



**A PHENOMENOLOGICAL STUDY OF AN EMERGING
FINANCIAL VALUE ECOSYSTEM: BASED ON
DISTRIBUTED LEDGER TECHNOLOGY AND NOVEL PEER
TO PEER GAME STRUCTURE**

by

Francois Crafford

(Student number:55775942)

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Supervisor: Prof H Nienaber

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DECLARATION

Name: Francois Crafford
Student no.: 55775942
Degree: DCOM BUSINESS MANAGEMENT

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DISTRIBUTED SYSTEMS, SIMPLE RULES AND NON-LINEAR AGENT
INTERACTIONS**

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ABSTRACT

The central research issue in this study is the third morphing of economies due to the externally available intelligent building blocks of technology. More specifically, it is anticipated that the widespread use of distributed ledger technology will transform the workings of organisations to such a degree that they will cease to exist in their current form. Hence, the use of distributed ledger technology is not merely a tame management problem; it poses a wicked strategic problem.

Furthermore, natural explanations add to the confusion in relation to what managers should do with distributed ledger technology. A transcendental phenomenological attitude is required to transcend the multitude of natural explanations. Phenomenology is both the philosophy and method employed in this study, which questions what human engagement in the world is about. More specifically in this study engagement with distributed ledger technology. This study closes this gap in knowledge by giving an accurate description of the essence of the distributed value ecosystem phenomenon.

The study makes a contribution to more coherent and fundamental understanding the essences of the distributed value ecosystem phenomenon is the nature of the relationship patterns that participants hold to distributed ledger technology.

The central factual finding is the nature and pattern of these relationships is transactional and circular.

The pattern preferred by most organisations is the bounded binary transactional pattern. Organisations seek primarily to have power over the socially complex aspects in transacting. However, the bounded binary transactional pattern may become an unbalanced and unfair value-subtract relationship over time. The response to unbalanced binary bounded value relationships is the unbounded transactional pattern, which gives participants greater autonomy and privacy pseudonymity, but not the transparency that is essential to transact seamlessly.

The third value relationship pattern and novel idea presented is the folded value relationship pattern in which participants balance conflicts over socially complex aspects in relation to self and others by meeting narrow micro-level near interaction

conditions. This is a more folded, novel strategic game that participants can pick. The key implication for society and organisations is that it presents an alternative approach to dealing with conflict in socially complex value relationships. In essence, with the folded transactional pattern, participants seek to trade up value relationships in relation to self and with others, as opposed to making value relationship trade-offs or sacrifices that lead to either compromises in relation to self or dominance over others. However, the practical managerial implication is truly folded value relationship pattern is not easy to create and is rare.

KEYWORDS: Constructive conflict; Distributed Ledger Technology; Distributed value ecosystems; Externalising organisational intelligence; Folded value relationships; Strategy; Transcendental phenomenology; Wicked problems; Self-sovereign identity; Socially complex resources.

A PHENOMENOLOGICAL STUDY OF AN EMERGING FINANCIAL VALUE ECOSYSTEM: BASED ON DISTRIBUTED LEDGER TECHNOLOGY AND NOVEL PEER-TO-PEER GAME STRUCTURE

ISISHWANKATHELO

Umbandela ophambili wophando kwesi sifundo kukuzotywa ngokutsha kwesithathu kwezoqoqosho ngenxa yobukho bezakhi zobuchwepheshe ezinobukrelekrele. Eyona nto ingundoqo yeyokuba kucingelwa ukuba ukusetyenziswa kakhulu kobuchwepheshe bokubhala iingxelo mali buya kuyiguqula indlela asebenza ngayo amaqumrhu, ade ayeke ukusebenza ngale ndlela enza ngayo ngoku. Ukusetyenziswa kobuchwepheshe bokusasaza iingxelo zogcino mali (ngesiNgesi kusetyenziswa isishunqulelo esithi DLT) akuyongxakana nje yolawulo; kuyingxaki enkulu nekhohlakeleyo.

Ngaphaya koko, iinkcazelo ezikhoyo zongeza ukubhideka malunga neyona nto emele ukwenziwa ngabaphathi ngobu buchwepheshe bokusasaza iingxelo zogcino mali. Into efunekayo kukusebenzisa indlela yophando ngokuphicotha amava nokufuna ukuqonda indlela acinga ngayo umntu, ngakumbi kumba omalunga nobuchwepheshe bokusasaza iingxelo zogcino mali. Esi sifundo sivala isikhewu solwazi esikhoyo ngokunika inkcazelo echanekileyo ngalo mbandela wokusasazwa kokuxabiseka kwentsebenziswano yendalo nomntu.

Esi sifundo sinceda ekuqondeni iziseko zombandela wokusasazwa kokuxabiseka kwentsebenziswano yendalo nomntu neepatheni zolwalamano lwabathathi nxaxheba kwicandelo lobuchwepheshe bokusasaza iingxelo zogcino mali.

Eyona nto ingundoqo efumanisekayo kukuba ubume nepatheni yolu lwalamano iquka intsebenziswano yorhwebo kwaye ifana nomjikelo.

Ipatheni ekhethwa ngamaqumrhu amaninzi yileyo yentsebenziswano ephakathi kwesibini. Amaqumrhu afuna tanci ukuba nolawulo kwimiba enzima yezentlalo xa erhwebelana. Noxa kunjalo, ipatheni yokurhwebelana ngezibini isenokudala ukungalingani nokuqhathana ngokuhamba kwexesha. Usabelo kulwalamano lwezibini olungenalngano yiphatheni yorhwebelwano olungabekelwanga mida, apho abathathi nxaxheba bekwazi ukuzithathela izigqibo ekhusini bengazichazi ukuba bangoobani, nto leyo inqanda ukusebenza ekuhleni nokufunekayo ekusebenzisaneni ngaphandle kwamagingxingxi.

Ipatheni yesithathu kwixabiso lolwalamano kulapho ulwalamano lusongiwe, apho abathathi nxaxheba belungelelanisa iingxabano ezingemiba yezentlalo enzima ngokufezekisa iimeko ezilula nezincinane. Oku kufana nomdlalo osongeneyo nolicebo lobulumko onokukhethwa ngabathathi nxaxheba. Okubalulekileyo kukuba le yindlela eyenye enokukhawulelana neengxwabangxwaba eluntwini nakumaqumrhu. Eneneni, kwipatheni yentsebenziswano esongeneyo, abathathi nxaxheba bazama ukutshintsha ulwalamano oluphakathi komntu nabanye, endaweni yokuncama izinto ezithile ezinokukhokelela kwilahleko okanye ekonganyelweni ngabanye. Noxa kunjalo, ipatheni yolwalamano olusongeneyo kulwalamano lwabalawuli ayinto ilula kwaye inqabile.

AMAGAMA APHAMBILI: Ingxabano eyakhayo; Ubuchwepheshe bokusasaza iingxelo mali; linkqubo zentsebenziswano yendalo nomntu ezisasaziweyo; Ukukhuphela ngaphandle ubulumko bequmrhu; Ulwalamano lwexabiso olusongeneyo; Icebo lobulumko; Ubume obunyukelayo; Iingxaki ezinenkohlakalo; Ubuwena bokuzithathela izigqibo; Imithombo enzima kwezentlalo.

UCWANINGO OLUGXILE EZIGAMEKWENI OKUHLANGATSHEZWANE NAZO MAQONDANA NE-EKHOSISTIMU EFUFUSAYO YOBUNANI-MALI: OLUSEKELWE PHEZU KWE-DISTRIBUTED LEDGER TECHNOLOGY KANYE NE-NOVEL PEER-TO-PEER GAME STRUCTURE

KAFUSHANE NGOCWANINGO

Udaba olungumgogodla walolu cwaningo wukuguquka kwesithathu kweminotho ngenxa yamandla namakhono obuchwepheshe besimanjemane atholakala ngaphandle kwenhlangano.

Ngokuqondileyo, kubhekeke ukuthi ukusetshenziswa kakhulu kwe-*distributed ledger technology* kusiguqule kakhulu isimo-sakhiwo sezinhlangano kanye nendlela ezisebenza ngayo, kangangukuthi zigcine sezingabonakali neze ukuthi zike zaba kulesi simo-sakhiwo ezikusona njengamanje. Ngakho-ke ukusetshenziswa kwe-*distributed ledger technology* akuyona neze inkinga elula futhi abangayixazulula kalula abaphathi; kepha kuyinkinga eyinkimbinkimbi futhi eyimpicabadala okungelula nakancane ukuyixazulula.

Ngaphezu kwalokho, izincazelo zemvelo ziyengeza phezu kokudideka okuphathelene nalokho okumele kwenziwe ngabaphathi maqondana ne-*distributed ledger technology*. Ukuze kudlulelwe ngale kwenqwabanqwaba yezincazelo zemvelo ezikhona kudingeka indlela-kucabanga nendlela-kubuka evulekile yokuqonda ulwazi oluphathelene nezimo kanye nezigameko okuhlangatshezwane nazo noma okudlulwe kuzona. Ifenomelaji iyikho kokubili ifilosofi kanye nendlela-kusebenza esetshenziwe kulolu cwaningo, okuphonsa umbuzo mayelana nokuthi kuphathelene nani ukuxhumana kanye nokubandakanywa kwabantu emhlabeni, ikakhulukazi maqondana nokubandakanywa okuphathelene ne-*distributed ledger technology*. Lolu cwaningo luvala igebe lokungabi khona kolwazi ngokuthi lunikeze incazelo enembayo yomongo we-*distributed value ecosystem*.

Ucwaningo luyalekelela futhi lufake isandla ekutholakaleni kokuqonda okuhle nokuhleleke kahle futhi okuyisisekelo komongo we-*distributed value ecosystem* okungukuthi lokhu kuwuhlobo lwamaphethini obudlelwano obuboniswa ngababambiqhaza maqondana ne-*distributed ledger technology*.

Umpfumela osemqoka kakhulu futhi oyiqiniso otholakale ocwaningweni wukuthi ubunjalo kanye nephethini yalobu budlelwano ibandakanya izinhloso zokuzizuzela okuthile futhi okungubudlelwano obusasiyingi.

Iphethini encanyelwa yiningi lezinhlangothi yi-*bounded binary transactional pattern*. Izinhlangano zihlose ikakhulukazi ukuba namandla phezu kwezinto ezithile ezinobunkimbinkimbi emphakathini lapho zenza umsebenzi wazo. Kodwa-ke ngokuhamba kwesikhathi i-*bounded binary transactional pattern* kungenzeka ibonise ubudlelwano obungenakho ukulingana futhi obuchemile obungenabugugu. Impendulo yokubhekana nobudlelwano obungama-*unbalanced binary bounded value relationships* yi-*unbounded transactional pattern*, enikeza ababambiqhaza ukukhululeka nokuzimela okukhudlwana kanye nobumfihlo bokuthi bangazidaluli noma baziveze ukuthi bangobani, kodwa-ke lokhu akubanikezi ukusebenza ngendlela esobala okuyinto edingekayo ekusebenzeni ngaphandle kwezihibe.

I-*third value relationship pattern* kanye nomqondo ophusile owethulwayo yi-*folded value relationship pattern* lapho ababambiqhaza beqinisekisa ukuthi kunokulingana phakathi kokungqubuzana noma udweshu oluphathelene nezinto eziyinkimbinkimbi emphakathini maqondana nabo uqobo kanye nabanye abantu, ngokuthi bahlangabezane nama-*narrow micro-level*

near-interaction conditions. Lokhu kuwumdladlwana ofongqekile wesimanjemanje futhi okhethekile nosemqoka ongasetshenziswa ngababambiqhaza. Umthelela osemqoka walokhu emphakathini nasezinhlanganweni wukuthi lokhu kuhlinzeka ngendlela ehluke yokubhekana nokungqubuzana nodweshu kubudlelwano obuyinkimbinkimbi emphakathini. Empeleni, ku-*folded transactional pattern*, ababambiqhaza bahlose ukuthola okungcono kubudlelwano phakathi kwabo bona uqobo lwabo kanye nabanye abantu esikhundleni sokwakha ubudlelwano lapho izinhlangothi zonke zithola ukushintshisana okulinganayo noma ukuzidela okuthile maqondana nobudlelwano, okuyinto eholela ekutheni kube nokuvumelana phakathi kwezinhlangothi okuhambisana nokuzidela komuntu uqobo lwakhe noma-ke ukukhonya phezu kwabanye. Kodwa-ke umthelela walokho oqondene nabaphathi wukuthi akulula neze ukwakha i-*folded value relationship pattern* yoqobo futhi lokhu kuyivela kancane.

AMAGAMA ASEMQOKA: Ukungqubuzana okwakhayo; *I-distributed ledger technology*; *Ama-distributed value ecosystem*; Ukusetshenziswa kwenhlangano yangaphandle ukuhlinzeka inhlangano ngamandla nekhono lokwakha nokusebenzisa ulwazi ngenhloso yokuzuza imiphumela emihle; *Ama-folded value relationship*; Iqhingasu; *I-transcendental phenomenology*; Izinkinga eziyinkimbinkimbi okungelula neze ukuzixazulula; Isimo-bunjalo sokuzimela komuntu; Izinsiza zomphakathi eziyinkimbinkimbi.

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LIST OF ABBREVIATIONS AND ACRONYMS

The following abbreviations are used throughout the study.

DLT	Distributed ledger technology
GDPR	General data protection rights
ICO	Initial Coin Offering
NTM	Nontrivial machine
SARB	South Africa Reserve Bank
TM	Trivial machine

CHAPTER 1: INTRODUCTION TO THE STUDY

1.1 INTRODUCTION

Organisational strategy is a quest to create products and services of value (Grant, 2016:35). The dominant logic that is used to explain how value is created, delivered and appropriated is value chain theory (Porter, 2008; Sheehan & Foss, 2017). It is a chain-like, ordered strategic logic derived from analytical methods and a set of related principles. More specifically, a complex adaptive system (meaning an organisation) is reduced to its basic parts (the principle of reduction) (Morin, 2007:1). Each part is analysed separately in terms of time and space (the principle of disjunction) (Morin, 2007:1). The separate parts in the systems' architecture are fitted to form an ordered chain-like system. The assumption is that value creation can be determined by analysing the properties of parts in a system (the principle of universal determinism) (Morin, 2007:1). Moreover, an assumption is made that relative difference (a competitive advantage) can be determined by analysing the properties of parts.

This study contends that Porterian activity analysis (Porter, 2008; Sheehan & Foss, 2017) is grounded in a specific type of dominant logic (Bettis & Prahalad, 1986, 1995) in which the game structure is binary, as opposed to complex, in terms of principles and method and folded states (see Figure 1.1).

This simple logic determines what data are incorporated by organisations into strategy structures, which include the game structure of binary, dyadic value relationships, values and learning of organisations. The dynamic that organisations aim to create, using simple logic, is interactions between parts that are controlled, repeatable and predictable in pattern, and which result in a 'clock-work' dynamic. The dynamic that results from this reinforces the logic used, and this logic then becomes the default.

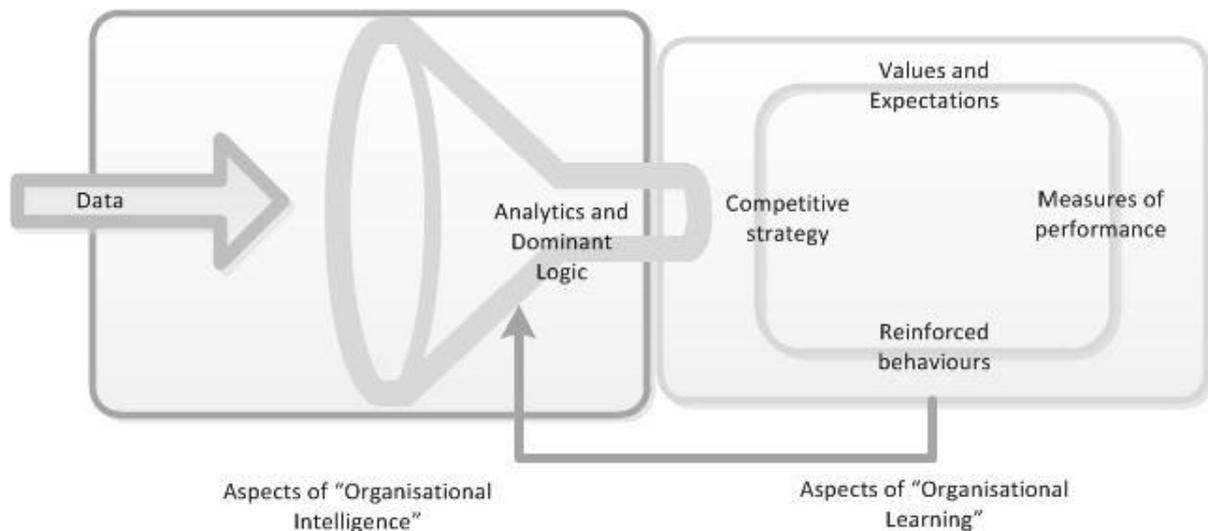


Figure 1.1: Dominant logic

Source: Bettis & Prahalad, 1995:3

Organisations are complex adaptive systems. They are not ‘trivial machines’ (TMs) or mechanical ‘clock-work’ systems in which the system outputs and inputs follow immutable laws, nor are they connected to predetermined rules (Tsoukas, 2017:139). Furthermore, seeing organisations as trivial machines, trivialises human agency into mechanical rule-following which generates predictable behaviour. Organisational research is similarly ‘trivialised’, to find regularity, rather than to account for unpredictability and the novel (Tsoukas, 2017:14).

If organisations are viewed as nontrivial machines (NTMs), then one can start to account for how patterns emerge, both stable and novel, from local, direct and near interactions between the parts in complex systems. Moreover, nontrivial machines keep changing their rule transformation, and their internal state keeps changing (Tsoukas, 2017). Hence, there is no central control or repetitive pattern that can be predicted (Stacey, 1995). Throughout history this has been seen in the societal systems of cooperation and coordination (Fayol, 1916; Skivington & Daft, 1991) that have undergone fundamental transformations that completely rearrange societal world-views, to fundamentally transform how its basic social, economic and political structures and institutions work (Drucker, 1992:95).

However, it is not easy for managers to engineer such sharp transformations. Managers are predisposed to organisational logics and game structures that are pre-picked within a much larger social and economic system. In other words, there is a ‘genetic’ component that pre-picks the types of game structures used. Bettis and

Prahalad (1995) argue that organisational dominant logic is an organisational 'genetic factor' which predisposes an organisation to what data is incorporated or left out the organisational strategy, systems, values and learning.

Furthermore, the use of simplifying logic results in a loss of insight into the properties and non-linear dynamics of complex adaptive systems. In complex adaptive systems (namely, organisations), strategy (Mintzberg & Waters, 1985), capabilities (Eisenhardt & Martin, 2000), value (Allee, 1999, 2000, 2002, 2008), learning and unlearning (Bettis & Prahalad, 1995), emergent order (Barabasi & Albert, 1999), and scale free (Barabasi & Albert, 1999) properties emerge from parts that cannot be determined by analysing the properties of individual parts. Irreversibility and path dependency (Levy, 1994:170) are also properties of complex adaptive systems.

Interactions between parts of a complex system cannot be separated in space and time (using the principles of disjunction and reduction). Both positive and negative feedback occurs in complex systems that amplify or dampen a dynamic (Stacey, 2011; Simon, 1996). The result is that small changes by a stubborn or peculiar person or events can escalate into major changes (Stacey, 1995:481). Moreover, complex systems need a specific level of diversity (Mitleton-Kelly, 2003; Ashby, 1956) and mechanisms (Penrose, 1995) that enable them to grow and demonstrate intelligence (Allee, 2002).

The study of complex systems reveals a fundamental flaw in simplifying logic itself. What this means, is that the use of analytical methods destroys what it seeks to understand about complex adaptive systems (Cilliers, 2002). However, cutting up a complex adaptive system does not result in smaller equally valuable parts, but rather a mess (Allee, 2002). Tsoukas (2017) argues that if complexity is to be taken seriously, management studies should move away from disjunction and reduction (paradigm of simplifying) and rather move towards conjunction (embrace complexity).

A coherent, complex management logic linked to value creation and appropriation has not emerged yet. This begs the question why it has not emerged yet. The development of a better understanding of value creation and appropriation in complex settings primarily focuses on presenting value constructs or concepts that try to catch up with the complexity challenges that managers have to deal with. This is particularly apparent in constructs, such as shared value (Porter & Kramer, 2011), co-creation

(Prahalad & Krishnan, 2008; Prahalad & Ramaswamy, 2004), value ecologies (Hearn & Pace, 2006), coopetition (Nalebuff & Brandenburger, 1997) and value networks (Allee, 2002) that propose a different underlying logic or world-view to rearrange the workings of organisations and value relationships of organisation within society.

Each world-view position taken or metaphor that is used presents some insights into the complexities of creating and appropriating value, or creating better value relationship, while simultaneously obscuring fundamental aspects of organisations as non-trivial machines. Beyond this theoretical problem, the practical problem managers face is the re-architecture of organisational workings and changing relationships that organisations have with society. Managers are not dealing merely with a tame efficiency and effectiveness problem. Managers are in effect dealing with the wicked and intractable strategic problem (Buchanan, 1992; Camillus, 2008) of the rearrangement and re-architecture of the fundamental workings of organisations and changing societal value relationships.

In terms of this study, it is anticipated that the widespread adoption of distributed ledger technology (DLT), which in essence, is an immutable asset database that is shared by all participants across multiple sites, geographies or institutions (Walport, 2016:5), will fundamentally rearrange the world-view, the structure and values of social, economic and political organisations (Arthur, 2017).

Distributed Ledger Technology is part of a family of technologies where participant nodes in a distributed network update a copy of a common set of data. Nodes also share their data set with all other participants in the network. Creating a shared and immutable ledger is particularly relevant to the Banking and Financial services sector where the initial cost to first create digital products and services is usually very high. Distributed ledger technology dramatically reduces the incremental costs of creating, transacting and delivering a digital product or service almost to zero (Arthur, 2017).

Furthermore, parts of value chains or networks are traditionally focused on participating in a game that adds and appropriates value by drawing complex social resources into the marketplace, and by inventing new ways to exploit these complex social resources. These parts of the value chain are now faced with fundamentally different 'mechanics' in terms of how some aspects of socially complex resources are exploited within a truly distributed value ecosystem. The deployment of distributed

ledger technology (DLT) by communities of distributed and decentralised, peer-based forms of cooperation and coordination are so different that the strategic implications (that is, long-term implications) for managers are mind-bending.

The strategic implications range from major shifts in the nature of the power relationships and complex social resources, to having power with others to create desired future outcomes. In other words, these are complex folded states where individuals have autonomy, yet collaborate with others, where they have privacy, yet can be transparent at the same time. Furthermore, organisational mandates to have control over socially complex resources are no longer simply accepted as an ideal relationship. In other words, there is a need for identity, money and personal data that are self-sovereign. Moreover, the value that organisations will be able to appropriate in a decentralised and distributed value ecosystem may be severely impacted upon.

In terms of the literature, the concept of value continually evolves. The idea of value started with classical economists, such as Adam Smith who differentiated between the concepts of 'value in use' and 'exchange value' (Bowman & Ambrosini, 2000:4). The use value of products is assessed subjectively, which means that the use value is defined by the customer's perception of the usefulness of products and services. Exchange value is the value realised when a sale is made, whereas, value captured is determined by the subjective assessment of relationships of power between buyers and sellers (Bowman & Ambrosini, 2000:4).

The concept of 'market value' also emerged, which is the aggregate of the costs of production. Austrian economists defined market value as the worth that a quantity of goods has for a certain business (Von Böhm-Bawerk, 1959). In terms of strategic value, the concept of 'added value' emerged, which is the total value that has been created with the inclusion of a partner, or minus the value created without a partner or action (Brandenburger & Nalebuff, 1995). Furthermore, the concepts of value added and competitiveness (Caves, Porter, Spence & Scott, 1980) are used in conjunction with the concept of a 'value chain' (Porter, 1980). The idea of value created and appropriated through chain-like processes and activities is well entrenched in strategy literature (Porter, 1980; Sheehan & Foss, 2017).

In terms of customers, the following are important concepts: 'customer value' (Treacy & Wiersema, 2007), 'value propositions' (Gattorna & Jones, 1998:101), 'shareholder value' (Kaplan & Norton, 1998), and 'shared value' (Porter & Kramer, 2011).

In terms of 'value relationships', it includes knowledge and intangibles as currency (Allee, 2000), network size, structure and conduct as tied to network value (Afuah, 2013), customers to create own value (Normann & Ramirez, 1993), value as embedded in social interest (Emerson, 2003).

Relationships in themselves are perceived as potential resources, specifically certain kinds of external relationships with actors (Fernandes, Ferreira, Veiga & Marques, 2019; Ivens, Pardo, Salle & Cova, 2009). Moreover, there is a shift in thinking about value in terms of individual organisational strategy to thinking about strategy in relation to whole ecosystems (Hearn & Pace, 2006; Teece, 2007).

The challenge that managers face in terms of changing value relationships is based on organisational games that are pre-picked, meaning that the structure and nature of relationships in transacting are often based in self-interest, competition, overt conflict and inequality (Follett, 1925). Furthermore, value relationships are also more difficult to disentangle (Bowman & Swart, 2007), and actors can create ties that can be amplified, or scaled more easily (Barabasi & Albert, 1999).

A fundamental understanding of the changing value relationships based on peer-game structure has not yet emerged. Blockchain communities are inventing peer-based game structures not seen before. The motivation behind the invention of novel game structures is that communities seek to be the destabiliser. Communities in society are trying to opt out of value relationships that do not offer a fair give-and-take of value. This pattern challenges the argument that only organisations are the destabiliser (Schumpeter, 1942) and that society primarily seeks stability (Drucker, 1992).

Furthermore, peer-based game structures have considerably expanded the scope of the game that organisation have to learn to play. These new peer-based games are more complex and folded in nature, which makes it possible for anyone, even an individual to act as a destabiliser by inventing a 'killer application' or an application to create a 'killer ecosystem'. Highly centralised organisations perceive these developments in peer-based game structure as a threat to their existing value relationships with society. In other words, this refers to the dominantly bounded

transactional power over the relationship that has been cultivated or engineered over socially complex resources, specifically in the financial and banking sector. The perceived threat is either to the mandate of organisations (the perception that they will cease to exist in the future in their current form) or that a constraint on the value appropriation will be possible in the future.

Moreover, if there is a perception that participants subtract more value than that which they create in a value relationship, these players will either become obsolete, be displaced by others participants, or the participants will be required to reinvent itself (this is already happening to players that function as repositories of data). In addition, the 'levers' or tools (namely, policy-making 'levers' to change the dynamics in a mechanistic way) that highly centralised institutions have in their toolbox, and which give them power over others in value relationships, may become less useful or obsolete.

To learn how to play peer-based games, or at the very least to be present in these new novel peer-based games, the organisations and institutions participating in the current study either developed proof of concepts to experiment with DLT, or made use of applications developed in an open community. In cases where controlled and safe experiments were required, regulatory 'sandboxes' were useful, due to the highly regulated nature of these institutions. These experiments often start as a thought experiment, which then progresses to testing a 'proof of concept' to develop a more fundamental understanding of peer-based game structure and the 'mechanics' of such distributed systems, mostly with the intention of shaping an emerging peer-based game before it is too late.

Developing a fundamental understanding of DLT is a mind-bending experience for most managers, as the 'mechanics' of a truly distributed and folded value relationship are completely different. Furthermore, while using DLT, it is not possible to predict future outcomes; at best managers try to anticipate the consequences while using DLT. In adopting distributed technology, managers do not know if they are making right or wrong decisions. It is mostly a matter of judgement and an assessment if outcomes will be better or worse, satisfying or simply good enough.

Section 1.2 below addresses the background to the research problem, the 'third economy' (Arthur, 2017).

1.2 BACKGROUND TO THE STUDY

Drucker (1992:95) argues that throughout western history, in a matter of decades a society can undergo many sharp transformations. Society rearranges its world-view, basic values, its social and political structures and key institutions to such a degree that the people born into that new world cannot imagine the previous world that existed. Drucker (1992:95), in terms of these transformations, contends that we currently live in a knowledge society and the purpose of every organisation is the integration of specialised knowledge into a common task.

Furthermore, society is differentiated from organisations in that society seeks stability, whereas organisations purposefully engage in a process of creative destruction (Drucker, 1992; Schumpeter, 1942). Organisations break down the old ways of doing things, rearrange how society cooperates and coordinates, and organisations build new architecture to create states that did not exist before. The organisation in this game structure is a destabiliser. The economist, Joseph Schumpeter (1942) refers to this process as 'creative destruction'. The organisational plan should be to abandon, rather than to prolong, the existing ways of doing business. Organisations must be willing to systematically abandon what they have established (Drucker, 1992).

Brynjolfsson, McAfee and Spence (2014) maintain that technology is substituting more types of labour than ever before, and fewer individuals are winners in the new organisational form that contains much larger knowledge and network components in the organisational architecture. The winners in society now are those that can innovate, and create new products and business models, and where the distribution of income takes the form of a power law. A much smaller number of winners capture the rewards, and a long tail of participants that capture very little of the rewards, which essentially leads to growing inequality in wealth and opportunity. It has also become a challenge to build inclusive economies in societies driven by knowledge. Moreover, within a more highly networked society there is an emerging logic of accumulation that focuses on the commodification and control of behaviour, while producing new markets of behavioural prediction and modification (Zuboff, 2015).

Arthur (2017) contends that technologies external to organisations can now recognise, sense, filter and use data to act appropriately, and essentially, the argument is that this new class of technologies will do what all intelligent biological living systems do.

The result is technologies, such as big data, the cloud, machine learning and artificial intelligence that are slowly and steadily rendering human activities obsolete. Arthur (2017) argues that the externalising of organisational intelligence is causing economies to enter a new era, which he has termed “the third morphing of the economy”, which is the point where the economy produces enough for everyone, but the means, namely, the jobs that are required to access these products and services becomes the central economic problem. In terms of individual’s experiences of technological progress, it is no longer a case of all ‘economic boats’ rising evenly.

Overall, the background to this study is the anticipated third morphing of society and economies. In decades to come, decentralised, distributed and autonomous forms of organisation will morph, and rearrange society, its organisations and institutions by making more complex cooperation and coordination possible at a scale never achieved before (Swan, 2015). Furthermore, morphing the way that society and organisations create, transfer and capture value, will morph existing organisations and industries to such a degree that they will cease to exist in their current form (Arthur, 2017). More specifically in terms of this study, it is anticipated that central banks, retail banks and other financial institutions will cease to exist in their current form.

1.3 PROBLEM STATEMENT

This section presents the theoretical and practical problems that organisations in the financial and banking sectors face using DLT. More specifically, the use of DLT to transform the workings of organisations to participate in an emerging decentralised and distributed value ecosystem.

1.3.1 Theoretical problem

According to Yin (2011:93), “The search for meaning is in fact a search for concepts”, which are abstractions of the actual data in an empirical study. The search for meaning, in terms of value creation and appropriation that is complex and distributed in nature, has produced a steady stream of constructs and concepts that managers can use. However, complex phenomena are irreducible. To understand complex phenomena fully it is essential that we understand all of its complexity, however, there is no human way of doing this (Cilliers, 2005:259).

Knowledge of complex systems is largely based on agent-based models. These models reduce the complexity of systems they model. The reason for doing so is humans are 'finite' and bounded rational beings (Simon, 1978). As humans, we cannot step outside of complexity, as opposed to an abstract being, such as a 'Laplace demon' (Laplace, 2012), which essentially refers to an intellect so vast that it is able to calculate the present state of the universe as the effects of the past and the cause of its future. Consequently, we must choose the frameworks we use, and these frameworks are always provisional, and also never complete (Cilliers, 2005:259).

Furthermore, models of complex systems may reveal an aspect of a complex system such as emergence, requisite variety, critically organised, self-organising, coevolution, variation and selection, but obscure another fundamental aspect or principle at work. There is no simple way to reduce complex phenomena, by abstracting into simple terms without a loss of meaning (Cilliers, 2005:259). Only modest claims can be made about possessing knowledge of complex systems, as some aspect is always left out in a model that acts in a non-linear way. It is not possible to predict what a reduction of complexity in models will have on a complex system, as an environment changes over time (Cilliers, 2005). More specifically, in terms of this study, societal and organisational architectures will rearrange themselves to become more decentralised and distributed.

The theoretical problem of this study is the search for new abstractions and a complex management logic to explain the social and organisational rearrangements or transformations of value creation, transfer, sharing and appropriation that has produced a 'reduced' abstract understanding of the emerging distributed financial value ecosystem phenomenon. Further, it is not clear which new constructs or concepts in the literature accurately represent the actual lived experiences of participants in terms of the emerging distributed value ecosystems phenomenon. Therefore, there is a need to return to lived experiences rather than to simply accept or assume that emerging constructs and concepts of the phenomenon are accurate abstractions and representations or models of reality.

1.3.2 Practical problem

The practical problem that managers face in using distributed ledger technology (DLT) to re-architecture the workings of organisations to participate in emerging value

ecosystems poses a wicked problem (Rittel & Webber, 1973), as opposed to a tame or benign management problem.

Issues such as efficiency and effectiveness are a relatively tame or ordinary management problem (Rittel & Webber, 1973). When dealing with efficiency and effectiveness issues managers are within an ordered domain and the traditional approach is to sense–analyse–respond (Kurtz & Snowden, 2003:468). In other words, managers can separate cause and effect in space-time (causality is linear). They can resolve efficiency and effectiveness issues by collecting more data, defining issues more clearly, breaking them into smaller problems (applying the principles reductionism and disjunction), and thus have a clear response to a tame management problem (using either good or best practice). They then use negative feedback to close any gaps. As such, managers in an ordered domain can clearly determine if decisions are right or wrong, and they can reach a point where they can say the problem was solved (Kurtz & Snowden, 2003; Rittel & Webber, 1973).

However strategic decisions about the idealised future states of organisations, answering the question “what should social systems do”, is a different class of problem. Rittel and Webber (1973) contend that strategic planning problems about idealised future states are ‘wicked’, not because of the degree of difficulty, but rather because there are innumerable causes for the problems that have been identified, and causality is non-linear, which makes the problems difficult to describe, and often the problems remain ill-defined.

Furthermore, the challenge facing managers is that with more social complexity (generalised complexity), namely, problems that are socially complex in nature, become even more wicked (Bettis & Prahalad, 1995; Rittel & Webber, 1973). In other words, these kinds of problems are perpetually ill-defined because it not possible to generate all the possible solutions ahead of time (Rittel & Webber, 1973). In addition, causality in complex social settings is non-linear (Allee, 1999, 2000, 2002, 2008; Barabasi & Albert, 1999; Eisenhardt & Martin, 2000; Kurtz & Snowden; 2003; Stacey, 1995;).

It will not be possible for managers to predict and control the long-run effect that DLT will have on how the economy and society arranges itself. Cause and effect are only coherent in retrospect. Although managers will see patterns in retrospect, these

patterns never repeat themselves. At best, managers can anticipate how the economy and society will arrange itself, but they will not be able to predict. Data precede models, manager first probe, then try to make sense of the data and then respond (Kurtz & Snowden, 2003; Stacey, 2011, 1995).

Hence, in complex problem settings, managers need to probe–sense–respond, as opposed to sense–analyse–respond (Kurtz & Snowden, 2003). This means that they first do small experiments, while sometimes they make ‘big bets’ (De Smet, Lackey & Weiss, 2017); they then sense, using sense-making models, such as agent-based models (Cilliers, 2002); and then respond (Kurtz & Snowden, 2003). Managers then manage patterns as they emerge, and use ‘strange attractors’ (positive or negative attractors) to either amplify or inhibit the patterns that emerge (Kurtz & Snowden, 2003). In complicated settings, managers traditionally use analytical tools, such as categorisation models and pull ‘levers’.

In terms of this study, managers are confronted with the question about what their organisation or a group of organisations should do with DLT. The practical problem in answering this question is not merely a tame management problem, which means that it is not an efficiency and effectiveness issue. It is a different class of problem: a wicked problem.

Wicked problems can be differentiated from ordinary management problems based on at least ten distinguishing properties (Camillus, 2008:3; Rittel & Webber, 1973):

- **It is not possible to write a well-defined problem statement for a wicked problem**, as in the case of ordinary management problems. Problems dealing with social constructions, such as changing the workings or organisations (architecture and re-architecture) are never solved. They are only resolved over and over (Rittel & Webber, 1973). The formulation of the wicked problem is the problem. Managers experimenting with fundamental technology will find that the processes of conceiving problems and finding solutions are identical. As new solutions are offered by DLT, specifically through using cases that have been developed and tested, new problems will be discovered. Hence, problems will remain ill-defined as they change with every attempt to implement new solutions.
- **There is no stopping rule.** With ordinary tame management problems, managers can say when they have reached a point that they have solved a problem.

However, strategic planners will never reach a point with wicked problems where they have reached an idealised future state (an ideal system that society will use to coordinate social and economic activity). Strategic planners will feel they can always do better. They will stop either when they run out of money, time or patience.

- **There is no right or wrong decision** in adopting DLT, but there are ‘good’ or ‘bad’ outcomes. Deciding about adopting fundamental technology, such as DLT, and what distributed autonomous systems should do, is mostly a matter of judgement (there is no optimal solution). The assessment of the solution will most likely be better or worse than existing centralised organisational systems, or satisfying or good enough.
- **There is no test for the solution to a wicked problem.** In the case of ordinary management problems, managers at some point can determine, often early on, how good a solution attempt has been. However, with wicked problems, the solution will generate waves of unforeseen consequences and even undesirable repercussion over an extended period of time. The use of technology that fundamentally is disruptive to the existing relationships and game structure of organisations may destroy more value (social and economic capital) than what it creates over an extended period of time (Atluri, Dietz & Henke, 2017:37), as well as create massive technological unemployment (Arthur, 2017; Keynes, 1933).
- **Every solution to a wicked problem is a ‘one-shot operation’.** There is no opportunity to learn by trial and error as every attempt counts. Participants deploying DLT will find there is no trial run that can be made, without incurring any kind of penalty (as unwanted actions cannot easily be corrected or reversed). This means that every person that attempts to implement systems based on distributed ledger technology will find their actions to be consequential. The very nature of DLTs is that they are irreversible and immutable (Swan, 2015). Trying to reverse transactions or interactions poses another set of problems. Consensus is required from everyone to change how actors cooperate and coordinate within a distributed system.
- **Wicked problems do not have an enumerable set of possible solutions.** There is no finite set of rules that can account for all the possible situations in which distributed ledger technology can be used. With DLT there is an infinite number of

rules that can be created (Swan, 2015). Essentially any rule that the community accepts is possible.

- **Every wicked problem is unique.** Ordinary problems belong to a class of problems that can be solved in the same way. By contrast, every wicked problem is self-contained and entangled with other problems, and it is impossible to determine a single root cause. Managers may find that distributed ledger solutions are useful to solve ordinary problems in the same way as other technologies do (distributed technology may even be better at solving ordinary, tame management problems). However, it may be fundamentally harmful to try and solve wicked problems using DLT, as other problems entangled with the unique problem that an organisation is trying to solve will emerge.
- **Every wicked problem can be seen as a symptom of another problem.** Problems of a strategic nature can be described as the difference between an idealised state and the current state. The process starts by looking for a causal explanation. For example, the problem may be that people can easily copy content on the web (Swan, 2015). Solving this problem (the double-spending problem), using DLT to create a distributed autonomous, immutable and irreversible ledger applications will pose new problems of which the original problem is the 'symptom'. For example, how will the government tax people that decide to use cryptocurrency pseudonymously? In this way actors can circumvent an entire banking system. New forms of cryptocurrency ensure anonymity for anyone transacting on the 'dark web'. This creates less friction, pseudonymises identity, and makes more complex illegal distributed ecosystems possible.
- **The representing of a wicked problem is explained in numerous ways.** The different stakeholders involved in using fundamental technology will give different perspectives on what the real problem is and what causes it (different positions as to the 'right' question that should be asked, and the 'right' answer to the question asked). For example, arguments are made about protocols lacking in terms of the web (Swan, 2015), the limitations of the current banking system (Arthur, 2017; Swan, 2015), the social contract that organisations have with society (which drives the movement to decentralising nasty and exploitative centralised organisations), and the externalisation of organisational intelligence and technological unemployment (Arthur, 2017).

- **The planner has no right to be wrong.** Planners that deal with wicked problems are held accountable for the consequences of ideas that have been implemented. For example, regulators cannot make decisions that will expose a financial system to systemic risks. They cannot make impulsive decisions. There is no immunity for them, as their quest is not for the truth, but rather a quest to create something of value for society, or meet a mandate, such as regulators seeking to ensure stability in a system. Consequently, there are fears that more value can be destroyed than what is created or severe disruption can be caused to the stability of existing financial systems.

Furthermore, there is no 'reset' button that organisations or society can push if the DLT experiment goes wrong. DLT, if successful, will be deeply embedded in the workings of organisations and will require major social and political change (Arthur, 2017; Iansiti & Lakhani, 2017; Ito, Narula & Ali, 2017; Swan, 2015).

Even if all of these experiments fail, it will still have an impact on the generation of new forms of distributed autonomous business models (Swan, 2015), new forms of value transfer (new asset classes and useful cryptographic objects), and new ways to cooperate and coordinate socially and economically.

The process of learning to play, and shape the peer-based distributed game structure that fundamentally rearranges how participants in a distributed value ecosystem cooperate and coordinate to exploit socially complex value relationships as related to identity, money and personal data, is not merely a tame or benign management problem, it is a wicked management problem.

Given the theoretical and practical management problem, the method of inquiry in this study needed to transcend the abstractions that add to the confusion of what organisations should do with DLT. In other words, there is a need for a different and practical way of seeing the distributed value ecosystem phenomenon that does not involve the generation of more explanations, logics, concepts, frameworks, models or theories.

For the purposes of this study, phenomenology presented a way of transcending ordinary ways of inquiry, and to see the essential qualities of managers' experiences of the distributed value ecosystem phenomenon. A phenomenological attitude as opposed to an 'organisational attitude' it taken to the method of inquiry (Gill, 2014).

Overall, the purpose of this study is to seek and describe only that which presents itself in a manager's experiences. That is, the essences of the lived experiences of the distributed value ecosystem phenomenon, and to reject that which is contingent, unessential and transitory in the phenomenon.

1.4 PURPOSE OF THE STUDY

The purpose of this study is to seek and describe the meanings and essences of managers' lived experiences of the decentralised and distributed value ecosystem phenomenon.

Phenomenology essentially refers to the study of a phenomenon, where it is anything that appears to someone in his or her conscious experience (Husserl, 1907/1964, translated by Alston and Nakhnikian). To seek the essences, which in this case, refers to the invariant qualities of managers' experiences of the distributed value ecology phenomenon, this study employed phenomenology as both the research philosophy and research method (Gill, 2014).

1.5 RESEARCH QUESTIONS

The overarching research question that guided the study is as follows:

- What is the invariant experience of managers using externally available intelligent building blocks (distributed ledger technology) to transform or rearrange the way organisations cooperate and coordinate with others in a distributed value ecosystem?

The secondary research questions derived from the primary question that guided the study are as follows:

- Is there is a difference between the actual lived experiences of managers of the distributed value ecosystem phenomenon and the theory on the distributed value ecosystem phenomenon?
- Is there a new coherent blueprint or rules of the game emerging for the use of the externally available intelligent building blocks to transform the distributed autonomous organisational architecture?

- What is impact of fundamental technologies, specifically distributed ledger technology on organisational intelligence? Meaning, do fundamental technologies change how organisations recognise, sense and act appropriately in complex problem contexts (value ecosystems) where the coordination of human activity between many actors, machines and institutions will become a major future challenge?

1.6 RESEARCH OBJECTIVES

The primary research objective of the study is as follows:

- To describe the invariant features of the distributed value ecosystem phenomenon.

The secondary research objectives of the study are as follows:

- To differentiate between the actual lived experiences of managers of the distributed value ecosystem phenomenon and the theory on distributed value ecosystem phenomenon.
- To explore how distributed ledger technology is used as a fundamental external intelligent building block to create new forms of distributed, autonomous organisational architecture.
- To explore the impact of fundamental technology on organisational intelligence.

1.7 SIGNIFICANCE OF THE STUDY

This study primarily contributes to a more fundamental and coherent understanding of the essences of the distributed value ecosystem phenomenon by employing a phenomenological attitude as opposed to an organisational attitude (Gill, 2014). This study is also original in that no other studies of the distributed value ecosystem phenomenon have been found in the context of the financial and banking sector that employ a transcendental phenomenological attitude (see Chapter 2, Section 2.5 that presents a literature review verifying the degree to which transcendental phenomenological studies are rare in organisational and management studies). Furthermore, the review confirms the absence of transcendental phenomenological technological studies using DLT or the lived experiences of the distributed value ecosystem phenomenon.

This study makes a contribution to the understanding of the essences of the distributed value ecosystem phenomenon is the nature of the relationships that participants in distributed value ecosystem hold to DLT. The nature of these relationships is transactional and circular in nature.

Furthermore, this study makes a contribution to the current knowledge on value relationships and transactional patterns. In relation to these patterns involved with self and others in transacting, there are transactional patterns that participants seek to either amplify or dampen, or a novel transactional pattern that participants seek to explore using DLT.

In terms of the circular nature of relationships, the study finds that organisations seek primarily to have power over relationships in transacting. The result is that participants are locked into the binary cycle of a bounded relationship pattern that may become harmful to self over time. This means that value relationship trade-offs or compromises are made in terms of socially complex resources, and in essence, they experience an unbalanced relationship of give and take of value. The response to an 'unbalanced' binary bounded transactional pattern is first to exit the bounded binary pattern into a binary unbounded transactional pattern, which is not a seamless experience.

However, there is a third pattern that has been less explored. The novel transactional pattern less explored relates to value relationships that are more 'folded' in nature. In other words, the participants balance the conflicts and friction over socially complex resources by meeting narrow micro-level near interaction starting conditions that make more folded value relationships possible. With the folded transactional pattern, participants in a distributed value ecosystem can opt into or out of the unbalanced value relationships of power with others, and counter the exploitation of aspects in relation to self.

The key implication of folded value relationships for society and organisations is that it presents an alternative approach to dealing with the increase in friction and conflict around the socially complex aspects of value relationships. For example, the participants have autonomy over money, identity and personal data, and at the same time, they have a seamless experience in transacting with others. Furthermore, their interactions with others are both transparent and private. In essence, with the folded transactional pattern participants seek to make a trade-up in value relationships in

relation to self and with others, as opposed to a value relationship trade-off or sacrifice that leads to either compromise in relation to self or dominance over others. However, a truly folded value relationship pattern is not easy to create and is rare.

1.8 RESEARCH DESIGN

This section addressed the research design of the study. The term 'research design' refers to the general plan the researcher used to answer the research questions of the study (Saunders, Lewis & Thornhill, 2015). More specifically, the nature of the study and phenomenology is discussed, as the research philosophy within which this study is situated, followed by a description of the phenomenological method employed, which determined the limits of what and who formed part of this study, and the collection and analysis of the data.

In other words, the current study is situated within the transcendental phenomenological world view (dealt with in section 1.8.1). The specific descriptive method employed is Giorgi's (1985) phenomenological method (method referring to the way in which data is collected and analysed) in which the assumptions of the method closely aligns with Husserl's phenomenological philosophy (steps in the research method followed are outlined in section 1.8.3).

1.8.1 Husserl's transcendental phenomenology

The nature of the current study is qualitative and descriptive, as the researcher sought to describe the invariant qualities (essences) of participants' lived experiences of the distributed value ecosystem phenomenon. Furthermore, this study is situated within a transcendental phenomenological world-view (Husserl, 1907/1964 translated by Alston & Nakhnikian). This means that the researcher's world-view in reality is a social construction, and to discover new knowledge requires the researcher to return to the phenomenon in terms of how it appears to us in our consciousness (Husserl, 1907/1964, translated by Alston and Nakhnikian).

Husserl is regarded as the founder of phenomenology (Gill, 2014). Husserl (1907/1964, translated by Alston & Nakhnikian) believed that only one source of certainty exists, this source is our inner intuition and experiences, and all scientific knowledge rests on inner evidence. Husserl rejects the notion that objects in the world

exist independently (an objective reality) and that information about these objects is reliable (Sanders, 1982). For this reason, the discovery of new knowledge, knowledge that we can be certain about, requires us to return to how things appear in or present themselves to us in our consciousness. Hence, the dictum often used in phenomenological research is "...to the things themselves" (Moustakas, 1994:27). Furthermore, the use of the term transcendental implies the researcher would perceive the phenomenon freshly, as for the first time and see it in its totality (Creswell, Hanson, Plano & Morales, 2007:254; Moustakas, 1994:34).

1.8.2 Research approach: transcendental phenomenology

In terms of the research approach, organisational phenomenological studies follow one of two research approaches, namely, a descriptive approach (Edmund Husserl's transcendental phenomenology) or an interpretive approach (Martin Heidegger's hermeneutic or interpretive phenomenology). Most of the phenomenological families of methodologies are rooted in either Husserl or Heidegger's approach to phenomenology (Gill, 2014). The current study followed the **descriptive approach** (Husserl's transcendental phenomenology), as the researcher was interested in describing the lived experiences of managers of the distributed value ecosystem phenomenon, which may be very different from the theoretical understanding (natural explanations) of the phenomenon.

Furthermore, transcendental phenomenology was considered as an appropriate research approach for this study, as it is a systematic way of uncovering and describing the textures and structures of lived experiences in efforts to arrive at a deeper understanding of the nature and meaning of the experiences of a phenomenon. The rationale for specifically choosing transcendental phenomenology as the research approach, as opposed to other research approaches in this study, is discussed in more detail in Chapter 3.

1.8.3 Methodological choice: Giorgi's method

With regards to the phenomenological method employed in this study, it can be stated that there is no precise or authoritative phenomenological method for the collection and analysis of data (Gill, 2014; Sanders, 1982).

Gill (2014) gave some guidelines on choosing a specific phenomenological method. The first piece of advice was to determine whether the researcher's assumptions closely align with Husserl or Heideggerian phenomenological philosophy, or whether it is a combination of both. Gill (2014) further stated that important considerations in choosing the phenomenological method are the nature of the research question, the intended research outcomes of a study, and the practical considerations, such as research access, sampling approach and number of participants. Anosike, Ehrich and Ahmed (2012) contend that out of all the competing phenomenological positions, only Giorgi's (1985, 1997) descriptive method strictly follows the Husserlian phenomenological tradition.

The researcher in the current study, having considered his own personal philosophical assumptions, the research questions, and the intended outcomes of the study, used Giorgi's phenomenological method for this study (Giorgi, 1985). In addition, there were also other considerations for using Giorgi's method, such as how well the method was developed and the extensive use of Giorgi's method in organisational studies, and how closely the method aligns with the Husserlian phenomenological tradition. These considerations are discussed in more detail in Chapter 3.

In terms of the selection of participants, the purposive and snowball sampling methods were employed. In Chapter 3 the relationship between the data collection units (experiences of managers) and the topic of this study is discussed, which also includes the inclusion criteria, informed consent, confidentiality and saturation that determined the final number of participants (elements of meta-themes were present as early as six interviews). The instrumentation which involved using semi-structured interviews, the organising and synthesising of data, and how rigour is ensured in the study (trustworthiness) is also dealt with in more detail in Chapter 3.

In terms of Giorgi's method (1985), the steps employed in the analyses (phenomenological reduction) and synthesis of data were as follows:

- **Description** involved obtaining a concrete description of the phenomenon as lived through by participants by using semi-structured interviews (Giorgi & Giorgi, 2008:11). The researcher temporarily suspended (bracketed) any theoretical biases being held about the phenomenon in order to attain an understanding of what the phenomenon essentially is, and the researcher did not posit whether the

respondents' experiences of the phenomenon are real or not. The researcher only considered the presence of the phenomenon as related to that which was presented by the experiencing person (Giorgi & Giorgi, 2008).

- **Phenomenological reduction** required the researcher to read the entire transcription of each interview to get a sense of the whole, then go back to the transcription again, reading more slowly to establish 'meaning units' (Giorgi & Giorgi, 2008). Data was 'horizontalised', which means that equal value was given to the statements that were made, and the researcher was receptive to each statement made by a participant. Repetitive and irrelevant statements were deleted, leaving only the 'Horizons' (meaning units). 'Horizons' that were non-repetitive and non-overlapping were grouped into themes, which were then used to develop the textural descriptions of the phenomenon. To construct textural descriptions, the researcher needed to follow a pattern of looking and describing, looking again and describing while referencing textural qualities (Husserl, 1907/1964, translated by Alston & Nakhnikian).
- **Imaginative variation** is a reflective process, which starts the search for essences (Anosike *et al.*, 2012). An essence is the most invariant meaning (general meaning) of a phenomenon. Imaginative variation involved the researcher moving from the participant's situated statements to a general statement that represents the most invariant meaning of the phenomenon (Anosike *et al.*, 2012:14). Hence, the researcher used imaginative variation as a mechanism to ask: "what is essential?" and "what is incidental?" to arrive at a description of the essential structures of lived experiences (Anosike *et al.*, 2012:14). The outcome of imaginative variation is a structural description of participant experiences.
- The final step involved the integration of the textural and structural descriptions into a **composite textural-structural description** of the essences of the experience of the phenomenon. The researcher typically presents this synthesis as a single statement that represents the essences of the phenomenon. It is also emphasised that the essences of any experience are never fully exhausted (Moerer-Urdahl & Creswell, 2004:32), and the essence of a phenomenon can never be fully established, as the textural-structural synthesis embodies the essences at a certain time and place, from the perspective of the researcher (Moustakas, 1994).

A framework is included in Figure 3.1 in Chapter 3 that guided the phenomenological analysis of experiences involving the use of technology. The framework assisted in structuring the analysis of the collected data into textures and structures of the managers' experiences, to arrive at the essential qualities of lived experiences. The detail of these six steps in Giorgi's method (1985), namely, epoché, horizontalisation, delimitation and clustering of invariant horizons into themes, the contextualisation of the themes, individual textural-structural descriptions and composite textural-structural description that answers the primary research question of this study is dealt with in Chapter 4.

1.9 DEFINITION OF TERMS

The table below lists the most important terms used in this study and supplies a definition of each.

Table 1.1: Definition of key terms

Key terms	Definition
Distributed Ledger Technology (DLT)	This is a family of technologies where participant nodes in a distributed network each update their own copy of a common set of data. Nodes also share their data set with all of the participating nodes in the network.
Blockchains	This term refers to a type of distributed ledger where transactions are organised into cryptographically secured consecutive blocks.
Public blockchains	This is a distributed ledger open to the public. Anyone can transact or be a validator in the execution of a consensus protocol.
Consensus protocol	This refers to the protocol used to reach agreement between a number of processes or agents for single data value during computation.
Private blockchains (consortia)	This is a private permission peer-to-peer decentralised blockchain that is not open to the public.
Cryptocurrency	In the context of financial services, the term cryptocurrency, crypto-assets and crypto-tokens are used to indicate ownerships stored on a distributed ledger using cryptography to secure transaction records.
Killer applications	Also known as killer app, this is a computer program or software that is so essential or desirable that it proves to be the core of some larger technology.
Tokenisation	This is the process of substituting a sensitive or valuable data element with a non-sensitive equivalent that has no extrinsic or exploitable value (for example, substituting fiat currency with currency tokens).
Wicked problems	These are problems that are socially complex in nature and that are extremely difficult or impossible to solve or fix.
Self-sovereign identity	This is an identity that gives individuals full autonomy over their credentials, without having to request permission from an intermediary or give over control of their personal data to a central authority. The self-sovereign identity paradigm is the opposite of a centralised identity paradigm, where a person's identity is provided by an outside entity.
Surveillance capitalism	This refers to an economic system centred on the commodification of personal data with the purpose of making profit.
Zero knowledge proof	Also known as zero knowledge protocol, this is a method that makes it trivial to prove that one possesses certain knowledge or information, without revealing it to prove the information one possesses or additional information.

Source: Researcher's own compilation

1.10 ASSUMPTIONS

The researcher acknowledges that it is not possible to separate oneself from the assumptions being held. At best, the researcher can suspend (bracket) the topic and research question (Anosike *et al.*, 2012:10; Hycner, 1985:281; Moerer-Udahl & Creswell, 2004:19-35; Moustakas, 1994:34). The researcher acknowledged the following assumptions at the design stage of the study:

- There are limits to how useful the positivistic, analytical method is in understanding a socially complex phenomenon. Hence, the researcher draws a distinction in terms of management problems that are merely complicated, and problems that are complex and wicked in nature.
- Analytical methods destroy a great deal of what it seeks to understand, by 'cutting up' complex systems through the employment of the principles of reduction, disjunction and determinism.
- Organisations are complex adaptive systems. Hence, what can be understood about a complex phenomenon is not linear or fixed (what can be understood is emergent in nature). More specifically, complex adaptive systems are continually under construction and they keep on changing their rule transformation, which in turn, keeps changing the states that emerge.
- Data within the lived experiences of individuals in terms of a phenomenon can provide an accurate, valid description of the essential qualities of the phenomenon.
- The development of new constructs, concepts and metaphors is, in fact, a search for meaning but not necessarily a search for an understanding of the 'whole', or the development of an essential understanding of a phenomenon.
- Constructs, concepts and metaphors employed within the literature that are abstractions, all 'suffer' from some loss of meaning. No single construct, concept or metaphor can fully represent a complex adaptive phenomenon.

1.11 LIMITATIONS

The limitations of a study refer to the potential weakness or problems with a study (Leedy & Ormrod, 2015). The main limitation of the current study is the scope of the study, which is delimited to the financial and banking sector. The reason for this is that

the frictionless nature of DLT makes it possible for unconventional actors to be part of peer-based game structure, which will redraw, merge or may create large ecosystems not envisaged before. For example, social media companies are already creating 'super applications' that combine a wide range of financial services into one application. It is also possible to experiment with DLT at very low cost. Consequently, it is already possible for a much larger number of players to experiment and expand a 'killer' distributed value ecosystem.

1.12 SUMMARY (CHAPTER LAYOUT)

The purpose of this study was to seek and describe the meanings and essences of managers' lived experiences related to the decentralised and distributed value ecology phenomenon. The chapters are laid out as follows to achieve the objectives of the study:

Chapter 1 contained an introduction to the study, including the background to the research problem, the theoretical and practical problems that manager face in using DLT, the significance of the study, and the research design. Chapter 1 also presented the definitions of key terms, and discussed the assumptions made and main limitations of the study.

Chapter 2 contains three distinct parts. The first part is a thematic literature review of emerging constructs and concepts on value creation and the emerging distributed value ecosystem phenomenon. The second part situates the study within the current literature, particularly focusing on the central themes that emerged in the study. The third part includes a review of phenomenological management studies, specifically using technology to establish how this study differs from other organisational-technological phenomenological studies.

Chapter 3 deals with the methodology used to answer the primary research question, as more specifically, phenomenology differs significantly from other methodologies. Phenomenology is both a philosophical discipline and a research method (Denzin & Lincoln, 2005). In other words, the methodology discussed in Chapter 3 refers to both the philosophical assumptions, which this study is based on and the research method. The research method refers to the data collection and the steps followed to seek and describe the invariant feature of the value ecosystem phenomenon. This chapter also

addresses the appropriateness of the research design, selection of participants, informed consent, instrumentation, data collection, analysis and synthesis of data, as well as the conceptual frame used for the analysis of data to arrive at the essence of participants' experiences as related to the distributed value ecosystem phenomenon.

