (Schiller, 2018) or pay through fiat for a commission/exchange fee (Bee Token, 2018). This indicates that eventually, user ends up paying fee to use blockchain based SES if the user does not own a virtual currency. Our interview data suggests that in the long run, these blockchain based network will have to charge a fee but probably lesser than established SES (Rsp1:31, Rsp3:46). Rsp3 (46) highlights, it may start with no fee to gain initial supplier base and this fee/commission could eventually go up as the business grows. Rsp3 states this as: *"Today they will charge less because that is the only way they can survive. It is not just technology, it is business. There was a problem and so they want to solve the problem and obviously if they can reduce cost, they will charge less commission but essentially, they are intermediaries. Any platform is an intermediary by definition"* (Rsp3: 48).

### 5.2.2 Trust in the platform

When a user trusts the idea, next they verify if the platform is secure and trustworthy enough to support them when needed (Botsman, 2016). We found that Botsman's (2016)

aforementioned statement is in a way endorsed by the respondents. Based on our empirical data we found that irrespective of the technology infrastructure behind a SES platform, user will trust the platform to engage with it for sharing services if there are good peer reviews (Rsp1: 35) and availability of service quality and support services (Rsp1:62). However, there is an air of skepticism if blockchain based SES can provide such a service quality when they scale up the operations due to funding to manage the operations and technological considerations (Rsp2: 13; Rsp4: 6; Rsp1: 48; Rsp5: 6).

### *5.2.3 Trust in the User*

Botsman (2016) states that people have to trust other participants on the platform who can be users or service providers before they can start using SES. Hawlitschek et al. (2018) built behavioral layer because in addition to participants having trusted relationship with one another through intermediary for say arbitration or service quality, there a need to trust the provider of service while using the service. Interview data showed that a software code acting as an intermediary in the place of an established intermediary as trusted arbitrator is perceived as an impediment to create trust relationship with network users (Rsp1: 46; Rsp2: 23). But it is important to note that as per literature, blockchain based SES can leverage the network consensus mechanism (Beck et al., 2018) with an incentive-based dispute handling mechanism such as highlighted by Rsp6 (10), to create a more secure and validated network participants through distributed trust.

## 6 Conclusion

*This chapter presents the answer to research question by highlighting the key findings, which is the main purpose of this thesis. In the following section, we showcase how the research question was answered according to the research framework. Chapter ends with implications for future research.*

### 6.1 Research question and purpose

We conducted our research by seeking answer to the following question: “How does blockchain based sharing economy services (SES) affect the established SES?” By doing so, our aim was to explore elements of blockchain based SES and their potential to affect established SES platforms, by asking how and why questions. Based on the empirical data gathered through interviews and the literature reviewed, we understood that blockchain based SES are unlikely to disrupt the established SES as the way they operate today. The main reasons were: monopolization in the tech industry (Rsp4: 12, 14), technological infancy to create fully decentralized network with no servers (Rsp1: 54, 60), lack of necessary supporting means including legal structure, value proposition, revenue model and customer acquisition strategy to compete with “real” companies (Rsp5: 12; Rsp6: 16; Rsp1:32). As discussed in the Chapter 5, there is no prevailing dissatisfaction with the existing SES’ solution and therefore the current value proposition of blockchain based SES is not good enough to attract customers to these new SES platforms. Hence, we believe that there is no market yet for blockchain based SES. As Teece (2010) suggests, creators of these kind of market-less applications must design their organizations and business models very carefully to survive in a market that is not ready to be performed in yet.

We argue Warburg’s (2016) statement on blockchain based trust which would replace the trust created through institutions or intermediaries, and we found that it has not matched the empirical findings. Our research findings indicate that blockchain cannot solely replace the trust created by established SES. However, there may be a trust shift from established SES to a community collaborating and creating a trustful sharing services network (Beck et al., 2018), if the blockchain based SES redesign their trust discourse by leveraging on consensus validation mechanism.

Despite the fact that blockchain based SES appear unattractive and impractical today, they may be disruptive in future, if management draws attention to suggestions stated in relevant literature which could make these platforms disruptive players in SES. First one is that innovators in this field have to focus on undiscovered needs of future customers instead of addressing problems and needs of today's users (Christensen, 1997). Second, with adequate resources (Christensen, 1997) and necessary tools to run a business such as funding, employees, and business model the disruption chances of these platforms could be increased in the future. Third, they have to form a supplier base which is the core to attract customers to the platform because adequate suppliers are crucial for customer acquisition (Apte & Davis, 2019). High service quality and good customer experience enabled by efficient processes are key elements to foster trust among customers and service providers (Apte & Davis, 2019). Our findings also suggest that blockchain bases SES can leverage a key feature which is the

distributed trust created through network consensus validation mechanism to attract users to their platform.

Besides answering the research question, this research also offered insights into various use cases on blockchain that are carried out by both big corporations and startups. However, the difference we found was that the larger corporations are still at initial stage waiting to scale up. There exists a caution and skepticism around blockchain technology at bigger organizations due to the transformations needed in support systems, including the necessary regulations that can accelerate implementation attempts. This is an advantage for blockchain based SES startups, as this new field is their playground and at present, it has significant entry barriers for established SES platforms which quite often seeks marketing research and numbers to decide entering a new business (Christensen, 1997).

## **6.2 Implications for future research**

We believe that the findings of this study would be useful to academia and IS practitioners as this field of research is quite new and seeking for newer and interesting IT artifacts (Ostern, 2018). Since our research was more from a business model perspective, exploring the research constructs from established SES' stance against blockchain could bring alternative insights. Regulatory guidelines and virtual currencies emerged as interesting areas to further research as token-based payment system is found a significant barrier for a user to engage with a blockchain based SES. We found that the blockchain offers several theoretical possibilities that management could possibly leverage through experimentation to create or re-design their business model, for disruptive innovations in future. From this perspective, we urge the researchers to be motivated to ask novel questions and keep this research phenomenon an active research area to offer insights to IS practitioners.

## Appendix 1: Interview guide

1	What makes the blockchain architecture attractive to some industries? What benefits and challenges this technology offer, and under what conditions it would work well?
2	What impact does blockchain technology have on already established companies that serve as intermediaries (ex. Airbnb, Uber etc) ?
3	How do you see established companies reacting to this new technology, i.e. do you see these companies continue to exist with different model or value proposition and play a new role? If yes, what might the new role be?
4	How do you see future of new blockchain sharing services like Lazooz, BeeNest, and Slock.it? How do you see them compete with existing technology giants such as Airbnb and Uber?
5	Do you think that today's big companies see blockchain as a threat to their business? If so, how?
6	According to you, which industries will benefit most from blockchain technology?
7	From where might most resistance to blockchain implementation come? How willing are the companies to switch to/trust such new technology?
8	What factors might prevent/impede companies' blockchain adoption? Cost, lack of expertise etc.
9	What factors might lead the companies to decide on implement blockchain technology on their business?
10	Approximately, how long would it take for blockchain technology to be fully implemented in digital service platforms, if at all?
11	Would you like to add further information or suggestions?
12	Is there anybody that you would like to suggest us to interview in order to further our research?

## Appendix 2: Interview transcript 1

<i>Line</i>	<i>Actor</i>	<i>Conversation</i>	<i>Code</i>
1	Researcher	Thanks so much for joining us on weekend	
2	Rsp1	Not a problem you are most welcome	
3	Researcher	myself Sathya and my friend Hilal, we are both doing our Master of Science in Information Systems. I hope you had a chance to have look at the thesis background that we shared with you.	
4	Rsp1	Yes, I have already	
5	Researcher	great I will go through the questions that we will have minimum intervention during the information sharing but in case we need something more, we will try to interrupt and ask you to expand or give us an example.	
6	Rsp1	Sure, let's go through the questions One by one and I will expand and if required I might give it a longer answer	
7	Researcher	Please do, that is going to be good help for us.	
8	Rsp1	Ok	
9	Researcher	Could you tell us your role. And how you are associated with blockchain technology?	
10	Rsp1	I am currently working as head of products for an insurance start-up that is working in this space actually as an intermediary. So, we are brokerage company both in India and Singapore. We have an insurance tool, so it is a workflow automation tool for the reinsurers and that has a blockchain back and then that is my involvement in currently. Before that I was at an insurance firm's innovation centre and there I developed customer facing app with a blockchain back and that gave me the core expertise on blockchain.	INTER
11	Researcher	Excellent. Based on your experience and how willing are the companies to switch to or adopt this new technology?	



12	Rsp1	First of all, switching, I think, is a term I will very reluctantly use. Because, switching would mean that we change the whole architecture of a company and for large companies that [is] just not possible. SO, companies take time in switching even from mainframe computers with servers in their own office to the cloud which is gaining a lot more acceptance. blockchain in itself is such a new technology plus a new mindset that it is just going to take time. If you ask the question switching, nobody is actually thinking of switching right now as far as I know. There was another word, adopting. I think adoption is everybody is looking at by doing small pilots and proof of concepts and that I think is the rage of the industry it used to be much more the fall in the price of various crypto tokens from the ICO days which is not long ago just a year back. I think as taken a lot of the punch away from the hype around these projects. But people are still looking at doing pilots to make sure that they are not left out of a new technology coming and disrupting them. So, looking to adopt a lot of thing going on, switching I don't think anybody is ready to switch.	BM-ADP, DST CRP
13	Researcher	thank you for the clarification. When we say companies have started piloting or making some efforts in terms of adopting this new technology, do you see change in accountability for this companies, when they adopt blockchain technology in their business model?	
14	Rsp1	May I ask you to define accountability? and when I mean accountability there is a leader being accountable for using the budget or accountability in terms of company's accountabilities to its customers or is there something else that you are referring to?	
15	Researcher	Here we mean the governance in terms of ... you know decision making rights. For example, decision making rights are with certain entity ... and if they adopt blockchain technology in their business model is there any change?	
16	Rsp1	Sorry Sathya, I am still not there, if you could give me little detailed example then that will help.	
17	Researcher	Could we say that if they adopt blockchain technology, there will be more transparency in the organization. Maybe we can ask this question in this way. Because we read that blockchain technology lead more open transparent relationship between both users and company so could we say that blockchain makes this possible? More transparent organizations etc.	

18	Rsp1	<p>Yes. The answer to that question is definitely yes. If blockchain technology is adopted, then theoretically things will be more transparent actually the question around accountability of people becomes less relevant because transparent people more easily held accountable. That this is a very academic question in the sense and when I mean academic, what I mean is it is theoretical it is possible. Just with the new technologies things are possible but there has to be an intent behind such systems in place. The people who are at the helm, if they want to be transparent and held accountable, they don't need a blockchain to do that. So, I think you have to ... that with that factor. So, I don't think any business leader in today's, in my opinion, will go ahead and implement a blockchain solution because they want to be more transparent or accountable. Business leaders by design are answerable to the shareholders and their first and primary requirement is actually to make more money for their shareholder. And that is by design. they will do whichever allows maximise their shareholder value. Now if increasing transparency and accountability increases shareholder value then they might be implementing such systems and if there, during that implementation, blockchain is the easiest system to implement then that system will get implemented. So, take that practicality along with that thought that blockchain usage will increase accountability and transparency.</p>	
19	Researcher	<p>We are getting the answer. [it] depends upon the intent of the decision-making authority to pass or share this accountability with the system.</p>	
20	Rsp1	<p>Yes. If you want to increase accountability in terms of decision making today, you could simply have certain emails being available to be read by people. you can have the database to be written by ... a few people and read by a lot more. And if you could do that, you will have that accountability. But rarely the businesses do that, because businesses hold off the self interest in mind, because sharing too much information might take away their business edge. It is not the answer. I don't think it is the blockchain, the answer is intent of people, pure and simple. If there is intent, they do not need blockchain to implement transparency and accountability. blockchain might be an easier solution to implement because of its inherent design.</p>	

21	Researcher	What do you think about customers? They are interested in transparency and accountability more? what do you think about them. You said that companies don't need blockchain to do that they just need intent to do it. But does this affect the customers, maybe they will increase customer satisfaction or attraction to the company?	
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22	Rsp1	<p>In this one, it is going to be an opinion. the previous questions you asked I could be much more, sure of the answers. But this one is going to be an opinion. I will tell you why an opinion. Depending on the user, if you are looking at a user in India, I think the notion around privacy, data being kept private all of that doesn't apply to a tier 2 tier 3 city, I don't know Hilal, if you are familiar, if you are going to the smaller town in India, they don't care about privacy. Ok I am just saying India ...you could take southeast Asia for that matter you go to a small town in Malaysia, Indonesia and Thailand, they don't care about privacy. However, when you come about privacy, transparency, accountability; these concepts from what I heard from my European friends or my Japanese friends, it holds a lot of meaning in the developed world. So, first of all you have to make sure that customers are different in different places. the people who are wealthy in the developing countries like India, Thailand, Philippines, they might praise it. So, let us mark the two different customers. Now the customers who don't care about all the accountability and transparency, I don't think they care about the technology being used. there might be certain segment of users who will praise the transparency or there might be certain use cases where transparency is praised. I will come to all three examples with some caveat. And I am going to jump a little ahead. There is an article I have written on my LinkedIn post, have a look at it, I am going to literally rephrase that. Google is an intermediary. All the searches happen on the Google centralized servers. If somebody said that all these searches will get decentralised somehow, and the value will get redistributed, I once did a math, Google makes about anywhere between 50 dollars ... from a user. If Google's net income is divided by the number of users, you get to about as about 50 dollars 60 dollars. Now, if google gives you back 50 dollars or the system is distributed so that you made 30 dollars 40 dollars, I don't think you and I will care about that 30 dollars 40 dollars. I don't think the person on the ground in the small towns of Asia will care about this redistribution, openness and transparency by making a little bit of money from there. Still little. I much rather have all the free services Google gives me Gmail, Google Map that add so much value to my life and they can take my data. and I actually trust Google to do a lot of the things right, not everything but most of the things right. So, that is one customer segment. When it comes to the really wealthy in terms of privacy, accountability, like I know exactly where it is going on, they would pay for it. I don't think again technology matters. There are couple of use cases that is the third thing, where I believe this can have a huge impact. and all the intent of different stakeholders are aligned. there is something called direct benefit transfer, so in the western</p>	BM-EFC, IMC, USE, PRI, TR-INTER
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		<p>world those are also called unemployment benefits. In the eastern world, it is called direct benefit transfer especially in India. I get thousand dollars a month in the western countries. In the eastern countries you get certain basic necessities at very low cost like literally cents.</p> <p>Transparency, accountability all of that makes a lot of sense in that case. You see the political leaders; they would want to be able to brag about and say "ohh I have distributed millions of dollars in wealth to the bottom of the pyramid. People at the bottom of the pyramid would like a lot of transparency that "ohh the government is supposed to give me ten dollars fifty dollars or whatever thousand dollars and I am getting every cent to my account. In such use-cases I believe blockchain can be a huge help, because everybody wants it. Sort of universal basic income is getting more and more attraction especially in the current Indian elections. and there, a blockchain solution will be of immense help. Because government wants to brag about transparency. So, I know I gave long answer to your question, so I demarcated question in terms of the customers value transparency, accountability, all of that depends on the customer. So, I gave you a couple of use cases on that of Google and its users how to think of customers there are rich and wealthy and the people who are at the bottom of the pyramid. for most commercial use-cases I came, they might not be relevant. If you get into the public sector, then the concepts around redistribution of wealth, universal basic income, direct benefit transfer, this is the base similar to the food stamps done in the US. There I believe all the stakeholders starting from the political leaders to the government executives, it is in all their benefit, and I am now obviously the end customer who have transparency and accountability and in such cases, blockchain solution could be very handy. Now I will pause. Either questions or comments on that long answer or further questions.</p>	
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23	Researcher	Thank you it was great to have long answer.	
24	Researcher	I agree with Hilal, too. Thank you on that. Next question we have is about, it is again it is quite a broad thing to ask you. What factors might prevent or impede the companies' blockchain adoption? Here maybe because we had two use cases that we discussed couple of minutes back on the Google and on the government adopting blockchain to have the transparency. So, maybe you could explain from those two use cases or those two as a, you know, companies or government bodies adopting blockchain, what factors you think might, you know, make them rethink as a constraint for them like in terms of cost, lack of expertise that they have to build to make the whole thing happen or any other factor that you would like to mention?	

