A GRADUATION THESIS

EMBEDDING HUMAN CENTERED DESIGN IN THE CREATION OF BLOCKCHAIN BASED CONSULTS

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PREFACE

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MASTER THESIS

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Here I present to you, the final report of a graduation project for the master Strategic Product Design at Delft University of Technology. In this report, I will guide you through the 5-month graduation project which was executed in collaboration with the great people of KPMG Digital Transformation.

For this period of time, I have been challenging myself to try and understand the blockchain technology and its true value. Throughout the process, I have met a series of inspiring people but can conclude; almost none of these blockchain experts know everything on the topic. The blockchain technology is an interesting discussion on which the community iteratively tries to understand more and more.

The project was a collaboration of a team of people that all were very valuable in contributing towards the final design.

Deborah, thank you for being critical on almost all topics but most of all, inspiring me in your work ethic.

Nick, thank you for listening to my insecurities throughout the project and coaching me further to exceed my limits.

Karin, thanks for sharing your vision, and your drive to grow design within KPMG. Also, thank you for allowing me to make my own mistakes and learn from them.

Thank you to all my colleagues at KPMG, you have helped me throughout the process. Always being open to discussions and always being available for my time-consuming tests. Also, thanks to the problem-owners from the two companies to open up your cases for this study.

Further, I would like to thank my friends and family, I could not have done it without your support!

I would like to thank Leroy and Sjoukje for always reading my pieces and helping me structure my thoughts but also pushing me to relax from time to time.

Finally, I would like to thank Hidde. Thank you for supporting me through this stressful period, inspire me and pushing me further but also make me happy when I was struggling.

I truly hope you will enjoy my report and hopefully learn about the interesting insights I discovered.

Cheers,

Milou

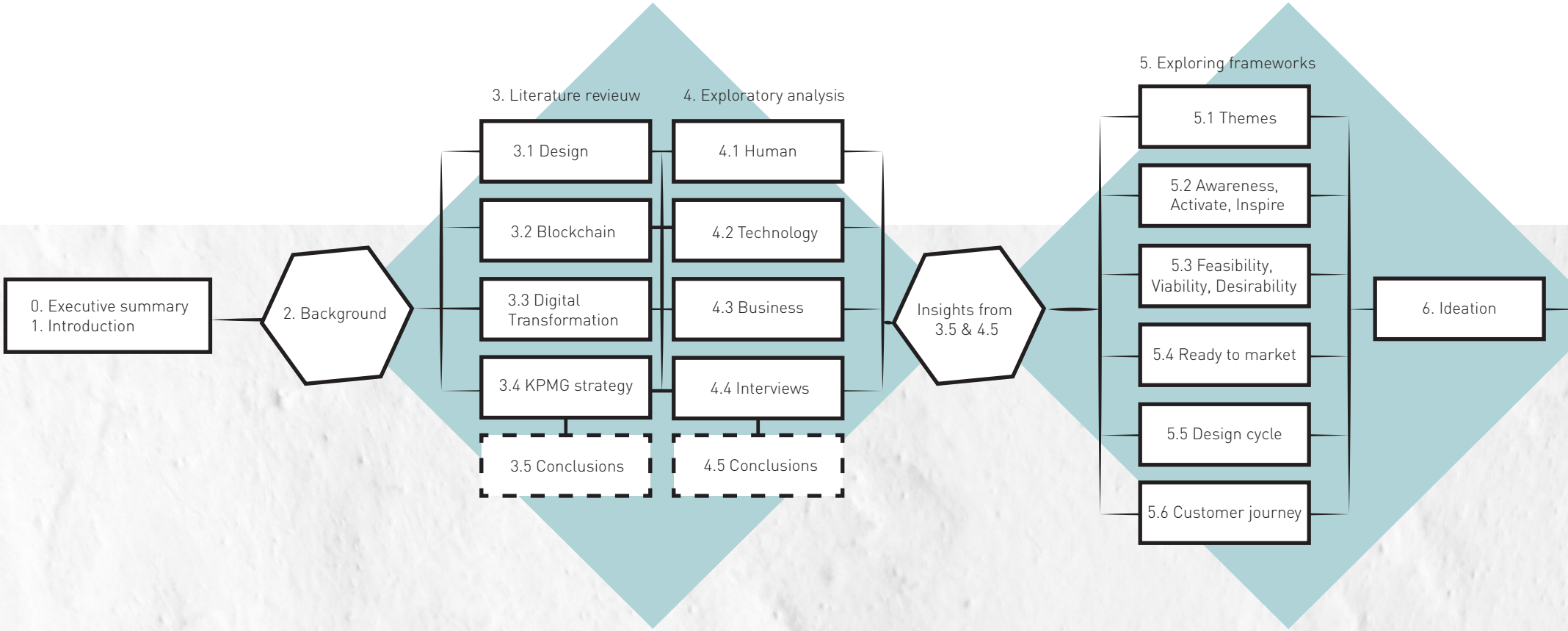
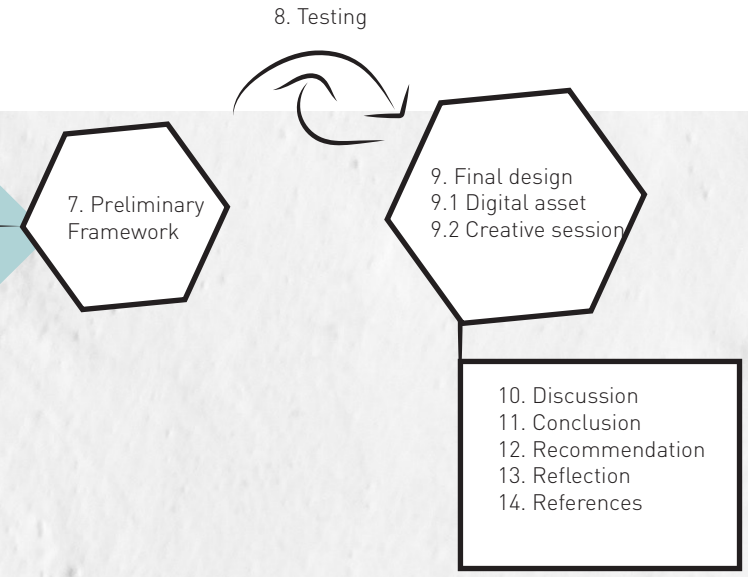


Figure 1: Table of contents visual



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READING GUIDE

Background
In this chapter, the reason behind the research is discussed; integrating stakeholder needs in a backend solution such as blockchain and the increasing demand of integrating blockchain in digital strategies within KPMG.

Literature review
In the literature review, the four topics Design Thinking, Blockchain Technology, Digital Transformation and KPMG strategy will be discussed and combined together in a concluding chapter.

Exploratory analysis
Three analysis are executed based on the human perspective, technology perspective and business perspective.

Framework
The framework is a structural approach to blockchain-based consults.

Conclusions
After every chapter, a conclusion is given that will combine the knowledge from the subchapters and relates to the next chapter. In the concluding chapters of the literature review and the exploratory analysis, insights are formulated.

Insights
Insights are collected throughout the literature review and the exploratory analysis and used later on in the design of the framework. These insights refer to key insights that are important to consider in the creation of blockchain applications.

LEARNINGS

After the subchapters in the literature review and the exploratory analysis, the main learnings are summed up

0 EXECUTIVE SUMMARY

This thesis researches the topic 'embedding stakeholder needs in the creation of blockchain applications' as part of digital strategies within the KPMG Digital Transformation department. The research resulted in a framework consisting of a digital asset and a creative session enabling KPMG consultants and clients to explore the possibilities of blockchain within their value chain.

The blockchain technology has gotten more publicity over the last few. The decentralization of data in combination with an immutable ledger seems promising, but will drastically change our existing economies. It will disrupt our economy by 'taking out the middlemen.' As value chains will simplify, the blockchain will take over human-tasks. This research aimed to explore how this technology could enter our market by looking at stakeholder needs. KPMG Digital Transformation also saw an increased demand for implementing emerging technologies like blockchain. In collaboration with KPMG, the project was executed to find a structural approach to the creation of blockchain based projects.

The literature review discusses, the topics design thinking, blockchain, digital transformation, and the KPMG strategy. In the exploratory analysis, three analyses were executed from the perspectives of the human, technology, and business similar to IDEOs three pillars of design thinking (IDEO, n.d.). From both the literature review as the exploratory analysis, insights were collected. These insights are key to the creation of blockchain applications and focus on three perspectives: technological feasibility, viability in business and human desirability.

In the value proposition analysis, 80 public blockchains and 50 permissioned blockchains were analyzed on their customer values. These values were used to bridge the gap between stakeholder needs and a back-end solution such as blockchain. Answering which common blockchain values are essential in the creation of a customer benefit statement if we focus on stakeholder needs. Moreover, secondly, answering how these values relate to interactions within a digital infrastructure. The tests conclude whether and how a digital infrastructure can be created using the insights (in cards) focusing on feasibility, viability, and desirability. This workbook-based assignment was tested with two companies and four groups of consultants on the content and flow.

Final Design

The final design consists of a combination of a digital asset and the creative session design, meant for KPMG consultants to explore the value of blockchain within a digital strategy with their clients. The digital asset consists of three elements:

1. Blockchain news (on specific industries) and education.
2. A case checker: answering how interesting blockchain is for a specific case.
3. Session preparation, collecting data for the creative session.

For the creative session, a workbook was designed consisting of three exploring assignments: finding stakeholder needs & values, creating a customer benefit statement and exploring cases to experience the value of blockchain in a tangible and explorative structure.
The framework assesses the potential of blockchain in a specific context, simulates a discussion on its value and inspires creative thinking among KPMG consultants and its clients.

The final design was evaluated with KPMG. Finally, the recommendations for the continuation of the project are discussed, which consider the integration of a digital asset and a creative session over a large corporation such as KPMG and liabilities in a digital asset.

PLEASE, INSERT HUMAN

1 INTRODUCTION

The following thesis was written as part of the graduation project to finalize the MSc Strategic Product Design at the Delft University of Technology in collaboration with KPMG.

KPMG is one of the big four audit firms and has three services: financial audit, tax, and advisory. This project is executed within advisory, more specifically the digital transformation department. In this fast-changing digital world, many new technologies such as artificial intelligence, Internet of Things and Blockchain become more critical. Digital transformation strategically advises clients on how to digitalize their company/assets and integrate these new technologies.

This thesis aimed to research how to **use human-centered design in the creation of blockchain applications** in specific. The goal was to design a structural approach for the KPMG consultants on how to tackle blockchain-based projects with a human-centered perspective.

After a variety of research and iteration, the project proposes a framework which integrates stakeholder needs in the creation of a blockchain application. The framework contains both a digital tool and an offline session between KPMG consultants and the client to explore how blockchain can be valuable within the context in which the company is established. The digital tool focusses more on empowering the client to self-educate on blockchain and explore blockchain to innovate within their businesses.

The thesis report is built up in a few phases:
The first phase is the literature review that contains three blocks; design thinking, blockchain as a technology and management consulting/digital transformation.

The second phase is analysis, to explore these three blocks a bit further and in a broader context, the three pillars human, technology and business were researched. In the human-analysis, a stakeholder analysis was done, and personas were created, the technology was explored further by experimenting with the Ethereal coding language Solidity. Thirdly a better perspective on business opportunities within the field was created by analyzing value propositions of both public and permissioned blockchains. Moreover, interviews were executed with experts around the field of design, blockchain, and management consulting. From this analysis and literature review, insights were collected.

The iterations aimed to make these insights tangible in a framework which can be used by the KPMG consultants. Therefore, the insights were projected upon a variety of well-known frameworks.

From these iterations, a preliminary framework was proposed which was tested among consultants and potential clients with their cases.
These test results and the insights of the reflective interviews were considered when defining the final form and shape of the framework, adapting to the needs and vision of KPMG as an advisory group.
The last chapter of this report contains recommendations for future use, a discussion, and reflection upon the project.

2 BACKGROUND

2.1 BLOCKCHAIN

Since the creation of Bitcoin in 2008 by Satoshi Nakamoto, the concept of the technology behind the cryptocurrency; blockchain has been growing. Blockchain is not just used for currency transactions but can be used for all kinds of value transactions. It as a peer-to-peer trading system which is cryptographically secured by an algorithm and owned by the community. Due to the algorithm, value chains can be simplified, and middlemen can be taken out of the process.

Blockchain as a technology has the opportunity to change our entire notion of trust within a system. When looking into ancient history until now, our society has always been trusting on a person/human entity to ensure the value of their currency; from a tribal chief to a central bank. The blockchain will replace this human entity with an algorithm. In this way, a human-human interaction becomes a human-technology interaction, which will be a tremendous change for our society.

Blockchain as an innovation is technology driven, meaning that mostly the blockchain developers and technology specialized are driving the development of the innovation. Since a while, also the business opportunities around the system are starting to get explored more. New opportunities for innovative revenue models start appearing. However, while the blockchain is a technology that will change our interaction with trust tremendously, there is still little information available on how to design for human needs within this topic. Therefore, this thesis aims to research this missing link between blockchain and human-human-centered design.

Figure 2: KPMG logo in office

2.1 KPMG

The graduation project has been executed in collaboration with KPMG. KPMG has three main services as can be seen in figure 3: audit, advisory, and tax. The graduation project was done in advisory in collaboration with the department Digital Transformation.

The Digital Transformation department creates digital strategies for and together with clients. In these collaborations, more and more clients show an interest in blockchain technology, whether or not it is applicable in their case. Generally, within the department Digital Transformation, a trend can be seen in the integration of new technologies in such digital strategies. Nonetheless, for blockchain, knowledge is still limited. Even though the demand for inclusion of blockchain in digital strategies is growing, KPMG has not yet developed a structural approach on how to tackle these questions on the integration of blockchain technology. Thus, KPMG is looking for a structural approach for blockchain projects specifically.

Innovation Advisory and Digital Advisory
Currently, a separate blockchain group (Digital Ledger Services group) with blockchain experts is part of the innovation advisory department. Meaning that blockchain is still seen as innovation and therefore mainly consists of education-based projects. Meaning that most projects educate clients on how blockchain works and in which way it can be applied for them. It is essential that the knowledge on blockchain can be used more widely within the firm (such as within digital strategies) and is not dependent on this relatively small digital ledger services-group. The blockchain technology should also be used within these more common and larger projects in which the exploration of blockchain might be a part of the process. Therefore, the thesis aims to create a structural approach for blockchain projects that can be used within more departments than innovation advisory which also integrates a human-centered approach.