Chapter 4 presents the findings of the study, more specifically, the process of phenomenological reduction and synthesis. Furthermore, the researcher describes his own experience with the phenomenon (epoché), process of horizontalisation, delimiting horizons, clustering of horizons into themes, and placing the themes back into the overall contexts or horizons from which they initially emerged. Thereafter, the textural and structural descriptions are presented for each of the participants. The final section of the chapter presents a composite description of the individual participants' textural-structural descriptions. This composite description answers the primary research question as to the invariant qualities (essences) of participants experiences lived through in terms of the distributed value ecosystem phenomenon.

Chapter 5 provides an overview of the study, as well as presenting the factual, interpretive and conclusions drawn and discussing the study's contribution to knowledge. The overview includes a brief description of the central research issue, as well as the relationship of the central research issue to the research statement and research gap identified. Then the descriptions of the relationship between the conceptual the frame used and the research design, research statement and factual conclusions, the research questions and interpretive conclusions, and the conceptual frame and conceptual conclusions are dealt with. The final section addresses how the gap identified in the knowledge has been closed.

CHAPTER 2: LITERATURE REVIEW

2.1 INTRODUCTION

The literature review chapter provides a theoretical and conceptual context to the phenomenological method (transcendental phenomenology) used in this study, which is in line with the method to prepare for a phenomenological study, and to connect the literature to the research topic and research question (Moustakas, 1994). The objectives of the thematic literature review are to:

1. Explore theories and core themes in the literature on emerging constructs and concepts related to value creation and the emerging distributed value ecosystem phenomenon. The initial literature review targeted literature that covered value creation and appropriation as a complex, distributed, rule-based, non-linear, complex brain-like or ant-like dynamic;
2. Situate the study within the existing literature, particularly focusing on themes that emerged in the findings chapter of the study; and
3. Review phenomenological studies of management experiences, specifically using technology to establish how this study differs from other organisational-technological phenomenological studies.

2.2 SEARCH OF THE LITERATURE

The sections that follow reflect the result of searches of books, peer reviewed articles and dissertations. Sources searched in the initial round involved the Proquest (ABI-Inform) and Ebsco-host (Business Source Complete) databases. In the initial search no specific period was selected, as the relevance of the articles to the main topic of the study was considered to be of greater importance. A search for 'value creation' combined with key word combinations of 'complexity', 'non-linear', 'dynamic' and 'distributed' was carried out. The key words and abstracts of the search results were scanned. Those articles that introduced a complex and/or larger conceptual frame for value creation, in the form of new constructs, concepts or metaphors were completely read (see Appendix B that gives an overview of these concepts, constructs or metaphors that were identified, and the different research methods that were

employed, which overwhelmingly involved abstraction, and the common themes amongst the articles).

Further search rounds were undertaken. The starting point for further searches was the articles that are listed in Appendix B, which led to more articles being considered. This practice helped to expand the scope of the search to other articles that had initially not been considered. Furthermore, the key journals that emerged from the search were: *Academy of Management Journal*, *Academy of Management Executive*, *Emergence*, *Journal of Complexity* and *Strategic Management Journal* (three of these journals are rated (A*/A) as leading journals in the field of management and strategy by the *Australian Business Deans Council Journal* (ABCD) list).

The literature reviewed also included phenomenological studies done in organisational settings and the experiences of using technology (most of these studies were undertaken in the sphere of education). This part of the literature search aimed to establish the originality of the study, specifically whether there were any other phenomenological studies of experiences related to using DLT in the context of the financial and banking sector.

The thematic literature review structure in the sections below is as follows:

- The first part of the thematic literature review deals with the development of strategy constructs, concepts and the evolution of perspectives on the concept of value in the literature.
- The second part situates the study within the literature in terms of the central themes that emerged in the study (Chapter 4). In other words, the relationship between the invariant textures and structure of experiences that emerged in the findings chapter, Chapter 4, and the literature relevant to these textures and structures of the participants' experiences.
- The third part of this chapter presents a review of organisational phenomenological studies, and/or phenomenological studies that involved the use of technology. These articles were published in three management journals: *Journal of Management Studies*, *Journal of Management Inquiry*, and the *Journal of Management and Organisation* (these journals rated as leading journals in the ABDC list). More specifically, the search result delivered 355 dissertations or theses that had a management topic, 122 that had an organisational behavioural-

related topic, 111 that had an occupational-related topic, 109 that had a health care-related topic, and 77 that had a women studies-related topic. The search period that was considered was between 2008 and 2019.

- In terms of the number of management dissertations and theses that specifically employed the transcendental phenomenological method, the search found no transcendental phenomenological management-related studies before 2008. However, between 2013 and 2015 there was a sharp increase in the number of management-related transcendental phenomenological studies (the period of the search being up to 2019, as the data collection started in 2019). These studies dealt with management-related topics or issues such as: gender, ethics, the web, adult education, women studies, military training and theology (see Appendix C). Only one transcendental study was found related to the banking industry, more specifically, banking executives' ethical perceptions (Moffett, 2005). No transcendental phenomenological study was found related to the distributed value ecosystem phenomenon in the banking and finance industry, or a phenomenological study of managers' experiences in the banking industry using DLT (see Appendix C for an overview of these studies).

2.3 THEMATIC LITERATURE REVIEW

This section provides a thematic overview of the theoretical context related to the current phenomenological study. This is in line with the method to prepare for a phenomenological study, and it is a way to connect the literature to the research topic and research question (Moustakas, 1994).

The themes that are dealt with are:

- a. the evolution of strategy theory;
- b. state of constant revolution;
- c. the search for a coherent logic for a constant state of revolution;
- d. movement from an atomistic to a connectivist world-view of value creation;
- e. value ecosystems changing the shape of industries;
- f. emergence of distributed and decentralised value ecosystems;
- g. fundamental technology; and

h. the accumulation of more complex organisational designs over time to perform novel functions, such as externalising organisational intelligence.

The implications of externalising intelligence for managers are that more complex decentralised and distributed organisational designs are emerging, before there is a proper understanding of the function and the long-term implications for management's action from the workings of these designs. In other words, design precedes function to perform the functions in a decentralised and distributed manner that was not previously possible, or even imagined.

2.3.1 Evolution of strategy theory

In terms of the structure and evolution of strategy theory, from the 1960s to the late 1990s strategy research has made a pendulum-like swing. The 'strategy pendulum' has moved from a focus on the internal organisational characteristics in the 1960s to the industry structure in the late 1970s, and back to the internal resources of organisations in the 1980s and 1990s (Furrer, Thomas & Goussevskaia, 2008).

The current swing of the strategy pendulum from the 1990s onwards is gradually moving towards a more dynamic, complex and even messy view of the strategy process (Bengtsson, Kock & Lundgren-Hendriksson, 2019; Stacey, 2011; Levy, 1994:165; Prahalad & Hamel, 1994; Porter, 1991). The complex and messy view is the result of increased levels of individual and organisational complexity (generalised complexity) and uncertainty.

There is also an increase in the fluid nature of complex social, technological and economic systems. This is primarily the result of the interconnectedness and interdependence between parts of the technological, social and economic systems (Mason & Mitroff, 2010). However, the increased fluid nature of these systems is not by grand design. Complex systems evolve, and they are self-redesigning and self-replicating. Complex designs evolve and accumulate over time (Dennett, 1995). Progress is often made when society stumbles upon such design, which they then discover to be useful, as opposed to that which is purposefully created (Hayek, 1945:528), in other words, design precedes function.

The problem is that traditional strategy theory (Porter, 1980) the planning school that is descriptive and prescriptive in nature largely fails to recognise the stumbling, messy

nature of progress. Furthermore, the accumulation of new designs or frameworks for organisational workings in high velocity environments is not an incremental or punctuated affair. Strategic change is rather a constant state of revolution (Brown & Eisenhardt, 1997:1).

2.3.2 Constant revolution

In value networks in 'high velocity' contexts, organisations find that relationships between actors are much more open and entangled, and more actors can now participate in a near and direct manner, due to the frictionless and boundary-blurring nature of fundamental technologies. Actors can also play more than one role simultaneously (roles start to blur, as well), and they are more interconnected and interdependent (Allee, 2000; Bengtsson, Kock, Lundgren-Hendriksson & Näsholm, 2016; Bowman & Ambrosini, 2000; Bowman & Swart, 2007; Nalebuff & Brandenburger 1997). In essence, the relationship interdependences between actors are much more complex, blurred and entangled. Actors simultaneously compete, cooperate to create, extract and destroy value intentionally or unintentionally.

In a complex environment, organisations often have to play catch up, as the new or novel 'games' or 'logics' that emerge could potentially disrupt an entire industry. Furthermore, Nalebuff and Brandenburger (1997) argue that organisational strategic action comes from changing the game, which is different from most other games, and in which the field, players and rules are set.

Nalebuff and Brandenburger (1997) contend that an organisational strategic game consists of 'PARTS'. This means that there are **players** in a game, **added value** that players bring, **rules** that structure the interaction between players, **tactics** that are used to shape players' perception of the game and how to play the game, and a game has **scope** or boundaries and linkages to other games, which define where one game ends and another begins (Brandenburger & Nalebuff, 1995).

If one wants to change or pick a different game, then one must change at least one component of the game. The most fundamental component of a game are the players and their value added (Nalebuff & Brandenburger, 1997). Value add for a participant is defined as the "value created by all players in the vertical chain minus the value created by all the players except the one in question" (Brandenburger & Nalebuff,

1995:60). By changing these fundamental aspects of the game, other aspects of the game will change as well.

The concept of value add helps to determine how the 'value pie' will be divided by estimating the value of the pie when you are in the game, and then subtracting the size of the pie when you are not in the game, which will give an indication of what you would be losing by not being in the game.

For example, in the banking and financial industry, which is highly regulated (Ali, Ally & Dwivedi, 2020:5; Dahlberg, Mallat, Ondrus & Zmijewska, 2008:167), regulators play a central role in defining the 'PARTS' of the financial and banking game. Given the mandate that regulators have, they use their mandate to define whether participants are either locked-into or locked-out of the game, and ensure that there is a level playing field between players. Regulators are also instrumental in defining the value add that participants bring to the game, and imposing constraints and harsh financial penalties that shape the behaviour of actors. Moreover, regulators constrain whether a fundamentally new game can be picked or not, and clarify how to think about new games that emerge (by defining the rules of new games) and how these new games are connected (or the regulators simply do not clarify how they are connected).

These key aspects of the financial and banking 'game' are primarily related to the prediction, control and power over the 'mechanics' and the competing dynamics of financial and banking value networks. This is specifically related to executing monetary policy and creating stable economic conditions, price stability and currency stability in the economy (the primary concern being macro-level outcomes). Conflict over the ownership and control of financial resources is also entwined in the game, and this impacts on the creation, destruction, storing, transfer, sharing and appropriation of value.

However, in terms of this study, when a community distrusts the players and the game itself, distance is created between the perceived value add by players, less the actual value add, which means that the perception is that more value is extracted than has actually been created. Quintessentially, a 'trust deficit' in the game itself then emerges (Frizzo-Barker, Chow-White, Adams, Mentanko, Ha & Green, 2020:9). Furthermore, perceptions related to the value add or capture of value by players change over time, which leads to communities challenging the assumptions that have been made about

the participants' role and their true value add (and concern if the value relationships result in value subtracted). The key strategic concern, given a growing trust deficit, is whether it is possible to pick a fundamentally different game that follows a different strategic path.

In terms of the literature, the idea of an 'alternative cooperative paradigm' presents an alternative strategic path. It is possible for organisations to rethink the value relationships with other organisations. Organisations that develop networks that extend beyond their boundaries make it possible for the organisations to absorb knowledge, experiences and capabilities from diverse sources, specifically from their competitors, which positively influence innovation and organisational performance. In other words, this refers to the organisational relationship pattern that moves from competition and cooperation to cooptation (Fernandes *et al.*, 2019; Nalebuff & Brandenburger, 1997).

The traditional strategic management paradigm (Barney 1991; Porter 1980) stresses that competitive interdependencies (negative interdependencies) arise from diverging and completely opposite game structures, which then generate substitution effects (Padula & Dagnino, 2007:33). Furthermore, a competitive advantage comes at the expense of other actors in a value ecosystem (namely, the win-lose game structure). The main implication of the competitive paradigm is that the independencies between organisations are defined as a zero sum game structure (Padula & Dagnino, 2007:35).

The emphasis of the alternative cooperative game structure is on cooperative interdependencies, which focus on converging interest. This means that a win-win game structure, in which organisations seek a collaborative advantage in which the strength and success of an organisation contributes to the strength and success of another organisation (Fernandes *et al.*, 2019; Padula & Dagnino, 2007:33). The main implication of the cooperative paradigm is that that the independencies between organisations are defined as a positive-sum game structure (Fernandes *et al.*, 2019:626; Padula & Dagnino, 2007:35). The cooperative paradigm assumes that organisations foster cooperative interdependencies by appealing to collective, convergent interests rather than narrow self-interests (Fernandes *et al.*, 2019; Padula & Dagnino, 2007:36).

However, these two paradigms represent the two extremes of organisational game structure (this refers to the interdependences between organisations). The reality is rather more complex. Brandenburger and Nalebuff (1995) contend that both negative and positive interdependencies exist at the same time across organisations. This means that coopetition in different configurations is possible, and this has implications for innovation and value capture (Bouncken, Fredrich & Kraus, 2020).

The theoretical roots of coopetition research are a combination of research areas. Fernandes *et al.*, 2019:624 contend that coopetition research is a combination of three research areas, namely, competitive and cooperative interaction, game theoretical strategic interdependence theory (Brandenburger & Nalebuff, 1995) and resource-based theory (Barney, 1991). For their part, Bengtsson *et al.* (2019:14) contend that coopetition research combines four research areas: network theory, game theory, competitive dynamics and resource-based theory. More specifically, with network theory, the traditional line of research on a business network focuses on the relationships between buyers and sellers when studying business networks, and less attention is given to relationships between competing firms. Actors, based on network theory, are embedded in relationships to gain access to resources and the research focus has been mainly on cooperative relationships (Bengtsson, Wilson, Eriksson & Wincent, 2010). Whereas, theories of competitive dynamics explain competitive relationships, and interaction between competitors through actions and responses, and little attention has been given to cooperation between organisations.

Network researchers have realised that organisations have to coordinate both horizontal and vertical network relationships to obtain an overall favourable and stable network position. Therefore, it is not sufficient to study only the relationships concerned with cooperation. However, there is an awareness that competition plays an important role in networks (Bengtsson *et al.*, 2016:14).

Padula and Dagnino (2007) stress that coopetition exists at various levels: macro (countries, aggregate of companies), meso (inter-firm) and micro-level (company, groups, and individuals within an organisation). Which expands the possible levels of coopetition.

In terms of this study, decentralised and distributed value networks expand the scope of the coopetition game by making coopetition possible at different levels, as well as

between levels (by collapsing levels). This means that coopetition is possible between individuals, organisations and even machines that interoperate as nodes, on a peer-to-peer basis, in a decentralised and distributed network (Ali *et al.* 2020:8; Guo & Liang, 2016). This peer-to-peer game structure is made possible through an immutable shared ledger or intelligent shared memory component (a distributed ledger). Furthermore, with an open interoperating system many more actors can interact, transact in autonomous, as well as pseudonymous ways that were not previously possible. Therefore, coopetition relationships in a distributed network are not just the dyadic relationships that are primarily highlighted in coopetition research (Bengtsson & Kock, 1999; Chen, 2008;).

In game theoretical terms, the participants in a value network can choose to play more than one role simultaneously (Nalebuff & Brandenburger, 1995). In traditional network theory, relationships between organisations and customers/actors are well defined. However, where previously the definitions and roles of competitors and co-operators were clear, they are now a great deal more blurred (Bengtsson *et al.*, 2019:15).

In terms of the symmetry or asymmetry in value networks, Brandenburger and Nalebuff (1995:60-61) contend that when participants in value network are only viewed as competitors, then one might completely overlook the symmetry that already exists in a value network. Brandenburger and Nalebuff (1997) argue that if you help other people to become more valuable, then you should share in some way in their gain. Hence, we should ask the question: What can we do to make the value 'pie' larger and then how can we share in the gain we created?

In terms of strategy research, Bengtsson *et al.* (2019) argue that strategy research is moving from process-based research to micro-level research (looking more at individual incentives and coopetition capabilities), and a call is made for research that focuses on multiple actors in a network to individual levels that are influenced by coopetition. This would incorporate an extension to the goals and motives in coopetition strategies to move from pure economic goals to include social goals, and include more stakeholders in the coopetition picture. Bengtsson *et al.* (2019:19) argue that a more systematic integration of micro-level perspectives into coopetition research has the potential to build more solid coopetition theory. Bengtsson *et al.* (2019:19) propose that coopetition should rather be defined as: the simultaneous intentional and

unintentional competition between multiple stakeholders at any level of analysis, driven by different interests and goals that subsequently form paradoxical relationships.

In terms of this study, experimentation with DLT is a different kind of competition game structure that is selected by organisations. Hence, it is regarded as an 'alternative cooperative paradigm', in which there are peer-based interdependences (which is a real-world example of multiple actors, at different levels in a network driven by different interests for participating, with positive interdependencies).

More specifically, in terms of interrelationships, information symmetry is 'baked' into relationships between actors as starting conditions of the interoperating system. For example, it is possible for each node to have direct ownership and control over their own data (via a private cryptographic key), to be transparent and have privacy in their interaction. However, it is possible to include multiple actors that have universality in their interactions, and that do not just default to dyadic relationships.

The implication of altering key 'PARTS' of centralised value networks to become decentralised and distributed, considerably expands the scope of the competition game that individuals, communities and organisations may decide to play on a peer-to-peer basis (a different configuration of value relationships).

From a micro-level perspective, a distributed ledger creates an interoperating capability that nodes (an individual, group, organisation, a country or machine) can use to cooperate and coordinate in paradoxical ways without having to use an intermediary. In other words, nodes can have both privacy and transparency, and be both self-sovereign and collaborate at the same time.

In terms of the generic drivers for the adoption of a competition-based strategy by an organisation, competition expands the market size of the current market, creates new markets, and creates efficiency in the utilisation of resources as organisations develop horizontal relationships with other organisations that perform similar operations (Daidj & Egert, 2018:103).

In terms of this study, the drivers for the adoption of DLT by financial institutions, such as banks and stock exchanges, are primarily related to the lowering of transactions cost, crossing ledger boundaries (no need for reconciliations and more secure transactions), and the ability to better cope with the blurring of organisational boundaries.

Moreover, there are more incumbents, in the shape of financial technology (fintech) organisations, in the market that perform better at interacting with clients than traditional banks do, and some of these players seek to perform operations that the centralised banking system controls (for example, social media sites that seek to create currency native to their social media sites). Using DLT, incumbents, such as social media and the open source community, can, in theory, already create their own crypto objects, but they are largely held back by a regulatory chasm, between non-traditional players and traditional players in the banking and financial game. This means that there is a lack of universal regulation of open distributed ledger systems (Ali *et al.*, 2020:6; Frizzo-Barker *et al.*, 2020:10). The impact of expanding the competition peer-based game is that financially more inclusive societies can be created, where centralised financial services are either very expensive, poorly developed or non-existent.

In terms of the traditional competitive dynamics perspective, using the linear-mechanistic type frameworks to expand the scope and 'location' of the competitive game that is played are less useful. The dynamics that play out in complex settings are non-linear (Stacey, 2011; McMillan 2008; Bettis & Prahalad, 1995; Levy 1994:169). As previously indicated, the well demarcated boundaries that organisations construct collapse (Prahalad & Hamel, 1994:9) or start to 'blur'. Organisations, in complex settings such as education, housing, health care, financial services, banking and crime prevention, find that their fight is with non-linearity and that the boundaries collapse. In other words, they face wicked problems, rather than tame management problems of efficiency and effectiveness (Rittel & Webber, 1973). Their struggle is primarily with creating future ideal states (Mason & Mitroff, 2010). However, actions and effects are not constant in complex settings. An action (cause) can have a large variation in effects, depending on how sensitive a system (sensitivity dependency) is to an initial set of conditions (Levy 1994:6; Stacey, 1995:481).

In terms of the strategy literature, it is being argued that the traditional strategy process (planning school) and content (specifically value chain theory and resource-based theory) (Barney, 1991; Porter, 1980) are experiencing a breakdown in complex, high velocity settings (in effect, a breakdown of the game itself is being experienced). This breakdown of theory is the result of ordered, prediction, control and optimisation

conceptual frameworks lacking explanatory power when uncertainty increases (Eisenhardt & Martin, 2000:1106).

Furthermore, organisations in high velocity environments find that change occurs much faster, in shorter spaces of time, as technological and economic systems become more interconnected and interdependent. The result is that that which is known as fact is overturned with surprising regularity, and the growth of knowledge is exponential (Arbesman, 2012). Consequently, incrementalism (incremental changes) is no longer sufficient (Hamel, 1996). For many organisations, strategic change is not even a punctuated affair. The normal state is rather a constant state of revolution (Brown & Eisenhardt, 1997:1; Prahalad & Hamel, 1994).

In a constant state of revolution, the key question for organisations is how to act strategically (Bettis & Prahalad, 1995). Many organisations find it hard to bring about strategic change, or they see the change needed, but they are unable to act (Bettis & Prahalad, 1995). To act requires organisational intelligence. The concept organisational intelligence suggests that change will not happen simply by changing the surface architecture, and the strategy, structures and systems of organisations. Bettis and Prahalad (1995) and Prahalad and Hamel (1994:9) argue that the dominant logic used, and which gives shape to surface architecture, has to change.

Seen from a game theoretical perspective, the creation of fundamental change is not about playing the existing game better. To shape strategy, organisations have to decide what the 'right' game is that they have to play (Nalebuff & Brandenburger, 1997). However, picking the 'right' game is not easy. Furthermore, organisations have to learn how to play new games, but by the time they have learnt how to play the new game, it is too late to shape the game (Nalebuff & Brandenburger, 1997:29).

In terms of this study, organisations that realise that distributed technology will be disruptive to their way of doing things, mostly first develop and experiment with DLT proofs of concepts, and create safe-to-fail experiments with DLT in regulatory 'sandboxes', mostly to determine if they are still playing the right game. Whereas, the incumbent's experiments with DLT, outside of regulatory boxes, rather seek to establish if it is possible to play a fundamentally different game, a game that expands the scope of the playing field.

From an organisational logic perspective, organisations find that they need to understand the key 'PARTS' of the game that is changing in their efforts to shape strategy and influence the future, and from a dominant logic perspective, the problem is less about changing the shape or the 'aperture' (size) of the filter or fine-tuning the aperture of the lens used (see Figure 1.1 in Chapter 1). The greater challenge for organisations is strategic efforts that require an organisation to move the conceptual filter used to a different 'bandwidth' (location) that gives shape to surface architecture (Prahalad & Hamel, 1994). Organisational intelligence is needed to fundamentally change the 'location' of the game.

2.3.3 Search for a coherent logic for a constant state of revolution

The following questions have been asked: Is a complex logic (conceptual filter) emerging in strategy literature? Is it a coherent logic? An argument for a more complex and dynamic management logic for a constant state of revolution is made in the literature, but it has not yet emerged as a single coherent logic (Grant, 2016; Allee, 1999:121; Stacey, 1995). The argument for complex management logic is that mechanistic-linear conceptual frameworks portray organisations as trivial machines, which does not accurately represent the realities and dynamics of a more complex world that is more connected, interdependent and less predictable in the long term.

In addition, the social and economic sciences favour the simplification of reality, which makes mechanistic-linear type frameworks useful decision-making tools, primarily as they neatly ignore and conceptually 'side-step' the increasing complexities of social and economic systems. Yet, complex social and economic systems change over time, to accumulate designs that are more complex. Therefore, models or frameworks of complex systems are never complete, as the boundaries of complex systems cannot be identified objectively, finally and completely (Cilliers, 2005:612). The real-world problem is that decisions are made using simplifications of reality that can do real harm to social, technological and economic systems.

For example, Berners-Lee (2010) the inventor of the world-wide web argues that society takes the web for granted, and simply assumes that it exists. However, the design of the web is based on a set of principles. These design principles are universality, open standards and separating the web from the internet (Berners-Lee, 2010). The primary principle, universality, allows everything to be connected to

everything else, which is the foundation for the diversity and growth of the web, the digital virtual web (web 2.0), as well as an emerging autonomous economy (web 3.0). However, some of the most successful organisations (such as Google, Facebook and Uber) are chipping away at these principles by creating islands of information (Berners-Lee, 2010; Zuboff, 2015). They are actively shaping the foundational aspects of a decentralised and distributed network. Information flows into information islands, but users cannot connect their information to other sites. Information can only connect within sites. Berners-Lee (2010) argues that if this trend continues, the web will become more fragmented, and individuals will lose their freedom to connect to anything they want. As more data accumulates in such 'information islands', the more individuals become locked in (grooved in). It is also important for the evolution of the web to keep it universal and the standards open, as it is not in the hands of any one person or organisation.

These principles create the conditions to make a decentralised and distributed system work for us, to create greater diversity and social innovation. Berners-Lee (2010) contends preserving the principles of universality, open standards and separating the web from the internet principles makes it possible and consequential to create future un-imagined capabilities (such as distributed ledger applications and a distributed value ecosystem) and things we cannot image to be of value to humanity (Berners-Lee, 2010). These design principles are also the basis for a virtual and autonomous economy (the second economy). Preserving these principles, is consequential for activating social innovation and creating things of value not yet imagined (Berners-Lee, 2010), and will most likely contribute to the third morphing of the economy (Arthur, 2017).

2.3.4 From an atomistic to a connectivist world-view of value creation

In terms of paths to value creation, more diverse, connected, shared paths to value creation are proposed (Grant, 2016: 419; Porter & Kramer, 2011). Constructs, such as co-creation (Prahalad & Krishnan 2008; Prahalad & Ramaswamy, 2004), value networks (Allee, 2002), value-creating ecologies (Hearn & Pace, 2006) and shared value (Kramer & Pfitzer, 2106; Porter & Kramer, 2011) hint that there is a world-view shift in terms of strategy, structures, values and organisational learning (workings of organisations).

Furthermore, 'things of value', such as social capital, social networks, open source programs, open markets for ideas (ideagoras), the internet of things, and shared computational resources are being created through distributed paths and non-linear dynamics. Therefore, more than just products or services are being created that have value for society (Tapscott & Tapscott, 2017).

Traditional strategy (prediction and control types of frameworks) is being challenged because capabilities are being invented to perform more complex functions in a decentralised and distributed way that did not exist before, and these 'interoperating capabilities' are being extended to both individuals and organisations, which fundamentally change the game structure between individuals, society and organisations. For example, nodes (individuals and organisations that are not traditional financial institutions) in a decentralised and distributed value network now have the capabilities to be their own bank (Swan, 2015) or create their own exchange.

'Killer applications' that are based on decentralised and distributed architecture, for example, crypto payment objects and self-sovereign identity objects, are already changing the transfer, sharing and storing of value and personal data. Moreover, the next killer application anticipated is a 'killer ecosystem' (Consensys, 2019). This means that there are now tools and protocols that make it easier to create a new generation of decentralised and distributed applications that interoperate better, and provide the foundational components for a decentralised and distributed 'killer' ecosystem. Examples of these components include trusted transactions and smart contracts, self-sovereign identity, reputation, proof of location and asset tokenisation (Consensys, 2019). The most significant aspect is the emergence of interoperating crypto components, which are native to a distributed and decentralise value ecosystem, and which make it possible to connect these crypto components to create business models that are truly native to the web.

2.3.5 Value ecosystems

The metaphor of value creation as mechanistic and chain-like was once useful, although under a set of complicated conditions. The value-chain metaphor neatly hides the true dynamics of value creation in complex settings (Hearn & Pace, 2006:56). To provide a better explanation of value creation, sharing, distribution and the capture of value in a complex setting, constructs have emerged that better

embrace the complexity in social and economic systems that are increasingly becoming more data-driven. These constructs portray value-creation, sharing and appropriating as a more brain or ant-like dynamic.

Annexure B gives an overview of these emerging value constructs in the literature. Four memes (Dawkins, 2016) (memes being a unit of knowledge or idea that has evolved) emerged in the literature search in terms of value networks and value ecosystems. These memes are a set of (1) starting conditions, (2) diversity of near interactions, (3) complex systems and network components, and (4) ecological rational decision-making, as briefly discussed below. These memes are central to understanding in the current study how DLT shapes value creation, sharing and capture, and why a much larger distributed financial value ecosystem is emerging.

2.3.5.1 Set of starting conditions

A shift is seen from value creation through chain-like systems to complex, distributed and brain-like or ant-like networked systems, where each stage of the value chain breaks down (disintermediation) to introduce more options for how actors in the system can interact (Hearn & Pace, 2006), bringing, in essence, more diversity in terms of interactions. Moreover, there is a shift from focusing on ending conditions, to focusing of a set of starting conditions. The reasons for the shift in focus to a set of starting conditions are:

- To expand the 'pool' of value that is created, and to make use of externalities as opportunities (Porter & Kramer, 2011).
- To expand the conceptual frame of value creation, to include knowledge and intangibles as currency (Allee, 2000), to include network size, structure and conduct as tied to network value (Afuah, 2013), to include customers creating own value (Normann & Ramirez, 1993), to include human capital as embedded, which creates a struggle between actors in the process of capturing value (Bowman & Swart, 2007), and to include value as embedded in social interest (Emerson, 2003).

2.3.5.2 Diversity of near interactions

There is also a shift from consumers to co-creators of value, and a shift from competition and cooperation to coopetition (Brandenburger & Nalebuff 1995; Hearn & Pace, 2006; Nalebuff & Brandenburger, 1997). Hence, in terms of near interactions:

- Organisations need to manage more complex and diverse interdependencies (Allee, 2000).
- It is difficult to disentangle interactions (Bowman & Swart, 2007).
- Ties can be created between actors and these ties can be amplified, or scaled more easily (Barabasi & Albert, 1999).
- There is a need to reconfigure the roles amongst a constellation of actors that will be mobilised.
- Actors in networks can structure relationships to both compete and collaborate with each other (Nalebuff & Brandenburger, 1997; Bengtsson *et al.*, 2019).

2.3.5.3 Incorporating complex systems and network components

There is a shift from value chains to value networks, and there is a shift from product value to network value (Hearn & Pace, 2006). Hence, value is no longer in products or services, but rather in the networks themselves. Therefore, systems' thinking moves from 'hard systems' thinking to:

- living systems (Miller, 1965);
- value networks (Allee, 2000); and
- business ecosystems (Hearn & Pace, 2006; Teece, 2014:329).

2.3.5.4 Ecological rational decision-making

There is a shift in the thinking related to individual organisational strategy to thinking of strategy in relationship to the value ecology (whole business ecosystems) (Hearn & Pace, 2006:56; Teece, 2007). In creating 'things of value' in an ecosystem, decision-making has shifted from optimisation to:

- An ecological rational and systems intelligent approach to decision-making (Hämäläinen & Saarinen, 2004).
- Value capture as a bargaining process between the actors (Bowman & Swart, 2007).
- Recognising returns (value captured) are not a trade-off between financial and social interest. It is a proposition composed of both financial and social interests (Emerson, 2003).

- Resource orchestration (Sirmon, Hitt, Ireland & Gilbert, 2011), which focuses on how resources are used. Research on resource orchestration extends resource-based theory in three areas. (1) Resource orchestration across the scope of an organisation, (2) resource orchestration at various stages of organisational maturity and (3) the depth, resources orchestration across levels of the organisation. Managerial actions such as structuring, bundling and leveraging capabilities play a crucial role to realise the full value of resources (Barney, 1991).

2.3.6 Emerging digital value ecosystems

In the previous section, memes have been identified that are emerging as to how value creation, sharing and capture is changing, and how the workings of organisations (the architecture) are changing in emerging value ecosystems and ecological rational decision making in terms of whole ecosystems.

Memes are analogous to genes (DNA) in biological organisms/living systems. A meme is a model of genes (Dawkins, 2016). In the case of organisations, it is similar to a possible blueprint for organisational workings, which contains information on experiences. Memes essentially transmit ideas and concepts to improve or create new ways of working (McCarthy, Rakotobe-Joel & Frizelle, 2000:559).

The central meme in terms of emerging value ecosystems is that organisations in a decentralised and autonomous economy will move towards creating value through complex, distributed and brain-like networked systems where each stage of the value chain breaks down (disintermediation) to introduce more options for how actors in the system can interact. For example, in this study the creation of distributed autonomous organisations, distributed autonomous applications opens up the possibility to create a distributed autonomous society (Swan, 2015:23). Hence, the composition and shape of organisational architecture fundamentally changes. There is also a fundamental shift to think of strategy in terms of whole ecosystems as opposed to individual organisational strategy (Kandiah & Gossain, 1998).

Possible reasons why the composition and shape of organisation architecture is changing, is ubiquitous computing combined with networked systems dramatically reduce, frictional and marginal costs (Iansiti & Lakhani, 2017: 121; Brynjoflsson *et al.*, 2014), which in turn has the effect that traditional organisational and industry boundaries ‘blur’ – creating value ecosystems (Atluri *et al.*, 2017).

It is not a new phenomenon that technological developments cause industries to appear, disappear and merge (Atluri *et al.*, 2017). Fundamental technologies radically reordering traditional industry boundaries. It is also enabling organisations that are digital natives to compete across several industry simultaneously (Atluri *et al.*, 2017; Gossain & Kandiah, 1998), creating value ecosystems that blur the boundaries between traditional industries.

Further, digital natives are more likely to define their business model in the future not by who they compete against in traditional industries competitors, but rather by how well, they are competing in ecosystems (Atluri *et al.*, 2017:1). Atluri *et al.* (2017:5) contend that several large ecosystems are likely to emerge in retail and institutional spaces within the next decade. Retail banking and Finance is already far down the road in experimenting with DLT (fundamental technology), creating private blockchain consortia (Ali *et al.*, 2020:1; Frizzo-Barker *et al.*, 2020:8; Iansiti & Lakhani, 2017:121). However, the composition and final shape of the distributed and decentralised financial and banking ecosystems that will emerge is far from known (Arthur, 2017).

2.3.7 Fundamental technology

In the previous section it is argued that fundamental technology is adopted by organisations because of lower transactions costs, but the downside is that fundamental technology also has a disruptive impact on social and economic order (Arthur, 2017; Iansiti & Lakhani, 2017; Ito *et al.*, 2017). Social and economic capital is often destroyed (Fukuyama, 2017), and it often takes a great deal of time, often several decades, before stable states of social and economic order emerges from such great disruptions (Arthur, 2017; Iansiti & Lakhani, 2017; Fukuyama, 2017).

Great disruptions have a deep impact on social and economic order and the rules used by society to self-organise (Fukuyama, 2017). Why is there such a deep impact? To create new social and economic order, existing architecture has to be broken down at a cost, which does not fit well new with emerging architecture (Arthur, 2017). Moreover, fundamental technology displaces whole groups of people permanently, who are never employed again – technological unemployment (Arthur, 2017).

John Maynard Keynes (1933) coined the term technological unemployment. He predicted that around 2030 the production problem would be solved and there would be enough goods and services produced for everyone, but sharing in it, which means

that jobs would be scarce. The economic problem that needs to be solved in the future by organisations is not production (as technology will solve the production problem), but rather how to give people access to what is produced (Arthur, 2017). Which in strategy terms turns to issues of conflict over ownership and control of resources, and appropriation of value created (Bowman & Ambrosini, 2000).

Once technology solves the production problem, most humans will be deprived of their primary purpose (Arthur, 2017; Keynes, 1933). This opens up new possibilities for humans to focus on the real values of life, but it will take decades for humans to adjust the habits and instincts that have been created over generations to solve the economic problem of production (Keynes, 1933). Furthermore, traditional organisations and industry boundaries will most likely cease to exist, or blur with new forms of autonomous and distributed forms of organisations that will coevolve with traditional centralised organisations.

2.3.8 Externalising organisational activities and intelligence

Ronald Coase (1937) made the argument that organisations establish boundaries based on transaction costs. When the cost of transacting in an open market exceeds the cost of internally managing and coordinating an incremental activity, then the activity will more likely be performed by an organisation internally. However, in the second economy, namely, the virtual and autonomous economy, the initial cost to create the first digitised product or service is usually very high, but creating and delivering the second product or service, the incremental costs of creating, transacting and delivering a digital product or service, dramatically declines to almost zero (Arthur, 2017). For example, software and other digitised products once created can be duplicated and distributed at almost zero incremental cost (Brynjoflsson *et al.*, 2014). In addition, organisational boundaries are primarily established by the cost of managing and coordinating incremental activities (Coase, 1937). Hence, it makes a great deal of sense for organisations to externalise activities in a digital and autonomous economy.

How is it possible for organisations to externalise organisational activities, as well as organisational intelligence? Arthur (2017) contends that digital technologies have morphed the economy in three ways: The first morphing involved integrated circuits, smaller processors and memory, which greatly speeded up calculation. The second

morphing involved connecting digital processes (computational devices), creating local and global networks, as well as conversation between everything (principle of universality). The second morphing made it possible to execute physical activities virtually and autonomously. However, the virtual and autonomous economy (second economy) is not just adding another layer to the physical economy, namely, the physical activities performed by human workers. It is also steadily externalising the intelligence of organisations, using virtual algorithms and machines, which are not located in human workers. These technologies external to organisations, can recognise and sense, filter and use data to act appropriately, essentially doing what all intelligent biological living systems do. The result is technologies, such as big data, the cloud, machine learning and artificial intelligence are slowly and steadily rendering human activities obsolete. Arthur (2017) argues that the externalising of organisational intelligence is causing economies to enter a new era, which he coins the third morphing, as the point where the economy produces enough for everyone, but the means, jobs, to access these products and services becomes the central economic problem.

The impact of externalising organisational intelligence in the economy is not the usual multiplier effect of technological change that economies experience, where everyone benefits from an increase in productivity. Not all the 'boats' in the third economy will rise equally as productivity increases. A few 'boats' will rise a great deal more. The more realistic model for the third economy is that a few, highly skilled and creative people will be able to take advantage of fundamental technological change, earning a great deal more than people which are less skilled (Brynjoflsson *et al.*, 2014; Stiglitz, 2017).

Externalising organisational intelligence, using technologies such as big data, the cloud, machine learning, artificial intelligence and internet of things will significantly disrupt the current boundaries and architecture of industries and organisations. The current form of many industries and organisations will most likely cease to exist in the next decade, as mentioned before (Arthur, 2017:6).

2.3.9 Entering an era of distributed autonomous organisational transformations

Blockchain technology is one of the technologies, in a 'bag of technologies' that organisations will use to externalise organisational intelligence. In terms of clearly defining what blockchain is, there is no one definition (Frizzo-Barker *et al.*, 2020). A varied range of definitions is presented in the literature, which indicates the newness of the blockchain phenomenon and research undertaken (Ali *et al.*, 2020:2; Frizzo-Barker *et al.*, 2020:7).

However, certain key aspects have been mentioned when defining blockchain. Blockchain technology is made up of at least three separate technologies: encryption (asymmetrical encryption), automated execution of transactions (smart contracts) and distributed ledger technology (a type of distributed database).

The term blockchain is also used interchangeably with the term distributed ledger technology (Ali *et al.*, 2020:5), specifically in the banking and financial sector. A distributed ledger is seen as nothing more than a database spread across nodes or computing devices in a peer-to-peer network, and blockchain is one kind of implementation of a larger class of distributed ledger technology (DLT) (Angelis & Da Silva, 2019:2). The basic workings of the database are that each node replicated in a blockchain network saves an identical ledger copy, and each node updates independently.

The feature most mentioned in defining blockchain is the decentralised nature of blockchain (Ali *et al.*, 2020:5; Frizzo-Barker *et al.*, 2020:4). It is not maintained by a central authority or node in a network (Angelis & Da Silva, 2019:2; Guo & Liang, 2016:2). Updates are done independently, which ensures that no one actor or group of actors colluding can alter data or have control over the updates.

The second important feature of blockchain is trust, security and transparency, which is a key building block in the sharing economy and essential to peer-to-peer interactions and relationships (Frizzo-Barker *et al.*, 2020:7). The terms 'trust machine' and 'trust anchor', are often also used to describe blockchain. Further, the code of blockchain is open source. Anyone can scrutinise the code, which makes it difficult to build a backdoor into the system (Ali *et al.*, 2020:3).

In terms of coordinating transactions on a blockchain, a consensus algorithm (proof of work, proof of stake, byzantine fault tolerance) is used to synchronise the data updates between nodes. In the case of blockchain, the underlying structure of the interaction is chain-like. This means that cryptographic blocks are sequenced into a linear structure in which each block cryptographically is referenced and link to the previous block created (a process of cryptographically 'hashing' blocks using a hash function (Angelis & Da Silva, 2019). Cryptographic blocks of data (transactions) created are considered immutable, in the sense that it is a prohibitively costly endeavour to alter a block of data (Angelis & Da Silva, 2019). Transactions initiated cannot easily be reverse engineered (Guo & Liang, 2016:2), which is ideal in terms of the finance and banking sector participants that need to cooperate and coordinate, to execute transactions that are private and transparent, faster, less costly, tamper resistant and inherently safer (Casino, Dasaklis & Patsakis, 2019:55; Guo & Liang, 2016).

An important overall feature in defining what blockchain is the peer-to-peer-based aspect of transactions, which suggests commitment to principles such as open-source, peer-to-peer networks, decentralisation, social solidarity and disintermediation (Frizzo-Barker *et al.*, 2020:7).

From an organisational design perspective, blockchain is described as an external available intelligent building block that is available to organisations and that was not previously available, to transform the structure of interactions and transactions. Arthur (2017) makes the argument that these building blocks will not just be automated machines that replace humans. "...these building blocks will be used to re-architect the way we do things. In doing so, organisations and industries will cease to exist in their current form." (Arthur, 2017:6).

In terms of the blockchain technology adoption by organisations, the most likely scenario is that blockchain technology will follow the same path as the adoption of web technologies (Iansiti & Lakhani, 2017). Organisations will most likely first create localised private blockchain (consortiums or permissioned blockchains) to experiment with, but as blockchain adoption becomes widely accepted, both public and private blockchains will merge (Iansiti & Lakhani, 2017).

Iansiti and Lakhani (2017:123-126) developed a framework that proposes the four phases the adoption of blockchain technology is likely to follow. These four phases

are based on two dimensions. The degree of novelty and amount of complexity and coordination required (the number and diversity of parties involved to produce value with the technology). Applications low in novelty and complexity are likely to be adopted first. Those applications high in novelty and complexity will take decades to evolve. The long-term impact will be deep and persistent, and will transform society and the economy. The phases identified by Iansiti and Lakhani (2017:123) as to how organisations are likely to adopt blockchains are as follows: single use, localisation, substitution and transformation, as discussed below:

Single use involves using cryptocurrency (for example, Bitcoins, Altcoins and Monero) which requires a low degree of novelty and coordination but creates a less costly and highly focused solution. Similar to emails replacing phone calls, faxes and 'snail mail', cryptocurrency is used as an alternative payment method for foreign currency and asset trading, where the present financial system has limitations.

Localisation involves creating localised networks on which multiple organisations become connected to a distributed ledger (a consortium or permissioned blockchain network). Banks and stock exchanges, for example, are testing blockchain technology as a replacement for paper-based systems and manual transaction processing (in areas such as trade finance, foreign exchange, real time gross settlement and cross border settlement).

Substitution involves a low level of novelty, but a high degree of coordination (as blockchain use moves beyond localised networks to involve broader public use). This implies changing entire ways of doing business, and allows blockchain technology to become deeply embedded within organisations. For example, blockchains may be used to create affordable financial services for people that are not 'bankable'. Creating such architecture poses a great many coordination challenges.

Transformation involves the adoption of smart contracts. Their adoption will require coordination between many actors and gaining institutional agreement on standards and process. Adoption of smart contracts will require major social, legal, and political change. Smart contracts (Blockchain 2.0) may be the most transformative application for organisations, as contracts can be automated, which will replace traditional organisational structure, processes and intermediaries, such as lawyers and

accountants. The roles of these intermediaries will radically change (which implies the reinvention of roles of participants in the blockchain game).

Overall, blockchain technology, as previously indicated, is one application of DLT, and DLT is a technology in a 'bag of technologies' that organisations will use to externalise organisational intelligence in such way that it addresses the economic problem of distributing what is produced, without centralised control or a controller. Furthermore, these technologies impact on the nature of the intelligence of the system itself. The system will most likely recognise, sense and act appropriately. Essentially, "...this sort of intelligence is self-organised, conversational, ever-adjusting and dynamic. It also largely becomes autonomous. These conversations and their outcomes will take place with little or no human awareness or intervention" (Arthur, 2017:4).

2.4 COMMON GROUND AND DISCONNECTS IN THE LITERATURE

Section 2.3 dealt with the evolution of the concept value and limits to the usefulness of the value concept framed as a value chain in complex settings. In the literature, there is also a shift in explaining the value concept, to frame value relationships in complex settings as value networks and value ecosystems. Moreover, externally available intelligent building blocks make it possible to completely transform the way things are done (how society cooperates and coordinates), which in turn, will re-draw the boundaries of the current industrial landscape.

The section below discusses the common ground and disconnects between literature and the textural and structural aspects of participants' experiences using DLT.

The themes that are dealt with in the sections below are:

- a. managing changing value relationships;
- b. organisational and blockchain community logics;
- c. conflict is the difference;
- d. constructive conflict;
- e. power over or power with others to create the future;
- f. value of blockchain applications and;
- g. central problem in all social sciences

2.4.1 Managing changing value relationships

A central thread between this study and the strategic management literature is the importance of understanding the changing relationships in value networks. More specifically, the game structure between actors.

The traditional structure of relationship between actors in a value chain is based on self-interest, competition and conflict (Porter, 1980; Barney, 1991). Business is perceived as war. Using this metaphor, presents a game of winners and losers, dominance over others or compromise. However, the price of war is that in the end no one truly wins (Nalebuff & Brandenburger, 1997; Follett, 1925:68).

Furthermore, managing value relationships is fundamentally about deciding how to deal with conflict over the ownership and control of resources (Brewer, 2107). In this study, the sources of friction and conflict are over the control and ownership of individuals' money, online identity and personal data accumulating in 'information islands' (Ali *et al.*, 2020:13; European Commission, 2019; Zuboff, 2105; Berners-Lee, 2010).

There is also a broader social consciousness of the degree of information asymmetry that exists and a growing 'trust deficit' in data-driven societies as result of this asymmetry. The European Commission (2019) for example, reporting on the General Data Protection Regulation to the European parliament argued that strong data protection rules are essential to guarantee the fundamental right to protection of personal data in a highly networked society. These data protection rules are seen as central to a democratic society that is increasingly data-driven. Furthermore, the perception is that digital transformations will offer and create new services and jobs, but pose challenges in terms of identity theft, the sharing of illegal content, and the development of intrusive surveillance tools (European Commission, 2019; Zuboff, 2015).

It is becoming clear that people expect their personal data and privacy to be protected and to have control over how their data is used. A global survey on internet security shows a 'trust deficit' that is widening around the globe in terms the way that people behave online (78% of people surveyed were concerned about their online privacy) (European Commission, 2019:10).

People are also increasingly becoming aware of data protection rules and their rights, and are exercising their rights. These rights include information about the processing of an individual's data. Also, the right to obtain access to personal data, and the right to ask that incorrect or incomplete data be corrected. Individuals can also request that personal data be erased when no longer needed or processing it is unlawful. They can object to the processing of data for marketing purposes, request the restriction of processing of personal data in specific cases, have the right to receive data in machine readable format, and request that decisions made on automated processing that significantly affect a person, to be made by a natural person and not a computer (European Commission, 2019).

The implications of general data protection rights (GDPR) legislation for organisations is that it will increasingly force organisations to store a minimum of personal data, and control the storing and processing of data. Moreover, organisations are now also more accountable in terms of how they use data (as accountability models and privacy officers need to be in place). Furthermore, GDPR legislation places severe penalties on organisations, if organisations get the management of personal data wrong (European Commission, 2019). As a whole, the GDPR legislation is the first example of the large-scale protection of individual data rights that gives individuals some indirect control over their data, and that has an indirect impact on how their data is used.

In response to data privacy concerns, organisations are developing technologies that offer more privacy-friendly services, such as search engines that do not track users or use behavioural data. The rationale for an increasing number of businesses promoting respect for personal data is that it is a differentiator and a selling point (European Commission, 2019).

The complexity challenge that organisations face, with the bigger concern over data privacy, is how to integrate the self-interest, more conflicting goals, and values of protecting personal data that differ from the existing highly centralised organisational profit-driven values. Examples of these community values, as mentioned, include a greater need for online privacy (and ensuring personal data rights), self-sovereignty (a need to have an online identity that is self-sovereign) and a need to self-determine the future (capabilities to create the future that people want). Blockchain technology presents a viable solution to address these data privacy concerns, provides personal

information that is reliable and reduces the cost of verifying personal data (Ali, *et al.*, 2020:13)

However, in the strategy literature, the primary focus in terms of structure of interaction is how to divide the 'value pie' (Brandenburger & Nalebuff, 1995), or how to enlarge the value pie (shared value) (Brandenburger & Nalebuff, 1995; Kramer & Pfitzer, 2016; Porter & Kramer, 2011). The focus is not on changing the 'location' of the value pie to align closer or converge to what individuals value in a data-driven society. More specifically, the goals or positions that communities are taking in terms of having more control over how their data is used.

The blockchain community, for example, is building more decentralised and distributed networks to shift the location of the structure of interaction in a data-driven society. This means that the 'right' game for individuals or communities that have privacy and sovereignty concerns is to move to a decentralised and distributed value network by creating micro-level capabilities to move the 'location' of the value pie. This is a real-world example of how multiple individual actors at a micro level are influenced by coopetition (based on peer-based game structure), and how individuals with new capabilities can engage in coopetition on the basis of social goals (and not just pure economic goals). Which both intentionally and unintentionally contribute to shaping the financial and banking landscape.

The movement to decentralise organisations, the counter movement, has resulted in centralised 'information islands' that seek to have greater ownership and control over individuals' personal data, as more data accumulation means more profits for organisations that can make inferences from data islands (European Commission, 2019, Guo & Liang, 2016:11; Zuboff, 2015). For example, Ali Pay operating in China now has access to detailed data on individual consumption patterns, consumption ratios and even living expenses, which gives them a competitive advantage over traditional banks that only have data which gives a general overview of consumption patterns (Guo & Liang, 2016).

More concerning is that social media, with data islands to their disposal, actively try to modify user behaviour in subtle ways to accumulate more profit. Zuboff (2015) contends that organisations are motivated by a logic of accumulation, in which the private life of individuals are drawn into markets and exploited for profit.

However, by externalising organisational intelligence, it is possible to take a different decentralised and distributed path to how society cooperates and coordinates that which was not previously possible. It is also possible to create value networks that are more inclusive, autonomous and self-sovereign, and more importantly, change the degree to which individuals have power with others in a community to create the future that is a positive sum game.

2.4.2 Organisational and blockchain community logics

In the previous section, changes in the structure of relationship between participants in value networks and the emergence of new forms of decentralised and distributed organisational forms are dealt with. New decentralised and distributed forms of organisations are emerging because society, more than organisations themselves, need to align the systems of cooperation and coordination that are used with the community values (which leads to changing the game structure between individuals in society and organisations).

The central question is: what is the source of new forms of organisational design? Management logic is argued to be the source of new forms of organisational design (Dijksterhuis, Van den Bosch & Volberda, 1999). Dijksterhuis *et al.* (1999) argue, based on contingency and selection theories that there is a direct link between changes in environmental conditions and intermediate forms of organisation that are experimented with. In essence, a coevolution explanation is given why organisations experimentation with different variations of organisational forms and that there is changes over time of shared management schema of the dominant organisational design that is used.

In terms of management aligning their environment and organisational form, appropriate design attributes are often presented as an end-state variable or fixed embodiment. This, however, does not fit with the growing interest in organisations that are aiming to become more agile, flexible and adaptable (Huber 1984; Volberda, 1996). To this end, scholars emphasise the importance of studying the process through which new organisational designs emerge (which links to the argument of studying micro-level processes and the evolution of these processes). Hedberg, Nystrom and Starbuck (1976) point out that in the design of an organisation it is less important to discover where an organisation is, than to understand how it got there

and where it can go tomorrow. In terms of this study, it is important to understand the path dependency of the game structure and how decentralised and distributed systems make it possible to change the path of future game structure to be taken.

Furthermore, in terms of seeking disruption, the key disconnect between the theory and this study is that communities seek to be more engaged in creative destruction (Schumpeter, 1942), more so than organisations have been. However, in the literature, the opposite is argued, that organisations seek to be disruptive by engaging in creative destruction, and that society seeks stability (Drucker, 1992).

From a management logic perspective, which is defined as the sets of macro level beliefs that strongly affect management practice and theory (Barley & Kunda, 1992), management logic is different from community logic. It is less aligned or converging from the desires and motivations of communities. Management logic, specifically management logic of accumulation (Zuboff, 2015) conflicts now, more than ever, with community logic. Moreover, as management logic moves further away from the values or beliefs of communities, communities become more self-directed and take a very different path, by adopting different design principles, and game structure that focus on the begin states of systems of coordination, using micro-level processes to coordinate social, economic and even political activity. In part, the diverging values of organisations and communities explain the blockchain community movement to decentralise highly centralised organisations.

2.4.3 Conflict is the difference

The previous section described management logics as the source of new forms of organisation (Dijksterhuis *et al.*, 1999). However, the current study finds that communities are also sources of logic, and drive the exploration of new forms of social and economic cooperation and coordination, which make novel community peer-to-peer games structures possible. In essence, communities are expanding the scope of the game that organisations have to learn to play (whether intentional or unintentional).

A key argument in the literature that establishes common ground with this study is that conflict is part of life, and is integral to making progress (Follett, 1995; Brewer, 2017). Why is conflict integral to making progress? Conflict is the legitimate expression of difference. Without conflict, without difference, there can be no progress. There is value in difference and conflict is often the difference (Follett, 1925).

2.4.4 Constructive conflict

Follett (1925) contends that there are three ways to deal with conflict. The first is the domination of a party over others that offers a quick solution, but the solution is unstable, leads to resentment and it is unconstructive, because it suppresses the less dominant perspectives that potentially could add value (zero-sum game structure). The second mode of dealing with conflict is compromise that most likely leaves all parties dissatisfied and is a suboptimal result (negative, suboptimal game structure). Moreover, successive rounds of compromise or concessions made provide only temporary respite, as conflict is suppressed, and eventually re-emerges in a more virulent form.

The third way to deal with conflict is integrating conflict (constructive conflict). This entails searching for an innovative solution in which parties bring differences into the open (positive-game structure) (Fernandes *et al.*, 2019:626; Follett, 1925). The key insight is that parties cannot hope to integrate differences if they do not know what they are. The first rule "... for obtaining integration is put your cards on the table, face the real issue, uncover the conflict, bring the whole thing to the open" (Follett, 1925:75). Participants would give an authentic account of the begin state of the current structure of relationship between parties, which then sets the stage for how it may change. Hence, the first use of conflict is to understand there is no 'right' answer in a conflict situation. One should assume that both parties likely have the 'right' answers, but to different questions (Follett, 1925:67).

The game structure to constructive conflict is to ask how people who differ and oppose each other, understand what is the right question, given their position is a rational one and indeed correct. Then, the second step is to make the conflict difference 'work for us', and to use the mutual understanding of each other's question to integrate positions into a new and different answer that satisfies what each other considers as right (Follett, 1925:4). The end-result is not domination, manipulation or compromise. It is rather integration of different interests.

Moreover, constructive conflict is a process and links to circular responses, which proposes that in a conflict situation people and groups react not just to others, but also to their relationship with others (Follett, 1925:35). Hence, parties or participants may realign and re-evaluate their interests in the process of dealing with conflict

constructively. In the case of the realignment between groups, it is important to watch with every realignment how the interests of parties change, and how far it changes the conflict (Follett, 1925:35).

In terms of the study, domination over others by centralised organisations is a common thread in participant's experiences. The movement to decentralise centralised organisations shows that groups in the blockchain community have fundamental questions about how to make progress in resolving conflict over money, identity and data resources, and their take on the positions of participants (such as Bitcoin maximalist, anarchist or pragmatist positions).

Furthermore, centralised organisations, such as banks and exchanges, are experimenting more with DLT (for example, using DLT to settle interbank payments) in order to have some stake in the emerging decentralised and distributed game. Highly centralised organisations also have to answer the question whether their mandate to have control over individuals' money and data is still valid. For example, this question has been asked by Project Khoka (South African Reserve Bank, 2017) of the South African Reserve Bank, and the European Commission on data privacy (European Commission, 2019).

However, the open blockchain community finds that there is a need to formalise and reach consensus over protocols to make progress by giving clarity on crypto object definitions, protocols and through reaching agreement on the rules of the game (Ali *et al.*, 2020:5). Furthermore, different groups ask fundamentally different questions and while they do re-evaluate their interests, is not clear if a different answer is actually arrived at, and if there is a common answer that satisfies what each considers to be the right answer.

2.4.5 Power over or power with others to create the future

In considering what is the right answer to questions of power relationship. The common ground between the literature and this study is that there is a choice between 'power over' or 'power with' relationships, and power relationship matters because of reciprocal responses and the circular nature of relationships of power (dynamics that play out reinforcing existing power relationships) (Follett, 1925).

In terms of this study, the power that actors have (as autonomous nodes in a decentralised and distributed network) when they work together, matter a great deal even though they do not have any formally defined authority (Ali *et al.*, 2020:1). No one node can control a decentralised and distributed system, but every node contributes to making the complex cooperation and coordination possible between actors (as indicated before, this is the key feature of DLT). Hence, the power that individual actors have when they work together as truly autonomous actors is not the traditional 'power over' model.

In terms of the literature, Follett (1925:103-109) is critical of the traditional 'power over' model, and makes the argument that it should be reconsidered because it is reductionist and self-defeating, as measures of increasing severity have to be imposed on others to maintain dominance. Moreover, the cost to do so becomes prohibitive.

The alternative model that Follett (1925:103-109) proposes is the 'power with' model, which is viewed as a more natural and productive approach than any system solely based on control and dominance. No details are given how to achieve this it, only obstacles and ways to deal with these obstacles.

Follett (1925) argues that 'power with' stems from combining the individual knowledge, experience and abilities specific to individuals (which links to the argument made in cooperation research of understanding micro-level processes and capabilities).

"Once individuals discover they have this power, it unifies the individual powers into a total power of the group, and makes each individual responsible for shaping his or her contribution to fit the task as a whole. Our contribution is of no value unless it effectively relates to the contributions of all others concerned" (Follett, 1925:24).

Further, the idea that only the fittest will survive is an outdated idea and over-simplistic view of the structure of relationships in an ecosystem (Follett, 1925). This refers to cooperation and cooptation (Nalebuff & Brandenburger, 1997), which is similar to the concept of 'power-with' that is seen as more useful.

The concept 'power with' may also be useful in terms of the idea of a fitness landscape (Gill, 2014; Kauffman & Weinberger, 1989), in which many actors' survival depends on making transitions with others in a landscape to increase their fitness, which in turn shapes the landscape itself.

A key question asked by the blockchain community in this study is about the fitness of centralised actors and themselves (as a result of a trust deficit between community and highly centralised organisations). How to increase their fitness and/or completely re-shape the banking and financial landscape -decentralising highly centralised organisations (Ali *et al.*, 2020:4).

The link not made between the literature and the study is that both the 'power with' and 'power over' approaches are both evident and participants move or 'pivot' between approaches contingent on the game structure that is picked. 'Power with' relationships formed when groups realised that their desires to increase their fitness to make transitions in a landscape align. 'Power over' relationships are formed when groups realised it is easier to dominate or compete in a landscape (and not change the shape of the landscape), or undertake a process to integrate conflicts over resources.