25	Rsp1	<p>Google use case is just to give you a little more caveat. I think the ex-founder of Mozilla firefox or someone along those lines started something called a basic attention token. Have a look at that. BAT. I think they are trying to work with a browser called duck duck go or something similar whereby their concept was, if I use Google chrome, google knows all my data and on the back of it Google makes money. So, the question was the BAT was trying to say that if you use this particular browser, you will get paid in marketing dollars by doing all these searches. wanted to explain that before I say the answer what will stop blockchain adoption, let say, in that particular use case. First of all, I think is the huge advantage that a system like Google has, I think this will stop this particular blockchain variation of Google search engine that become the same size of google. Reason being is Google is just so ahead. Unless they find out something that gives them that kind of skill very very quickly, I don't foresee that happening. there is a lot around trust there as well. Then again value of trust. So, again I will come back to the user. The user on the ground in any developing country, if they don't get the search results very quickly, they will never adopt this new technology even if it pays them back for doing those searches. Unless you have volume, you will not have marketing people coming and doing marketing on that search. It is a virtuous cycle which unless the other creator of this blockchain variation of Google figures out it will never reach scale. I think it is just a factor of existing players' massive economies of scale. That is the answer to that. Now if you were asking what will stop Google from implementing this, nothing actually stops Google, if they want, they can. I just don't see a reason why they should. Their current system works very beautifully. People rarely complain. Yes, the European anti competition board might sometimes give them certain fines but to the end user, I have rarely seen that users are saying "ohh I will not give my data to the Google". There are enough users, don't get me wrong. But unless Google sees a sudden dip in the number of users using google, (whenever I say google, I am talking about the search engine, only ok. Maybe auxiliary services like Chrome around it) unless they see a dip in that I don't foresee them requiring to do a change. Now theories around innovation say that these things to be blind spots for large companies where they can get disrupted suddenly. Possibly true and at this point and time, there is no sudden event that will take trust away from Google. But if suddenly, there were to be something that takes trust away from google search engine and then people will look for these and then existing blockchain based search engine redistributing the wealth that is created from those searches to the users. As suddenly</p>	BM-IMD, ADP, PRV, FTR, USE
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		<p>gain prominence that might work, but I don't see why google leaves it ...change anything. They might do pilot and do it in a small country to see if that model has more benefits for them as a company, but again I think those chances are stretched. I will move to the public sector examples. There is just a function of scalability. If you are talking about a country like, I think it has only benefited when you are talking about a large-scale place. So, countries like Singapore, Estonia. Estonia has blockchain based system for its one and half million population and it was there. If I am talking about larger countries with population of 25 million 30 million hundred million or more so and looking at using a blockchain system to distribute wealth for the welfare system, I think there is a lot of work already going on there that I also might not have idea about. But people are talking about it and looking to implement. So,I don't think there is anything stopping that and there are facts for this go and try. The only biggest challenge will be the age of the technology. So, if I were to implement a solution that will help in this benefit transfers of welfare systems. I much rather and these are going to cost money to build. Not non-significant amount. It is not a thousand or ten thousand dollars, it will possibly cost millions of dollars, much rather trust systems that have been proven overtime. Then use a blockchain based system that hasn't been proven. So, the other thing that will impede is the ability or the courage or the vision of leader who is taking the call which system to use. again pause. Does that answer those two examples and the question clearly?</p>	
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26	Researcher	Of course, to me yes. Hilal what do you think?	
27	Researcher	Yeah absolutely yes.	
28	Researcher	Thank you. We also learned one of the drivers what would make a company like Google look at blockchain. I think we got some tip from you and that angle as well. thank you for this elaborate explanation. Now, give you a background, when we started researching on this concept of blockchain technology, many articles that we came across talked about how it impacts the intermediaries and we just took some popular examples like Airbnb and Uber; and when we came across some of the decentralised organizations coming up what could challenge these big entities? I mean we really wanted to take some expert opinion on. Do you think blockchain technology will have, what kind of impact it will have on these intermediaries like Airbnb and Uber.	
29	Rsp1	I saw that two examples you have mentioned, I haven't looked into the company per se. I don't think that the technology will have a lot of impact I will tell you why. Uber spends a lot of money attracting people on to their system. when I mean system, these are platforms and platform are meaning that they have two sides in their business. One is the service provider and one is the service receiver. In Uber, Uber does a lot of work in attracting people to become drivers on their system. similarly, Uber also does a lot of promotions to get riders on their system. every country they go to, they do that marketing campaign. So, is Airbnb. Let's take these two, little more in details. If I were a company that build a distributed system to do this, I would take the responsibility getting both riders as well as drivers on this platform to cater to the bigger group. Right?	BM-EFC, IMC, DST, IMP, INTER, TR-UBR
30	Researcher	Yes. That is our understanding as well. Correct.	

31	Rsp1	<p>And if I were to do that, I am burning a lot of money or capital to attract all these people. and only over time do if these people stick around on to this platform do I as a company make money. So, in that case, it just does not seem that decentralised distributed blockchain system will make money. Now most of these startups, the model that they would go for the same or created distributed network whereby a driver or a rider can come and match that rides instead of charging the 20, 25 percent that UBER charges, the system will only charge, let's say less than 5 percent. Ohh great. If you charge less than 5 percent so that extra 20 percent does that mean the ride value is done. Let's go through an example. If it is a ten-dollar ride, 2 dollars goes to Uber, 8 dollars goes to the driver. Now let's say if the system was distributed blockchain blah blah blah and instead of 20 percent, it takes 5 percent so does that mean that ride becomes from 10 dollars to 8 and the half dollars. Actually not 8 dollars and 5 cents. So, matching about those lines. Or is it that I as a rider, still pay 10 dollars and the driver gets 9 and a half. Ok. Or is that the ride become 10 dollar and the rider gets a little more 8 and half and the system gets 50 cents. Nobody has gone down and dog deeper into that. If that were the case, then yes, I as a rider, if latter was the case that ride becomes cheaper, I as a rider will definitely go on this system. then why will the drivers come up? There is still decent amount of marketing to be done to actually get that scale. And even if today's Uber is going for an IPO, those all their e-filings are public now, they are not a profitable company. So, with all the burning of the money becoming such a behemoth, they are not still making money. So, how will this distributed system where marketing dollars are not being spent to get all the drivers and riders become a profitable distributed model? This is where my doubt is. Nobody is going to spend time to build this whole system unless they see that they have their own profit. Let's dig deeper. There are developers sitting and creating this Uber's distributed style variation, right? These developers only will do it when they know that in 2, 3 year's time all the time and spending right now will get monetised. But if there is no path to it, it will never get monetized. There is that catch-22 in there. This particular startup that is building alternative version of it, if they want to capture less than 20 percent, then no visible fund for them. And if no visible founding for marketing, then they will not be able to burn the marketing dollars to attract the drivers and riders. And hence they will never become big. So, I have my doubts with the Uber's variation on that. I might be missing something. But those are the questions I would ask as I looked to this alternative of Uber that is using blockchain. I will pause before I go to the Airbnb's alternative. Does that make sense?</p>	<p>BM-EFC, IMC, DST, IMP, INTER, COM, TRAN, PRF, RVN, FTR, STR, UBR</p>
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32	Researcher	<p>It definitely. Because, if we were to talk to experts from these companies, I think the information that you have given us would help us focus our questions on few things, because these are new information and that is going to be really useful for our further interviews. Thank you on that.</p>	
33	Rsp1	<p>From the Uber side, as I said, look into how much money they are spending on technology. If for some reason, distributed network could take away a huge chunk of the technology cost, yes, the cost of running that business goes down. But I think, there biggest chunk is marketing. And as I said they have done the IPO filing so you can see exactly of they are hold money being spend in marketing and how much is in technology. Going to Airbnb. very similar answer. Airbnb does a lot of work in terms of attracting users. So,if you are on google and looking for a hotel, you will see an Airbnb add pop-up. And without that vacationers will never come to Airbnb because they will not know about it. Now vacationers coming to Airbnb and then the vacationers don't come to Airbnb they will be not be a lot of people putting their houses on Airbnb. And Airbnb is taking its time to get that model right, how to take pictures of their houses, so that houses have a better rating. Reviewers are leaving reviews consistently, so let people can make an informed decision. I think Airbnb has done a great job when it comes to transparency. If you have used Airbnb, the only thing I personally as a user have a complaint is that they do not allow certain comments to be changed after time. and they are very strict on that I am quite sure that they must have their reasons for it. But other than that, they are very transparent. Saying that this is the money you pay, this is the place you stay, these are the reviews. So,how does a blockchain really change that?. Just form a philosophical point of view but Airbnb is giving a lot of service thereby giving this economy of scale. again, my same answer. You just don't foresee somebody just because it is a distributed system coming and disrupting this model. And I haven't even gone into deep technical aspects of it. What does distribution in this case mean? Does this mean when I as a person who is renting my house instead of having the Airbnb app which is an app which is a front-ending app on my mobile phone with a backend server at the Airbnb office. Instead of that behold resides on my phone, so I am a node, or my phone is a node in this network of sharing. Ok. What are the advantages of it? I cannot seem to think of any. Unless there was some privacy involved in it. I will pause here because I can go a little deeper into technicalities and I just did a quick LinkedIn search for Sathya, I think she will get the technicalities. Hilal I don't know your background, so I just paused myself before I go deeper</p>	<p>BM-BNF, CHL, PRB, EFC, IMC, DST, IMP, INTER</p>

		<p>into what does it really mean to have a blockchain system for Airbnb or Uber. Should I go into that?</p>	
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34	Researcher	<p>No. This is perfect when it comes to what changes or the what is the kind of reinvention that Airbnb or Uber would start looking at it. I think from that perspective you have given us a very good information. But, one more just to clarify one more thing, we did come across, you mentioned the discovery cost, you know like today as a user if I login to Google, there is an add of Airbnb popping up, so the way user discovers Airbnb or uber, you know there is a lot of marketing campaign going on, all that is fine. But when it comes to finding decentralised network, suppose I am in Sweden, if I have to know that there is a decentralised network for ride sharing that is available, I don't know, where I would come across that? How to discover? How do you think user in future, maybe it is our opinion and guessing but, based on the information that we have, how do you think a user in a community will find out there is a network for ride sharing which I can, you know, be part of it?</p>	
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35	Rsp1	<p>Internet is my simple answer. I obviously google being the biggest behemoth of search engine that will be there, but you have social media. and it will happen just like, it would have happened 250 years ago. It will happen by people telling each other. there are two ways you always know about a new system, a new service. Either you go and look at into, when I said 250 years ago, you would have gone, actually 250 is wrong. Telephone, so there has to be some sort of an ability to search. So, there are two ways; either I search on my own, or I ask somebody. So, search on your own in older days were literally going around and asking people one by one then it became to phone directly and now it is Google. And when I mean Google search engine obviously it would be Baidu in China, but those other two. All you ask people. Before gain back in time, you will ask somebody you trust whose opinion you trust. Nowadays, then it moves from instead of going and physically asking to a phone call, now instead of that you literally go on social media whereby you see of friend commenting on something etc. or your friend's friend or suddenly a post that becomes, has thousands of comments you come across it and you get to know from it. Those are the only two mechanisms that awareness is built. when we mean awareness any users' awareness of a new service. That is just not going to change unless suddenly, even that philosophically those are the only two ways, as the delivery mechanism that has changed. So, tomorrow if we invent telepathy then instead of doing a crude typing in search we will close our eyes and connect to some other person and know information. the delivery mechanism will change but the basic remains the same. I need to be aware of a new system, how do I become aware? So, again, coming back to today's age, it will always depend on the Internet meaning google, facebook, instagram, if there is a new social media in that case. there might be for certain use cases it will be different, so nowadays there is a lot of movement around converting our steps into dollars for donation. If you will look at this service called socialimpact.in I think whereby if you count logged a number of steps you are doing in this mobile app the money that we have raised from the CSR (corporate responsibility funds) get donated to the certain number of the organizations. What the company is showing that giving an impact. They are making ... lot more mobile and as well as donating money. Now, why I am coming to that example, it is just it will get the information of such services will get transferred in interest groups.</p>	TR-USE
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36	Researcher	Yes, I could clearly get it. How technology has evolved, like Web 1.0, Web 2.0 and Web 3.0 and importance of social network and how that base is going to ...may be play a role in creating awareness when these new decentralised networks come into picture. Just one more aspect, for a user, there is a Uber network today and there is a decentralised network, the difference being, this again a hypothetical example, the difference being the currency with which I[user] transact with these networks, it is say the value in terms of money say dollars and kronos [fiat] and in the other it is a cryptocurrencies, do you think it is going to matter?	
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37	Rsp1	<p>I do not think it matters. It will only matter if the same currency I use in decentralised Uber allows me to go and buy bread. Unless that happens, I really do not care. I do not think any user cares for that matters. So, these examples that you mentioned to me, that is why I wanted to get into the technology part, if all these networks have done is created a new currency for user to transact, that is not really any game change. How does it fundamentally change people lives? I do not think it does. That is why the Airbnb and Uber use case you gave me and again do not get me wrong; I have not read their white papers and that is where the secret lies, you should read these white papers. But if they have just changed a new currency, what is the advantage of that? These new startups say- I have started a decentralised network and there is transparency. Transparency in what? I am taking the ride, there is no transparency, Uber can have that information. So, all goes down to use case whereas certain use cases where this [will] make a lot more sense. I do not have any paper to show you. The idea of having a distributed system where my information does not leave my device might make sense. The only example I can think of explaining this in a layman's term as much possible. there are certain information that are private. Let us take an example of my blood data. I don't want people to know everything about health. I do not mind if my doctor knows etc. I will very rarely give that to a service provide unless there is a need for it. If I were to build a system anyone who needs my health information, ...Let us say my health data is on my mobile phone. It could be an insurance provider who wants to insure me based on health data, it could be my doctor, or it could be government saying you are eligible for this job only if you are healthy and fit. These people might want the data. So, I am saying, I do not want to give you the data but I can give you a processed data. What does that mean? Let us take the data of simple height, If I am &lt; 170 cm, the government will not give me a pilot job. I am telling the government I do not want to tell you my height but can you send me the logic if &gt; 170 cm yes or else No. If my mobile has the health data, you get the output of it. So, instead of getting the data, you get the processed data. In such a case, a distributed system is a very useful use case. Instead of me sending my personal data to a centralised service provider, the centralised service provider suddenly becomes centralised. Theoretically in these cases, distributed decentralised system can work very nicely and there is a massive technology cost savings. Instead of housing all these data and protecting it, I do not care about data, I am sending the logic and getting that [information] back.</p>	<p>BM-CRP, PYM, CUR, USE, TRAN, TR-PRI, UBR</p>
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38	Researcher	That could be a good example. May be a logic or may be is it like, company A wants data from us, instead of reading whole record, they can request for particular data?	
39	Rsp1	<p>I would not even say particular data. If I am sending data, then it is still a centralised service, right? I think so it is still a opinion. Let us move to a concept of self-sovereign identity. There is an article by Antony, you can search on Google. I believe this where a blockchain could very easily work. Your birth certificate is with the government entity that manages birth and death records. Your health data depending on the time...when you were a kid, you went to your town 's hospital. When you are an adult or when you are in your university, your university hospital has your health records and when you are 30 years old, the city where you live has hospital records. So, 3 different hospital has your health records. Your income statement is all with the tax authority. All your property data is with registrar's office that registers property. So, a person's data is with various entities. Now instead of passing data on blockchain, the access mechanism is on blockchain. Let us say, a company wants your income records. So, instead of you going to income tax department to get your income data, you could simply on the distributed blockchain network, you say Oh! give that company A the access right to use my information for next 24 hours. And with that rights, the company A goes to fetch data and the data provider just checks the access. Oh! his access permission is provided to company A, so let us give the data access to company A for next 24 hours. Now the access mechanism can be distributed very easily, and I can foresee a blockchain use case there. Let us say in a mobile phone, I get a ping that company A wants my data, let us say [my answer is] Yes, I want to give for next 24 hours. or company B pings me I want a data, so the answer is No, I do not want to give company B the data. This can be distributed. Access control and auditability could be in blockchain.</p>	TR-USE
40	Researcher	In this example, if I were to make quick connection. As a User, I feel powerful if I am placing myself in this use case as such I have the power to decide and second thing is the transaction cost, instead of manually obtaining the certificate or through email, here it is all automated, still access is controlled by me, right?	