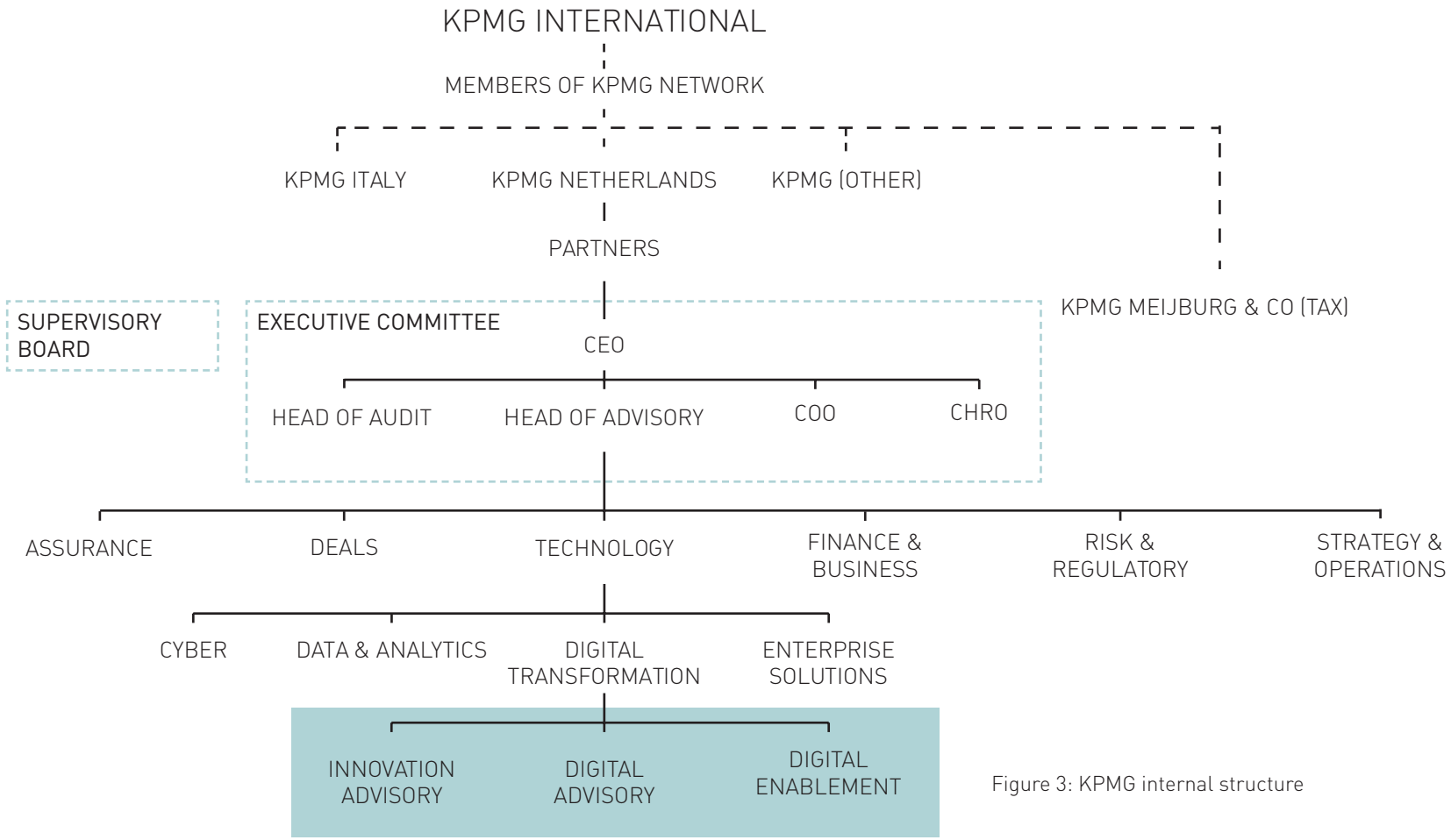


Figure 3: KPMG internal structure

Digital Advisory
The digital advisory differentiates between seven iterative steps in supporting clients in their digital transformation process: discover, stress-test, aspire, sketch, mobilize, launch and realize (Digital transformation KPMG, n.d.). The department advises companies on large digital transformations considering robotics, agile, etcetera. Moreover, they support companies in finding how these technologies can become of value in this fast-paced society.

Digital strategy
Within the Digital Advisory department, the consultants create digital strategies to advise clients on how to integrate digital in their business or transform their business with digital solutions. Most of these strategies start with creating an ambition, followed by the definition of pillars which together create the basis for a digital strategy. In addition to that, concrete actions are defined varying from an experiment to an organizational change.

KPMG Markets
KPMG considers four different markets in which the company mainly operates: financial services, corporate clients, health and public sector. Digital strategy-projects are mostly carried out within the financial services and corporate client markets.

The human side of digital
In KPMG's new marketing campaign, the company describes people-driven progress as their approach. Also, within the digital transformation department, KPMG believes that change starts with people and society and technology is a tool instead of a solution. Therefore, the thesis will aim to propose a solution on how this human-centered approach can be integrated with blockchain focused projects.

2.3 PROBLEM DEFINITION AND ASSIGNMENT

Currently, blockchain-based projects often fail in structurally integrating the needs of the stakeholders in the creation of blockchain applications (IDEO, n.d.). Therefore, within this graduation project, basic approaches for this creational process was to be explored, and suggestions were made on how to integrate human needs within these projects. The aim of this graduation project was to both create a tangible solution for KPMG as a consulting company and add new knowledge in the blockchain industry by using design thinking as a mindset.

The assignment is formulated as follows:
design a framework of design principles which is applicable across industries for both blockchain developers as blockchain consultants (KPMG) which integrates human-centered design in blockchain based innovations/products/services.

The aim is to find a balance between human-needs, the possibilities and limitations within blockchain technology and the involved stakeholders to create principles that can be used in consults for blockchain based digital strategies (e.g., by questioning the effect of taking out the middleman on the consumer).

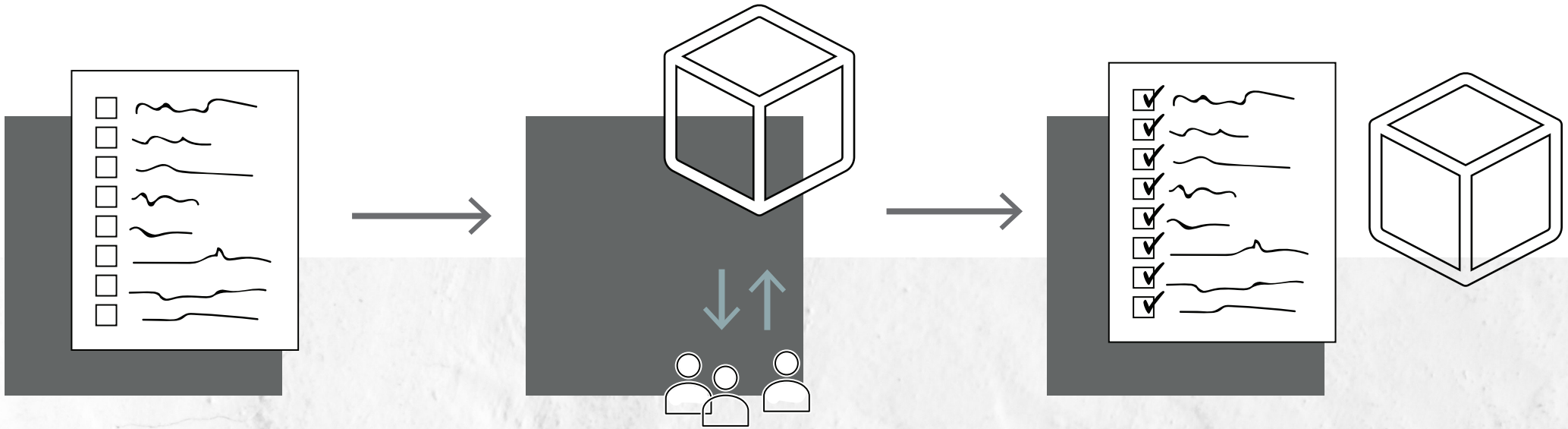
2.4 APPROACH

The primary process was inspired by the design cycle; define, create, validate, implement. In which three iterations took place. Between define and create, the grounding of the project was found. Create and validate were focusing on iterations for the creation of the concept and validate-implement was to define the final design.

Grounding
The academic grounding was done through a literature review focusing on three pillars; design, blockchain, and management consulting. In this literature review, the pillars were explored separately and linked to each other. To extend the knowledge, not only extracting it from academic resources but also practical resources the three broader contexts human, technology and business were explored to gain more insights. Lastly, interviews were done with experts on design, blockchain, and management consulting.

Iterate
From the literature review and the different analysis, insights were collected. To translate these insights into a tangible approach, the insights were projected on several popular frameworks to find how these insights could be communicated within a preliminary design.

Deliver
In the deliver-phase, a preliminary design was created of which the content was tested in a series of experiments. The results of these experiments were collected and together with the known context of KPMG Digital Transformation in which the project will be executed the form and shape of the final solution has been designed.



GROUNDING

Create principles created from theory-based and practice-based research with the human-centered perspective

ITERATE

Test the extend of human-centeredness within the creation of blockchain consults with and without the principles

DELIVER

Deliver a framework with validated design principles that can be used for both consultants and blockchain developers

Figure 4: initial visualised approach from project proposal

“Design thinking is a human centered approach to innovation that draws from the designer’s toolkit to integrate the needs of people, the possibilities of technology, and the requirements for business success.”

—Tim Brown, President and CEO of IDEO

3 LITERATURE REVIEW

The literature study was done to get a better and more informed perspective on the topic. As the question is as follows:

How to embed stakeholder needs in the creation of blockchain-based consults?

If we look at *embed stakeholder needs*, we can refer to design thinking/ human-centered design. Therefore, the first pillar discussed is design thinking as a methodology and explore how the end-user can be integrated structurally in a creational process.

The research question specifically targets blockchain as a technology. Accordingly, we will explore the back-end solution and how it will or can disrupt our economy. This sub-chapter will discuss why it is essential to focus on this technology specifically.

Lastly, consults refers to management consulting as a practice. The research is done in collaboration with KPMG. The company experienced a more substantial demand in exploring emerging technologies such as blockchain in digital transformation processes. In this subchapter, we will shortly go deeper into management consulting but specifically, describe digital transformation and how digitization is becoming more critical within KPMG's clients.

In the concluding subchapter, these three pillars will be discussed together. We will explore the strengths, opportunities, and weaknesses within the context in which the research question takes place and formulate next steps to explore within the analysis chapter.

In this chapter:

3.1 DESIGN THINKING

In this chapter, we will go deeper into design thinking in general and in relation to the research question. In this chapter, we will compare the design approach to other approaches such as technology push and market pull. Moreover, the different use cases and applications for design as an approach will be discussed, and lastly, we will conclude how this might impact the research question. More specifically, how this methodology can be used to use these stakeholder needs in complex innovation such as blockchain.

Design-driven innovation is a concept in which an innovation is driven by consumers presented by Verganti (2009). To explain this concept a further, we will discuss first innovations from a technology push and market pull, after which design-driven is drawn into this context (figure 5).

Moreover, the importance of design within the different phases of innovation creation will be discussed to create a perspective on how design (thinking) can be of influence on the creation of blockchain applications.

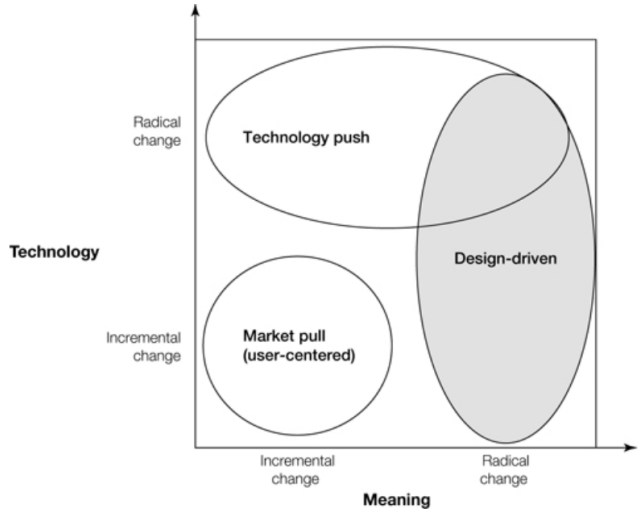


Figure 5: Design driven innovation (Verganti, 2009)

Technology push

Blockchain currently can be seen as a technology-driven innovation, meaning that the trust and security platform drives how the innovation is shaped and how business activities will take place (Kobler et al., 2017). Norman (2014) argues that technology changes drive radical innovations without integrating user research. As blockchain is a radical innovation driven by technology, we can assume that user research is lacking. Nonetheless, Norman emphasizes the importance of human-centered design for the enhancement of the innovation. As he explains, successful companies such as Google, Facebook, and Twitter have used the methodology to enhance their product after first market introduction. In addition to that, human-centered design can be seen mainly as valuable in later stages within the creation of radical innovation or in the enhancement of a product/service.

Market pull (user-centered)

An innovation driven by a market pull or being user-centered relates to a concept in which the user is central in the process. As the user is asked, needs are observed, and user tests are done, these solutions often fit the needs of the target group perfectly. Since the user feedback is directly gained from the target users, the inspiration for solutions is also only gained from that frame of reference. Therefore, it leads to incremental solutions rather than radical change.

Design-driven

In his paper, Verganti explains that innovations can also be pushed by design rather than pushed by technology or pulled by the market (Verganti, 2009). Design-driven innovation creates new markets instead of forming existing ones by pushing radical new meanings. Verganti describes that consumers buy meanings rather than (technological) products. Design-driven innovation is not focused on radical innovation (tech push) or incremental innovation (market pull), the new markets introduced creates desirability at the consumers' end. Therefore, it is critical to define these new markets and find human needs which can be solved by a radically different solution such as blockchain. To find these needs, we have to look at the user that is involved carefully; the human-centered design is a philosophy in which the user is centralized in the creation of innovation.

Human centered design relates to a process that meets the needs of the user

Greenhouse, 2012

Human-centered design

The human-centered design relates to a process that meets the needs of the user, a process that is grounded in research and data on skills, abilities and user limitations (Greenhouse, 2012). Human-centered design is a methodology under which participatory design (Allen, Lueng, McGenere, & Purves, 2008), ethnography design (Carmien & Fischer, 2008) and empathic design (Chen, 2011). All of these mentioned methodologies aim to integrate human perspective in the process of innovation creation. Integrating the human perspective is done by creating an innovation that is useful, usable and that focusses on a person's expressed and latent needs. Human Centered Design can also improve strategic decision making as the philosophy considers the core needs of the person who needs the solutions (DC Design, 2017).

Human-centered design can be seen as a mindset from which innovation is created, to make this all tangible, design thinking is introduced next. Design thinking involves tools and methods that structurally help one to apply human-centered design principles.

Design thinking

Design thinking is a methodology/attitude/mindset that is driven by design but should be applied across applications (tech, business, design) to be valuable (Brautigam, 2017).

As Tim Brown (CEO IDEO) describes it, design thinking is a method of meeting humans' needs and desires in a technologically feasible and strategically viable way (Brown, 2009). Design thinking often refers to a set of tools that integrate human-centered design; both designers and non-designers can use these tools.

Viability, feasibility, and desirability

Brown (2009) discusses how in the creation of innovation three constraints are considered throughout every stage: feasibility, viability, and desirability. Feasibility goes more in-depth in the technological boundaries, questioning if the innovation is feasible to build and hold up for commercial purposes. Viabilities goes into the business case; the product/service must be commercially viable to be able to be successful. Lastly, desirability questions whether the end-user has a need that will be solved by the product/service. Moreover, it will analyze whether the product/service is 'desired' by the user or could be desired.

Design in time

For radical innovations, the design approach is often used in product iterations instead of initial idea creation. As the technology itself is far out of scope from the target consumer, it is preferably the interaction and value creation in which the user should be integrated instead of the backend solution itself.

LEARNINGS

From tech-driven to design-driven

Design going further than design

Blockchain being a back-end solution

Exchange based on cryptographic proof instead of trust

Satoshi Nakamoto

3.2 BLOCKCHAIN

In the previous chapter, we explored how we can integrate human needs in an innovative process. In this chapter, the focus will specifically be on blockchain as an emerging technology.

Although the blockchain technology has been existing for a while, since the introduction of Bitcoin by Satoshi Nakamoto, it grew in popularity. The blockchain has become a buzzword in innovation, but yet is still often an undefined subject when asking what it truly means. Therefore, we will explore the technology and how it will influence our society's current processes in this chapter. Then, the maturity of blockchain will be discussed and how it will change in the nearby future.

Blockchain technology

The blockchain, the technology behind the Bitcoin, a technology most people have heard of but still a small percentage of people understands its value. In essence, the blockchain is a new network in which trading between peers becomes autonomous and therefore also decreases the number of middlemen needed (Warburg, 2017). The autonomous exchange is created by an algorithm which secures the transaction in which two peers do not need to know each other; the algorithm facilitates a trustless exchange.