In experimenting with DLT, the participants continually pivot back and forth between approaches to having 'power with' or 'power over' relationships with others (pivot between using open or permissioned blockchains), contingent on whether their interests converge in some way or not (for example, creating a financially more inclusive system or serving the needs of a few dominant players in the game).

In the case of permissioned DLT experiments, where there is a powerful central regulator in the landscape, actors in a centralised context pivot towards 'power over' relationships as the correct answer (the dominant game structure). However, with blockchain technology capabilities, the expectation is that the banking and financial industry will be completely transformed. This implication is that a different approach to transforming 'power over' relationships may lead to a very different 'correct' answer that satisfies a much larger number of participants, with a much larger scope of game to play.

However, there is concern about the corporatisation of blockchain. For example, the benefits of blockchain may become centralised and monopolised by organisations that are already powerful players in the banking and finance industry. The opposite and more optimistic view is that it will allow anyone in society to be an 'active code maker', instead of a 'code receiver' in an open source ecosystem (Frizzo-Barker *et al.*, 2020:11).

2.4.6 Value of blockchain applications

In terms of the current state and full extent/scope of blockchain applications, limited attention has been given to the full extent of blockchain applications that have emerged in the literature. A systematic review by Ali *et al.* (2020:2) of the state of play of blockchain technology in the financial services sector, found that there is a lack of major studies and publications (specifically in the financial sector), despite the possible disruptive implications of blockchain technology that have been indicated. Frizzo-Barker *et al.* (2020) in their systematic literature review of blockchain as a disruptive technology for business, found 155 papers on blockchain research into the possible disruptive nature of DLT, but they have indicated the research to be in the early stages conceptually and empirically (83% of the papers were conceptual and 17% empirical). Furthermore, Ali *et al.* (2020:11-12) found several gaps in the blockchain literature. The gap most relevant to this study is that most papers that discuss blockchain ideas, applications, theories, frameworks, challenges of blockchain are at a conceptual level. Empirical studies are still emerging that deal with blockchain solutions for business and the social applications, as well as the roles and impacts on industries. The nature of the issues that organisations have to deal with are split into 20% technological issues in adopting blockchain and 80% of the other issues is attributed to organisational practices.

In terms of classifying blockchain applications, Casino *et al.* (2019) provide a systematic literature review of blockchain applications. The applications have been identified across multiple domains: financial applications, integrity verification, governance (citizen and user services, public sector services and voting), internet of things, healthcare management, business and industrial applications (supply chain and energy management), education, privacy and security, data management and other miscellaneous applications.

More specifically, in terms of the financial application of DLT uses there is a variety of sub-domains. These domains are: settlement of payments (for example, real-time gross settlement processes of central banks), prediction markets, security markets, digital payments, loan management schemes, general banking services, financial auditing (provenance), crypto currency payment and exchanges (e-wallets), interoperable open source infrastructure enabling global payments and currency exchanges and economic transactions (Ali *et al.*, 2020). However, it is difficult to

determine objectively, completely and finally the scope of possible domains of blockchain applications.

Similarly, the blockchain community narrative of the value of blockchain is continually morphing. For example, proof of concept of a peer-to-peer electronic cash system (Nakamoto, 2008) (the initial White Paper narrative). A payment system that makes micro transactions possible, and censorship resistant system, digital gold, private and autonomous transactions (specifically dark web transactions that are fuelled, which is increasingly being used by legitimate businesses). A programmable database in which all kinds of data, not just transactions, can be programmed, cryptocurrency being an uncorrelated financial assets and the creation of a 'killer' ecosystem (Consensys, 2019).

In terms of value drivers, the blockchain value is understood as functionalities that are gained (Angelis & Da Silva, 2019). These functionalities are transparency, immutability, privacy, durability and reliability, democratisation, security, risk control and tokenisation. These value drivers enable reductions in transaction cost, the addition of new services, the delineation of organisational boundaries and the automation of decision-making (Angelis & Da Silva, 2019; Chen, Stegorean & Nistor, 2018; Guo & Liang, 2016:12; Holotiuk, Pisani & Moorman, 2017). In essence, the bulk of the literature is concerned with the value of blockchain in solving relatively tame management problems, as opposed to wicked management problems.

In terms of feasibility and viability, creating a blockchain application requires that all participants are in agreement about how they will cooperate and coordinate, and there are often many additional issues (at technical, corporate and societal level) that have to be settled, such as the scope of application, regulation, performance of the system, and security (Angelis & Da Silva, 2019). Frizzo-Barker *et al.* (2020:10) for example, cite technical challenges such as throughput, latency, security, wasted resources, hard forks and multiple chains.

As a whole, the literature at an organisational, corporate level focuses on the value of DLT as end-states and functionalities, without being concerned about the fundamentally changing game structure. The concern not addressed in literature is how fundamentally different starting conditions can change the game structure. Game structure also matters a great deal, in terms of the lived experiences of individual

society, how disruptive the technology can be to how society chooses to cooperate and coordinate. For example, private blockchains (a clearly bounded form of distributed ledger) are mainly concerned with gaining the functional benefits of blockchain, but the value relationship with customers remains a 'power over' relationship. Fundamentally, the concern is not making progress in integrating conflicts/frictions in value relationship over money, identity and data (organisations seek to play the existing rules of the game better). This means that individuals locked into relationships of dominance or compromise find that there are few options to opt out, to make progress (either compromise or have an exit strategy or even worse, being locked out by the system). However, when individuals are extended micro-level capabilities (which were not previously possible) to cooperate and coordinate on a peer-to-peer basis, the game structure changes in such way that individuals can opt in or out of value relationships to create value networks with others.

However, it is not easy to develop distributed ledger applications based on 'power with' relationships, as consensus has to be reached with everyone in terms of how to cooperate and coordinate. Consensus is 'programmed' into the mechanics of applications and changing the rules of the game is not a unilateral affair ('forks' in value relationships are created). However, the gain is elegant in terms of the possible novel states of interaction between nodes (more folded than binary). This means that the essential quality of lived experiences in micro-level interactions improves, which is not always evident from the functionalities or mechanics of distributed ledgers, and that are emergent in nature.

For example, banks are currently fraught with problems, such as back-end processing inefficiency, transaction lag, fraud and operational risk (Guo & Liang, 2016:2). Interbank payments rely on processing by clearing houses, ledgers that have to be maintained and backed up, and reconciliations are needed between ledgers and payment initiations. All of these processes are lengthy and costly. Cross-border payment can take three days or longer to be finalised (Guo & Liang, 2016:8).

DLT solves many of these problems, as banks can create a shared unified ledger for transactions among the participants, and have transactions validated in real time (T+0 settlement). Risk management benefits from an increased speed in settlement, which results in less liquidity. Netting opportunities are also presented between participant, which decreases balance sheet risk, and improved regulatory compliance (meet 'know

your customer' and 'anti-money laundering' compliance) as regulators are be able view a single transparent ledger of all the transactions among participants in a financial system.

Hence, what is experienced is emergent in nature. Further, more importantly is how participants experience what they experience. The essential qualities of interactions matter in making progress in managing changing value relationships.

2.4.7 Central problem in all social sciences

This section connects the literature, the central problem in all social sciences to the problem statement of this study, namely, creating future ideal states and making progress.

In terms of future ideal states and making progress towards future ideal states, Hayek (1945:528) contends that the central problem in all social sciences is how to make progress without excessively controlling individuals or telling them what the desirable things are that they should do. Hayek (1945:528) disputes that society makes progress because individuals become smarter. It is rather the opposite. Society makes progress because capabilities are extended to individuals that they rarely grasp, but that allow them to perform complex tasks without having to excessively control or tell individuals what the desirable things are that they should do.

In terms of the literature reviewed on strategy and organisations as complex and adaptive phenomenon in this chapter, traditional strategy theory (Porter, 1980) (descriptive and prescriptive strategy process) fails to address the central social sciences problem pointed out by Hayek (1945:528). Traditional strategy (Porter, 1980) literature starts with the assumption that strategic thinking is required to create a desired future (the macro end-state is the central concern). Desired future end-states are articulated, communicated to all and behaviour shaped to achieve the end-states. Organisational architecture explains how strategy components should fit together to better execute strategy. However, the implementation of strategy centrally becomes a matter of dealing with a cooperation and coordination problem. The cooperation problem is aligning the different interest of individuals with the diverging goals, while the coordination problem is how to harmonise their different activities, even if their goals are not in conflict (Grant, 2016:45). Control is then also needed to ensure that

processes and routines are followed. Negative feedback signals that gaps and controls (strategic controls) are viewed as essential to address widening gaps.

However, from a complexity and evolutionary perspective, the 'cosmic pyramid' (Dennett, 1995:64) of mind, design and control gets overturned. Strategy processes through a complexity and evolutionary lens starts at the bottom end of the 'cosmic pyramid', and are micro-level processes. Order is the starting point. A set of starting conditions (Snowden, 2005), simple rules (Eisenhardt & Sull, 2001) and near interactions (Cilliers, 2002) are created. Designs emerge, which accumulate over time into more complex designs over time (Dennett, 1995). Moreover, designs can emerge before their function is understood and through exaptation novel functions may be discovered.

Patterns can be observed, but are rarely repeated (the marble and bowl analogy that is often used in complexity science). Therefore, the purpose or end cannot be seen from the beginning. The 'road' unfolds in a stumbling manner as individuals stumble upon systems and tools that extend their capabilities to perform more complex functions. Individuals are also more inclined to follow an ecologically rational approach (Chase, Hertwig & Gigerenzer, 1998) in using these tools. An ecologically rational approach suggests that individuals pick from a 'bag' of tools that they anticipate will perform well in a specific task environment (Chase *et al.*, 1998). For example, it is ecologically rational to use a search engine to search for information on the web, as it requires less time and attention. Distributed ledger systems may become an ecologically rational choice to 'interoperate' using financial 'Legos' to create decentralised and distributed value ecosystems.

Furthermore, ecological rationality implies that individuals continually try to increase their fitness (both to compete and collaborate) in a landscape, and these micro actions in turn, shape the landscape through a process of circular responses and different strategic positions taken as to how to solve conflict over socially complex resources.

The complexity challenge is whether strategists can ever make optimal decisions in systems that are open, where crucial knowledge is often tacit, and becoming highly distributed amongst many individuals/actors, and individuals are nested within larger complex social systems that influence their behaviour. Circular responses play out and schema/mental models change over time of what the 'right' game that they should

pick. In other words, the economic, social, political and psychological impact of deploying DLT can be understood in retrospect. Further, our current understanding of the distributed value ecosystem phenomenon may not be an accurate reflection of our understanding of how society and organisation may transform with the widespread adoption of DLT.

Overall, many individuals in an organisation and society make decisions at a micro level. Moreover, they are often ignorant or fail to anticipate what will emerge at a macro level in the end, in response to decisions and actions they take and how relationships to others and their responses will change.

2.5 TRANSCENDENTAL PHENOMENOLOGICAL STUDIES WITHIN ORGANISATIONAL STUDIES

In the previous section, it was argued by several authors (Stacey, 2011; McMillan, 2008; Cilliers, 2002; Bettis & Prahalad, 1995; Levy, 1994:169) that there are limits to the usefulness of positivistic philosophy, and analytical method in understanding organisations as complex adaptive systems. An important issue in developing a theory of organisations and society is that it is a slow process. Social science, unlike natural science, is of a multi-disciplinary nature and complex. Social sciences often first borrow ideas, and theoretical lenses often first from physics to develop an understanding of the 'physics' of society.

For example, Thomas Hobbes' book, *Leviathan* (published in 1651) is an early attempt at creating the science and understanding of the 'physics' of society. Hobbes (1980) believed that motion was the natural state of all things originated from this principle. He believed a theory of society could be developed. In his mind the universe was a giant clockwork mechanism, and so too humankind. By taking society apart (reductionist method), Hobbes (1980) thought that the workings and mechanisms of society could be unravelled, and a useful theory of society could be developed.

Edith Penrose (1995) described ways that firms grow and why they grow (seeking to understand the mechanisms for growth). Drucker (1985) in 'Innovation and Entrepreneurship', searches for the mechanisms to create a stable society that would preserve the past, yet make rapid changes in the environment (Drucker, 1992). The current popular kind of theory of the 'physics' of society and economics is complexity

(Arthur, 1996; Eisenhardt & Sull, 2001; Levy, 1994; Mitleton-Kelly, 2003; Stacey, 1995; Stacey & Mowles, 2015). These authors propose a new kind of 'physics' for organisations, society and economics and hedge this argument on complexity principles, such as emergence, self-organisation, path dependency and positive feedback.

The common ground between complexity theory and phenomenology, the research methodology employed in this study is that both contemporary complexity theorist and phenomenologists, such as Husserl (1907/1964, translated by Alston and Nakhnikian)) and Heidegger (1927), is they reject or at least believe there are limits to positivistic philosophy and analytical method.

Furthermore, phenomenology is both a philosophy and research method, and is broadly viewed as a 'resistance movement' to positivistic philosophy (Gill, 2014). The philosophy of phenomenology involves setting aside our 'natural attitude' (Husserl, 1907/1964, translated by Alston & Nakhnikian) or 'organisational attitude' (in the case of organisational studies), to thinking about things, and to question what human engagement in the world is all about (being in the world). More specifically Husserl introduced the concept of 'Lifeworld' (Husserl, 1907/1964, translated by Alston and Nakhnikian)), Heidegger introduced the concept of 'Being-in-the world' (1927). This links to the notion in complexity science that we cannot step outside of complexity itself.

In terms of phenomenology in organisational studies, Tomkins and Eatough (2013) contend that phenomenology makes a great deal of sense in organisation studies, as several leading phenomenologists, such as Heidegger (1927/1962), Merleau-Ponty, (1945/1962) and Sartre and Mairret (1948/1973) have made work and working life the key feature of the human experience. Organisational researchers have also drawn on phenomenological ideas. In the organisational research, there is the 'turn' to practice (strategy as practice in strategy research), the 'turn' to ethics and the 'turn to embodiment' in organisational research (Tomkins & Eatough, 2013:259).

Sanders (1982:358) contends that phenomenological research is not a 'new way' to view data. It is rather a 'new way' to view what is truly discoverable, but often not seen. Hence, there are several implications for organisational research. The first is phenomenological analysis provides a means to reveal the deep structure of

organisations that are taken for granted. The researcher assumes the concept of 'dominant logic' (organisational DNA which gives shape to organisational architecture) and essential qualities and the nature of value relationships would be examples of deep structure.

The second implication of phenomenology for organisational studies is phenomenological research method itself. Behavioural phenomena often elude quantification and statistical inference, and most management research does not study deep structure. The concern is mostly surface architecture (functions) performed and changes to it, and not the logic or game structure (positive or negative sum game structure) used which gives shape to organisational architecture. Sanders (1982:358) contends that phenomenological analysis is an answer to this methodological void.

The third implication for organisational studies is themes and underlying essences that emerge in phenomenological studies may validate, repudiate or complement quantitative research findings. Yet, despite the promise of phenomenology for organisational studies, phenomenological studies within organisational studies are very rare (Anosike *et al.*, 2012:4; Gill, 2014:118; Holt & Sandberg, 2011:237).

To verify the degree to which phenomenological studies (more specifically transcendental phenomenological studies) are rare or absent in organisational and management studies, Proquest (ABI-Inform), Ebsco-host (Business Source Complete) data bases were searched (19 data bases in total). The period 1985 to 2019 (the 2019 limit is due to the data collection period, undertaken in 2019) was considered as Giorgi's phenomenological method was first published in 1985 (no period delimitation was used in later searches). The search term 'phenomenological study' and 'transcendental phenomenology', was combined with Giorgi, Husserl, Heidegger and Schutz (influential phenomenology authors) as key search terms. The search was further limited to high-ranking peer reviewed general management, organisational studies and strategic management journals. In Annexure B, the search results are shown. Three articles were published between 1983 and 2012 in two high-ranking journals (*Journal of Management Inquiry* and *Journal of Management*). However, in terms of dissertations and theses, 34 have been published that used either transcendental phenomenology method and/or Giorgi's (1985) method. These studies were further classified as either management related, organisational behavioural, occupational psychology, health care management or nursing studies. Only one of

these transcendental phenomenological study was conducted within the banking industry. More specifically, a transcendental phenomenological study of banking executives' ethical perceptions (Moffett, 2005).

2.6 SUMMARY

The literature review chapter gives a theoretical and conceptual context to the phenomenological method (transcendental phenomenology) used in this study, which is in line with method to prepare for a phenomenological study, and to connects the literature to the research topic and research question. The central thread between the literature and the study is changing value relationships is not merely a tame management problem, and conflict around socially complex resources poses a perpetual, wicked problem for organisations.

In terms of the DLT research, research is in the early stages, conceptually and empirically (Ali *et al.*, 2020; Frizzo-Barker *et al.*, 2020). The majority of the studies are conceptual, and Ali *et al.* (2020:7) in terms of blockchain in the financial services industry contend: "...Overall, there is a lack of major academic studies and publications in this emerging field, despite the potential implications of this technology".

Chapter 3 that follows, explains why a qualitative research design is used to answer the research questions of the study. More specifically, in terms of the research design, it is explained why the transcendental phenomenological method is considered more appropriate than other methodological methods for the study of a complex adaptive social phenomenon – the distributed value ecosystem phenomenon. The term methodology refers to both the philosophical assumptions which the study is based on and the research method used in this study. The term research method refers to the way in which the data is collected and analysed.

CHAPTER 3: METHODOLOGY

3.1 INTRODUCTION

The purpose of the study was to seek and describe the meanings and essences of managers' experiences of the value ecology phenomenon. Chapter 1 dealt with the background to the study, significance of the study, contribution of the study and problem statement. Chapter 2 contained a thematic literature review that focused on determining the core themes in the literature, on emerging constructs and concepts on value creation and the emerging decentralised and distributed value ecology phenomenon. Chapter 3 deals with the methodology, used to answer the primary research question: What is the invariant experience of managers using externally available intelligent building blocks (DLT) to transform, or rearrange the way organisations cooperate and coordinate with others in a distributed value ecosystem?

More specifically, the methodology refers to both the philosophical assumptions which this study is based on and the research method used in this. Research method referring to the way how the data in this study was collected and analysed. Furthermore, phenomenology is different from other methodologies. Phenomenology is both a philosophical discipline and research method (Anosike *et al.*, 2012; Denzin & Lincoln, 2005; Gill, 2014; Shaw, 2010). This chapter also addresses the appropriateness of the research design, selection of participants, informed consent, instrumentation, data collection, analysis and synthesis of the data, as well as the conceptual frame that was used for the analysis of the data.

3.2 APPROPRIATENESS OF RESEARCH DESIGN

Research design is the logical blueprint that is used to answer the research questions of a study, and the research design that is the most appropriate for a study is the one that answers the research question (Saunders *et al.*, 2015; Yin, 2015; Creswell *et al.*, 2007:238). The research design of this study is qualitative in nature, as the main purpose of this study is to seek and describe the meanings and essences of managers' lived experiences of the decentralised and distributed value ecosystem phenomenon.

Furthermore, a qualitative research design was viewed more appropriate than a quantitative research design for the study of a complex adaptive social phenomenon – distributed value ecosystem phenomenon. As mentioned before, it is argued by several authors (Bettis & Prahalad, 1995; Chia & Holt, 2006; Cilliers, 2002; Levy 1994:169; McMillan 2008; Sanders, 1982; Stacey, 2011; Tomkins & Eatough, 2013) that there are limits to the usefulness of positivistic philosophy, and analytical method in understanding organisations as complex adaptive systems. Analytical method may itself destroy what we seek to understand about complex social phenomenon (Allee, 2002; Cilliers, 2002).

There is also common ground between complexity theory and phenomenology in that both complexity theorist and phenomenologist reject or at least believe there are limits to positivistic philosophy and analytical method. Phenomenology is a philosophy and research method (previously indicated in Section 1.13), and broadly viewed as a ‘resistance movement’ to positivistic philosophy (Gill, 2014). Phenomenology, the philosophy, involves setting aside our ‘natural attitude’ (Husserl, 1907, translated by Alston & Nakhnikian, 1964) or ‘organisational attitude’ (in the case of organisational studies), to thinking about things, and to question what human engagement in the world is all about (being in the world). Husserl (1907/1964, translated by Alston and Nakhnikian) introduced the concept of ‘Lifeworld’ (1907), and Heidegger introduced the concept of ‘Being-in-the world’ (1927).

The pivotal difference between Husserl’s descriptive, transcendental phenomenology and Heidegger’s interpretive phenomenological is the phenomenological ‘worlds’ they conceived. Husserl (1907) believed context was of peripheral importance (our universe, our world is a pre-given, and the lifeworld is the backdrop to which all things appear as themselves). Whereas, for Heidegger, context is a central concern (Wojnar & Swanson, 2007:174). Heidegger (1962) introduced the concept of ‘dasein’, the human way of being in the world. With Heideggerian phenomenology, the situatedness of people is central: the culture, social context, or historical period in which they live and from which they cannot abstract themselves from (Wojnar & Swanson, 2007:174).

More broadly, in terms of the use of phenomenology in organisational studies, Tomkins and Eatough (2013) contend that phenomenology makes a great deal of sense in organisation studies, as several leading phenomenologists, such as Heidegger (1927/1962), Merleau-Ponty (1945/1962), and Sartre and Mairat

(1948/1973) have made work and working life the key feature of the human experience.

Organisational researchers (Chia & Holt, 2006; Cunliffe & Coupland, 2012; Cunliffe, 2009; Jarzabkowski, 2005; Jarzabkowski & Whittington, 2008) have also drawn on phenomenological ideas in organisational research. There is the 'turn' to practice (strategy-as-practice in strategy research), the 'turn' to ethics and the 'turn to embodiment' in organisational research (Tomkins & Eatough, 2013:259). Sanders (1982:358) also maintains that phenomenological research is not a 'new way' to view data. It is rather a 'new way' to view what is truly discoverable, but often not seen.

Overall, there were several key considerations for using the phenomenological method, as opposed to other quantitative or qualitative methods in this study:

- Transcendental phenomenological method provided a means to reveal the deep structure and organisational logics (Bettis & Prahalad, 1986, 1995) of new forms of organisation that are more open, autonomous, decentralised (as opposed to abstracting, developing grounded theory or creating a more conceptual understanding that would fragment understanding even more).
- Another reason for using phenomenological method is the phenomenological research method itself. Complex social and behavioural phenomena often elude quantification and statistical inference, and most management research does not study deep structure (Dandridge, Mitroff & Joyce, 1980; Sanders, 1982:358). This mostly involves the surface architecture organisations and changes to it, as opposed to what gives the shape to organisational architecture (the workings of an organisation). This means that the dominant logic (perceptual lens used) determines what data are left out or incorporated into organisational architecture (Bettis & Prahalad, 1986, 1995). Sanders' (1982:358) phenomenological method addresses this methodological void.
- The phenomenological method is also particularly suited for the study of the use of technology, as it has become a pervasive feature of our life and is embedded in our lifeworld. The concept, as proposed by Husserl (1907/1964, translated by Alston and Nakhnikian), is that we simply accept its existence (Cilesiz, 2011), but technology is built on a set of underlying principles (Berners-Lee, 2010).

- The final reason is that the themes and underlying essences that emerge can be used to validate, repudiate or complement the quantitative research findings of the distributed value ecology phenomenon (Glaser & Strauss, 1967; Sanders, 1982:358).

In terms of the choice of the specific phenomenological method, the researcher first considered his own personal philosophical assumptions, the research question and intended outcomes of the study to decide between using a descriptive, transcendental (Husserl, 1964) or interpretive (Heidegger, 1927) phenomenological method, as proposed by Husserl and Heidegger, respectively.

The transcendental (descriptive) phenomenological method (Giorgi & Giorgi, 2008) is concerned with how objects are constituted in pure consciousness (Wojnar & Swanson, 2007:173). The hermeneutic phenomenological method (Van Manen, 1997) is concerned with reading text, so that the intention and meaning behind appearances are understood (Moustakas, 1994:13). The interpretive phenomenological method (Benner, 1994) is concerned with the interpretation of structures of experiences (Wojnar & Swanson, 2007:173).

The transcendental phenomenological method was considered more appropriate for the current study, primarily as the nature the research question is to describe the essence of the value ecology phenomenon, as opposed to articulating practical and everyday understandings and knowledge related to a phenomenon (Van Manen, 1997) or exploring in detail how participants make sense of their personal experiences of a phenomenon (Benner, 1994).

Table 3.1 (Gill, 2014:122) below gives an overview of the phenomenological methods in terms of disciplinary origin, methodology, aim of the research, sampling, key concepts and applications in organisational studies.

Table 3.1: A table of phenomenological methodologies

Phenomenology					
	Descriptive phenomenology (Husserlian)			Interpretative phenomenology (Heideggerian)	
	Sanders' phenomenology	Giorgi's descriptive phenomenological method	Van Manen's hermeneutic phenomenological method	Benner's interpretive phenomenology	Smith's interpretative phenomenological analysis
Disciplinary origin	Organisational studies	Psychology	Pedagogy	Nursing	Psychology
Methodology as	Technique	Scientific method	Poetry	Practice	Craft
Aims	To make explicit the implicit structure (or essences) meaning of human experiences	To establish the essence of a particular phenomenon	To transform lived experience into a textual expression of its essence	To articulate practical, everyday understandings and knowledge	To explore in detail how participants are making sense of their personal and social world
Participants (sampling)	3-6	At least 3	Unspecified	Until informants reveal no new findings	1 or more
Key concepts	Bracketing (epoché) Eidetic reduction Noematic/noetic correlates	Bracketing (epoché) Eidetic reduction Imaginative variation Meaning units	Depthful writing Orientation Thoughtfulness	The background Exemplars Interpretive terms Paradigm cases	Double hermeneutic Idiographic Inductive
Applications in organisational studies	Kram and Isabella (1985)	McClure and Brown (2004)	Gibson (2004)	Yakhlef and Essen (2012)	Murtagh, Lopes and Lyons (2011)

Source; Gill, 2014:122

In terms of Giorgi's (1985) descriptive phenomenological method, it is considered an empirical method as it bases itself on factual data that is collected (Ehrich, 2005). It is one of the most fully developed phenomenological methods and highly cited (Gill, 2014). The method aims to produce accurate descriptions of human experiences of a particular psychological phenomenon, but it is also widely used in organisational studies (Burgoyne & Hodgson, 1983; Chikudate, 1999; Harris, 2015; Koufoudakis-Whittington, 2014; Moffett, 2005; Posey, 2013; Stalinski, 2014; Steinkruger, 2013; Tichenor, 2011; Tunheim & McLean, 2014; Vasconcelos, 2010).

The central reasons why Giorgi's descriptive phenomenological method is widely used is that it is the most fully developed descriptive transcendental phenomenological method (Gill, 2014).

Interpretive phenomenological methods were not considered for this study, as interpretive phenomenological methods are more appropriate to study the contextual features of lived experiences, using a blend of the researchers and participants' meanings and understanding of a phenomenon (Wojnar & Swanson, 2007:177).

The detail of the steps followed, using Giorgi and Giorgi's (2008) descriptive phenomenological method is dealt with in Chapter 4.

3.3 SELECTION OF PARTICIPANTS

In terms of the background to the selection of participants. The banking and finance sector was specifically targeted in this study because DLT is in the early stage of playing a significant role in a financial technology revolution (Ali *et al.*, 2020), specifically in the development of payments systems that are distributive in nature, much more tamper-resistant and more resilient. Furthermore, a motivation for choosing the banking and financial sector is the number of organisations that are part of the active development of 'killer' distributed ledger applications, or a 'killer' value ecosystem that has the potential to be fundamentally disruptive to the economic, legal, political and social system (Frizzo-Barker *et al.*, 2020:7).

This study initially used purposive sampling, given the topic of this study and interest in determining the invariant qualities of participant's experiences of the distributed value ecology phenomenon. The data collection units (Yin, 2015), the units of observation and units of analysis (Mouton, 2013:51), in this study were the

experiences of individuals, not organisations. Hence, the participants who were deliberately targeted for this study were individuals who the researcher suspected may hold the broadest range of perspectives and experiences (Moustakas, 1994). More specifically, experiences either experimenting with or using DLT to transform organisational architecture (workings of organisations) in the financial and banking services industry in South Africa.

Qualitative studies often have more than one level of data collection units, and these units often have a nested relationship (Yin, 2015). In terms of this study, the relationship between the data collection units and the topic of the study, at a narrow level, is experiences that were related to either experimenting with or actively using cryptographic objects, such as cryptographic payments objects (for interbank payments settlement and tokenising currency) and identity cryptographic objects (self-sovereign identity) (as explained in Chapter 2).

The initial purposive sample of six participants included persons employed as blockchain leads or managers in small blockchain units at South African banks (these units consist of no more than five persons). This included a person from the South Africa Reserve Bank (SARB) blockchain unit, a blockchain lead at a consultancy firm, and a technical lead (blockchain application developer from an international blockchain organisation). All the aforementioned persons participated in a project to explore and test a proof of concept to use DLT for interbank settlement in the South African banking system. In broad terms, the goal of the experiment was to assess the application and use cases of DLT through a project that required collaboration between SARB and the banking community. Hence, all the participants in the initial round of sampling shared the same experience but played different roles in this experiment.

Snowball sampling was also employed, which helped to identify four additional participants who were not considered in the initial sampling and who would not have been easily identified through the use of other sampling techniques (Yin, 2015:89). At the end of their interview, the participants were asked who they thought had a great deal of experience experimenting or using blockchain technology in the context of the financial and banking services industry. Some of the participants who were identified were part of the proof of concept experiment and some participants were not part of this experiment. Most of the participants in the snowball sampling stage recommended

persons that were influential in some way in growing the blockchain ecosystem: the organisers of a community of blockchain entrepreneurs club, the lead/founder of a blockchain consortium, blockchain entrepreneurs who were considered to be thought leaders, and the founder of a regional blockchain hub.

The use of snowball sampling revealed the texture of the participants' experiences of a blockchain community that was instrumental in creating interest and excitement in experimenting with blockchain technology, and actively shared experiences, ideas, fears and optimism in different forums, meetups, blockchain entrepreneur clubs and regional blockchain hubs at a local and even global scale. Hence, the relationship between the data collection units and the topic of the study, at a broad level, is a unique community that actively uses a range of forums (in person and online) to collaborate in a global experiment that aims create and 'grow' an open, distributed and decentralised value ecosystem.

Two broad inclusion criteria were used in the selection of participants: (1) Participants had to have at least a year's experience of either experimenting or using DLT as an intelligent external available building block to transform the architecture (workings) of an organisation, and (2) they were able to give a full, rich description of their experiences. All participants interviewed could give full, rich descriptions, except for one participant that was not available for a personal interview, but gave a 'lean' written response instead.

Saturation determined the final number of data collection units in this study. Saturation is viewed as the 'gold standard' (Glaser & Strauss, 1967) by which purposive sampling sizes for interviews are determined. Saturation often occurs before 12 interviews, and elements of meta-themes are present as early as six interviews (Guest, Bunce & Johnson, 2006), supporting the recommended minimum range found by Onwuegbuzie and Collins (2007:289).

In terms of sampling size, 10 participants were included (the final number of 10 determined by saturation), which is comparable to other transcendental phenomenological organisational studies identified in the literature search (see Section 4.7), with 'management' or 'organisation' as the topic of the study (see Appendix C, column: 'sample size'). The number of participants from formal banking, meets the minimum sample size of three (3) for homogenous subgroups, as proposed

by Onwuegbuzie and Collins (2007:289). The other participants were either from other financial institutions or non-traditional players developing distributed ledger applications for the banking and finance industry.

3.4 INFORMED CONSENT AND CONFIDENTIALITY

The University Research Ethics Committee (College of Economic and Management Science) approved the research (see Appendix A). Part of the approval process required adherence to ethical considerations during all stages of the research process (Saunders *et al.*, 2015). This includes aspects such as gaining access to participants, establishing contact with participants (via emails, social media platforms and phone). Obtaining informed consent (and being clear on the scope of the consent), ensuring confidentiality and anonymity (omitting identifying information in the data and written documents), agreeing to a place and time-commitments (avoiding unsociable times to meet) and retaining and storing data collection safely for three years after the completion of the study, and obtaining permission to record and publish.

Participants who met the inclusion criteria, as discussed earlier, were forwarded an email invitation (see Appendix D) that explained the purpose of the study, primary objectives of the study, the nature of their participation in the study (a semi-structured face-to-face interview that would last between one and two hours), and that the interview would be recorded (audio recordings were done). Participation was on a voluntary, anonymous and confidential basis, and it was indicated that participants may withdraw from the study at any stage without negative consequences. The potential benefit of the study to industry and the academic community at large was explained as well. At the start of each interview the researcher again reviewed the contents of the invitation and all participants signed the consent form (Appendix E).

3.5 INSTRUMENTATION

In qualitative research standard instruments and measures of data are not employed, as the researcher is the instrument (Creswell *et al.*, 2007; Guba & Lincoln, 1985). The most dominant method employed by researchers in phenomenological studies to collect data involves interviewing participants (Bevan, 2014; Kvale, 2006).

The researcher followed the interview protocol set out below (and in Appendix E). In broad terms, the approach taken is that questions should be generally broad and

open-ended (Bevan, 2014). The main advice given to structured interviews is ‘deliberate naiveté’ (Kvale & Brinkman, 2009). In other words, the researcher sets aside any prejudgements, biases or preconceived ideas about the phenomenon, and looks at the phenomenon ‘naively’ and from a fresh perspective, while bracketing the use of personal knowledge. Hence, the use of the term transcendental, which means that everything about a phenomenon is perceived freshly, as if for the first time by the researcher (Creswell *et al.*, 2007; Moustakas, 1994:34). Section 4.2.1 (Chapter 4) explains in more detail how the researcher bracketed his own knowledge and experiences while conducting this study.

Bevan (2014:138) contends that phenomenology must be structural, but it has no universal method. To give structure to the interview process in the current study, Bevan’s (2014) phenomenological interview method was used (See Table 3.2 below and Appendix E).

Table 3.2: Structure of phenomenological interviewing

Phenomenological Attitude	Researcher approach	Interview structure	Method
Phenomenological reduction (Epoché)	Acceptance of natural attitude of participants	Contextualising (Eliciting the Lifeworld in Natural Attitude)	Descriptive/Narrative context questions
	Reflexive critical dialogue with self	Apprehending the phenomenon (modes of Appearing in Natural Attitude)	Descriptive structural questions of Modes of Appearing
	Active listening	Clarifying the phenomenon (Meaning Through Imaginative Variation)	Imaginative variations: Varying structure questions

Source: Bevan, 2014:139

For the purpose of the current study, a semi-structured interview was undertaken. The questions were structured into three question domains, namely, contextualisation, apprehending and clarifying the phenomenon, according to Bevan (2014) and as reflected in Table 3.1 and Appendix F.

In terms of the first question domain, contextualisation dealt with the participant’s context or ‘backdrop’ to experiences of the value ecology phenomenon (Bevan, 2014:139). The contextualisation questions asked were as follows:

- Tell me how it came about that you got involved in the distributed value ecosystem phenomenon?
- How long were you involved in ...?
- What contexts, situations, events, persons or actions have strongly influenced your experience of the distributed value ecosystem phenomenon?

The second question domain dealt with apprehending the phenomenon, and the different modes of appearance of the phenomenon (Bevan 2014, 140). The researcher asked descriptive and structural questions to establish the different ways in which participants experienced that which they experienced (Bevan, 2014:140). The questions that dealt with apprehending the phenomenon were:

- What was the lived effect of your experience?
- What changes do you associate with this experience?
- How did the experience affect you?
- How did the experience affect others intimately connected with this experience?
- What feelings were generated by the experience?
- What dimensions, incidents and people intimately connected with this experience stand out for you?
- What changes in states did you become aware of at the time?
- Have you shared all that is significant with reference to the experience?

In addition, in clarification of the mode of appearance, probing questions were asked. The researcher aimed to clarify that which was similar and that which was different in the modes of appearance in the participants' experiences. Examples of probing questions asked:

- Can you please describe what you mean by...
- Can you tell me more about the...
- Can you describe what you did when...

In terms of the third question domain, clarifying the phenomenon, the researcher asked questions to add clarity and explicate the variations in the participants' experiences (Bevan, 2014:141). 'Variations' questions were generated by actively

listening and being reflexive to the participants' descriptions of their experiences (Bevan, 2014:142). The researcher also paid attention to how the participants' experiences of the phenomenon would change during the interview, and 'variations' questions were asked to examine and to clarify the variations in the participants' descriptions.

For example, questions were asked that focused on explicating variations such as:

- Variations in the topics of conversations (strategic in nature) that stood out about using DLT.
- Variations in thought when it is appropriate to use the technology (contexts to technology use and the problem solved in that context), and what is holding back the ecosystem from taking off.
- Variations in the seamlessness of participants' experiences in using DLT in transforming organisational architecture, and understanding when organisations will reap benefits from using DLT.
- Variations in the degree of strategic clarity, the sense of direction or signs that gave direction in the landscape to explore, and how to balance the exploration and exploitation of the technology in this landscape.
- Variation in perceptions as to how truly disruptive the technology is to the working of an organisation (architecture) and the actual evidence in participants' experiences to support a fundamental shift in the workings of organisations.

The researcher recorded field notes after each interview to complement the audio recordings. The field notes primarily dealt with aspects such as the contextual aspects that were the drivers for the use or experimentation with DLT, perceptions, cues to emotional states, and states that participants became aware of in experimenting or using DLT.

3.6 DATA COLLECTION

This section discusses the data collection that was conducted for the present study. It includes a discussion of the phenomenological attitude and the researcher's approach, the interview protocol that was used in the study, and the data analyses and synthesis.

3.6.1 Phenomenological attitude and researcher approach

The first step in Giorgi and Giorgi's (2008) method involves obtaining a concrete description of the phenomenon as lived through by participants, by interview or direct description (Giorgi & Giorgi, 2008:11). All of the participants were interviewed at their workplaces (conference rooms or offices) during office hours, with the exception of one participant who indicated he wanted to meet at a coffee shop close to his office during working hours.

In collecting data, phenomenological researchers are primarily interested in describing the experiences in the way that a person experiences it and not through a theoretical lens (Bevan, 2014:136). Phenomenological researchers consciously make a shift in attitude, from a natural attitude to a phenomenological attitude in collecting data. However, the researcher acknowledges that there are limits to how much one can make this shift and truly bracket one's experiences and knowledge. Bracketing is integral to being more aware of one's own natural attitude, immersion in one's own lifeworld and how much of it is taken for granted (Merleau-Ponty, 1945/1962). The process of bracketing essentially amounts to a dialogue with one self and being more reflexive about what is taken for granted when asking questions (Bevan, 2014).

The specific approach that was followed while collecting data involved accepting the natural attitude of participants, reflexive critical dialogue with self, and active listening. Accepting the natural attitude of participants involved accepting fully a participant's experiences of the phenomenon as they experience it, and not influencing the participant's accounts of their experiences and the interview process in any way. Reflexive critical dialogue involved being conscious while asking questions, of one's own natural attitude and avoiding asking questions that are loaded with theoretical assumptions (Bevan, 2014:138). Active listening involved listening for variations in experiences and asking questions to clarify the variations in the modes of appearances of the phenomenon.

3.6.2 Interview protocol

In terms of the interview protocol followed, the researcher started the interview with a social conversation. Briefly explaining the purpose of study, research questions, the objectives of the study and the nature of each participant's involvement in the study (ethical considerations and approval by the University Ethics Committee, College of

Economic and Management Sciences – Appendix A) and completion of the consent form (Appendix D). The goal of the social conversation was to make sure that participants had read and understood the invitation initially sent out, listening whether participants had any concerns and building some basic level of rapport.

The researcher explained to the participants that phenomenological researchers make use of interviews due to their interest in the lived experiences of the participants (Englander, 2012:14), and the study specifically seeks to give an accurate, detailed and complete description of the invariant aspects of their experiences (essences) as related to the value ecology phenomenon that participants have lived through. Furthermore, they were asked to provide their permission to record the interview and if they had any questions.

The opening question of the interview requested participants to give a detailed description of the background to their experiences and to confirm the duration of their experiences with the phenomenon. Other questions in the contextualisation domain dealt with persons, situations, events or actions that strongly influenced their experiences of the phenomenon. The remaining questions focused on the modes of appearance of the phenomenon and clarifying variations in the experiences of participants, namely, imaginative variation (see Appendix F).

Overall, the goal was to encourage the participants to describe their experiences with as much detail and clarity as possible. However, it is not possible to control how participants express their experience, for example, the participants would at times describe their experience using an analogy, use significant events to draw comparisons, or theory to ground their experiences in some way. These interpretations needed clarification at times, to obtain more clarity on what was experienced (noema), as well as structural questions as to how the participants experienced that which they experienced (noesis).

3.6.3 Data analyses and synthesis (phenomenological reduction, imaginative variation and synthesis)

The second step in Giorgi's phenomenological method involves, phenomenological reduction which requires the researcher reads an entire description to get a sense of the whole, then go back to a description again, reading more slowly, establishing 'meaning units' (Giorgi & Giorgi, 2008).

Phenomenologists in general are reluctant to follow a recipe in analysing interview data. The reluctance is a fear of being too focused on the steps in the research method (following a 'cookbook' set of instructions). Keen (1975:41) describes phenomenological analysis of data as "...an approach, an attitude, an investigative posture with a certain set of goals". Hence, no method should be imposed on a phenomenon, as "...that would do a great injustice to the integrity of that phenomenon" (Hycner, 1985:280).

However, concrete guidelines are offered by several authors (Hycner, 1985: 280-301; Moerer-Udahl & Creswell, 2004:19-35; Moustakas, 1994) that try to stay true to the attitude of phenomenology. The guidelines followed in analysing the interview data are as follows:

- Transcription: The interviews were transcribed verbatim. Each participant was given a copy of the transcribed interview to check accuracy and provide feedback. One participant requested a copy of the audio recording.
- The researcher listened to every interview several times to get a sense of the whole, as well as read the transcription at the same time to establish the accuracy of the transcription and make corrections where needed (part of step 2 in Giorgi's method).
- Epoché (part of step 2 in Giorgi's method): Most phenomenological researchers start the process of phenomenological reduction by bracketing as much as possible their own judgements, perspectives and experiences (Hycner, 1985:281; Moerer-Udahl & Creswell, 2004:19-35; Moustakas, 1994:34). The researcher engaged in a reflexive process (epoché), by recalling his own past experiences regarding the use of technology to transform the working of organisations (and often a gap experienced between idealised design, ideal outcomes and actual messy experiences experimenting with new technology). The researcher also recalled his own theoretical understanding of how perspectives, specifically on strategic management theory has evolved, on creating and appropriating value in complex settings. For example, the use of bank management simulation software to learn how to interpret economic scenarios and make strategic decisions. Furthermore, an interest in how useful complexity theory may be in developing a deeper understanding of sharp transformations of the workings of organisations.

- Horizontalisation (part of step 2 in Giorgi's method): This step involved identifying significant statements that supply information about the experiences of the participants. All the statements were treated as having equal value (Moustakas, 1994).
- Delimitation of horizons (part of step 2 in Giorgi's method): Repetitive statements irrelevant statements, and statements not relevant to the research question were deleted (Moustakas, 1994). What remained were the horizons (meaning units) that stood out as invariant qualities of the participants' experiences.
- Invariant qualities and themes (which is the outcome of step 2 in Giorgi's method): Horizons that were non-repetitive and non-overlapping were then grouped into themes.
- Imaginative variation (part of step 3 in Giorgi's method): The research looked for common themes amongst all the participants, as well as variations within themes for each of the participants. In principle, imaginative variation, step 3 in Giorgi's method, involves the researcher moving from the participants' statements to a general statement that represents the most invariant meaning of the phenomenon (Anosike *et al.*, 2012:14). Hence, the researcher used imaginative variation as a mechanism to ask: "what is essential" and "what is incidental", to arrive at a description of the essential structure of lived experiences (Anosike *et al.*, 2012:14). The outcome of imaginative variation is a list of the textural and structural descriptions of the participants' experiences.
- Contextualising themes: Before writing up the individual textural and structural descriptions, themes were put back into the overall contexts or horizons from which they emerged (Hycner, 1985:293).
- Individual textural and structural descriptions (the outcome of step 3 in Giorgi's method is textural and structural descriptions): From the themes developed, individual textural and structural descriptions were developed for each participant. The contexts of these themes for each of the participants were considered, before developing the textural and structural descriptions for each participant.
- Composite textural and structural description, which is the essences of the phenomenon (the final step in Giorgi's method: synthesis): The textural and structural descriptions were then synthesised into a composite description of the

value ecosystem phenomenon. This description is the invariant structure, essence of the value ecosystem phenomenon.

Generally, researchers present this synthesis as a single statement that represents the 'meanings' and 'essences' at a particular time and place. It is also emphasised that the essences of any experience are never fully exhausted (Moerer-Urdahl & Creswell, 2004:32), and the essences of a phenomenon can never be fully established, as the textural-structural synthesis embodies the essences at a certain time and place, from the perspective of the researcher (Moustakas, 1994).

Qualitative data analysis software was used in the analysis process to organise the large amount of meaning units that were generated more effectively, to group horizons into themes, and to develop the structural and textural descriptions. Furthermore, invariants qualities and themes were graphically represented in how many times they appeared, making it easier to identify the invariant qualities and themes that stood out for all participants, and variations in themes between participants.

3.7 CONCEPTUAL FRAME FOR ANALYSIS OF EXPERIENCES USING TECHNOLOGY

Cilesiz (2011:492) contends that phenomenology is highly suited for the study of human experiences related to technology, as technology has become a pervasive aspect of our lives and is firmly embedded in our lifeworld. It has become seamlessly integrated into our lives and simply accepted to exist. The concept of human experience within phenomenology has a very specific meaning (Giorgi, 1997). The general meaning of experience refers to activities or events that we participate in. Husserl's (1907/1964, translated by Alston and Nakhnikian) phenomenological understanding of experience, however, is the full experience or act of consciousness in which something real is given to our consciousness. Our consciousness is directed toward something (intentionality). In phenomenology, intentional experience is experience that has a material (realism) and an ideal or noetic component (idealism) (Moustakas, 1994).

Figure 3.1 below depicts this ideal-material duality.

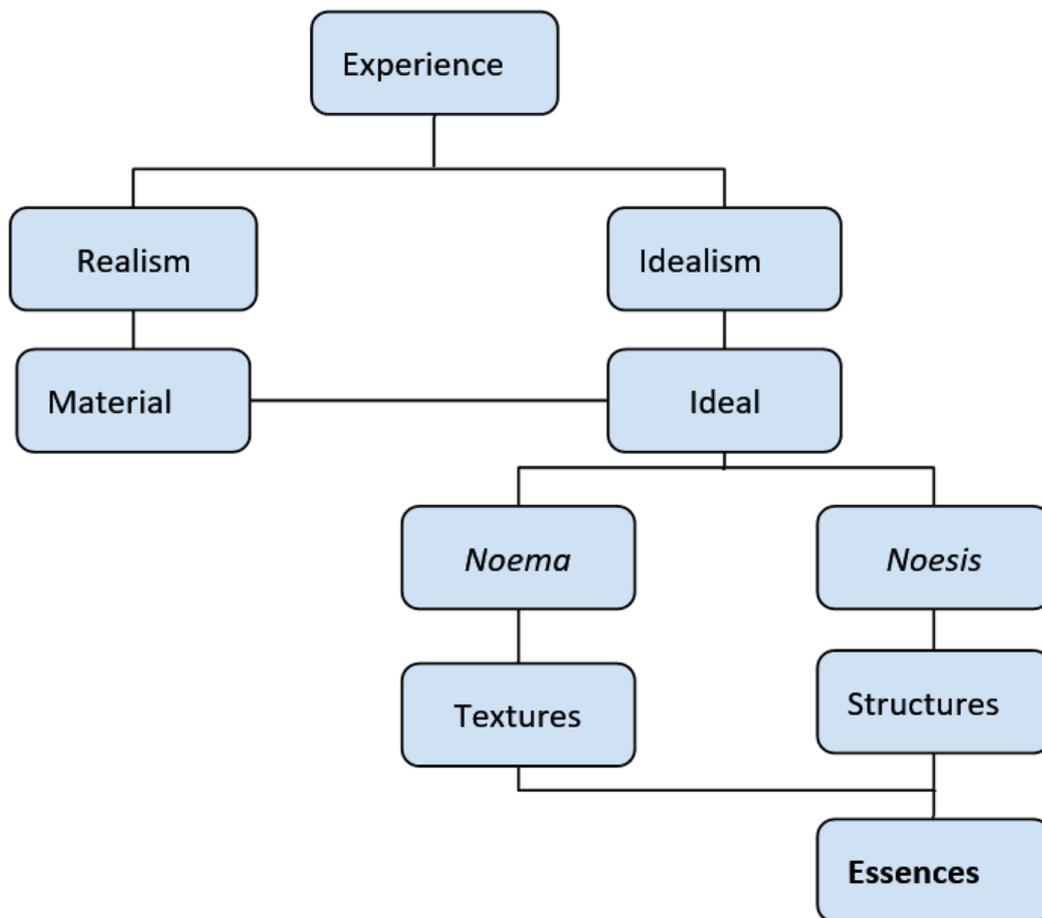


Figure 3.1: Phenomenological concept of experience

Source: Cilesiz, 2011:497

Phenomenological inquiry is concerned with discovering the essences of ideas, but we can only know what these essences are through conscious experience of the material component. Furthermore, every conscious experience consists of two interrelated dimensions, a noema and noesis (Moustakas, 1994:69):

Noema is viewed as the act of experience. Essentially, that which is experienced, the 'what of experience' (the perceived, the felt, the thought, the remembered or the judged). In terms of this study, noema is viewed as the 'what' of experiences, using DLT, meaning the textures of the participants' experiences. However, where noema exists, there is also a corresponding noesis (Moustakas, 1994:69). Noesis refers to the object of action (perceiving, feeling, thinking, remembering and judgment). In terms of this study, 'how' participants experienced 'what' they experienced while using DLT. This refers to the underlying structures of experiences.

In analysing the data, the researcher considered that experiences using DLT consist of both textures (varying outside in appearance) and structures of experiences (underlying similarities in terms of relations to self, relation to others, emotions and states that participants became aware of). The multiple textures of experiences were explored through the process of imaginative variation. In terms of the structure of experiences, the focus was on finding underlying similarities between the participants. Individual textural and structural descriptions were developed, and a composite description of the invariant qualities of participants experiences was compiled, namely, the invariant qualities of experiences of the value ecosystem phenomenon. Figure 3.1 gives an overview of the understanding of the meaning of phenomenological experiences and components considered to arrive at the essences of the value ecology phenomenon.

3.8 TRUSTWORTHINESS

Conventionally, validity and reliability are the terms discussed in quantitative research as the concepts that determine the rigour of a study. Lincoln and Guba (1985) argue that trustworthiness should be established in qualitative research. The conventional concepts of generalisability, internal validity, reliability and objectivity are replaced by the alternative concepts of credibility, transferability, dependability and confirmability. Credibility and internal validity, transferability and generalisability, confirmability and objectivity, and dependability and reliability-reproducibility are viewed as comparable concepts.

3.8.1 Credibility

With regard to credibility (internal validity), the seven strategies generally considered in combating the threats to validity in qualitative studies are intensive long field involvement, 'rich data', respondent validation, search for discrepant evidence and negative cases, triangulation, quasi-statistics, and comparison (Yin, 2015).

The current study employed the following credibility strategies:

- **Long-term engagement:** In terms of the researcher's engagement, meetups and conferences of the blockchain community were attended (Blockchain Entrepreneurs Club of South Africa). The researcher also had informal discussions, networked with blockchain community members and entrepreneurs, and followed

the social media feeds of the blockchain community. Essentially, the researcher engaged in as much persistent observation as possible of the discussions of community members in blogs and networking platforms.

- **Rich data:** The two main criteria used to include participants in the study to ensure rich data were: (1) The participants needed to have been engaged in using DLT to either experiment or to transform the workings of an organisation for a minimum period of one year. (2) Participants had to be able to give a rich description of their experiences. Only one of the participants did not meet these criteria, but the data was still useful as it showed differences in engagement with the distributed ledger ecosystem and the general quest to develop a deeper understanding of the shape of perceptions about how useful the technology may be.
- **Respondent validation ('credibility check'):** Respondent validation is the most commonly employed validation strategy in transcendental phenomenological studies (Moustakas, 1994). The transcribed interview and the textural and structural descriptions were forwarded to the participants to check for accuracy and comment.
- **Discrepancies (variations in modes of appearance):** Field notes were made of variations in modes of appearances in participants' descriptions. The researcher consciously listened for different perspectives and 'voices' in the participants' experiences to ensure fairness and quality of balance between the differences in experiences (Lincoln & Guba, 1985). These variations, when recognised, were probed during interviews to get more clarity on the variations in the descriptions.
- **Triangulation** was used to verify the descriptions of participants from sources other than the interviews. Sources included audio recordings made of blockchain community meetups attended, white papers that have been written by the blockchain community, blogs and video of international blockchain conferences, and panel discussions (made publicly available online).

3.8.2 Transferability

With regard to transferability (generalisability), Lincoln and Guba (1981:80) suggest that one should ask about the applicability of the findings in other contexts and with other subjects. This study specifically targeted participants that experimented or used blockchain technology in transforming the workings of an organisation in the financial

and banking services ecosystem. This study makes no claims as to how transferable the findings are to other applications and contexts of DLT. Examples of other applications are: trade financing, tracking and monitoring charity donations, collect and secure share data for highly siloed organisations, tracking products in a logistics system, distributing digital collectables, tracking the licensing and payments of geospatial data and prediction markets that may emerge.

As a whole, generalisations of phenomena are not possible, because phenomena are intimately tied to the time and place in which they exist (Lincoln & Guba, 1981:80). Hence, the findings of the study were described in as much detail as possible, to allow the reader to assess whether the findings are transferable to other contexts.

3.8.3 Dependability

With regard to dependability (reliability-reproducibility), Lincoln and Guba (1981:80) suggest one should ask whether the findings would be consistently repeated if the study was replicated with the same (or similar) participants in the same (or similar) context. For the purpose of the current study, the research design, data collection and analysis are explained in a structured and detailed manner which makes it possible for other researchers to replicate the study. In other words, methodologically it is clearly set out in Chapter 3 how data were collected and analysed to capture the invariant qualities of the distributed ecosystem phenomenon (Gnyawali & Song, 2016:12). In other words, the what, why and how of the chosen research design were explained, and the reason why the transcendental phenomenological method specifically was chosen.

3.8.4 Confirmability

With regard to confirmability (objectivity), Lincoln and Guba (1981:80) suggest asking the question as to the degree to which the findings are a function to the neutrality of the researcher and the conditions of the inquiry, as opposed to function of the biases, interests or perspectives held by the researcher. The researcher engaged in an approach of reflexive critical dialogue, noting any pre-established dispositions held. However, the researcher also acknowledges the limits to bracketing personal biases, when the researcher is the research instrument.

Overall, confirmability was demonstrated by providing a detailed textural and structural description for each participant that is rooted in their context, and the participants were asked to assess the accuracy of transcripts, and the textural and structural descriptions developed. In other words, rigour was demonstrated by showing empirically how findings are organised, distilled and how the findings relate to the theory (Gnyawali & Song, 2016:12). These methodological and empirical rigour aspects are dealt with in Chapters 4 and 5, respectively.

3.9 SUMMARY

Chapter 3 dealt with the rationale for the selection of the research design, the specific phenomenological method that was employed. Giorgi's (2008) transcendental phenomenological method, the selection of participants, obtaining informed consent, instrumentation (the researcher as the research instrument), data collection, analysis and synthesis of the data, demonstrating trustworthiness, as well as the conceptual frame that was used for the analysis of the data. The next chapter, Chapter 4, presents the findings of the data analyses and synthesis.

CHAPTER 4: FINDINGS

4.1 INTRODUCTION

Chapter 3 contained a description of the methodology used in this study. Chapter 3 also contained detailed discussions of the selection of participants, informed consent, instrumentation, duration of interviews and the conceptual frame that was used for the phenomenological analysis of the use of technology (see Chapter 3, Sections 3.3 to 3.7).

Chapter 4 gives a detailed description of the findings of the data analysis (phenomenological reduction) and synthesis process. In Chapter 4 the researcher first describes his own experience with the phenomenon (epoché), describes the process of horizontalisation (re-reading transcribed interviews and identifying significant statements), delimiting horizons (identified horizons that stand out as invariant qualities), and the clustering of horizons into themes (Giorgi & Giorgi, 2008; Moustakas, 1994). Themes are then contextualised to place the themes back into the overall contexts or horizons from which they initially emerged (Hycner, 1985). Textural and structural descriptions are then presented for each of the participants' experiences they lived through as related to the value ecology phenomenon (Giorgi & Giorgi, 2008; Moustakas, 1994). The final section presents a composite description of the individual textural-structural descriptions (Giorgi & Giorgi, 2008, Moustakas, 1994). This composite description answers the research question, as to the invariant qualities (essences) of participants' experiences lived through as related to the distributed value ecosystem phenomenon (Giorgi & Giorgi, 2008; Moerer-Urdahl & Creswell, 2004; Moustakas, 1994).

4.2 DATA ANALYSIS PROCESS

The six steps in the analysis process are discussed in Sections 4.2.1 to 4.2.6 below to provide an overview of the six steps followed in the analysis process. A high-level overview is provided to navigate the steps in the analysis process (phenomenological reduction) more easily.

The steps in the analysis process followed and dealt with in the sections below are:

- a. Step 1: Epoché
- b. Step 2: Horizontalisation
- c. Step 3: Delimitation and clustering of invariant horizons and themes
- d. Step 4: The contextualisation of the themes
- e. Step 5: Individual textural-structural descriptions
- f. Step 6: Composite textural-structural description

4.2.1 Step 1: Epoché

Epoché is the first step in the analysis process. Cilesiz (2011:51) advises the development of a subjectivity statement at the start of the study, which is a useful starting point to explicate the researcher's prejudgement and helps to facilitate the bracketing process. The researcher engaged in the epoché process throughout the study, and more so to bracket subjectivity during the data analysis.

In revisiting the subjectivity statement stated in Chapter 3, the researcher recalls:

- His own theoretical understanding of perspectives on strategic management has evolved. More specifically, management logics as a source new organisational forms and the emergence of a large frame of constructs and concepts on creating and appropriating value in complex settings.
- The use of bank management simulation software that is based on 'clock-work logic', which refers to classical management logic to interpret economic scenarios and make strategic decisions. Furthermore, an awareness of the limits of using classical management logic to understand the workings of organisations in settings that are now more interconnected and interdependent.
- The researcher also recalls an interest in using complexity theory as a theoretical lens. This lens is perceived as useful to attain a better understanding of the post-industrial management logic that stresses the blurring of boundaries, and organisations opening their borders to deal with more complexity to ensure their continued existence (Dijksterhuis *et al.*, 1999).

4.2.2 Step 2: Horizontalisation

The second step in the analysis process involved identifying statements (meaning units) by the participants as relevant to their experiences of using the blockchain technology to transform the working of an organisation to enable participation in the blockchain ecosystem (distributed value ecosystem phenomenon). Hycner (1985:282) defines units of meaning as “...a unit of general meaning as those words, phrases, non-verbal or para-linguistic communications which express a unique coherent meaning (irrespective of the research question) clearly differentiated from that which preceded or follows”. This is the process of attaining an essence of a meaning that may involve a word, phrase, sentence, paragraph and even significant non-verbal cues noted during the interview process (Hycner, 1985:282).