41	Rsp1	<p>Yes, you are absolutely right. But this is where all the good news ends. it is theoretical. In order to pull this off, the government has to step in saying, let us take payment system for example. The whole world transacts money through SWIFT. How central banks can use SWIFT as a messaging mechanism for transferring money between country to country. When it comes to credit cards, there are only 4 big messaging rails or networks, these are Visa, Master Card, AMEX and RuPay in India. Unless government goes and creates such networks, saying, going forward, anybody who wants access mechanism has to use this system, this system may never take place. Even if government says that, all entities housing this information has to then make it possible. But now for these entities, they have to spend money to make this information transfer technology possible. Because, their current system does not have the ability to read this access control mechanism from blockchain. Where will the money come from? The government has to fund it? so you can see...on paper it could sound very exciting but in real case, to implement this is a mammoth task even in a country like Singapore. If Singapore government wanted to do this, just for any particular use case, it will take time. And hence, Sathya you have stayed in Singapore. Take the case of SingPass, is an example of centralized system doing exactly this. In India, there is an application that show you all entities to whom Aadhaar card access has been given to, Aadhaar has digital identities in India, it had its controversies, but centralized app was designed just for that. So,it is the ability to execute in terms of the time, scale, capital requirement will always be an impeding factor.</p>	TR-USE, PYM
42	Researcher	Ok. Thank you. Hilal, you had something to ask?	
43	Researcher	<p>I have a question. Actually, you answered it previously, partly. But if we go to Uber drivers or people who rent their homes on Airbnb and we go them and say, there are 2 system. There is Airbnb and Uber and there is another system where you do not have to pay commission for your transactions. Which one do you prefer? Do you think to drivers it matters?</p>	

44	Rsp1	<p>Yes absolutely it matters a lot. It absolutely matters right. So,if I were to use this system. So,for the service. But I also meant answering it right. So,for the service provider. It will matter a lot. Right. Because if I were .. I'm the service receiver and I'm paying ten dollars. The service provider gets the whole of ten dollars. They will definitely be on a system that has zero commissions. But again that's theoretical right. now a lot of these startups what they mention is or you come use our system. We have zero commissions. Oh but you have to use this token instead of dollars. Now that's the whole story falls apart right. Because who is going to ensure that the ten dollars I receive which will help me by 10 dollars worth of bread when it gets transacted in these tokens will still hold a 10 dollar value. And I think that question gets missed out a lot and that is where these systems that are saying all zero commissions. Oh great. How are you doing that. Oh you have zero commissions because you are transacting in the currency of our network and suddenly wait currency of your network? will that currency help me buy bread?. Well yes you can but you have to transfer the currency to dollars. Wait. So,if I get paid ten dollars how much is that in your platform or ten dollars is hundred tokens in my platform but that is as for current exchange rate. But tomorrow exchange rate can change. Yes it can. But you might make more money because it will go up. What if it goes down do I lose money. And these questions start coming up whereby those platforms then fail because the token that they used to come to say zero commissions and then they float the token in the exchanges to be traded. And counter kind of hinders the ability to use this to gain trust. Now if I created a system and I said all transaction will be not in tokens but in dollars and in zero commission obviously all the users will be starting to use the system but if I had zero commissions I and I created the system how am I making money. Unless I don't want to make money. in which case great the system will obviously prosper. But then. For a system there a thousand users. tomorrow there will be 10000. the day after there will be hundred thousand. will my system be able to cope with the pressure? will I keep doing all this work for free? The reason these big companies like Uber and Airbnb charges 20 percent is because they have to hire more and more people as the system grows and as the system grows they have to hire more and more people. So,they have to make money to hire these people. So,if I were to do zero commissions how am I hiring people. And it always has an open ended loophole which I haven't figured out how this Zero commissions works out</p>	<p>BM-CRP, PYM, CUR COM, TK,TRAN, PRF, RVN</p>
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45	Researcher	<p>Okay. Here again Hilal I just have two hypothetical example but that hopefully will get a little more. Basically it's the experts opinion. So,when we say hire people what are they hired for in your opinion? These hiring people are for?</p>	
46	Rsp1	<p>To scale a system right. So,I think you know this very well from your past background. So,let me see if I could make it absolutely in layman's terms. I am looking at ... my great. This is the best way to explain this to your computer. Yes. I don't know whether you guys have ever played video games but effectively your computer has a computing power. OK. Both your computer as if you started opening Google Chrome. You started opening excel you started opening word. you started opening a playing in different music videos. Your computer will crash because your computer aren't able to take all these processes happening at the same time. Just like your brain you cannot be you cannot do two things at the same time our brains are not designed that way. Similarly if I'm talking about the system that for example would Uber as one server is matching you the riders and drivers. Right. But that system is designed only to take a certain amount of volume because the just like as I give you the example of Google Chrome Internet Explorer all of that you open on your computer your computer will crash. Similarly if a system is designed to manage thousand riders and drivers at any point suddenly if it becomes 10000 that system will not be able to date. You'll have to hire people to scale those systems. And that is just on the technology side. OK. If if you were to manage all these 10000 people's complains you have to have a complain desk. Right. And these drivers you're assuming all these drivers are truthful right? for some reason the driver actually says Oh I didn't receive the money you have to give me the money. How do you rate those drivers? security. So,some of the service some drivers has suddenly gotten off track and gone to another place. You have to have a helpdesk where you can go and press SOS. And the help based on the Uber will actually contact the police. Or from 1000 people maybe one person can do it for 10000 you need 10 somebody of hundred thousand you need hundred and these are just three different services I've talked about. But just as any system grows you need to have more people managing these and hence that is where the hiring goes. One kind of utopia. say Oh but I can have robots do it but somebody has to create this robot. You still need to hire people to create these robots in today's date. So, robots can create robots in today's day and hence that's not scalable automatically</p>	BM-TRAN, PRF, RVN, SEC

47	Researcher	Ok. So, when it comes to managing the system, it still holds good. The scenario is good. But you know how the funding, or the finances are taken care ...	
48	Rsp1	Correct. To Zero commissions. If the system grows and I as optimistic person or even a hundred people who have said Oh we will create the Uber of the world that has zero commissions they will have to constantly be working on it and hundred people is not enough to create the will of the world at zero commissions. unless they figure out the technology that just you know can scale automatically which will be an invention in itself. Right. But even then, the servers... who are going to be for the servers? if you are running an Uber, unless you decentralize whereby none of your software needs a server, they're all running on the user's mobile phone So, the user is paying for the resources themselves. OK. And that that could be potentially possible whereby you don't have to pay a single amount of money to any technology service provider. You create an app that runs on customers mobile phones and driver's mobile phones and you don't have to maintain that. So, all these hundred people are doing are constantly coding and making sure the software the app is able to scale. Yes, that would be possible. But there you have 100 people dedicated for the altruistic nature for the rest of the world saying we will not make a single cent out of it but we do it only for the betterment of the human society. If that happens then that will happen.	BM-COM,TK TRAN, PRF, RVN
49	Researcher	Yeah. I think Hilal, Correct me if I'm wrong. Those some of the articles on our basics when we were reading about these concepts, we came across concepts like this where individual nodes will contribute ...might contribute to the transaction or you know the power and memory, from the nodes it is used. And again, like you mention if it's for the society without having in mind profit as something in mind then this is achievable, but we do not know what is happening right now with the networks that are being created. Is that what we are trying to say?	
50	Rsp1	Yes. Yes	
51	Researcher	Okay. And just just one more., It's 10 minutes past the time that we initially thought maybe between 45 minutes to 60 minutes we could complete. Are you OK to give us a few minutes?	
52	Rsp1	Sure sure sure.	

53	Researcher	<p>Great. Another important thing you mentioned is... When that transaction costs or when the commission is less, we as a group when we talk about ...we feel it's its advantage for the users like drivers, and renters to rent their home through these decentralised networks. Suppose this token which is used in this network, Like the example you quoted, if I'm able to encash it at the same value outside this network it could be to pay for my gas or it could be to buy a bread ...if the acceptance of this token is wide, do You think the perspective of the drivers and renters could change in terms of adoption?</p>	
54	Rsp1	<p>Absolutely. So, let me be a little more optimistic and answer this question little broader as again like other things. what will make a Airbnb decentralized work is if I could create one - It's truly decentralized so there is no servers. It's all based on mobile apps. The technology today doesn't exist by the way but hopefully in 5-10 years it will. If you want to get into particulars. Oh man I am forgetting the name Ethereum has this one particular protocol that allows for that to happen, but they are doing very little research on it whereby the node can actually work on a mobile phone. But the day when we reach where by the nodes is on a mobile phone and you don't need a single server to do it. Yes it will be possible. the currency to be transacted if that holds its value yes it will be possible. And those are the two things the day suddenly it happens, You will see these gaining a lot more attraction. Okay. Lastly if you design the value of the token instead of being freely floated in the exchange, to define the value of the Currency, you know the token rather connected it to the intricate fundamental value of the system, then it will work. What do I mean by that? Let's say the value of the token is actually Ok. It's a ride sharing or Airbnb I pay ten dollars and the person who is renting out gets ten dollars. OK. That is there has to be slight commissions if you don't have commission these tokens are useless. Ok so let's say there is a 50 cents commissions on that transaction. But the whole 50 cents whenever it goes there are a thousand such transactions. That is five hundred dollars in the system over the day. Whoever has transacted using the tokens will get a small piece of the five hundred dollars. Then suddenly the tokens value is fundamentally connected to the number of transactions happening in the network. And if you go by that design, then yes it will stop making sense. Very few people have tried to do it in that manner. There were some tokens that actually tried to do it and in such a case it would have made sense but it's just the execution wasn't great. I'll pause. I don't want to go into details of that because of that you just might be...</p>	<p>BM-BNF,CHL, PRB, CUR,TK, FTR, RVN, TRAN</p>

55	Researcher	You answered it. Yes, it's sort of you've given us the answer. Hilal, do you have anything more on this particular question?	
56	Researcher	No no. Thank you.	
57	Researcher	So, I think. Question number seven. I think we kind of discussed that like it what value proposition that these decentralized networks can Come up with to attract customers... I think just now we discussed if if the nodes serve as a computing power and if the token that is created and circulated has a value which can be used elsewhere, or it has ... the wealth distributed in a way ...that would attract [users]. I think those are the two Things that I can Draw from our conversations so far. Is there any other value proposition that these network ... decentralized network can come up with if they have to attract users to join these networks? And second if you haven't mentioned and if you have anything in mind.	
58	Rsp1	No, I think I've mentioned all of them.	
59	Researcher	Ok great. Our research as far as the conversation that we had right now with use cases, the number of use cases that this technology could be applied are numerous. It's like several sectors and in several ways within these sectors that this could be used for?	

60	Rsp1	<p>I don't think it's many by the way Sathya. Really. So,let's just to clarify that. Many meaning ...yes there are 100 use cases where a blockchain could be used or maybe the number is two hundred three hundred thousand. But I think the universe of applications in today's world is in millions. So,that that many has to be had just just let's just quantify that very clearly. Okay. If there were if I were to take an approximation of the number of mobile apps on App Store. Right. That's a very good use case. What are the total number of use cases right. I think only less than a percent or 2 percent of those can be redesigned completely using blockchain which doesn't have a centralized service system. Centralized services have its inherent benefits. I don't think we can distribute everything, and we have to give them. We have to be mindful of that. And as I said just like that Google right because it's centralized because it has all this knowledge, a decentralized system can can never do that unless we come up with a new fundamental change in science whereby, you're doing multiple computations at the same time. And. So, just I do I want to make sure I'm communicating correctly here. There are certain use cases that has to be centralized only because we don't have the computing power to do it. And I quantify this very clearly. Today the reason. And Google is is great and your distributed system will never get there ...Google has the history of God knows petabytes. What is bigger than petabytes. I think they have more than petabytes of data of these searches that have been conducted in the past 20 years since Google was born. Now nobody has that data right. So, if nobody has that data, no distributed system can actually provide the service that Google provides. OK. This can change. This can literally change overnight. Suddenly if we figured out quantum computing. the reason I'm saying quantum computing the theory around quantum computing is you could actually do multiple computations at the same time because the physics ...the laws of physics are different with quantum computing. OK. And if that happens then suddenly a new distributed network could potentially be possible for information such and you wouldn't not need a centralized service. And that's just one example. I don't think everything can be distributed. There are various certain use cases where I buy a distributed network has maximum value. And that's why I wanted to stop you when you said many because yes there are many use cases. One hundred two hundred and maybe even a thousand. But I don't think the number is more than a thousand in my head. If I sat down and started talking down problem statements in the world that can be solved with a distributed network. I don't think I'll go beyond thousand and the number of ICOs that were launched... I think if you can just look at the number of ICOs that were launched with close to 6000 out of which</p>	<p>BM-BNF,CHL, PRB, FTR TR-USE</p>
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		<p>one is out of which a lot were fake. If you just go into the depth of ICOs that raised more than 10 million dollars which will give you a sense OK that they did some work. I think the number is less than thousand and that in itself will show you the number of use cases in the world that can be helped with a distributed network.</p>	
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61	Researcher	So, what we are hearing from you is ...in terms of ...you know when we talk about is there a huge impact to the intermediaries or will they be written off in the near future because of the onset of this new technology. The answer is wherever they use cases that need centralized system they're going to still stay there. The intermediary is going to stay there and do the work they are doing now?	
62	Rsp1	Yes, intermediaries do provide a service. And as long as that service has value it will happen. A blockchain will not be able to move it or remove it unless the use case demands that their distributed network is more efficient than a centralized intermediary driven network.	BM-EFC, IMC, DST, IMP, INTER
63	Researcher	And when we mean efficient it is that those values that are provided by the intermediaries ... If those are created by this decentralized system, theoretically maybe or we don't know what the balances ..but if it happens then yeah?	
64	Rsp1	Yes, absolutely right. If those same values and more were created through that distributed network and this is very theoretical then then that distributed network would have would make sense and values could be both tangible in terms of monetary value or more qualitative in terms of customer satisfaction. One simple example I could think of are brokers. In today's ... brokers when I mean brokers rental agents. Rental agents have knowledge of a certain area very well and they are intermediaries and do tomorrow you can you can have a website that collates all of this information and people leave reviews but even that website instead of multiple intermediaries is one intermediary. You can't suddenly decentralize that because the knowledge that that person has of that locality which houses good landlords good et cetera unless you digitize all of that and then distribute it in some form that one single real estate agent will always have some value	INTER
65	Researcher	You mentioned about a LinkedIn article,	

66	Rsp1	Oh yes. So, if you go to my LinkedIn, under my posts, you will have a blockchain 2.0 Article. Have a look at that. You will also have if you... There is a podcast by somebody called Shannon I'm forgetting her name. She interviewed me very similar to the interview we are doing but more on a high level as a podcast interview. I think she runs very good interviews of such experts. You could just go listen to their recordings and even reach out to those folks if you want. That I think is another good proxy for you to go in and find information. So,if you just Google my name podcast crypto Shannon I think you'll be able to find this particular channel I'm talking about if you can't Whatsapp me I'll find it for you.	CRP
67	Researcher	Great show.	
68	Researcher	How would you like us to mention you in our thesis support? Would you like to give a full title a name title and company?	
69	Rsp1	I'm indifferent so whatever suits your purpose I'll give it that.	
70	Researcher	Great. Then we would like to have a full title.	
71	Rsp1	That is OK.	
72	Researcher	Maybe that we will have it in written from you so that we place it appropriately.	
73	Rsp1	Sure. Not a problem.	
74	Researcher	Hilal, Do you have anything to add?	
75	Researcher	Yeah. could we use your quotes from the interview in our thesis text?.	
76	Rsp1	Absolutely. It's not a problem. Just when you use my quotes but just take the ones that are not in swing reading any other company on the particular entity just so that you know I just don't get sued because I said Google or something I said etc.. Ok so feel free to use my quotes whenever it's not targeting some entity and just me it's my opinion. I think that's good.	
77	Researcher	OK. We had a great conversation and this being a weekend, Thank you so much for joining us.	
78	Rsp1	Well. Thank you so much. I really appreciate the chat. It was very nice. Thank you.	
79	Researcher	Thank you very much.	
80	Researcher	Well bye bye. Have a nice Sunday evening.	