Exchanging without trust

The distributed ledger makes it possible to execute value exchange between strangers; as trust is not needed within the exchange, in the blockchain context, it can also be referred to as the trustless exchange. For example, the algorithm behind a smart contract enables two strangers to create a consensus around a specific agreement, and autonomously, the agreement will be executed when agreed upon. More specifically, as explained in figure 6, the blockchain takes away any middlemen. In the use case of buying houses, the ownership of any property should be on the blockchain after which it can be exchanged between people. In this case, the blockchain will replace the middlemen like real estate agents and notaries. Instead, the exchange will be done digitally on the blockchain.

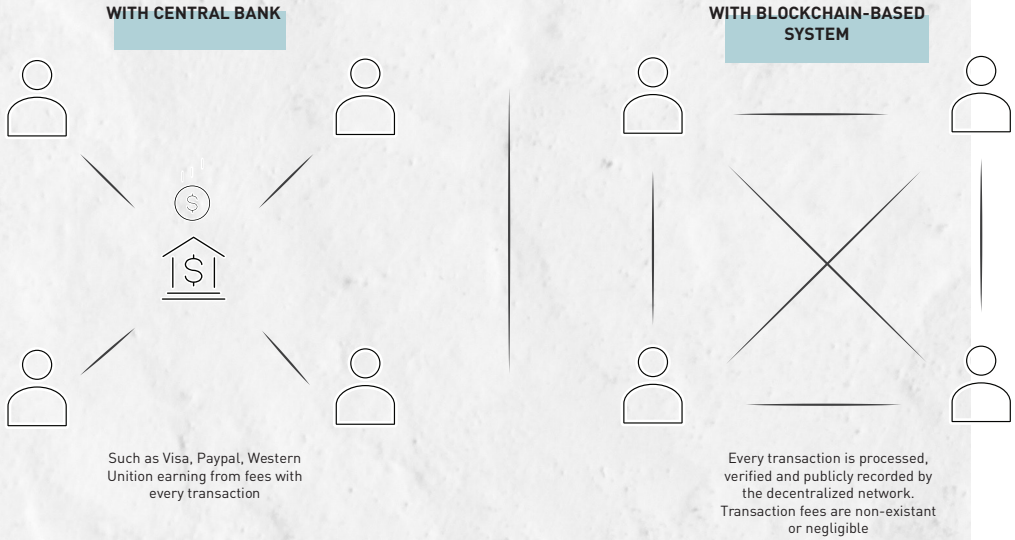


Figure 6: With and without blockchain based system

the blockchain

Advantages of exchanging on a decentralized solution such as blockchain are, e.g. immutability, censorship resistance, and the trustless environment. The real estate industry is a compelling use case for the blockchain because it needs a common database on which multiple parties can modify. Also, the use of blockchain can enable the integration of transaction dependences within smart contracts on e.g., loan approvals or title clearances.

Technology

As Elsden et al. (2018) describe, the blockchain principle consists of three powerful technologies to make this trustless exchange possible; a distributed ledger, immutable storage, and a consensus algorithm. The distributed ledger can be explained as an algorithm in which the actors within a specific transaction hold permission to read and write. Immutability links to the fact that every block in which a transaction is registered links to a chain in which the history of transactions is stored and cannot be changed. Finally, with a consensus algorithm, the transactions will be validated to create a shared consensus on the state of the database. The combination of these technologies enables for an innovation that is transparent, unchangeable, not owned by a single party and can communicate across ecosystems. In addition to that, it is can potentially be valuable across a variety of markets and for several use cases and can drastically change the way we interact with certain products/services.

Immature

The blockchain is still in its immaturity and will be until at least 2015 (Treat et al., 2015). Immaturity means, there are still technical complications to be found in, e.g., speed; Bitcoin currently processes seven transactions per second, Ethereum 15 and Ripple 1500, but that is nothing compared to VISA that can do more than 24000 (Ydstebø & Sandvoll, 2018). Currently, the technology is expensive in use, look at the amount of data storage blockchain needs and the energy it uses. However, also, it is not yet scalable and fast in its use, as in every node there needs to be a copy of the ledger. It takes a long while to validate any transaction done in the chain. These technological boundaries currently seem challenging, but according to experts, when looking at the amounts of investments and dedication on the blockchain technology itself, it will only be a matter of time until these technological restraints will be solved (Harris, 2018).

A more relevant question is on how it will change our society and in addition to that economies. The next subject will explain how blockchain will impact us as a society and our day-to-day life.

Changing economies

Swan (2015) explains that the blockchain technology will disrupt our economy in three phases. The first phase (according to Swan called Blockchain 1.0) has already happened and focusses on the cryptocurrencies such as Bitcoin. In Blockchain 2.0 the smart contracts are introduced, and blockchain 3.0 describes applications beyond currency, finance, and markets.

Cryptocurrencies

It all started when Satoshi Nakamoto published his paper on bitcoin: a peer-to-peer electronic cash system. By introducing the bitcoin, Nakamoto founded the first cryptocurrency that would enable exchange based on cryptographic proof instead of trust (Nakamoto, 2008).

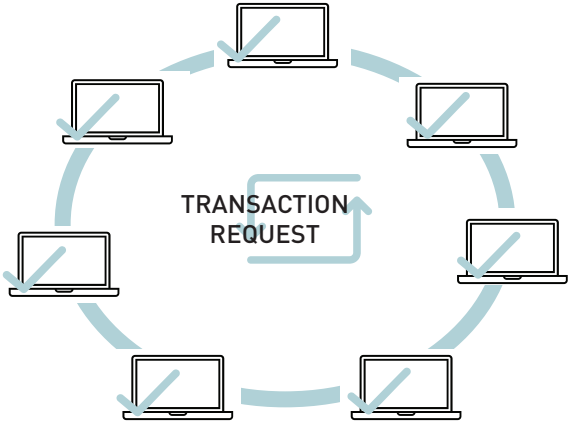
Smart contracts

Ethereum, the first and largest smart contract platform, aims to eliminate trust even more within value exchange and is currently the largest smart contract provider.

It facilitates transactions between two individuals where there is no trust

User requests a transaction on the blockchain

The requested transaction is broadcast to P2P network consiting of computers known as nodes



The network of nodes validates the transaction and the users status using known algorithms

is established. No trust between two individuals can be due to a variety of reasons such as geographical or language barriers. It is a transaction-based state machine. The smart contract enables two individuals to create and find a consensus in a contract that enables value transaction.

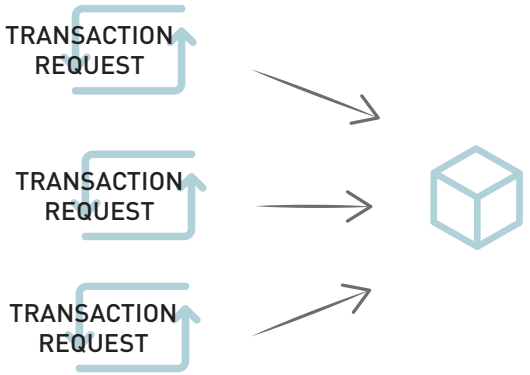
Those contracts can be authored to autonomously enforce rules of interaction through algorithms (Wood, 2014), making them smart. Ethereum is a generalized technology on which various transaction-based state machine concepts can be built.

Beyond currency, finance, and markets
Blockchain has not only the power to change many industries, but it has the potential to replace many human endeavors (Swan, 2015). The technology will start with replacing middlemen with automated systems. Smart contracts will become most important in the validation process and automatically via smart sensors and other data input programs, data can be collected.

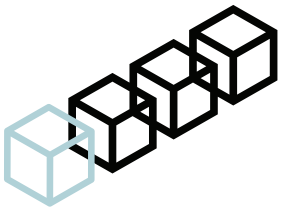
Due to its interconnectivity in a universal and global scope, the technology can easily upscale, and every sort of resource allocation can start being automated. As many systems will become automated, many human-to-human interactions will become human-machine interactions (Swan, 2015). As Swan argues, not only is blockchain a better organizational model, due to the requirement of a consensus, the process will have greater liberty, equality, and empowerment.

Blockchain within KPMG
Within the blockchain sector, KPMG is currently differentiating itself in the Netherlands with their Blockchain Maturity Model by KPMG's Distributed Ledger Services group. This Blockchain Maturity Model assess the main risks that will occur when implementing a blockchain solution within a specific company.

Looking at KPMG's primary client base for blockchain projects, it is essential to make a difference between a public and permissioned blockchain as a solution.



Once verified, the transaction is combined with other transactions to create a new block of data for the ledger



The new block is then added to the existing blockchain, in a way that it is permanent and immutable

Transaction is complete

Figure 7: Blockchain technology

Public vs. Permissioned blockchain
The main difference between a public and a permissioned blockchain is that within a permissioned blockchain, only an authorized set of entities can write and read on the respective blockchain (Wüst & Gervais, 2017). As it often has many resemblances to a central database, one can often question whether a central database can be better suited for a specific solution. The most known examples of permissioned blockchains are Hyperledger Fabric and R3 Corda.

In public or permission-less blockchains such as bitcoin and Ethereum, any individual can join and leave the network as a reader and writer (Wüst & Gervais, 2017). There is no central instance that controls or dictates, and all data is transparent for any community member.

Within KPMG the permissioned blockchain is the most used form. As the company has a lot to do with laws and regulations, privacy issues and security. The permissioned blockchain can still have a specific form of authority over a blockchain network.

Entering a large industry
Currently, the blockchain market is a large one. When looking at Initial Coin Offerings (a blockchain fundraising tool), they raised over $3.4 billion only in the first quarter of 2018, after which it did not slow down (Kaplan, 2018). Even though the market for ICOs is large, many offerings fail quickly and experts say it will take a while before knowing why successes or failures take place. In reality, the white paper which is published during an Initial Coin Offering often sounds very promising, but during production and actual product release, the final product/service seems less promising than in the beginning.

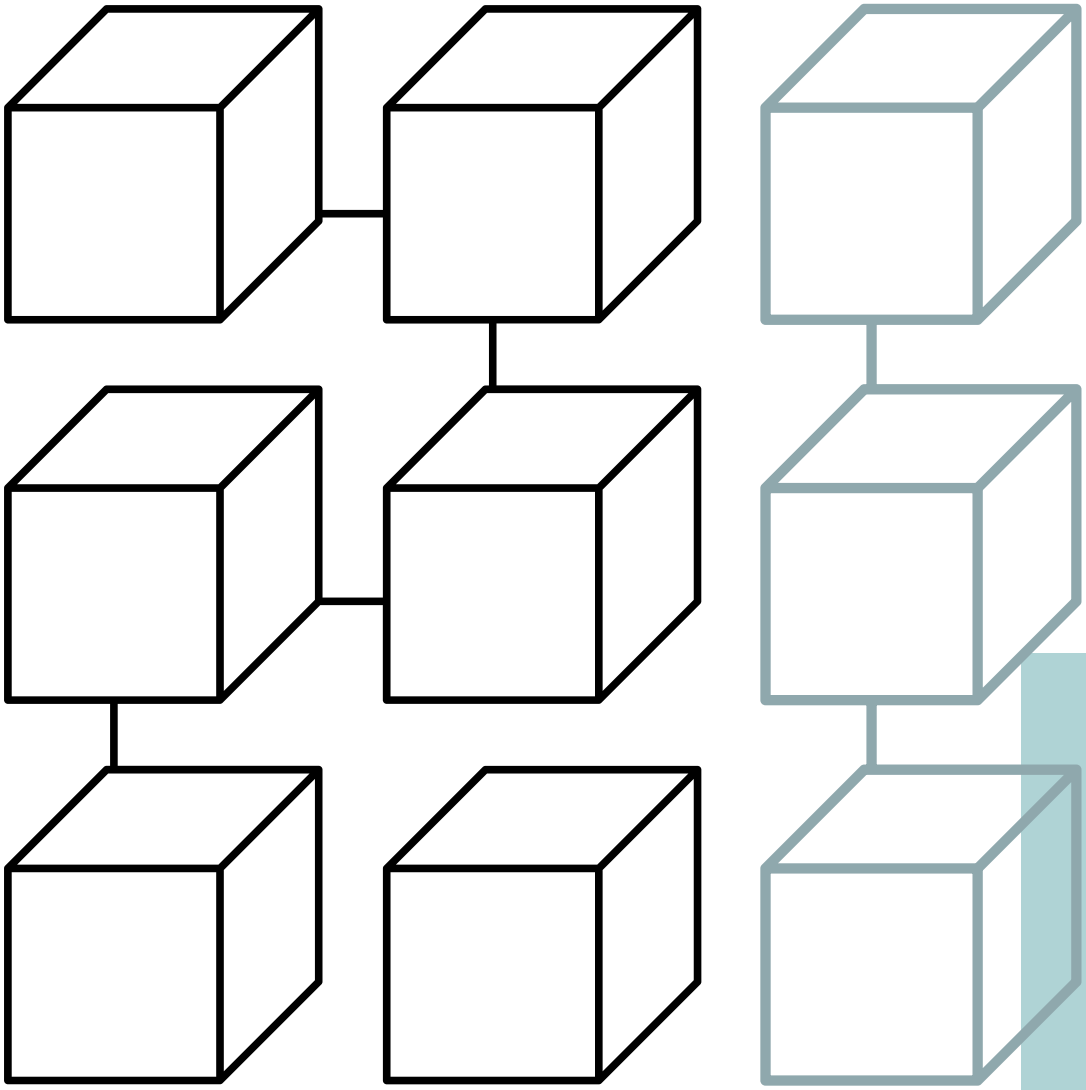
Bitcoin was the first blockchain company on the market, as Bitcoin was established in 2009; the longest-standing company is nine years at this moment of writing. Therefore, even though the industry is large, the list of proven success stories is still concise. The blockchain is still in its immaturity and will be until at least 2025 according to various experts (Spekelink, 2018, Treat et al., 2015). According to them, blockchain in a few years will look different from what it looks like today. Therefore, when designing a blockchain-based product service, one should not take all currently existing blockchain limitations as a set boundary.

Conclusions
If we look at the blockchain itself, the technology can be valuable in our daily lives considering security, transparency, traceability, etc. It will enable us to work even more global because it enables trustless exchanges and autonomous processes.

Although the technology seems promising, it will still take time for the blockchain technology to become mature and in addition to that become a relevant option next to their centralized and faster competitors that currently exist.

The blockchain should be seen as a core technology that will structurally change our processes (like in the real estate example) instead of proposing an extra service.

The blockchain industry is rapidly evolving, significant investments and intelligent brains work on the topic, and therefore we can expect fast changing improvements within the field.



LEARNINGS

KPMG is mainly focused in permissioned blockchains

Blockchain is immature

The blockchain technology will change our society in three phases; cryptocurrency, smart contracts and beyond currency, finance, and markets

.

the trustless exchange

3.3 DIGITAL TRANSFORMATION

In this chapter, the focus is on the last part of the research question:

How to embed stakeholder needs in the creation of blockchain-based *consults*.

Consults refers to management consulting, as this project is done in collaboration with KPMG and their digital advisory department. In this subchapter, management consulting will shortly be introduced to explain the context concerning digital transformation; using digitization to change traditional processes.

This subchapter aims to define the context in which the project takes place concerning KPMG as a company and their processes.

Management consulting
According to Mckenna (1995), management consulting can be defined as a service in which objective outsider's advice management on the improvement of their business, operations, performance, and institutions.

In the last couple of years, the exploration of digital technologies is crucial to exploit success (Matt, Hess & Benlian, 2015). Their research explains to do this; it often involves transforming key business operations.

When a technology like blockchain comes into the picture, a (large) company needs to transform its daily routines (Westerman et al., 2012). The KPMG digital transformation department helps companies define the strategies on how to transform their businesses from a digital perspective.