All statements made in the interviews were treated as having equal value (referred to as horizontalisation) (Hycner, 1985). Many meaning units were identified in this process. Meaning units were also ‘timestamped’, linking the meaning unit to the audio recording of the interview.

The meaning units that were identified were then reviewed for each of the participants again, to establish if they overlapped or repeated, and if the units of general meaning that were identified addressed the research question. Statements that were irrelevant to answering the research questions were deleted. What remained were horizons that stood out as possible invariant qualities of the participants’ experiences. At this stage of the process, no grouping or ordering of statements was undertaken.

Figure 4.1 (embedded below) gives a list of all the horizons identified in the far-left column (Double click on the embedded icon to see Figure 4.1. (Note, Scalable Vector (SVG) type files are supported by Internet browsers such as: Google Chrome, Firefox, IE and Opera). The far-left column in the figure gives a list of all the horizons and themes identified in the form of a code tree. A single count of each horizon identified is given in the columns P01 to P10. The last column (sum) indicates the number of participants identified, for each of the horizons. This number varies between 1 and 10 participants. The last row (sum) indicates the total number of invariant horizons identified per participant column.



Figure 4.1: List of horizons and themes

4.2.3 Step 3: Delimitation and clustering of invariant horizons into themes

The third step in the analysis process involved identifying horizons that stood out as invariant qualities of experiences and grouping/clustering horizons into themes. Horizons were colour-coded (green and blue) to differentiate whether horizons were essential to the textural or structural aspects of the participants' experiences. Qualitative analysis software allowed a 'code tree' of horizons to be colour-coded, which made it possible to differentiate more easily between the textural and structural aspects in the transcribed text of each participant. The number of times that meaning units (horizons) were identified was also considered, to identify possible invariant qualities of experiences, as the 'number of hits' could be an indicator of some significance in terms of how meaningful issues are to participants (Hycner, 1985:287).

The number of 'hits' of each horizon in a theme per participant is indicated in Figures 4.2 to 4.12, which is included in the discussion of each of the themes identified. The researcher also considered that horizons may have the same literal content (the same word or phrase is used), but the meanings attributed may vary significantly because of a very different context or chronology of events as experienced by the participants (Hycner, 1985:287).

The use of qualitative data analysis software (MAXQDA) assisted in the process of grouping horizons into themes. Moustakas (2008) describes the process of identifying themes as iterative, as it is a process of looking and describing, looking again and describing while referencing textural qualities (Husserl, 1907, translated by Alston & Nakhnikian, 1964).

The process of identifying themes also involved deleting repetitive and irrelevant statements, and statements that were not relevant to the research question (as described in Chapter 3, in Section 3.6.3). What then remained were the horizons that stood out as invariant qualities (themes) of the participants' experiences.

The sections below describe the themes that emerged for the textural and invariant structural aspects of the participants.

4.2.3.1 Textural themes

Textural themes (noema) relate to the act of experience. The ‘what’ of experiences using blockchain technology (see Chapter 3, Section 3.7), namely, the perceived, the felt, the thought, the remembered or the judged were as follows (see Figure 4.2 below):

- Catalysts (the remembered and felt);
- Thought experiment (the thought);
- The rules for rule-breaking and rule-making (the felt and judged);
- The problem quest and mapping the solution space (the perceived and judged);
- The decentralised and distributed value lens (the perceived); and
- The difference: mechanics (the thought and judged)

Figure 4.2 below gives an overview of the six textural themes that were identified. The symbols (the size of the ‘circles’) indicate the number of horizons for each participant (column) identified in a theme relative to the overall number of horizons for each theme (row for each theme). The last column indicates the total number of horizons identified for each theme.

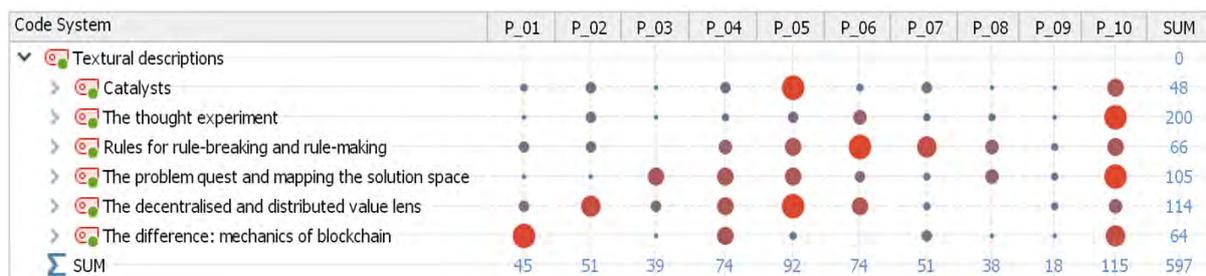


Figure 4.2: Textural themes of participants' experiences (noema)



(Double left click on the icon for a larger image of Figure 4.2)

In the sections below, each theme is presented as three components: the first component is a figure of the horizons identified in each theme (the code system). The last column in each of the figures indicates the total number of horizons (SUM) identified, and the symbol (circle size) indicates the relative number of horizons identified for each participant, relative to the total number of horizons (the SUM

column). The second component is a description of the theme (each theme has several sub-themes or components) and the third component in the discussion of a theme is selected quotes. This means that examples from the participants' responses connect to the description component, to ground and add more detail to the description.

Theme 1: Catalysts

Participants remembered, felt and judged that three catalysts were important in terms of why people were drawn to the value ecosystem phenomenon and why the phenomenon resonated very strongly with them at a personal level. These catalysts are (1) the erosion of trust in centralised organisation, (2) divorcing blockchain from the cryptocurrency hype, and (3) blockchain and cryptocurrency are intertwined (see Figure 4.3 below).

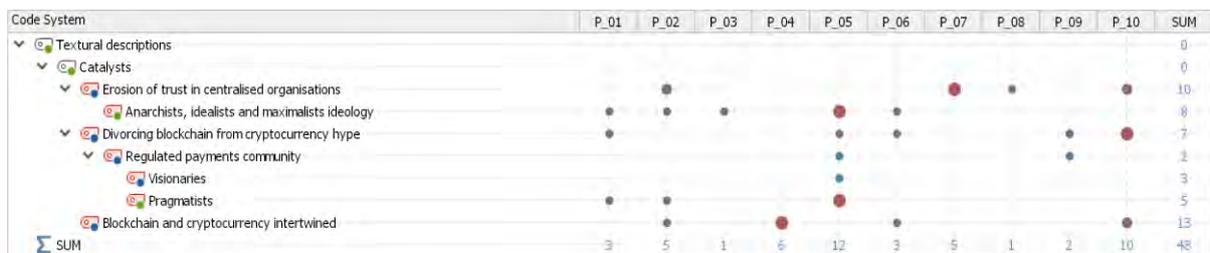


Figure 4.3: Catalysts



(Double left click on the icon for a larger image of Figure 4.3)

The three catalysts that have been identified are discussed below.

1. Erosion of trust in centralised organisations

Participants perceived and judged that there is a deep distrust of highly centralised organisations due to: identity theft, erosion of individuals' financial well-being, and loss of control over their personal data that has become a commodity to be monetised by centralised organisations (people and their data are products or units of value).

Participants felt, in general, that individuals have become more conscious of a need to protect their identity, privacy and other assets, factors over which they have little sovereignty. Being self-sovereign is viewed by participants as having full ownership and control over all aspects of one's online identity. No other person or organisation

can alter or take away a claim made (for example, tamper or alter ownership of land titles, qualifications obtained, block or sensor a bank account).

The current problem described by participants is that in the digital world, individuals do not have a single identity which they control, and this then leads to the problem that they do not have control and ownership over any claims made in an online world. It is not easy to verify claims made. In an online world it not easy to 'prove that you are not a dog, are over 18, live at a certain address, graduated from a certain school, work at a specific company, or own a specific asset' (Sovrin Foundation, 2018:4).

Individuals also need to make use of user names and passwords for every site they log into. They have little control over data collected and it also not transparent how this data are then used. Stated in another way, in highly centralised systems, individuals do not possess the capability to make a choice and affect in a direct way how their money and data are used. Personal data are scattered across the internet and guarded by organisations and owned in pockets by organisations (information islands) that are often not capable of keeping the data safe (Sovrin Foundation, 2018). The pervasive state is that of pseudo-sovereignty over identity, personal data and money.

The interest in blockchain technology is described by participants as a social movement that is trying to secede from highly centralised systems to protect their identity, data and financial well-being. Participants note that the general perception is that banks cannot be trusted and have no track record that they can be trusted.

The participants' experience is that individuals in the blockchain space place a great deal more trust in the blockchain community; more than the trust they have in the centralised institutions, such as banks and government. Participants also noted that individuals have no alternative but to use banks. However, DLT and cryptocurrency present an alternative decentralised and distributed system, and native payment and identity objects extend the capability that they previously possessed to make a choice and affect, at an individual level, how their data and money are used.

The participants noted that initially, the movement attracted 'nutters', crypto anarchists and Bitcoin maximalists. However, there is a great deal of interest in the benefits for the man in the street from adopting blockchain technology. Participants felt that pragmatism is being injected into the collective mind of society to move to this 'brave

new world' by connecting many blockchains and blockchain applications, thereby creating a decentralised and distributed value ecosystem.

Table 4.1 below provides selected examples of participants' responses in terms of erosion of trust in centralised organisations

Table 4.1: Erosion of trust in centralised organisations

Document name	Segment
P_01	<i>So, I think one of the experiences is that it was first almost this anarchistic thing that will, we are gonna disrupt everything. Like even as shortly back as a year ago, I was in an industry meeting. People said; you guys need to have a look at this, because three months from now you are gonna be gone, but like if you don't, but we are still around.</i>
P_02	<i>It's a social movement as much as a technical one, because of decentralisation idea and the borderless and if you someone like X speaking, you hear the sort of changes to society and those kind of things, and if you if you step back from where we are globally and not want to go into politics too much. There is a lot of worrying things going on, and so there is a lot of people almost wanted to secede from nationality and go and buy an island and live there, and have a blockchain system and everything will work nicely</i>
P_02	<i>It is this very much kind of... we set up the internet as a decentralised system and failed to do a few things, and then it got screwed up, and now Facebook, we can fix that and we can we can get the stuff right this time. So, there is very much that kind of ideological thing about it, but also a bunch of people, you can make a lot of money doing it and it is not going away.</i>
P_02	<i>I think like anything new, it starts out with being driven by people who got a passion for doing it, and they see all sorts of the world changing stuff there and that attracts idealist, and hippies and nutters that you have at the moment, but there's also a big degree of pragmatism that comes in.</i>
P_03	<i>Yeah, I think maybe eventually, they can drive a major shift, but the banking system here is good enough here to support a large percentage of the population. There isn't a big enough need to go and change my life, or my financial life, to only own crypto and only spend crypto currency. So that is a big shift. It is not a big enough shift population or population-wise a need to make that shift, as well. Maybe, you as a zealot may change your mode of operating, to become entirely crypto-based, but just because you do, and you have faith in the future of the decentralised system, there is not really a big enough need among your peers, so that's also to happen, and emerging markets, there is a big enough need, where they don't necessarily need to understand what DLT is, how it works, but the value that they get from it can be so big that the shift is going to be easier for them. You are shifting from cash to distributed ledger technology.</i>

Document name	Segment
P_05	<p><i>There's the regulated payments community, which is traditionally very conservative and there's this blockchain world, which is traditionally super unconservative and there's two worlds have in many cases collided, fairly violently, at times. You have people here who see stuff working in the, in the unregulated space and say: Why don't you guys just either go away or make it work in your environment and these guys saying no you don't fully understand how it works and they say well we are making it work, so I think you do understand to an extent, but there is a lot of misunderstanding between these two communities, and I think companies like X fit right in the middle, we are real crypto nuts, if you like. People that are cryptographically, technically very savvy, but we have people who have got... one of our co-founders was at X bank for 20 years running their, for many years, running their digital payments platform. So, we have people from the banking world, to the traditional regulated space, as well as people from the crypto space.</i></p>
P_05	<p><i>There is not many companies in the middle if you like, and I think, you know, there's a lot of things that the Bitcoin maximalist don't understand about economics and about and the way things work and there's a, there's a huge amount of things that the traditional space where people got used to the fact that a cross-border payment just takes 3 days.</i></p>
P_05	<p><i>So, they are not the Satoshi Nakamoto's, the classic, where did he come from? No one knows? Where did he go? No one knows, it's just this crazy thing with a bunch of crypto anarchists who started something. That technology has now matured to a place where you getting real career opportunity.</i></p>
P_05	<p><i>In the in the bitcoin world people will say well it's all one in the same you know if you have a Bitcoin wallet and your Nano ledger, your phone, you've got the private keys, you just make the payment, you don't need anyone in the middle. That's fine I think for the Bitcoin maximalist.</i></p>
P_06	<p><i>So, we can integrate into blockchain tomorrow, quite literally, and the only thing holding us back, as I say, is the regulatory authorities, which we respect and we're working with them, very closely to help them, guide them, into how to regulate this environment, because at end of the day, we actually do want it regulated, and I think even the maverick, crypto punks out there, they don't necessarily like the word regulation, but it would be a good thing, because the problem with the crypto markets, now, and again... the same thing applies, there's risk involved.</i></p>
P_07	<p><i>At least now with SSI, it self-sovereign, the technology behind it. It is flipping ground, now you at moment it's not self-sovereign, organisations hold the data about you, and if you could pick. In the past huge issues with Equifax, where stuff gets compromised. The idea is to flip it around where you as an individual own your own information and control who has access to what and revoke it, if you want to. You have visibility at all time.</i></p>
P_07	<p><i>It is trust. The whole Bitcoin revolution was spawned due to the economic crisis. People distrust banks.</i></p>

Document name	Segment
P_07	<p><i>Here the thing, life happens. If you trust a bank, like tomorrow you are blacklisted. You cannot participate in the banking system, if you're blacklisted. You cannot get any banking services, right? Here's a platform where it's censorship resistant, no one can censor you on the Bitcoin blockchain, whether you are a machine or a fridge or you are a Raspberry Pi, or you are a man born in Uzbekistan, right? No one can censor you from participating in the financial services. That resonated many people at a very, very personal level. The same thing with getting a loan, the same thing with my identity, the fact that my identity could be sitting somewhere in some machine at... exactly, right? It is getting hacked, right now, it's getting dumped, right? I have to trust the government systems that the engineers that will protect my data, but it's not happening, you know. So, at the very personal level, like I want to be my custodian, of my own identity and I don't want the government to tell me who I am, I want to tell the government who I am. See that better. It resonates you at a very personal level. The trust aspect.</i></p>
P_07	<p><i>The federated trust model does not work anymore. I trust in the math, I trust in the decentralisation, I trust in the community, more than I trust an entity. Because, you know, based on the historical data we have seen these big entities you know, you cannot fully trust them.</i></p>
P_07	<p><i>That's what I'm saying, exactly that the trust aspect I don't, I don't trust like one entity, one organisation. Because, historically they have not proven to be trustworthy. Facebook, Google, all these guys. So, it's changing.</i></p>
P_08	<p><i>It is trust. The whole Bitcoin revolution was spawned due to the economic crisis. People distrust banks.</i></p>
P_10	<p><i>I think there is an opportunity now, for intermediaries that actually really face up to this now and see where the world is moving. It is not just the technology things, it is not just the value thing, it is also a political thing, it is a social and cultural thing. People have lower trust in organisations.</i></p>
P_10	<p><i>I mean, if you look like at the 2008 crisis onwards. The fact that it seems quite likely that we are poised yet for another one. Ridiculous like debts levels, and if you also just look at even in the local context the ridiculous, ridiculous levels of corruption, come from large centralised powerful organisation and a lot of them are banks. Africa Bank, BBS. These are not good stories, KPMG, Eskom, SAF. A lot of these centralised organisations basically are showing cracks and the public is just kind of fed up with this. This is also a trend that you need to think about. It is not a technological thing at all. This is what the public, what society is willing, not willing to put up and if there is an alternative, will they go to it? and that is extremely powerful. So, I think it is actually the first time that we have a technology that can effectively disrupt the power structures like that. Because, previously it was like, oh well for me to do this I have to use a bank, they are all corrupt so what am I going to do. Previously I had to use MTN, Vodacom. You know like it is the land of cartels. South Africa is the land of cartels. Where you have a small group of people that provide these services, and there is only handful of them.</i></p>

2. Divorcing blockchain from cryptocurrency hype (disjunction)

The second catalyst that participants judge as a driver of interest in blockchain technology is organisations that are trying to find the true utility of blockchain by separating cryptocurrency (applying the disjunction principle), and the hype around it, which is viewed as a foundational layer for cryptocurrency applications. In general, three crypto-asset token classes emerged: payment tokens (payment objects), utility tokens and security tokens. However, there is not a great deal of clarity around the definition of crypto-asset classes and what function each type of crypto asset performs (Janssen, Weerakkody, Ismagilova, Sivarajah & Irani, 2020:303).

Furthermore, organisations see more value in using blockchain technology as a base layer to build on, and central banks have mostly experimented with permissioned blockchains and tokenising fiat currency (created crypto-payment objects). By divorcing cryptocurrency from blockchain, organisations can create a controlled distributed value ecosystem. They can create distributed control, but not distributed trust. Participants also felt that highly centralised organisations, in general, are extremely sceptical about cryptocurrency, and choose to focus on how blockchain can solve ‘pain-points’ in organisational processes (which is the focus of pragmatists and hard-nosed business people). Participants viewed efficiency and effectiveness gains as an obvious step, although myopic (a narrow view of blockchain technology use).

Table 4.2 below provides examples of participants’ responses in terms of blockchain/DLT disjunction.

Table 4.2: Divorcing blockchain from cryptocurrency hype

Document name	Segment
P_01	<i>One of the experiences for me is kind the hype versus reality aspect. So, I've been in one or two meetings where people. So, I was at the first Bitcoin conference, as an example, in 2014, and people were saying there were some banks here and some regulators and people almost booed. Like a year X sponsored the event.</i>
P_01	<i>So, I think the big experience is trying to find the viable use cases. So, there is hype, but there is also potential. I think we really need to see the potential come through, but although we are starting to see elements of it coming through.</i>

Document name	Segment
P_02	<i>I think like anything new, it starts out with being driven by people who got a passion for doing it, and they see all sorts of the world changing stuff there and that attracts idealist, and hippies and nutters that you have at the moment, but there's also a big degree of pragmatism that comes in.</i>
P_05	<i>There was a lot of hype around it, but for me fundamentally I wanna be in the space that provides the rails that provides payments. In the in the bitcoin world people will say well it's all one in the same you know if you have a Bitcoin wallet and your Nano ledger, your phone, you've got the private keys, you just make the payment, you don't need anyone in the middle. That's fine I think for the Bitcoin maximalist. But, you know my mum is never gonna own her own private keys. She may in a few years' time, she may make your payment on blockchain networks, but it'll be through an intermediary that holds her account for her. It operates on my behalf and it's a model that we've had for centuries and centuries. The custodian model. So there will be custodians who will hold keys, who will provide amazing customer experiences, who will hook into these blockchain based payment rails, who will make available payments within seconds and I think people who work, I going to then choose, either work in a client-facing service environment or I work in a rails environment, that provides the rails to make these amazingly fast highly secure, highly compliant payments happen.</i>
P_05	<i>There's the regulated payments community, which is traditionally very conservative and there's this blockchain world, which is traditionally super unconservative and, and, and there's two worlds have in many cases collided, fairly violently, at times. You have people here who see stuff working in the, in the unregulated space and say: Why don't you guys just either go away or make it work in your environment?, and these guys saying: No you don't fully understand how it works, and they say: Well, we are making it work. So I think you do understand to an extent, but there is a lot of misunderstanding between these two communities, and I think companies like X fit right in the middle, we are real crypto nuts, if you like. People that are cryptographically, technically very savvy, but we have people who have got... one of our co-founders was at X bank for 20 years running their, for many years, running their digital payments platform. So, we have people from the banking world, to the traditional regulated space, as well as people from the crypto space.</i>
P_05	<i>So, I think the landscape is, we need commercial companies to pick up the slack. I think the visionaries have done what they needed to do. There are few more serious visionary events that will happen. Ok, we have seen the vision, we understand the vision. We now need commercial companies to go and build a product, and I, and I like the fashion show analogy. The fashion shows have largely been done. You have seen it, it's great and we understand how it works. We know what to do. Now we need commercial companies to actually come to a bank and say; right here is a platform.</i>
P_05	<i>To network computers together was incredibly visionary. They built the vision in 1969. People only started making serious money over the internet in the early 2000. Maybe not during the .com bubble, but the Facebooks and the Google really only kicked off in the early 2000s, that's a long time and a lot of money was spent and there were a lot of companies, and I think of</i>

Document name	Segment
	<p><i>companies like Packard Bell and others, who are not really big companies now, but put in a huge amount of money in the 80s into developing network standards, in developing the internet. They didn't score, not like Mark Zuckerberg scored. So, it's a hard thing to say; will, will the landscape change because of this technology? For sure. Will there be some winners? For sure. Will there be some losers who have invested a lot into this technology? For sure. Who are they gonna be? I do not know.</i></p>
P_05	<p><i>So, I think we're we somewhere in the space over here, the people that were on it for the ride and the hype and excitement they are dropping off like, like rats jumping off a sinking ship. The people who really loves coding and love building and love the challenge of creating stuff for pragmatists, they are getting super excited. I think I fall in the space over here. I think a lot of my colleague are sitting in the space over here, it's really hard, because to convince these people, you have to provide them something that is significantly better than the current thing. I had a conversation with someone who's, or who's a hardcore cross-border payments specialist in a bank. He said to me; unless you can bring me something that is better than my current system, I'm not interested, that is almost his exact words.</i></p>
P_05	<p><i>Just better. If he can an extra four, five cents per transaction, he is happy, but I cannot bring him something that's, that's worse than his current environment. That is the pragmatist.</i></p>
P_05	<p><i>The fear that it's gonna be, very once again from the pragmatists, you can be difficult to get there. So, we'd rather just make our current systems work a little bit more efficient, but it's a little bit like the post office saying we gonna deliver letters faster than we ever did before. You now, fundamentally they can't compete with, with, with email, you know, it not a fair race, it like teaching kids to play soccer. Don't run with the ball, pass the ball. No one can run faster than you can pass. There's a fundamental shift in that, in the, in the way that we do stuff. Eventually everyone's gonna make the shift and, and the value propositions are very clear. They not quantified at this point.</i></p>
P_06	<p><i>I mean, all the hype about Bitcoin doesn't really help, you know. Now that they understand that it is not really Bitcoin, it's blockchain, and the team is now... we as, as a company, as an executive committee, everyone is 100% fully on board and we understand, and we believe very, very strongly that the financial markets will be disrupted, and that we have to move and we are moving. So, we have made a strategic decision that we are moving our business onto Blockchain and we will assist, as far as possible the regulators, to allow us to move there and operate a crypto exchange, number one, but secondly for the normal equities that we list and all our normal securities, products that we list on a regulated change that we do today. We will move them onto a blockchain version of our exchange and, and we will do that obviously with the blessing of the regulator, over time.</i></p>
P_09	<p><i>For the general public, blockchain is often coupled with crypto currency. To move the technology forward, it is vital to have the distinction and to education the public of the technology and its capabilities.</i></p>
P_09	<p><i>The technology should not merely be a rehashing of current payment options and also not put the soundness and stability of the broader financial system</i></p>

Document name	Segment
	<i>at risk. Due to DLT technology being decentralised and not being regulated promotes fraudulent and criminal activities. Crypto currency, Bitcoin are often used to fund underground criminal activities.</i>
P_10	<i>The hype certainly doesn't help even if you are divorcing the cryptocurrency element from blockchain. Which a lot of people, lot of leading thinkers believe something that shouldn't be separated.</i>
P_10	<i>The reality is a lot grimmer than the hype, for sure. The hype plays a role in making that reality grim. In most group, most organisations, enterprises, especially banks are extremely sceptical about. From a technology perspective banks have adopted the stance maybe blockchain, but certainly not going Bitcoin. From a crypto perspective, most banks tend to ignore the cryptocurrency element of it and try to focus on how can we use blockchain to create efficiency optimisation within processes.</i>
P_10	<i>So, I think the hype is dying down, but the hype is certainly not helping, but organisations are starting to dip their toe into the water, but I still do not think they are using it in long long-term sustainable ways, but maybe I am thinking too far ahead. Maybe, organisations are looking for what they can achieve in the short term.</i>

3. Blockchain and cryptocurrency intertwined (conjunction)

Some participants (Participants: 02, 04, 06 and 10) felt and judged that cryptocurrency was intertwined, and this conjunction was needed to realise the true utility and potential of blockchain technology (applying the conjunction principle). Hype is viewed as necessary, and it is even essential to discovering the true utility, rather than it being a scam, as was the initial perception of many participants.

Participants felt that cryptocurrency drove interest and adoption of the protocol (decentralised and distributed architecture protocol) and blockchains, in general. Without an incentive mechanism, the protocol is considered just a lone-standing toolbox. An incentive mechanism is needed to maintain the protocol, secure it, create disincentive to collude and to ensure it is self-sustaining (create distributed trust).

Participants felt and judged that the hype drives and makes the exploration of the blockchain space possible, albeit in an unconventional manner. The exploration is fuelled by the open, transparent and public nature of the phenomenon, speculative activity and a low barrier to entry. Participants felt that once the hype has gotten 'out of the way', the speculative snake oil salesmen and 'rats' would abandon ship (and pragmatists are starting to do the work needed to build the ecosystem). The true utility

value for the man in the street would then be revealed, radically improving the life of the ordinary man (network effects would then be seen).

Table 4.3 below gives examples of participants' responses in terms of the conjunction of blockchain and cryptocurrency, which is perceived as being essential to build a distributed value ecosystem.

Table 4.3: Conjunction of blockchain and cryptocurrency

Document name	Segment
P_02	<i>The madness of crowds, the general behavioural stuff, is very interesting, because that does not change, that is human nature. The way that people behave is pretty consistent, and consistently daft. So, you have all of those things going in, and it will happen again.</i>
P_04	<i>Hype is necessary for reality, because I say that in context of emerging technologies, without that types for you not gonna drive news agencies to report on something, and therefore, you're not gonna get general public adoption or actually just general public interest.</i>
P_04	<i>The problem is people, along with these hype cycles that get driven, you have a lot of people who do not understand the industry, but invest in it and because it is a hype cycle, you're always gonna have people that are at the very top of the cycle, when it comes crashing down, they lose their money, and I know people, for example, I always define the situation to get out of an investment when people start taking loans and packing up their...</i>
P_04	<i>We are still figuring out what the technology is capable of. You can consider the previous few months as a shakeout of scams and money-making schemes and things. There still potentially another one to come, if we had to compare this to a Gartner-hype cycle, we don't really know where are on the cycle right now, because the cycle keeps repeating itself.</i>
P_04	<i>Blockchain is an old concept. It dates back before crypto currencies. Crypto currencies is what drove the large-scale adoption of blockchains in the world, right now.</i>
P_04	<i>Like I said, blockchains have existed for a very long time, beforehand, but there was no incentive to maintain blockchain. Now, because we have attached a token of value, something that you can argue is a collectible right now, it's drives transactions on the blockchain. Therefore, it drives a blockchain itself. So, that's Bitcoin or has Ethereum takes two different approach. They create a utility value to the blockchain and add a cryptocurrency to give it the funding, to incentivise miners.</i>
P_04	<i>There is an incentive and that is economic collapse. You have your anarchists in the world, who say that wealth is concentrated in one place only. So, we want to collapse the current system. Now the problem with doing so. It takes so much money to get to a point where you can create economic collapse, especially in a bitcoin ecosystem, that once you do it</i>

Document name	Segment
	<i>you've destroyed all the wealth you put into it. So, it is a disincentive to go down that route.</i>
P_06	<i>Yeah, I think the other, other blocker you were saying, the other thing that stops, that is stopping blockchain from taking off and again and comes back to crypto and he might think; well why? Why, why because block chain systems all pretty much power but some kind of token underlining, and that token is just, it's just a cryptocurrency, at the end of the day. They're the same things. So, I think one thing that is holding it back, is the ability to pay for services using a token or a currency or a cryptocurrency, that means you should be able to go and buy a coffee with a rewards token, a bitcoin or a piece of a bitcoin or something like that. Now it being held back because volatility of the coins, but I mean there's nothing to stop, you know, you having some kind of a stable token or stable coin for, for those kind of payment and as soon as merchants start accepting, en masse, then you know, you get that network effect or when that start happening...</i>
P_10	<i>The hype certainly doesn't help even if you are divorcing the cryptocurrency element from blockchain. Which a lot of people, lot of leading thinkers believe something that shouldn't be separated. I tend to agree with that, that cryptocurrency and blockchain are intertwined at a level that... Ultimately cryptocurrency is an incentive mechanism to drive adoption and use of the protocol that is my view of it. Without an equivalent incentive mechanism, the protocol is just itself a toolbox, just sitting there. Why should I use this? Ah, I need to sustain it, I need to protect it, I need to secure it, and have to do this all myself. I may as well use a database. Ultimately, I think when people really start thinking about it, what it gets to. Ultimately, for networks to be self-sustaining, you need an incentive mechanism that is native to the protocol.</i>
P_10	<i>It's like saying: Cool, we are going to take Bitcoin, it is great, look it's a fantastic, we are going to take that, but the whole proof of work thing that is X, you know, where are going to just like, just Byzantine fault tolerant, everybody is just going to agree. Is this solving security, or this is just saying that everybody that is observing get to yeah, yeah, that is cool, but you can have colluding on this network. What prevents that? Just the fact that everybody can agree, actually doesn't actually prove to you that this was done in a secure manner. Because, the point: Is there an incentive or disincentive for somebody to cheat the system or not cheat the system or somebody to actually go and like speak to the other participants and say yeah, man, if all of you like, Eos has this problem, where there are 21 blocked producers, and this is meant to be a public blockchain but whatever...</i>
P_10	<i>So, of the 21 producers, could a majority of them collude to say cool, you know what: for some of these transactions basically we are going to effectively vote in a particular way, to actually add this to the blockchain, or block that particular transaction, because it is in our best interest to do. So,</i>

Document name	Segment
	<i>maybe we will split the profits after the scam. What is your incentive or disincentive basically to prevent that kind of behaviour?</i>
P_10	<i>The question was about hype or hope. I think what's is happening now from a hype perspective, you know, I think 2017 was insane with ICO stuff that we went through. Although that being said, this year ER's raised 2.4 Billion dollars in ICOs. You don't see as many ICOs, but you are still gigantic amounts of money being raised off the back of a white paper, frankly a ridiculous suggestion, anyway. So, the hype itself in a way has died down to 2017 peak hysteria. What's starting to happen right now, a lot of very interesting work is going on.</i>
P_10	<i>So, I think ultimately, the hype cycle was absolutely needed. Mostly to get it out of the way. So, I think that from this point forward I think, he said with complete confidence, that things would be a little smoother going forward.</i>

Theme 2: Thought experiment (the rabbit hole)

The second essential texture of the participants' experience of the distributed value ecosystem is a thought experiment (noema) that participants engaged in. The 'thought experiment' contains the following four components (see Figure 4.4 below):

- (1) Participants describe how they discovered, and developed a fascination with the distributed value ecosystem phenomenon;
- (2) How they started to research the cryptocurrency and blockchain world,
- (3) Thinking through the implication of using blockchain, they judge that the 'physics' (mechanics and dynamics) of the blockchain world is both unsettling and exciting in terms of how it challenges prevailing thinking (the noesis: experimentation itself is stressful and fear of disruption), and
- (4) The final component is excitement (organisations taking notice of blockchain) in terms of the opportunity to change the way things are done.

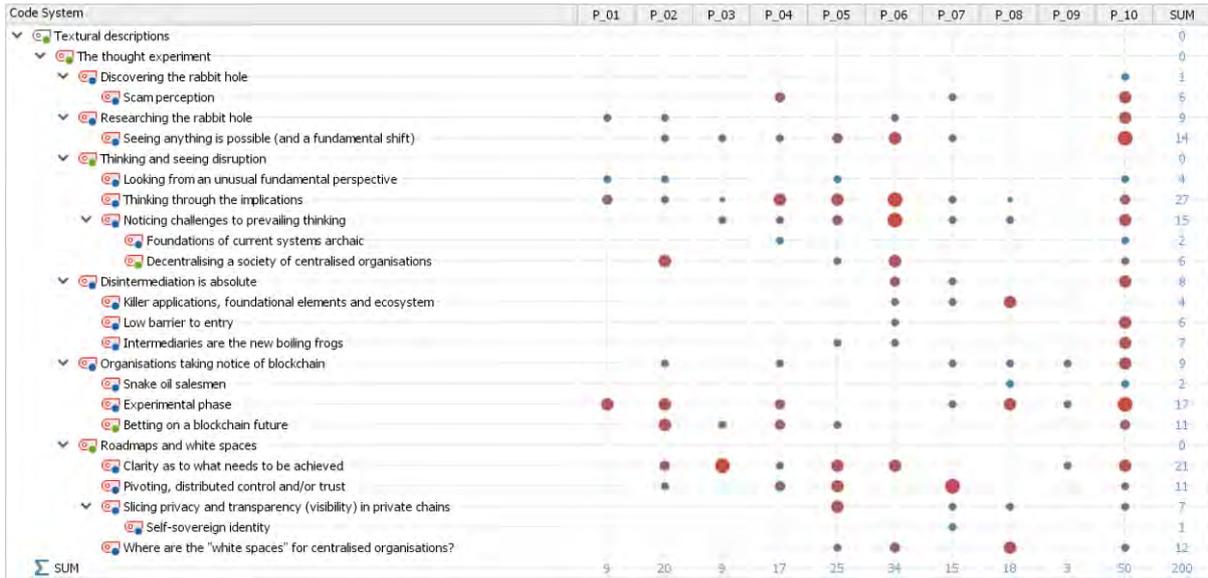


Figure 4.4: Thought experiment



(Double left click on the icon for a larger image of Figure 4.4)

The **first component of the thought experiment is discovering the thought experiment**. It is described as a ‘rabbit hole’, and is seen as a whole new paradigm. When looking from an unusual perspective, seeing anything is possible and realising it, is a fundamental shift.

Blockchain technology makes new business models native to the internet possible, creates new perceptions of value, makes it possible to transform governmental structures, and makes decentralised and distributed social and economic ways of coordinating possible, that were not previously possible.

Table 4.4 below gives examples of participants’ responses in terms of discovering the thought experiment.

Table 4.4: Thought experiment experience

Document name	Segment
P_01	... because it is not the way that we do things. It kind of changes our culture to some extent. You know it kind of goes against the grain.
P_02	It's actually a whole new paradigm and there, again to be in strategy and particularly in financial service, ignoring blockchain is not an option. So, I need to embrace that and understand that, and then you go down the rabbit hole, you get excited about blockchain, the next thing you know you're running around doing talks, and things and getting interviewed by people.
P_02	My role has changed in as much that I talk about blockchain, but 10 or 15 years ago I was talking about strategy and financial services, and new business models and that kind of thing. Then, fintech comes along and you've got businesses new start-ups, building new business models and disrupting banks and insurers and whatever, and then in South Africa, trying to think from a strategy perspective, you could not ignore fintech. Some people have tried to, but it has really not gone well, and then blockchain comes along and for me it even more fundamental than fintech. It's not just sort of a little application of a technology to a sector in clever ways. It's actually a whole new paradigm and there, again to be in strategy and particularly in financial service, ignoring blockchain is not an option. So, I need to embrace that and understand that, and then you go down the rabbit hole you get excited about blockchain, the next thing you know you're running around doing talks, and things and getting interviewed by people.
P_04	So, I said no I had not, but I did go home and investigated the next day, and I started noticing that the price was rising steadily, but massively as well and the first thing that came to mind was this is probably a scam, because now in the real world actually appreciates at this rate it, and we talking about R50 dollars, a hundred dollars a day.
P_04	So, so I was probably too young, not probably, I was too young to have care about the .com bubble, in 2012 or something of the time. But, because of that, I have a now being made aware of the similarities, and also, well similarities in terms of scams, in terms of hype cycles, in terms of emergence of technologies, in terms of corporate investment community investment, start-up environment, etcetera, and just like you had companies like Pets.com, your gonna have similar companies, right now and because of my background over the past five years it is relatively easy to identify the scams from legitimate companies and I think it adds a lot of value when we can talk to people about that I hear about their experiences who maybe only got involved in the past year.
P_05	There's a fundamental shift in that, in the, in the way that we do stuff. Eventually everyone's gonna make the shift and, and the value propositions are very clear. They not quantified at this point.
P_07	So, X was the big proponent of Bitcoin, initially. He was doing a lot trading, you know, and it was like, and actually trying to get everyone on board, and I was like this is a scam, I don't like it, but then I bought a little bit of Bitcoin at the time, but then that's where the interest started. This is interesting. You know, how you make virtual money. How does this work?

Document name	Segment
P_10	<i>These are all great technologies, a lot of them are foundational game changers, but I don't think any of them, maybe with the exception of AI, can fundamentally up-end, like power structures in the world, the way that blockchain can. So, for me I see it as something. You know it is also a cliché, but I am owning it. You know the impact that the internet has had. I feel that it has had as much a disruption potential and influence as the internet has had. It can fundamentally create new business models, new perceptions of value, new governmental structures, new way of organisation you know, you know social coordination</i>
P_10	<i>But, when I came across blockchain, you know the fact that it fundamentally up-ends a lot of existing structures, government, finance, economics, identity. I found something that has that sustainably capture my interest for a very, very long, long time and I decided to, and again, I decided the fact that one: we are at a stage right now where stuff is merging and happening right now. This is a wave that I'm very, very happy to actually be a part of and something that has inspired me</i>
P_10	<i>... and I first heard of blockchain just like, I first heard of Bitcoin a time ago, but immediately dismissed that as, oh my god! It is such a scam and I really regret that and when I was at the JSE I started digging into blockchain further is when I really started to understand, you know, the power and the potential of this emerging technology, and from that point I end up researching feverishly</i>

The second component of the thought experiment entailed research by participants that entailed reading (white papers), attending internal presentations, conferences, meetings and engaging in long discussions. The aim of the research by participants was primarily to develop a more fundamental, understanding of the potential impact of blockchain technology adoption.

A more fundamental understanding then raises questions about how disruptive the technology could be, and what damage it would do to existing business models, as well as disruption to industries (banking, financial and other industries) due to the boundaryless nature of the technology.

Table 4.5 below gives selected examples of the participants' responses in terms of research by participants into the blockchain phenomenon.

Table 4.5: Research by participants into the DLT phenomenon

Document name	Segment
P_01	<i>I started reading up on it. In 2013 when I was at the bank we actually had an informal working group that started along with other government departments, that started looking at that and the implications of Bitcoin, then later DLT, as we started unpacking the different aspects of it. That is my background and how I got involved in it.</i>
P_01	<i>I've been involved on and off since 2012. That's when I started reading about it, but I have not been involved in it full time. So, I was in a working group since 2013. We kind of then looked at kind of an initial position, one or two internal presentation, started to go to some conferences. It was not my day job. So, we had an official working group since around 2014, 2015 and I've been in a unit that looks at it on a permanent basis since August last year, so August of 2017.</i>
P_02	<i>I think the thing that has had the most influence on me was the kind of the long discussions about the potential with people that know what they are talking about. So, chatting with guys building blockchain-based system, chatting with guys in the space for a long while, reading about those kinds of projects.</i>
P_06	<i>It's taken probably about a year to 18 months for the rest of the team to get their heads around it, but the CEO and myself certainly drove that right from the beginning. We saw, number one the risk and number two the potential and the rest the guys were less convinced. I mean, all the hype about Bitcoin doesn't really help, you know. Now that they understand that it is not really Bitcoin, it's blockchain, and the team is now... we as, as a company, as an executive committee, everyone is 100% fully on board and we understand, and we believe very, very strongly that the financial markets will be disrupted, and that we have to move and we are moving. So, we have made a strategic decision that we are moving our business onto Blockchain and we will assist, as far as possible the regulators, to allow us to move there and operate a crypto exchange, number one, but secondly, for the normal equities that we list and all our normal securities, products that we list on a regulated change that we do today.</i>
P_06	<i>So, I began researching it, and the more I researched it, the more I realise that, you know, it was fundamentally going to disrupt the financial institutions. Not so much ourselves as an exchange.</i>
P_06	<i>I think now that we understand it a lot more than we did two years ago. I think we are not necessarily in danger of being disrupted ourselves. However, the competition becomes a lot easier to get up and running, and by that I mean, obviously in the in the crypto world and I know crypto is only just part of blockchain.</i>
P_07	<i>Okay, actually I can bring these guys on board, they can actually back up my ledger, at no cost to me. I can back up, like I scratch their back and they scratch mine, and I can trust them, you know in this thing, you know and obviously not trusting in the, in the true nature that I'm trusting you, because you are a human being, but trusting in the mathematics and the consensus</i>

Document name	Segment
	<i>mechanism in a blockchain. That for me is a mindset shift that happened actually during project X.</i>
P_10	<i>They were looking for ways to diversify their business model and look at what other things they could do and I led a team of thirteen, where we investigated all kinds of technology, business models, what is happening in Europe, UK, financial trends, technology trends, international trends, and one of them happened to be blockchain, and I first heard of blockchain just like, I first heard of Bitcoin a time ago, but immediately dismissed that as, oh my god! It is such a scam and I really regret that and when I was at the X I started digging into blockchain further is when I really started to understand, you know, the power and the potential of this emerging technology, and from that point I end up researching feverishly.</i>
P_10	<i>It is cliché, but I mean, do remember being very, goose bumpy when I read like Satoshi's white paper. Ok, it is really corny, but it is like, it was like a genesis moment for me. Really getting serious about it would be cool. This sounds like it deserves my attention. Let's start at first principles, so, where do we? Read the Bitcoin white paper. That's where it began for me. Since then since, I get a lot of support from the community.</i>
P_10	<i>So, I have come around some very interesting research, specifically around decentralised autonomous organisation or decentralised autonomous cooperatives, which actually are slight nuance, but very interesting stuff. So, you know whether these things will actually, will show up in the future, I'd love to see it happened, but right now just the thought experiment is fascinating. So, I think there is a lot of very interesting stuff that is occurring right now, but from a media perspective nobody cares, because you can't make any money off it immediately.</i>
P_10	<i>I think, when you play around with this technology actually, like just dig a little bit, actually understand the impact of it. It creates a state of almost like anything is possible. I know it sounds tremendously naive to actually say that out loud, but it does create, I do believe it has that potential when you actually look at how it can be applied and you know the interesting solutions that people are coming up with to solve all kinds of problems that you didn't think could be solved with the technology like this. Or where other technologies have tried and failed actually solve the problem. It does sort of create the feeling that anything is possible, I think the state is: a state of just opportunity creation of opportunity, of opportunity viability.</i>

The third component of the thought experiment involved thinking through the implications of adoption of blockchain technology. Exploring the ‘rabbit hole’, participants perceived that the technology challenges prevailing thinking as to how things are currently being done in the financial and banking ecosystem and that it will be fundamentally disruptive to centralised business models (more specifically, if they are an intermediary). More broadly, participants also perceived that organisations will

be disrupted in other industries as well, due to the frictionless and boundaryless nature of the technology. More specifically, the reason why participants perceive the technology will be disruptive is as follows:

- Disintermediation of centralised organisations is absolute, if architecture is created that is truly distributed.
- The development of a killer application by anyone is possible. A killer application that can out-disintermediate the disintermediary (being 'out-disintermediated'). Real-world examples of such applications already exist in the combinations of cryptocurrency with 'killer applications', which makes more complex value networks and coordination possible.
- A low barrier to entry. For example, it is easy for anyone to start up a cryptocurrency exchange, and little investment is needed to experiment with the technology (develop and test a proof of concept).
- The technology will fundamentally disrupt archaic business models (banks and stock exchanges) and it has already had an impact on the depositories of financial data (central securities depository). The technology may also create new perceptions of value, new atomic services (SSI, location-based services), new government structures, new ways of doing business native to the internet, new measures of success, and new ways to socially coordination.
- The technology will impact on centralised organisations' capabilities (processes) to capture value ('vampiring' by banks, which refers to organisations that profit from reconciliations, transfer and store of value and make current notions of organisational success meaningless).
- In the long term, the technology will shift control and capabilities to capture value for the individual. Hence, it will in the long term change the mind-set of the way how business is done and the power relationship between the individual and centralised organisations. It will invert and scatter the organisational management pyramid.
- The capabilities that the technology will bring, will be difficult to compete with, especially as the technology matures (similar to the post office trying to compete with email).

- The technology will shift how individuals trust. Trusting in the mathematics (asymmetrical cryptography), a ‘trust machine’ and not in a person or centralised organisation. Trust is in a ‘trust machine’, the machine logic used (a set of mathematical starting conditions) and not human emotion.
- A strong belief and feeling that the technology creates a state of almost anything is possible and that the technology can solve problems where other technologies have tried and failed to solve difficult problems.
- A strong belief that anyone can change the world (‘create the future we want’) using the technology, right now. There is no need to wait for centralised organisations to pivot towards the technology.

Some of the participants recognised that the disruption and future state they described and perceive may seem to be a socialist utopia, but there is also clear pragmatism in using the technology (financial inclusion, self-sovereignty identity and fairer distribution in the capture of value).

Table 4.6 below provides selected examples of participant’s responses in terms of the thinking through the implication of blockchain technology adoption.

Table 4.6: Implications drawn of blockchain adoption for organisations

Document name	Segment
P_01	<i>So, one of the initial claims was this is going to disrupt our position as a X and even and prior to my previous job I was also working in banking and the claim was that this is going to change everything. Therefore, I am interested in things that might impact on what I do and the future. Things might be different.</i>
P_01	<i>... because it is not the way that we do things. Its kind of changes our culture to some extent. You know it kind of goes against the grain.</i>
P_01	<i>I was at another job and I am not an economist at all, but one of my initial questions were, if somebody produces another form of value that could be used for payment, what is the impact then on monetary policy?</i>
P_02	<i>It is to come at it from an angle of: what does this change from a strategic perspective? What does this enable? What does this break? What does this mean for the future of particularly financial services but more broadly businesses in other industries?</i>
P_02	<i>... and then with corporate clients, it's around what does it mean for me? How is this gonna damage, or damage my business? or create business opportunities I need to grab onto?</i>

Document name	Segment
P_03	<i>Correct, yeah. I think the technology is there, mobile phones are there, smart phones are there, banks can do this, they just choose not to, because they have to opt to challenge their own business models. Banks have no desire to do that. Banks are not incentivised to serve the entire population, they are incentivised to continue to serve a smaller and smaller percent of the population, but mobile money scoop up the middle class and lower class, just cater to the wealthy and the ultra-wealthy.</i>
P_04	<i>... and what blockchains are, and what relevance it has to the world and that's when I realised; okay, there was actually this technology layer that has the potential to influence many other industries, and that's effectively my involving from the beginning.</i>
P_04	<i>So, for them to, to turn that whole ship around and become extremely innovative, adopting new technology is going to be extremely difficult, and they are fearful of that now, because they are start-ups that can walk in and do things far quicker, far more cheaper, efficiently and capture a market far quicker, because of social media, for example, influencers can build a following quicker than your traditional banks can. I think those are two good examples.</i>
P_04	<i>Especially, if were going into a world where IOT is going to become such a problem, then you are gonna have billions and billions and billions of devices around the world, all communicating with each other, with central servers, with blockchain, whatever. Are we at a stage where blockchains can facilitate that great of data transfer? and only time will tell.</i>
P_05	<i>So, traditionally you could work for a company like Visa or MasterCard or BankServ, people who provide these platforms and payment rails, if you like, in the middle, or you can work for banks, and I think banks gonna have to figure out are they gonna be the people who are facing the clients and providing client services, or are they going to play in the, in the rail space, are they gonna be somewhere in the middle? You know, I think the whole world is gonna change a little bit.</i>
P_05	<i>Some of the richest firm in the world are audit firms. What do audit firms do? They reconcile one set of books against another. You need a third party to say: I'm looking at yours, I'm looking at yours, I'm finding a transaction that here, but not here. Let's find out where it went. Once you get everyone operating on the same ledger or the same set of like highly auditable reconcilable ledgers, it becomes, you know, so much easier. So, I think the reconciliation process is a big process, that's where the massive cost-saving is gonna come.</i>
P_05	<i>So, so the technology is there, I think it is more a case of now, of bringing people together, and just making sure we are not introducing systemic risk. We are not causing things that gonna really, really upset people's lives in the future. So, it is more about making sure that all of those checks and balances are there, but I am absolutely convinced that within a few years, three, four, five years' time, you and I, people on the street will be able to make payments to anyone anywhere in the world as easy as it is sending a WhatsApp now and it I mean is happening already, with a number of use</i>

Document name	Segment
	<i>cases and bizarrely enough, it's happening in communities that we didn't really expect it to be that the ones who would be front runners in this technology, but it is and it's happening, and it's gonna become, you know, it's a network-effect, the more people is doing it, the more other people are going to start doing it.</i>
P_05	<i>We take away the reliance on centralised systems. If the high value payment system in any country is called the real-time gross settlement system is called RTGS. If a country's RTGS goes down, no bank can pay any other bank. That's a disaster. So, they have multiple backups of those systems. So, it's not that the systems currently are not resilient, but the cost to the SARB running multiple backups is highly expensive. The cost of running a distributed ledger which has multiple versions of the truth, kind of stored away, so anyone can reconnect and reconcile or refresh their transaction list. So, the resilience is a massive benefit as well. So, it is resilience, reconciliation or the lack of reconciliation requirements, and the speed, the ability to transact, because I don't have to go through multiple ledgers. Crossing ledgers is always expensive, time and cost of a single ledger, single debit credit. So, the value, I think is there, just hasn't been quantified and hasn't quite being proven in the language that people understand. You and the budgets.</i>
P_06	<i>It is a very interesting in the story, even Uber, which themselves came along and disintermediated the taxi industry. Even, they themselves are in the danger of being disintermediated themselves by blockchain, and there's a living working example that happened in Austin, last year or two years ago, when Uber themselves were disintermediated by a blockchain application.</i>
P_06	<i>So, quite frankly I no idea that we would be looking or considering blockchain or cryptocurrencies or anything like that when I did join, and I don't think any of us here did consider that we would be going down the path that we are, but it soon became very apparent to me for probably: why? because, we are an intermediary. So, being an exchange, we are not like not an intermediary in the way that a broker is, but we are an intermediary in the way that we are a place where buyers, willing buyer, willing seller come to meet, and trade shares and share stocks and shares in, and products. So, in terms of being that kind of an intermediary it became apparent to me very quickly that's the advent of blockchain is a major disruptor in that it, it disintermediates intermediaries.</i>
P_06	<i>I think now that we understand it a lot more than we did two years ago. I think we are not necessarily in danger of being disrupted ourselves. However, the competition becomes a lot easier to get up and running, and by that, I mean, obviously in the in the crypto world, and I know crypto is only just part of blockchain.</i>
P_06	<i>So, the competition and the risk to us was not so much blockchain itself, but the competition that would come with blockchain, the enablement of anybody out there to help to run an exchange and trade anything they liked, with the only thing that's holding them back right now on, on the financial world anyway being the regulators. So, the regulatory authorities, the Reserve Bank, the FISCAs (Financial Services Control Authority), the National Treasury. So, those three regulators are the only thing that's stopping, us</i>

Document name	Segment
	<i>right now from moving normal equities onto a blockchain environment and trading, trading is on the blockchain, and why would one want to do that in the first place?</i>
P_06	<i>So, that's the route we're going, and we are also, as I say, to get back to point, how did we get involved? Well, we saw a risk. Initially, we thought of as a risk of ourselves being disintermediated. I don't think, I don't think an exchange will be disintermediated, because an exchange is always an exchange. It's not like a broker, broker certainly are in danger or at least of, perhaps not 100% being disintermediated, but certainly, they would have to change their model, and, and I, that goes for many types of brokers, whether it's property, financial services, that the middle man, even..</i>
P_06	<i>We as, as a company, as an executive committee, everyone is 100% fully on board and we understand, and we believe very, very strongly that the financial markets will be disrupted, and that we have to move, and we are moving.</i>
P_06	<i>There are certain players that are going to have to reinvent themselves or they will find themselves out of business. We have a clear understanding of that, and we, that as being hugely beneficial to the man in the street, and again to come back to this whole financial inclusion thing.</i>
P_06	<i>So, you know why would you do something on blockchain? Well, to cut out cost, to cut out middlemen who don't add any value, to make things more efficient, to make things more inclusive, to bring it to a broader base, a broader market-based. If those, if doing a blockchain solution answer those questions, for sure, but it doesn't always do that, so there's a lot of hype. I think that is what people got it be aware.</i>
P_06	<i>Yes, exactly. We choose because it fits very well, because if we don't, we gonna see our ass. We will, because somebody else will come along and do it. Our CEO is fond of saying, in one of his lightbulb moments, he is fond of repeating it. Our competition is not the X, or these other couple of X's started up after us. It's not the X. Our competition is some clever little oke sitting in Belarus, starting an X tomorrow, and eating our lunch, our lunch is no longer just South Africa, and, and it is global and that's what blockchain does. It makes your market global, number one. Secondly, it cuts, like I say, it's just, it's so much more efficient than today's model, and that's why we don't care about the X sitting over there. They are not our competition. Our competition is out there in the global, smart okes sitting in, in, in Latvia Estonia and the States, in China, who's spinning up solutions. They can cut us out. So, we have got to be there ourselves, and I think financial institutions, in general in South Africa, needs to think like that, because they will lose out. The banks are going to have a terrible time. The only thing keeping them safe is the regulator, the regulations at the moment, but I mean we are fast approaching a society where we won't need a bank. You literally won't. What for? and I look forward to that day.</i>
P_07	<i>The banks rely heavily on SWIFT for messaging, right? For instance, now we implement a blockchain solutions, there's no need for SWIFT and some banks actually their business models is around SWIFT. So, how do they make money now? You are taking that away, right? and it's like okay how we</i>

Document name	Segment
	<i>gonna make our money, right? You need to explain that, you know, that I most like a return on investment kind of thing.</i>
P_07	<i>How does this work? So, and then fast forward a few months that was the first, you know the bank holds from time to time what you call a codefest, where a bunch of engineers get together, and they come like for 24 to 48 hours together (basically a hackathon), the bank engineers. So, for the codefest, the first codefest, we decided to build a blockchain solution. We said, we will implement the bitcoin blockchain infrastructure for the bank and actually show people, you know, what it means to mine a block, how blocks look like, you know, and visualise all of that. So, have a blockchain instance. and have a visualisation of the transactions, as they get mined and etcetera, just for education, and for other people to build on top of that. And, so we did that. We didn't win. However, we manage to get the solution up. To me, that experience of the hackathon, I just realised the destructive nature of this technology.</i>
P_08	<i>It is often stuff that you don't see right up you use it, and someone goes: ah, but can't we do this, fit this into what this does, or can't you do this as well? It isn't necessarily easy to off the bat. Once you get the feel for this technology, as an organisation, and a lot of these things start popping out.</i>
P_10	<i>The disintermediation is absolute, and if that is absolute, then, then being able to extract value from the centre is basically gone along with it. So, people need to think about different ways of getting value.</i>
P_10	<i>You know it is also a cliché, but I am owning it. You know the impact that the internet has had. I feel that it has had as much a disruption potential and influence as the internet has had. It can fundamentally create new business models, new perceptions of value, new governmental structures, new way of organisation, you know, you know social coordination. It is not like, you can say yeah cool, we can do the same thing with data sense, no, you can't, not by itself, and again blockchain by itself is not a solution, in and of itself.</i>
P_10	<i>We have created, have entrenched a power structure that will take you years to unravel. So, I think right now, I don't think a lot of organisations see this as a threat to their model. Until it's too late.</i>
P_10	<i>The point is that at least they are responding, in a way to specifically how this technology threatens them. But in terms of how our organisations are responding, I don't think that they feel threatened yet. It is more sort of like a frog in a pot of cold water that is slowly boiling. That's more of what is going to happen.</i>
P_10	<i>I think, when you look at what fintechs are doing to banks, the long-term view of fintechs, of banks; all the interaction between the banks and the customers are being slowly being eaten away by fintechs that provide much better use cases. Not use cases, I mean much better, much better value and experience to customers that what banks have been doing. So, what banks are we coming are really just a utility provider, where fintechs actually connect the utility to customer. Now in this case, take that further and think that the blockchain is actually breaking up the utility provided itself and saying cool: you know what, can utility provider take some of the things they</i>

Document name	Segment
	<p><i>are doing, and then add that on to this network, this peer-to-peer network, where maybe some nodes are specialty providers of particular kind of service and they all compete for, you know, that is that is what the world, that's probably the end game for banks. Like, you are maybe a specialist in something, but there are lots of other people that are competing. So, it breaks up your monopoly on these utility services, that fintechs are already showing you are, that is what you are becoming, and it just breaks it up and says: cool, a bank that does these five things, these five all become independent, like atomic services that gets added into this network of value.</i></p>

The fourth component of the thought experiment entailed opportunity-seeking.

In the final component of the thought experiment participants recognised that blockchain technology presented a solution, but the problem and solution space are not well mapped. Participants felt and judged opportunity seeking in the blockchain landscape was in the early stages. Organisations in the regulated payments space are primarily experimenting with the technology to try and solve pain-points in current operational processes. In terms of seeking strategic clarity about blockchain uses by organisations, there are no clear ‘signs’ to follow in the blockchain landscape (liminal landscape). However, some organisations have a sense of what needs to be accomplished in this landscape:

- Understand the customer problems first (and create a seamlessness blockchain experience for the man in the street experience) that the technology can solve (for example, financial inclusion), rather than take the approach: build the technology and ‘they will come’.
- The borderless-ness nature of technology makes it possible to operate everywhere, very quickly and drive growth.
- Blockchain/DLT solutions can be bootstrapped very quickly, and lean start-up structures can move much quicker than large organisational structures that have complicated governing and reporting structures.
- There is a great deal of value in reducing the need for reconciliations.

Table 4.7 below provides examples of opportunity-seeking in an emerging distributed value ecosystem landscape.