## Appendix 3: Interview transcript 2

<i>Line</i>	<i>Actor</i>	<i>Conversation</i>	<i>Code</i>
1	Researcher	Thank you for giving your Sunday morning for our thesis work, Myself Sathya who had done Bachelor's in computer technology and some work experience as an IT consultant. Hilal, would you like to introduce yourself?	
2	Researcher	Yes, I have background in political science and International relations, but I have Master education in Information systems and process experience in companies... different companies	
3	Rsp2	Alright. I am CA Manager in [company name]. My focus on blockchain is specifically on evaluating the security around the processes and technologies that has been used to manage blockchain solutions. Currently I am focusing now on cryptocurrency space specifically companies that offers crypto wallets and also the exchange work for the individual consumers and as well as for the enterprise.	
4	Researcher	Ok. We hope you do not mind we (are) recording the conversation	
5	Rsp2	Definitely. I have one question [request] like to include my name and not the company name for legal reasons.	
6	Researcher	I understand that, may we include the name and the role.	
7	Rsp2	Yes	
8	Researcher	That will be enough for us.	
9		[some interruption]	
10	Researcher	Based on your experience with this technology, how willing are the companies, switch to or adopt blockchain as part of their business model?	

11	Rsp2	<p>Companies are willing. Definitely they want to invest in the blockchain technology. I think like any other technology, in the beginning, companies jumped to the bandwagon of making an investment and trying to fit this blockchain into a solution. Rather than making this blockchain as business enabler, they were trying to fit the blockchain to address any business problems. So, later they realize that it is not the right way to do it. Because blockchain is not a solution for all. It only fits for some business problems and the companies started gradually, carefully walking the trend to see where exactly it fits in and then trying to make the investment to implement the blockchain solution to address their business problems. So companies are definitely willing, it is more about, in the beginning we saw many companies are investing , we thought it could boom ...but within a year or so [they] pulled back and started realizing it is not beneficial if it is not a solution to a problem.They are carefully walking it right now. In terms of adoption, definitely they are willing to adopt to this new technology.</p>	BM-IMD, ADP
12	Researcher	<p>So we heard from you ...any new technology coming in... they are trying to see if it fits their business [and] if it can enable the efficiency or otherwise. When it comes to the blockchain technology, which factors do you think is preventing or holding them back going full scale? we can speak in terms of blockchain capabilities.</p>	

13	Rsp2	<p>It depends on nature of business. When you look at blockchain, there are two specifics, private and public. Permission or permission less. So, lot of enterprises going towards permissioned blockchain. They want to keep their information probably within suppliers and vendors and include, carefully include few participants. So, it depends. For public blockchain, the main challenge is scalability and the speed at which transactions can be processed. So, example, let us say, bitcoin can process 10 transactions/seconds but with respect to Visa, 33,000 transactions/second. So, it is a huge challenge for the public blockchain and cryptocurrency companies to scale and process like Visa. [And] unless they do it, it may not be a de-facto currency at the global level. so, w.r.t public blockchain scalability, in the processing speed, there are solutions out there that could address...they are still researching lightning network which is to enhance the speed of transaction but still not as equal as what Visa has been processing per second or so. So, in terms of enterprises, permissioned blockchain, its cost and skillset availability ...to bring the developer with that skillset and completely rely on them and on top of it, the regulations. When it comes to auditor, when they come onboard to evaluate the financial statement, to give an opinion and if they have a transaction in blockchain and the company does not have a way to prove that blockchain technology which is providing the logic to process the transaction, it is very hard for the company to come up with the solution to evidence auditors how these transactions are processed. Even though blockchain is immutable and all those benefits are available, it is harder for the enterprises, in terms of audit, getting this audit and regulations ...being addressed.</p>	<p>BM-IMD, ADP, PRV, CUR, CRP, REG</p>
14	Researcher	<p>we are getting this...the last point you are telling us is, that the skillset to validate this kind of contracts / software code is a challenge ?</p>	
15	Rsp2	<p>Yes correct, there are many challenges. we can talk about many but among them I think in terms of enterprises, regulations are the key enablers... still the regulators are trying to figure out how to regulate public blockchain. Auditors are trying to figure out how to evaluate the black box ...processing of data transaction. So, the overall skillset at global level, there are only few individuals available. the company needs to pay more to hire and retain them in the space.</p>	<p>REG</p>
16	Researcher	<p>we got you, in terms of cryptocurrency adoption, USA, kind of leads among the rest of nations in the world. is there anything happening on regulations side on blockchain? Are there anything new [that] has come up or something you heard of?</p>	

17	Rsp2	<p>Yes, w.r.t US, it is sectorial. When I say sectorial, depends on states. New York being the financial hub, the state where most of financial matters are dealt, they are coming up with more regulations which are specifically on the emerging technology like blockchain. There have certain regulations like companies need to KYC (know your customers) and also anti-money laundering. Also Bit license, companies [that] needs to serve the New York residents, specifically the cryptocurrency, they need to go through certain regulations related to Bit license. Once they go through, we talked the bit license requirements, they will be... company will be issued a bit license. This [Bit License] creates trust within the market and the company can generate more business through the BitLicense. But in terms of regulations specially, [the] ICO tokens, the other type of crowd funding, some of them are considered as securities, so some of them go through security regulations and some of them are not. It is something that is challenging [the] SEC regulator...how to see whether it is a financial security are not. when there is no clarity in the regulations, they [companies] are paying a catch-up situation. Regulators always play a catch-up w.r.t the emerging technology. They do not really adopt... come up with set of regulations to regulate them. So, they still playing wait and watch game. But they are taking steps to adopt the new technology, so that the innovation is not contained because there are no regulations.</p>	REG, CRP
18	Researcher	<p>That is a useful information. If someone were to start a ride sharing platform and the choice is between Uber type of ride sharing platform versus completely blockchain based, say we came across decentralized autonomous ride sharing applications from Slock.it and La'Zooz, when you compare these platforms [blockchain versus non-blockchain] how do you see the difference in terms of accountability, their responsibilities ?</p>	



19	Rsp2	<p>For the decentralized, it is my personal opinion ...could be the public perception as well [that] if the company does not have physical address, [and] there are no employees, it is harder for me to believe in the code that runs the company right? especially you know, they have a pool of fund and decision is made by the people who invested or some way the other way they vote to how the investment should work. The people voting are... even though they are educated, but they are not the people who are similar to CEOs and CFO of the company to make the right decision for the DAO to invest in certain things. It is harder and it is risky for the firm to function. When company does not have legal address to it, again there are ...it is very difficult for any legal matters to be dealt. Let us say you know privacy matters and issues in EU is dealt differently w.r.t privacy issues in US. The GDPR in EU could make the company pay certain penalty and fines and also gives right for citizens who are impacted. In US, it is a different set of privacy. So, it is a risk of having people [network participants] making decision [about] how the company should make investment for the future of DAO, how people should be rewarded in the system and also rely completely on the code. Specially if code is hacked. ..we saw in Ethereum right? because the code [that] automatically running the transactions and smart contract [] people watching the funding being stolen by hackers and they could not prevent it because they could not make the change unless all workers come together to agreement to make the change happen and stop the hacker. So, the main DAO challenge is specifically... how they are going to deal with legal matters when the companies do not have physical address. They completely rely on the code and how they [are going] to prevent hackers? Because these are going to be developed by developers and only few set of developers are involved in developing the solution, how they can rely on code to autonomously function? educated or experienced people within the firm to make the financial decisions how to make investment and operate the company, it is going to be tricky for the company to sustain in the market if decisions are made by people who are not [experts] in making financial decisions for the DAO day-in day out just like CEO or CFO of a company.</p>	PRI
20	Researcher	<p>So, we understand trust is the major differentiator between these 2 entities?</p>	

21	Rsp2	<p>Correct. Even Uber is not trust worthy. There are [also] struggling. Every day we are seeing a lot of issues with Uber, either the driver who is driving the car is doing some crime and so that impacts the Uber. I trust Uber because they have on-boarding process. When they onboard the driver, they have all the background check and all other related matters to make sure they have the right driver and also, they train them, the driver, before they get into driving [for Uber]. whereas in case of DAO, how all these going to be implemented? It is going to be harder to code in a smart contract. it is going to be very difficult to believe in the code to ensure that they have a ...onboard the right driver and with whom I can rely to travel in the car to take me from one place to another.</p>	TRST
22	Researcher	<p>So, there are some areas that are not transparent that are not so clear for us to make the difference and talk about what is good in them or how to choose between them. There are many things that we are not clear. when it is onboarding, is it de-centralized on-boarding [meaning] does it require voting and majority consensus to bring someone into the network, we do not know about the entry criteria. Right?</p>	
23	Rsp2	<p>Yes, you know it is quite tricky [challenge] to bring in all these in a smart contract. How are they going to evaluate the driver background? They can validate their criminal records directly taken from government records and educational records from [educational institutions] but still it is harder for me to believe that all [validation] are automated and I think they should be some human intervention especially in taking decisions like this, what endangers my life. I have to be careful.</p>	
24	Researcher	<p>How decentralized or centralized these two [entities] are, we are not seeing how decentralized these units [networks] ... because there are so many processes and activities, can all these be automated and can be called decentralized is a question.</p>	

25	Rsp2	Yes, there are also advantages when I kind of support the direction of DAO, whenever I see the companies who owns 90% of market share by one or two companies say Uber and Lyft, they dictate the terms and conditions and they take the huge share of ...as a transaction fee. When drivers or users [are] paying the money, why they have to take 20-25% of transaction fee, just for providing the software to connect these two [entities]. obviously I see the transaction fees and they playing monopoly in the market, all these things [are] going to be inhibitor for Uber and Lyft growth and hence an opportunity for DAO to challenge Uber and Lyft to address [these concerns] and that could be one of the area that they can look into or already addressing... to take more market share from Uber or Lyft specifically around transaction fees and also changing the terms and conditions for drivers and users. So, these can be advantage for DAO in the ride sharing market.	BM-COM, TRAN, DST
26	Researcher	From this perspective, how do you see the future of intermediaries? Like Airbnb or Uber?	
27	Rsp2	10 years back, someone was to talk about Uber ...ride sharing company, we would have said, you know there are several complications for the company to exist and function but now we accepted Uber. So, it takes time for someone to accept the DAO but DAOs are definitely a threat to Uber. But [we can expect] Uber and Airbnb to definitely will look into DAO opportunity at least in some portion of [their business model], to do something to make sure to adapt new type of organization but I do not foresee this happening very quickly unless DAO address all regulatory and legal matters. Unless there is some sort of human intervention, the main purpose of DAO is not to have a human intervention, but they want to have everything automatic. But some sort of human intervention making decision, certain matters that endangers life, would give lot of opportunities for them to capture market from Uber or Airbnb.	BM-DST, INTER, REG
28	Researcher	If Uber has to ...that is another important point u mentioned. if Uber and Lyft ...they might be looking at some advancement in technology and if they were to incorporate some of the advantages of blockchain, DAOs are...whatever they can bring to their business model. Do you think this could change the transaction cost in Uber, can it bring change to cost of transaction? if it were to adopt blockchain?	