According to KPMG (figure 9), we are currently in the second transformation wave. Where the first transformation focused on customer experience in the front office and organizations exploring digital solutions with the use of startups, in the second transformation KPMG explains that this digital focus should be applied company-wide.
As can be seen in figure 9, KPMG believes that by 2020, companies will focus more on digitization also in the mid and back office. The increased importance of digitization means that we can no longer focus on optimizing front offices and customer experiences but need to focus on digital strategies to adapt to companies from the core.

Figure 8: Digital transformation within management consulting

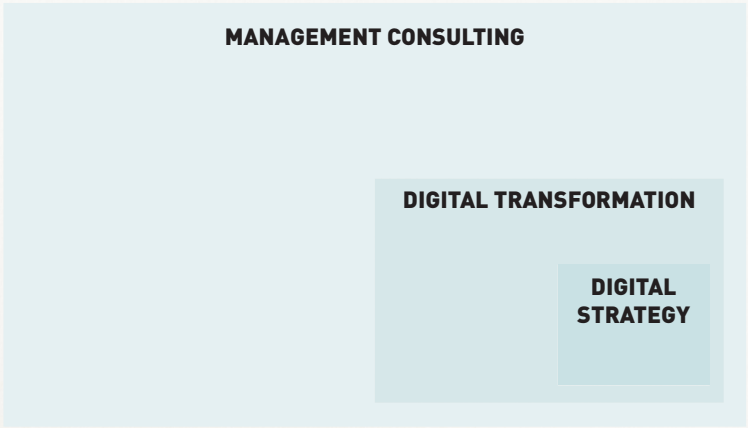
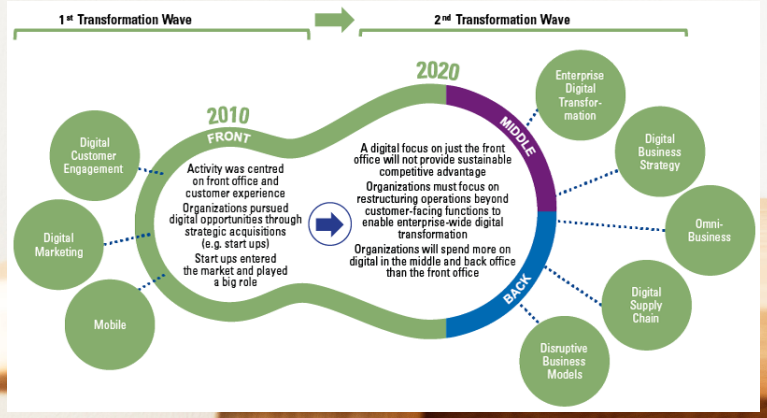


Figure 9: Digital waves by KPMG



To analyze whether a company must react and how one can do this, Westerman et al. developed a maturity model considering digital intensity and transformation management intensity. In this chapter, these two concepts will be explained and how these concepts will affect the project further on.

Digital transformation advantages

As Westerman et al. (2012) describe, the level of digital maturity can be explained on two axes: digital intensity and transformation management intensity (Figure 10).

Digital intensity relates to innovativeness, where fashionistas implement or experiment with digital solutions. These companies focus on digital powered change but fail to base their strategy on real knowledge or explore the maximization of business benefits.

The conservatives lack in exploring innovativeness but understand the value of one unifying vision throughout the company. Digirati are the companies that are mature in both dimensions and according to the study, outperform the industry significantly and are more profitable (Westerman et al., 2012).

Four Types of Digital Maturity

Figure 10: Four types of digital maturity (Westerman, Bonnet & McAffee, n.d.)

According to Westerman et al., every industry contains Digirati, and therefore every company should take digital transformation into account in forming their future strategy (Figure 11).
Kane et al. (2015) argue that it is not technology but the strategy that drives digital transformation. Many early-stage companies are failing because of their focus is too much on technology instead of strategy. Moreover, in his paper, Kane stresses the importance of agility within digital transformation. He refers to Perry Hewit, the chief digital officer at Harvard, who said agility is more important than technical skills and Emory professor Kosnski who says the 21st century is about agility, adjustment, adoption and creating new opportunities. Lastly, research shows that storytelling is a popular means of gaining employee engagement for digital transformation (Kane et al., 2015).

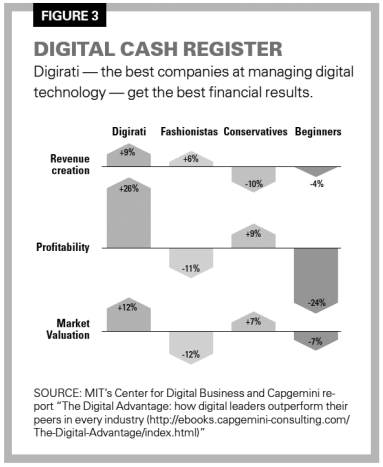


Figure 11: Digirati get the best financial results

To create a digital strategy for a specific client, we need to look at the core of an organization, to integrate an innovation like blockchain; some structural barriers are defined to keep in mind.

Structural barriers to innovation
To build a digital strategy for a service solution which integrates an innovation such as blockchain, often similar structural barriers occur. Especially in the creation of a digital strategy, these barriers should be considered. Jones & Samalionis (2008) defined some reoccurring structural barriers within innovation in service companies:

1. service organization silos that are designed to support operational efficiency rather than rapid change; particularly true in-service companies
2. Many competing agendas within the organization, all vying for the same resources
3. lack of a consistent team or champion for an extended period between idea generation and bringing those ideas to market
4. measures of success (and accountability) that are ill-defined
5. the massive scale of some service organizations, which makes it hard for them to match the nimbleness of the marketplace
6. last but not least: the fact that change is expensive (Jones & Samalionis, 2008)

Existing companies and company structure are built upon operational excellence and not ready for a rapid change. Digital transformation is expensive and difficult to carry out, due to the many variables. Therefore, KPMG advises companies on how to transform their businesses.

Digital transformation within KPMG
KPMG advises their clients on how to execute this digital transformation within their company. Although the transformation is mainly technology driven, to be successful, the companies believe it goes further than that (Digital Transformation KPMG, n.d.). The department focusses on company-wide change within organizational structures as process-wise, and the work approach should transform in front-, mid- as back-office.

Data is used to predict customer behavior and design a consumer experience that integrates within the current and future context. To advise clients on digital transformation, KPMG uses seven iterative steps (figure 12):

Digital strategy
With a digital strategy, the digital transformation department guides their clients towards (a) improve their business, (b) change their business, or (c) creating new business models. In this strategy, a digital ambition is formulated and roadmap on how to get there focusing not only on the board but throughout the entire company. In their digital strategies, KPMG aims to advise on (Digital Strategy KPMG, n.d.):

1. A clear ambition and vision with the stakeholders in the middle
2. A business model, revenue model & operating model
3. A roadmap with digital initiatives
4. Strategy by creating PoCs
5. Investment case

This thesis will mostly focus on the first three steps in which a higher vision on the integration of blockchain within a company is explored, in which the first step is most important. As blockchain is a buzzword technology, it is essential to create a shared ambition and focus for the transformation towards a blockchain product/service and create a vision on how to create a value proposition for the customer.

DIGITAL TRANSFORMATION

1. **Discover**, ontdek wat digital voor jouw organisatie kan betekenen
2. **Stress-test**, identificeer wat de impact van digital is op jouw organisatie
3. **Aspire**, stel vast wat de digitale ambitie wordt
4. **Sketch**, ontwikkel Proof of Concepts en minimal viable products
5. **Mobilize**, difineer een value case en stel een gedetailleerd implementatieplan op
6. **Launch**, kick start het implementatietraject, dat front-, mid-, en back-office verbindt
7. **Realize**, duurzaam embedden van de nieuwe aanpak en innovatiekracht

Figure 12: Seven Steps of Digital Transformation within KPMG NL

Conclusion

Digitization is becoming a norm rather than an exception. In which digitization needs to be integrated into the core of a company instead of just the front end. Digital transformation processes are challenging since companies are created for operational excellence instead of rapid change, but technologies are emerging fast, and companies need to be able to adopt these technologies rapidly to stay relevant.

Where digitization and IT strategies used to be a specialization, currently it is a given in a strategy. Nevertheless, every management consulting has a digital department focusing on these digital transformations specifically. This is also the case in KPMG, the demand for digital strategies is increasing, and the department is growing.

LEARNINGS

The importance of digital transformation within the core of a company

Companies traditionally are not built for rapid change

Digital transformation driven by strategy not technology

3.4 KPMG STRATEGY

At this moment, we have described the different elements essential in the research question. To elaborate more upon the context, this subchapter will focus on KPMG as a collaborator in the project. As described in the project approach, the digital advisory department sees growing demand in the integration of emerging technologies such as blockchain in the creation of digital strategies. Moreover, the company also is changing in its approach and is becoming more human-centered. In this chapter, the aim is to relate the research topic to KPMG as a company in its corporate strategy and corporate culture.

Strategy
Recently, KPMG published a new internal company strategy, although not many details can be discussed on this. A selection of elements is essential to share for the context of the project:

Digitizing assets
Many management consulting companies are focusing on digitizing their assets (McMillan et al., 2017), KPMG is also aiming to digitalize their assets. Especially within the Digital Advisory department, since the department advises clients on digital strategies, it seems only obvious that they also want to digitize their services. This increase of asset-based consulting can be seen the management consulting companies, McKinsey has a portfolio of 85 solutions that use technology, data, advanced analytics, and subject-matter expertise to extend their services towards their clients. It enables them to deliver impact at a faster pace and for a longer term (McKinsey | New Ventures, n.d.).

People driven progress
KPMG's recent marketing campaign discusses human-driven progress, in which KPMG emphasizes the importance of people and society as a driver in innovation. The company explains that in their opinion, technology is a tool to achieve progress for human and society. Even though KPMG mentions that many technologies are human-driven, they aim to look at the stakeholders to enlarge the quality of innovation and shorten time-to-market (The Human Side of Digital | KPMG, n.d.).

LEARNINGS

Asset based consulting is increasing within management consulting

The increase of human centeredness in the KPMG strategy

3.5 CONCLUSION

The literature review aimed to gain a broader and more informed perspective on the context in which the project takes place.

In this chapter, we will combine the knowledge gained in throughout the literature review and create insights. In the creation of blockchain based consults, these insights are crucial to consider.

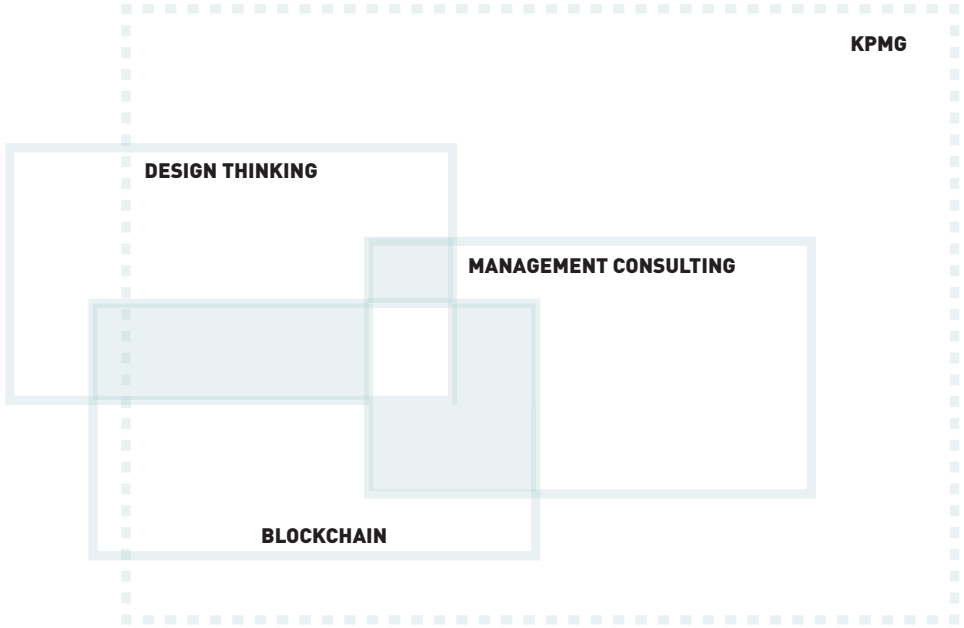


Figure 13: Overlaps between chapters

If we look at the combination of management consulting in technological change and the integration of Human Centered Design, we immediately see a clash. Where clients often come in and aim to integrate a specific technology.

In human-centered design, it is about **looking at the people and their needs first instead of pushing a technology**. These two approaches clash significantly. Therefore we need to ask ourselves, in which phase of the digital strategy should we push a technology and in which phase should we focus more on pushing the needs of the consumer.

HCD and a Technology
HCD discusses that looking at users' need to find a solution is the best option, what if we conclude that a blockchain based solution is not the right one? Aim to sell service with still the ability to change the technology behind the service that is sold.

From tech-driven to design-driven
When a radical innovation becomes more mature, an innovation often changes from being tech-driven to being design-driven. Design-driven innovation is used in finding a solution in the execution rather than the back-end solution of a technology.

Design going further than design
Although design thinking is a methodology driven by design, it should be used across applications. Design thinking means thinking about the feasibility, viability, and desirability of a product/service.

Blockchain 2.0
That means a transition from technology-driven innovation to design-driven innovation is necessary.

If we look at **blockchain as a technology** and referring this to **the creation of consult**, the following insights are essential to consider.

Blockchain 1.0, 2.0 & 3.0
As Swan (2015) describes, the blockchain will enter our society in three waves. The first phase considers cryptocurrency; the second phase changes the finance market and the third will go beyond cryptocurrency, finance, and markets and will consider government health, science, literacy, culture, and art.

Blockchain and the Law
According to Werbach (2017), the relation between blockchain and the law is a two-way street. They need to meet each other in the middle.

Distributed ledgers are active
The distributed ledger is active (Werbach, 2017), meaning that they do not merely record information, they ensure that the transaction matches the consensus. For bitcoin this means, the system self-enforces financial transfers.

One Network
A (permissioned) blockchain will start being valuable when many parties are collaborating towards one goal to make a value chain faster and more cost-efficient.
We should design solutions that are not just driven by one party, but that motivates parties to collaborate.

If we look at the **practices in KPMG**, some general insights should be considered up front.

GDPR
The GDPR law states that everyone has the right to be able to be forgotten online. As the blockchain is immutable, we have to ensure that people can be erased.

Creating a digital asset
As KPMG is aiming to create digital services also within their consulting services, the aim of the framework should be to be (partially) digitalized.

A foundational technology
Like the internet, the blockchain is a foundational technology, whose impacts could reach into every corner of the world. To move forward, though, law and distributed ledgers need each other.

The human side of Digital
Although technology is still the driver behind most of the strategy project, human-centeredness is becoming more critical within KPMG. Therefore, a structural approach should be given on how to integrate the user to drive the process.

The importance of digital transformation
Digirati perform significantly better than beginners in digital applications. Therefore, it is crucial for any digital-focused company to focus on digital powered change.

Companies are not built for rapid change
Most companies are built for operational excellence rather than rapid change. As a result, change is often difficult to execute throughout an entire organization and is expensive.

Digital transformation is driven by strategy, not technology
As Kane (2015) stated, digital transformation is driven by strategy. Thus, a framework should focus on first exploring potentials within the strategy and create a feasible solution with that strategy as a driver.

Collaboration
The blockchain, especially a permissioned blockchain, starts to get interesting when more than one party collaborate. Sharing databases and making processes over a chain easier, secure and more transparent for the consumer is what can make the difference.
KPMG and permissioned blockchains
As KPMG's client base often consists of large enterprises that focus a lot on privacy and confidentiality, a permissioned blockchain is more suited within these contexts than a public blockchain.