Table 4.7: Opportunity-seeking in the emerging distributed value ecosystem landscape

Document name	Segment
P_01	<i>We are not gonna something stupid. So, just following a more agile approach and testing things, in what we call the child, but which is actually a proof of concept. It is a funny word that we are supposed to use, but just doing a proof of concept, doing it with industry, I think that whole experience of almost driving that, was very stressful, because it is not the way that we do things.</i>
P_01	<i>Whereas, now we look at how we can simulate a whole lot of things and develop something that kind of fair to the ecosystem and allows people to collaborate, work together and does not kill innovation.</i>
P_01	<i>We have to think about interoperability with DLT going forward, which is one of the things we see, project X . We might have to become more agile on how we deliver on projects going forward, and if you think going forward, and think the infrastructure more broadly, again... it has not come through yet.</i>
P_02	<i>It's actually a whole new paradigm and there, again to be in strategy and particularly in financial service, ignoring blockchain is not an option. So, I need to embrace that and understand that, and then you go down the rabbit hole you get excited about blockchain, the next thing you know you're running around doing talks, and things and getting interviewed by people.</i>
P_02	<i>So, what we are seeing is people experimenting with blockchain technology in ways where everything else is the same or plugin blockchain as see whether it works. So, well, we'll try and use everything that maybe that makes sense for, it's a fast horse, but it's, it's, it's, it's the opportunity to understand and to play with it.</i>
P_02	<i>So, those kind of things happen, at the same time but that's not the corporates out here and the start-ups are out here, it's not about the start-ups moving to the corporates, but they drag the corporates here as well. One of the things that are really interesting about fintechs and start-ups is that it is generally changing the way that corporates behave. So, corporates realise they need to innovate, and the way that you innovate is actually is best embodied in how start-ups work, because they work quickly, and all those good stuff, and corporates start to change they are thinking.</i>
P_03	<i>Technologically, it is a major shift. It goes from one heavily depending on services like AWS, to completing approaching a decentralised architecture. There is a massive cultural shift as well. It reorients our structure from being back end, front end to being decentralised protocol first, the implementation of the application second. Because, we are ultimately doing is designing a decentralised architecture that is open source, so that anyone can come and participate, implementing their own application that uses this technology, tools that everyone has spun out, and Wala will be one of those third-party application</i>

Document name	Segment
P_04	<p><i>Our own reserve bank is experimenting with it. There are very few countries on earth looking at something like that. We have an amazing reserve bank and we have an amazing banking system as well, because they formed something called the South African Fintech Blockchain Consortium of which X sits on, and the purpose is to experiment with the technology and understand how it affects business and also to test out regulations, because regulations were created 40, 50 years ago, maybe even 100 years ago when the Reserve Bank was created. Those are not necessarily relevant to modern society. So, we are looking at creating that sandbox environment to test the boundaries of current legislation and see if it doesn't give me updated.</i></p>
P_04	<p><i>From that point I started trading for maybe two or three years and started upskilling in what blockchains are, and eventually led to quitting my job as a mechanical engineer, because that's what I graduated as, and moving completely into entrepreneurship, to build this ecosystem, because I realised that Africa has the potential to stand shoulder to shoulder with the rest of the world, because it is still an emerging technology.</i></p>
P_07	<p><i>Obviously, the position of project X was just an experiment, right? I think the whole project X, instead of holding back the whole blockchain ecosystem, it has opened new possibilities, because as we speak there's new use cases that are being explored, as what is a second version of X? Like you know, and there are pilot projects now. X was a POC, but now we are taking a step further with; what pilots can you can we do as an ecosystem on the blockchain. Yet, so I don't think, project X opened a lot of doors, and the fact that the monetary authority of Singapore is going live with their RTGS solution and the South African Reserve Bank is closely aligned with them, I can be confident that the South African Reserve Bank would also wanna follow suit, on what their counterpart in Singapore is doing, in terms of getting something out. Maybe as a pilot or in a production.</i></p>
P_07	<p><i>Okay, this thing will now be called blockchain. However, in terms of the end of the day use cases and blockchain technology, there's a lot of research that's happening. It still very young.</i></p>
P_08	<p><i>One thing to note, I wasn't involved in project X, but seeing the organisation reacted. There is much more interest is seeing how to make it main stream for the bank. But before, most people's understanding is of Bitcoin, how are we going to do this in the bank? Where actually it put has put it up on the bank's radar, the whole group's radar.</i></p>
P_08	<p><i>I think we are still stuck in that sort of hype phase. There is a lot of people around it, but there is a snake oil salesman just looking. There are sort of early birds, but no speaker yet, and its next week. We are still, many parts of the world in still in the hype phase, but the with these POCs that we are doing, a lot more organisations are getting more into the actual wisdom phase, trying to get more knowledge and understanding of it. So, we are more in the beginning, but I'm studying and see how to properly use it.</i></p>

Document name	Segment
P_08	<i>One of problems, maybe it is just banks as a whole. It is very regulated as a whole. It is actually very difficult to see how this is going to work from a technology perspective, which makes it very difficult, to see how this actually, this will work in production in a bank. Because, there are very strict security. It is bank obviously and to understand how blockchains are fairly open, you have to communicate with nodes and keep track of what's going on. So, that is sort of a big open question. How does it going to actually fit into the organisation and can we productionise this and ready to productionise this?</i>
P_08	<i>It is not even that. It is also organisations, it has a certain way of doing things. Blockchain is quite different to a lot of the ways to do things. It is a big learning gap. Different layers of IT, you gonna have to understand how it work, dev-ops has got to understand how it fits into the existing system or they have to change how to do things, how you are actually going to communicate with other nodes.</i>
P_09	<i>Be observant and informed of the new updates to the technology. Our organisation also attended various payment conferences to evaluate the application and the viability of the technology. Our organisation did not see the benefit of DLT as a wholesale payments system but more as a payments enabler (value add services).</i>
P_10	<i>Yeah, the most obvious change is just the fact that people are sitting up now and taking it seriously, right. Again, the technology strictly speaking has been available for a very long time. The first sustainable blockchain, I guess was like 2009. But, the point is I think a lot of organisations right now, after seeing the hype, after seeing the amount of money that can be made, especially looking at like enterprise software vendors, like IBM, like Microsoft, that are really seriously investing in this technology. I think a lot of organisations are starting to pay attention. It is not just some fringe group of society, that's looking like trying to overturn the status quo, but that is happening, but I think that just people that have enterprise and organisation demands today are starting to pay attention, mostly because where they buy their software and services from.</i>
P_10	<i>Those players like IBM, Microsoft, Google, Amazons are starting to provide service and show you can actually drive service value right now. So, don't worry you don't have to go all in cryptocurrency stuff, but by just using this technology there are some viable use cases that you probably can invest in right now. So, what it is seeing that I've been seeing is that a lot of people from enterprise and from organisations are attending events asking questions. They are not just immediately dismissive: Oh, this is garbage. So, that is healthy, it is a healthy response right now.</i>
P_10	<i>But, leaving that, I think that from an organisational perspective, organisations are starting to like, you know, sit up and take notice individually starting to play around with the technology, even it is something like.</i>

Document name	Segment
P_10	<i>So, the notion of a cryptocurrency and I lean on Bitcoin, because it is the only one, I mean it is the one that has proven itself, and if you think about high value transfer that cost almost nothing that can happen at a tiny fraction of the time amount of time that is required for existing mechanisms for value transfer. That itself basically has really got people to sit up and ask questions about the domain of value transfer.</i>
P_10	<i>No, it's more like, the way that organisations are getting information about blockchain today. There are some organisations that are researching it themselves, other organisations that are effectively buying research, getting the McKinsey's and... of the world understanding this. But, the point is because it is an emerging technology, there are a lot of people that effectively touting themselves as experts. I am an expert, speak to me and I think the opportunity, it's the right time for a snake oil salesman. You know just this hype thing; the hype also basically extends to the enterprise world as well and it is difficult to separate this.</i>
P_10	<i>Everything here is cutting edge, everything is emerging, and there is a lot of very interesting work that is going on right now during the sort of lull phase. I generally tend to look more at the like what's out there sort of stuff.</i>
P_10	<i>So, you know whether these things will actually will show up in the future, I'd love to see it happened, but right now just the thought experiment is fascinating. So, I think there is a lot of very interesting stuff that is occurring right now, but from a media perspective nobody cares, because you can't make any money off it immediately.</i>
P_10	<i>I think they, you now, they do need to experiment more, and I think the experiments need to be a lot bolder than the experiments they currently do. Just taking an existing problem and saying: cool, can Oh can I apply blockchain to it? is not fundamentally the wrong approach. But, there are things that you can experiment with, using such a game changing technology that leads to completely new models of business that you have never even considered before.</i>

Other observations by participants on the evolution of the distributed value ecosystem include:

- Participants see that organisations have taken an interest in having a finger on the pulse in terms of the development of the blockchain ecosystem, by employing a blockchain lead and/or creating a blockchain unit and ensuring they 'have a seat at the table' in the ecosystem.
- Participants see that fintechs and blockchain start-ups have influenced how corporates behave (working in agile teams and working quickly), primarily because they need to innovate. However, start-ups also realise they need to behave more

like corporates (need to comply with regulation and scale). Hence, participants see a chasm between the corporate world and the blockchain world. Transition between the worlds is hard, due to a regulatory chasm. This means that both regulatory and self-governing clarity is needed. As a whole, the perception is the technology is ‘way ahead of the regulation’.

- Participants felt that more education, experimentation and exploration is required to develop a deeper, more fundamental understanding of what needs to be achieved.

Theme 3: The rules (the felt and judged)

The third essential texture of participants’ experience of the distributed value ecosystem is the rules that regulate and/or govern blockchain peer-based game structure. Banks and financial institutions are highly regulated (Ali *et al.*, 2020), whereas a truly decentralised blockchain application completely ignores existing regulation (self-organising and self-regulating). There is no centre that can be regulated. Rules that govern a distributed and decentralised system are embedded in the protocols and standards, such as token standards that are adopted. Hence, a regulatory chasm exists between these worlds.

Three components emerged in terms of the rules theme (see Figure 4.5 below):

- (1) Rules for rule-breaking,
- (2) Regulatory sandboxes, and
- (3) New rules for rule-making are needed.

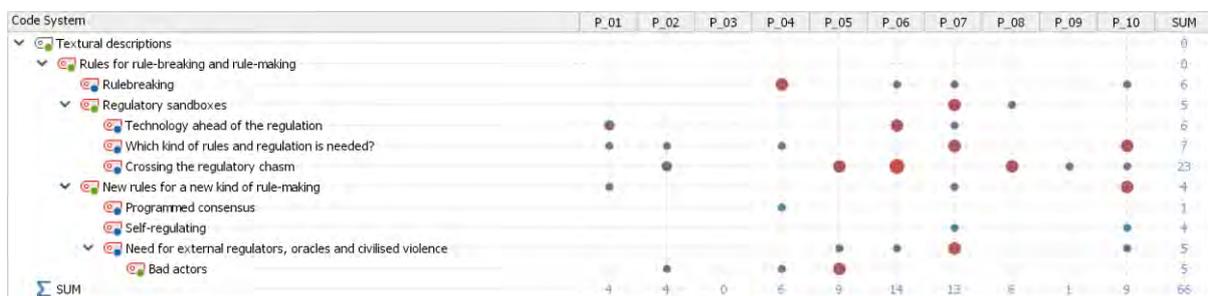


Figure 4.5: Rules breaking, regulatory sandboxes and new rule-making



(Double left click on the icon for a larger image of Figure 4.5)

1. Rules for rule-breaking

Participants felt, and judged that a highly regulated environment and rules that were designed to protect them do harm to individuals and society. Hence, rule-breaking, in a highly regulated and exclusionary context, is seen as rational to ensure fairness and personal well-being in the long run. Some participants felt that with blockchain technology they were in the position to break rules, and that it would be to the benefit of everyone, and they would ask for forgiveness later, or they felt that one should comply with the spirit of regulation, but not comply with the letter of the regulation. Alternatively, it would demonstrate that the existing regulatory framework was not well considered for where society is heading. Some participants felt that they simply needed to demonstrate that they ‘ticked’ the regulatory boxes, which would make it possible to move into the blockchain space.

Table 4.8 below provides examples of the motivation provided by participants to engage in rule-breaking.

Table 4.8: Rule breaking

Document name	Segment
P_04	<i>So, when I got to South Korea, specifically Seoul, all my bank cards were not working. So, luckily South Korea actually had quite a strong crypto industry and had a crypto ATM in their incubator hub that allowed me to sell some of my Bitcoin to be able to transact in South Korea. So, a very good example of a decentralised system, where you do not need the security measures the banks think they are useful to us, but actually cause a hindrance sometimes. It is a good example of me being able to continue with my daily activity, based off my investments in cryptocurrency.</i>
P_04	<i>Is this doing more harm to me right now or is it doing future harm? I just cannot deal with it right now. So, it put me in a situation I was thinking: I need to get myself out of the situation that can potentially human be replaced by computer one day, into a situation where I am able to break rules and regulations and ask for forgiveness later, but in the process of asking for forgiveness prove that what I've done actually benefits society.</i>
P_04	<i>I can challenge you to this. You can find any engineer that is in the blockchain industry and ask him or her why they are in the industry. I guarantee you the answer will be because there's too much rules and regulations from in what they came from, and they want to be able to innovate, solve problems, maybe step on toes here and there, but for the benefit of everyone else, and to prove that the existing framework does not, is not applicable to society anymore.</i>

Document name	Segment
P_06	<i>What we are definitely gonna be driving it, and like to say, well, we'll do it, we will do it anyway, and, and hope that we drag the regulator along with us.</i>
P_07	<i>Yeah, that is true. Regulation and governance, you know it's a big thing. Even if you look at regulation, are regulations as it stands right now, blockchain doesn't fit anywhere. So, it means and I like what the Reserve Bank is doing, having a regulator sandbox.</i>
P_10	<i>So, I think that there are problems that, that are caused by the regulations, the surveillance, the exclusionary practices of, not just financial, but also state-level actors today that this technology completely ignores. They just don't give a X about that stuff and I think that those is some of the appropriate usage of it, which may not necessarily be legal. I'm not actually encouraging people to do illegal things.</i>

2. Regulatory sandboxes

Participants judged that blockchain technology does not fit into current regulation anywhere. Furthermore, participants are aware that blockchain technology is creating capabilities and new structures that are not yet understood well by regulators. As previously indicated, the technology is way ahead of the regulation. Regulatory sandboxes created by the central bank regulator (in the case of the South African Reserve Bank) created a safe space to demonstrate the use of blockchain, without exposing banks and the banking system to unforeseen risks. It creates a safe space for participants to experiment within limits. More broadly, most of the experimentation in terms of central banks evaluating blockchain and DLT has been the wholesale payments process. The authorisation and oversight approach taken by the regulator is essentially 'test and learn' in a safe space. Participants praised the courage of the regulator to experiment with the technology and the use of regulatory sandboxes. The praise is mainly due to organisations operating in the regulated space, and that want to adopt blockchain technology, need regulatory clarity (for example, a clear definition of different crypto-asset classes, and token standards that should be used) to move to blockchain.

However, participants also questioned the type of rule-making required to cross the regulatory chasm, and the power that government institutions and regulators should have, which they do not need to have anymore. The challenge that regulators face with a fully decentralised and distributed system is that there is no central structure to

regulate. A regulator must regulate every individual user (node) in a network, which is an impossible task when a decentralised and distributed network starts to scale. Hence, the logic of having a centralised regulator in a fully distributed system is questioned.

With a fully distributed system, the systems governance model is determined amongst the participants in a network, as to the form and content of the governance system. How trust is established, which consensus mechanisms will be used (for example, proof of work, proof of stake, or byzantine fault tolerance, in the case where the actors already trust each other in a consortium), token standards and the finality of transactions. Therefore, it not easy to attain universal rules or standards that govern a truly open, decentralised and distributed system. These rules are determined by aspects, such as how consensus is reach by different groups, and they are influenced by ideological differences, influential individuals followed in a community, and the number of participants that adopt a protocol and standard.

There is no one organisation or body that determines which protocols and standards are adopted. This leads to multiple equilibria with regards to which rules or standards are adopted in the open unregulated community.

Table 4.9 below provides examples of participants' responses in terms of regulatory sandboxes.

Table 4.9: Regulatory sandboxes

Document name	Segment
P_01	<i>So, I think there are potentially different levels. I think moving out of unit where...just because of things I studied in the past. So, one of the lines that I like is... because of run-up of these things, in my prior unit, which was a supervisory unit, I would talk to people and they would say: listen, regulation always follows innovation, you know</i>
P_02	<i>In a broader sense, yeah. Look in the broader conversations we had a panel at the Blockchain Africa Conference in March, I think in the beginning of March, and there was a guy, there was a guy, a colleague from Hong Kong, X Hong Kong who's done a lot of work with ICOs in this space, and literally has written books on this stuff and a little bit older, when I say older, the probably in his forties, and then and then there's a bunch of start-ups. We don't need regulations, we will self-regulate in the world. That is a really immature view on life. Henry, the guy from Hong Kong was saying; look this is how it works in the real world, you do need regulations, because you get to a certain scale and you can't, you can't control the thing. As a founder, you don't know everybody, and see what's his name has done a number of</i>

Document name	Segment
	<i>stuff and then you, you get to a point where you built a filter system, the system start to optimise for itself, instead of wherever you ideals might have been, when you set up the thing in your bedroom and the way of dealing with that, is to put more rules in place and then maybe some of the rules are self-imposed, that's great, but also because some point you find that that bad actors get in and mistakes happen, unintended consequences, you need proper regulations to come in and that's just the way things work, and sorry, because that's life. You know we invented cars and then the next thing you know, there's speed limits and traffic signs and stuff. So, it is the natural order of things. I don't think that you can get away from it.</i>
P_06	<i>No, no, way ahead! The regulators are very much playing a catch-up game. They are open, but because of the complexity of the market, that it is a tough challenge for them to get their heads around it.</i>
P_06	<i>So, we can integrate into blockchain tomorrow, quite literally, and the only thing holding us back, as I say, is the regulatory authorities, which, which we respect and we're working with them, very closely to help them, guide them, into how to regulate this environment, because at end of the day we, we actually do want it regulated, and I think even the maverick, crypto punks out there, they don't necessarily like the word regulation, but it would be a good thing, because the problem with the crypto markets, now, and again.. the same thing applies, there's risk involved.</i>
P_06	<i>So, in one way we are kind of nowhere here yet. But like I said, we certainly going to be, see ourselves as driving that in the financial markets anyway, that move onto blockchain world. What we are definitely gonna be driving it, and like to say, well, we'll do it, we will do it anyway, and, and hope that we drag the regulator along with us.</i>
P_07	<i>What governance model? Do you think governance in terms of blockchain, should it happen on-chain or should happen off-chain, and in terms of regulation? Should regulation be on the blockchain or should that be off-chain? Do we need an external regulator to actually regulate a blockchain asset, or do we regulate the technology, and where do you regulate your regulator, the technology, or assets around the technology and how do you do that? This is very interesting thing, but obviously your research is not around regulation.</i>
P_07	<i>Yeah, that is true. Regulation and governance, you know it's a big thing. Even if you look at regulation, are regulations as it stands right now, blockchain doesn't fit anywhere. So, it means, and I like what the Reserve Bank is doing, having a regulator sandbox.</i>
P_08	<i>It is also, a bank is a very regulated institution. Until regulation catches up, you cannot just go and do it. There are potentially huge fines that you have to worry about. As a very regulated organisation we are waiting for direction as to the proper way to go.</i>
P_08	<i>You basically need the regulator to spearhead this, if you wanted it to be used main stream. You can obviously use it internally in the bank, as long as it ticks all of the regulation boxes.</i>

Document name	Segment
P_10	<i>There is two ways at looking at that problem. One, how do we make this compliant client regulation. It is one way of looking at it. It is a short-term view that a lot of organisations are looking at today.</i>
P_10	<i>That's not necessarily wrong, the question, I think, I feel that people should be asking is: do we need this bloody regulation? Because, me trying to be compliant with this that regulation ultimately means that I may as well have a centralised system. I may as well, as well have the service offered by central regulator, you know. So, ultimately instead of me complying, I have a solution that inherently is not malicious. Is there a way of solving this trust problem or solving this regulatory problem, without using the existing regulation today? Regulation is there to prevent some short form of bad practice. It is meant to prevent money laundering, child trafficking. Do I need to comply? Can I comply with the spirit of this regulation, rather than with the scripting of this regulation? Because, the scripting of the regulation, the way that it is stated, makes you design a system in a way, a particular architecture. But, I can still comply with the spirit of the law, without having to build a centralised system. I can use something that is for more efficient. Something you know that is a lot more frictionless, but I can also prevent money laundering, and child trafficking using this mechanism. This mechanism itself is not inherently illegal, but it's more about. It is a two-way street. In some ways the technology needs to get closer to the regulation, but I think regulation also needs to get closer to the technology. But I see almost very little of that happening.</i>
P_10	<i>So, that is still a defensive reaction. You need to think about it, cool. How do I adhere to the spirit of the regulation that I have created, to prevent the economy being jeopardised by money laundering and like massive exchange control violation? So, that notion of fairness needs to come into play with regulators, so that is a major paradigm shift. I think ultimately, where a lot of this is going, is the notion of the power of governments and what power governments should have and what they don't need to have anymore</i>

3. Rule-making in a blockchain world

The participants' perceptions regarding blockchain rule-making in the context of the blockchain world differed. Some participants (Participants 02, 06 and 10) felt that as a blockchain system matured and scaled, 'proper' regulation, as opposed to self-imposed rules, is required to deal with unintended consequences. The 'natural order of things' is that with the invention of any technology, rules will be needed ("...and sorry because that is life, you know we invented cars and then the next things, there are speed limits and traffic signs and stuff").

Some participants (Participants 07 and 10) thought rule-making by a centralised organisation of a truly decentralised blockchain or application made no sense. It would not solve the trust problem. Essentially, there is questioning regarding what powers government and regulators should have and what they do not need to have anymore.

One participant (Participant 07) also noted that it is possible to codify regulation into blockchains to prevent exposing the system to risks, such as money laundering and exchange control violations. However, cryptocurrency investors still take huge risks, as there is none of the traditional protection for investors, if a crypto exchange should collapse (Participant 06).

Therefore, participants still perceive and judge that there is a need for a regulator and oracles when an input and enforcement external to a blockchain is needed. The oracle problem then leads to who enforces ownership in the real world and decisions made, which lead back to a need for an authority, civilised violence and ‘men with guns’.

Table 4.10 below provides examples of participants’ experiences of rule-making by formal and rule-breaking by the blockchain community.

Table 4.10: Rule-making and rule-breaking

Document name	Segment
P_02	<i>... but also, because some point you find that that bad actors get in and mistakes happen, unintended consequences, you need proper regulations to come in and that's just the way things work, and sorry because that's life, you know we invented cars and then the next thing you know, there's speed limits and traffic signs and stuff. So, it is the natural order of things. I don't think that you can get away from it.</i>
P_04	<i>Potentially, so, how do you start weeding out the problems in blockchain or the bad actors? I think society or maybe, maybe it'll take AI, to realise that there are the good actors, there are the bad actors, let's get rid of the bad actors, as soon as possible, and where blockchains probably have the upper hand is there's no emotion behind it.</i>
P_05	<i>So, so it but once we move on to a common ledger, we're both the sender and the receiver have full visibility of that payment. You can start doing additional revocations, we bring the regulator in and say: Hey, listen here's a payment, busy going through right now, you can have visibility on it, they can start maintaining lists that maybe you don't want to send to the banks and they may know that the bank take in our country now, we had some banks that people knew that the senior management at those banks were dodgy, they were processing transactions for bad people, now so, it all good and well to give them a list of people that you don't want them to process transactions for, but in effect, you are tipping them off. Hey, listen, we've</i>

Document name	Segment
	<i>discovered that some of your clients are criminals and, and they can, if they are also criminals, you are between a rock and a hard place. Now, the regulator can say well I don't actually wanna give that bank my list of criminals, because I happened to know for a fact that their people who processing the payments are also involved in criminal activity and, and or I suspect and, and I wanna be able to block the transaction before it gets to them.</i>
P_06	<i>So, if you're an investor in crypto Bitcoin, any crypto, many people perhaps don't understand, but there is huge risk, because you have no guarantee. If X goes bust tomorrow you've got no guarantee that any cash that you've got there, that you are holding on my wallet there or any Bitcoin that you'll ever see that again, and you have no protection on that, there's no one for you to go to, that's going to go to chase X down, and get something of your investment back. You're gone, if they are gone, your money is gone, and your cash is gone and your Bitcoin is gone. You have no recourse, so it's a good thing to have a regulated crypto environment, because it provides investor protection.</i>
P_07	<i>However, if you look at the flipside of things, blockchain in itself, there is a lot of governance and regulation that needs to be actually looked into, in terms of this technology itself. Like, if we deployed a private chain, you know where this is a number of banks that are involved. Number one, who owns the code, who owns the updates, who decides what update goes when, you know, who are the gatekeeper, and things like, what happens in the case where we need to, basically for a legitimate reason want that blockchain to fall, what do we do? Sometimes things happen. I have seen that with Ethereum classic, that fork from Ethereum classic. Sometimes something unjust happens to a blockchain. What happens? Do we fall? or do we? you know, there is this whole thing, the governance structures that need to be built around his technology as well. Not only just looking at external regulators. So, need to look at how do we actually govern...?</i>
P_07	<i>Self-regulate, exactly. All of those things. And if you think about payments, there are a whole lot of things happening, before a payment can happen, like, for instance sanction screening, you know anti-money laundering. Where does that happen? Does it happen on chain? Do we have an integration to external oracles that will feed that information? that could potentially slowdown that chain, and we are back to square one. All these things are happening</i>
P_10	<i>So, self-regulation is something that I think, I believe self-regulation is something that is powerful. But, self-regulation has this taint. It is just basically a cartel, a bunch people saying: yeah, yeah, we are regulating ourselves, no worries. There is a difference between like saying that you are self-regulating and actually being able to prove that you are self-regulating.</i>
P_10	<i>Just because it says on a blockchain, it doesn't mean physically that piece of land or that car now is actually being used by the other guy. So, ultimately the oracle problem leads to the enforcement problem, and the enforcement problem comes down to men with guns, right? You need a state to enforce things like land ownership ultimately. If there is a dispute, blockchain is not going to, going to resolve your dispute. You need some authority to, that</i>

Document name	Segment
	<i>both parties respect basically, either whatever the form they most respect takes, in terms of any respect that anyone understand is one of enforcement, one of violence.</i>

Theme 4: The problem quest and mapping the blockchain solution space (the perceived and judged)

The fourth essential texture of participants' experience of the distributed value ecosystem is the question: What should blockchains do? Participants framed their experience in terms of the quest by organisations to map the problems that blockchain should address in number of ways. This theme has four sub-components (see Figure 4.6 below):

- (1) Solve customer experience, and organisational effectiveness and efficiency problems,
- (2) Solve the problem how to decentralise organisations (reducing the dependency on centralised organisations),
- (3) Solve the financial inclusion gap problem, and
- (4) The problem of applying blockchain to problems that do not need a blockchain solution, which implies education is needed in terms of the fundamentals and mechanics of blockchain technology to understand when a blockchain is needed.

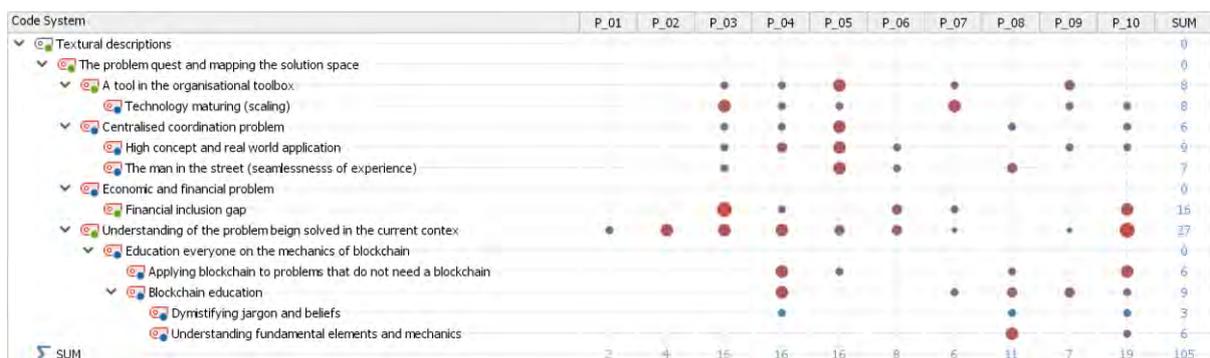


Figure 4.6: Problem quest and mapping the blockchain solution space



(Double left click on the icon for a larger image of Figure 4.6)

1. Organisational-related problems that blockchain addresses.

Some participants (Participants 03, 04, 05, 07 and 09) judge blockchain as a tool in the organisational toolbox, an enabler to create more seamless customer experiences (useful as a customer-facing applications). Participants' perception and judgment is that the blockchain application is merely an enabler to provide a better customer experience and improve organisational effectiveness and efficiency to deliver a better customer experience.

Participants judge that the 'high concept' (developing proof of concept, pilots, 'the fashion show') has been proven and real-world application will follow, operationalising the blockchain. However, organisations that are traditionally conservative (such as central banks and commercial banks) will adopt blockchain once it has been proven to be operationally ready for banks.

Participants judge operational readiness as having both private and transparent transactions, regulatory compliant transactions and transactions that can be scaled to current levels that transactions are processed at (the perception is that pragmatism is needed to move beyond the visionary and pilot stage). However, participants see that there is no need for customers to understand how blockchain technology works, it should simply be a seamless experience for the man in the street.

Table 4.11 below provides examples of participants' experiences in terms of organisational problems addressed by blockchain technology.

Table 4.11: Organisational problems that blockchain addresses

Document name	Segment
P_03	<i>The crypto ecosystem was maturing in a number of different ways, it was starting to scale, demonstrating different opportunities. We realised it was the correct approach to deliver a consistent global experience that allows us to achieve our goals for servicing our customers. It's that when we shifted our entire company's focus to be one that is entirely based on distributed ledger technology, and decentralised financial services.</i>
P_03	<i>Cash. It is slow, it has no memory, cannot borrow against cash, it loses on a daily basis because of inflation, you can lose it, it can be stolen, it can be destroyed. So, it also does not transfer well, it doesn't scale in payments and travel as well. So, our focus is providing a digital currency which is easy to use, it's fast, it's instantaneous, it's borderless and it's no cost to use and so you can offer those things as payment mechanism, but driving utility, offering ways to people actually spend it immediately. That provides a real sense of value for consumers, not just, oh I have a balance here, I send it to you, then</i>

Document name	Segment
	<i>you have a balance. That is not a real form utility. A utility is carrying that into some other real value, it could be withdrawing into hard cash or turning that into airtime or data.</i>
P_04	<i>Oh, you know, simply from where we started in 2013 in South Africa. We were trading something like 16 bitcoins a day, on one of the major exchanges, we now are trading possible a 1 000 a day. So, the industry has developed to a point where now, from back then when nobody actually knew about Bitcoin, accepted as payment, to where we are now. We can now purchase plane tickets, we can purchase smart watches on your ecommerce stores. So, the way that we can live our lives right now is actually dramatically changed from where was five years ago. It's not simply an investment, it is actually a utility tool, a utility value tool in the world, and I think it's interesting to see where it came from: the scams, the crashes, the exchange hacks, to where we are going to.</i>
P_05	<i>So, for me it's not more complicated than that. The technology has been proven. The regulatory compliance stuff is being worked on. The platforms are being worked on, you know, there's lots of announcements coming up towards the end of this year. Have a look at all those announcements. Companies saying; right we've now connected 10 banks together, hundred banks, four hundred banks. They are using our platform to do payments, not high volumes yet, but they are doing it. It's complicated for now, but we are getting there, we are working out, making it simpler and simpler. That is this year. Next year is gonna be 10, or 5 000 banks connected on a single network. It's a whole lot easier to use. You are gonna get banks saying, you know the operations people saying: in the past I had to do all of these jump through all these hoops, now I connect seamless, I plug in my payment system, it happens, that's next year or the year after you are going to get people saying: hey you know my bank providing you this thing or there's a new payments provider that never existed before,</i>
P_05	<i>I had a conversation with someone who's a hardcore cross-border payments specialist in a bank. He said to me: unless you can bring me something that is better than my current system, I'm not interested, that is almost his exact words.</i>
P_05	<i>So, I think that has even changed a little bit. I think a year ago, it was all about scalability and confidentiality. So, the big issues for enterprises were: am I able to put enough transactions on this network that it'll be processed in fast enough time, and the other one was: well if I'm putting in public ledger, or even a semi-permissions ledger that my, my competitors are on as well, am I gonna expose competitive data onto this network? So, those were the two big concerns a year ago. I think through project X, and now in a very big way, through project X, we have definitely addressed those. So, there's no doubt that blockchain technology is scaling, and you know, project X proved that certainly in the high value interbank payment space, it comfortably could manage with the volumes, and I mean, since then we probably gone, you know, what we were doing... Let's put it this way, it's not fully tested yet, but I think within a few months we gonna see at least a 10 times improvement in the volume of transactions that we go through, which opens it up to some other higher volume schemes, and then in terms of confidentiality, two things</i>

Document name	Segment
	<i>are kind of juxtaposed, you can have a lots of transactions or you can have confidential transactions.</i>
P_07	<i>To the end-user, to someone it's just an enabler (it is just an enabler). You shouldn't really care about blockchain (it is just an enabler). However, you should reap the benefits. Right now, to send money, for instance, to Namibia. You know, I mean, look, based on the regulation that is required right now. Now it will take, it will not take anything less than a day, to get that money. Right now, I mean obviously the banks are able to do it, because they make it an honest transaction. But, in the future that's not gonna happen, right? Blockchain should solve that problem, whereby when you send money anywhere in the world, it will be like sending email. You don't think about it, you just send it. You don't think about the rails, the underlying protocols, SMTP, what is happening, you are sending, and you know it is going to reach the target in next few seconds. If not a second, ya?</i>
P_09	<i>Our organisation did not see the benefit of DLT as a wholesale payments system but more as a payments enabler (value add services).</i>
P_10	<i>If I am dealing with a low trust environment, that maybe makes sense to start investing in this technology, but often. I think what's going to happen is that we are going to see a lot of blockchain being applied to problems that really don't need a blockchain and that is almost going to create like an enterprise hype cycle. Where organisations may come up with solutions and will wonder why did adoption fail? Or why did I not achieve the scale I was hoping to achieve? And then you realise what I was actually doing, actually just applying something very complicated to a problem that the market already has a solution to. I think that what is probably going to happen next in the short term. So maybe like, I don't know, here is a guess, maybe three to five years from now we will actually start seeing more sustainable, appropriate uses for a technology like this.</i>

2. Centralised social and economic coordination is the problem

Some participants (Participants 02, 03, 05, 06 and 10) judge that blockchain technology supplies the control to create the future that we (individuals and society) want by removing the dependency on centralised organisations (the noesis is hope and confidence in building a future without centralised organisations that are a 'thorn in the side') and it is a way to disrupt power structures.

Identifying and understanding the centralised social coordination problem (sovereignty over identity, personal data and money) that blockchain technology can solve is the first step. Organisational roadmaps (strategic roadmaps) are orientated towards decentralising coordination (and getting rid of 'nasty' organisations).

Table 4.12 below provides examples of participants' experiences in terms of decentralising organisations.

Table 4.12: Decentralising organisations

Document name	Segment
P_02	<i>... then it's the decentralisation issues, how do you get rid of this sort of big nasty corporations out of the system? And how do you do those sort of things?</i>
P_02	<i>It's a social movement as much as a technical one, because of decentralisation idea and the borderless and if you someone like X speaking, you hear the sort of changes to society and those kind of things, and if you if you step back from where we are globally and not want to go into politics too much.</i>
P_03	<i>Our approach is that we have identified, before we got into the crypto space, we identified customer problems. We have customers that will use this, and we found the technology to make that work. As we develop more protocols our roadmap is being oriented such that we have identified new opportunities that customers need immediately, we will build those, and to solve those and we build it is a decentralised manner, participate in it and then go with that. With X's first implementation we get immediate adoption, it is not go and build it, sit there and until someone pick it up, if someone ever chooses to pick it up. What ends up happening is that people will see on an ongoing basis that X will continue to be the most engaged with protocol, financial ecosystem globally, and that will motivate new companies, start-ups to also choose to opt into this technology as well.</i>
P_05	<i>So, I think an organisation, like all of these platforms, for me, they should be saying: I already have the network. How can I best establish kind of a distributed network out of my centralised network and looking at those questions? Companies that are payments providers like Western Union and MoneyGram have this amazing networks, it's all very centralised at the moment. So, they should be saying: how could we decentralise our network? The risk for them is currently because everything comes through a central point, they can charge fees at a central point. The fear for them, if I lose that central point, will I lose my ability to charge fees? My argument is always there is: rather have a percentage of something, than a 100% percentage of nothing, and because if you don't do it, for sure someone else gonna do it.</i>
P_06	<i>It is a very interesting in the story, even Uber, which themselves came along and disintermediated the taxi industry. Even, they themselves are in the danger of being disintermediated themselves by blockchain, and there's a living working example that happened in Austin, last year or two years ago, when Uber themselves were disintermediated by a blockchain application. So, in Austin what happened, Uber had something like 50 000 drivers in Austin Texas, Austin is a big city, huge population. They had 50 000 Uber drivers, working for Uber and the Austin authority, City authority decided that these guys got quite big and they wanted to, they wanted all the Uber drivers to register with the city authority, for whatever reason, I don't know what the underlying reason was, but Uber said no, that's not their policy and they refused to do it. So, Austin said: okay we'll then, we, you don't have a licence</i>

Document name	Segment
	<p><i>to operate here any longer, you have to leave the city. So, they did, which left 50 000 Uber drivers unemployed, but there was another little app, written on blockchain. It was called sell411, sell411, it was kind of like a play on the 911 emergency services. This wasn't emergency services, it was services for people who needed a plumber or electrician or a tyre... you know they woke up in the morning their tyre was flat, and did not know how to change a tyre, and it was a community service and free. You downloaded the app and you could go out your 411 and just post in there "mechanic", "tyre change", "plumber" and it would tell you where they were, the nearest one's and you would say I need a tyre changing and the nearest, the mechanics in the vicinity, would say I will charge you a hundred dollars and I'll be there in five minutes, with the other guy, but further away, I will be there in half an hour, but I will charge you 50 dollars and then you choose which one you wanted, and the app would connect you, and he would know exactly where you are. You would know exactly where he was, and they were paid by Bitcoin. So, the underlying transaction went from your Bitcoin wallet to their Bitcoin wallet, so no cash, no danger of getting robbed, mugged, but these guys because had already been verified, like an Uber driver was verified, so they knew, the app knew who they were. There's a service and the Uber drivers, just the guys who ran this thing, just said to do Uber drivers: well come onto this thing, register yourself here as a driver and there you go, and they had no middle man, because Uber is still centralised. It's a centralised system.</i></p>
P_06	<p><i>So, there are vested interests, the banks certainly have their invested interests. It's not in their interest for same day settlement. It's not. They lose money. So, and there are their other vested interest as well. Well, the Central Securities Depository in this blockchain world, there is no role for a CSD. The blockchain is the CSD. The blockchain is the record of ownership of that security and that security can be a Bitcoin or it can be a share in Anglo. If it's written on the chain, that's your immutable proof of ownership. Whereas the CSD, which is, by the way, majority-owned by the X is sitting there right now in the middle here, and that intermediary is not required anymore, and they know it, they know it! So, they are trying to reinvent themselves, which they should of course. There's no reason why you can't reinvent yourself, but they will need to, because there's no need for a CSD in the blockchain world, and, and we see that very clearly and we've made that aware to the regulatory authorities, and they are starting to see it as well, but of course their worries are systemic risk and things like that. Which is right, that's what they should worry about, and we are going down that path, we see it inevitable, and we are gonna be at the front of it, rather than the back of it.</i></p>
P_10	<p><i>So, I think it is actually the first time that we have a technology that can effectively disrupt the power structures like that. Because, previously it was like, oh well for me to do this I have to use a bank, they are all corrupt so what am I going to do. Previously I had to use MTN, Vodacom. You know like it is the land of cartels. South Africa is the land of cartels, where you have a small group of people that provide these services, and there is only handful of them.</i></p>

3. Financial inclusion gap

The participants (Participants 03, 04, 06, 07 and 10) perceive and judge that financial markets and institutions, and centres of power (banks and government) will be fundamentally disrupted by blockchain technology (as discussed in the previous theme: decentralising organisations). Participants perceive and judge that there will be a shift in the power relationship between the individual and the centralised organisation, such as banks and government. This refers to who has what power in the relationship to capture value in the ecosystem, as well as seeing a shift in the perception as to which powers organisations and government should have.

The participants judge that blockchain technology will create a much more inclusive financial system (right-size and create more fair value capture which would lead to a more inclusive financial system), and a frictionless and transparent financial ecosystem. Participants judge that the current financial intermediaries, such as banks, are in for a tough time and will need to reinvent themselves.

Table 4.13 below provides examples of the participants' experiences in terms of the inclusion gap that blockchain/DLT addresses.

Table 4.13: Inclusion gap

Document name	Segment
P_03	<i>We had partnership with several banks, of different banks' sizes, in different countries, and after several years trying to work with them, because of numerous reasons those partnerships never came to fruition. The reasons include apathy, incompetence and cannibalisation of existing business, because banks predominantly make their money and revenue from fees associated with basic accounts, but the end result of this that it creates an environmental where consumers are not actually incentivised to keep their money with banks. If I put in R100 it's not gonna be R101 the next time I see it, it is going to be R85. So, consumers are not financially excluded because they don't understand banking, they are financially excluded intentionally because they definitely understand how banks work. They are extremely savvy with their money.</i>
P_03	<i>In 2017 it became painfully obvious to us that banks are going to continue to be risks and continue to slow us down in our pursuit to be able to include people, financially include people across a continent of 53 countries. The crypto ecosystem was maturing in a number of different ways, it was starting to scale, demonstrating different opportunities. We realised it was the correct approach to deliver a consistent global experience that allows us to achieve our goals for servicing our customers. It's that when we shifted our entire</i>

Document name	Segment
	<i>company's focus to be one that is entirely based on distributed ledger technology, and decentralised financial services.</i>
P_03	<i>What the distributed phenomenon does for me, is, it enables consumers and enables companies' consumers to engage with the global economy. It enables them to protect themselves against potentially protectionist policies and governments that have, that end up hurting consumers. We in Uganda, for instance, in the last month, a month ago, what we saw was the government imposed a ridiculous tax on mobile money, where they are now charging the 1% tax on every transaction set, that includes every deposit made, every withdraw, every peer-to-peer transfer. That means if you go and you deposit say 10 000 shillings, you will have a deposit tax, you will have a deposit fee, charged by the M&L, and when you send that amount to someone else you pay another 1% tax, and another M&L and then withdrawal and then another 1% tax by the government. So, if you send, say a large amount, say a million shillings, it is about US300 US dollars, you may end up with 940 000 shillings actually. That is a 6% tax, to send money, in the country. This is the primary financial payment rates. This is horrifically bad policy, it hurts the middle class, it hurts the, the lower economic classes as well. Crypto, traditionally the alternative is to go through banks to offer client services. Crypto breaks down the barriers and introduces for competition to come and provide different services to give more competitive offerings, to give more ownership and control over one's funds to the individual as well.</i>
P_03	<i>Banks are not incentivised to serve the entire population, they are incentivised to continue to serve a smaller and smaller percent of the population, but mobile money scoop up the middle class and lower class, just cater to the wealthy and the ultra-wealthy.</i>
P_03	<i>I think that is true, but I think that undersells the actual opportunity. The reality is that even in a market like South Africa, where you have the, one of the most robust banking infrastructures worldwide, and by far the most robust infrastructure in this continent, you have a massive problem. South Africa +70% of people have bank accounts, only half of them actually use them. What about the 30% of the country that have banks accounts, but they use it for one day a month, that is their pay day. Is that really a banking customer? Or is that just someone that needs to get paid, so they need to have a bank account, so they get their salary paid in, they have to pay the fees to get their salary and it ends up just being a banking tax. How is that financial inclusion? It is just banks benefiting from robbing people that need the money without actually servicing them, not adding any value.</i>
P_04	<i>So, there's, there's gonna be that. It's not holding the industry back, at all, but I think it's the wrong approach and it's because these traditional businesses come from a background where they ring-fence what they're doing, and they try capture a market and protect that market. Whereas, the whole cryptocurrency industry is not about protecting what you are doing, it's about making it open to the world, and saying: hey, this can improve society.</i>
P_06	<i>Well you'd want to do it, because it's it is far more efficient, and therefore, far cheaper, and therefore, far more financially inclusive, and that's what our particular company is all about. I mean that's one of our founding principles</i>

Document name	Segment
	<i>was financial inclusion, and our model is completely different from the JSE model, far more inclusive and I mean this talk is not about our company how it's structure and how we work and how it's different from the JSE, but it is essentially already a blockchain model and that's because we settle T+ 0, which is exactly blockchain.</i>
P_06	<i>Yeah, we believe we do. Like we say. There are certain players that are going to have to reinvent themselves or they will find themselves out of business. We have a clear understanding of that, and we that as being hugely beneficial to the man in the street, and again to come back to this whole financial inclusion thing. Transacting on an exchange and being able to buy shares should be available to the man on the street and it's not today. It is in our environment, but we are very small and the JSE it is not. They are not about financial inclusion. The man on the street, a guy who has a hundred bucks or thousand rand to invest, cannot invest in shares on the JSE. It's just too expensive. He cannot do it. He can, but he's gonna lose money.</i>
P_06	<i>It's, it's such a huge... the potential for making things better is huge, but I think it's also the case that a lot of it is over-hyped and the questions have to be asked: well does it actually makes sense to do on blockchain? Sometimes it doesn't. So, you know why would you do something on blockchain? Well, to cut out cost, to cut out middlemen who don't add any value, to make things more efficient, to make things more inclusive, to bring it to a broader base, a broader market-based. If those, if doing a blockchain solution answer those questions, for sure, but it doesn't always do that, so there's a lot of hype. I think that is what people got it be aware.</i>
P_07	<i>People that are very optimistic about what new opportunities blockchain will build. Because, the thing is, if you like have, like a completely decentralised system, then the economic models now change. You know, the unbanked, now have an opportunity to get to the bank, right. You know, so they have an opportunity to partake in this economy. You know, like you think about the people on the streets that are the vendors. They can't partake in the banking systems, at the moment, but there is optimism, in terms of the future opportunity of this, this can open up the economy, you know like more participants. There are two sides to the coin.</i>
P_10	<i>They are solving like remittance problems, basically at the bottom of the financial economic pyramid. So, it's good to actually see that kind of retail consumer facing solutions that are starting to drive mainstream awareness. Which I think is fantastic.</i>
P_10	<i>There are. So, there is a difference between appropriate and legal. Mostly, we have regulation that is based around having either a central party that controls things, or a number of hubs that, in effect, report to a central party, like SARB and the commercial banks. A regulation is written in a way that effectively excludes other participants from performing the same service, and again I'm not saying it was done any way that was inherently malicious, but it was built because of this is the environment, this is the ecosystem that we have, this how we regulate this kind of, this kind of ecosystem, this kind of design. But, what that means, it becomes quite exclusionary to people that...</i>

Document name	Segment
	<i>if I want to transfer money to you, without using a bank, some countries basically deem that as illegal.</i>
P_10	<i>But, ultimately what they are looking to do now, is tokenise their fund. I made a joke with them, many months ago when I first met them, you should call it Cow coin, except they are now doing cattle and sheep. But, really that is what they are looking to do. At least the one joke that we took away from this is, they are calling it "smartcowcontracts". But, it is really about taking an asset that is, from a cultural perspective, something that South Africans and Africans see as cattle is wealth, at a traditional asset level. They are taking that traditional asset and allowing people to invest into something as small as 50 rand in this cow. So, it is a financial inclusion play on assets that represents traditional wealth, but also now trying to introduce transparency and reduce friction in the process by tokenising it, and also being able to monitor and be able to make this, the asset itself quite transparent to the investors.</i>
P_10	<i>But, what I love about it, it is actually it is touching something that is deeply traditional cultural locally. What we are investing in, like is not some new technology that we don't understand. We are investing in a cow, you understand what a cow you just had a burger, or you are investing in a cow, because you understand a cow means wealth. Like traditionally in a village basically you can still pay like Lobola for a cow. So, marrying, what is like a traditional asset, but making it available in a very, very slick way that happens to use this technology.</i>
P_10	<i>So, Wala, as an example, is solving a remittance and very low remittance problem for people at the bottom of the economic pyramid, basically. Creating instant payment at zero fee.</i>

4. Applying blockchain to problems that do not need a blockchain

The participants perceive and judge that very few people in organisations have the technical understanding of the mechanics of blockchain, and that centralised database solutions already exist that are easier to implement. Participants see that blockchains are being applied to problems that do not need a blockchain solution. Participants describe the general perception about what blockchain do as skewed, for example: "blockchain will change everything" and can simply be applied to any problem that decentralises a society of centralised organisations.

However, the reality is that there is very little data available on actual use cases. A participant (Participant 03) noted people are taking what looks like data and fitting it to the narrative that has been created. The reality is that most blockchain models precede data (still in the proof of concept and pilot stages, and little actual data of an operationalised blockchain is available).

Table 4.14 below provides examples of participants' experiences in terms of the problem that arises because blockchains are being used for problems that do not need a blockchain solution.

Table 4.14: Applying blockchain to non-blockchain problems

Document name	Segment
P_01	<i>My boss says, we are going deeper understanding. I think one of the things, just also referring back to the project, the unit that I am in now, so, we were taken out of different departments and sent to help the bank, the kind of dissemination of information, the kind of input that we get, so we are not stuck in a silo.</i>
P_02	<i>It is difficult, one of the challenges at the moment is, I think there are different stages in the adoption of new technology. Blockchain doesn't change in the way the way we adopted cars, or the internet or posters or whatever. The process you go through is first to understand in your current context.</i>
P_02	<i>I think the technical understanding is developed in a very small percentage of the population anyway. I think now most of these people already know about blockchain and the rest of us are learning about it.</i>
P_03	<i>Yeah, all you can do is say: oh, that is a convincing argument, or no, it is not a convincing argument because of this economic theory. Then people just argue back and forth. Whereas, people taking what looks like data and fitting that to a narrative, rather than being.</i>
P_03	<i>What you also get though, is that you get loud voices coming in with: this is our analysis, this is our view, this is our projection how things are going to end up. We have done some research on this. Which is fine, but ultimately ends up being our opinion.</i>
P_04	<i>So, because of this hype cycle you can apply blockchains to anything. You can apply cryptocurrency or a derivative to anything. It should simply can't work. It's simply does not affect everything single problem on earth, but it does, it does influence a lot of problems, in a positive way, and another thing, we keep saying blockchains will solve that problem.</i>
P_04	<i>No, it goes back to my earlier point. I do not think anybody understands the potential value of it yet. We are still in the experimentation phase of it. We will find this utility values over time, assuming that cryptocurrency and blockchains really do have a use case.</i>
P_07	<i>Understand what the mechanics are and what the technology can actually enable for them, and the way it can disrupt them as well. So, I think that is actually the problem.</i>
P_10	<i>So, what's cool about this technology is that, because it can be applied in so many different ways, it almost forces almost a first principle approach to almost everything, and for me that is fascinating. Because, I have been like a first principle person, forever. So, I never call myself an expert on</i>

Document name	Segment
	<i>anything and mostly because I immediately begin the first principle thing and that point like...</i>
P_10	<i>I do believe it has that potential when you actually look at how it can be applied, and you know the interesting solutions that people are coming up with to solve all kinds of problems that you didn't think could be solved with the technology like this, or where other technologies have tried and failed actually solve the problem.</i>
P_10	<i>Absolutely. A fundamentally I think it is like, it relates to inappropriate understanding, inappropriate usage of the technology. So again, I have given talks about private, permissioned versus permission-less blockchains. So, something like Bitcoin, blockchain vs hyperledger, specific for specific quorum. Now, I'm not saying that quorum was inappropriate usage of the technology. It was for a permissioned set of participants, with a central regulator, to solve a problem basically that only exist between them. Now that point is 100%, but often I think what problems it is going to create, is when people believe I must create a permission private blockchain for this particular need, and then realise, well actually it hasn't solved like fraud or cartel-like behaviour. Because, but I was using blockchain. So why hasn't it prevented fraud? Well it turns out we actually have, just have four nodes and three of these guys know each other, and can collude, right so. I think actually just a lack of understanding, you actually need lots and lots of independent parties that are all validating and all that are contributing like hashing power.</i>

5. Blockchain education is needed to understand whether an organisation needs a blockchain

The participants noted that they often spend more time explaining firstly the fundamentals and mechanics of blockchain, as well as demystifying the jargon and beliefs, rather than addressing the question whether there is an actual need for a blockchain and what an organisation should do with blockchain.

Table 4.15 below provides examples of participants' experiences in terms of a need identified for blockchain education.

Table 4.15: Blockchain education need

Document name	Segment
P_04	<i>Now, yes, okay so where blockchain technology will not work, is if you tried implemented it in an organisation itself only, because at the end of the day the organisation trusts the data that it is creating. So, what do you need to put it on a blockchain for? It's far cheaper to have a central server and just run the data on a central server, and have separate admin rights, or do to prevent corruption or whatever. We're probably it is valuable, is to anchor the state of that data, to a budget.</i>
P_04	<i>They are also, what we found is when we educate adults, it takes a lot longer than if we had to educate children. The reason for that is also ready predisposed to the concept of money, central banking, international transfers, salaries, taxation, all of that kind of stuff, and the first thing is this is a scam, that's their first thought, and when we educate them we first have to unwind that mindset, and then talk about the potential of cryptocurrencies versus fiat currencies. Whereas with kids for example, they don't have this preconception of what money is, right? Someone else earns it and spends it for them. So, it is a lot easier to discuss the two systems, relative to one and another. Cryptocurrencies and fiat currencies and the history of fiat currencies. It is a very tangible concept if you move from cows, to... to salt, to gold, to paper money to, to plastic money, digital money to cryptocurrency now. It's an easy progression in a child's mind.</i>
P_04	<i>Okay, so number one is education, they need to understand what the technology is, first. A lot of people are simply using blockchain technology, cryptocurrency as buzzword, they think that it can apply to the business, because there's someone else talking about it, and that is due to a lack of education. So, we, we, we, a lot of the focus of every person on the industry, in the industry, I think right now, is actually education. To get your product to market you have to be able to explain what the product is, what the benefits are and why the technology behind it is relevant. So that's number one.</i>
P_04	<i>So, I think it is a misconception that we can just decentralise everything and go on a trust-less system provided by blockchains.</i>
P_05	<i>One of the characteristics of blockchain is that it is, you know... it works best across organisations and it's very difficult when you're inside an organisation that's is interested in blockchain, to build anything relevant in blockchain because all of the use cases are typically internal, the influence they have is internal and the internal systems actually work really well.</i>
P_07	<i>So, they we have an idea, I think some people. So, what happens with technology? You know, the early adopters, they will typically, will over-exaggerate its impact, and then the typically late adopters will underestimate its impact in the long term. So, where we are at playing, we pretty much like paint the right picture. You now, like painting a picture is one thing, but painting the right picture is another thing.</i>
P_08	<i>And also, to also make clear to people that you cannot just put it on the blockchain and see what is going to work.</i>

Document name	Segment
P_08	<i>That is actually part of what we have been doing, as a team, we were trying to help educate people like in the organisation where there is any misunderstanding. We get people to a point where they can actually understand what the mechanics are of blockchain are. Based on that understanding they can assess themselves, whether this is actually a good use case for blockchain or not. Because, one of the things we found, a lot of people approaching use, and asking to meet with them. We basically end up educating more, what blockchain was and not so much whether the use case is good or not</i>
P_08	<i>Not necessarily. I think. There is a lack of understanding around it, the hype, people almost has to shift through the hype and start to understanding the mechanics.</i>
P_08	<i>I think, like any new tech, when the web started coming out. There was a web-bubble and also like a lot of misunderstanding what it is. Eventually, it became more ubiquitous and people starting to use it, what was on top of the web and then it started to make sense to people. Even till to this day, today the man in the street doesn't understand what happens underneath, but they reap the benefits of it. There are also buzzwords going around, and like one of the things is trying to educate the organisation on it, just getting rid of the hype. I forgot the name of it, basically it is a graph, but there is an upcycle there and a trough of despair, then there are sort of actual learning over here, which go up slowly. Many, a lot of people are still at that hype level, to just dispel that hype. Focus people on what exactly...</i>
P_08	<i>We basically end up educating more, what blockchain was, and not so much whether the use case is good or not.</i>
P_08	<i>It is basically, it is an ongoing process, one of the approaches we have taken is. We have got to an internal forum, X between the X group, where we had a few sessions so far, to start interest and to, get an understanding of where people's levels are at, you know. Basically, trying to get people on the same page. A basic understanding of the mechanics of blockchain. And also, to also make clear to people that you cannot just put it on the blockchain and see what is going to work. It has very specific mechanics and very specific goals. Things that it actually can assist with. It wouldn't work for everything.</i>
P_08	<i>You cannot just wake up one morning and go: oh, there this problem and blockchain will fix it. It isn't necessarily the case. You are just trying help educate people to make them understand that it has very specific characteristics; likes it's immutable, it's shared across organisations, it generates a central trust anchor and you want to decentralise that trust. Then, things like that, just make them understand, what makes a good use case and what doesn't also.</i>
P_08	<i>Understand what the mechanics are and what the technology can actually enable for them, and the way it can disrupt them as well. So, I think that is actually the problem. I was also too young when the web start to become a thing. There was also pretty much a lot of hype around. It was actually hard to understand what is real and what wasn't.</i>

Document name	Segment
P_09	<i>To move the technology forward, it is vital to have the distinction and to education the public of the technology and its capabilities.</i>
P_10	<i>Where organisations may come up with solutions and will wonder why did adoption fail? Or why did I not achieve the scale I was hoping to achieve? And then you realise what I was actually doing, actually just applying something very complicated to a problem that the market already has a solution to. I think that what is probably going to happen next in the short term. So maybe like, I don't know, here is a guess, maybe three to five years from now we will actually start seeing more sustainable, appropriate uses for a technology like this.</i>
P_10	<i>Often what happens in this world is that, because it is a new buzzword it is often a solution in search of a problem. There are problems that it basically can solve, but by and large the kind of solutions that we have today are sufficient. When using a database for something, for something that you control, and you issue. That is 100% fine. Do you trust yourself? Yes, I do. So, I should trust my own database. If I am dealing with a low trust environment, that maybe makes sense to start investing in this technology, but often. I think what's going to happen is that we are going to see a lot of blockchain being applied to problems that really don't need a blockchain and that is almost going to create like an enterprise hype cycle.</i>
P_10	<i>What you are getting is security, and people need to really understand that it is not a by-product. It is fundamental to the security of a public blockchain, that people need to literally have some skin in the game, for them, as an incentive for them not to cheat. So, if you say cool; I could am gonna go with my own private blockchain, because I trust these five people. If you do, then the issue is why are you using a blockchain. The problem that is going to show up here is inappropriate use, inappropriate understanding of why certain elements are fundamental. You can't just take this out and still believe that you have a secure system.</i>
P_10	<i>So, and specifically with a technology, like blockchain and its application. It is not just one thing that you need to understand. You need to understand, to be a practitioner, you need to understand, you know some fundamentals of computer science, some fundamentals of cybersecurity, which is link to computer science, some fundamentals of economics, some fundamentals of mathematics, serious fundamentals of mathematics, like areas of game theory. There are lot of these fields.</i>

Theme 5: The decentralised and distributed value lens

The fifth essential texture of the participants' experience of the distributed value ecosystem is how the distributed and decentralised architecture impacts on value transfer and capture of value. This means that the participants' value lens, and the perceptual filter used as to what blockchains do and what data should be incorporated or left out of the workings of organisational architecture (see Figure 4.7 below).

The perceptual value lens theme consists of four components:

- (1) Right-sizing value captured, meaning blockchain creates a fairer dynamic in how value is captured (a more 'flat world'),
- (2) Changes to the shape of value lens (changes how tasks are performed).
- (3) Changes the aperture (size) of the value lens. This means that new kinds of payment objects have been created. More complex value networks are made possible, and architecture can be created which leads to a broader and more inclusive market base (flat world).
- (4) Changes to the location of the value lens. This means that there has been a shift in capabilities that the individuals possess, which they did not previously possess, to transfer and capture value in a direct and near manner (there is no need to make use of intermediaries, such as banks).



Figure 4.7: Perceptual value lens



(Double left click on the icon for a larger image of Figure 4.7)

1. Right-sizing the capture of value

The participants (Participants 03, 04, 05, 06, 07 and 10) perceive and judge that blockchain will 'right-size' value capture. A truly distributed blockchain ecosystem would create architecture for a fairer appropriation of value and eliminate intermediaries that do not truly add value, which would right-size the value captured. Blockchain will achieve this by changing the shape, aperture and location of the value

lens (perceptual filter) used to create architecture and the dynamics that play out as fairer value capture. These three aspects in right-sizing value capture are discussed in the sections below.