29	Rsp2	I think one of the main things [reason] that we adopted to Uber is...consumer's fare. When we take Taxi, it costs \$25 whereas Uber charges only \$12 or \$13 or \$14 which is 50% less than the taxi. so DAOs are going to move Uber in that direction to say...let us say...Uber charges \$12 and DAOs charge \$8 so people are going to move quickly in that direction. So, Uber has a pressure obviously in terms of fees and some or other way they have to show the consumers that there are other things that consumers have to consider before they adopt DAOs. so, what I foresee is the cost of transaction or cost to consumer is going to come down. Uber will have pressure to bring down cost to the consumers.	BM-TRAN, PYM, COM, BNF
30	Researcher	when it comes to the primary functions of Airbnb or Uber, based on our literature read we got to know that they do spend enough in marketing to attract suppliers and users into the platform. When it comes to DAOs, I am not sure how...does it require same scale of marketing ...or is it because it is going to bring down the cost for users or may be lesser commission or no commission for the suppliers, can we expect some change in the marketing cost that intermediaries has to spend today?	
31	Rsp2	The main purpose of marketing for any new product is getting familiarize with product. if I were to be in the market like...I do not know about Uber, I do not make an attempt to take their Uber taxi...so the market has to adopt to build the trust initially with customers using the product should have certain advantages to the customers. so, marketing cost is going to be there but how they market themselves going to differ. so the intermediaries definitely if they do not create the awareness or familiarity with product, consumer like us not would adopt that just because it is DAO, I may not use the product unless otherwise you market the product [about] how trustworthy is the product, how benefits me when I use this product etc, I am not going to use the product.	
32	Researcher	We got it! If someone does not have technical background, they can still be supplier or user of a Uber or Airbnb application. Is this going to differ in a DAO? We came across that the currency that is used for transaction could be cryptocurrency, but we are seeing some challenge that not everyone owns cryptocurrency, Hilal has come across articles about this that there is a fee for exchange.	
33	Researcher	Yes	

34	Rsp2	<p>Yes, that is another drawback for DAOs. They use their own currency. Let us say I got some shares within the DAO to process their native currency. so, the people will evaluate within the company if the currency is equivalent to certain number of fiat currency say to US dollars. you will not get that value when you exchange, you see the reality when you exchange...so in terms of value of cryptocurrency that is being discussed, it is one of the drawbacks of DAO. When people evaluate Airbnb for like \$15 billion people have some guidelines to evaluate whereas w.r.t cryptocurrency the valuation is very difficult to comprehend as a normal consumers or suppliers without knowing what it is, to build trust in the value of cryptocurrency or the currency that they are using within DAO, their native currency. Did I answer your question?</p>	<p>BM- CUR, TK, TR_CUR, CRP</p>
35	Researcher	<p>Yes, if that is going to be a challenge for them. And if they opt for another medium say credit card like Uber or Airbnb but internally as part of their platform may be there is an exchange process built...but that is an additional process if they want to do it in platform. If that difference they could show, would a mature supplier or user of Airbnb or Uber, there would be change in mind ...ok I am fine to adopt?</p>	
36	Rsp2	<p>Yes, we are humans. we are used to see things in a certain way. If the adoption to phenomenally improve if I do not see change from normal operation. if I see same interface to get the taxi and ride the taxi same as smooth as what I used for Uber taxi and there is a financial transaction is going to be same that they take money from my card, background whatever you do with that money you do not expose me to those, the adaptability is going to phenomenally increase. That is one of challenge w.r.t blockchain, they are trying to come up with an interface which is we are all used to ...currently within cryptocurrency world they are able to bring up something for ordinary investors can invest in cryptocurrency but the same thing should be brought to other set of blockchain users like other applications DApps, i.e., decentralised apps. as long you put me through the same level of rigor what Uber is doing or the process that I am familiar with[or a normal consumers familiar with, the adoption will increase for DAO or DApps.</p>	<p>CRP</p>
37	Researcher	<p>OK. As you are more into security, we came across triad, the intermediary, supplier and user...when it comes to security in a ride sharing for example[] non-blockchain versus blockchain ride sharing[, leaving the type of currency used, just from the security point of view, is it going to be different for these 3 entities?</p>	
38	Rsp2	<p>Hmmm Ok. [Silence]</p>	

39	Researcher	As a user, when I download these application, I may have to give payment details...	
40	Rsp2	At first, when I had the Uber app, I was hesitant to give my credit card details because I do not know about the company. But later, as the product becomes familiar people started using because I am one of the risk averse person and then I started using this Uber service. But the question is about...right now I have credit card, [credit] card company protects me. if there is going to be a fraudulent transaction, my credit card company will protect me. As soon as I say that I do not recognise the transaction, the credit card company look into the matter and they will fight for me to get that money back or invalidate the transaction so that I am not penalised for something. w.r.t DAOs I am not sure how credit card companies will work. As long as I am protected, right now I am not looking into Uber security to see whether they are protecting my information whether they have a set of procedures to protect my data. Everyday I see some sort of ...LinkedIn or Uber, there is news on hack, or some information is leaked, like that we still use their service. Companies are not 100% security proof.	CRDCCD, UBR
41	Researcher	Very true.	
42	Rsp2	In terms of security, as long as I am protected, if the DAO or some other company, I am going to use their product.	
43	Researcher	W.r.t cryptocurrency if we have to talk, credit card I do understand...thank you for the details...credit card company gives second level of protection if there is a fraudulent transaction. when it comes to DAOs and cryptocurrency, you have some knowledge about the Bitcoin, when users use that as the medium or transaction , do they have similar rights?	
44	Rsp2	No, they do not have similar rights because there are no regulations. Not a regulated like fiat currency, Bitcoin is not backed by any government so there are no protection. If you have to ask me a question about Bitcoin or any kind of cryptocurrency, I am still I am a risk averse person, I want to play wait and watch unless entire society starts using those one type of cryptocurrency. Even though bitcoin has good market share as opposed to other cryptocurrencies, I don't own Bitcoin in my personal investment or I use it for processing transaction with any companies, so there are no legal back for Bitcoin.	REG, CUR, CRP

45	Researcher	Alright !, Now I think is the the right time to ask you. Suppose there is a community network that is coming in the area of your stay and it talks about a DAO a ride sharing DAO is coming up and the only way to transact with this DAO is cryptocurrency but you get a cheaper ride and they also talk about in terms of contributing to the society let us say sustainability or profit sharing within the network of society, would you be interested ? but you do not own a cryptocurrency yet but if you have to be a user, if they say that is an entry point that you have to own one, would you be interested in it?	TR-CRP
46	Rsp2	I would not be. because I do not want to own something that I do not know future about. No, I cannot completely rely it.	
47	Researcher	Just to add to that, suppose say all things stated remains the same but the medium of paying for the transactions can be say, there is a choice ...	
48	Rsp2	Fiat currency	TR-CUR
49	Researcher	Yes, it could be a crypto currency or a normal credit card, will your opinion change?	
50	Rsp2	Yes, definitely change. I can definitely use that ,it is an advantage for me . the main reason for not using cryptocurrency is because I do not trust , the valuation of cryptocurrency.	TR-CRP
51	Researcher	Another thing about the, major feature of match-making platform like Uber, the quickness with which they make these decision. When we request for a ride and a match is being made and sent with blockchain running in the background...may be Uber themselves going to adopt blockchain for their process, would the quickness vary ? do you have an idea?	
52	Rsp2	If terms of adaptability, quicker as opposed to Uber, you are asking the question?	
53	Researcher	In terms of transaction speed, speed with which they do the matching ?	
54	Rsp2	It depends on person to person. I could wait 5 minutes to get the driver to come and take me. But for others it may be a big factor that they cannot wait for 5 minutes. But if 5 minutes could save me \$10 or \$14, I could wait. that should not be a problem at all.	

55	Researcher	May be we have discussed the value proposition from Uber perspective and La'Zooz or those DAOs. If they have to really attract ,based on our conversation what I see is, the type of currency that is used for transaction, if the status quo is same, I am hearing that there could be more favourable adoption to these.	
56	Rsp2	I am not looking into Uber on-boarding process and the similar ride sharing DAOs. When it comes to rigor ,in terms of getting the drivers on-boarded within the network, approval without any background check, that would be one of the key factors that I will consider. Even though they would allow me to use credit card to make the payment, I would give more value to drivers who are on-boarded for the specific purpose than other features credit card or lesser money to take me from point A to Point B.	TR-PYM, CRDCD
57	Researcher	Hilal, do you have anything more to ask?	
58	Researcher	Mentioning about commission or commission-less, we know that using cryptocurrency could be a drawback for DAOs but on the other hand, charging no commission, do you think this could be an advantage for DAOs or block chain users?	
59	Rsp2	Yes, definitely. That is one of the factors that they can use it [to market] for their advantage. Because, Uber to start with, they had a lesser commission and then gradually they increased the commission. It is quite going in the direction of being unfair to the drivers who are working hard to take the passengers from point A to point B. It gives me a perception now that even though I save money through a ride,Uber is not doing a fair part to pay the drivers. Especially in India when I see the drivers struggling to make the ends meet, Uber is taking huge commission which is quite unfair which could be one of the things that could be an advantage for the DAO if they either take less commission or 0% commission and drivers are paid 100%, I would be happy to consider this as one of the factors to consider using DAOs.	BM-COM, TRAN, DST
60	Researcher	OK	
61	Researcher	Alright, anything else Hilal?	
62	Researcher	No. did you ask 'how to attract customers'?	



63	Researcher	In terms of challenges, two [of them] we heard; how the drivers/suppliers are on-boarded to the system, another challenge is the payment, the transacting currency. In terms of opportunities for these DAOs, if they can project themselves that they are helping society or in terms of helping driver community by taking less or no commission.	CUR
64	Researcher	Ok , then we are done.	
65	Researcher	Is there any other information you would like to add?	
66	Rsp2	I think you have asked the right questions, if there is anything that you have after transcribing, if any questions, let me know. We can either talk or chat via email.	
67	Researcher	Great! Thank you for giving your Sunday morning. Thank you so much	
68	Researcher	Thank you very much, for your time and contribution to our thesis.	
69	Rsp2	Sure, good luck with your thesis. I am glad that I am part of this thesis.	
70	Researcher	Thank you	
71	Rsp2	Thank you, Bye	
72	Researcher	Thank you, Bye and have a nice day.	

## Appendix 4: Interview transcript 3

<i>Line</i>	<i>Actor</i>	<i>Conversation</i>	<i>Code</i>
1	Researcher	Indranil, Thanks to you for supporting our thesis work. Myself Sathya [introduction]. Hilal [introduction]	
2	Rsp 3	I am an engineer by education. I work as a Project Manager in Tetra Pak. I had opportunity to work in project delivery in different functions. HR, Finance, Supply Chain, Manufacturing etc.	
3	Researcher	based on your experience with this technology, we understand you have been associated with some blockchain initiatives in Tetra Pak, how do you see companies adopting to this new technology? You could speak from Tetra Pak perspective or if you are following other industries, you are most welcome to give us information about rest of the industries as well.	
4	Rsp 3	Let me give you a background about what I have done with blockchain. Last year, we had an initiative innovation we were looking at different digital solutions that are available in the market and we were trying to see that in Tetra Pak digital transformation initiative how some of these can help us.	BM-ADP
5	Researcher	Sorry to interrupt, there is a bit of echo. Indranil, could you come over close to mike.	
6	Rsp 3	Indranil, I will disconnect and let us all re-connet	
7		[Reconnected]	
8	Researcher	Still the echo is present but may be we'll take it slow	
9	Researcher	I will speak slowly and if you cannot hear , let me know.	
10	Rsp 3	We were looking at different opportunities that Tetra Pak can find out of blockchain. or in other words, we were looking for use cases for blockchain delivering value for Tetra Pak and helping Tetra Pak in it's digital transformation. Blockchain was new to us. you have read some basics on blockchain right?	BM-ADP, USE
11	Researcher	Yes	

12	Rsp 3	Ok. First we understand it is quite complex. We took sometime to understand blockchain in a simple way. We spent time with senior business leaders of Tetra Pak to see what kind of problems we have for which we can use this technology. Next thing we did, we looked at other people in the industry who used blockchain, to get outside view. We did this in two ways. One, we took interviews like how you guys are doing it now with companies who have been using blockchain for example, <> from Singapore who have done some PoCs in blockchain. We also spent some time with MetLife. We tried to understand what they have done and see if we have similar use cases within Tetra Pak. we identified few use cases within Tetra Pak where blockchain can be used and we made certain recommendations to the organisation	BM-ADP, USE
13	Researcher	Could you mention what those use cases are?	
14	Rsp 3	Yes, let me show you. can you see the screen? (Please see pictures in the last paragraph of this interview transcript. Process explained). We are trying to enhance our business model to provide services to our customers in addition to providing packaging equipment and packaging materials. Food safety traceability is a hot topic. What Tetra Pak is trying to do is provide a digital platform connecting these various value chain partners. If you see, Tetra Pak, being a hardware company meaning equipment and packaging company, is going towards a service business.	USE
15	Researcher	Does Tetra Pak have this platform already? or it is going to come up with a new platform based on blockchain?	

16	Rsp 3	<p>Where does blockchain come here is...we have ProCo as an initiative where a QR code is placed on each package for a consumer to scan and trace the value chain. Our customers can buy this service from Tetra Pak. When we have digital code on a package it is also a risk. External organisations possibly a competitor can reverse engineer this code or create counterfeit code or they can corrupt the code. One of the use case we came up with is- if we store this unique code in a blockchain. This is one of the very big projects in Tetra Pak, this unique code we call it [some] code. Our recommendation is that we store customer information in a blockchain so that we minimise the risk of someone hacking or creating counterfeit code. What Tetra Pak wants to do is, we want to provide this service not only to Tetra Pak packages but to also to our competitor packages. Meaning our customer can use this service and print this QR code on our competitors package. There are few more use cases we talked about. Another one is digitalised trade platform. You must have heard about IBM Maersk initiative and they are using blockchain to support end-end supply chain. It is very interesting ... Tetra Pak is one of the participants in the Proof of Concept. So if you back and look at IBM (platform) you see a packaging company which has participated in the PoC and it is Tetra Pak. There are different entities involved in packaging who not necessarily trust each other and today they are transferring a lot of manual documents and the idea is to use blockchain to capture this information. Imagine, the exporter puts in export related document in the blockchain and before the freight forwarder reaches the port, the port authorities have verified these documents and they are not verifying manually but through smart contract. So when the freight forwarders come in, it just goes into the [], there is no holding time. Same thing happens when it reaches the other side of Atlantic when it reaches American soil. They can see all documents submitted through smart contracts, accept those documents to clear the goods and then secondary transport can take it to the warehouse.</p>	USE
17	Researcher	Ok	
18	Rsp 3	You also understand that all of these can be done without blockchain.	
19	Researcher	Yes, that is where I am coming to. HaHa. we can use an application to trigger and what made you choose blockchain or what opportunity you saw in blockchain that formed an enabler for this particular solution	BM-BNF, EFC, IMC

20	Rsp 3	Sathya, to be honest with you, I don't know the answer. it was not my solution, it was IBM Maersk's solution which we are using as a partner. We are not trying to develop this solution. we are partner in this solution. The question is that the entire thing can be done in a centralised system. We do not need a [de]centralised blockchain to do this. The fact is that such a thing was tried many times in the past where we tried to bring collaboration between different partners in the value chain and it has always failed.	
21	Researcher	The reasons?	
22	Rsp 3	Many reasons. One of the major reasons are the people behind. So, people are not ready to collaborate. Also maturity. Each of these organisations has to have have similar maturity if they want to communicate with each other. Let us say, when I export, I define my goods in a particular way that port authority or the freight forwarder takes it another way because the Master data for the exporter and freight forwarder are not the same. If you see here, the amount of effort that will be necessary to streamline the data or streamline the structure of data, to have an IT system that can talk to each other similarly. The success rate of B2B integration is quite low even today and here we are talking about B2B between multiple partners. even though it seems very easy, implementation wise it was never been successful.	
23	Researcher	Was there an enterprise system that was used by Tetra Pak but which was not productive the way you wanted to be, but now you are considering blockchain based enterprise system from IBM? Is that what we are hearing?	
24	Rsp 3	No, this is not an enterprise system but across the enterprises	
25	Researcher	OK	
26	Rsp 3	Tetra Pak has an ERP system but the others, they may or may not have an enterprise system but they'll have some kind of system. Now making these 2 systems talking to each other is not easy. We are multiplying complexity.	
27	Researcher	How was the communication before?	

28	Rsp 3	There were different types of communications which were used like EDI. very often what you see in this logistics business is that ...lot of these things happens in physical paper. So the truck will carry the physical documents or they mail .pdf documents to the port authority. even in 2019. the requirements from port which is on one side and the requirements of ports on other side are very different. When I discussed with IBM about these, they said blockchain will solve all problems of humanity. Any problem in the world you have can be solved by blockchain. But my take is ...this is my personal take, they just wanted to try a new technology and try to make something which failed before. If you look at it a conceptual, it is a fantastic idea. But it is due to practicality they could not make it work. There is a lot of hype about blockchain. so they are trying to ride that hype and see if they can implement and make it work. That is my personal opinion.	
29	Researcher	OK. If Tetra Pak has to be a partner in the network, if we have to talk about what are the drivers or what are those factors that could prevent/de-limit Tetra Pak from reaping much benefit out of this whole thing, is there anything that comes to your mind - in terms of cost or expertise or any other factors that could prevent or impede from Tetra Pak gaining more from this blockchain based network ?	
30	Rsp 3	Our learning has been that blockchain is a nascent technology. It has lots of hype ... not that much of a substance. When I speak to these guys[IBM], seems it will solve all those known and unknown problems of humanity. We heard from Vice President of blockchain technology of IBM that consumers can determine the food contents []. What we found when we try to upload the file to IBM Maersk, it could not even upload the file.	
31	Researcher	Ok	
32	Rsp 3	So, there is a big difference when it comes to reality, we tried to come together on three occasions but could not upload the file into the system and then we have to send to IBM for them to upload through backend. IBM claims Maersk is a one stop solution but that is not what business leaders think. when we consider the logistics cost, documentation is 20% of the cost. And there is a technology called 'Control Tower Technology' that could make things work.	BM-IMD, ADP, PRV
33	Researcher	which means there are theoretical benefits but when it comes to practical - you are unable to see those benefits what is claimed in practical?	