Looking at **blockchain specifically**, some assumptions are often made but are not undoubtedly true.

Errors and security flaws
A smart contract can have errors and security flaws, like any other software code. Errors or security exploits in smart contracts are particularly dangerous because the blockchain directly carries value or rights to assets.

In digital transformation processes, it is often about **the integration of a specific technology** within the core processes of a company. These insights should be considered when dealing with blockchain as a technology specifically.

Machine of trust
The blockchain lets, people who do not trust each other, execute a value exchange without the need of a trusted third party. (Christopher, 2016)

Blockchain being a back-end solution
Design focusses on the integration of the consumer of a product/service. As blockchain is a back-end solution, the consumer often does not directly interact with the blockchain; instead, often there is a middleman/platform in between.

Blockchain is immature
Although the market is already large, blockchain is still an immature technology which means that the processing speed is low compared to centralized solutions.

This broad range of insights covers the context from a high perspective. In the next chapter, we will focus on analyzing use cases and application areas to create insights for a more concrete application within blockchain based consults.

“The main advantage of blockchain technology is supposed to be that it’s more secure, but new technologies are generally hard for people to trust, and this paradox can’t really be avoided.

—Vitalik Buterin, Co-founder Ethereum

4 EXPLORATORY ANALYSIS

In the literature review, we researched the different subjects: design, management consulting and blockchain to define the different elements within the research question.

The chapter will describe three different perspectives on the subject: human, business and technology. The analysis contains interviews with experts within these different fields or intersections of them. Lastly, a conclusion of insights is written at the end of the chapter.

From the literature analysis, a theoretical background was introduced in which we could elaborately see the influence of design thinking in the creation of innovation. As design thinking involves human-centered design, it is important to explore which 'humans' are essential in the creation of blockchain applications. Therefore, first, a stakeholder analysis is executed to create an overview of essential players in the market.

Secondly, as blockchain is a back-end solution and a design approach is often integrated into the creation of a front-end solution, it is crucial to structurally assess the technology and how the human can or should not be integrated into the creational process of this sophisticated technology. Therefore, in the technology analysis, the blockchain technology is explored from a non-developer point of view.

Lastly, how can we create value for our customer? If we look at blockchain solutions, what are the most common propositions and how do these propositions differ from non-blockchain solutions? A value proposition analysis was executed to invest which value can drive the integration of blockchain within a company.

To validate the outcomes of the analysis and literature study, interviews were executed with experts on design thinking, blockchain and management consulting or a combination of them.

The chapter aims to collect insights generated from different perspectives to thoroughly investigate the context as broad as the scope of the project. Due to the division between human, business, and technology, we could establish insights upon human needs, business impact, and technological feasibility and finally validate those insights and extend knowledge together with experts. In the final discussion chapter, the most important insights will be discussed from origin to application potential.

In this chapter:

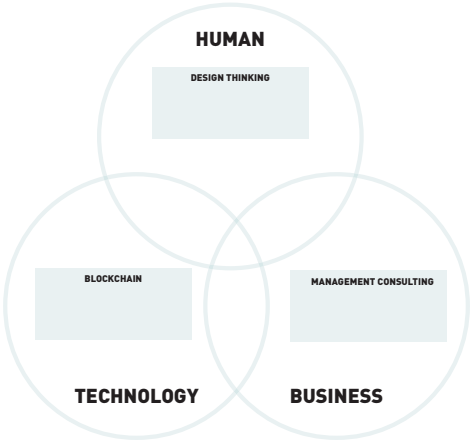


Figure 14: Relation between literature review and exploratory analysis

Entering the blockchain is the weakest link of the chain

Voornaam achternaam

4.1 HUMAN

Finding human means refers to desirability. In this chapter, the aim is to explore the roles different stakeholders that are existing or appearing in the creation a blockchain-based application.

Therefore, different stakeholders within one value chain will be assessed to find what they desire. To gain a better perspective on who these stakeholders are within a blockchain application, we executed a stakeholder analysis. According to Goodpaster (1991), a stakeholder analysis can be used to identify both positive and negative impact on each stakeholder. Also, it is used to describe the stakeholders' goals, objectives, values, and responsibilities.

Stakeholder analysis

In the stakeholder analysis, we will frame the interactions between the stakeholders and define the roles that are present in a blockchain application. As Swan (2015 describes, the integration of blockchain often simplifies the chain in which a value exchange takes place. It also changes the roles of the involved parties within that chain, e.g. a notary does not have to help buy or sell your house anymore but needs to help to interact with the blockchain.

In the stakeholder map (figure 15), we can see the interaction of the stakeholder within a general blockchain. Any blockchain is different, but this exercise aimed to identify the most common roles and identify their tasks. In the figure, we can see the blockchain application in the middle and directly interacting with the developer, end-user, and government (as an indirect stakeholder). Moreover, we can see the developer interact directly with the community as the community validates every transaction in the blockchain. In the stakeholder analysis, the KPMG consultant is interacting with the blockchain developer (or his/her company) to help find purpose and give strategic advice on the use of blockchain.

During the stakeholder analysis, we found nine different stakeholders that could be involved in a blockchain-based project. The tasks of the stakeholders might change a little depending on the purpose of the blockchain and depending on the industry in which the blockchain application takes place. Nevertheless, the aim was to describe their general roles with a focus on goals, objective and values to be able to use this knowledge in finding concrete stakeholder needs in the creation of a blockchain-based application for this project. In figure 16, the primary stakeholders and their roles are described.
Although it might seem from figure 15 that the blockchain developer is in the middle of all the connections. It is a vicious circle in which the end-user is also the validator in the blockchain community and therefore part of the validation phase in every transaction.

Currently, the community often exists of many 'other' stakeholders next to end-users (e.g., investors, product owners, developers, suppliers, and the government). The more people will interact with one blockchain, the more the validation phase is depending on end-users instead of other stakeholders.

If we look at the value chain in which a blockchain based application takes place, it is often the role of the party at the beginning of the chain (e.g., the supplier), whether something physical can enter the (digital)

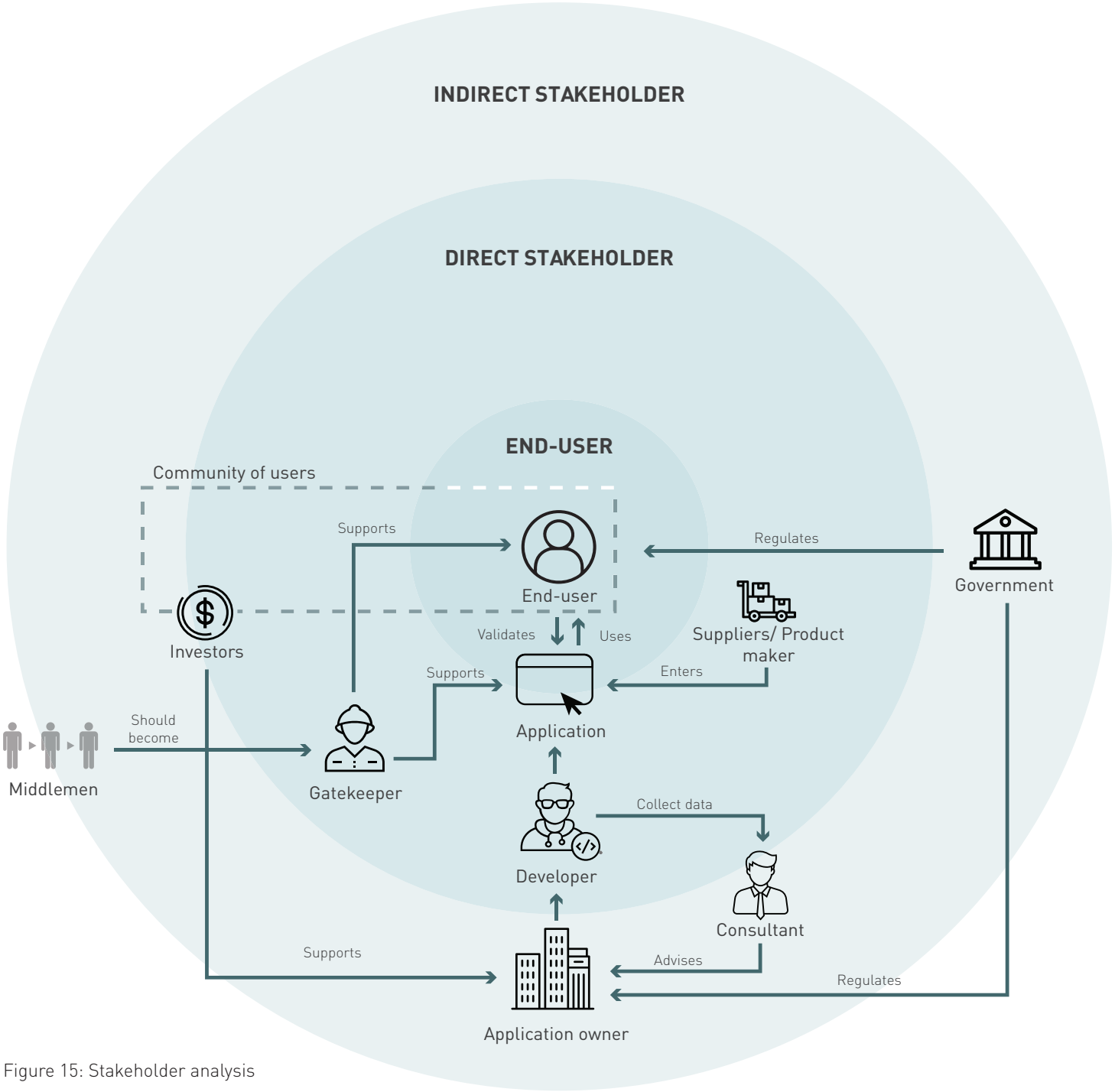


Figure 15: Stakeholder analysis

Stakeholder	Role
The Developer	As blockchain is a back-end solution. The developers have a lot of decision power on the form, shape, and interaction of the final product/service.
Blockchain owner	The blockchain owner is only applicable in a permissioned blockchain. The owner has the highest stake in the blockchain and therefore can define a set list of rules and regulations.
Consultant	Knowing the strategic decisions that can be made in the blockchain infrastructure before building the application.
End-user	The end-user will eventually use the blockchain based application but will most probably not know how blockchain is integrated and how it works. The end-user will care about the value the product/service will have for him/her in particular.
Government	The technology is built on anonymity. For the government it is essential to be able to trace criminal activity and ensure security and that laws and regulations are being met.
Community	The community together is co-owner of the blockchain. It is their task to ensure the transaction is valid.
Suppliers	For physical products, the suppliers have to make sure a particular product enters the blockchain the right way. Much responsibility lays in this task.
Investors	Within an ICO the investors are also the community.
Middlemen	Middlemen like banks, notaries and other administrative jobs will likely be simplified or disappear. They need to rethink how they can add value for the end-user.

Figure 16: stakeholders & their roles in blockchain based application.

blockchain. For example, if we look at coffee beans as an example. It is an excellent use case for a blockchain based application to be able to trace back the heritage of the coffee beans and make sure that the different trades between party is done fairly. The digital file of the coffee beans should enter as soon as possible, but the information on price, origin, capacity, and quality should be entered truthfully as in the blockchain, all information is immutable. This point is crucial as from this point; the blockchain will trace every exchange and autonomously through an algorithm. Considering, this 'entering of the blockchain' is a human action and is depending on the trustworthiness of the person entering the information, it is the weakest link of the chain.
The blockchain developer is the one that needs to consider all variables that influence the system, he/she needs to code the interactions and their dependability on each other in one blockchain system.

A consultant is an independent variable that directly influences the blockchain developer but is limited to an advising role.

Moreover, the government is an important variable and will become more critical in the future. Privacy, anonymity, and traceability are all governmental policy issues that need to be addressed while creating a blockchain application.

The blockchain community can be seen as one of the most complex stakeholders. As the community is both the consumer, sometimes investor and the validator in the chain.

If we look at research on how blockchain will change our economy, it often discusses the replacement of middlemen (Tapscott & Tapscott, 2015). These banks, notaries and other admirative middlemen need to redefine the value they can add to the end-user.

Conclusion

In conclusion, we can see that the integration of blockchain impacts an ecosystem significantly. Processes will be automated and simplified, resulting in tasks disappearing. Moreover, if we look at the community being end-user, investor and validator we can see that it is not just one party that controls. The interconnections and distribution of ownership are critical to the concept behind blockchain. However, a mindset needs to change for our supply chains to also complement that theoretical idea.

With these stakeholders and their roles in mind, the shift can easily be made from stakeholder roles towards needs. The specification of needs is essential in the creation of a value proposition. These needs are industry and, but by knowing the stakeholders, these needs can be formed more easily.


The integration of
blockchain impacts
an ecosystem
significantly.

LEARNINGS

As blockchain is a complex technology, the ease of use needs to be considered for all non-developers
The community is both end user (, investor) and validator

The end-user does not care about blockchain back-end but about the value it has for him/her
Entering the blockchain is a crucial step (often done by the supplier)

The government as an important stakeholder, as rules and regulations around a blockchain based system are still in development

4.2 TECHNOLOGY

In this technology analysis chapter, the aim was to get acquainted with the blockchain technology from a developers' perspective. The back-end solution is currently technology driven in which the developer has a lot of the decision power. By looking at the technology from a developers' perspective, the goal is to gain technology-based insights but also to identify how business and human can integrate into the creational process without interfering with the complex technological process.

Moreover, from the personal belief of the inability of creating a solid framework without experiencing the blockchain technology in-depth first, a course in solidity was taken. To start understanding the value of blockchain and the process of creating such an application, the goal was to learn solidity; the coding language on which one can make smart contracts on Ethereum. I took an online course at Udemy to learn more about the technicalities that are involved when creating a smart contract. Smart contracts are contracts that allow autonomous transactions. For example, with a smart contract, betting in soccer matches can be done autonomously. All the participants place their bet, and when one team defeats the other, the exchanges will take place autonomously.

Results
As the level of understanding in blockchain, specifically in smart contracts, was growing, we could define a series of exciting opportunities.

Autonomous transactions
Within the creation of a smart contract, most interesting is the creation of autonomous transactions. When the smart contract is established, and a consensus is created upon this contract, all parties can independently act and execute the tasks after which a defined autonomous transaction takes place. In this way, even strangers can exchange valuable information, currency, and access. For example, a person in the Netherlands can invest in a farm in Nigeria and with a smart contract, split the profit, without having to have trust between the two people.

Communicating outside the blockchain
Within one blockchain it is easy to participate and execute transactions. Nevertheless, in our complex world where the internet of things plays an important role. It is the communication outside the blockchain that can be valuable. E.g., using smart sensors to collect data within an environment and collecting that data on a blockchain to initiate a specific transaction between two parties. To achieve communication outside one blockchain, an oracle can be the solution, but the integration of an oracle is still complex and immature. (Van der Laan, 2018).