Table 4.16 below provides examples of participants' experiences in terms of right-sizing value capture/appropriation.

Table 4.16: Right-sizing value capture

Document name	Segment
P_03	<i>Or is that just someone that needs to get paid, so they need to have a bank account, so they get their salary paid in, they have to pay the fees to get their salary and it ends up just being a banking tax. How is that financial inclusion? It is just banks benefiting from robbing people that need the money without actually servicing them, not adding any value.</i>
P_04	<i>So, let alone that the value of time that was last lost, we also lost value in the money itself, because of the conversion. It's simply a case of: I want to send money to a person overseas, because they gave me a service, they should be able to get their money straight away. Right, we have done a legitimate transaction, but because of the rules and regulations in the banking system there are difficulties in doing that, inefficiencies. SWIFT itself is inefficient, because it was developed 40, 50 years ago or whatever it was. Whereas, if I was able to pay them, supply in Bitcoin, it would have taken 10 minutes, not even, it would have a few seconds to have seen the transaction, but for the transaction to have been confirmed a bit longer. But, the fact I wouldn't have to ask permission to send money to that person, and he is very, I mean it's his choice to convert it back to fiat or keep it in crypto. So, that that that is a good experience of the difficulties of the system, of the current system and where crypto is applicable to solve those problems, and if you just repeat the question again.</i>
P_05	<i>Which is crazy when you think about the fact you can download a film from Netflix in 30 seconds and start watching it. You know that's a whole movie compared to a R100 payment, which will only appear in someone's account in three days' time... So, people have got a little bit happy with the status quo in a regulator space, people want to mix it up and this combination of the two coming together I think for me there's a lot of learning that needs to happen, for me the work is not technical. We have proven over many years that technically we can make a payment anywhere in the world within a couple of seconds. It's now getting all of the concerns of the regulated world to be adopted by this brave new space, and it's a case of moving some of these anti-authoritarian figures into space where they say well, actually we can help the man in the street, because until we get to a point where, you know, the man in the street can walk into a coffee shop or walk into a spaza shop and buy a bag of tomatoes, using blockchain technology, using any kind of distributed ledger. Until we get to that point, you know, we are not touching enough people.</i>
P_06	<i>That's a fundamental shift, you don't have to go anywhere near the bank and pay exorbitant fees and wait days for your money to get to some other bank,</i>

Docume nt name	Segment
	<i>and then someone goes into the other Bank or ATM and draws it out. You can do it in seconds, on an app, today</i>
P_07	<i>Here's... the other major thing is a blockchain almost trumps some of the traditional mechanisms through which certain organisation would be making money. The banks rely heavily on SWIFT for messaging, right? For instance, now we implement a blockchain solutions, there's no need for SWIFT and some banks actually their business models is around SWIFT. So, how do they make money now? You are taking that away, right? And it's like okay how we gonna make our money, right? You need to explain that, you know, that I most like a return on investment kind of thing.</i>
P_10	<i>So, these are the responses. Responses basically are very short-sighted and very defensive. What are you defending? You are, are defending the existing status of value transfer and the extraction of value.</i>
P_10	<i>In this world, you are basically more of a participant, in some way. One day I am a consumer, the next day a service provider. Ultimately, I can give and take value from the system, but it distributes it fairly.</i>
P_10	<i>There was a very interesting paper that I came across recently called Babarfar. It talks about this notion of a decentralised autonomous cooperative, where everybody has built a participant and... you can be a provider of a service, consumer of a service, but ultimately. In the traditional world you are either a provider or a consumer.</i>
P_10	<i>This is one of the things that excite me about it, it creates a lot fairer, the distribution of power thing, absolutely, but also the distribution of value, and it makes things a lot fairer because if I contribute something, I am rewarded basically in equivalent value, and ultimately and that is what a lot of a sort of believe.</i>
P_10	<i>This is one of the ways it is doing that. I mean the capitalist society that we live in today, is comprised of a lot of these little hubs that provide services or provide a platform of some kind and extract value from it. This is how things are done, but when you consider what a blockchain, a decentralised product, the technology itself, what it can do when you actually do when you take it to its nth degree. That need for, you know destroying the intermediary, the middleman in between.</i>

2. Shape of the value lens

The first way in which the perceptual value lens is transformed is the shape of the value lens used. Participants perceived and judged that the workings of organisations will change due to the boundaryless and frictionless nature of DLT. This means that the perception is that the first use case of DLT is fixing the pain-points of current operational systems and processes with a system that is much faster, efficient and effective at processing transactions. With a 'faster horse', it is anticipated that new

kinds of more inclusive value network may emerge, and transforming the transfer of value in a number of ways: transform how payments and interbank payment are done (tokenising of currency), investment or crowdfunding (initial coin offering), tokenising of assets that traditionally are hard to trade (by reducing the friction in transferring value that is traditionally hard to trade), and the issue of bonds and possibly monetary policy.

More specifically, the process of transferring value will become more efficient and effective (settlement is cycle T+0), as there is no need to make use of the corresponding banking system. There is no need to hold money overnight to do a cross-border payment (unlocking liquidity) and reconciliations are not needed between ledgers (between individuals and banks, banks and banks, and a central bank and banks).

The system itself will be more resilient (there is no central point of failure) and it will make the transfer of value more transparent (distributed and shared consensus-based truth). The provenance of a transaction can also easily be verified (where a transaction originated from and where it went), which creates more confidence and trust in the system. The overall affect is that the velocity (the speed of money) of money increases.

Table 4.17 below provides examples of participants' responses in terms of change to the shape of the value lens.

Table 4.17: Shape of the perceptual value lens

Document name	Segment
P_01	<i>I think the mandate still stays the same. The way we execute things that will probable all change.</i>
P_01	<i>Because, we have all of these developments like DLT that is something we now have to think about. How do we do things different. It touches, if you think about monetary policy, issuing bonds, even those things might change.</i>
P_04	<i>So, there's a threat to the likes of PWC, KPMG, whatever, but they are also looking at the technology to see how to enhance their business as it is. If they are the one that are anchoring data to blockchain, then they reduce their workload over time.</i>
P_05	<i>So, it so there's very real clear benefits to having a single ledger, having a process that can operate quickly. Now, some of those benefits are already being realised with other clever ways of interacting between siloed systems, but I think once we have these distributed ledger, blockchain environments,</i>

Document name	Segment
	<i>specifically reconciliation is about locked up liquidity, there are real tangible financial benefits.</i>
P_05	<i>Sorry, there is one other major value proposition is resilience. At the moment, you know, if a payment system goes down, no one can make payments. Every now and again you get a notification from your bank, "Sorry our payment systems are down". What does that mean? It means that their main server went down, and their backup server went down, because they always have backups and possibly their second backup. It means that they have gone into a disaster recovery phase, which means they have to now switch to the disaster recovery site or switch to get the data in from their disaster recovery site and that normally takes a little while and for that time they cannot process transactions. There could be many reasons, but there's some central point that's failed. Now, you know, when last did a Bitcoin payment fail? They don't fail, because there's this massive resilience on the network. You know, you don't care if half of Bulgaria's Bitcoin servers go down. It makes no difference, because you reach your payment through some other servers, and so the resilience is the other huge one. We take away the reliance on centralised systems.</i>
P_06	<i>It is a little bit mind-bending for everybody who doesn't really understand how it works, but we're already see who is going to be cut out of that little chain, and it's good because it at the end of the day it benefits the investors and the issuer, because it drops costs and it increases efficiency and there is none of this cheap T+3, T+5 settlement cycle, which the banks love, because it makes them lots of money.</i>
P_06	<i>So, it's not so much as us getting disintermediated, it it's all the other people now able to do that, a lot cheaper, a lot quicker. We've done it a lot cheaper, and quicker than the JSE, but we don't want to be that Uber, when someone else comes long and out-Uber's us. You know what I mean. So, that's, that's where, how we got into it.</i>
P_06	<i>We know it came from that person, we know it went that person, that Bitcoin or that security has transferred from ownership from that person to that person. That person got the funds and it's immutable, and the chain is written down and you can't change it. Now, I think we got to the point where people, even the regulators, understand that that that's a fact. They can't argue that point. When it comes to private chains of course, there's a difference, that's what the banks want to do. You know like Ripple, Ripple is essentially a private chain.</i>
P_10	<i>So, like, oh my God, it's such a pain, it costs so much money. Is there actually a way for me to make this faster, more transparent for my customers and cheaper for me? And means I maintain and operate fewer systems and less operational stuff to do so. That's some value that you can see right now.</i>
P_10	<i>I mean if you just have to look at financial intermediation, say I want to transfer, the double-spend problem that the bitcoin blockchain solves, that it is a form of self-regulation. It is a form of self-regulation, it is clearly transparent. Everybody can prove, this is what happened. That is an example, take that as an example, cool, what can we apply to this concept</i>

Document name	Segment
	<i>across different forms of value transfer, across different kinds of processes where regulation is required and use that? I think that is something that is very, very powerful, we need to look a bit more of that.</i>
P_10	<i>So, it is a financial inclusion play on assets that represents traditional wealth, but also now trying to introduce transparency and reduce friction in the process by tokenizing it, and also being able to monitor and be able to make this, the asset itself quite transparent to the investors.</i>

3. Aperture of the perceptual value lens

The second way in which the perceptual value lens transforms is the aperture of the value lens (the size of the value lens). Being able to do things more efficiently and effectively leads to experimentation in doing things not previously possible with previous generation technology (web 2.0). For example, participants perceive that crypto payment objects (and the tokenising of assets and currency) extend capabilities that did not exist before in the transfer, store and appropriate value in a frictionless, near direct way. Using crypto-objects to interact makes it possible to have more participants in a value ecosystem (the number of participants accommodated in a value pool).

It also makes it possible to create more complex value networks that did not make economic sense before (such as micropayment, micro services and giving everyone a bank account for free). Furthermore, combining crypto objects makes more complex interaction possible (for example, identity payment and reputational objects within a 'killer ecosystem application').

With value networks that are more inclusive and border-less, a more inclusive financial market base may be created. The result of a larger value lens is not just a 'faster horse', but also a completely different social and economic coordination system emerges, with different mechanics and properties (it would include coordination between autonomous devices, as well as the internet of things).

Overall, the 'physics' of the system is completely different. However, the capabilities emerging from this new coordination and/or 'interoperating' system is not well understood, and participants argue that a great deal more experimentation and education is needed to understand how to use these capabilities, before there can be large scale adoption of blockchain technology.

Table 4.18 provides examples of participants' experiences in terms of change to the aperture of the value lens used.

Table 4.18: Aperture of the perceptual value lens

Document name	Segment
P_01	<i>The potential is there, so if, some people refer to it as the tokenised economy. Once you start to have your house on a distributed ledger, you don't have to pay somebody thousands and thousands of Rands to kind of register your deed.</i>
P_01	<i>I also think the non-financial use cases. So, people talk about sovereign identity. One of the ways to potentially implement that is DLT. You know, if we can implement something like that in South Africa, even though the rest of the infrastructure does not change, that will enable a lot more people to be able to have easy access to financial services. So, there's potential, massive potential.</i>
P_02	<i>Where's the white space for blockchain? Partly it's, it's, I think it's, just kind of developing my thinking, it is a combination of two things. One is new, the complete new things that you could not do before, like send money over distance without an intermediary, but then an ICO (Initial Coin Offering) is a completing new way of raising money, then there's also things like or before didn't make sense for me to buy newspaper per article, but I could do that if my browser contains an identity that has a way of paying, which may be Ether or Bitcoin or whatever, and the website is set up to in a way that I could pay per article or one cents at a time and that makes sense. Before it did not make sense, so were you take an existing model, and extend into space that was not there before and then create a completely new model and those two areas that other have figured out yet.</i>
P_02	<i>IOT (Internet of Things) is one massive space, and again it is that combination, you take you take IOT and combine that with Bitcoin and Blockchain and whatever enables, and you take AI and combine with Blockchain and then then get new things. Suddenly you have all these new tools and we're just at the beginning unpacking all the opportunities.</i>
P_02	<i>Where I get interested is where you do something completely new, Bitcoin is a first. It is a new way of doing money,</i>
P_02	<i>One is new the completely new things that you could not do before, like send money over distance without an intermediary.</i>
P_02	<i>You can have a parallel identity automatically, my fridge can spend money on my behalf, something like that, or my car can park at the lights and charge a minute in an induction loop in the road and pay the city or whoever owns the induction loop a few cents for being topped up slightly.</i>
P_02	<i>ICOs is a new way of fundraising, the second and then things like non-fungible tokens.</i>
P_02	<i>... and steward identity and all the other stuff is going on, are the next ones.</i>

Document name	Segment
P_03	<i>Crypto, traditionally the alternative is to go through banks to offer client services. Crypto breaks down the barriers and introduces for competition to come and provide different services to give more competitive offerings, to give more ownership and control over one's funds to the individual as well.</i>
P_03	<i>The main thing that we focus on is being able to, enabling people to make payments for free just from their smartphones. So, we consider, sort of three quote, unquote competitors. The first is banks and the value that they offer versus banks are the cost, access and speed. Mobile money in some markets is a major competitor. It has become the second financial infrastructure really, because you can make a lot of purchases. You can do things with a very low barrier to entry, as a feature phone and USSD menus, but mobile money now without cost. Those cost can be very expensive especially at the micro transaction level, which our customers do very frequently. The lowest rates that mobile money charge can be up to 50% of the transaction. Which is not possible. It is not sustainable</i>
P_03	<i>We obviously don't want to go the route where we go around being another organisation controlling everyone's identity. Self-sovereignty is a critical component to be able to achieve in the next generation of financial services. It is on our roadmap, our approach is to incorporate some of the protocols, and solutions that are already out there being developed by other teams and incorporate some of the things that we need to make digital identity work for the experiences that we are offering.</i>
P_04	<i>So, for example, looking an academic certificates that are anchored to blockchains, allows a graduate to prove that any time in the future, that they got, they were issued with a degree, at a very specific time, by a very specific institution, and potentially show that there was 4 years or 3 years of work behind that. That is, that is juxtapose against a situation where, let's say; a high-profile person claims that they have a degree now, but the degree was only registered on the system two weeks ago. Yet, it was awarded 10 years ago. So, now you start to question, you know, is there something fishy. With blockchain it's impossible to question those things.</i>
P_04	<i>So, so, that's looking at one example. Another example is looking the transport and logistics industry, the tracking of vehicles in whatever jurisdiction, because of another party, let's say for example, the UN is interested to ensure that their aid into Africa, does make it to the group destination. With blockchain you can anchor the GPS location, and actually track the positions on a map. So, you know there's, there's definitely good examples, that have come to light in the past few years with regards to blockchain technology, but it is only made possible because cryptocurrencies have created that mass market adoption, the network effect effectively.</i>
P_04	<i>A very good example is venture funds, venture capital funds. The fact that you had to go to a syndicate organisation to raise funding, to start your business. That seems to be an archaic system, because that is very centralised, you can only get exposure to a certain group of people. Whereas, when it comes to cryptocurrencies or specifically smart contracts and ICOs now, you can create funding from the world, from anyone that has</i>

Document name	Segment
	<i>access to this ecosystem. That's arguably the best solution that we have come up with regards to blockchain technology right now.</i>
P_04	<i>So, identity definitely comes up a lot, and I think that is because in blockchains, in cryptocurrencies you have a private key and you are the custodian of that private key. If you give it out, you effectively lost your identity of those coins on the blockchain or Bitcoin or whatever. So, you guard that with your life, and similarly you've got your identity of your life, because that's what that's what gives you credibility in the world effectively. So, there's definitely a good synergy between those two concepts, blockchains and identity, and I think in general, we also see a huge driving in education right now, because of the possibilities that blockchains provided.</i>
P_04	<i>So, for example, SWIFT is a bottleneck in international money transfer, international money policy itself you could argue is a bottleneck, and if we could create an identity system that fits hand in hand with a blockchain, such that you can do instant payments around the world, but still sit within the bounds of regulation then that is a great use case.</i>
P_05	<i>Oh, so one is one of the questions they asked: where there any kind of realistic volumes applied to these networks? We said no, they are really just test transactions. So, they said: we love to test in a realistic infrastructure, with realistic volumes of transactions. So, that would really be something that really never been done before, while maintaining the fully confidential state of those transactions.</i>
P_05	<i>So, you can work for a bank or you can work for one of these new platforms, that are definitely challenger platforms and incumbents are definitely, you know, either a messaging systems or settlement systems and the, these new platforms will provide what we call a payment object, which is everything you need around the payment, which includes the payment instructions, all of your kind of data that the regulators need as well as your actual settlement token if you like.</i>
P_05	<i>You have your existing platform. Here is another platform. We can connect it and process a payment. It's quicker, it is faster a list of reconciliation. You plug it in here, you plug it in here, you don't have to worry about thinking about the underlying technology. I think in five years' time people will be doing payments, it will be going over blockchain. We never knew it.</i>
P_06	<i>I gave you an example with Uber. In this country, I don't know yet. Remittances for example, again, it's, it's gonna take a while to take off, but I mean, you can do remittances in the US, phone to phone using underlying cryptocurrency. I can send US dollars from here to Mexico or anywhere in the world, to a particular individual person who's using the same app. You can do it today. So, that's a fundamental shift.</i>
P_06	<i>Even the remittance system and you know, allows you to send money to your gogo in Zimbabwe, at a fraction of the cost of doing it the traditional way or even any of the other traditional ways. Just giving the cash to a taxi driver and him going out and trusting that he gives it to your gogo.</i>

Document name	Segment
P_06	<p><i>... and that will certainly make our lives a lot easier, but it's not a blocker for us. It wouldn't it would make our lives easier, our own lives easier and I'll make everybody lives easier, if you had a system which is just an app on your phone, and you could prove your identity, whether you are local or foreign. With everything on there and you're not having to redo everything, every time you want to go and get up a bank loan or buy a car or just you do an HP, something somewhere else. You got to do the same thing all over, all over again. It is just one little thing, thing. Blockchain will sort all that out.</i></p>
P_06	<p><i>So, yes it disintermediated the taxi companies, as we knew them, but it is still central Uber man sitting at the top. You contact him, he contacts the driver, back and forth, all centralised. This thing disintermediated Uber completely. It was completely decentralised, so these Uber drivers therefore didn't pay anything to Uber anymore, but they did the exactly the same service and it worked exactly the same way, apart from being decentralised. Distributed ledger system, running on a bitcoin underlying payment which made everything safe. So, there was a perfect idea of somebody being disrupted by a blockchain technology and its fantastic story I think.</i></p>
P_07	<p><i>It opens up a whole new world in terms of backing up in a distributed decentralised manner. In terms of my thinking about how do your backup systems now, has changed a little bit. Okay, actually I can bring these guys on board, they can actually back up my ledger, at no cost to me. I can back up, like I scratch their back and they scratch mine, and I can trust them, you know in this thing, you now and obviously not trusting in the in the true nature that I'm trusting you, because you are a human being, but trusting in the mathematics and the consensus mechanism in a blockchain. That for me, is a mindset shift that happened.</i></p>
P_10	<p><i>What they do is fractional asset investing, but the asset that they invest in, that they put up for investment opportunities is cattle. But, ultimately what the looking to do now, is tokenise their fund. I made a joke with them, many months ago when I first met them, you should call it Cow coin, except they are now doing cattle and sheep.</i></p>

4. Location of the value lens

The third way in which the perceptual value is transformed is the location of the perceptual value lens. The participants perceived and judged a fundamental shift in the control of identity (self-sovereign identity), personal data and money (money that is censorship resistant), and if architecture is used that is fully distributed. There is no centre to control. The value lens also shifts to a single source of truth (there is no need for intermediaries or agents to reconcile different versions of the truth). The result of these shifts is that DLT extends capabilities to nodes in the network to transfer and appropriate value in a direct and granular way.

Capabilities to extract or capture value shift to nodes, although individuals are direct participants in capturing value, granularly. Value creation and appropriation shift away from value chain-based and bounded relationships. This means that producer and consumer-based, linear and dyadic relationships will likely morph into more peer-based, non-linear, folded circular relationships. The focus of this capabilities' shift, as a whole, is not to rely on intermediaries or centralised institutions to create a bigger value pool and then find ways to share it with others, or regulate behaviour to create a fairer dynamic in the distribution of value.

This differs from constructs such as shared value (Porter & Kramer, 2011) and the shared economy proposed in the literature. The perceptual value mind-shift is to extend capabilities to nodes (a micro-level focus). Individuals, organisations and communities in a decentralised and distributed value ecosystem are nodes, who have a capability to own and directly control objects that are native to the web. This makes more complex value networks and business models native to the internet possible. For example, networks of trust, identity and reputation (anchors to create business models native to the internet).

With complex near-interactions nodes, individuals, organisations or a community can capture value in a direct and granular manner that was not previously possible. The thinking shifts from value chains, shared value and a fairer distribution of value, to fairer value micro-level transfer and the capture in an ecosystem (Kramer & Pfitzer, 2016).

Table 4.19 provides examples of participants' experiences in terms of the location-shift of the perceptual value lens.

Table 4.19: Location of the perceptual value lens

Document name	Segment
P_03	<i>What the distributed phenomenon does for me, is, it enables consumers and enables companies' consumers to engage with the global economy. It enables them to protect themselves against potentially protectionist policies and governments that have, that end up hurting consumers.</i>
P_04	<i>If we had to do it through the banking system, I'm not sure how easy it is to hold wealth in Dollars in South Africa right now, but someone else is the custodian of that money, and they can turn around, because of regulations as say; you have to convert that back into Rands right now, because of rules and regulations. So, it puts you at risk of being devalued, as an individual,</i>

Document name	Segment
	<p><i>based on the decisions of policy makers, such as parliament, or you know, just stupid comments that are not well thought out, and the effect on the economy is not considered. Similarly, because of the discussion, the political discussions in the country right now. Not, not even in South Africa, Turkey for example, is going through a crisis and yet because they are also an emerging economy, it has an effect on our economy. Yet, we are not involved in those problems. So, Bitcoin, cryptocurrencies, I'm gonna say Bitcoin, because it is the dominant cryptocurrency. It is potentially a global currency that is not susceptible to the decisions of an individual. It's too it's acceptable to the decisions of society, as a whole and because of that, it has in my opinion a firmer position as a as a store of wealth, maybe not a transaction tool, all other cryptocurrencies can be transaction tools, but Bitcoin is definitely a better store of wealth, because of that decentralisation nature of it. So, my experience is that I would prefer to be in crypto.</i></p>
P_04	<p><i>If you're in a situation where there's a party that has the ability to corrupt or edit data that should not be edited, that's a good use case of blockchain technology. Disintermediating that third-party and becoming a trust-less system. Another situation is when you, again when you, you want to remove a bottleneck in a situation. So, for example, SWIFT is a bottleneck in international money transfer, international money policy itself you could argue is a bottleneck, and if we could create an identity system that fits hand in hand with a blockchain, such that you can do instant payments around the world, but still sit within the bounds of regulation then that is a great use case. Yeah, I can't remember what else.</i></p>
P_05	<p><i>... not just visibility to, because you can make you make centralise ledger visible, but have trust in because they, they can see the provenance of all of the payments that happened up to that point, and they know, and they control their own accounts, that's the main thing.</i></p>
P_05	<p><i>So, could be where my money sits, or my client's money sits, but the fact is I have a partitioned section of the ledger, whichever private keys I have, I own, I can control the payments from those accounts, which is which is significantly different to any other way of partitioning any other kind of database. So, there's this significant benefit of no reconciliation and the ability to partition in such a way that, that I only control those accounts that I have authority over.</i></p>
P_05	<p><i>Now, you know, when last did a Bitcoin payment fail? They don't fail, because there's this massive resilience on the network. You know, you don't care if half of Bulgaria's Bitcoin servers go down. It makes no difference, because you reach your payment through some other servers, and so the resilience is the other huge one. We take away the reliance on centralised systems.</i></p>
P_05	<p><i>So, what, what is interesting is a central ledger typically don't have full control over your own account. So, you can log into your bank account and you can make the payment, but you are not actually making a payment, you are sending an instruction to someone, to make a payment on your behalf. You can't control your actual bank account. You can't log on there and say: transfer money from X account to X account. You have the illusion that you're doing it, but actually you login on and you sending an instruction and</i></p>

Document name	Segment
	<p><i>there's an automatic process in someone's making is that payment on your behalf and someone could make a payment without you instructing on your account, and that's the scary thing about the current, you know, financial, the way the financial systems work. So, banks work really, really hard to make sure that you, know you don't have. People who are not authorised to make payment on your behalf can't, but the reality is, you know, it happens all the time. Someone hacks a website, gets details that they shouldn't get hold of and suddenly your payments are going off your bank account and you never asked him to go off your bank account, and see you don't have control of that.</i></p>
P_05	<p><i>So, I spent about 18 months there, working mainly in the in the traditional payments space, funny enough, but saying: you know what if you could take two organisations that don't trust each other, but need to make payments between each other, in normal government-backed currencies, fiat currencies, what if you could put them on a single ledger, a distributed ledger. Allow them to control their own accounts private keys, if you like, and be able to do payments between each other, with government issued currency or regulated currency at least, and so that was the premise and couple of projects, probably the most significant early on was the Central Bank of Singapore and monetary authority of Singapore.</i></p>
P_05	<p><i>Everyone can see exactly what's going on as a single source of truth amongst everyone, there's no, no reconciliation requirements, so that's the first key benefit in a payment context, and the second is I control my accounts on the ledger. So, could be where my money sits, or my client's money sits, but the fact is I have a partitioned section of the ledger, whichever private keys I have, I own, I can control the payments from those accounts, which is which is significantly different to any other way of partitioning any other kind of database. So, there's this significant benefit of no reconciliation and the ability to partition in such a way that, that I only control those accounts that I have authority over. So, it could be a bank that has access to kind of a treasurer accounts, there even customer accounts, but it could be like a broker of sorts, could be a payments provider, could be so you can start partitioning these distributed ledgers in many different ways, that's, that's significant.</i></p>

Theme 6: Difference in mechanics

The sixth essential texture of participants' experience of the distributed value ecosystem is 'the difference' in mechanics of a distributed ledger system. The participants' perception and judgement of the mechanics (blockchain architecture workings) of the distributed value ecosystem is that it is fundamentally different. Three sub-themes emerged in terms of the mechanics of blockchain (see Figure 4.8 below):

- (1) Participants notice that decentralised and distributed architecture is emerging parallel to centralised organisational architecture.

- (2) Centralised architecture is not agile and quick enough to keep pace with how the decentralised and distributed value ecosystem is being shaped by an open, transparent and sharing blockchain community.
- (3) Lean blockchain architecture influences how start-ups and corporates are starting to behave like each other (pivoting towards each other).

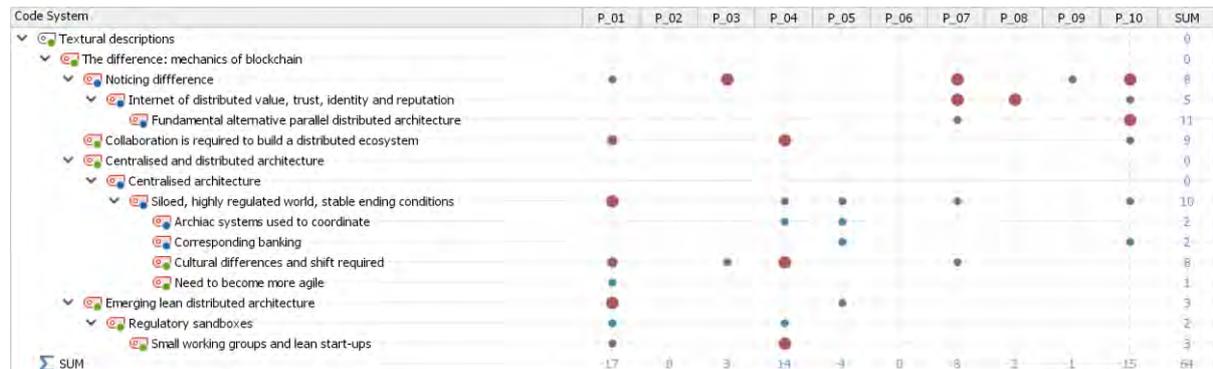


Figure 4.8: Blockchain mechanics



(Double left click on the icon for a larger image of Figure 4.8)

1. Noticing emerging parallel decentralised and distributed architecture

The participants (Participants 01, 03, 07, 09 and 10) perceive, notice and judge that a decentralised and distributed architecture is emerging parallel to the centralised organisational architecture. Participants refer to this emerging architecture as the internet of value, trust, identity and reputation (Web 3.0). The belief is that blockchain architecture not only flips the traditional management pyramid, but also scatters it. The mechanics of blockchain make it possible to create new business models (and a token-based economy) that is the complete reverse of the current centralised business models (“I think it is going to be difficult for organisations to really grasp the principle of a pure blockchain based protocol. Because, if it is truly decentralised and distributed, it means then that there is no organisation or some entity at the centre, just like sucking up profit, and that is something that I've been saying”).

Table 4.20 below provides examples of participants’ experiences regarding noticing emerging decentralised and distributed organisational architecture.

Table 4.20: Emerging distributed and decentralised organisational architecture

Document name	Segment
P_01	<i>So, if you think, if you are talking organisational architecture, that is more emerging.</i>
P_03	<i>We realised it was the correct approach to deliver a consistent global experience that allows us to achieve our goals for servicing our customers. It's that when we shifted our entire companies focus to be one that is entirely based on distributed ledger technology, and decentralised financial services.</i>
P_03	<i>Technologically it is a major shift. It goes from one heavily depending on services like AWS, to completing approaching a decentralised architecture. There is a massive cultural shift as well. It reorients our structure from being back end, front end to being decentralised protocol, first, the implementation of the application, second.</i>
P_07	<i>He is not employed by an organisation necessarily. Like you don't have to clock in at eight in the morning. He works wherever in the world, whenever he wants and also gets paid in cryptocurrency. That's the life, right. That is the future of work.</i>
P_07	<i>It is not even that. It is also organisations, it has a certain way of doing things. Blockchain is quite different to a lot of the ways to do things. It is a big learning gap. Different layers of IT, you gonna have to understand how it work, dev-ops has got to understand how it fits into the existing system or they have to change how to do things, how you are actually going to communicate with other nodes.</i>
P_07	<i>Now you have this whole new market, parallel economy that is opening up that people globally can get access to funding.</i>
P_08	<i>I guess we obviously work in banking, but how other industries will be affected. Banking obviously that spawned from the currency, but how affect other industries, because this is web 3, the next version of the web, how will that will play out.</i>
P_08	<i>It's completely different. It's this whole new use cases. These cases are coming out where, you have this network of people, where you can distribute the trust, across to people, you don't need one to verify that. There is whole lot of new use cases that are popping up in other industries.</i>
P_10	<i>I think it is going to be difficult for organisations to really grasp the principle of a pure blockchain based protocol. Because, if it is truly decentralised and distributed, it means then that there is no organisation or some entity at the centre, just like sucking up profit, and that is something that I've been saying. It has been at the tip of my brain for a very long time.</i>
P_10	<i>So, it breaks up your monopoly on these utility services, that fintechs are already showing you are, that is what you are becoming, and it just breaks it up and says cool; a bank that does these five things, these five all become independent, like atomic services that gets added into this network of value.</i>

Document name	Segment
P_10	<i>It is more than rails. Yes, banks do you use rails, specifically from a payments, but rails just mean something cool it means connecting something to something else. This doesn't just connect something to something else. It is not just the rail, it is like also a foundation for the station you know. Where the train journey begins. I am really like stretching this metaphor, but is rails and the foundation for the endpoint of the rails. So, it's a lot.</i>
P_10	<i>So, I think it is a fundamental like layer, not just for technology you know. Just like the economics of it. Again, this is speaking in generalities you have different kind of blockchain. You now actually have a way to create incentive mechanisms for people, for agents, you know in your terminology, by designing something like this. You are effectively plugging in different kinds of technology on top of it, to effectively make it so. It is an amazing fundamental platform.</i>
P_10	<p><i>Wow. Well we touched on the notion of a decentralised autonomous organisation, to a degree. Mostly the fact that it is a business model that is completely the reverse of the current centralised models that we have.</i></p> <p>Researcher: It turns the pyramid upside down?</p> <p><i>Completely. It scatters the pyramid, really</i></p>

2. Centralised architecture mechanics

The texture of participants' experiences of the mechanics of centralised financial organisations (central banks, banks and stock exchanges) is that they are perceived as 'stodgy', archaic systems, highly regulated and exclusionary. High barriers to entry exist and organisations are not always interested in financial inclusion. Central banks, commercial banks and stock exchanges seek to maintain stable ending conditions: price, financial and currency stability. Participants also judged the centralised regulated payment infrastructure as not being as agile and quick as it needs to be. They are not keeping pace with leaner start-up culture, that is more open, transparent and sharing.

In the regulated payments space, small pockets (blockchain units) exist with a start-up culture. The perception is that organisations in the regulated space do not possess the capabilities (ambidexterity) to turn around the 'ship', and a major cultural shift is needed to do so. Participants that were involved in experiments with blockchain, judge that blockchain is a collaborative, rather than a competitive game.

Table 4.21 provides examples of participants' experiences in terms of the organisational ambidexterity demonstrated by centralised organisational (in the regulated payments space) exploring blockchain technology.

Table 4.21: Centralised organisation mechanics and ambidexterity

Document name	Segment
P_01	<i>So, I was involved in the project from the start. One or two things was just, maybe not so much about the technology, but as an institution is more stable, that is supposed to be more stable, we are responsible for financial stability and these things</i>
P_01	<i>When we have to go to market, you know, we have to have this very kind of almost rigid way we do things. Because, the country in essence has to have confidence in that, you know. We are not gonna something stupid.</i>
P_01	<i>So, it is a lot more stodgy. A lot more traditional and I think, and that unit was 160 people.</i>
P_01	<i>I think a lot of things are still I play. You mentioned the project, but to some extent you can do a project, but then nothing comes of it. So, I think, the thing for is to take that experience and we need to as a bank become more agile in the way we approach things</i>
P_04	<i>It's I mean, how would your corporate you...it's you know, this this industry right now is very well suited to a lean start-up methodology, for example, where you find a problem to solve, you bootstrap a solution as quick as possible, and you test if it answers a problem, and if society adopts your solution, if they don't, then you prove immediately, and you listen to your customers and say and ask them; why did it not work for you. So, your large entities who have governing structures and reporting structures and whatever. They cannot change at that rate, and it's true throughout history that you have larger entities that can be disrupted by your smaller more agile companies.</i>
P_04	<i>Yeah, I think that point is when they realise that their own system is so archaic that it is a massive hall over to get onto a new system. So, that might as well just continue with what they're doing and that's where your potential for start-ups, tech companies to come in and disrupt industry.</i>
P_04	<i>So, for them to, to turn that whole ship around and become extremely innovative, adopting new technology is going to be extremely difficult, and they are fearful of that now, because they are start-ups that can walk in and do things far quicker, far more cheaper, efficiently and capture a market far quicker, because of social media for example, influencers can build a following quicker than your traditional banks can. I think those are two good examples.</i>
P_04	<i>I think a good example is one of the companies that we deal with left their corporate position, despite that company that they left having created a blockchain unit, but that blockchain unit wasn't agile enough to get things done. So, the guy simply left and said we are gonna do it as a start-up.</i>

Document name	Segment
P_05	<i>So, at the moment in the world we live in any payment from anyone, any one institution at a different institution, whether it is within the same country, whether it is across borders, becomes very complicated, because you need to hop between different trusted banks.</i>
P_07	<i>I would say at this point it's not really, there isn't much that has changed as a culture, because there's pockets. It's only few pockets that were involved with project X. Definitely, in those pockets, those people that were involved in project X, their culture, the culture, the way they see themselves participating has changed, because now we see people now want to explore more use cases. What other mechanisms can you guys collaborate ...?</i>
P_10	<i>Listen, I think at the moment it is not, locally, for sure. I don't see any organisations basically breaking up and saying: oh my God, we are seeing where blockchain is taking us and we and deciding to unbundle.</i>

3. Emerging externally available intelligent interoperating building blocks

In the previous section, the texture of participants' experiences of the mechanics of blockchain ecosystem showed that collaboration is required to make it work. The participants judge that blockchain works best when organisations in an industry are connected using blockchain (an external intelligent building block for an industry). The participants also judge that it is silly to put a blockchain in an organisation, as the value lies in the capabilities to interoperate and the network effects that are created by collaborating (coopetition emerges between participants, based on peer-based game structure between participants).

In the regulated payments space, most people work in small units, such as blockchain units, to experiment and understand the impact of blockchain technology on the current financial system. Furthermore, to understand the impact on financial infrastructure and the systemic risk in adopting blockchain and finding the 'white spaces' for the organisation (efficiency and effectiveness gains). The focus is not on 'creative destruction'. The concern is in understanding the 'destruction' and competition, or new opportunities that blockchain will bring. The proof of concepts developed in the payments space (real-time gross settlement) has shown that blockchain technology works.

The participants judge that the workings of centralised organisations will change, but not the mandate of organisations in the regulated payment space, such as central

banks and banks, where the mandate is to ensure stable ending conditions (economic stability, price stability and currency stability).

In the unregulated payments space, the focus is on moving beyond the 'business as usual' practice. The focus is on the strategic value of blockchain (improving the fitness of the underlying system of coordination, and create a fairer dynamic in the transfer and capture of value). Organisations in the unregulated space have tried to work with banks but have been frustrated in creating the future they want.

Overall, participants judge that decentralised and distributed architecture is emerging parallel to the regulated payments architecture, and that a great deal of work is being done by the blockchain community to create the components and layers needed to grow the blockchain ecosystem (payment objects, identity objects and smart contracts that are native to blockchain).

The impact on centralised architecture is that it changes from being front end – back end to an open protocol (with an open protocol anyone can either opt in or out of the ecosystem). The blockchain ecosystem is also maturing because layers are being added to the open protocol (for example, an identity layer that is often missing in most of the use cases).

Table 4.22 below provides examples of the participants' experiences regarding the emerging externally available intelligent interoperating building blocks.

Table 4.22: Emerging intelligent interoperating building blocks

Document name	Segment
P_01	<i>I would say merging architecture. Again, I think on how you see things. Definitely, if you look at the bigger payment systems. The wholesale payments that some specific architectural DLT arrangement, whatever the term you want to use, then there might be other DLTs that have to interact or interface. So, also, it's emerging.</i>
P_01	<i>So, I think they're kind of units and even within departments people, that emerging, that's starting to think differently, but I do think it's emergent. So, it's definitely not... we did not change overnight. Everybody is not necessarily on board with things. It is a cultural change, things will definitely change, happen over time.</i>
P_01	<i>One of the things that we are involved in is, what we call innovation facilitation. So, regulatory sandboxes, innovation hubs, accelerators and so that is potentially things that we may do different, which may be four, five year before DLT, but it not just because of DLT (whatever technology term</i>

Document name	Segment
	<i>you want to use, fintech, emerging tech, exponential tech or whatever), but that is something four five, year ago, it was not even on the radar for us.</i>
P_01	<i>So, that experience wasn't necessarily true of the entire unit, but now being in a small unit, in essence three of us, but just the fact my two colleagues in the unit, I think we think alike, we think about the future and the impact of these technologies.</i>
P_04	<i>The purpose is to experiment with the technology and understand how it affects business and also to test out regulations, because regulations were created 40, 50 years ago, maybe even 100 years ago when the Reserve Bank was created. Those are not necessarily relevant to modern society. So, we are looking at creating that sandbox environment to test the boundaries of current legislation and see if it doesn't give me updated.</i>
P_04	<i>It's you know, this this industry right now is very well suited to a lean start-up methodology, for example, where you find a problem to solve, you bootstrap a solution as quick as possible, and you test if it answers a problem, and if society adopts your solution, if they don't, then you prove immediately, and you listen to your customers and say and ask them; why did it not work for you.</i>

4.2.3.2 Invariant structures

In this section discusses the structural themes (noesis) that emerged in terms of the object of action (see Chapter 3, Section 3.7), such as the act of experiencing: perceiving, feeling, thinking, remembering or judging. The object of action is essentially how participants experienced what they experienced using DLT (see Figure 4.9 below for the underlying invariant structures that were identified).

The three underlying invariant structures of participants' experiences that were identified are as follows:

- (1) Self-determination in terms of relations to self and relatedness to others.
- (2) Feelings of fear, excitement and frustration.
- (3) Binary and folded states.

These underlying structures were identified and described through a process of imaginative variation (see Chapter 3, Section 3.6.3).

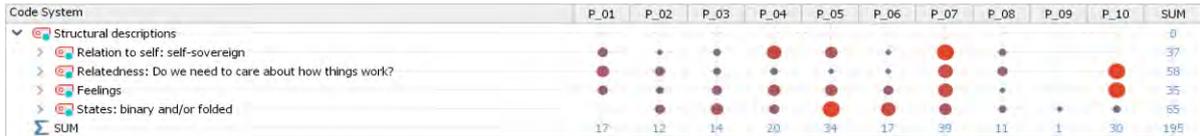


Figure 4.9: Invariant structures of participants experiences (noesis)



(Double left click on the icon for a larger image of Figure 4.9)

Self-determination

The first invariant structure of participants' experiences connected to using DLT is self-determination. Self-determination consists of two sub-structures (see Figure 4.10 below):

- (1) Relation to self: self-sovereignty (autonomy), and
- (2) Relatedness: interaction with others and harm.



Figure 4.10: Invariant structure self-determination



(Double left click on the icon for a larger image of Figure 4.9)

There is an open awareness and interest in what is happening to the individual's identity, data and financial well-being. Society is more aware and mindful of harm to self and others from centralised systems of coordination. There is also a growing awareness that individuals seek to be in control of what affects them and they seek more autonomy (self-sovereignty). See Section 4.2.3.1 for the catalyst (noema), seeking self-sovereignty, more specifically, money that is censorship-resistant, and privacy and control over personal data and identity (self-sovereign identity). Individuals

are more aware that they do not control their bank accounts, data and online identities. There is also an awareness that they do not control how their money and data are used in a centralised system.

The resulting dynamic is that how the financial system works is exclusionary. This means that the nature of the financial system works for the wealthy, but the financial system in terms of online interaction (value transfer and capture) does not work for individuals at the bottom of the financial pyramid. Individuals at the bottom of the pyramid still use cash to transact. Individuals have no choice but to use bank accounts, primarily to have their salaries or pensions deposited and then withdraw most of it in cash to transact, as it is cheaper to do so. It is assumed to be the natural order of things. The judgment is banks are serving a smaller and smaller segment of society with very basic financial services, and fintech organisations have taken the lead in terms of the client-facing aspects of banking.

Individuals are aware that cryptographic objects issued on blockchain (such as payment and identity objects) give nodes (individuals or organisations) who own the private keys of crypto objects the capability to control the flow of value and interactions with others, without the need of an intermediary, such a bank or government organisation. Interaction with others on a peer-to-peer basis extends a capability to individuals that has never existed before. It challenges the 'natural order'. It makes fairer capture and distribution of value in a direct manner possible and creates a perception that anything is possible, and can cause a power shift between highly centralised organisations and individuals in society.

1. The structure of experience in terms of relation to self

Individuals are more confident that by using DLT they can protect their identity, data and wealth (financial well-being). The participants judge that individuals feel they are more in control of their destiny, and a blockchain makes it possible to create the future they want. They don't have to wait for centralised organisations. Furthermore, there is a reduced dependency on intermediaries, as a distributed and decentralised system grows. More nodes are available to maintain and ensure the continuity of a distributed system (and increased resilience). Individuals also indicate there is a great deal of trust and willingness to collaborate with others in the blockchain community. More so than the trust in banks and government.

Table 4.23 below provides examples of participants' experiences in terms of relation to self, and seeking self-sovereignty over personal data, money and identity.

Table 4.23: Relations to self: self-sovereign

Document name	Segment
P_02	<i>There is a lot of worrying things going on, and so there is a lot of people almost wanted to secede from nationality and go and buy an island and live there and have a blockchain system and everything will work nicely.</i>
P_02	<i>Yeah, you don't have to go that far to when the idea of being self-sovereign or whatever you call it was not unusual, that was the norm. Passports only really came into circulation in the last 100 years or so. Before that you had a letter from someone, before that you had a letter of introduction before you went to a new town or something like that. So, there's different things that have come in, as we travelled more and need to prove who we are, for various things, and that's only changing because I need to prove who we are in different contexts, not just as I cross the border, but as I engage with a new business or new service or whatever. So, those things will change.</i>
P_03	<i>Crypto, traditionally the alternative is to go through banks to offer client services. Crypto breaks down the barriers and introduces for competition to come and provide different services to give more competitive offerings, to give more ownership and control over one's funds to the individual as well.</i>
P_03	<i>It is giving us a clearer path to success. It is giving us a clearer path to opportunity. We are all motivated on the same goals, which are just not success in this business, but the desire to actually solve these problems and banks have been a thorn in our side more than value add since the beginning of our company, so for us it gives us more control over our own destiny.</i>
P_04	<i>So, a very good example of a decentralised system, where you do not need the security measures the banks think they are useful to us, but actually cause a hindrance sometimes. It is a good example of me being able to continue with my daily activity, based off my investments in cryptocurrency.</i>
P_04	<i>But, the fact I wouldn't have to ask permission to send money to that person, and he is very, I mean it's his choice to covert it back to fiat or keep it in crypto. So, that that that is a good experience of the difficulties of the system, of the current system and where cryptos is applicable to solve those problems, and if you just repeat the question again.</i>
P_04	<i>So, moving into crypto, allowed us to maintain our net worth, in dollar terms, and still be the custodian of that wealth. If we had to do it through the banking system, I'm not sure how easy it is to hold wealth in Dollars in South Africa right now, but someone else is the custodian of that money, and they can turn around, because of regulations as say; you have to convert that back into Rands right now, because of rules and regulations.</i>
P_04	<i>But I think, so it's probably good to say that society, humanity is kind of losing its way, identity. I cannot speak for 500 years ago, I'm pretty sure that societies, being small communities, had a way of weeding out things that</i>

Document name	Segment
	<i>were not to the benefit of society, and now because we are living in this boarded country jurisdiction to society, where decisions made in Johannesburg don't necessary influence Cape Town as much, and vice versa but it's still being made at a policy level for the country. Whereas, if you had one village, in one part of Africa, you had a village in another part of Africa, today there within the borders of a country, but a hundred years ago they didn't influence each other whatever. They lived in harmony and their societies themselves had a way of weeding things out, weeding out corruption.</i>
P_04	<i>But I think what we are gonna start doing. I think it's already becoming evident with like with the likes of California saying; we wanna be your own country now. They're realising that this globalisation situation that were in actually just doesn't seem to work. We wanna be in control of what affects our lives.</i>
P_05	<i>Someone hacks a website, gets details that they shouldn't get hold of and, and suddenly your payments are going off your bank account and you, you never asked him to go off your bank account, and see you don't have control of that. Now, with a distributed ledger everyone has the same visibility. Everyone can see exactly what's going on as a single source of truth amongst everyone, there's no, no reconciliation requirements, so that's the first key benefit in a payment context, and the second is I control my accounts on the ledger.</i>
P_06	<i>It was completely decentralised, so these Uber driver's therefore didn't pay anything, to Uber anymore, but they did the exactly the same service and it worked exactly the same way, apart from being decentralised.</i>
P_07	<i>Just to add on a bit to the paradigm shift, blockchain like if you implemented it right. Think about land registry, think about title deeds. Putting that on the blockchain. Issuing that like so basically eliminating the whole waiting period for title deeds and you're reducing that. So, you give people dignity. There is as a human aspect there. Because, when I have my title deed, its dignity for me. I know tomorrow the government won't come and say we are building a clinic where you are staying, right?</i>

2. In terms of the relation to others

There is awareness that a decentralised and distributed value ecosystem promises friction-free collaboration with others, without the need for a central authority or intermediaries. Interaction that is censorship-resistant is also made possible, which is viewed as desirable in terms of a counter-balance to the oppressive or exploitative contexts created by highly centralised systems. This gives individuals an alternative system, which individuals can opt in or out of, if the nature of the relationship is not a fair give and take.

Without the need for intermediate and centralised authorities, transaction costs are lower, and there is less friction in the system itself, due to the boundaryless nature of blockchain. This further changes the structure of relation with others. It means the number of direct participants (near peer interactions) in a value network can dramatically be increased (everyone can have a free bank account). It makes more complex value networks possible than what was previously possible or seen as economically viable in an online centralised database environment.

In terms of the organisational perspective on using blockchain and its relatedness with others, there are two perspectives that participants hold: a narrow and broad perspective. The narrow perspective is that blockchain is viewed as a technology that organisations can pick from a bag of new technologies, to perform tasks in more effective and efficient ways. In terms of organisational workings, a fit perspective is used. This means that managers seek to create alignment and fit between the environment and organisational architecture workings that result in stable end-conditions. Hence, the start and ending conditions, and the dynamic that plays out in the system stays the same. Individuals are consumers and centralised organisations are the custodians of individuals' money and data (a power over relationships between organisations and society).

Management is concerned with value that is extrinsic (units of value) in nature: cost, speed and convenience in using a service. However, individual users do not own their money or data, and they do not control how their money is used once it enters a money or information 'island'. The interaction for individuals (consumers) with others is linear and is a point-to-point affair. The result is that the capture of value and distribution of value is determined by the centralised organisations who have control over the flow of value in and out of money and data islands.

In the case of banks experimenting with blockchain (in the payments space), banks are excited about the security and frictionless properties of the technology, but fear the autonomy that it will give users, if fully distributed. Autonomous users are a less attractive proposition, as it destroys the centre from which value can be extracted and controlled. Hence, counter-arguments are made that individuals' private keys should be managed by banks (provide key management services), and customers do not need to understand how blockchain technology works. The technology would fade into the background of user experiences. Essentially organisational processes will remain

opaque to end-users. The same linear dynamic, in a permissioned blockchain should play out, where centralised organisations are the custodians of individuals' and society's money, data and identity.

The second perspective is a much broader perspective. Blockchain is viewed as a fundamentally different social and economic system of coordination. The logic that is used is primarily concerned with the fitness of the management logic itself. This refers to the degree to which the management logic that is used impacts on social distrust and economic distance. The concern is with the value intrinsic to the system, namely, trust-generating mechanisms, frictionless interaction, having both privacy and transparency, and both collaboration and autonomy in interacting with others (which in a centralised system are binary states, as opposed to a folded state). Hence, a less trivial and linear, dyadic perspective of interactions with others is used, and a much greater concern showed for the social and economic distance created by the management logic used. Hence, a more circular understanding of relatedness with others and the harm created by the system of coordination itself.

The focus of the broader management logic shifts to changing the starting conditions in a system of coordination. The starting conditions shifts to the individual (a node). It gives direct ownership and control to nodes over money, data and identity. The aspects of autonomy and relatedness to others are placed at the centre of the system of cooperation and coordination. With direct ownership over money, data and identity, individuals have control over the flow of their money and data in the ecosystem (there are no money or information islands from which to extract value). This difference is now possible, because of crypto objects native to the internet that did not exist before. It breaks the model of money and information islands and makes truly decentralised and distributed models of social and economic coordination possible. Hence, there is a great deal of fear of the disruption that blockchain technology could create, but also excitement about the possibilities what could be created (see invariant structure feelings: fear, excitement and frustration).

An important assumption of the broader perspective is that individuals are viewed as being much less ignorant of the dynamics that play out on a macro scale. This means that individuals do understand very well how centralised systems affect their financial well-being, but they are locked into a relationship with centralised organisations, such as banks. Moreover, individuals in the blockchain ecosystem do take a keen interest

in how centralised systems affect them, but also how a decentralised and distributed system can make a difference. There is an awareness that a blockchain system can play an important role in increasing the fitness of participants in a value ecosystem and not just the fit between participants and highly centralised systems used to cooperate and coordinate.

This means that there is an alternative system of how we can trust, and individuals can opt in or out of existing centralised systems to protect their money, data and identity (they can even create their own money if they need to). Crypto objects (payment, identity objects and smart-contracts) can be used to signal trust and create new business models native to the internet, and very different measures of success may be created.

There is also a single consensus-based source of truth and a global decentralised and distributed ‘value brain’ that can ‘fire and wire’ in a decentralised and distributed manner that was not previously possible. This creates a great deal of excitement. Individuals perceive that they can create the future they want by participating and collaborating in a direct and near manner.

Table 4.24 below provides examples of the participants’ experiences in terms of the relatedness to others and harm.

Table 4.24: Relatedness: interaction with others and harm

Document name	Segment
:P_01	<i>... the willingness of everyone to collaborate...</i>
P_01	<i>But I mean, I need to be more engaging with people and spend more time meeting with people and talking to people, and finding out kind, you know, what they're requirements, their needs and demands are, but also it cause me to think more big picture, because as I mentioned, we are responsible for financial stability, so I have to think systemically and more how things fit together.</i>
P_01	<i>I think the one thing, because using the technology at the moment. So, we are not forced by technology at the moment, but culture, because of these developments means that we have to become, just, I don't want to say less flat, but again, maybe overuse the term, but we have to collaborate more with kind of the, the other departments. So, we have to kind of, to use other clichés breakdown some of the silos, to make sure that when we share information that we do across the board. We tend to work and working groups which is kind of cross departmental for some of these developments,</i>

Document name	Segment
	<i>and then also aid in sharing of information and building intelligence of across the board.</i>
P_01	<i>Whereas, now we look at how we can simulate a whole lot of things and develop something that kind of fair to the ecosystem and allows people to collaborate, work together and does not kill innovation.</i>
P_01	<i>So, just in essence my job has become more collaborative and I now had find that I have to assimilate a lot of things. So, where in the past I was in a position.</i>
P_01	<i>Realising this is not something that necessarily can be done by one party. Somebody said blockchain is a team game. I think that is also the one experience we cannot do this thing on our own. We have to kind of do it with everybody else.</i>
P_02	<i>So that sort of infusion of the start-up was working in the corporates brings them or more distraction they start at work into agile teams, and break-up into smaller pieces and all of those kinds of things.</i>
P_07	<i>Ok, actually I can bring these guys on board, they can actually back up my ledger, at no cost to me. I can back up, like I scratch their back and they scratch mine, and I can trust them, you know in this thing, you now and obviously not trusting in the in the true nature that I'm trusting you, because you are a human being, but trusting in the mathematics and the consensus mechanism in a blockchain. That for me is a mindset shift that happened actually during project X.</i>
P_07	<i>You know it was in a true sense a distributed and decentralised kind of network, but you know, what, what hit me, you know, which was so I think the main success factors that, South Africans, you know, this Ubuntu concept, it came into play a lot there. For instance, one of the banks, just had one engineer, like a relative junior guy, who did not really understand the technology, was battling a little bit and I mean at that the time, we had Chris, and Chris and I sat with this guy. We helped him set up his node. Like, this how you do it, this is what you need to do. He learnt a lot and we are friends to this day.</i>
P_07	<i>Collaboration is at the centre. It is not possible to do blockchain if you are just on your own, running a node. It's stupid. But there, that collaboration aspect was collaboration on steroids, in a sense. In what sense? One, the team itself, we had guys, like X, X team is based in Prague.</i>
P_07	<i>The main thing also is the collaboration aspect, for this thing to take on, blockchain requires collaboration. Specifically, in the banking space.</i>
P_10	<i>You know, I mean, I like to believe that we help bring that connection together, by like structuring entrepreneurship and technology opportunity networking at all of our events. So, we like to create that ecosystem basically for opportunity creation on this technology.</i>

Document name	Segment
P_10	<i>Dude, we were trying to do something similar. I would like to actually collaborate with you, build... I think that sort of groundswell, like the stitching together the ecosystem is starting to happen. I think we still have a long way to go, but in the short time that we have had from April until now, we have seen some pretty interesting stuff, like just having no idea, it was going on, but WOW thank you for that. Like health tech stuff. Just really, really cool stuff. But, I think it is still early days, lots of opportunity, lots of space.</i>
P_10	<i>We have the opportunity, we always have the opportunity to create the future that we want, rather than just inherit the future from someone else. I think fundamentally people need to believe in that, and start asking those questions.</i>
P_10	<i>I think, I think it's already starting to happen, but it needs to accelerate, but again, I want it to happen tomorrow, but what needs to happen is. There needs to be more support provided from society, from academic institutions, from research institutions, from private sector as well to all collaborate on. Because, the technology affects all of these participants that I'm talking about. So, how can we effectively collaborate to create the future that we all would like to have, that is mutually beneficial for everybody.</i>
P_10	<i>So, I think that kind of groundswell, it is slow, but it is starting to happen. If you look at retail facing organisations, like X and the work that they are doing. The publicity and marketing that they are doing. I like what they are doing, because they are doing it in a responsible way. It's starting to actually like, become kind mainstream, which is great. This is what you want from a technology. It shouldn't be, you know some sort of exotic technology that is only available to the high priest of the technology world, no. This is something that should that can affect anybody and should affect them for good. I think we are now starting to see a lot more people, you know but X obviously, but you also heard of organisation, like X, down in the Cape.</i>
P_10	<i>We are not, the community basically itself, we sort of like this happened very organically, where people have showed up, made suggestions. We got like community managers now starting to scale the organisation a bit. But, we are not. The only rules that we really have just, don't shill your coin on this platform that is really it. Otherwise it is an open space for discussion, and for people to actually come up with ideas and stuff.</i>

Feelings: Fear, excitement and frustration

The second essential structure of the participants' experience is feelings of:

- (1) Fear,
- (2) Excitement and Frustration

(see Figure 4.11 below).

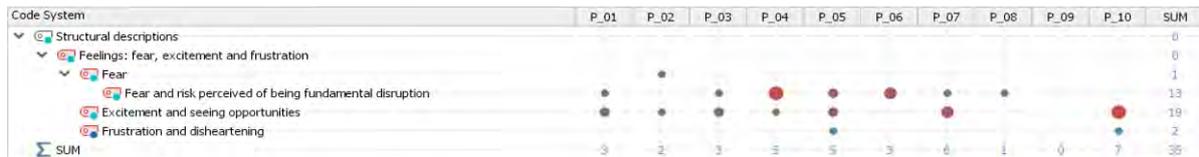


Figure 4.11: Feelings of fear, excitement and frustration



(Click on the icon for a larger image of Figure 4.11)

1. Fear

The participants (Participants 01, 02, 03, 04, 05, 06, 07, 08 and 10) judged that blockchain technology will fundamentally change the workings of centralised organisations, work and the financial landscape and economy. They have thought through the implications of using blockchain and judged that the principles and assumptions on how financial institutions and the economy work will be challenged (see Table 4.6 for selected examples of participants' responses in terms of thinking through the implications of blockchain use).

The participants felt that blockchain applications will become ubiquitous and seamless, and existing financial banking and business models and the metrics by which success are measured will become meaningless. Participants felt and judged that there is a great deal of fear in terms of the disruption to organisations (specifically, banks and exchanges) in the regulated financial space. These fears are whether:

- There will be need for current financial intermediaries to exist at all.
- There will jobs in areas, such as payments systems, auditing and reconciliations (accounting).
- Centralised organisation in the regulated space will be able to turn around and respond as quickly as fintech and blockchain start-ups do.
- Incremental improvements in current centralised systems will make it possible to compete at all with how blockchains work.
- Centralised organisations are paying enough attention to developments in the blockchain ecosystem.

2. Excitement and frustration

The participants (Participants 01, 02, 03, 04, 05, 07 and 10) described that anyone who has seriously looked at blockchain and who has developed a fundamental understanding sees 'fertile opportunities' and felt 'super excited', inspired, full of hope and 'serious curiosity'. Participants that are in the blockchain units want to work, or be involved in the blockchain ecosystem. They see and judge that blockchain technology opens a whole new world of career possibilities. Some participants have made it their career, and some have incorporated it into their career.