34	Rsp 3	we spent some time with Gartner[]	
35	Researcher	Given this background, are there any active work going in Tetra Pak	
36	Rsp 3	We are doing some PoCs to capture customer's production data in a blockchain.	
37	Researcher	OK. Hope you had a chance to look at the thesis background that we shared with you. Apart from blockchain being used to enhance or to change part of business processes, there are also called decentralized organisations made possible through blockchain and we learnt that the digital platform that Uber uses could be replicated through a blockchain based network called decentralized autonomous organisation. This is a digital platform that is kind of emerging threat to Uber because it makes it possible without intermediaries using smart contract and another value proposition they say is , it would cost less for a ride because the value generated is shared within network. Have you heard about such network? What is your understanding of these networks?	
38	Rsp 3	Uber is not only dealing with unused resources. Uber owns a lot of cars. In Singapore, before Uber was sold, Uber had lots and lots of cars which were leased and they also utilized some unused resources. so I think the business model is different. And I have a question, this DAO...IBM is creating a similar platform Maersk, Blockchain does dis-intermediation. So, it removes intermediaries between people who is creating the value and people who is consuming the value. How they are doing it? Technology is creating that trust so it does not depend on the intermediary.right ?	
39	Researcher	Right.	
40	Rsp 3	All these digital platforms are actually intermediaries right?	
41	Researcher	Yes	

42	Rsp 3	I am trying to replace [it with] another intermediary? Who is going to run this platform? who is going to make money out of this platform? IBM Maersk is not doing it for fun. They have actually created a new company to manage this [initiative]. In a way it [the DAO] seems to be a new intermediary but not taking away. Let us say, I am transferring money from Singapore to Sweden, I do through banks. Banks are intermediaries. When we did the research we found that are some 5 intermediaries in such kind of transfer money across countries and each one of them add a cost. But why people are doing it [through banks] because they trust. So, they are taking fees by providing me the value or providing me the trust as a service. When I transfer money, I am not ready to loose the money that is why I am ready to pay the commission. If the technology can replace and create that trust, of course. But DAOs are the new intermediaries. It is not going to run its own right?	BM-INTER, BNK
43	Researcher	Agree.	
44	Rsp 3	They are in this business not to improve the life of humans, they are trying to make money out of it.	
45	Researcher	we are glad to have IBM example. The kind of DAOs we came across like La'Zooz, the claim is that they are being promoted as a community or social network in which they share the under utilised resources. In a way it is being claimed, it is a non-profit or a community service, based on our research we did come across there is a group of developers who create this system and they float it and they set a target level, when these many users join, then the network starts functioning. But we also understand that any IT system needs maintenance for it to be able to be kept running. So cost involved in all that.	
46	Rsp 3	If someone tells me I am doing to do some charity, let us say I am not going to buy it. Like you said there is cost involved, how long can you sustain that? They need money, in order to sustain and they need to take money. Today someone is taking 20% cut, I[new intermediary with blockchain] will take 5% cut. But another person can come and say, I'll take 18% commission. What is the difference?	BM-TRAN, PRF, RVN
47	Researcher	While we were researching, they [new business model with blockchain] are trying to reduce commission rate than that is charged by Uber or Airbnb. Uber is charging high commission. That is why some of the developers came together to create a blockchain based application which is not charging any commission but let us say 1% or 2% or something.	



48	Rsp 3	<p>Yes, I agree with you. They are also intermediaries and may be they are charging less. The moment they pickup things, they will start charging more. Today they will charge less because that is the only way they can survive. It is not just technology, it is business. There was a problem and so they want to solve the problem and obviously if they can reduce cost, they will charge less commission but essentially they are intermediaries. Any platform is an intermediary by definition. If they can use technology to reduce cost and hence charge less, these large corporations are not sharing the profit with people, I understand conceptually that blockchain has the potential to provide the trust that we need today. We need intermediary because we need the trust. If technology can provide the trust, then I do not need these [Uber/Airbnb/bank] intermediary. If I could transfer money through blockchain, and I could trust blockchain and blockchain had legal acceptance that if I loose money I can go to court and tell them that I put [transfer] money and the other person didn't receive it, then I am ready to do it [using blockchain based network] provided I pay much lower commission. Fundamentally what blockchain is trying to do is trying to create the trust that we need between different organisations to work together through technology.</p>	BM-INTER
49	Researcher	We got it.	
50	Rsp 3	That is why there is a hype that it can be the biggest thing that has happened since the invention of Internet because it can dramatically change the landscape. All companies who are the middleman between the producer of value and consumer of value are under threat because technology can produce that trust. But this is at conceptual level.	
51	Researcher	Well said. What would be the intermediaries reactions be like ? How are they going to respond to this?	
52	Rsp 3	This is a difficult for me [to answer]. They could jump into the bandwagon which will make difficult for the DAOs. I do not know. But there is a hype around blockchain. If you say you are working on blockchain may be your share prices will go up. You understand what I mean? That is one more thing we got it from Gartner. They said in 2018, 85% of the blockchain projects reported can still be done without using a blockchain.	BM-ADP
53	Researcher	Ok	

54	Rsp 3	For organisations to work together collaboratively, it is not easy. It is not the technology that is holding it back but it is the other things. I think the technology will be there but the ability for organisations to collaborate with each other, that is something we have to look into.	BM-ADP
55	Researcher	Do you think blockchain can play a role? What can it bring to this collaboration challenge?	
56	Rsp 3	At the end of the day, when there is value for each partner, they will come together. I'll give you an example. Let us say Tetra Pak has banned something from a vendor. so we create a purchase order in our system. we send it to vendor. vendor create the order in their system and creates an invoice. Tetra Pak receives the invoice and then inputs into our system. This is a non-value add activity. The moment they create an invoice, it comes to our system, then we can remove this non-value added activity right? very simple right? I do not need a person to sit and input into our system. right?	BM-ADP
57	Researcher	Right	
58	Rsp 3	But it is very difficult to implement. We can see the value?	
59	Researcher	Yes.	
60	Rsp 3	But it is difficult to implement if the data definition is different. Today, we find it difficult to implement between two systems. Now if we have to do it between 5 or 10 systems, it is going to be difficult.	
61	Researcher	So, we understand ... there is technical challenge in terms of how data is defined in the system today and so, if they have to collaborate with blockchain, it is going to be complex ? We are not talking about possibility but a complex activity to collaborate and produce an output to enhance collaboration or remove this non-value add activities.	
62	Rsp 3	Correct. It is nothing to do with blockchain right ? It is about mapping of data across system. Blockchain is going to work but it has to get right inputs. right?	
63	Researcher	Yes	

64	Rsp 3	By definition we use blockchain when there are multiple people in the chain who not necessarily trust each other. right?	
65	Researcher	Very true	
66	Rsp 3	Now mapping their systems into a uniform data model, it is going to be a challenge...it is not a blockchain challenge but it is going to be a challenge. At B2C level, it is different. For example if we are talking about this ride sharing thing. I do not know how it works. I looked into blockchain on how it can collaborate with each other.	
67	Researcher	That is a good information. At this moment we came across challenges like cost, lack of expertise but we are hearing that for a company like Tetra Pak or IBM Maersk if these are going to bring several entities into the network, one of the challenge is how the data [system] is going to talk to each other.	
68	Rsp 3	Some other limitations we have seen in blockchain is; lack of privacy. Blockchain by nature is everyone should see everything. But imagine if Tetra Pak has 5 vendors and everybody can see the price for every vendor? problem right? I buy the same stuff from 5 vendors and each of the vendors can see each other's price in a B2B scenario. Non-technical limitation is lack of legal acceptance. I'll say an example, I am the owner of the apartment and I want to rent and then there is an agent. I [User] put all the funds in a blockchain and create a smart contract. when I have told the blockchain that I have got the keys, the agent gets automatically paid from my bank account. I can write that code right. Imagine if I have to explain to the real estate agent. Will he buy it? Will he accept this? This is technically complex, will normal people accept? those are the other limitations that we thought about.	PRI, BNK
69	Researcher	Reputation of the intermediary which is replaced by trust from blockchain...but still we say that reputation of the intermediary still could make a difference in terms of someone accepting the transaction?	
70	Rsp 3	Yes, User acceptance will take time.	
71	Researcher	Indranil, if you were to put yourself in the User [place]. Now that you have some experience and exposure to blockchain, if such a network comes, will you be interested to participate in a network based on blockchain ...may be book a Uber kind of ride or Airbnb kind of renting through a blockchain based network ? What is your opinion?	

72	Rsp 3	If I am booking a vacation stay, since I know blockchain now I would trust it. I would not have trusted it 1.5 years back when I knew nothing about blockchain. If that provides a better value, I will.	
73	Researcher	Ok	
74	Rsp 3	Again, there has to be better price or some other value. Let us say I go to booking.com and the same place is offered for a \$100 more, then it is an incentive to book through blockchain.	
75	Researcher	Ok then... Thank you for your time. If we have any follow-up questions, we'll write to you	
76	Rsp 3	If you have any follow-up queries, do not hesitate to come back to me. I'll help you wherever I can. Can I request something from both of you? once you have done with your thesis, can you share it with me?	
77	Researcher	Sure.	
78	Researcher	Thank you, Sure, would you like us to include Name, Role and company in the thesis?	
79	Rsp 3	[reviewed consent statement] Yes. Thank you	
80	Rsp 3	Was this discussion useful?	
81	Researcher	Of course, very useful. getting information from Tetra Pak with the kind of experience you have in this subject, it is going to be of great value to our thesis work.	
82	Rsp 3	Great	
83	Researcher	Thank you, Have a nice evening.	
84	Rsp 3	Thank you. Bye	

## Appendix 5: Interview transcript 4

<i>Line</i>	<i>Actor</i>	<i>Conversation</i>	<i>Code</i>
1	Researcher	Thanks for joining us for a formal conversation on blockchain. just I give you a short background. I am sure you may have looked at the document we sent.	
2	Rsp 4	Yes, I did.	
3	Researcher	We wanted to do a exploratory study on BC* to understand how this technology is disrupting the established intermediaries. We came across, the most familiar intermediaries that we have come across are Airbnb and Uber. Because we have used it. So, we thought it is good place to start understanding the concepts and its applications and challenges in this area. So, we choose sharing economy. This is the background, if you could tell me your role or your association with this technology in general. * Please read it as 'blockchain'	
4	Rsp 4	I have been associated with BC in primarily from the point of view of the business, which is identifying what are those use cases... Because that is one of my area of specializations. We have a startup in India where we are just through .... on BC solution from the ground ... used for corporate side in terms of tracking that is an application which is being used with distillery bottled and waters bottles. So that provides them authentication, and anybody can check whether this is an original packaged water, or it is duplicate which is one of the major issues in India. The duplicity of even, you know, the basic stuff like package and the water and all that. So, we are using it trying to find application. One of the business applications that we are trying to find in terms of registering of sale deeds in India. That is where we are working on a solution. Primarily because of the election, was to the workaround the public sectors ... in India right now. So that and we are working onto couple of other solutions in the same space, public sector space. I have also been in discussion with some friends who are working on the transport side of BC, so I keep on doing, you know, bouncing of ideas with them. But they are not directly associated with any of those [blockchain based ride sharing] solutions. But yes I do keep on contacting each other, taking each other's point of view on some of the potentials.	

5	Researcher	Great. So, based on your experience, how do you think the intermediary companies have started looking at BC as part of their business model ...[or] in terms of enhancing their business model?	
6	Rsp 4	See the way I see, replacing of intermediaries let's say Airbnb or Uber by a BC based intermediary.... First of all, that somebody will have to sit down and develop that BC solution on which these transactions can happen. The moment somebody develops a solution that alters intermediary ... at the end of the day, It is not possible completely replacing intermediaries because the fact that there is not one BC. there are other going to be competing with private BCs on which some of these solutions will have to be created. But yes, what it can do is if introduced, the cost of transactions and the cost of market making which they used to do. That is one potential. But for that to even happen, there are number of pieces in the whole puzzle which will have to come and fit into each other. It will not just have to be BC based transaction, it will also have to be a smart contract system and the money linked with the smart contract. As of now, not many banks have started to support smart contracts or other ...you will also have to maybe integrate with some e-currency. So, the way I see it is in a full-fledged BC based mode... It might take around five to seven years as much as to fortify or successfully challenge existing set of platforms. Because it needs a lot business as well as technological pieces which will have to come true. For example, from a technological point of view, the system to support that kind of transaction, because takes a lot of time to create a block. there is no ... even in a private BC which can support so many transactions. For example, in Uber people expect transactions in real time and the technology has not matured enough to support that kind of transactions in real time. ... still out on that, the technology which will have to be addressed the linkage with the bank and financial institutions, the acceptability of digital currencies by the central banks. So, a lot of things will have to fall into place for that to become a reality, to create that fiction place where things can move between various users level. That is my view at this stage currently.	BM-EFC, IMC, DST, IMP, INTER
7	Researcher	Great. That is quite a lot of information...and you mentioned about cost of transactions coming down because of having BC as part of the platform. Could you elaborate on that? How does the cost of transactions go down?	