Physical – Digital
As already explained in chapter 4.1 Human, the link between the physical world and the digital blockchain is weak. An excellent example of a blockchain company that connects the physical world with a digital application that is blockchain based is Everledger (Figure 17). Everledger aims to create a transparent tracking system that secures the trustworthiness of diamonds and colored gemstones. Their application creates a footprint of a diamond after which it can securely be traced without immutability, and therefore

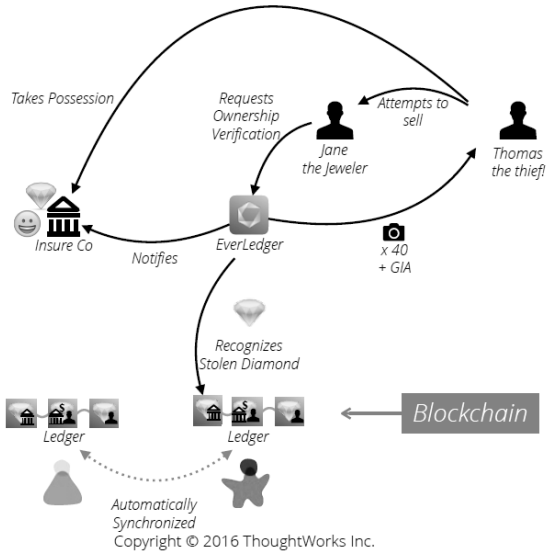


Figure 17: Everledger example

one can always ensure the trustworthiness of the product. Although the service seems valuable, it is the connection between the physical and digital world that is difficult to trace. One person, for instance, needs to add the product to the blockchain after it entered the blockchain the product is entirely traceable, but one always needs a gatekeeper for a product to enter.

Ecosystem change

Currently, blockchain is a back-end solution that is immature (chapter 3.2 blockchain). The technology needs a lot of processing power to run, and the transaction speed is still relatively low. Running the smart contract on Ethereum took a significant amount of time to be executed; the blockchain is slow compared to other solutions. Nonetheless, due to the enormous buzz around the technology, companies want to research and implement as soon as possible even since a centralized solution will often be cheaper, faster and more efficient.

Combining responsibilities

As the blockchain automates a series of actions with an algorithm, the value chain will be simplified. By taking out middlemen within these processes, responsibilities will be at the technology's end, or more responsibilities will be attached to one specific stakeholder within the chain. In the creation of a smart contract, many variables should be defined up front whereas, in the current situation, these conditions are formulated during the process. E.g., in real estate, the broker and the notary have two different jobs each executed in a different point in time, in the blockchain these tasks will be executed by the blockchain algorithm and these need to be executed at the same time.

UX and blockchain

The blockchain is an ideal solution to enable peer to peer transactions. Nonetheless, it is a trustless back-end exchange algorithm which is distributed (chapter 3.2 blockchain). When a platform or interface is created, it is often linked to a centralized platform on which personal account details are collected.

This centralized front-end solution is needed to create an understandable user interaction but goes against the blockchain principles.

In this chapter, we looked at blockchain as a technology and how, from a developers' perspective, we should consider certain aspects of the creational process. In this chapter, the frame of reference in which from a desirability and viability perspective we can still make alterations and at the same time consider the feasibility of a blockchain project was defined.

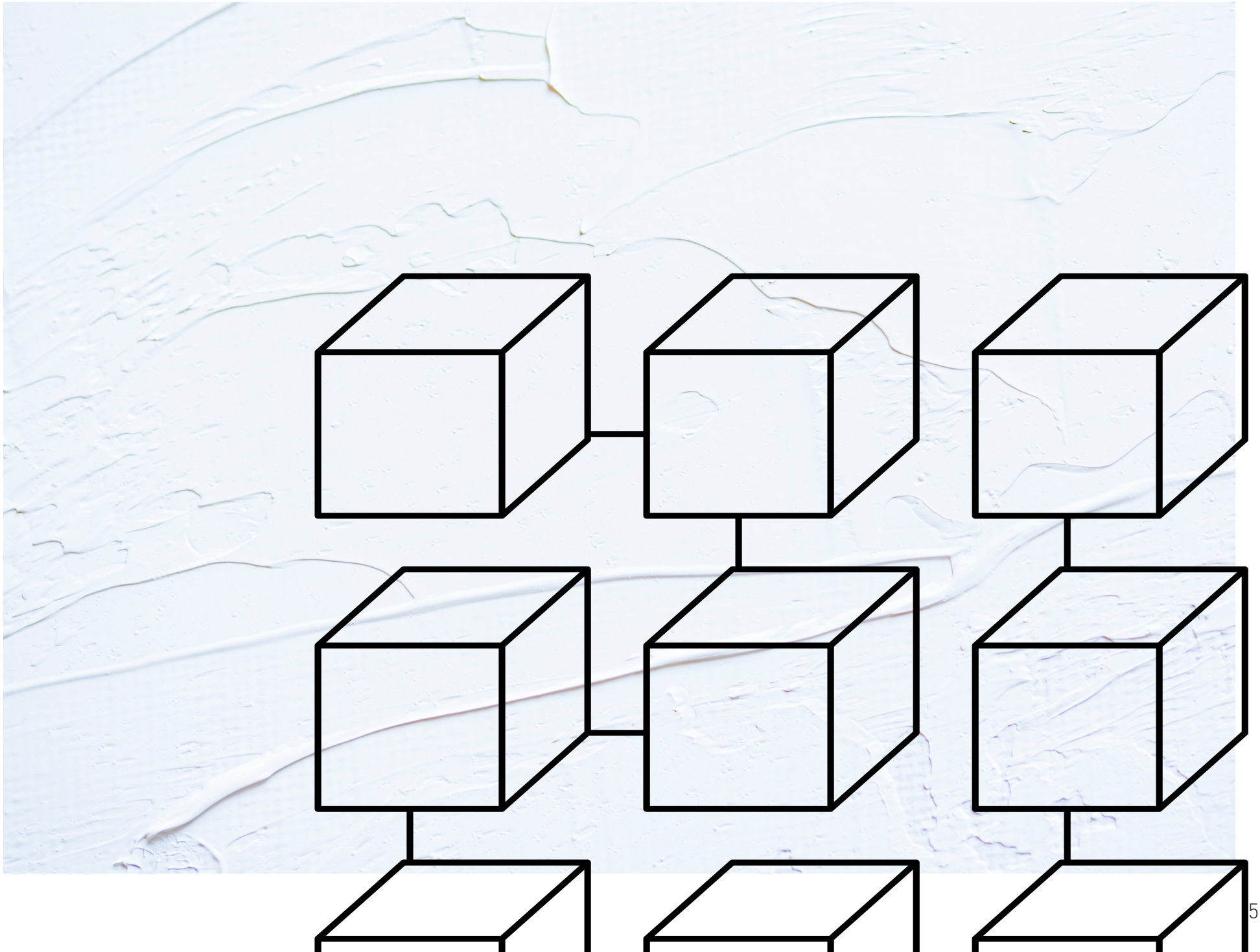
LEARNINGS

Difficulty of communicating outside a blockchain

The blockchain will simplify the chain and redistribute responsibilities

The weak link between physical and digital

Blockchain and user experience design are conflicting



Analysing companies on their value proposition

4.3 BUSINESS

In the third chapter of the analysis, the aim was to discuss the effect of the integration of blockchain from a business perspective. How the integration of blockchain will change the business is an unanswered question. To explore how blockchain can become valuable for a company in a consult, we need to define how blockchain can impact a company.

To get a more tangible perspective on how blockchain can change a company, we focused on the value proposition. In the value proposition statement, an innovation, service or feature is described that is attractive for the customer. In this chapter, we will research how the value proposition changes when blockchain comes into the picture and in addition to that changes what the business can propose to their customer. Furthermore, we will research how are these value propositions differ from non-blockchain companies and between different blockchains.

Value proposition analysis
To understand how a specific company is valuable for a consumer, the value proposition can be analyzed. The value proposition, on the one hand, focuses on consumer understanding but also describes how one creates value for that customer. The value proposition creates a fit between these two elements (Oswalder et al., 2014). The value proposition canvas designed by Oswalder et al. (2014) consists of two elements: the customer profile and the value map. In the customer profile, the characteristics of the target group for which the value proposition was designed is explored. As the customer profile differs significantly per company and industry, for the value proposition analysis we mostly focus on 'create value.' According to Oswalder et al. (2014) create value describes the set of value proposition benefits your product/service to attract customers. Thus, the aim is to compare these benefits and seek reoccurring themes within these blockchain based organizations.

Method
In the value proposition analysis, 80 public blockchain and 50 permissioned blockchains were analyzed on their value proposition. The 80 public blockchains were collected from the Amsterdam Blockchain Expo 2018 and a selection of articles focusing on the most promising blockchain startups in 2018. The permissioned blockchains were difficult in sourcing; many of the permissioned blockchains are not open to the public. These

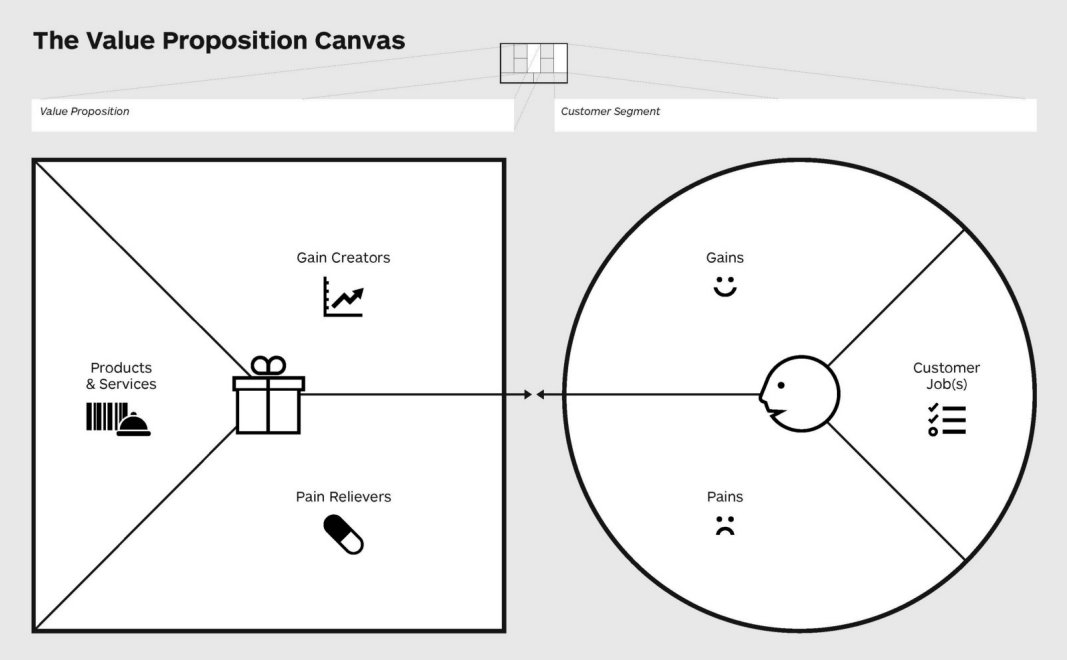


Figure 18: Value proposition canvas (Strategyzer, n.d.)

permissioned blockchains were sourced through Google. For each company, their website was researched to find a sentence which describes the value the company would promise to offer their customer (the value propositions can be found in Appendix D & E).

If we look at the value proposition, the main focus was on the pain relievers and the gain creators (figure 18). We looked at which values are proposed to solve these pains or create the gains. These values were collected and clustered together to find the most reoccurring values.

What is a value?
The value in a value proposition relates to the reason why a consumer would use a product/service (Oswalder et al., 2014). In the analysis, a differentiation could be made between values that focused on interaction (e.g., feeling of empowerment or security), the difference/impact of the integration of a specific technology (e.g., smart data, traceability)

Public blockchains
Eighty blockchain based startups were analyzed on their value propositions to find underlying themes, overlaps and links to build upon. These value propositions differ from:

"Enabling businesses to speak the same language with integrity." - Orgintrail

to

"Using big data to decentralize the sports industry. Real-time player valuations" - Playrs

and

"We are breaking big data barriers and building a new health economy to improve healthcare worldwide." - Grapevine world

In figure 19A, the most reoccurring values in the proposition of public blockchain-based companies are described. The entire document of public blockchain value propositions and their themes can be found in Appendix D.

An example of a company that uses **empowerment** in their value proposition is Civil. Civil is a journalism market platform that enables journalists to write their pieces and distribute them with a decentralized model over the world, ensuring that the author will be paid a fair amount and holds the copyright. Empowering the author to act as their publisher.

If we look at **cost-effectiveness**, Electron can be taken as an example. Electron is a secured platform for energy trading in which the middlemen are taken out of the process. The blockchain enables different parties to directly trade with each other without middlemen taking an amount of the profit; the exchange will become more cost-effective.

Aidcoin is a company that promises **transparency** in their blockchain application. The company creates trust in the charity sector by making every donation trackable and therewith ensuring efficient use.
If we look at security, we can take Selfkey as an example. The company empowers both individuals and companies to have full ownership over their own digital identity. The company promises security through a blockchain application on which the participants can store, share and access their personal documents.

From the public blockchain value propositions, we can conclude that there is a strong relationship between the Internet of Things and blockchain. This is described in the theme: **smart data**. A selection of blockchain companies used smart data collected from, e.g. smart sensors to execute transactions or initiate actions. E.g., Ambrosus is a blockchain startup that uses smart sensors to track food and pharmaceuticals throughout their entire logistical lifecycle to ensure quality.

If we look at **community**, we can take JoyToken as an example. The company enables peers to enter a trustless gambling ecosystem using contracts validated by the community to ensure the exchanges between the parties and building an active community in which games can be played.

PUBLIC BLOCKCHAIN

Themes	Description
Cost-effectiveness	Being a cheaper solution, or more fair considering the division of cost over the entire chain
Empowerment	Empowering consumers to own their own assets, digitally. More than that, being able to sell, trade or share them
Security	Due to all transactions being cryptographically secured, the interactions between consumers and businesses become more secure
Transparency	Relating to the fact that the blockchain is immutable and accessible for everyone. No participant can act without being noticed by the community
Community	As trustless transactions can take place, a community can be created with people wanting to achieve a similar goal without trust, geographical location or identification being an issue
Smart-data	Data can be collected and by the use of smart contracts, the data can become smarter. The interaction between IoT and blockchain is not an uncommon one

Figure 19A: Public blockchain values

Permissioned blockchains
The initial value proposition analysis was based on startups since the technology is new and currently mainly used by startups. However, in the context of KPMG, permissioned blockchains are more useful to investigate. As already described (chapter 3.4), KPMG's current client base consists of corporates and SMEs, and therefore, permissioned blockchains are often a more suitable solution. Still, the public blockchain is seen as an essential source of inspiration in the creation of blockchain applications (further explained in chapter 4.4 Interviews). In support of this finding, another value proposition analysis was executed in which 50 permissioned blockchain companies/projects were compared.

These value propositions were focused on privacy and finality:
"Enabling privacy and finality across any agreement or asset type" – R3 Corda

Alternatively, a good user experience:

"Ripple connects banks, payment providers, digital asset exchanges and corporates via RippleNet to provide one frictionless experience to send money globally." – Ripple

Also, fast exchanges

"MultiChain helps organizations to build and deploy blockchain applications with speed." - MultiChain

These permissioned blockchains, developed by or partnered with well-known corporates such as IBM and Rabobank, are often not industry specific. The most common values in the value propositions of permissioned blockchains are described in figure 19B. The entire list of permissioned blockchains with their value propositions and values can be found in Appendix E.