Some participants feel frustrated (Participants 05 and 10), because centralised organisations are not moving fast enough and primarily have an internal focus. They are being dragged down by the 'organisational imperative'. A good number of people working in organisational blockchain units are frustrated with the 'organisational imperative', which is not necessarily seen as wrong, but have joined other organisations interested in building the blockchain ecosystem (the future).

Table 4.25 below provides examples of participants' experiences in terms of feelings of fear, excitement and frustration.

Table 4.25: Feelings of fear, excitement and frustration

Document name	Segment
P_01	<i>People are concerned about the future, and will I still have a job kind of thing. So, I think there is exciting stress and there is good stress and not so good stress. But, I think, excitement on the one hand of doing something different, but also like if you are doing different...</i>
P_01	<i>I think there is also excitement, but there are also different parties. For me it is exciting to be involved in it. I think, what I have seen with different engagements with banks, people are excited because we are involved in these things.</i>
P_01	<i>So, that experience wasn't necessarily true of the entire unit, but now being in a small unit, in essence three of us, but just the fact my two colleagues in the unit, I think we think alike, we think about the future and the impact of these technologies. So, that's very exciting for me. The deputy governor that I report to, so he can be difficult at times. So, just his level of excitement and commitment I this and also the governor on some of the aspects.</i>
P_02	<i>I don't think anybody dealt into it, really looked it properly, who has not got super excited by it. I don't think, there are some sceptics out there, they sound, they sound, they can very convincing and whatever, but I don't know anybody who's really got into properly, who hasn't got really, really excited. I think I think there's. You can take quite a narrow sort of view of it and then</i>

Document name	Segment
	<i>and then pick why Bitcoin does not doesn't work or whatever it is, but I think if you look at it properly and in a broad way and then there's so much going on, you can't ignore it and some people have kind of thrown their whole careers behind it and some people it's just tried to incorporate it into their careers, as I have.</i>
P_03	<i>So even if they were not fearful, if they were possibly sceptical, they were protecting against a future where they could not image getting more value out of someone that is engaged in the bank, with someone that they can just tax with fees.</i>
P_03	<i>For me banks have continued to generate feelings, negative ones and so DLT gave us the confidence that we could go out and solve this problem without them, and we had confidence in what we could do. We always knew that and banks for whatever reason, whether they doubted our potential or they were scared of what could happen and it going really well, they were always a point of friction for us. So being able to remove this major dependency, provided a big sense of hope for where we going to go and confidence what we built.</i>
P_03	<i>It is just more confidence in terms of our roadmap, and how quickly we are gonna able to grow and prove people wrong, one, and given the technology really how fast we can grow, because the nature of the technology is that it is completely borderless.</i>
P_04	<i>In terms of corporate involvement, there is the aspect of curiosity and also fear, because an auditing firm, for example, thrives on the situation that they need to walk into a business and prove or and an organisation has to proof to an auditing firm that everything's in check.</i>
P_04	<i>Oh, you know that's the auditing firm, then you have your financial firm, the banks, they are arguably the most curious and the most fearful, because they know that this can disrupt their business model completely, and we have to agree that the banking system as it stands is an archaic system.</i>
P_04	<i>So, for them to, to turn that whole ship around and become extremely innovative, adopting new technology is going to be extremely difficult, and they are fearful.</i>
P_04	<i>So, personally it's exciting, because every time that a hype cycle happens, there is an underlying reason for it.</i>
P_05	<i>The fear for them, if I lose that central point, will I lose my ability to charge fees? My argument is always there is: rather have a percentage of something, than a 100% percentage of nothing, and because if you don't do it, for sure someone else gonna do it.</i>
P_05	<i>The fear that it's gonna be, very once again from the pragmatists, you can be difficult to get there. So, we'd rather just make our current systems work a little bit more efficient, but it's a little bit like the post office saying we gonna deliver letters faster than we ever did before.</i>

Document name	Segment
P_05	<i>This was indicative of the excitement that came from the visionaries, now these guys got much more money than the techies, these guys are generally people like the MAS Singapore, even the South African Reserve Bank. I put into the visionaries.</i>
P_05	<i>... and may be formed and happening and there is a lot of excitement around that, but you need people who can just go to a client and say; hey, here is new platform, look it works, you see it works, it's processing payments and you know what, it is cheaper, it's faster than your current system.</i>
P_05	<i>Silly to go and put a distributed system inside my organisation. So, I think like many people working in banks got frustrated and about two years ago left, started the process of leaving ...</i>
P_07	<i>To my sense, a lot of fear obviously. Because, the problem with blockchain, well the perceived problem is that it will disintermediate everything, right? So, to the person that's a trusted individual, I think about someone that's working for BankServ, say for instance. If you know that your business could be completed disintermediated in the payment system, that actually as BankServ we may not be required. That is a lot of fear. You know, if people have fear they either fight or flight kind of thing. Some elements of fear that's happening and again you flip the coin, there is also optimism, you know.</i>
P_07	<i>Just to add to that, blockchain resonates with many people at a personal level, the way it works, decentralising ledger. At a personal level, this makes sense, this will work, right, but as to what form of shape no one is 100% sure.</i>
P_07	<i>That resonated many people at a very, very personal level. The same thing with getting a loan, the same thing with my identity, the fact that my identity could be sitting somewhere in some machine at... exactly, right? It is getting hacked, right now, it's getting dumped, right? I have to trust the government systems that the engineers that will protect my data, but it's not happening, you know. So, at the very personal level, like I want to be my custodian, of my own identity and I don't want the government to tell me who I am, I want to tell the government who I am. See that better. It resonates you at a very personal level. The trust aspect.</i>
P_07	<i>You see, because, the technology, it resonates with people at a very personal level. There's no way you can run away from blockchain. It's like the same thing you can say about artificial intelligence. That's just, these things are gonna happen. It's because they resonate with people at the very, very personal level.</i>
P_07	<i>People that are very optimistic about what new opportunities blockchain will build. Because, the thing is, if you like have, like a completely decentralised system, then the economic models now change. You know, the unbanked, now have an opportunity to get to the bank, right. You know, so they have an opportunity to partake in this economy. You know, like you think about the people on the streets that are the vendors. They can't partake in the banking systems, at the moment, but there is optimism, in terms of the future opportunity of this, this can open up the economy, you know like more participants. There are two sides to the coin.</i>

Document name	Segment
P_08	<i>Part of it speak to the fear, spoken earlier about. There is no set rule or finish line that you can see that is there, you know. I think getting an understanding of the ecosystem, what is going on, if we need to be part of that or if we need to catch up with what is going on in the ecosystem. If something can disintermediate an organisation we need to understand why it can, if there is anything that we need to adapt and be part of that, new way forward, whatever X.</i>
P_10	<i>Excitement, inspiration, hope and serious, serious curiosity. The one thing that I love about this technology, I think, I am generally somebody that is very... I think I overdo it a bit sometimes, but I try to look at everything from a foundational perspective.</i>
P_10	<i>I think it creates for me creates for me excitement, inspiration, hope and massive curiosity. Just this feeling of exploration and discovery. I love it.</i>
P_10	<i>This is a wave that I'm very, very happy to actually be a part of and something that has inspired me, you know to actually go out there assisting in the creation of BECSA, contribute back to community, and really like try to grapple with this technology, basically as it emerges. So yeah, it really has inspired me.</i>
P_10	<i>There is a state, sort of like fertile possibility, and I think that is. If you look at little like token engineering workshops that are occurring, white papers that are being released, if you look at research from economics, from mathematics, from even like philosophers, very interesting things that are being created and starting to converge, where there are really some exciting possibilities. It is a state of continual possibilities, if that is a state.</i>
P_10	<i>This is one of the things that excite me about it, it creates a lot fairer, the distribution of power thing, absolutely, but also the distribution of value, and it makes things a lot fairer because if I contribute something, I am rewarded basically in equivalent value, and ultimately and that is what a lot of a sort of believe.</i>
P_10	<i>I think, when you play around with this technology actually, like just dig a little bit, actually understand the impact of it. It creates a state of almost like anything is possible. I know it sounds tremendously naive to actually say that out loud, but it does create, I do believe it has that potential when you actually look at how it can be applied and you know the interesting solutions that people are coming up with to solve all kinds of problems that you didn't think could be solved with the technology like this, or where other technologies have tried and failed actually solve the problem. It does sort of create the feeling that anything is possible, I think the state is: a state of just opportunity creation of opportunity, of opportunity viability.</i>
P_10	<i>It is disheartening, to some degree, I mean somebody that reads a lot, you know that keeps track of stuff on Twitter is maybe to imaginative about what we can do with this technology. It is ultimately, sometimes a bit disheartening you know to be dragged back to the ground, by organisational imperative. It is not to say that organisation imperative is not justified, but I would like to experiment a little bit more, but I do think that seeds, planting seeds in my organisation anyway, where these sorts of things are starting to happen right</i>

Document name	Segment
	<i>now. It is encouraging, I just wish it would happen faster. But that is what I am trying to do.</i>

Binary and folded states

The third essential invariant structure of the participants' experience is related to the various states:

- (1) binary state,
 - (2) folded state, and
 - (3) blockchain user experience not being a seamless experience yet
- (see Figure 4.12 below).

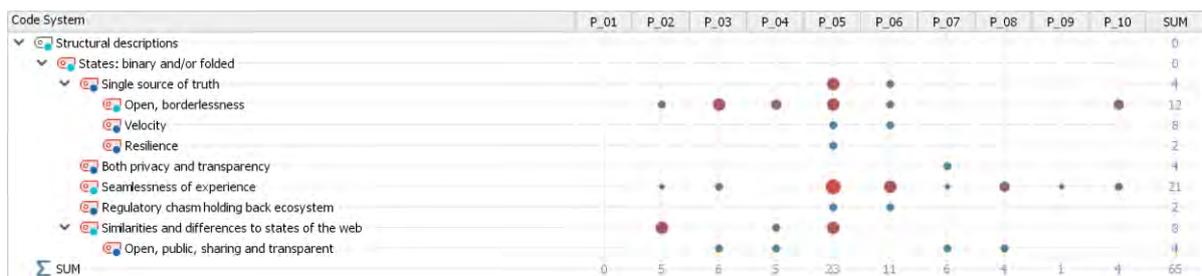


Figure 4.12: Binary and folded states



States.png

(Double left click on the icon for a larger image of Figure 4.12)

1. Binary state

The participants described the state of the centralised and highly siloed organisational architecture as binary. This means that individuals have no choice but to make 'binary decisions'. Individuals can have a great customer experience, but do not control their own data, bank account or online identities and data, and a pseudo-autonomous state exists. Individuals also sacrifice privacy to be transparent in interacting with organisations. They cannot have a proposition of both private and transparent transactions, both control over data that is broadcasted, control their online identity, collaborate with others and have a great customer experience.

'Binary architecture' also affects how individuals (nodes) are connected to others. Individuals cannot decide what data should be made available to others, and they

have little control over how it is used (see invariant structure discussion self-determination: autonomy and relatedness to others and harm). Data flows into information islands in a siloed world, but individuals do not have control over how information flows in these islands. Individuals have siloed identities with every organisation, website or application that requires a log-in. Having multiple online identities is not a seamless experience. Individuals must keep track of their multiple of identities and passwords. Organisations that require a log-in have the burden of keeping customer data safe (it is also costly for organisations to verify the identities of individuals and multiple back-ups of data need to be kept). Customer data which is stored centrally is an attractive target for hackers, and centralised databases are not as resilient to attacks as truly decentralised databases are.

Furthermore, as multiple identities can be created online, it is also difficult to differentiate if a real person is behind an identity, and which data are accurate. Multiple truths or versions of a truth exist around identity.

The essence of participant experiences of the state in a siloed world is 'distance' between peers; friction is inherent in the design of a siloed architecture, which creates distance, value is extracted by intermediaries by creating distance and the result of distance is that individuals must trade sovereignty over their identity, data and money for a great customer experience.

2. Folded-granular state

The participants described the state of the architecture of a truly open and distributed value ecosystem as folded and granular. This means that the individual's or an organisation's (nodes in a blockchain eco-system) experience of the value ecosystem phenomenon is a peer-to-peer relationship (more circular folded relationships with others). An organisation is now your peer, and you can be your own organisation (a folded state). There are no intermediaries, only 'near' relationships between individuals and/or organisations. Every node (individual or organisation) has control (sovereignty) over personal data and identity. Every person can influence and decide in a direct way an outcome in the ecosystem, but there is no one centre to control or attack (folded state). It is also very difficult to tamper with data (the state of the machine), once transactions have been finalised in a truly decentralised and distributed system (an immutable and irreversible state).

In terms of the self-sovereign identity, individuals can interact with others in a folded-granular way via self-sovereign identity objects that they control. Self-sovereign identity is seen as an important first step in creating a truly distributed and decentralised value ecosystem, and is useful in signalling trust to others. An individual or organisation can issue a credential, a ‘claim’ or a zero-knowledge proof, which individuals can use to interact securely and privately with others (peers).

Every person is the owner of their identity (SSI) and they control the use of credentials issued to them or claims made. Hence, no one organisation or entity establishes whether a person’s identity can be trusted, but everyone can contribute towards verifying whether the identity of person can be trusted (signalling trust to others). It is envisaged that any individual or organisation can issue a credential of any kind to another person, which can be shared with any other persons or organisations. Furthermore, credentials can be verified by one or many issuers of credentials.

Overall, the participants’ experience of the state in a truly distributed and decentralised value ecosystem is folded and there are granular ‘near’ interactions between peers: nodes in a distributed and decentralised system can have both privacy and be transparent, control their identity, data and money, and collaborate with others when and how they choose to do so.

Table 4.26 below provides examples of the participants’ experiences in terms of binary and folded states.

Table 4.26: Binary and folded states

Document name	Segment
P_07	<i>...and there is also the issue of privacy. It is a big thing that X was also testing. Can you still have transaction, where certain regulators can still have oversight of everything.</i>
P_07	<i>Again, like if you think about privacy as well. The nature blockchain is that the transactions are transparent, right? Now where do you slice the transparency? In terms of private transaction. Is it okay to say...</i>
P_07	<i>I would say; possibility of blockchain, you know that clearer in my head. I think, I have a clearer picture in terms of what's possible, what blockchain can do for companies. You know the fact that I can have, I can share this ledger with my competitors, but my competitors don't necessarily see all my transactions. The transactions are there, but they're all encrypted, right. It opens up a whole new world in terms of backing up in a distributed</i>

	<i>decentralised manner. In terms of my thinking about how do your backup systems now, has changed a little bit.</i>
P_07	<i>Can I have a private transaction between, like if you are the regulator, you should be able to see everything that is going on. But, if you are not the regulator you should not see what is happening. Not be able to see, but still know there is a transaction going on.</i>

3. Seamlessness of blockchain user experience:

However, the ‘dark side’ of the blockchain ecosystem experience is that is not a seamless experience. The participants perceived and judged that several critical problems still need to be solved, such as the management of private keys, and a regulatory chasm that needs to be crossed.

Some participants (Participants 06, 08) also made the argument that a ‘killer application’ would greatly contribute to a more seamless experience, as it would connect many users, blockchains and applications (interoperate more easily), and would make blockchain technology more accessible to the man in the street. However, a great deal of work is being done by pragmatists, to make the blockchain experience for the man in the street a seamless experience.

Table 4.27 provides examples of participants’ experiences of the blockchain user experience as not being a seamless experience.

Table 4.27: User experiences not yet a seamless experience

Document name	Segment
P_02	<i>One of the areas of improvement is going to be the user experience and the blockchain will gradually disappear and the best ones will disappear completely in the background, in the same way that the internet has, but the seamlessness at the moment is sadly lacking.</i>
P_03	<i>I think what is missing, I would not even say that it is missing. I wouldn't as that it is missing. I think we are still just in the alpha phase of your launch, that it is still limited functionality, in terms of what the overall system is going to be. So, there are things that we have demonstrated have massive utility, but there are things that we want to build, that incorporate ultimate ubiquity reach with this technology.</i>

Document name	Segment
P_03	<i>Maybe, you as a zealot may change your mode of operating, to become entirely crypto based, but just because you do, and you have faith in the future of the decentralised system, there is not really a big enough need among your peers, so that's also to happen, and emerging markets, there is a big enough need, where they don't necessarily need to understand what DLT is, how it works, but the value that they get from it can be so big that the shift is going to be easier for them.</i>
P_05	<i>because until we get to a point where, you know, the man in the street can walk into a coffee shop or walk into a spaza shop and buy a bag of tomatoes, using blockchain technology, using any kind of distributed ledger. Until we get to that point, you know, we are not touching enough people.</i>
P_05	<i>That for me, is where, that's the landscape right now. Once we there, we start using it, you are going to have the sceptics, the banks that say we'll never leave our current systems. You know, these things are bad... and to be sure, we can have a couple of events here. Someone lost money on this new system it's bad, it's terrible, but it will be fixed, but there's a process of going through this now, which it's going to be a little bit different to do this.</i>
P_05	<i>The thing that is missing, you know, unless you open a bitcoin account and get some bitcoin in there, you cannot send money easily. Banks cannot send money easily. The thing which is missing is the, is the interface from the normal people, the non-techies, non-visionaries, normal pragmatic people need an interface, whether an individual, corporate or bank, need an interface to plug into some kind of platform that allows them to drop a payment to someone anywhere in the world, with the same ease that it takes it to send an email.</i>
P_05	<i>So, take my predictions, let's put them down it, see what happens, but I predict that until we have crossed the chasm, we make it easier for people, cheaper for people, faster for people, to use this technology than the current systems. Who is going to use it? No one is going to use it.</i>
P_06	<i>.and that will certainly make our lives a lot easier, but it's not a blocker for us. It wouldn't it would make our lives easier, our own lives easier and I'll make everybody lives easier, if you had a system which is just an app on your phone, and you could prove your identity, whether you are local or foreign. With everything on there and you're not having to redo everything, every time you want to go and get up a bank loan or buy a car or just you do an HP, something somewhere else. You got to do the same thing all over, all over again. It is just one little thing, thing. Blockchain will sort all that out.</i>
P_07	<i>One of the key things, not seamless enough yet. I mean, the average man, there is a big aspect of public keys and private keys, and the average man in the street, even the average tech person isn't knowledgeable enough I guess to actually handle that. So, I think there will be an initial phase were different organisations, trust organisations almost have to manage that part for people, and then partly research in this space where, somewhere actually, I don't know how, actually managing these keys that people, since it's less of a fiction, it less difficult to get into the space.</i>

Document name	Segment
P_08	<i>You almost need a need a killer app. For example, just like the web that had a mass of pages everywhere. You had to hand pick the pages. Eventually a standard came, and Google came, making it very easy for people to find stuff. You almost need something like that to make, to make it more accessible to more people.</i>
P_08	<i>For example, no one is forced to use WhatsApp, but most people use it in organisations to coordinate in different work groups. It is simple, people use it. No one has to actually push it, to use it, it makes life easier, and almost easier and cheaper and they switch by themselves.</i>
P_08	<i>Until the day blockchain can be proven to be operational ready for the real-world scenarios in retail, it will be difficult for adopt the technology.</i>
P_09	<i>It's starting to actually like, become kind of mainstream, which is great. This is what you want from a technology. It shouldn't be, you know some sort of exotic technology that is only available to the high priest of the technology world, no. This is something that should that can affect anybody and should affect them for good.</i>
P_10	<i>Absolutely. It has that potential. Whether or not it can do that in the short term, I don't know. I think there is a lot of friction basically to adoption. From a technology perspective, from a technology design incentive, incentive design, user experience, most things involving blockchain are atrocious.</i>

4.2.4 Step 4: The contextualisation of the themes

The fourth step in the analysis process involved placing the identified themes back into the overall contexts or horizons from which they initially emerged (see Chapter 3, Section 3.6.3).

The context from where the themes come is social and economic 'distance'. The connection between context and blockchain technology use (the texture and structure of experiences) is the idea that blockchain technology extends the capability to narrow or erase social and economic distance.

The most striking aspect of the participants' experiences that they spoke about was how they were drawn to the distributed value ecosystem phenomenon. They were drawn to understand how it disrupts, drawn to explore the possibilities around creating more complex value networks, and the more they delved into it, the more it resonated with them at a personal level and created 'serious excitement'.

4.2.5 Step 5: Individual textural-structural descriptions

The previous section discussed the context that themes came from. In this section, step five in the analysis process, individual textural-structural descriptions are given for each of the ten participants' lived experiences of the distributed value ecology phenomenon (see Chapter 3, Section 3.6.3).

Participant 01:

The texture of participant 01's experience of the distributed value ecology phenomenon contained four themes. (1) What do blockchains do to the stability of financial infrastructure, (2) thinking through the systemic implications and risks of using blockchain, (3) creating a safe space to test the mechanics of blockchain and rule-making, and (4) judging the impact and value of the technology (see Figure 4.5).

The catalyst that created awareness and interest in experimenting with blockchain technology was distrust by Bitcoin maximalists in the current financial infrastructure (central banks and banks) and the disruption predicted to the current financial infrastructure. The participant is also aware the organisations need to be agile, innovative, fair to the ecosystem (create a level playing field), not kill innovation and not to do anything that exposed the financial ecosystem to systemic risks ('not do anything stupid').

The response to this need was to find a viable blockchain use case and create a safe space to experiment and demonstrate the mechanics of using blockchain (the 'test and learn' approach was followed). The end goals being to develop a 'deeper', more fundamental understanding of the impact of the technology on the financial system's stability (price, currency and financial stability). Thinking through the implications of using blockchain technology, the perception is that the shape of the value lens is likely to be transformed (more efficient and effective interbank settlement) and a cultural shift is viewed as necessary (being agile, sharing insight across organisational boundaries/siloes). The preliminary judgement made is that blockchain does not change the mandate of the organisation, but it will change the shape of the value lens used: how the mandate is achieved (capabilities, processes and routines). Blockchain is judged as only one of many technologies that need to be considered, a tool in the organisational toolbox that is shaping the financial ecosystem.

The structure of participant 01's experience contained three themes: (1) stressful, (2) collaboration, and (3) excitement. The participant indicated in terms of relation to self, that experimentation with the technology is stressful. It is stressful as it is not the way in which things are usually done in the organisation (the relationship to others shifts from policy-making to testing a proof of concept, and collaborating with others is required in piloting the use case and learning from experiences). Stress is seen as both good and bad: It is disruptive to the way things are done, but exciting in doing things differently. Being more engaging, finding out what others need and demand, and thinking more systemically. It is also exciting, in that the technology requires collaboration to gain the benefits of using a blockchain system (the nature of the participant's job and interaction with others had become more collaborative). The participant felt, in relation to self, excitement at being in a unit where it is required to think about the future impact of technologies (being a futurist at heart).

Participant 02:

The texture of participant 02's experience of the distributed value ecology phenomenon contained four themes: (1) The rabbit hole, (2) thinking through how blockchain disrupts, (3) how corporates and start-up are starting to behave, and (4) the shape and size of the perceptual value lens.

The texture of the participant's experience was essentially a thought experiment in using blockchain: discovering the rabbit hole (cryptocurrency and blockchain phenomenon), researching it and thinking through the implications of using blockchain technology. Then judging it is a shift more fundamental than the fintech revolution.

The aim of exploration is primarily to discover what organisations could do with the technology. What completely new things can be done that were not previously possible, and doings things that did not make sense to do before (micro payments, for example). The perceptual value lens used by the participant considers the shape (how things are done) and aperture (size of value pool): for example, new asset classes that did not exist before, new ways of sending money, new ways of raising funding, and working in ways not considered sensible before (this includes combining blockchain with other technologies).

The participant also noticed that corporates start to behave like start-ups, and start-ups become more like corporates (pivot towards each other).

The structure of participant 02's experience contained the three themes: (1) excitement, (2) a social movement, and (3) self-determination. An essential structure in terms of relation to self and feelings is the serious excitement that develops once individuals delve into the distributed value ecosystem phenomenon. Excitement in terms of how much is going on, and the possibilities in terms of making it a career or incorporating blockchain into a career.

The first essential structure of the participant's experience is in terms of relationships to others: the phenomenon is viewed as a social movement, in which individuals seek self-sovereignty (secede from nationality, self-sovereign identity). However, a deep understanding in the mechanics of blockchain is developed in only a few. The relationship with others is that individuals do not need to understand how the technology works. The implications for others are that more interesting relationships could develop, and more complex value networks are likely to emerge by combining crypto objects. However, the technology is far from disappearing into the background of the user experience (far from being a seamless experience).

Participant 03:

The texture of participant 03's experience of the distributed value ecology phenomenon contained six core themes: (1) designing decentralised architecture and seeing possibilities, (2) open to others, (3) borderless-ness and an ecosystem maturing, (4) challenging prevailing business models, (5) control over destiny by removing dependency on banks, and (6) solve customer problems first.

In terms of the catalyst for using blockchain technology and a decentralised protocol is the value that customers get from shifting from cash to using DLT applications (the participant's judgement is that the technology has matured and now is the right time to use it). An essential texture of the participant experience is thinking through the implications of creating decentralised and distributed architecture. These implications are: it moves architecture from being back-end, front-end to a decentralised protocol first. It creates architecture that is open source and allows anyone to participate in the ecosystem. It creates a capability to serve a larger percentage of a population's financial needs (more specifically, it solves the problem of financial inclusion in financial systems with exclusionary practices).

However, it also challenges the prevailing business model of banks in terms of how value is captured (noesis is fear of disruption). The perceptual value lens that is used: focus on solving immediate customer financial needs that the technology can address (the shape of the value lens is transformed). More complex value networks are created (the aperture of value lens is larger (see Section 4.3.2.1, theme 5). There is also learning from experience, which is used to add more value on top of the basic experience (the size of the value of the value pool created is continually made larger). Overall, the participant judges that the competition of the organisation is not banks, it is cash.

The structure of participant 03's experience contained two themes: (1) confidence in solving the customer problem (financial inclusion), and (2) negative feelings and points of friction in the relationship with banks.

In terms of the first structure of the participant's experience in terms of relation to self: The technology provides confidence that the customer problem can be solved (the financial inclusion gap), and it gives a clearer sense of the path to success. The participant felt in terms of relationship to self: more control over their destiny (removes reliance on working with banks, which has been experienced as thorn in the side of the organisation). Hence, the feelings that have been generated are both negative and positive. Negative, in terms of working with banks, and positive, in terms of a sense of hope for where the organisation is going and what can be built. Hence, there is sense that the technology makes it possible to create the future they want (and there is no need to wait for banks).

Participant 04:

The texture of participant 04's experience of the distributed value ecology phenomenon contained four themes: (1) conjunction of cryptocurrency hype and blockchain, (2) thinking through implications using blockchain, (3) connecting the blocks to create an ecosystem, and (4) rule-breaking.

A central theme in the texture of the participant's experience is conjunction of cryptocurrency and the hype around it, and blockchain. Hype is seen as necessary and even essential. Cryptocurrency is an incentive to maintain the system (ensure continuity), drive investment and the large-scale adoption of blockchain technology.

Cryptocurrency is also part of a mechanism (proof of work), that creates disincentive to out-game the system or collude with others.

Thinking through implications of using the technology: it has the potential to influence many industries. It poses a credible threat to current financial infrastructures. The foundation of current systems that financial institutions (banks and audit firms) use is archaic. These institutions are not agile and need to innovate (and try to innovate), but they cannot move as fast and capture markets as fast as start-ups (noesis: fear of being disrupted and speed of disruption).

The perceptual value lens (size and location of value lens) that is used connects blockchain organisations and entrepreneurs to an ecosystem. The approach to creating this ecosystem is to bootstrap a blockchain solution as fast as possible and test it. If it is not adopted, then make improvements immediately. Hence, being agile and quick is crucial (start-up culture is viewed as crucial to achieve success).

A final texture of the participants' experience is rule-breaking: in terms of the participants' relations to self and rules (the noema). The participants felt that rules and regulations that are designed to protect can also do harm in the long run, if followed dogmatically. Hence, rule-breaking is viewed as justified. If one is in the position to break rules that do harm, then it should be done if it is for the benefit of everyone. The attitude is to ask for forgiveness later. By breaking rules one can also demonstrate that current rules and regulations are no longer applicable to society. However, the participant states that there is a misconception that everything can be decentralised and there is still a need for rules. Rules are still needed to ensure coordination in society ('a traffic system needs traffic rules').

The structure of participant 04's experience contained the following themes: collaboration, trust and credibility. The structure of the participant's experience in terms of relation to self and others is the invariant structure: collaboration, trust and credibility that are intertwined. Collaboration involves getting people together to share experiences and knowledge, and even sharing customers. Blockchain does not work if it is implemented in an organisation, as the value of blockchain lies in the network effects created and capabilities to interoperate between nodes in a network. Hence, the participant judged the benefits of blockchain are the trust and collaboration generated across organisations in an industry or industries. Collaboration, creating

trust and credibility in the distributed value ecosystem is an important and essential structure of the participant's experience to appropriate the benefits of using blockchain technology.

Participant 05:

The texture of participant 05's experience of the distributed value ecology phenomenon contained four themes: (1) anarchists and pragmatists, (2) the chasm, (3) the fashion show, and (4) a retail solution for the regulated payment space.

The catalyst for the participant's experience is a need to find middle ground between the unregulated cryptocurrency space (the world of the bitcoin maximalist) and the regulated payments space (the world of central banks and banks). A second texture connected to the participant's experience in terms of these two worlds is the regulatory chasm that needs to be crossed. The solution is to demonstrate that regulatory requirements can be met. Blockchain applications can tick all the regulatory boxes in the regulated payment space, but work needs to be done by pragmatist. Pragmatism is needed to move beyond the visionary stage (the high concept phase of the thought experiment).

The third texture of participants' experiences in terms of the perceptual value lens used: blockchain proof of concepts are an essentially high concept (the 'fashion high end show'), and work needs to be done by pragmatists to find the true value for organisations (do the work that is needed to move blockchain into the banking retail space). In terms of the participant's perceptual value lens used: blockchain changes the shape of the value lens: effectiveness and efficiency of the payment infrastructure ("There's a fundamental shift in that in the way that we do stuff").

Blockchain also affects the aperture of the value lens: there are tangible benefits in using blockchain for banks (size of value in using blockchain can be quantified): it unlocks liquidity, there is no need to do reconciliations (single source of transparent truth), it is possible to partition aspects such as privacy and control of accounts, speed of transacting increases, T+0 (which affects the velocity of money) and a decentralised system is much more resilient than a centralised database system (there is no need to make multiple backups).

The fourth texture of the participant's perception and judgment in terms of the customer experience are: customer do not need to understand how blockchain

technology works or even that they are using blockchain to make a payment. The participant states the man in the street in a few years will be able to make a payment to anyone, anywhere in the world as easy as it is to send a message on a social message platform. Blockchain technology will ultimately disappear into the background of the user experience.

The structure of participant 05's experience contained the two themes: (1) trust and control over decentralised accounts, and (2) fear of losing centralised control.

The structure of the participant's experience in terms of relation to self and others is that a distributed ledger not only makes a ledger visible (transparent) to others, but also creates trust in them, because the provenance of all payments can be seen, and nodes (individuals and/or organisations) control their own accounts. The participant states that in a centralised ledger, individuals usually do not control their accounts. The fear of banks is that if there is a move to a decentralised ledger they lose central control and an ability to charge fees.

Participant 06:

The texture of participant 06's experience of the distributed value ecology phenomenon contained four themes: (1) use case is the catalyst, (2) thinking disruption, (3) shape and size of perception value lens, and (4) transition to a distributed value ecosystem.

The catalyst for the participants' experience is a use case. The use case presents a real-world example of the threat that blockchain, cryptocurrency combined with a killer application poses to intermediaries (for example, in the sharing economy an intermediary (such as Uber) will not be needed to coordinate interactions between participants in a blockchain ecosystem). Blockchain, if combined with a killer application, makes it possible for individuals to connect directly with service providers and make payments instantly (using cryptocurrency), without making use of any intermediaries (more complex social and economic coordination is possible). The thought experiment insight is that more complex and inclusive value networks of near interaction are possible, and direct appropriation of value, if crypto payment objects and killer applications are combined.

The second texture of the participant involves thinking through the implications of combining blockchain technology and killer applications the participant perceives and

judges that disruption will follow: disintermediation of financial intermediaries and fundamentally disruption to their business models. The disruption is not so much from the technology itself, but rather competition that will come with blockchain on a global scale. It is easy for anyone to spin up a blockchain solution (a killer application), very quickly at low cost and on a global scale (due to the boundaryless nature of the technology).

The third texture of the participant in terms perceptual value lens used: there is still a need for a marketplace (place for willing buyers and sellers to meet), but intermediaries business models in terms of value transfer and record keeping of value transfer will be challenged. Intermediaries will have to reinvent themselves and some already have. Blockchain technology will transform the shape (workings of the organisation) and aperture (size of the value pool and participation in that value pool) of the value lens used: cut costs, cut out middlemen that do not add any value and create a more inclusive financial market base.

The fourth texture of the participant's experiences is in terms of the transition to a distributed value ecosystem: the transition is being held back by regulators. Regulators play a catch-up game to the technology (but it will not stop the transition). The barrier to entry is low, it is not that costly to make the transition to a blockchain based system of coordination (and it can be done quickly). The transition makes a great deal of sense if the strategic goals of the organisation aligns (financial inclusion) with the dynamics of the blockchain. Overall, the transition is fast approaching an inflection point where society won't need intermediaries (banks) to transfer value.

The structure of participant 06 experience contained one core theme: benefits to the man in the street.

The structure of the participant's experiences in terms of relationship to self and other is as follows: the man in the street's experience of using blockchain will be a fundamental shift in terms of the control over money and the velocity of money (speed). Individuals using an online application can transfer value (money) to anyone, instantly (same day settlement, T+0) and avoid having to incur exorbitant fees. However, a seamless retail experience for the man in the street is not here yet (individuals are not yet buying a cup of coffee with cryptocurrency).

Participant 07:

The texture of participant 07's experience of the distributed value ecology phenomenon contained three themes: (1) distrust in banks, (2) thinking disruption, and (3) blockchain regulation fit.

The first texture of the participant's experience is in terms of distrust in banks: the feeling is that individuals have more trust in the community and a trust machine, than trust in highly centralised financial institutions (which has a very poor track record).

The second texture of the participant's experience is in terms of thinking through the implications of using blockchain technology and that it is destructive (this means that disintermediation is absolute) and the technology will be disruptive to intermediaries that provide messaging services in the current regulated payments infrastructure. Disruption is also feared from killer-applications and token-based systems that are simpler, better, faster and cheaper than the traditional bank payment infrastructure. Such an application would appeal to the younger generation (millennials or "born free"), more so than generation X, which is still "loyal" to banks. Token-based systems are also transforming how people work: interaction with others on a global scale, autonomy in when and where they work and payment for work done in cryptocurrency.

The texture of the participant's experience in terms of the transition to a distributed value ecosystem: the transition is being held back by regulators, as blockchain does not fit anywhere with existing regulation. Consortia based blockchain will play out as intranets in the long term (controlled blockchain). However, permission-less blockchains will become pervasive, it is not something that organisations can run away from.

The structure of participant 07's experience contained three core themes: (1) self-sovereign identity and money, (2) blockchain resonates with people at a personal level, and (3) collaboration with others.

The first structure of the participant's experiences in terms of relation to self: individuals want to be the custodians of their identity and money. They do not want others to tell them who they are. They want to tell others who they are. In terms of interaction with others, individuals want platforms that are censorship-resistant. Individuals want to be able to protect their identity, assets (for example, having a title deed that is censorship resistant gives a person dignity). It also gives a person the

capability to transact with others, even if they have been excluded or blacklisted from participating in the current financial system infrastructure.

The second structure of the participant's experience is in terms of relation to self. The participant stated that the technology resonates with people at a personal level: the reason why it resonates with them, the technology extends to individuals a capability to control that which affects people at a personal level.

The third structure of participant's experiences in terms of relation to others: there is a great deal of trust created in the blockchain ecosystem by a trust machine (a mind-shift in how people trust), by disintermediating trust. There is a willingness to collaborate with others. Even though building the technology with others, will decentralise that trust with others.

Participant 08:

The texture of participant 08's experience of the distributed value ecology phenomenon contained four themes: (1) emergent nature of opportunities, (2) a killer application, (3) transition to the blockchain world, and (4) understanding the mechanics of blockchain.

The first structure of the participant's experience is in terms of thinking about the implications of using blockchain technology and seeing opportunities: the opportunities for organisations to exploit the technology will not be obvious initially ("The synergies and what new ideas pop up basically, and applications that you cannot see even will pop out of that"). Use cases are also "popping up" in up in other industries (industry other than finance and banking). The participant states that opportunities will emerge as the technology is deployed and will also create new revenue models not anticipated. For example, previous cost centres for an organisation may become a revenue centre (micro services). There is also an opportunity to solve the problem of how to manage public and private keys to make the user experience less of a "fiction".

The second texture of the participant's thinking is in terms of making blockchain a more seamless user experience: there is a need for a killer application to be invented to make the blockchain technology more accessible to more people. No one would be forced to use the application. Similarly, to social media applications used for coordination. The application would be used to coordinate work groups. It would make

life simpler, easier and no one would force them to use it (for example, password control would no longer be needed). They will switch to it themselves.

The third texture is in terms of the perceptual value lens (shape and size of the value lens) used by the participant: it is anticipated many blockchains will be created and die, but those that will become dominant are those that solve “pain-points” for organisations that existing technology is not solving. The participant stated that the project to demonstrate the blockchain proof of concept works (RTGS use case) has put blockchain on the radar of more people in the bank. However, the structure of the participant’s experience in terms of making the transition to a blockchain world, the mechanics of blockchain (workings) is viewed as quite different. It is difficult to see how to productionise blockchain in a bank, due to the highly regulated nature of banks (and penalties that could be incurred), how it would fit into the existing ways that banks work (interoperate with existing IT systems) and how to have both private and transparent transactions (the regulator should be able to see everything going on).

The fourth texture of the participant’s experience in terms of understanding what the organisation should do with blockchain. However, a fundamental understanding of the mechanics and properties of blockchain is developed only in a few people in the organisation. Few people can make a sound assessment when blockchain technology makes a good use case or not (“you cannot just put it on a blockchain and see what is going to work”). The blockchain unit, the team ends up educating what is blockchain, rather than assess with others whether there is a good use case or not.

The structure of participant 08’s experience contained two core themes: (1) control and ownership of data, and (2) control over online identity.

The first structure of the participant’s experience is in term of relation to self: people do not switch easily between banks because of high switching cost and uncertainty in switching. Blockchain will make it easy to move data where they want to. It gives flexibility to control and own data. At present, the individual’s data is owned and control in pockets by big organisations. The second structure of experience is in terms of identity, relation to self and others. It is now possible for individuals to have control over identity and data connected to their identity, which is currently controlled by centralised organisations in data pockets. Self-sovereign identity flips who controls identity. Individuals control their online identity. With self-sovereign identity, individuals

control who has access to what data and revoke it if they want to. It also brings interesting new use cases (for example, solving the problem of password control).

Participant 09:

The texture of participant 09's experience of the distributed value ecology phenomenon contained two core themes: (1) separating blockchain from cryptocurrency, and (2) blockchain as a payment enabler (value added service).

The first texture of the participant's experience is in terms of the finding of the true utility of blockchain: "to move the technology forward, it is vital to have the distinction and to education the public of the technology and its capabilities." The judgement is that the true utility value for the organisation lies in the disjunction between cryptocurrency and blockchain.

The second texture of the participant's experience is in terms of the perceptual value lens used. The participant felt strongly that the value add comes from use cases outside the payment's space, making payments more efficient and accessible (for example, insurance claim pay-outs, and the registration of documents for vehicle finance). The current payment system of South Africa serves the industry well (efficient, effective, secure and accessible). The participant stated that the organisation did not see the benefit of DLT as a wholesale payment system, but more as a payment enabler (value-add services). Hence, the shape of the value is a value add and not a fundamental transformation of the working of the payment's space. The participant stated that blockchain technology will only be adopted by banks, once it has proven to be reliable and dependable in real-world scenarios.

The structure of participant 09's experience contained one core theme, namely, the seamlessness of experience.

The main structure of the participant's experience is in terms of the current state, namely, that blockchain has not proven yet to be operationally ready. The participant stated that the technology is in the experimental phase, and updates are required to make the technology more stable and seamless to use.

Participant 10:

The texture of participant 10's experience of the distributed value ecology phenomenon contained five themes: (1) lower trust in centralised organisations, (2)

cryptocurrency hype a necessary conjunction with blockchain applications, (3) thinking through implication using blockchain technology, (4) seeing disruption, and (5) transitioning to a blockchain world.

The first texture of the participant's experience is in terms of catalysts that drive interests in the distributed value ecology phenomena: perceived lower trust in centralised organisations and social and a cultural movement to decentralised, centralised systems of coordination. The participant stated that there are limits to how much society will put up with the failures of centralised organisations. There is now a technology for the first time that has the potential to disrupt power structures. The second catalyst is the hype around cryptocurrency and the use of blockchain technology. The participant judged that cryptocurrency and blockchain are intertwined and this conjunction is needed to create a truly distributed value ecosystem. The stance of banks is to ignore the cryptocurrency aspect and focus rather on using blockchains to create efficiency and optimisation within processes.

The second texture of the participant's experience is in terms of thinking through the implications of using blockchain technology (the thought experiment), which creates a state of mind that almost anything is possible. Small-scale experimentation also shows a desired future can be achieved now. There is no need to wait around for centralised organisations to create the future.

The third texture of the participant's experience is in terms of seeing disruption for centralised organisations such as banks. The disruption will be at a fundamental level in the long term: a fundamental shift, transformation in terms of the way organisations do business. Disintermediation in a truly decentralised system will be absolute (and "being able to extract value from the centre is basically gone"). Blockchain technology will present new ways of working and solve problems where other technologies have tried and failed, new business models will emerge, new governmental structures, and new ways of social coordinating that are financially more inclusive at a local level. It will shift the organisational notions of success. Metrics of organisation success will become meaningless (such as "vamping in profit"). The participant states that "If you are an intermediary, it doesn't look good for you."

The fourth texture of the participant's experience is in terms of the transition to the blockchain space. There is "a lot of interesting stuff", it is still early days, lots of

experimentation and lots of opportunity space”. The cost barrier to experiment with blockchain is low and use cases demonstrations show it can be done “crazy fast”. However, the response of the centralised organisation is not seen as agile and quick (“the point is that at least they are responding, in a way to specifically how this technology threatens them. But in terms of how our organisations are responding, I don’t think that they feel threatened yet. It is more sort of like a frog in a pot of cold water that is slowly boiling.”)

The structure of participant 10’s experience contained two themes: (1) feeling of serious excitement, and (2) a state of almost anything is possible.

The first structure of the participant’s experience in terms of relation to self: the participant felt that anything is possible with blockchain technology, and the phenomenon generates feelings of hope, excitement, inspiration and massive curiosity (it can sustain and capture the interest of the participant for a long time). The second structure of experience is a state of mind that almost anything is possible, but there is still a need for an authority. The participant states in terms of relation to others there is an opportunity to create “the future that we want, rather than inherit the future from someone else.” However, there is still a need for an authority to resolve disputes and enforce ownership, which comes down to “men with guns”.

In the section that follows, the sixth step in the phenomenological reduction process is dealt with. A composite textural-structural description is presented. This composite description answers the primary research question as to the invariant qualities of participants’ experiences of the distributed value ecology phenomenon.

4.2.6 Step 6: Composite textural-structural description

In this section, step six in the phenomenological reduction process, a composite textural-structural description (synthesis of textures and structures of experiences) is developed for all the participants from the individual textural-structural descriptions. The composite description indicates the essences (invariants) of participants’ experience of the value ecology phenomenon (see Chapter 3, Section 3.6.3). The composite description answers the main research questions in this study.

The context (backdrop) to the experiences of participants as related to the distributed value ecology phenomena is the ‘distance’ experienced by individuals in social and

economic systems in terms of how society cooperates and coordinates. Distance is manifested in experiences as distrust, frictions in the system, multiple versions of a person's identity, lack of autonomy and direct control over online identities, data and money. Multiple versions of the truth around money and identity are experienced. To arrive at an acceptable truth requires continuous reconciliation. Distance is also due to friction inherent in centralised system design. Complexity design challenges play a significant role in the degree to which individuals are well served or excluded in society.

In terms of answering the primary research question:

What is the invariant experience of managers using externally available intelligent building blocks (DLT) to transform, or rearrange the way organisation cooperate and coordinate with others in a distributed value ecosystem?

Six invariant textures of participants' experiences were identified. The first two were:

- (1) Three catalysts for a thought experiment in closing or erasing "distance" in social and economic system of coordination (the remembered and felt),
- (2) A process of thinking through the implications of creating and using a fully decentralised and distributed system of coordination (the thought).

On thinking through the implication, the participants perceived and judged that in the short term, highly regulated and siloed financial institutions will adopt blockchain technology for efficiency and effectiveness reasons. Distributed control is ensured, but not distributed trust. The implicit mandate that centralised organisations have leads to the judgement that it is "business as usual" for banks in the short term (central banks and banks are mandated to play a role in ensuring price and financial stability and DLT does not diminish this mandate).

The long-term thinking and judgement of adopting blockchain technology is that disruption will be fundamental (noesis is fear in terms of how prevailing ways of doing things will be disrupted). Intermediaries in the current centralised value ecosystem will have to reinvent themselves as their business models and measures of success will become meaningless as the distributed value ecosystem starts to mature and the user experience improves (for example, private key management is viewed as an important factor to sort out).

However, in terms of making the transition to a distributed value ecosystem, the following two invariant textures were identified:

- (3) A regulatory chasm first needs to be crossed (the felt and judged).
- (4) Blockchain presents a solution (interoperating capabilities), but the problem space itself is not well mapped or understood (the perceived and judged).
- (5) The perceptual value lenses used (the perceived) to determine that which is incorporated or left out of organisational architecture, the following three transformations are described: the shape, size and location of the perceptual value lens.

In terms of the shape of the perceptual value lens used: crypto objects, due to their frictionless and boundary-less nature, and as a single consensus-based source of truth, increases the velocity (speed) of money, reduces liquidity requirements and presents netting opportunities (in the case of a network of organisations in a permissioned set up) in making value transfers.

In terms of the aperture (size) of the value lens used: new forms of value transfer are made possible (tokenisation of assets and new asset classes), that was not possible or not viewed as economically sensible before (micro payment or micro services). More individuals can be part of distributed value networks (there is a low barrier to entry and experimentation), hence, more complex value networks can be created that were not previously possible, and which would create a more inclusive financial base.

In terms of the location of the value lens used, a capability is created to capture value in a direct and near manner and it shifts the capability to interoperate towards the nodes in a distributed network. This interoperating capability makes it possible for nodes to own and control crypto objects (control identity, flow of personal data and banks accounts), and presents an opportunity to influence social and economic cooperation and coordination in a direct manner. This is a novel peer-based game structure that a society of organisations has to learn to play.

The current thinking in terms of a blockchain technology inflection point that is reached and beyond, needs to be considered. The inflection point is reached when there is widespread adoption of 'killer applications' that combine many application layers to create a truly distributed value ecosystem. A 'killer ecosystem' is an ecosystem that

combines and coordinates crypto objects around identity, data and money to offer the man in the street a seamless experience. Disruption is perceived and judged to be fundamental and absolute.

(6) The difference as whole is in the mechanics of blockchain technology (the thought and judged).

Parallel to the centralised organisational architecture, a decentralised and distributed architecture is emerging. Participants refer to this emerging architecture as the internet of value, trust, identity and reputation anchors. The belief is that the mechanics of distributed ledger architecture not only flip the traditional management pyramid, but also scatter it, creating a different dynamic as to how value is transferred and captured.

Three invariant structures of participants' experiences were identified:

- (1) self-determination,
- (2) feelings of fear, excitement and frustration, and
- (3) a folded state of almost anything is possible.

The first invariant structure self-determination is described as:

- Autonomy over identity, personal data and money. Individuals experience that blockchain technology gives nodes (individuals or organisation) control over that which affects them directly. Further, their near peer-to-peer interactions can create a financially more inclusive society in a direct manner, and makes fairer value capture possible.
- A concern about the relatedness (circular relationships with others) and the harm to others in a centralised system of coordination. Individuals experience blockchain as a different system of coordination in which the concern is with the value intrinsic to the system (and not merely coordination of extrinsic units of value). Aspects of intrinsic value are described as: trust generating mechanisms, frictionless interaction, having both privacy and transparency, and both a seamless experience collaborating and autonomy in interacting with others.

The second invariant structure of participants is feelings. Feelings of fear, excitement and frustration. There is a great deal of fear experienced that the workings of organisation in the regulated space (business models) will be disrupted. However,

there is also a deal of excitement in terms of how workings may be changed, the career possibilities in the ecosystem and a feeling that almost anything is possible. A feeling that the future can be created that individuals want, now, rather than inherent the future or wait for centralised institutions. There is also a feeling of frustration in terms of the speed at which this “brave new world” is being created.

The third invariant structure of participants’ experience of the distributed value ecosystem is a folded granular state in terms of identity, personal data and money: individuals (nodes) can have both private and transparent transactions, collaborate with others (a trust generating machine is used to signal trust) and still have direct control over their identity and data (self-sovereignty) as starting conditions. There is no need to make trade-offs. A trade-off is a great consumer experience for aspects of intrinsic value to individuals and society, such as autonomy, collaboration with others, and the capabilities to capture value in direct way, and participation in a direct and near manner in a system to create a desired future.

Overall, the judgement of participants is that DLT extends an interoperating capability to nodes (individuals, organisations and communities) to transfer and capture value in a direct and near manner, which fundamentally is different from the centralised power law dynamic.

4.3 SUMMARY

Chapter 4 dealt with the process of analysing data collected. The first steps in the process involved bracketing the researcher’s own experience (epoché), the second step involved a process of identifying significant statements and identifying horizons that stand out as invariant qualities. The third step involved clustering horizons into textural themes and the invariant structures of participants’ experiences. The fourth steps involved placing themes back into the overall context from which they initially emerged. The fifth step involved developing individual textural-structural descriptions for each of the participants. In the final section, step six of the analysis process, a composite textural-structural description is presented. This composite description answers the research question, as to the invariant qualities (essences) of participants’ experiences lived through as related to the distributed value ecosystem phenomenon.

Chapter 5 that follows presents an overview of the entire study. The overview includes (1) the research issue, (2) the relationship of the research issue to the research statement and research gap, (3) the relationship between the conceptual framework used and the research design. In the sections that follow the research design, relationships between (4) the research statement and factual conclusions is drawn, (5) the research questions and interpretive conclusions, and finally, the (6) conceptual conclusions that were given the conceptual frame used. The final section addresses how the (7) gap in knowledge is closed.

CHAPTER 5: CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

Chapter 5 presents a summary of the entire study, the implications for society and organisations, and recommendations for future research.

The summary of the study that follows in Section 5.2 connects the relationships between different parts of the study as a sequence of the circular relationships that unfolded (Trafford & Leshem, 2008), more specifically, in terms of the relationships between different parts of the study. The sections that follow explicate:

- (1) How the central research issue connects to the research statement and gap in knowledge;
- (2) The relationship between the conceptual frame used and the choice of research design;
- (3) The relationship between the research statement and factual conclusions (factual conclusions meaning the textures and structures of participants' experiences using DLT) drawn;
- (4) The relationships between the research questions and the interpretive conclusions drawn;
- (5) The relationship between the conceptual frame and conceptual conclusions drawn, and
- (6) How the study closes the gap in knowledge identified (meaning, the contribution that the study makes and the key implications for society and organisations).

In the concluding sections of Chapter 5, recommendations for future research are made, implications of the research findings are drawn for society and organisations, and a brief summary of Chapter 5 is then presented.

5.2 SUMMARY OF THE ENTIRE STUDY

This section summarises the study in terms of the research issue, the research statement and gap in knowledge, the research questions and interpretive conclusions, and the conceptual frame and research design.

5.2.1 Research issue

The central research issue in this study is the third morphing of economies due to the externally available intelligent building blocks of technology (Arthur, 2017; Swan, 2015), specifically DLT. It is anticipated the widespread use of DLT will redraw the boundaries of industries and transform the workings of organisations to such a degree that they will cease to exist in their current form (Arthur, 2017).

Hence, the use of the externally available intelligent building blocks of technology, such as DLT, is not merely a tame management problem of efficiency and effectiveness. The use of DLT poses a wicked strategic problem. Furthermore, managers find that the explanations, constructs, concepts or frameworks that have been developed add to the confusion as to what managers should do with DLT, rather than give a fundamental understanding of the essences of the distributed value ecosystems phenomenon. The perception is that the adoption of the technology may lead to a sharp transformation in how society and organisations cooperate and coordinate (Arthur, 2017; Iansiti & Lakhani, 2017; Swan, 2015), which has implications for how organisations may create, share and appropriate value. Moreover, managers experimenting with DLT find that they cannot step outside the complexity of using DLT without any consequences. Managers do not know for certain if they will destroy more value, than what they will create. They do not know if the implications they have drawn about using DLT are strategically, the 'right' game. Hence, managers face a wicked, as opposed to a mere tame, management problem in picking the 'right' game.

Section 5.2.2 below addresses how the central research issue relates to the research statement and the gap that has been identified in the knowledge.

5.2.2 Research statement and gap in knowledge

In terms of the gap in the knowledge that was identified for this study, the literature provides natural explanations, abstract in nature, of an emerging distributed value ecosystem phenomenon that although they provide some insight, do not provide a

fundamental understanding of the essences of the phenomenon. To transcend the multitude of natural explanations that are abstract natural explanations grounded in an organisational attitude, a different attitude to studying the distributed value ecosystem phenomenon is required, namely, a phenomenological attitude was required.

Section 5.3 addresses how the research statement and research gap relate to the factual conclusions drawn from the research findings in Chapter 4 of the study. The contribution to knowledge, and how the gap in knowledge was closed are discussed in the final section of this chapter.

5.2.3 Research questions and interpretive conclusions

Given the gap in knowledge, the objective of this study was not to give further abstract explanations that may give new insights into the distributed value ecosystem phenomenon, but that simultaneously obscure meanings that are essential to understanding the distributed value ecosystem phenomenon. Hence, the objective of the study was to give an accurate description of the essences of managers' lived experiences of the distributed value ecosystem phenomenon.

Given the primary objective of the study, the primary research question in the study was as follows: What is the invariant experience of managers using externally available intelligent building blocks (DLT) to transform, or rearrange the way organisations cooperate and coordinate with others in a distributed value ecosystem?

Section 5.4 addresses the relationship between the primary and secondary research questions and the interpretive conclusions that were drawn.

Section 5.2.4 below addresses the conceptual frame employed in the study. This refers to the rationale for the research design and relationship in studying the distributed value ecosystems phenomenon from a phenomenological attitude.

5.2.4 Conceptual frame and research design

Chapter 3 presented and discussed the methodology that was used to answer the primary and secondary research question. The phenomenological methodology refers to both the philosophical assumptions that this study was based on, and the research method used in this study. The research method refers to the way the data in this study were collected and analysed. Giorgi's (1985) transcendental descriptive method was

employed as it is one of the most fully developed phenomenological methods and cited highly (Gill, 2014).

Conceptually there is common ground between complexity theory and phenomenology. Furthermore, there were several key considerations for using the phenomenological method, as opposed to other quantitative or qualitative methods. These considerations included:

- The transcendental phenomenological method as a means to reveal the essential qualities of complex social phenomenon (essences) (Sanders, 1982:358) and deep structure of organisations (Bettis & Prahalad, 1986, 1995).
- The problem that complex social and behavioural phenomena often elude quantification and statistical inference (Dandridge *et al.*, 1980; Sanders, 1982:358).
- The method being well suited to study the technology that has become pervasive and embedded in our life world and which is simply accepted to exist, without consideration of the principles it is built on (Berners-Lee, 2010; Cilesiz, 2011).
- The themes and invariant structures that are identified in the study that may be useful to repudiate or complement research on the distributed value ecology phenomenon (Glaser & Strauss, 1967; Sanders, 1982:358).

Section 5.5 provides more detail about the relationship between the conceptual frame used (the use of transcendental phenomenology) and the conceptual conclusions of the study. More specifically, it discusses the relevance of the study to other research and theories in the literature. The next section presents the factual conclusions of the study.

5.3 FACTUAL CONCLUSIONS

This section addresses the relationship between the research statement, as presented in Section 5.2.2 and the factual conclusions drawn from the research findings in Chapter 4. More specifically, Chapter 4 provided a description of the textures (noema) and structures (noesis) of participants' experiences using DLT (factual conclusions). Six invariant textures and three invariant structures were identified (see Chapter 4, section 4.2.3 that addresses the invariant textures and structures identified).

The six invariant textures identified were:

- a. Three catalysts driving exploration of DLT;
- b. A thought experiment in how DLT may disrupt how things are currently done;
- c. Three transformation of the perceptual value lens used;
- d. A regulatory chasm;
- e. A quest to map the problem and solution space using DLT and;

DLT mechanics are fundamentally different

- **Three catalysts** drive the exploration of DLT. The first catalyst is the erosion of trust in centralised organisations (Frizzo-Barker *et al.*, 2020:9). The second is a quest to find the true value of DLT by separating DLT from cryptocurrency (the decentralised nature is the basis for a trust machine or anchor for organisation) (Ali *et al.*, 2020:3; Frizzo-Barker *et al.*, 2020:7). The third catalyst is the value of distributed technology that is found to be intertwined with cryptocurrency. Cryptocurrency is viewed as an essential layer of a decentralised and decentralised value ecosystem. It is essential as an incentive mechanism to maintain an open protocol, secure it, create disincentives to collude, ensure the system is self-sustaining, and that it makes novel exploration possible at very low cost.

Furthermore, experimentation results in more applications layers, beyond the currency explored, such as self-sovereign identity, reputation and smart contracts. Hence, a more 'mature' form of distributed value ecosystem is emerging. The next more mature form of application envisaged is a 'killer' ecosystem application (Consensus, 2019).

- **A thought experiment** is undertaken in how DLT may disrupt the way things are currently done. This thought experiment is primarily presented in the form of an interoperating capability (Frizzo-Barker *et al.*, 2020:11), that makes it possible to cooperate and coordinate social and economic activity in a decentralised and distributed manner that was not previously possible. Actors, in coopetition terms, move beyond dyadic relationships (Bengtsson & Kock, 1999; Chen, 2008) to peer-based relationships (Frizzo-Barker *et al.*, 2020:7).
- **Three transformations of the perceptual value lens used.** Participants used a lens or conceptual filter (Bettis & Prahalad, 1995:3), which primarily determines

what makes sense (what data are incorporated or left out of decision-making) in the use of DLT. This means that this lens and the transformations of this lens firstly determine what transactional relationship pattern is the 'right' pattern to be of value in using DLT.