8	Rsp 4	<p>As of now, the transaction cost in BC is still pretty high. Because of three things. First is the transaction between the digital currency and actual currency. For example, if somebody accepts the payment in the digital currency, because of the volatility in the digital currency, you will have to ... risk that you are taking just from the currency point of view. So, companies will have to anybody who accepts that digital currency will also have to have a very strong hedging and make a, you know, maintain the financial systems to make sure that they don't lose that money just because of the price fluctuations in the digital currency. That is the financial exchange point. For example, between yesterday, bitcoin moved on 1400 dollars up. So, if somebody sold something in or let's say it moved down. So somebody has purchased something in bitcoin and accepted one bitcoin and the matter to us, the bitcoin value goes down by thousand dollars or five hundred dollars. That is a significant downside risk. So, either he will have to have a very strong hedging methodology, or he will have to exchange with the bank, so he can get a real time conversion of his money to this money. Because people who run their business are interested in managing the currency. That is clearly one ...exchange at the finance or the currency point of view. The second cost, that will have to come down... i.e., once the digital currencies become more acceptable, they become less volatile or most of all digital currency takes a shape, then that will become a once that the benchmark is there, that will go down in terms of cost of transaction than the hedging cost. That is a financial cost. The second cost is the port transaction cost. For example, you take a platform, but platform requires a lot of backend and server and ability to create blocks or computing power. At this particular stage, they are for example in Indian rupee value check ...or Hyperledger or some of the other private BCs and I want to post a solution on the private BC or provided by a particular supplier. It can cost as much as ten to twelve rupees for the transaction. So, the cost of executing BC transaction on a system on a third party system or software system can be around 1 to 1 and half kronor. That is a lot of money at this stage. and the fact that capacity is very limited. So once a lot of other consolidation happen in the market. Right now, everybody is creating their own BC, there are hundreds of private BCs. everybody is trying to capture this market. Once two or three people, three or four companies become emerge as a major winner ...or the leaders into that and the market gets consolidated, their scale of economy goes up, the more solutions on they have, the cost of operations goes down then the transaction cost will go down. SO, unless until the transaction cost collapse from let's say by a 90 percent from here, it is not going to very profitable for the companies. You will see the value in that because one the cost of the transaction to a company which is the, let's say, one million transactions a year or more. They are going to spend a lot of money in making sure the solution is on BC. whether they are going to be able to do that get that kind of a benefit from BC or not, they do not know, because it is all still in the air that you will get benefits on</p>	BM-CRP, PYM, CUR, ADP
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		<p>BC. So, unless the cost of executing the per block transactions goes down significantly, which will that is the way it happens in every new technology, whether it is an IoT or mobile. Once you start getting those numbers and then the cost can reduce exponentially. That's called broadband cost in India for a lot of those things. That is clearly second big aspect of that. The third big aspect is the business acceptability point of view. At this stage, the cost of moving your whole system into BC based system, now this operating it, but moving a system into BC system is a huge cost. While the number of people who are expert on this is very limited. the cost of moving your existing system is a significantly high cost at this stage. again it is an early stage of technology adoption. there are companies who are adopting it, but they are still, a lot of them, holding back, ok, lets see how we can find hybrid models around implementing BC. Hybrid models means do I need to move all my database into BC or I just need to move certain part of the transaction into BC. So once those hybrid models and successful examples come in, the cost of execution on moving creating BC based systems will also go down. so once these three costs started collapsing, then the adoption can significantly increase.</p>	
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9	Researcher	I think that is when then the consumer or the user can realize the benefit of the lower transaction cost?. Until then it is like a war between...	
10	Rsp 4	actually at the end of the day anybody who says "we are gonna pass on the benefits to users" is like, nobody passes on the benefits of any technology or any adoption on to the users. It is only temporary. Businesses primarily work on the concept of monopolies and the profit. So unless until these business make that exceptional profit, it is going to increase margins of a particular business of a particular business. Why are they gonna invest? They are gonna invest because they are gonna be able to charge maybe a little more money to the beneficiaries. for example, you should provide a BC based solution to foods related product. You are gonna be able to provide a better solution and maybe assure somebody that this is very good source of product and then you are gonna able charge them the premium. SO you are gonna invest in it today and expect that your cost go down significantly in the future and that the margins goes for expansion. Nobody foresees the benefits of technology. That are no seen that any company reducing the price of its product. It is only good to say that when they write articles and make interviews that they are gonna pass on the benefits of technology. Nobody does that. Lets assume mobile phones. the mobile computing power has increased dramatically in the last ten years. The hype of iphone has not gone down. It is not they are not doing something great which is to us not doing 5 years back. It is only VR capabilities recently added. For them no reduce the price. That is never their objective. I can sound a little cynical.	BM-TRAN, PRF, RVN
11	Researcher	No that is fine. It is your opinion based on what is happening around. Ok. Given this scenario, what do you think, it is hypothetical because I understand all the challenges that you have mentioned for Airbnb or Uber kind of network ...to come operational... be accepted by the users. I did get all the challenges that you have mentioned. Given this background, there are new players like German startup Slock.it coming up with the mobility network, La'zooz is another BC based network that is again a ridesharing application, what do you think...	

12	Rsp 4	<p>sorry to interrupt. That is what I am saying. At the end of the day it is again a startup. There is somebody who is creating their platform. As of now, Airbnb is creator of a platform. That is not a BC based platform. What other mobility startups are doing, they are creating new platforms which are BC based. Now, at the end of the day 90 percent of these startups or 95 percent of these startups create some solid technology which get acquired by some of this bigger player. The ability of them to be able to unseat some of these bigger players is very low. Because, one, the amount of money that these bigger players have already the profits that they are making. They can also invest and be solution expect that they would or would have not been investing in these technologies. Companies like Amazon, Facebook, Uber, they invest a lot of money in upgrade of technology. Ability of them to unseat some of these players is very very difficult. especially for the fact that now the tech space in the world especially in the US is very very monopolized. There are only four or five big companies which have the majority of the the valuation. And they do have very strong inhouse R&amp;Ds. They would also be investing a lot of money in and around this area. So the way things are, these startups are going to be able to create of successful models and maybe some good technology which can help them expand it, they will work on a micro basis on some small micro markets. But their ability to expand from those micro markets to bigger and global markets and unseat some these big players is very difficult. Unless until there is a major revolutionary change. Let me give an example. Lets say Spotify. Spotify is big player which revolutionised the industry in years back 2007 started. And Spotify also, the fact that available on all platforms and it had a first mover advantage. Today you are not believe amazon.</p>	BM-IMD, ADP, PRV, DST, INTER
13	Researcher	Sorry to interrupt, could you be little slower.	
14	Rsp 4	<p>Yes, sure. Today Spotify is struggling in terms of increasing its user base and Apple music has more subscriber than Spotify. Apple music is three years old platform. So these big companies take time to mature, learn from these other smaller players and then beat them in their own game. And that is how the tech space works. Either you get acquired by them or you, unless until you become very big t...he smaller players' ability to unseat these big tech corporations is limited. So, we generally see, there is a lot of hype around them. The actual reality is not many startups unseat existing large tech companies, anywhere in the world.</p>	BM-INTER, DST
15	Researcher	Ok. I understand. It kind of expanded our view on what is the future of these startups and how can [they] compete with the big intermediaries. In a way you have explained it, very well for us to understand.	

16	Rsp 4	<p>Just to give you clarity to that. All these startups that you see that would have a lot of money from the private equity capital. Now, Uber is also being listed, most of these big startups are already listed ... in the market. they have access to a lot of money. The problem with the startups coming unless until it is bootstrap by their own money, the problem is they go for a private equity in VC funding. And the VCs have the limited ability to keep on pumping money 2 years 3 years 5 years 7 years. Beyond that they are gonna look for an exit. There are only two exits or ... private equity in this BC or any other startups. I am giving you more broader worldview of the the way startups work. So when you come up with hypotheses, it is not just ... based on that technology, but also based upon how the industry works on it overall. The way these startups exit is to sell their startups and prime them to sell it to bigger companies or bigger startups. Let say Flipcart in India, you would be aware of that. Flipcart was priming itself to be acquired by Amazon India. They were in discussion for 3 years to be acquired by Amazon. They were struggling for money. They were in cashstrap and then they were able to sell it off to Walmart. This was a different because Walmart wanted to get into that market. Nobody wanted to be, wants to give a peculiar ... in a startup.</p>	
17	Researcher	<p>I have one question and it comes to the value proposition. Most of these startups, one is ...ok technologically built a sound platform or application which these big companies make an attempt to acquire. But, just coming to our example, these La'zooz or Slock.it blockchain version of ride sharing apps, what do you think of the value ...[Call disconnected]</p>	
18	Researcher	<p>Call disconnected. So, let me begin again. I was wondering... in terms of value proposition ...in terms of you know ...the business model that these blockchain based sharing platforms are coming up with... What do you think they can show it as a value proposition to first attract users? I mean, okay having a solid foundation [from] a platform technology point. But another thing is how they're able to attract users to their network from that angle. What do you think? as I learned from you in today's call that they may have to scale enough to achieve that lower transaction cost that can be passed on to the user?</p>	
19	Rsp 4	<p>So yeah. So, what happens is...</p>	

20	Researcher	Sorry. So, to give you the [complete] context. [as we heard] from the discussion with couple of other interviewees, as a consumer I would prefer to go for a different app[lication] if I get a better price.... that's a general notion. So, given that transaction cost may or may not be as competitive, let us say very different from the established players, what do you think are the value proposition these networks can come up that's to attract users to their network?	
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21	Rsp 4	<p>See again ...that's the million-dollar question at this stage. Nobody knows. And to be honest when I say that forget about moving from this cost that it would be over to or on new platform, I am talking about moving between Uber and lift. That's America. Right. And that's one of the questions which has been really... If you look here ...the analysts call as to why people point shifting between Uber and lift. There is something that we call the stickiness factor. The logic is ...and this is a logic which applies to the variety of solution in some economic theory which says that once you bring in ...you know various partners as a part of a network ...existing network and you know the cost of somebody leaving that network it becomes very high. And that applies in a number of solutions, for example, if you bring ...Amazon has brought in a lot of people in the online selling space but now for somebody [say] a seller to move out of Amazon to any other platform and say that I will not do my business on Amazon... it is very difficult to survive because Amazon now has a 50 percent of the market share. So, the stickiness factor that we call it is the cost associated with it by not going into that particular network or leaving that particular network.</p> <p>And that applies on a variety of solutions for example when we see clusters. Well let's say Bangalore. Now if you're if you're aware of Indian technology hub if you're not in Bangalore in IT or in you know startups are in technology then you're missing out on the 60 percent of the pie of the market. So that's why anybody who is ambitious will have to stick to Bangalore as a buy and that is same for financial industries in Mumbai in India. And that's in New York in US. If you're not there, then you're out of the game. So that's what happens for any particular network or any business for you to make very solid returns. You need to bring in stickiness factor to a location or a business or whatever.</p> <p>The work that you're doing ...about of these companies ...would bring that stickiness factor. Now that's the model on which these big companies operate and they compete on... the Ubers the Amazons all of them.</p> <p>They operate on this particular model that we're going to create we're going to burn our cash we're going to create to network and we're going to create such a compelling story that for you to not be a part of that particular network ...the cost of not being there... is going to be very high. Now how do you counter that? First of all, nobody knows. How do you confirm that? For example, Uber and Lyft. Their stickiness factor is very low because one person can operate in Uber [that] one person can operate in Lyft also. So, their ability to move between one platform to another platform is very high. That is very high. And that's one of the reasons these companies have not been able to make money right now especially in the US because you know they're not being able to stick the consumer. And this is only the only reason that Google has been able to do so well that if you're not there on Google ads ...[if] you're not doing marketing on</p>	BM-EFC, IMC, DST, IMP, INTER
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22	Researcher	Yes, we are getting that [point]. And another thing...	
23	Rsp 4	Just one corollary to what I said ... There is another area that they need to compete upon. They're not just competing upon with the taxi companies. they can also compete upon with these various car rental services. And that's their big businesses ...bigger threat. And the reason is that you know you can create a platform where people not just say that I will drive you down but people say that okay I'm travelling for five days and I have a vehicle in this particular place, somebody wants to use it for two days ...they pay me two hundred dollars and they can use it. And obviously that is guaranteed by somebody else. Whoever the platform is. That's where the car rental companies can come into contact so they will be the first level of threat or the competition rather than the Uber or Lyft of the world. That's my assessment from a transportation point of view.	
24	Researcher	Great. So, I mean if they can differentiate and position themselves for their initial entry, there are some avenues available?	
25	Rsp 4	Yes. Purely from a service innovation point of view and not just a business model innovation. So the problem comes is ...when the companies just try to innovate on a business model and see that we're going to only ...you know save money from here and we're going to reduce the costs then that is not sustainable because business models can be copied really easily and rather even services offerings can be copied but you can get a first mover advantage.	
26	Researcher	Okay. And we also learnt that these block chain-based networks... they can have the medium of a transaction in crypto currencies. we also learned some of them offer [user] fiat currency can be exchanged with crypto currency. just this that the transaction being paid through a cryptocurrency...How do you see this? Is this going to ...you know ...lower the acceptance or maybe, will it find higher acceptance with the younger crowd who has interest in mining these crypto currencies? Do you see any change? But as we understand that this network can be created with cryptocurrency or it could also be more of a fiat money. Is it going to alter the perception of a user to join the network?	

27	Rsp 4	<p>So, if you just keep it for just cryptocurrency then obviously, you're going to limit the amount of number of potential users you can have right to a very limited number of people. And for example, if you're focusing let's say only on Sweden as a market. Right. That's it. You say that again I'm going to focus on cryptocurrency. You are primarily what you're doing is out of a population of 10 million and three cities which are let's say half of the population we're just limiting yourself to one third of the market. Everybody has credit cards or other Swish these days or mobile payments these days but not everybody uses crypto currency. And even among the younger generation only the more reward one and the more risk taking one is takes a cryptocurrency uses cryptocurrency in the ones who use crypto currency they don't use it for a general transaction because they use it primarily from the point of view of either investing or doing something because the risk the risk profile of the cryptocurrency is way too high. So, I don't see somebody getting any clear advantage unless until you are focusing on a very specific cryptocurrency and you entered a You know you've entered a consortium kind of a thing. For example, Ethereum. Ethereum is the consortium with a number of banks or commercial companies are involved. Right. And that's where you know if you try to become a part of a bigger Consortium and then you know you know your cost of intermediation can go down because I explained you the cost of transacting from Ethereum or other bitcoin to again to dollar or Euro is again very high cost and the risks are very high. So just restricting it to cryptocurrency, I don't see it gives any specific advantage. The biggest part of cryptocurrency is anonymity and a lot of people use it because they want their transactions to be anonymous. If you don't want your transactions to be anonymous then why would you prefer to crypto currency.</p> <p>And then the second aspect is unless until you own cryptocurrency which is very rare because you know so you let us suppose you own an SEK and your transfer your SEK into cryptocurrency and then pay by cryptocurrency And then again if you transfer it to a ticket. So, you know why you would do twice a transaction unless you earn in that particular currency. Why would you do that. You adopt a cryptocurrency... largest number of people who adopt crypto currency is because of two things. One is, they want to do cross-border transaction and they don't want to use the regular banking channel charge 5 percent 7 percent commission and airtime time and all that. Second objective is to be anonymous. these two are the objective unless these are the objectives, would you prefer cryptocurrency?</p>	BM-CRP, PYM, CUR, TR-CRP
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28	Researcher	So, in our case of ride sharing or home sharing, I see ...based on what you said, ride sharing has less chances than maybe home sharing? an international vacation trip that they're taking and they don't want to use credit card [because] they want to stay anonymous and maybe avoid the cross-border ...intermediation costs?	
29	Rsp 4	But all this again the moment you make it exclusive you're excluding a large part. You know what you can always do is you can keep this as an additional payment option. You know I haven't seen anybody just making only cryptocurrency.	
30	Researcher	Got it. Yes.	
31	Rsp 4	That's what people ...who are ...a lot of people who do independent work and they don't want to declare it as an independent work for example, in today's gig economy there are a lot of people who are just looking not staying more than six months in any country. So, what they're doing is because you're not staying more than six months in a country, you're not liable to pay taxes in that country. So those kinds of people accept a lot of money through crypto... you know the payments but then that's a very small. why would somebody create a business model for that?	
32	Researcher	Ok.	
33	Researcher	Another thing we mentioned about is acceptance. you know legal acceptance of these ...is there any legal limitations for a company adopting blocking technology? Is there anything you know that there is a legal challenge for them when it comes to auditing?	
34	Rsp 4	That is very country specific. Every country has a different accounting auditing and legal set of conditions requirements. So, for that I know you can't make one general statement about one particular. I am not aware of any particular legal constraints from the adoption of or a regulatory constraint on the adoption of blockchain. Because of the inherent reason that blockchain brings more transparency not less. And any regulation that you have is from the point of view of bringing more transparency not less. So, I believe ideally should not make any problem through that because eventually at the end of the day you bring more transparency to blockchain transactions.	