A selection of propositions focused on **flexibility** in adapting to a company's needs:

Helping you assess the current state of IT systems and develop a high-level technology plan that reflects your organization's vision and long-term goals - ELEKS

Some proposed **scalability** as a value

Financial assets in a digital medium. Immutable ledger. Instant settlement. Scalability and reliability. Transaction privacy. – Chain Core

In contrary to public blockchains, in permissioned blockchains, **privacy** is important:

Quorum is ideal for any application requiring high speed and high throughput processing of private transactions within a permissioned group of known participants. Quorum addresses specific challenges to blockchain technology adoption within the financial industry, and beyond. - Quorum

Also, the **reliability** of a brand is perceived as being valuable:

We convert ideas into real products that are scalable and reliable - LeewayHertz

Traceability is named as a value in a selection of propositions:

Empowering entire drug supply shipment, with better traceability and tracking. - TraceRX

Moreover, **scalability** is named as a value:

We build apps that give wings to your business. Affordability. On-time delivery. Scalability - Consagous

Moreover, **ease-of-use** is perceived as being important in the propositions:

Gain access to the Waves platform's solutions for storing, trading, managing and issuing your digital assets, easily and securely. - Waves

PERMISSIONED BLOCKCHAIN

Themes	Description
Flexibility	Flexibility in adding and removing partners from a blockchain
Scalability	The ability to scale, add partners and extend services and provide more and more speed within the service
Privacy	The ability to keep data secure, within one blockchain the blockchain and between parties within that blockchain
Reliability	Reliability towards consumers that a normal brand or instance can propose
Traceability	The ability to trace back data and exchanges with the knowledge on it being immutable (e.g. for audit purposes)
Affordability	A solution that is affordable for an instance to implement
Ease-of-use	A solution that can be used by any person within a large and established organisation

Figure 19B: Permissioned blockchain values

Conclusion

The value propositions were analyzed and linked to each other to find valuable patterns that are reoccurring across industries. Although the value propositions contained many differences in their pain relievers and gained creators, the underlying values and morals to which they relate are often similar. For example, a blockchain application can give user ownership and decision power of his/her healthcare data and how it will be shared, or create a marketplace where one can quickly sell and buy physical assets from strangers. Both these utterly different applications relate to empowerment; the applications empower the user to reach further than their current boundaries. Nevertheless, there is a significant difference in the impact and importance within different industries.

During the clustering, the value propositions were clustered in different ways. Most blockchain based companies fit with more than one value but focus on one or two specifically. This does not mean that the other themes not applicable; it means that one or two themes are driving the value proposition.

LEARNINGS

Value propositions in public and permissioned blockchains are significantly different

Public blockchains focus on the end consumer (B2C)

Permissioned blockchains focus often on businesses (B2B)

Although overlaps in values could be found, there are still differences in level of impact depending on industry

More than one value can fit a single value proposition

4.4 INTERVIEWS

In subchapters 4.1, 4.2 and 4.3, an analysis was executed from a specific perspective. In this chapter, the aim is to verify the knowledge gained from the analysis with experts from the different fields.

Moreover, these interviews will be used to collect practical and tangible visions on blockchain should be integrated into different cases and what the opportunities within the technology are.

First, the selected participants and the interview guide are discussed. Then, the results will be discussed in which the main categories from the codebook with example quotes will discuss the most important insights.

Research question
The following research question was defined to focus on in the expert interviews:

1. How can we integrate human-centered design in management consulting?
2. How can we integrate human-centered design into a blockchain process?
3. Considering the knowledge from the analysis, how can we design a framework that can be used by consultants?

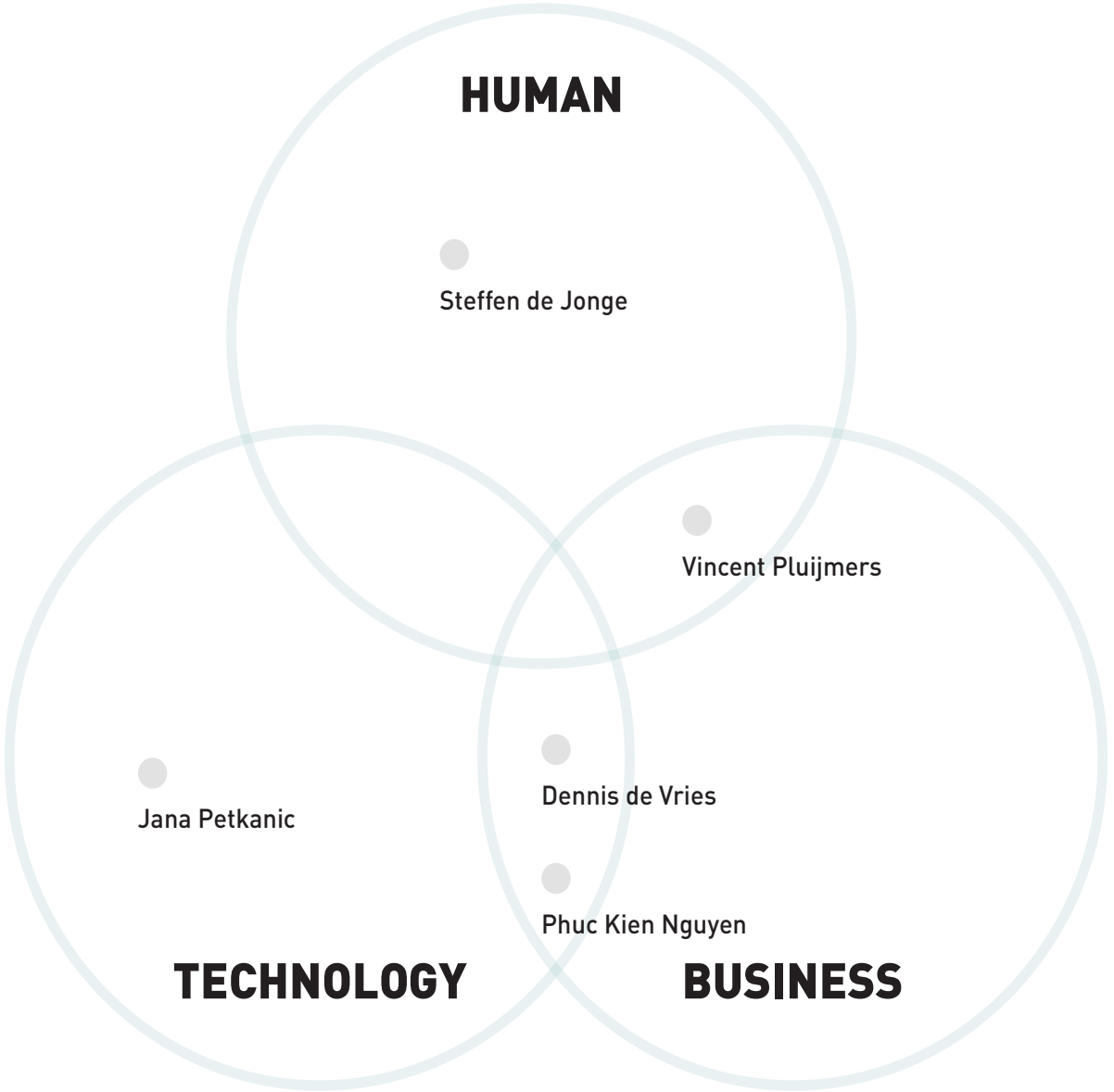


Figure 20: The different experts from different backgrounds, the interviewees will be introduced on the next page.

Set up
For the expert interviews, participants were selected with a background in design thinking. From the participants, a selection was from inside the company, KPMG and the other participants were from external companies to gain a broader perspective on the subject. The following selection of participants was interviewed:

DENNIS DE VRIES

Blockchain and consulting expert
Lead Digital Ledger Services KPMG

DENNIS DE VRIES

Blockchain expert
Blockchain consultant at The Fork and CEO of Blockchain Talks

DENNIS DE VRIES

Blockchain and business development expert
Development Engineer ABN Amro

DENNIS DE VRIES

Design thinking and
consulting expert
Senior Manager Innovation
Consulting KPMG

DENNIS DE VRIES

Design thinking expert
Co-founder of Spek
Amsterdam and teacher TU
Delft

Interview guide

The qualitative interviews were conducted to analyze how blockchain can be used, how it should be used and where the potential pitfalls and opportunities lay. Rubin & Rubin (2011) define purposes for executing a qualitative interview. This study aims to target these two purposes:

1. Creating portraits: to take different perspectives and complex situations into account.
2. Studying phenomena: making the invisible visible

The sub-questions focus on generating a base understanding of their perspective on design thinking or blockchain. After which deeper will be dived in their opinion on the integration of the two within the near future.

The interviews were expert interviews carried out in a semi-structured way. A semi-structured interview is based on an interview guide in which subject areas are set, but the interviewer is still free to explore, pros and ask different questions (Patton, 2002). Patton, who devoted his entire life to evaluation research, describes that the guide makes an interview more systematic and comprehensive. For comparability reasons, all interviews were taken in the work surroundings of the interviewee and conducted by the same interviewer.

The first topic goes deeper in interviewee's understanding of either design thinking or blockchain as a concept depending on the expertise of the interviewee. The second topic relates to the integration of human-centered design within blockchain. Then the value proposition themes were discussed, and these are coming back in known cases or hypothetical cases. Lastly, in subtopic four, a short brainstorm took place on how to use these themes to include user needs in the creation of blockchain applications.

The incentive was to first talk about natural subjects for the interviewee, subject in which he/she has expertise. After a while, the subjects became more subjective and open-ended to try and explore all possibilities. The entire interview guide can be found in Appendix F.

Results
Throughout the interviews, already many different perspectives came to light. Blockchain is a tool that can be helpful to solve a particular need when considering security, empowerment, and cost-effectiveness. However, at the current state, blockchain technology is more a buzzword than directly solving these needs. The urge of exploring what is possible with the new technology is more important in many companies than looking at what consumers need in the end. That also means that many solutions are not considering a well-designed user experience but also lack in considering some critical factors such as privacy and the law.

A few interviewees mentioned the importance of collaborations:

"it is about collaborations throughout a chain" - Phuc Kien Nguyen

The interviewees questioned ownership within a blockchain:

"All those things, maybe you should start a new entity and create a consortium" - Vincent Pluijmers

Traditional tasks will change into blockchain gatekeepers:

"The task of a notary just changes, I think" - Vincent Pluijmers

Trust was a reoccurring subject between the interviews:

"Now we trust some kind of patient database of which is not clear where the data exactly is" - Dennis de Vries

User interaction is something we need to worry about when designing a blockchain application:

"Via technology. They think I have to go to a real estate agent, a notary, I have to get a mortgage. Then you say, no mom, grandma, you can just push a button, and then I bought your house." - Steffen de Jonge

"Look, you always have users that want usability, but they also want security. They are not happy when they get an authentication screen three times in a row, but that means it is secure" - Phuc Kien Nguyen

The impact of a blockchain within our society was questioned:

"A public blockchain, as it is now, is just not that impactful in the western world. We have to start looking at the developing countries" - Jana Petkanic

Also, the difficulties in an immature technology such as blockchain were discussed:

"Currently, there are so many scam ICOs that it is difficult to figure out which one is real and which one is just there to collect money." - Jana Petkanic

One of the core principles of the blockchain, its security that lays within the community:

"Hacks are useless; the community does not let you use your winnings." - Jana Petkanic

The impact blockchain could have on our current society was discussed:

"We don't have to do 9-17 jobs anyone for all of our income. We can invest directly, buy stocks in third world countries. Help them grow their farms and make money at the same time. It is a win-win situation." - Jana Petkanic

After coding, the most important quotes were collected and clustered into categories. If we look at the categories from the codebook as shown in figure 21, the differentiation between the four superfamilies is made on feasibility, viability, desirability, and change. In which feasibility is about blockchain technology and its opportunities and weaknesses from a technology perspective. In viability, the quotes considered rethinking business, regulations and the value of blockchain. In desirability, the needs of the users were questions and how to integrate these needs in a creational process structurally. Finally, in change, the quotes were collected in which the impact on the industries was debated.

From these categories, together with the quotes, insights could be formulated. Like the insights in chapter 3.5, these are important to keep in mind during a blockchain-based consult. These insights focus on a wide range of aspects within the creation of blockchain applications. Some insights focus on the human experience:

Click, click, clicking further	Accept cookies? Yes. Agree to privacy regulations? Yes. Accept terms and conditions? Yes. We tend to click forward to what we want without actually reading what we are agreeing to. How can we take this into account and still make the interaction consider safety and privacy?

some of them focus more on the law

GDPR	The GDPR law states that everyone has the right to be able to be forgotten online. As the blockchain is unchangeable, how can we ensure people to be able to be erased?

moreover, some on what should be featured in a blockchain product/service:

Collaboration	The blockchain, especially a permissioned blockchain, starts to get interesting when more than one party collaborate. Sharing databases an making processes over a chain easier,more secure and transparant for the consumer is what can make the difference

Many more insights were drafted from the interviews which can be seen in the codebook in the appendix H. The main categories are shown in figure 21. From these insights, we selected the insights that are most interesting for KPMG and their practices by focusing on the six industries in which KPMG is most active in insurance, oil & gas, chemicals, utilities, banking, and CPG. The selection of the most important insights is discussed in the next chapter, conclusion.

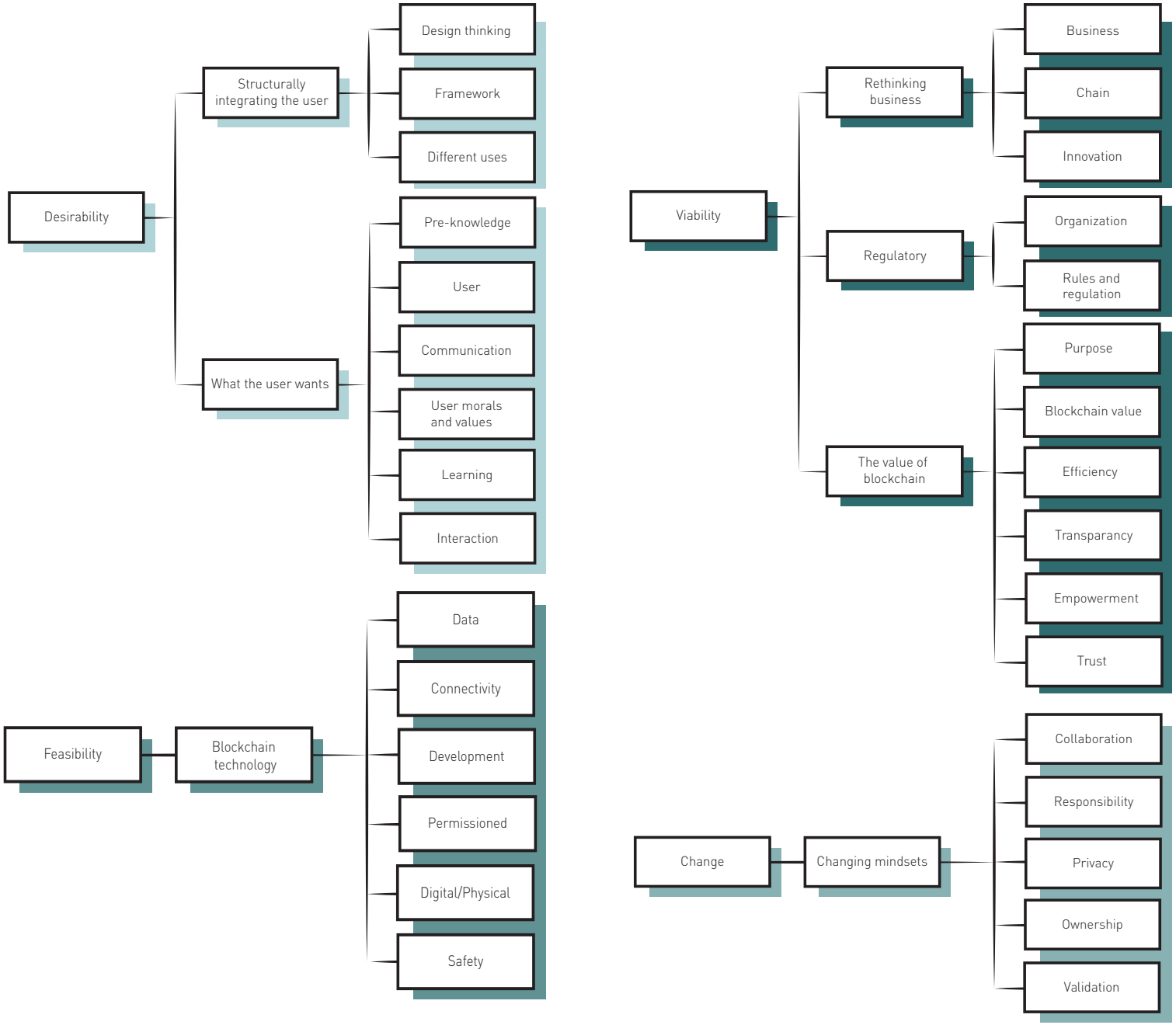


Figure 21: Codebook categories

LEARNINGS

Blockchain technology impacts data, connectivity, development, permissioned and public, digital/physical and safety

Viability in business considering regulations, rethinking business and the value of blockchain

Desirability considering the structural integration of the user and the user needs

Changing mindsets to integrate blockchain as a technology

4.5 CONCLUSION

In the exploratory analysis, the aim was to create a better understanding of how blockchain can be valuable from different perspectives. First, we discussed how it could impact stakeholders. Secondly, the goal was to gain a level of understanding in the technology to be able to get a vision on how feasibility should be integrated into a strategic framework. Lastly, the aim was to discuss how the integration of blockchain would change the business and its proposition towards the customer. To validate this knowledge and to translate the knowledge into tangible and concrete insights, expert interviews were collected. In this subchapter, we will combine the knowledge of the entire exploratory analysis and define insights that need to be considered in blockchain-based consults for KPMG and their clients. A selection of insights is similar to the insights collected in chapter 3,

A selection of insights was explicitly focused on **stakeholders** and their role within blockchain-based projects.