- The **first transformation** is in terms of the shape of the value lens. This means that participants judged that using DLT will lead to more efficient and effective interoperating processes (Ali *et al.*, 2020:8; Guo & Liang, 2016). The consensus is that using a distributed ledger within an organisation makes no sense, as it primarily extends interoperating capabilities between organisations. The perceived benefits of DLT are cost reductions (Ali *et al.*, 2020; Frizzo-Barker *et al.*, 2020:7-8) by removing intermediaries and the administration needed for record-keeping and reconciliation between nodes (an emergent property of a distributed value ecosystem is that there is no need for reconciliations). Further benefits are faster settlement of cross-border transactions, more liquidity as the velocity of money/transaction increases, no need to reconcile ledgers between participants in a decentralised and distributed network, netting opportunities, and the possibilities to turn cost centres into a revenue centre or create new streams of revenue not considered economically sensible before. For example, organisations may decide to provide micro services, make micro payments, or provide location and identity verification services in a decentralised and distributed value ecosystem. However, the transformation is not just a 'faster horse', meaning a more effective and efficient payment system. It is also possible to create a completely different kind of societal 'distributed organism' to cooperate and coordinate. It is anticipated that the nature of this organism will transform both the size and location of the value lens.
- More specifically, the **second transformation** of the value lens is a much larger boundaryless social and economic 'distributed organism' that is emerging in terms of how to coordinate social and economic activity (Frizzo-Barker *et al.*, 2020:9). This means that the aperture of the value lens enlarges and it is now possible to transfer cryptographic objects of value at very low cost, which in turn, makes the micro payments economically possible which were not previously possible. The strategic management implication is that it

is possible to have more participants in a value pool that was not sensible or economical before. The longer-term strategic value is that value networks that are more complex in nature may be created that have a broader, more inclusive market base. Furthermore, the combination of cryptographic objects, such as identity, reputation and smart contract objects, will make it possible to create business models that are truly native to the internet. The strategic implications of combining different applications in a distributed ecosystem have not yet been explored. In other words, the invention of a killer distributed value ecosystem application (Consensys, 2019).

- The **third transformation** of this organism is the **location shift of the value lens**. In a truly decentralised and distributed value ecosystem, there is no longer a centre from which to extract value. It is now possible for nodes to own and control aspects, such as their identity, money and data (Ali *et al.*, 2020:3; Frizzo-Barker *et al.*, 2020:1). Hence, the relationship to others in appropriating value is contingent on whether participants decide to opt in or out of relationships based on a fair give and take of value. This capability shift implies that individuals do not have to wait for intermediaries to create a bigger value pool and then find ways to share it with others (how the value pie is cut up may significantly shift). Strategic thinking shifts to direct near interaction and direct participation in a value network or ecosystem (Allee, 2000; Hearn & Pace, 2006; Teece, 2014). This will have implications for value appropriation, and individuals can create new 'pools of value' with others, as the barriers to engage in such distributed ledger experiments is very low. The excitement expressed is that it may result in fairer transfer and capture of value created, and the value appropriated by centralised organisations may be 'right-sized'. Overall, highly centralised organisations will have to reinvent or discover the value-add role they play in a truly open distributed value ecosystem.
- **A regulatory chasm** has to be crossed in order to integrate conflicts over socially complex resources in a different way. This means that regulatory clarity does not exist that allows organisations to move easily from a regulated space to an open distributed value ecosystem (Ali *et al.*, 2020:5; Frizzo-Barker *et al.*, 2020:9). It is easier for a consortia of organisations (small number of organisations) to decide on which protocols and standards to adopt, as participants have already

established who and how they will trust each other. In addition, clear, bounded transactional relationships already exist (Ali *et al.*, 2020:167), in which the use of well-defined standards is characteristic of financial services (Ali *et al.*, 2020:5; Dahlberg *et al.*, 2008:167). Hence, the nature of the relationship in terms of distributed technology is that it reinforces the existing pattern of bounded, power over socially complex resources relationships.

However, the long-term social-political and psychological aspects of DLT are not well understood. There is optimism that blockchain represents freedom from centralised organisations, but it may not be an accurate understanding of how power, capital and automation actually work and play out as distributed value ecosystems mature (Frizzo-Barker *et al.*, 2020:9).

Furthermore, in the case of autonomous and self-governing distributed ledger systems, actors have to decide on the protocols and standards to adopt (self-regulate). There is no central structure regulating the development of protocols and standards. Moreover, there is no central body in these open communities that helps to reach agreement on protocols and standards and centralised strategic agendas (Ali *et al.*, 2020:1). This leads to multiple rules and standards being adopted.

- **A quest to map the problem and solution space using DLT.** DLT poses a truly wicked management problem, which means that clearly defining the problem that DLT solves is a wicked undertaking in itself. The reason for this is that with every attempt to implement a DLT-based solution, the narrative changes as to the problem that was solved. Consequently, defining what is blockchain, and the specific problem or problems that DLT solves, remains open-ended and ill-defined (Ali *et al.*, 2020; Frizzo-Barker *et al.*, 2020).
- **DLT mechanics are fundamentally different.** The mechanics (namely, how DLT affects the organisational workings) of DLT are not easy to understand (a technical level and barrier to adoption of the technology). It is mind-bending for managers only familiar with the workings of hierarchical organisations and centralised databases (there is also corporate level and management practice level that is a barrier to the adoption of the technology). Consequently, education in terms of the mechanics of DLT is required to understand how fundamental differences in mechanics may affect transactional relationships (Frizzo-Barker *et al.*, 2020:11).

This then raised the question whether an organisation needs a DLT solution at all, if the organisation does not seek to change the fundamental nature of transactional relationships that already exist.

In terms of the structures of experiences (noesis) using DLT, the following three invariant structures were identified:

- **Self-determination:** This invariant structure of experiences consists of two components: the first component is self-sovereignty (autonomy in relation to self) that individuals seek over identity, money and data (Ali *et al.*, 2020:13; Berners-Lee, 2010; European Commission, 2019; Zuboff, 2015). The second component is a promise of friction-free collaboration with others to create complex value networks that were not previously possible. The rationale for creating a parallel decentralised and distributed architecture, is that centralised systems are sources of harm and exploitation if individuals in a society (Zuboff, 2015) are either locked into, or even worse, locked out (financial inclusion gap) from centralised systems because of the costs of participating in the system.
- **Feelings:** This invariant structure of experiences consists of three components: fear, excitement and frustration. Fear is in terms of the disruption to existing business models (Ali *et al.*, 2020:4) in the regulated space (disintermediation), and disruption from the competition from unconventional players that DLT will bring by inventing killer applications or a killer ecosystem (Consensys, 2019). The second component, excitement, is in terms of seeing fertile opportunities (Ali *et al.*, 2020:2). This will result in new career possibilities, in the form of better jobs for fewer individuals and permanent technological unemployment for many (Arthur, 2017; Keynes, 1933), and new types of business models and social interaction (Ali *et al.*, 2020:2; Arthur, 2017). Furthermore, the possibility of creating the desired future, as opposed to inheriting the future created by centralised organisations (contingent on transactional patterns, whether existing or novel, that are either amplified or dampened). The third component, frustration is in terms of not creating the future fast enough and being held back by organisational imperatives.
- **Binary or folded states:** This invariant structure of experience consists of two components, namely, a binary and a folded state. The binary state is about starting conditions in value relationship in which trade-offs are made in the design of

centralised networks and databases. This links to the arguments made in cooperation research, specifically, the positive and negative game structures picked between participants (Fernandes *et al.*, 2019; Nalebuff & Brandenburger, 1995).

The focus of centralised organisations is on creating great customer experiences, but a great customer experience is inherently also linear and/or dyadic (Nalebuff & Brandenburger, 1995), and a fragile relationship with self and others. Customers are not self-sovereign; processes are opaque and often friction-laden.

The binary transactional pattern impacts on the transfer and capture of value. The perception, specifically in terms of personal data, more value extraction than value add is created by centralised organisations (Zuboff, 2015), when participants are locked into binary types of transactional relationships with centralised organisations. Unbalanced value relationships emerge because binary transactional relationships are laden with complicated rule sets that consumers rarely understand or even bother to read when they agree to these rules. These rule sets determine that customers do not own and control their identity, money and personal data. Customers play the role of pseudo-autonomous actors in centralised database systems. A clear trade-off is also made in terms of aspects that are of inherent value to individuals in society. This means there is value in having both privacy and transparency in interacting with others, and being able to collaborate with others in a seamless way and being self-sovereign (truly autonomous) at the same time (Frizzo-Barker *et al.*, 2020:7).

5.3.1 Essences of the distributed value ecosystem phenomenon

A composite description of the invariant textures and structures (essence of the distributed value ecosystem phenomenon) is given in Chapter 4, Section 4.2.6. This composite textural-structural description answers the primary research question.

The overall factual conclusion is that the essences of the distributed value ecosystems' phenomenon are the relationships that participants in a distributed value ecosystem hold to DLT. The nature of these relationships is transactional and circular in nature.

In terms of the transactional nature of relationships, participants follow either a binary or a folded transactional pattern. A transactional pattern consists of a combination of aspects that are socially complex in nature, such as autonomy over money, identity

and data, seamlessness in interacting with others, and transparency and privacy in transacting with others.

Within a **binary transactional pattern**, participants primarily seek to have power over the relationship (Follett, 1925) and do so through disjunction ('cutting up') of socially complex aspects (Allee, 2002), which in turn lead to frictions and conflicts. In cutting up socially complex aspects in different ways, opposing world-views emerge of the 'right' question and answer as to how to resolve conflicts over the exploitation and cutting up of aspects of socially complex resources (Follett, 1925). Furthermore, within a binary transactional pattern, participants in picking the 'right' game, create two types of binary relationship patterns:

- **The bounded binary transactional pattern**, in which the dominant pattern is the power over relationships to others (Follett, 1925). A few powerful centralised players in the ecosystem seek to use DLT to retain their power over aspects of socially complex resources over which they already have a mandate (which is the primary motive for creating consortia). Within a power over relationship over others, participants in this transactional pattern make socially complex trade-offs (but trust is not truly distributed). Furthermore, the participants gain a seamless experience in interaction with others in a clearly bounded structure (which means that a regulator determines which persons are locked into or out of a bounded pattern of transactions), but in relation to self, each node makes a trade-off in terms of their autonomy (they are pseudo-autonomous participants in the system). Furthermore, participants need to be transparent in interacting with other, but never fully have private interactions. Consequently consensus is required to establish what constitutes a fair way to 'slice' autonomy and transparency and ensure the right of privacy of others.
- **The unbounded binary transactional pattern**, the power over relationship that participants seek to have, is power over aspects in relation to self (absolute autonomy and privacy). With a power over relations to socially complex aspect of self, participants also make a trade-off. Participants gain autonomy in the interaction with others, but trade-off a seamless experience interacting with others. Furthermore, in interacting with others, the participants have pseudo-private interactions (via pseudonymous identity). Hence, participants can have a form of

privacy, but they are never fully transparent in interacting with others (an opaque relationship exists in truly knowing the identity of an individual).

The novel and rare pattern is the **folded transactional pattern**. Within a folded transactional pattern, participants opt to create power with others in relationships (Follett, 1925) over socially complex aspects in relation to self and others (conjunction principle is applied). This, in turn, makes it possible to follow a different approach when dealing with frictions and conflicts over socially complex resources (a constructive and more folded approach), such as money, identity and personal data. In essence, the participants seek to trade-up to socially more complex, folded and elegant relations to self and with others.

However, the creation of a more folded transactional relationship pattern is challenging. It is not an easy undertaking, as the focus is on creating narrow near and direct micro-level interaction conditions (Bengtsson *et al.*, 2019; Padula & Dagnino, 2007) embedded as folded starting relationship conditions that are not continually subject to continuous rule transformation. The folded transactional pattern embraces the non-trivial nature of interactions and the agency that individuals have (Tsoukas, 2017:139) in a folded transactional pattern.

With more folded relationships in transacting, it affects the kind of dynamic that is possible. For example, with self-sovereign identity, in the future, individuals may have both autonomy and a seamless experience using self-sovereign identity while transacting with others, as well as privacy and being transparent in transacting with others. Hence, they can opt in or out of a folded transactional relationship pattern as needed. This means to opt out of a harmful transactional pattern to self (when more value is appropriated by others than what is created, or opt into trade-ups in relation to self and others).

Section 5.5 addresses folded transactional pattern as the difference, namely, a different way to integrating conflict and frictions over socially complex resources. In other words, Section 5.5 presents the conceptual conclusion: the new idea of folded difference and a different approach to constructive conflict.

Section 5.4 that follows, discusses the findings in relation to the secondary research questions and interpretive conclusions.

5.4 INTERPRETIVE CONCLUSIONS

This section addresses the relationship between the secondary research questions and interpretive conclusions.

The secondary research objectives of the proposed study were as follows:

- To differentiate between the actual lived experiences of managers as related to the distributed value ecosystem phenomenon and the theory on distributed value ecosystem phenomenon.
- Is there a new coherent blueprint and rules of the game emerging for using externally available intelligent building blocks to transform to distributed autonomous organisational architecture?
- To explore the impact of fundamental technology on organisational intelligence. This questions whether fundamental technologies change how organisations recognise, sense and act appropriately in complex problem contexts (value ecosystems) where the coordination of human activity between many actors, machines and institutions will become a major future challenge.

In terms of the secondary research question, whether there is a difference between the lived experiences of managers and the theory on the distributed value ecosystem phenomenon, the bulk of the literature presents natural explanations (Frizzo-Barker *et al.*, 2020) and there is a lack of major empirical studies and publications in the blockchain field (Ali *et al.*, 2020:2). Natural explanations (mostly conceptual, and to a lesser extent, empirical studies) entail:

1. Distributed ledger technology being a combination of at least three different technologies (Angelis & Da Silva, 2019:2) and the ‘mechanics’ of how distributed technology works presents a new way of how to cooperate and coordinate social and economic activity (Angelis & Da Silva, 2019:2; Guo & Liang, 2016:2); and
2. The kinds of problems distributed ledger technology solve are novel (for example, the double-spend problem) as a result of different distributed ledger technology mechanics (Iansit & Lakhani, 2017:121; Swan, 2015);
3. The value drivers of distributed ledger technologies lie in the novel functionalities gained (Angelis & Da Silva, 2019; Chen *et al.*, 2018; Guo & Liang, 2016:12; Holotiuk *et al.*, 2017);

4. A growing list of possible use cases for distributed ledger technology (Casino *et al.*, 2019:55; Guo & Liang, 2016; Iansiti & Lakhani, 2017:123-126); and
5. Arguments related to how distributed ledger technology may be instrumental in the third morphing of economies (Arthur, 2017), and its institutions by making more complex cooperation and coordination possible (Arthur, 2017; Iansiti & Lakhani, 2017; Ito *et al.*, 2017; Swan, 2015).

This study differs from other conceptual and empirical studies in terms of the factual conclusions drawn for the study. This refers to phenomenology presenting a different way of seeing how organisations actually use distributed ledger technology. In other words, the exploration and use of cases of distributed ledger technology are shaped by the nature of the relationship held by decision-makers to distributed ledger technology. The perceived ideal transactional pattern is the basis for asking the 'right' question related to how an organisation should use distributed technology, which in turn, steers decision-making to the 'right' answer for the case of the use of distributed ledger technology.

The meaning attributed from a phenomenological perspective as to the right answer, that is, the right use of distributed ledger technology is either about (1) reinforcing existing binary transactional pattern, (2) opting out of the binary transactional pattern into the more unbounded pattern, or (3) creating a more novel folded transactional pattern.

Overall, the nature of transactional relationships is key to understanding how organisations actually use distributed ledger technology (and not the novel mechanics or functionality it brings). The transactional pattern is consequential to the nature of conflicts and frictions that arise and approaches dealing with conflicts (Follett, 1925), specifically around the exploitation of socially complex aspects such as money, identity and personal data. In other words, the type of transactional relationship pattern that has been selected can either widen or narrow a trust deficit between centralised organisations and society (Frizzo-Barker *et al.*, 2020:9).

In terms of the secondary research question: Is there a new coherent blueprint emerging for using externally available intelligent building blocks to transform to distributed autonomous organisational architecture?

The finding is that a coherent blueprint has not yet emerged. Distributed value ecosystems have not yet matured to a stage where there is good management practice to follow (Frizzo-Barker *et al.*, 2020:12) and this study contends that this is one of the gaps in blockchain research, and presents a fruitful line of enquiry for researchers, specifically focusing on the successes and failures of organisational practices in implementing distributed ledger technology.

The use of cases of distributed ledger technology in this study does lead to the surface workings of organisations (in an inter-operative way). However, the transformation to the folded transactional pattern is still unfolding and rare. The interpretive conclusions in terms of coherent blueprint emerging are:

- Within a bounded binary pattern, distributed ledger technology is used to create surface architecture that is more multi-dimensional (Grant, 2016:419) (the reason for adding another dimension to the structure is that the regulator wants a more stable, efficient and effective organisational organism). Within a bounded transactional pattern, distributed technology shapes the surface workings of organisations in a narrow way. This means that current organisational ‘pain-points’ in transacting are addressed, but there is no fundamental change to the underlying nature of the transactional pattern (bounded binary pattern).
- Within an unbounded transactional pattern (the anarchist that wants a more free spirited organisational organism and is willing to make sacrifices in terms of the seamlessness in transacting with others). Participants seek to opt out of a bounded binary transaction pattern. This resolves autonomy concerns, but it is not a seamless experience transacting with others and there is a persistent need for ‘men with guns’. Civilised forms of violence (a regulator, for example) are needed to resolve disputes over how to ‘slice’ socially complex resources (how to ‘slice’ privacy and transparency concerns).
- Within a folded transactional pattern (the pragmatist decides it better to kill the binary organisational organism). This pattern is rare and has not yet emerged as a blueprint for how society may cooperate and coordinate (a great deal of work still needs to be done). The main interpretive conclusion drawn about the folded transactional pattern is that organisations seek to use this pattern to create or amplify novel relationship patterns that may be fundamentally disruptive in the long

run to the current dominantly binary-bounded transactional pattern of organisations (decentralising centralised organisation) (Ali *et al.*, 2020:7; Consensus, 2019). Furthermore, the most likely path in terms of the folded pattern, is that individuals and organisations will adopt a self-sovereign identity to trade up value relationships (constructively manage conflict) around the use of personal data.

Identity within the binary bounded transactional pattern of organisations, is fundamentally the most 'broken' aspect in transacting with others. In other words, individuals do not have autonomy over identity in relation to self; it is not a seamless experience managing their identity; they do not truly have privacy; and it is not transparent (it is rather opaque) to individuals how their identity, money and data connect outside of the bounded relationship transactional pattern to others.

The management of identity and the associated data within binary bounded and unbounded transactional pattern are problematic for both individuals and organisations. Organisations have an added costly task (accountability models and privacy officers increasingly need to be in place) to manage the data of individuals in such a way that they protect the individuals' right to privacy, and do not use inferences drawn from data in such a way that it does harm to individuals. Furthermore, the right to privacy is emerging as a fundamental right in a highly networked society (European Commission, 2019). Creating truly folded patterns around identity would be a significant step in addressing the current 'broken' nature of relationships in terms of the 'identity sacrifices' made to self and others in transacting.

In terms of the secondary research question: *What is the impact of fundamental technologies, specifically distributed ledger technology, on organisational intelligence?*

This questions whether fundamental technologies change how organisations recognise, sense and act appropriately in complex problem contexts (value ecosystems), where the coordination of human activity between many actors, machines and institutions will become a major future challenge. In other words, the question asks, do fundamental technologies, such as distributed ledger technology, have an impact on how organisations recognise, sense and act appropriately in a context that generally may be more complex?

Increased general complexity is likely to emerge, as a much larger number of diverse actors can interact in a distributed value ecosystem, but they are narrowly constrained at a micro level of interaction via an externally available intelligent building block that provides 'anchors' as to how to respond to other actors. This will either amplify, dampen or create a novel pattern in how they interact. Furthermore, distributed ledger technology is seen as an organisational interoperating system. Organisational intelligence is then not just the aggregate of actors within an organisation (Bettis & Prahalad, 1986, 1995), but it is rather the intelligence of all the organisations within a larger interoperating system between organisations.

In answering how organisations within a distributed value ecosystem recognise, sense and act in terms of the use distributed ledger technology: The study finds that organisations recognise, sense and respond either narrowly bounded or more folded as follows:

- Organisations that do not know whether more value will be destroyed than created using distributed ledger technology, make sense and respond to the use of distributed technology in a narrow way (essentially do not want to be seen as acting irresponsibly, and leave the door open for 'anarchists'). In other words, the response is to use distributed ledger technology to deal with existing organisational 'pain-points', while interacting with other organisations that they already trust and that have mechanisms to establish that trust. A narrow response affects the surface workings between organisations (addresses tame management problems), but the nature of the relationships between actors in the value ecosystem does not fundamentally change. This relationship is mostly about seeking to have power over relationships to exploit socially complex resources (it does not address the strategic wicked problems that management faces). The disjunction pattern of socially complex resources and the conflicts that ensue around it do not change (this is the 'boiling frog' response).
- A more 'folded response' emerges when organisation have a clear sense that there is value in using distributed ledger technology to pick a different kind of 'right' game. They see there is value in changing the actors, and/or their role in creating a different kind of value add (in other words, value in making a trade-up in a socially complex relationships) or they alter the role they can play in removing actors that subtract more value than what is created ('vampiring' by actors). In other words,

decentralising highly centralised organisations. The response is to use distributed ledger technology to alter the bounded transactional pattern so that it is a pattern which is more folded in nature. Furthermore, the folded transactional pattern has implications for how organisations balance relationships of power, which leads to more 'questioning' of the mandates given by society to centralised organisations. Essentially, it opens up possibilities for different ways of being, as a society of organisations. This means to move from power over relationships to self or others, to having power with others to exploit socially complex resources in ways that were not previously possible

5.5 CONCEPTUAL CONCLUSIONS

This section addresses the relationship between the conceptual frame (dealt with in Section 5.2.4) and the conceptual conclusions. This section addresses conceptually what the novel idea is that the distributed value ecosystem phenomenon presents.

The novel idea presented with distributed ledger technology is that more folded transactional patterns that were not previously possible are being made possible, which is essentially about not making trade-offs in the exploitation of socially complex resources, but rather making trade-ups in the form of the conjunction of socially complex aspects in relation to self and relation to others in transacting.

What is the old idea? In centralised systems of cooperation and coordination, the social aspects of value (such as autonomy, transparency and privacy) are socially complex aspects which give rise to conflict and often needs a regulator that governs transactional patterns, and they continually require regulatory responses in terms of how to make trade-offs around aspects of socially complex resources. Trade-offs or 'cutting up' of these aspects of socially complex resources are inevitable as the disjunction principle is embedded in the management logic used. There is no 'right' way to fairly and sensibly cut up resources that are socially complex in nature. How to cut up a value pie, and who has control and balancing interest in cutting up the value pie, are parts of the textures and structures of binary transactional relationships.

The literature presents two ways to cope with an increase in conflicting interest:

1. Grant (2016:419) argues that the multi-dimensional structure is the dominant strategy that organisations opt for to cope with the complexity challenge of an

increase in conflicting interests. In other words, the multi-dimensional structure is the strategy to cope with complexity.

2. Parker-Follett (1925:67) makes the argument that conflict is the difference, and without conflict, society makes little progress. However, the nature of the conflict needs to be constructive (conflicting positions are integrated), as opposed to spirals of destructive conflict (polarised positions).

In terms of the findings of this study, it has been found that conceptually there are relationships effects between the bounded transactional pattern, the use of distributed ledger technology, and coping with the complexity of growing conflicting interests around socially complex resources. The use of distributed ledger technology adds another dimension to the organisational structure that is already multi-dimensional (changes to surface architecture which support Grant's (2016:67) argument that the multidimensional structure is the strategy of organisations), but the idea of society and a society of organisations seeking fundamental changes to the nature of transactional relationships is neatly avoided.

What is the novel idea? There is value in integrating the socially complex aspect of relation to self and relation to others in a more folded way. A more folded transactional pattern has implications for both individuals and organisations that have to deal with an increase in conflicts around the exploitation of socially complex resources at a granular level.

Furthermore, constructive conflicts (Follett, 1925) are predicated on the idea that different opposing positions (idealised end-states) can be integrated through a circular process of re-evaluating the 'right' question and answers, arriving at a different meta question and answer that satisfies the different positions that is not a compromise of positions or dominance over others. The idea of constructive conflict on face value is an elegant idea.

However, a key finding in this study is that integrating conflict (constructive conflict) is messy. The mechanics of integrating conflict as end position poses a wicked problem in itself. Conceptually, a more fine-grained description of integrating conflict within a bounded and unbounded transactional pattern is as follows: Participants do understand there is value in each of the world-view positions and that they should not give ground to a position taken. They pivot to some degree towards an opposing

position. They may decide to both compete and collaborate (co-opetition) at the same time, but then also pivot back to their original world-view position, when they discover they are within a binary-circular transactional pattern.

Consequently, participants continually try to balance out relations of power over others and power over relation to self, never fully arriving at a meta-position. Moreover, participants find it is difficult to break or opt out of a binary transactional pattern, as they have 'grooved' into (they either become locked in or locked out of relationships to self or others), which is consequential to the trajectory of how socially complex resources are 'cut up' over time, and how conflict of interests are dealt with. Either dominance over others or compromise is required. Integration of conflict, for example, a stable constructive conflict via a meta-question and answer is an elegant idea, but messy in practice.

4. What difference does folded relationship pattern make?

Conceptually, the folded transactional pattern affects conflicts over aspects of socially complex resources in a fundamentally different way. How? The 'folded difference' is a combination of:

- participants having externally intelligent building blocks, such as distributed ledger technology, available to create a more folded relationship that was not previously possible;
- focusing on micro-level near-interaction as a more folded relationship starting condition and not the macro-view end position. Changing starting conditions makes it possible for more complex and elegant interactions to emerge (for example, it is possible to create relationship 'anchors', such as a self-sovereign identity, there is no need for reconciliations, netting opportunities and immutable transactions are presented);
- the conjunction of socially complex aspect of resources is made possible ('trade-ups' as opposed to trade-offs over socially complex resources are made in relationships to self and others);
- participants have the capabilities to opt in and out of relationships with others, contingent on a fair give and take of value (as opposed to being locked in or

completely opt out, based on power over relationships that is seen to be unfair give and take of value); and

- the agency of individual participants within a folded relationship are not trivial in nature. Participants, using distributed ledger technology already possess agency via ‘killer applications’ or possible a ‘killer ecosystem’ in the future that extend novel capabilities to cooperate and coordinate.

Hence, in a folded transaction pattern, participants balance conflicts and friction over socially complex resources in relation to self and others by meeting narrow micro-level near interaction conditions that make more folded transactional relationships possible. This means that socially complex ‘trade-ups’ in a transactional pattern are made possible (the idea of socially complex ‘trade-ups’ is discussed in detail in the interpretive conclusions section: the use of self-sovereign identity in transacting with others).

5.6 LIMITATIONS

The main limitation of the current study is the scope of the study, which is delimited to the financial and banking sector. The reason for this is that the frictionless nature of distributed ledger technology makes it possible for unconventional actors to be part of peer-based game structure, which will redraw, merge or may create large ecosystems that have not been envisaged before. For example, social media companies are already creating ‘super applications’ that combine a wide range of financial services into one application. It is also possible to experiment with distributed ledger technology at very low cost. Consequently, it is already possible for a much larger number of players to experiment and expand a ‘killer’ distributed value ecosystem.

The implication of the main limitation of the current study is the role that unconventional actors as informal institutions is not explored. In other words, unconventional players by creating killer applications or a killer ecosystem may subtly shift the “rules of the game” over time, which may create inconsistencies and conflict between the traditional formal rules of the game created by formal institutions, such as central banks and the informal rules of games created by unconventional players. Further, unconventional players may have implications in terms of the degree to which these unconventional players can alter or influence formal institutional rules of the game, alter value

relationship between society, its institutions and organisations, eliminate or reduce value subtracting relationships, and expand the scope of games explored.

5.7 CONTRIBUTION TO KNOWLEDGE

This section addresses the contribution to knowledge, and discusses how the present study closes the gap in knowledge that was identified and discussed in Section 5.2.2.

A systematic literature review of the state of play of blockchain technology in the financial services sector (Ali *et al.*, 2020) and blockchain as a disruptive technology for business (Frizzo-Barker *et al.*, 2020) indicates that blockchain research is at an early stage. The majority of the studies that were reviewed are conceptual, although empirical studies are emerging (Frizzo-Barker *et al.*, 2020). However, Ali *et al.* (2020:7) conclude in terms of blockchain in the financial services industry “Overall, there is a lack of major academic studies and publications in this emerging field, despite the potential implications of this technology.”

This study primarily contributes to a more fundamental understanding of the distributed value ecosystem phenomenon by employing a phenomenological attitude, as opposed to an organisational attitude (natural explanations). In other words, this study transcends the multitude of abstractions of the distributed value ecosystem phenomenon that are presented by giving an accurate description of the invariant qualities of the phenomenon.

This study is also original in that there are no other studies of the distributed value ecosystem in the financial and banking sector that employ a phenomenological attitude to develop an accurate description of the essential invariant qualities of the distributed value ecosystem phenomenon.

The key finding of the study is the essence of the distributed value ecosystem phenomenon is the nature of relationships that the actors in the distributed value ecosystem hold to distributed ledger technology. The nature of these relationships is transactional and circular. In terms of the transactional pattern, participants either seek to either amplify, or dampen the binary pattern, but a novel transactional pattern is emerging, with the aim of shaping a more folded value relationship pattern.

In terms of the circular nature of relationships, organisations seek primarily to have power over relationships in transacting. The result is that participants locked into a

bounded pattern may find value relationships that become harmful to self over time. This is an unbalanced relationship of give and take of value. The response to unbalanced binary bounded transactional pattern is to opt out of the bounded binary pattern into the binary unbounded transactional pattern, which is not a seamless experience (as key parts of the distributed value ecosystem complexes have not yet fully emerged).

The novel idea presented is 'folded difference' in which participants balance conflicts and friction over socially complex resources in relation to self and others by meeting narrow micro-level near interaction conditions that make more folded value relationships possible. With the folded transactional pattern, participants in a distributed value ecosystem can opt into or out of unbalanced value relationships of power with others, and counter the exploitation of aspects in relation to self of socially complex resources, such as money, identity and personal data.

The key implication for society and organisations is that it presents an alternative approach to dealing with the increase in friction and conflict around aspects of socially complex resources and value relationships, such as having autonomy over money, identity and personal data, and at the same time, having a seamless experience in interacting with others, while having interactions that are both transparent and private in transacting with others. In essence, with the folded transactional pattern, participants in a distributed value ecosystem seek to make a trade-up in value relationships in relation to self and with others, as opposed to a value relationship trade-off or sacrifice that leads to either compromise in relation to self or dominance over others. However, the truly folded value relationship pattern is not easy to create and rarely occurs.

5.8 RECOMMENDATIONS FOR FUTURE RESEARCH

As previously indicated, research into the distributed ledger ecosystem phenomenon is at an early stage (Frizzo-Barker *et al.*, 2020). It is reflected in the variety of blockchain definitions and how it is used interchangeably with the term distributed ledger technology. However, there is common ground as to the key features of an emerging distributed value ecosystem: 'distributed', 'decentralised and decentralisation', 'trust, security and transparency', 'immutability', 'transparency and privacy' and 'peer-to-peer transactions'.

Furthermore, the literature reviewed in this study and the recent two systematic literature reviews find the literature overwhelmingly conceptual (Ali *et al.*, 2020; Frizzo-Barker *et al.*, 2020). Empirical studies are emerging (Frizzo-Barker *et al.*, 2020), but there is lack of major studies in the financial services sector, despite the potential disruptive implications for the banking and financial services (Ali *et al.*, 2020:2).

Given the state of play of distrust in ledger technology research, the first recommended area of research is in terms of how the roles of participants are changing, and how traditional players in industries are reinventing themselves. Furthermore, the role of unconventional players (for example, individuals inventing killer distributed ledger-based applications, and killer value ecosystem applications), and the impacts of distributed ledger technology (for example, how externally available intelligent building blocks blur and re-draws industry boundaries).

Furthermore, initial studies focused on how technical aspects shape the diffusion and adoption of distributed ledger technology. However, the bulk of papers that followed focused on organisational and institutional practices as barriers to adoption (specifically, a regulatory and governance practices chasm that needs to be crossed by organisations wanting to move to a distributed value ecosystems). Hence, the second recommended area of research is the novel or good organisational practice that is required to successfully implement distributed ledger technology (and at a more fine-grained focus, good management and governance practices to decentralise highly centralised organisations).

The long-term social-political and psychological aspects of distributed ledger technology are not yet well understood. As the distributed value ecosystems mature, these aspects will start to play a significant role at a societal level. In other words, there is optimism that blockchain and an emerging distributed value ecosystem represent freedom from centralised organisations. However, the benefits of decentralisation may emerge as centralised organisations' dominance, such as the power over relationship of others by a few players. Therefore, the third recommended research area at a societal level is the social-political and psychological aspects of distributed ledger technology. This means that the patterns of value relationships that emerge are reinforced as the ecosystem matures. Moreover, whether distributed value ecosystems address social concerns and a trust deficit between societies and highly centralised organisations.

5.9 SUMMARY

The purpose of this study was to seek and describe the meanings and essences of managers' lived experiences of the decentralised and distributed value ecosystem phenomenon.

Chapter 5 contained a summary of how different parts of the study are connected in a circular way. The 'circle' of relationships started with the gap in knowledge that was identified in this study and ended with how the gap in knowledge was closed. In terms of the relationships between parts of the study, Chapter 5 explicates how the central research issue connects to the research statement and gap in knowledge. Furthermore, Chapter 5 addressed the relationships between the conceptual frame and research design, the relationship between the statement and the factual conclusions drawn from the findings, the relationship between the research questions and interpretive conclusions, and the relationship between the conceptual frame and conceptual conclusions. This discussion of the circle of relationships between parts of the study then concludes with how the study closes the gap that has been identified in the knowledge, as well as the key implications drawn for society and organisations.

In terms of the gap in knowledge identified in this study, the literature gave natural explanations, abstract in nature, of an emerging distributed value ecosystem phenomenon. The explanations gave some insights, but did not provide a fundamental understanding of the essences of the phenomenon. Given the gap in knowledge, the objective of the study was to give an accurate description of the essences of lived experiences of the distributed value ecosystem phenomenon.

The relationship between the research statement and the factual conclusions is found in the textures and structures of participants' experiences using distributed ledger technology. Six invariant textures (noema) and three invariant structures (noesis) of experiences were identified. A composite description of the invariant textures and structures was then presented. This composite textural-structural description answers the primary research questions related to the invariant qualities of the distributed value ecosystem phenomenon. The overall factual conclusion drawn is that the essences of the distributed value ecosystems phenomenon is the relationships that participants in a distributed value ecosystem hold to distributed ledger technology. The nature of these relationships is transactional and circular in nature.

The terms of the relationship between the secondary research questions and the interpretive conclusions led to the following interpretive conclusions:

- The bulk of the literature presents natural explanations (Frizzo-Barker *et al.*, 2020), and there is a lack of major empirical studies and publications in the blockchain field (Ali *et al.*, 2020:2);
- The nature of transactional relationships is key to understanding how organisations actually use distributed ledger technology (and not the novel mechanics or functionality it brings). The transactional pattern is consequential to the nature of conflicts and frictions that arise and the approaches to dealing with conflicts;
- A coherent organisational blueprint has not yet emerged for deploying distributed ledger technology. Distributed value ecosystems have not yet matured to a stage where there is good management practice to follow; and
- How organisations within a distributed value ecosystem recognise, sense and act to the use distributed ledger technology.

The study finds that organisations recognise, sense and respond either narrowly bounded or more folded.

In terms of the relationship between the conceptual frame and conceptual conclusions, the novel idea presented with distributed ledger technology is that a more folded transactional pattern that was not previously possible has been made possible, which is essentially about not making trade-offs in the exploitation of socially complex resources, but rather making trade-ups in the form of the conjunction of the socially complex aspects in relation to self and others in transacting.

The study's primary contribution to knowledge is a fundamental understanding of the essences (invariant qualities) of the distributed value ecosystem phenomenon by employing a phenomenological attitude, as opposed to an organisational attitude (natural explanations). In other words, this study transcends the multitude of abstractions of the distributed value ecosystem phenomenon by providing an accurate description of the invariant qualities of the phenomenon.

The key implication drawn for society and organisations is that folded value relationships present an alternative approach to dealing with the increase in frictions and conflict around aspects of socially complex resources and value relationships,

such as having autonomy over money, identity and personal data, while at the same time having a seamless experience in interacting with others.

In terms of recommended future research directions, given that distributed value ecosystem's research is at an early stage, three areas of research are proposed. The areas are: (1) how the roles of traditional industry participants are changing and the unconventional participant's role in blurring and re-drawing industry boundaries; (2) the novel or good organisational practice that is required to successfully implement distributed ledger technology; and (3) at a societal level, the patterns of value relationships that emerge or are reinforced as the distributed value ecosystems mature. Specifically, the social-political and psychological aspects of using distributed ledger technology.

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APPENDIX A: ETHICAL CLEARANCE CERTIFICATE



DEPARTMENT OF OPERATIONS MANAGEMENT ETHICS REVIEW COMMITTEE

Date: 19 February 2018

Dear MR FRANCOIS CRAFFORD

**Decision: Ethics clearance
approval from March 2018 to
2023 (project termination)**

ERC Reference # : OM/2018/002

Name : MR F CRAFFORD

Student # : 55775942

Researcher: Name: Mr F Crafford; E-mail address: crafff@unisa.ac.za; Mobile: 0721770847; Work: 012 429 4545

Supervisor: Name: Prof Hester Nienaber; E-mail address: nienah@unisa.ac.za; Department of Operations Management; Mobile: 082 453 6816

Working title of research: A phenomenological study of value ecosystems: based on open distributed systems, simple rules and non-linear agent interactions

Qualification: DCOM (BUSINESS MANAGEMENT, UNISA)

Thank you for the application for research ethics clearance by the Operations Management Ethics Review Committee for the above mentioned research. Ethics approval is granted for your studies (low risk PhD studies). Please note the following:

The low risk application was expedited/reviewed by the Ethics Review Committee on 13 February 2018 in compliance with the Unisa Policy on Research Ethics and the Standard Operating Procedure on Research Ethics Risk Assessment. The decision will be tabled at the next Committee meeting for ratification.

The proposed research may now commence with the provisions that:

1. The researcher(s) will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.
2. Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study should be communicated in writing to the Ethics Committee.



3. The researcher(s) will conduct the study according to the methods and procedures set out in the approved application.
4. Any changes that can affect the study-related risks for the research participants, particularly in terms of assurances made with regards to the protection of participants' privacy and the confidentiality of the data, should be reported to the Committee in writing, accompanied by a progress report.
5. The researcher will ensure that the research project adheres to any applicable national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the specific field of study. Adherence to the following South African legislation is important, if applicable: Protection of Personal Information Act, no 4 of 2013; Children's act no 38 of 2005 and the National Health Act, no 61 of 2003.
6. Only de-identified research data may be used for secondary research purposes in future on condition that the research objectives are similar to those of the original research. Secondary use of identifiable human research data require additional ethics clearance.
7. No field work activities may continue after the expiry date (2023). Submission of a completed research ethics progress report will constitute an application for renewal of Ethics Research Committee approval.

*The reference number **OM/2018_002** should be clearly indicated on all forms of communication with the intended research participants, as well as with the Committee.*

Yours sincerely,

Signature



Prof Rigard J Steenkamp

Chairperson : RERC

Department of Operations Management

Signature



Executive Dean : CEMS

APPENDIX B: EMERGING VALUE CONSTRUCTS AND COMMON THEMES

Authors	Year	Value construct or metaphor	Method	Common themes			
				Set of starting conditions	Near interactions	Systems or network thinking	Rationality
Afuah	2013	Network value is tied to network structure and its conduct (value is not only determined by the size of network)	Conceptual		Network structure – feasibility of transactions, centrality of members, structural holes, network ties and number of roles each member plays Conduct – opportunistic behaviour, reputation signalling and perceptions of trust	Network theory	
Porter & Kramer	2011	Shared value: Umbrella construct for non-market strategy, social entrepreneurship, social innovation and the bottom of the pyramid (Crane, Palazzo, Spence & Matten, 2014:133) Expand the “pool of value”	Conceptual	Externalities framed as opportunities Addresses social legitimacy issues of organisations	Organisational dexterity is required to enhance competition and social conditions	Soft systems approach	Optimisation
Herrala, Pakkal & Haapasalo	2011	Value creating networks:	Conceptual model and analysis	Components of model: customer value, core competencies, relationship and interactions			
Sirmon, Hitt, Ireland & Gilbert	2011	Resource Orchestration to Create Competitive Advantage					The emerging understanding of the role of managers' actions is the

Authors	Year	Value construct or metaphor	Method	Common themes			
				Set of starting conditions	Near interactions	Systems or network thinking	Rationality
							effective structure, bundle, and leverage of firm resources.
Bowman & Swart	2007	Value capture when capital is embedded	Conceptual	Humans as embedded capital Boundaries are not easily defined and there is a struggle of ownership between actors involved in the process of value capture	Difficult to disentangle interactions, hence it is difficult to attribute the creation of value to the component part of embedded capital		Value capture is a bargaining process between the actors involved.
Moller & Rajala	2007	Strategic nets (new modes of value creation)					
Teece	2007	Dynamic capabilities and micro foundations of enterprise performance	Conceptual		Entrepreneurial fitness is equal to evolutionary fitness		Dynamic capabilities allow organisations to create, deploy and protect intangible assets
Prahalad & Ramaswamay	2004	Co-creation experience: the next practice in value creation.	Conceptual	The meaning of value and the process of value creation are rapidly shifting from a product- and firm-centric view to personalized consumer experiences	The interaction between the firm and the consumer is becoming the locus of value creation and value extraction.		
Emerson	2003	Blended value proposition – intersect	Conceptual Analytical	Value is embedded in social interests			Return is not a trade-off between financial interest

Authors	Year	Value construct or metaphor	Method	Common themes			
				Set of starting conditions	Near interactions	Systems or network thinking	Rationality
		between financial returns and social return					and social interest, but rather the pursuit of an embedded value proposition composed of both
Allee	2000 2002 2008	Value networks: Knowledge and intangible benefits as currency (expand the conceptual frame of value)	Conceptual Modelling/ Mapping exchanges (analytical)		Organisations as value networks Manage complex interdependencies of the networked knowledge economy	Organisations as living systems (livings systems theory)	
Normann & Ramirez	1993	Value constellations: The goal is not to create value for customers but to mobilise customers to create own value from the company's various offering		Co-produced offering	Reconfigure roles and amongst a constellation of actors		Improving fit between competencies and customers

**APPENDIX C:
TRANSCENDENTAL PHENOMENOLOGICAL STUDIES WITHIN ORGANISATIONAL STUDIES**

Author/s	Year	Title of article	Classification	Sample size	Articles published in high ranking peer reviewed management Journals		
					Journal of Management studies	Journal of Management inquiry	Journal of Management and Organisation
Conklin, Thomas A	2012	Work Worth Doing: A Phenomenological Study of the Experience of Discovering and Following One's Calling	Organisational behaviour Experimental/theoretical treatment	9		×	
Vasconcelos, Anselmo Ferreira	2010	The effects of prayer on organizational life: A phenomenological study	Experiment/theoretical treatment Organizational behaviour Latin America	28			×
Chikudate, Nobuyuki	1999	The state of collective myopia in Japanese business communities: A phenomenological study for exploring blocking mechanisms for change	Asia & the Pacific Organisational behaviour Experimental/theoretical treatment	32	×		
Burgoyne, J G; Hodgson, V E	1983	Natural Learning and Managerial Action: A Phenomenological Study in the Field Setting	Experimental/theoretical treatment Organizational behaviour	37	×		

Dissertations or theses that employed transcendental phenomenological method or Giorg's method											
Author/s	Year	Title of dissertation or thesis	Sample size	Data collection: Semi structured interviews	Data collection: Observation	Management study	Study of phenomenology studies/theoretical	Organisational behaviour study	Occupational psychology studies	Health care management and nursing study	Other topics
Amaro, Frank C., Jr.	2015	Conflict in Families and Nursing Home Placement: A Phenomenological Study	12	x		x				x	
Harris, Miriam C.	2015	Exploring different generations: A phenomenological study on conflict management in the workplace	15	x	x	x		x			
McLean, Kerry-Ann N.	2014	Virtual team structure: A phenomenological study of perspectives from the non-profit industry	15			x					
Koufoudakis-Whittington, Stefania	2014	Interviewing in virtual worlds: A phenomenological study exploring the success factors of job applicants utilizing Second Life to gain employment	16	Real-time online interviews							x
Stalinski, Sherryl	2014	Female executives and the glass ceiling: A phenomenological study of stubborn, systemic barriers to career advancement	7	x				x			Gender
McBride, Thomas J.	2014	Lived experiences of effective ethics and compliance program managers: A phenomenological study	14	x		x					Ethics
Milligan, Russell W.	2014	A Transcendental Phenomenological Study of Reflection through Exercise	30	x				x			

McGuffin, Richard J.	2014	Law Enforcement Officer-Involved Fatal Incidents: A Phenomenological Study of How Law Enforcement Officers and Their Spouses Perceive and Describe the Experience of an Officer-Involved Fatal Incident	6	x					x		
Steinkruger, Kenneth	2013	A Phenomenological Study of the Effect of Face-to-Face Interaction on Virtual Teams	10	x		x		x			Web
Moritz, Matthew Peter	2013	Scope and Nature of the Experience-Based Training and Development Industry in the 21st Century: A Phenomenological Study	17	x							Adult education
Jones, Georgia Kaye	2013	The experience of obtaining employment for enlisted active duty service members' spouses: a phenomenological study	10	x					x		
Campbell, Lisa L.	2013	The organizational culture of acute care hospital's auditing and monitoring programs as experienced by health information management professionals: A phenomenological study		x						x	
Posey, Carmen N.	2013	Job shock influence on high employee turnover in call centers: A qualitative phenomenological study	10	x		x		x			
Smith, Tammy	2012	Outsider leadership transitions: A phenomenological study of Army Reserve General Officers	17	x		x		x			
Cunningham, Glenn K.	2012	A phenomenological study of the use of intuition among senior military commanders		x		x		x			
Tichenor, Amber L.	2011	A phenomenological study of the experience of rivalry among women in the workplace	9	x				x	x		Women studies
Schmaltz, Patricia	2011	Combat to Corporate: A Qualitative Phenomenological Study on Injured Veterans Transitioning to the Civilian Workforce	25	x		x					Military

Lucia, David	2010	Experiences of followers in the development of the leader-follower relationship in long-term health care: A phenomenological study	13	x						x	Adult education
Smith, R. Stephen	2010	The meaning and essence of fairness in the workplace: A phenomenological study of organizational justice	8					x	x		
Ellis-Morris, Christiana M.	2010	The lived experience of lesbians who come out in an organizational setting: A phenomenological study	10	x				x	x		
Quinn, Kathleen J.	2009	Experiences influencing physician rural practice and retention: A phenomenological study	15	x					x	x	
Cane, Sheila A.	2008	Training military commanders with simulation: A phenomenological study of task-technology fit		x		x					Military
Schorr, Frauke	2008	Becoming a successful entrepreneur---a phenomenological study				x			x		
Mirian, Laura E	2006	A phenomenological psychological study of registered professional nurses: Factors that contribute to organizational attachment or termination of employment		x					x	x	
Moffett, James Earl, Sr	2005	A transcendental phenomenological study of banking executives' ethical perceptions	30	x	x						Banking
Conklin, Thomas Arthur	2001	The call to nature: A phenomenological study of the experience of discovering and following one's calling	9	x	x				x		
Banaga, Gregorio Lopus, Jr	2000	A calling to work, a labor of love: A phenomenological study of the experience of work as calling	18	x	x						Theology
Goodman, Charles Vergil	1997	A phenomenological perspective of Total Quality Management: A study of mid-managers in an institution of higher education	6	x	x						Higher education
Vogel, Katharine A	1991	The experience of ethical decision-making among staff nurses: A phenomenological study	19	x					x	x	

Number of dissertations and theses “hits” using the key search term “phenomenological study”. The result/ hits are ranked according to the classification of the studies.

Management studies	Studies	Organisational behaviour studies	Occupational psychology studies	Health care management and nursing studies	Women studies
355	152	122	111	109	77

APPENDIX D: PARTICIPANT SOLICITATION

Invitation to participate in the research study titled: A PHENOMENOLOGICAL STUDY OF VALUE ECOSYSTEMS: BASED ON OPEN DISTRIBUTED SYSTEMS, SIMPLE RULES AND NON-LINEAR AGENT INTERACTIONS

[insert date]

Dear [Participant's name]

This letter is an invitation to participate in a study I am conducting as part of my Doctoral degree in the Department of Business Management at the University of South Africa (UNISA) under the supervision of Prof Hester Nienaber.

The purpose of the study is to give an accurate description of managers lived experiences of the emerging financial value ecosystem phenomenon.

The primary objective is to give an accurate description of the invariant or constant features of the value ecosystem phenomenon, while the secondary objectives are to:

- Explore how blockchain technology is used, as a fundamental external intelligent building block to create new forms of distributed, autonomous organisational architecture.
- Explore the impact of fundamental technology on organisational intelligence.

The specific research question guiding this study is: “What is the invariant experience of using externally available intelligent building blocks (specifically blockchain technology) to transform organisations to participate in the emerging digital value ecosystem phenomenon?”

You were selected, by way of purposive sampling as a possible source of information relevant to this study. The nature of the participation involves primarily describing your experience/s of the value ecosystems phenomenon. The semi-structure, in depth interview will last between 1 and 2 hours, and will be recorded with your permission.

Please note that:

- Your participation in the study is voluntary, which means that you may choose not to participate and/or may stop to participate at any time during the interview without any negative consequences. This also means that you do not have to answer a question if you feel any discomfort.
- Your participation is on an anonymous basis, your name will not be mentioned and all reasonable steps will be taken by the researchers to ensure that participants will not be identified based on the information that they provided.
- The information provided will be treated as confidential; no one will know who disclosed what information. To this effect we will protect audio or video recordings and written records of the interview, inter alia, by keeping it locked away in a safe.
- The data will be available to the researchers Mr Francois Crafford and Prof Hester Nienaber (supervisor of this study) who may use the results of the study for academic publishing purposes (academic journals and/or peer reviewed conference proceedings), which may take place sometime after the study is concluded, still adhering to the above conditions. Publication is an important academic endeavour as it furthers quality teaching. Copyright of the articles/conference proceedings will vest in the authors, while the journal will administer copyright.

The benefits of the study include an accurate description and better understanding of the deep structure (invariant, constant features) of the value ecosystem phenomenon, which gives shape to distributed autonomous organisational architecture. This deep structure is often taken for granted, simply accepted to exist or seen as commonplace. Furthermore, emerging themes and essences identified in this study may be useful to either support, repudiate or complement emerging constructs, concepts or models of value creation.

If you have any questions, please feel free to contact me (see below for contact information).

If you have any questions regarding this study, or would like additional information to assist you in reaching a decision about participation, please contact me at (+27721770847) or by e-mail at (crafff@unisa.ac.za). You can also contact my supervisor, (Prof Hester Nienaber) at (+27824536816) or e-mail (nienah@unisa.ac.za).

I would like to assure you that this study has been reviewed and received ethics clearance through the Research Ethics Committee at the University of South Africa (ERC reference # : OM/2018/002).

I hope that the results of my study will be of benefit to those organisations directly involved in the study, as well as to the broader research community. I very much look forward to speaking with you and thank you in advance for your assistance in this research study.

Kind regards

[Signature]

Francois Crafford

APPENDIX E: INTERVIEW PROTOCOL AND INFORMED CONSENT

The interview protocol followed focused on explaining to the interviewee the purpose of the interview, and creating a relaxed environment and dialogue. Furthermore, the protocol included ensuring informed consent, and asking permission to record the interview. The specific details of the protocol followed is as follows:

Dear Mr/Ms

Thank you for the opportunity to interview you in connection with emerging digital Financial Technology (Fintech) value ecosystem phenomenon.

The purpose of this study is to give an accurate description of the lived experiences of the value ecosystem phenomenon.

The primary objective is to give an accurate description of the invariant or constant features of the value ecosystem phenomenon, while the secondary objectives are to:

- Explore how blockchain technology is used, as a fundamental external intelligent building block to create new forms of distributed, autonomous organisational architecture.
- Explore the impact of fundamental technology on organisational intelligence.

The specific research question guiding this study is: “What is the invariant experience of using externally available intelligent building blocks (specifically blockchain technology) to transform organisations to participate in the emerging digital value ecosystem phenomenon?”

You were selected, by way of purposive sampling as a possible source of information relevant to this study. The nature of the participation involves primarily describing your experience/s of the value ecosystems phenomenon. The semi-structure, in depth interview will last between 1 and 2 hours, and will be recorded with your permission.

Please note that:

Your participation in the study is voluntary, which means that you may choose not to participate and/or may stop to participate at any time during the interview without any negative consequences. This also means that you do not have to answer a question if you feel any discomfort.

- Your participation is on an anonymous basis, your name will not be mentioned and all reasonable steps will be taken by the researchers to ensure that participants will not be identified based on the information that they provided.
- The information provided will be treated as confidential; no one will know who disclosed what information. To this effect we will protect audio recordings and written records of the interview, inter alia, by keeping it locked away in a safe.
- The data will be available to the researchers Mr Francois Crafford and Prof Hester Nienaber (supervisor of this study) who may use the results of the study for academic publishing purposes (academic journals and/or peer reviewed conference proceedings), which may take place sometime after the study is concluded, still adhering to the above conditions. Publication is an important academic endeavour as it furthers quality teaching. Copyright of the articles/conference proceedings will vest in the authors, while the journal will administer copyright.

The benefits of the study include an accurate description and better understanding of the deep structure (invariant, constant features) of the value ecosystem phenomenon, which gives shape to distributed autonomous organisational architecture. This deep structure is often taken for granted, simply accepted to exist or seen as commonplace. Furthermore, emerging themes and essences identified in this study may be useful to either support, repudiate or complement emerging constructs, concepts or models of value creation.

Based on the disclosed information above, I (the participant) understand the purpose of the study and my participation in the study and consent to participate on the conditions set out.

Participant's signature

Date

APPENDIX F: INTERVIEW QUESTIONS

INTERVIEW GUIDE

- May I record this interview?
- Any questions at this stage?

Opening questions: Profile, to ensure interviewee meets the inclusion criteria.

- Tell me how it came about that you got involved in the distributed value ecosystem phenomenon?
- How long were you involved in ...?
- What contexts, situations, events or actions have influenced your experience of the distributed value ecosystem phenomenon?

Contextualisation questions:

Hype or hope or a different reality

- Blockchain will chain everything versus the actual experience of using blockchain (the use cases) to participate in this emerging distributed value ecology phenomenon?
- Can you describe what is your actual experience versus the hype or hope? Please be as specific and detailed as possible.

Apprehending the phenomenon questions (modes of appearing):

- What was the lived effect of your experience?
- What changes do you associate with this experience or experiences?
- How did the experience affect you?
- How did the experience affect others intimately connected with this experience?
- What feelings were generated by the experience?
- What dimensions, incidents and people intimately connected with this experience/s stand out for you?

- What changes or states did you become aware of at the time? (diving into a rabbit hole)
- Have you shared all that is significant with reference to the experience?

Probing questions dealing with variations in modes of appearing (what is similar and what is different in modes of appearing):

- Can you please describe what you mean by
- Can you tell me more about the
- Can you describe what you did when...

Clarifying the phenomenon - themes to be explored in focal questions:

Strategic mode of appearing

- What (strategic) issues stand out in the conversations about using blockchain technology (by organisations and the blockchain community)?
- In your experience what is the (strategic) response/s to the blockchain phenomenon? (In terms of your experience/s how do organisations go about acquiring, and make sense of new information about the blockchain ecosystem and then strategically react to action taken by others?)
- What new problems are emerging (not anticipated/emergent in nature) in terms using blockchain technology (and the distributed value ecology phenomenon)?

Value mode of appearing

- In your experience when is it appropriate to consider using blockchain technology?
- In your experience which questions are being asked (or need to be considered) before considering using/exploring blockchain technology?
- Is there a clear understanding (knowledge of..) of the value that is created using blockchain technology?
- In your experience what is holding the blockchain ecosystem back? Why is it hard for organisations to trust blockchain (which is by definition a trustless system)?

Architecture mode of appearing

- How is blockchain changing organisations/business? What is similar and what is different in your experience?

- Is the distributed value ecosystem phenomenon a seamless experience or not?
- What do organisations need to do reap the benefits from blockchain? or when do organisation reap the benefits of using blockchain?
- In terms of your experiences what is missing in terms of the use cases of blockchain technology to reap these benefits?

Liminal ecosystem landscape (rabbit hole – how deep, which direction, and is this rabbit hole being created?)

- Where is the distributed blockchain ecosystem at this stage (the question is not suggesting there an answer to this question)?
- Is there a clear sense of direction or signs for organisations to follow that indicates “go this way” (or is everyone simply betting/speculating)?
- Is there a stopping rule in terms of exploring the uses of blockchain technology (or does one stop when funding runs out)?

Paradigm shift mode of appearing

- In your experience is there wide scale adoption or mostly experimentation with blockchain technology (argument financial services and micro-payments are the best examples of adoption)? Is the blockchain ecosystem at this stage truly disrupting the way that organisations work (overestimating short term and underestimating the long terms disruption?).
- In your experience is the distributed value ecology a paradigm shift (a fundamental change in the assumptions of how society organises or deals with the complexity of cooperating and co-ordinating)? What aspects in terms of your experiences support the idea of a true paradigm shift? or is it a strong belief that we stand on the cusp of large scale change (but impossible to predict what will emerge)?
- What is needed to create or drive the blockchain ecosystem? Can you give specific examples?
- Elaborate on other relevant topics that may arise during interview/direct description

Closing questions:

- Any relevant question/s to ensure all bases are covered and wrapping-up the interview.
- Would you like a copy of the findings of the study? How can we provide it to you without disclosing your identity?

Who would you recommend that I interviewing that has a great deal of experience in terms of the blockchain/distributed value ecosystem phenomenon?

Thank you for participating in the interview. A transcript will be provided of this interview to check if I understood you accurately. This will also enhance the trustworthiness of the research and I will request at a later that you check the final invariant description developed of the value ecosystem phenomenon.

APPENDIX G: TURNITIN RECEIPT



Digital Receipt

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UNISA

A PHENOMENOLOGICAL STUDY OF VALUE
ECOSYSTEMS, BASED ON OPEN DISTRIBUTED
SYSTEMS, SIMPLE RULES AND NON-LINEAR AGENT
INTERACTIONS

by
Francois Crafford

in partial fulfillment of the requirements
for the degree of

DOCTOR OF COMMERCE

in the subject field of

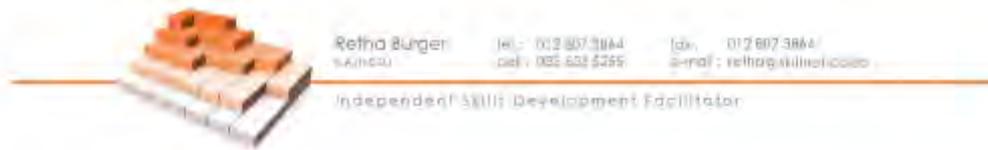
BUSINESS MANAGEMENT

at the
UNIVERSITY OF SOUTH AFRICA

Supervisor: Prof H Maseber

February 2021

APPENDIX H: DECLARATION OF PROFESSIONAL EDIT



Dear Mr Crafford

This letter is to record that I have completed a language edit of your thesis entitled, "A phenomenological study of value ecosystems: based on open distributed systems, simple rules and non-linear agent interactions".

The edit that I carried out included the following:

- Spelling
- Grammar
- Vocabulary
- Punctuation
- Pronoun matches
- Word usage
- Sentence structure
- Correct acronyms (matching your supplied list)
- Captions and labels for figures and tables
- Spot checking of 10 references

The edit that I carried out excluded the following:

- Content
- Correctness or truth of information (unless obvious)
- Correctness/spelling of specific technical terms and words (unless obvious)
- Correctness/spelling of unfamiliar names and proper nouns (unless obvious)
- Correctness of specific formulae or symbols, or illustrations.

Yours sincerely

Retha Burger

22 February 2021