35	Researcher	Got it. Okay. We are approaching the end, the depth of knowledge that you gave us during this conversation... I think it's going to be a lot beneficial for us. Is there anything else you would like to add?	
36	Rsp 4	Nothing specific that you know. Just drop a message ...but my only point is blockchain as the technology is at least 15 years old now. A lot of people don't realize it ...that the technology was already in circulation since 2005 and 2009. So, there's been a lot of hype cycles around it. There are a lot of startups jumping on currently.	
37	Researcher	Why it suddenly it picked up?	
38	Rsp 4	Yeah. So, the hype cycle of Bitcoin which you know came into really big limelight. So that's what happens. You know that's when you see the real... you know the moment it already hits the hype. General thumb rule is the moment the media starts talking about it or the front end make them start talking about it. Then it's time to move to the next thing. two three years back, Media was really talking about the block chain and everything you know, and we had articles in Harvard Business Review ... if you look at the last one and a half years two years, we don't see anything out of there. So, the dust has really settled. So, you know that's what I tell people. You're two years maybe five years behind the blockchain. Next media hype is expected to be around AI. And IoT. I think that's the next. because the applicability, actual user applicability of that [AI and IoT] is very strong. In the next five years... going to be of security. IT security and that's a really strong area because of AI because of IoT because of all these things how data security is going to emerge and we'll have to model over the next five years next 10 years because of all these industrial applications, it is going to be a very interesting topic for reading and I feel more important because you know sorry to say but whatever you guys are studying and a lot of research already happening are already happened on that space. You might want to study on the security aspects of this also because that has more acceptable requirements in the market.	
39	Researcher	Yeah. Okay we understand. so, from the practice point of view there is a gap in there ...which is a potential research area that we are getting [to know] from you.	

40	Rsp 4	That's from IT security point of view because I see the automation is coming. Industry 4.0 is there. you have IoT just picking up significantly all of them are going to lead to security concerns both personal as well as corporate securities, IT security and that's where predictions are.	
41	Researcher	Sorry to interrupt but we have [learnt] blockchain not as a standalone technology but as an allied technology combined with IoT etc. We saw some examples where blockchain combined with AI	
42	Rsp 4	Like...for example, applications like industrial applications right. That's supposed to have industrial applications where you know you're operating certain robots on or through IoT space and you can have the exchange of the information exchange is recorded on a blockchain basis. So that to make sure that you know it is more secure and it's all recorded. So, there are a lot of use cases which are emerging of multiple technologies doing interplay to. the whole idea of solution architecting is coming but then they're all still at nascent stage, they're at a proof of concept stage. even block chain, I have not seen you know I've seen most of the applications are still on the proof of concept stage even last four years I have not seen any major application going live on block chain. The one thing which I forgot earlier to mention is some of these companies that you are talking about the transport platforms ,they might not move their transactions on block chain which is when I say the booking of a ride might not be in blockchain but the financial transactions or the transaction contract... the smart contracts might have blockchain. So, they might move certain part of the process of the value chain into blockchain and certain part will still keep out of that location [blockchain] because the existing technology does not support that kind of transactions. So, you might see the hybrid process also.	
43	Researcher	Fantastic.	
44	Rsp 4	I'm not sure how much helpful it is. But any clarification you have any. Happy to help.	
45	Researcher	Thank you. I know this is quite a lot of information and it does going be a great value to our thesis. So, thank you so much.	
46	Rsp 4	No problem. Sathya.	
47	Researcher	And how do you want your consent option. Should I include your name. Company name. What's your preference?	

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48	Rsp 4	I don't have a company. So, I'm a management consultant ...independent management consultant. And the second is I have been involved very intimately[closely] with public sector solutions. So, I was in the advisory in Ernst & Young India for seven years. And before that I was in Wipro and Tata Consultancy Services ... been working in consulting space since 2016. sorry 2006 onwards. And you know, lot of my focus is on finding solutions around the public sector space.	
49	Researcher	Thank you so much, have a nice day.	
50	Rsp 4	Okay thanks. Thank you.	

## Appendix 6: Email interview 1

<i>Line</i>	<i>Actor</i>	<i>Answer</i>	<i>Code</i>
1	Question	What makes the blockchain architecture attractive to some industries? Which ones will benefit more from this technology?	
2	Rsp5	<p>From my perspective blockchain is about cutting out the middle man and reducing the amount of trust needed to do business with your counter party. Instead of trusting one central authority you can instead rely on that a majority of the nodes in the network act correctly.</p> <p>The industries that do transactions of any kind (monetary, informational etc) could use blockchain technology. I believe that the industries that have the least amount of trust or the most centralized trust structure could benefit the most.</p>	BM-EFC, IMC, DST, IMP, INTER
3	Question	What benefits blockchain technology offers for digital economy?	
4	Rsp5	Blockchain can enable a new type of network by cutting out the middle man and establishing a common shared infrastructure and protocol. Enabling free competition on a shared infrastructure, opening up for new companies to establish themselves who could otherwise not enter due to restrictions of a centralized trusted party such as a clearing house.	BM-EFC, IMC, DST, IMP, INTER
5	Question	What challenges blockchain technology offers for digital economy?	

6	Rsp5	<p>Some of the challenges are legal, business model, security and the inertia towards new technologies.</p> <p>Blockchain technology is a massive change compared to how cooperation happens today, in today's environment there is always someone in charge that can take on the legal burden of a system. That can be in charge of maintaining and running the system. With a blockchain system there is no clear administrator or operator of a system as this responsibility is distributed to all node operators. From a legal perspective this makes it difficult, who is in charge if the system malfunctions or if someone commits a crime using the blockchain? It is currently unclear. Another legal issue is privacy and GDPR, a blockchain keeps the history of all transactions, if these transactions contain any private information it could be in violation of GDPR.</p> <p>The second challenge is business model, as someone has to pay to build the system but there is no clear way to charge for the use of the system without introducing a centralized element or reducing the network effect of the system. It is a balance between the payoff of the initial participants and the future growth of the network.</p> <p>Security is the third challenge, in any blockchain network private keys are used to sign transactions and sometimes blocks, if these keys are stolen you could create "fake" or illegitimate transactions or even rewrite the blockchain. How to generate and store these keys are a major challenge to any blockchain system.</p> <p>Last challenge is the challenge of most technologies, simple the fact that people do not like change. Blockchain is a large infrastructure change that often effect the whole business, if you want to get the benefits of the system it is not something you can simple tag onto a product. It must be part of how you conduct business and how you have designed the whole system. This is costly and difficult for large companies. This is one of the reasons we are seeing startups leading the way as they have no legacy systems to consider.</p>	BM-BNF, CHL, PRB, REG
7	Question	What impact does blockchain technology have on business model and value proposition for the companies that serve as intermediaries (ex. Airbnb, Uber etc.)?	
8	Rsp5	One could view blockchain as a threat as it to some extent makes intermediaries unnecessary, however it could also be a tool to provide a better service to customers. Instead of having segregated markets on different platforms such as Uber and Lyft, they could share an underlying blockchain infrastructure that allows actors on both platforms to connect. Intermediaries could still provide services such as escrow, vetting/rating systems or other services which might be hard to put on a blockchain.	BM-EFC, IMC, DST, IMP, INTER

9	Question	How do you see Airbnb/Uber's future role in the wake of blockchain technology?	
10	Rsp5	I see these firms becoming service providers in a decentralized market and competing with others instead of the oligopolistic actors they currently are.	BM-EFC, IMC, DST, IMP, INTER
11	Question	How do you see future of Decentralized Autonomous Organizations (DAOs) like La'zooz, BeeNest, and Slock.it in terms of how they will compete with their corresponding existing market leaders?	
12	Rsp5	They have the advantage of being nimble, small and having a structure setup for blockchain technology from the start. However they lack the necessary tools to interact with the real world. Such as a necessary legal structure, business model and customer acquisition model. There are still a lot of problems that needs to be solved before DAOs or companies using ICOs can compete with "real" companies.	BM-FTR, STR
13	Question	How willing are the companies to switch to/trust this new technology?	
14	Rsp5	I would say that they are very enthusiastic to do innovation projects and generate hype but unwilling to take the next step and change their business and put the system into production. Due to some of the reasons stated above and the general problem that blockchain is relatively new and untested.	BM-IMD, ADP, PRV
15	Question	What factors might prevent/impede companies' blockchain adoption? Cost, lack of expertise or any other factor you would like to mention? Why do you think so?	
16	Rsp5	I mentioned some above but beyond that a general lack of track record and the relatively untested technology prevents firms from trusting it completely. Also from a business perspective it can sometimes be hard to justify a decentralized infrastructure if the company that carries the cost of building the system does not see any significant returns. Instead they risk cutting out the crucial decentralized nature in an attempt to adapt it to something familiar, in this they will lose out on the benefits and end up with a normal database, though slower and more expensive.	BM-IMD, ADP, PRV
17	Question	Do you see change in accountability for the companies when they adopt blockchain technology in their business model?	

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18	Rsp5	If you use a public blockchain where all transactions are open for the public to inspect it could give more transparency and accountability as users could observe facts about the system without the permission of the companies running the system. However most enterprise blockchains are made private to some extent which might negate this benefit. Still most blockchains provide more accountability than a normal blockchain due to its resistance to manipulation or deletion.	
19	Question	Would you like to add further information?	
20	Question	Would you suggest additional contacts to interview in order to further our research?	



## Appendix 7: Email interview 2

<i>Line</i>	<i>Actor</i>	<i>Answer</i>	<i>Code</i>
1	Question	Slock.it and USN are said to disrupt existing sharing service businesses (for example Airbnb and Uber), could you describe the vision of USN?	
2	Resp6	According to me, the vision of USN is to create a cryptoeconomy of sharing service businesses over a decentralized web. It would facilitate sharing platforms for individual users too. The USN would become the universal broker for any kind of sharing service (homes - airbnb, cars - uber etc.). Something like "An airbnb of all airbnbs and ubers" in very abstract terms. As a one-liner I would put it as "Secure digitalization of all rentable assets"	
3	Question	What makes blockchain technology more attractive to sharing platform? What features/capabilities of blockchain technology that makes USN possible?	
4	Resp6	Blockchain provides byzantine tolerance and a strong platform to host (crypto)currencies over it. It redefines the way we transact. Apart from the financing solution it provides a immutable ledger that makes tracking ownership easy. Apart from these, since current blockchains are heavily driven by crypto they provide features like non-repudiation, transaction integrity and other features (of Public Key infrastructure) intrinsically.	BM- BNF, CHL, PRB
5	Question	Research says blockchain-based sharing services distribute wealth among its network users. Could you explain it for USN and what it means for a network participant?	
6	Resp6	I am not sure what do you mean by "research says". Blockchain based sharing services remove the middleman. They open possibilities of digitalising any kind of asset and renting them out on the network. I think this is the main value that the USN provides. If you have a washing machine that you use only for an hour per day then you can rent it out to anyone through USN.	
7	Question	Could you describe the roles and responsibilities of various entities in USN?	
8	Resp6	In simple understanding there are two types of users. The user who wants to rent 'out' the asset and the user who wants to 'rent' the asset for a specific time period. The main responsibility of the renting 'out' user is to maintain the asset. For example, If it is a coffee machine then make sure that the coffee machine works	

9	Question	How are disputes/disagreements between entities handled in USN?	
10	Resp6	Disputes or disagreements over the quality or functionality of the rented asset will occur time to time. The USN will features a strong incentivisation solution to this problem. In analogous terms it is something like the security deposit for rented apartments.	DISP
11	Question	What are the requirements (entry criteria) for a user to join this network?	
12	Resp6	Pretty much the same entry criteria required for airbnb or uber.	
13	Question	What are immediate and long-term benefits for a user switching from an existing (call it non-blockchain sharing business platforms like Airbnb, Uber, etc.) to USN?	
14	Resp6	Immediate benefits are obvious. No brokerage or middleman BS for readily shareable/rentable assets. Over the long term USN would provide a super sized market for any kind of sharing economy possible.	
15	Question	What are the challenges for USN to attract users to join its network?	
16	Resp6	Since the USN is based on blockchain technology, governments and regulators, from my perspective pose the biggest challenge. The regulations pertaining to blockchains tech is still in its infancy and regulators have already gained a “false” negative image about it which slows it growth.	REG, TRST
17	Question	What is the impact USN like DAOs can have on non-blockchain sharing business platforms such as Airbnb, Uber, etc.?	
18	Resp6	USN while opening up opportunities for individuals also encourages businesses to adapt to it. But the important thing to note is it does not differentiate between the two. In some sense, it strengthens the concept of free market.	
19	Question	If you were to survey potential future users for Dēmos, the Mobility System of Slock.it, to know if they are willing to join this platform, a. what questions would you ask them? b. what information would you like to share with them? c. How USN attract users to join its network?	
20	Resp6	a.k.a marketing plan is something I do not have access to. I have ideas of my own but I am not sure if they align with that of the marketing team. You should contact them.	

21	Question	Could you describe business model of USN, its revenue model and value proposition?	
22	Resp6	The value proposition should be clear through various answers given above. As far as the business model and revenue model is considered I have my own ideas but I do not have access to what is being implemented by the C-level team.	

## Appendix 8: Email interview 3

<i>Line</i>	<i>Actor</i>	<i>Answer</i>	<i>Code</i>
1	Rsp7	My specialties are Continuous Improvement and Operations. As such, my understanding of Grab's business drivers and backend architecture are limited. I have only a high-level understanding of blockchain technology and it's potential applications.	
2	Question	What makes the blockchain technology attractive to some industries? Which of these industries will benefit more from this technology?	
3	Rsp7	From articles and a few presentations (at business school), I understand this technology can be especially useful for: i.consumer goods for better tracking of their products down the supply chain. This can be especially beneficial when recalling contaminated products ii.financial services, although I am not sure what the exact applications would be	
4	Question	What benefits blockchain technology offers for digital economy?	
5	Rsp7	Better tracking of digital transactions via unique identifiers at each step. Protection from hackers (especially DDoS attacks) due to the decentralized model	
6	Question	What challenges blockchain technology offers for digital economy?	
7	Rsp7	Creating awareness so people know the basics of how it works, and its potential applications. More early adopters so others can study and improve on what they have implemented.	
8	Question	What impact does blockchain technology have on business model and value proposition for the companies that serve as intermediaries (ex. Grab etc.)?	
9	Rsp7	I do not foresee a big change in the business model, however this could be due to my limited exposure to the business side of things. I do foresee more ease of deploying more ease of launching new services such as PMD (Personal Mobility Device) sharing services since potentially each PMD could be better tracked using blockchain.	

10	Question	How do you see Grab's future role in the wake of blockchain technology?	
11	Rsp7	Building on the PMD point mentioned above, this technology could ease the launch of new services. I foresee Grab could use blockchain a lot moving forward.	
12	Question	How do you see future of Decentralized Autonomous Organizations (DAOs) like La'zooz, BeeNest, and Slock.it in terms of how they will compete with their corresponding existing market leaders?	
13	Rsp7	Apologies. No comment on this. I do not know much about DAOs.	
14	Question	How willing are the companies to switch to/trust this new technology?	
15	Rsp7	Awareness is still low, and I think early adopters will be few. I foresee more early adopters to be small firms or startups. Eventually, I'm not sure how long, larger corporations will start using blockchain more.	
16	Question	What factors might prevent/impede companies' blockchain adoption? Cost, lack of expertise or any other factor you would like to mention? Why do you think so?	
17	Rsp7	Other than cost and lack of expertise, the points mentioned in my answer to question 3.	
18	Question	Do you see change in accountability for the companies when they adopt blockchain technology in their business model?	
19	Rsp7	Not immediately. Legally, accountability will remain with the companies until changes are made to contracts. This could happen in the near future.	
20	Question	Would you like to add further information?	
21	Rsp7	Nothing else.	
22	Question	Would you suggest additional contacts to interview in order to further our research?	

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