Gatekeepers
In a permissioned blockchain the task of the middleman will not entirely disappear; instead, it will change to being a gatekeeper. To ensure the quality and trustworthiness but also help users to interact with the network. What will these tasks look like and how will they be successful?

"I don't understand why."
The concept of blockchain is complex. How can we communicate to people that they need to change their ways to be able to participate in the network?

Social trust
A human to human interaction becomes a human to technology interaction. We have to define how to gain trust in every use case and build our application requirements upon that. It differs whether it is your house on the blockchain or your social media content.

Click, click, clicking further
Accept cookies? Yes. Agree to privacy regulations? Yes. Accept terms and conditions? Yes. We tend to click forward to what we want without actually reading what we agree to. How can we take this into account and still make the interaction consider safety and privacy?

Letting go of ownership
Where in the public blockchain the user might have ownership, for larger companies this ownership will start to disappear. By creating shared databases that are accessible by all different parties within one chain, a company needs to let go of the idea of having their client database.

Trusting an organization rather than yourself
Why do we keep our money at a bank rather than in our own homes? It is because the average person trusts a specific organization more than he/she trusts him- or herself. If we want to make people responsible for their assets, this way of trusting needs to change.

Changing Mindsets
For the blockchain to make a significant impact, mindsets need to change. We need to start looking different at ownership, privacy, and responsibility and enlarge the role of a technology such as blockchain within this.

Private key
If we have the ultimate blockchain, everything connects to your private key. Because no one is the owner of the blockchain, it means that if you lose your private key; you cannot click the "forgot password"-button. Can we trust people with that responsibility?

These insights should be considered to be able to **create a consult around the technology blockchain**, specifically.

Back-end solution
Blockchain is ultimately a back-end solution, how much should the user be integrating into defining a back-end solution, is it not just the front-end? As blockchain is often compared to the internet in its early years, nobody will blame the internet, but people will blame the website (front-end) for anything.

Ease of use
A blockchain will often be used by people that are not just developers; the blockchain technology is a rather complex one. Ease of use should be considered when designing the solution

Physical - Digital
The weakest point in the blockchain is the communication between physical and digital. If initially, something has wrongly entered the

blockchain, it is impossible to change that. The trust issue keeps existing, but the place in which it takes place changes towards the point in which something enters the blockchain.

The community as a validator
The blockchain is protected by cryptography, but even when it is hacked, the community will make sure the collected assets are invaluable.
Synergy between technologies
As Blockchain is just about value exchange, to objectify the process data can be gotten from smart sensors, integrating IoT. Moreover, many people talk about blockchain and VR/AR as a match made in heaven.

The Buzzword
Communication should go further than just explaining the buzzword Blockchain. Currently, many people know the buzzword, but there is a lack of knowledge in the actual meaning and how it can change our ways as a result.

The following insights focus on **the framework** and give a vision on how it should be designed within the scope of this project.

HCD and a technology
HCD discusses that looking at the users' needs to find a solution is the best option, what if you conclude that a blockchain based solution is not the right one? How can you sell something and then change the thing you are selling?

Forgetting about existing context
Within innovation, it is always exciting to keep thinking about new ideas, products, and services but a new product always needs to succeed within an existing context. How can we design to change the context or integrate into this context?

User not central in the decision-making
Often it is the CFO that is central in a particular decision over the user. We have to find a way to integrate human-centered design when the CFO is still in the center of the decision-making process.

Technology as a tool
A technology such as blockchain is used as a tool for business purposes, not the other way around. How can we change the structure of this process, the belief?

These insights discuss **the "why"** behind the integration of blockchain applications and can help with the creation of a value proposition.

Messy IT infrastructure
With the age of the internet and all its possibilities, we kept on creating.
The result: we made a mess of our IT infrastructure. The blockchain is an opportunity to simplify that infrastructure again.
Collaboration

A technology such as blockchain is used as a tool for business purposes, not the other way around.

Technology as a tool

The blockchain, especially a permissioned blockchain, starts to get interesting when more than one party collaborate. Sharing databases and making processes over a chain easier, secure and more transparent for the consumer is what can make the difference.

Does the user care?
When developing a specific application, we need to ask the user if they care about a specific feature in a product/service or if they do not care about it.

The **context of KPMG** and the industries in which blockchain-based consults take place also were discussed, these topics do not directly link to the three perspectives but came forward as crucial within the interviews.

GDPR
The GDPR law states that everyone has the right to be able to be forgotten online. As the blockchain is unchangeable, how can we ensure people to be erased?

Audits, audits, audits
A blockchain application can make a significant difference in auditing. By making all processes trackable back to the start, the process of finding data can be done autonomously as where we currently use many workforces which is expensive.

Different departments
There is a blockchain group, a group that focusses on new business ideas, innovation group. Between all these, there is an overlap in the knowledge that is not optimally used.

Public blockchain as an inspiration
Our western world is not yet ready for a public blockchain that has a significant impact. Therefore it can be mainly used as an inspiration for permissioned blockchains which are ready to be implemented

Permissioned vs. Private
A permissioned blockchain is operated by known entities instead of just one entity. Both value efficiency over anonymity and transparency but in a permissioned blockchain also immutability is essential which is not the case in a private one.

Conflict of Interest
A company such as KPMG has both advisory and accountancy. As we have to stimulate parties to collaborate within one blockchain that also means that a conflict of interest might occur. We cannot also advise an auditing client to participate in a certain blockchain.

Cost-effectiveness in B2B
Cost-effectiveness is essential for management within a business, but for any employee, they probably could not care less about cost-effectiveness. Therefore, one must not just lay all their value upon cost-effectiveness in a B2B solution.

Permissioned blockchain for now
As public blockchains are not that impactful in western worlds and used currently more within KPMG as inspirations, we will focus on permissioned blockchains for now

Next
Now the insights on the topic are collected, the aim is to find a tangible framework in which these insights can be used by the KPMG consultants. In the next chapter, we will iterate on a potential framework.

Figure 22: Frameworks projected on matrix

5 EXPLORING FRAMEWORKS

In the concluding chapter of the literature review, we can find a series of insights which are critical to the creation of blockchain application from different perspectives on a high level. In the explorative analysis, these insights enriched with concrete insights from practice which give feedback on a more concrete and actionable level. These insights are valuable but yet still unactionable within the context of consultancy within KPMG. Therefore, this chapter will explore how these insights can be used in a structural and actionable way.

If we look back at the research question, the project is about embedding stakeholder needs and creating a consult around blockchain as a technology. In this chapter, we projected the collected insights from both the literature review and the explorative analysis on popular frameworks that are used within design (embedding stakeholder needs) and business (creating a consult). The following frameworks are explored:

1. themes as collected in the exploratory analysis: business
2. awareness, inspire activate
3. feasibility, viability, desirability
4. ready to market
5. design cycle
6. customer journey

An axis was created on the topics theoretical-practical and commercial-research as a reference to make sure that frameworks from a broad perspective were researched.

After projecting the insights on the various frameworks and defining what works best, also the needs of KPMG as a consulting practice will be considered. Finally, the chapter aims to choose one framework or a combination of elements of frameworks for the proceeding towards the final design.

5.1. THEMES

In the first approach, the insights were projected on the themes generated by the exploratory analysis: business (value proposition analysis). This was done to see how these insights would relate to the different values reoccurring in public blockchain value propositions. Hypothetically to find a way to make these themes more tangible by linking them to hands-on insights.

Result

In reality, only half of the insights could be linked to the themes. Themes are often focusing to the front-end of a product/service as the value proposition is a proposition towards the end-user. Half of the insights were focused on the creation of blockchain application and their complementing pitfalls and opportunities or the strategic decision-making process behind it. These technology feasibility or general business insights could not be linked to a value proposition which is just a promising message from a company towards a consumer.

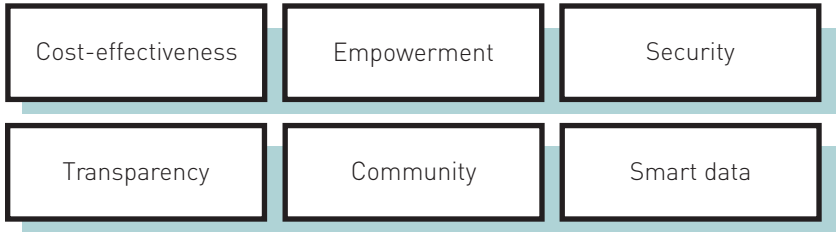


Figure 23: Public blockchain themes

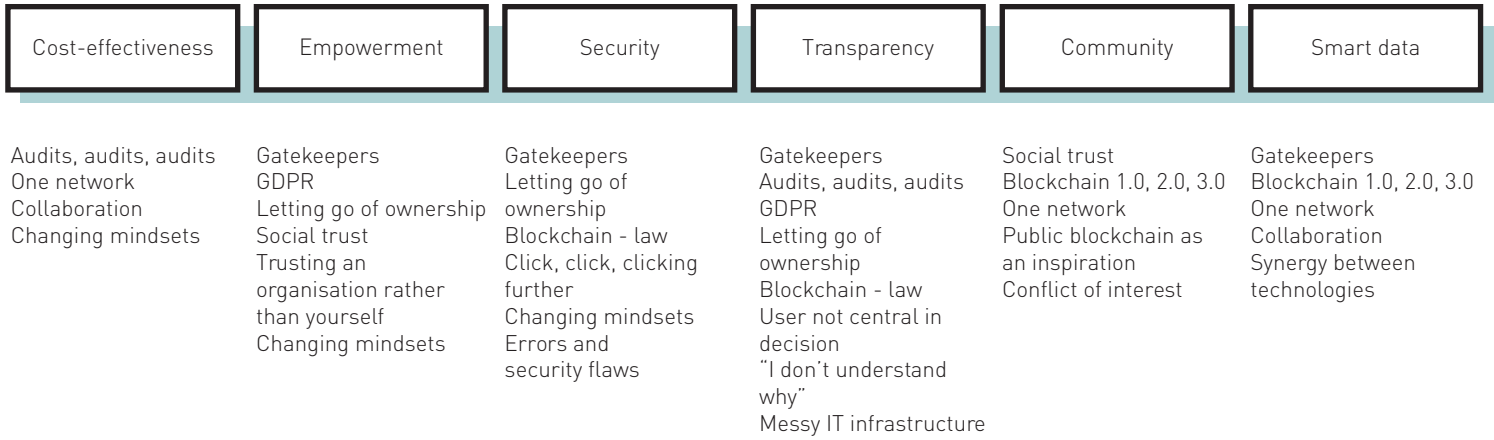


Figure 24: insights projected on public blockchain themes

5.2. AWARENESS, INSPIRE, ACTIVATE

The awareness, inspire, activate model is mostly inspired by the aim of the research; proposing a structural model that can be used in the creation of blockchain-based consults within digital strategies. As blockchain is such a new and complex technology, first awareness should be created on what the opportunities are with both consultants as the client. Then it is essential to integrate design within that process, to create people driven progress (chapter 3.4 KPMG strategy). Secondly, inspire relates more to showing on how design has been integrated into the creation of innovation and how that can be done within blockchain technology. Thirdly, it is activated. The ultimate goal of the framework is to activate people to start integrating human-centered design in the creation of blockchain applications.

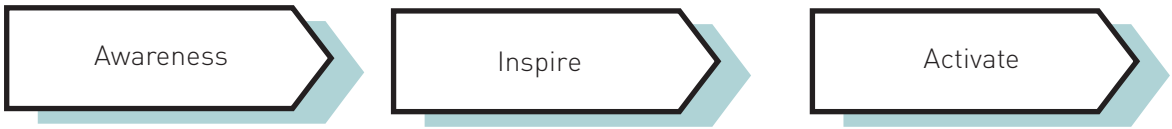


Figure 25: awareness, inspire, activate

Result

By projecting the insights on the awareness-inspire-activate-framework, the commerciality that characterizes the framework came to light. The awareness, inspire, activate model is a model that fits perfectly within sales. It creates an easy to understand storyline on how to use stakeholder needs in the creation of, but it lacks in certain concrete actions. Although the purpose is understood with the general target group, it is easy to reproduce what is done for the next purpose instantly after introduction.

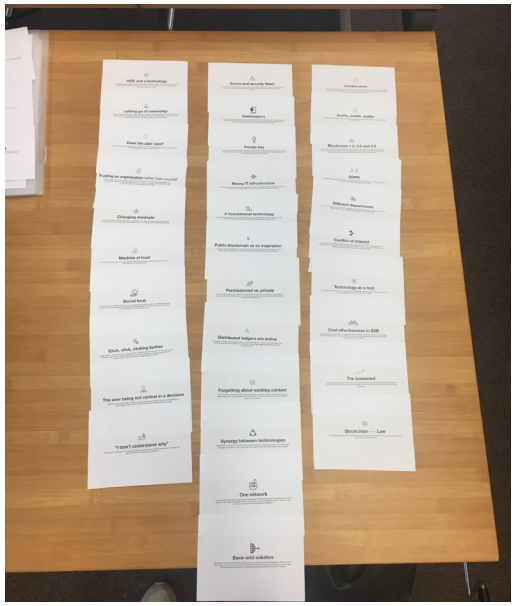


Figure 26: insights projected on awareness, inspire activate

5.3 FEASIBILITY, VIABILITY, DESIRABILITY

Tim Brown, IDEO's CEO develop the feasibility, viability, desirability model. The model argues that for the creation of innovation one needs to find a balance between all the pillars; feasibility, viability, and desirability (Brown, 2009). Feasibility links to technology, answering the question of whether this innovation is technologically feasible. Viability relates to business and describes whether the technology is commercially viable and if it will be profitable. The desirability only includes the human and its needs; is the product desired and what are the human needs that are solved by the creation of this product?
This framework was chosen to target the full scope of the creation of innovation without dividing in time-stages but in three different perspectives so the insights can be used at all time during the creational process.

Result
After a few iterations, the insights could entirely be divided over the three pillars with a few exceptions that could fit two pillars. E.g., Click, click, clicking further, which describes the notion that user's do not read cookies and policies can relate to desirability but also to viability in business. Nevertheless, after the iterative process, each insight was divided over the different topics. The downside of this iteration was the fact that the insights were not divided on time relevance within the stages of the process, on high-low priority or the different perspectives. The addition of time or priority would be valuable to add in the creation of a framework when using feasibility, viability, desirability.

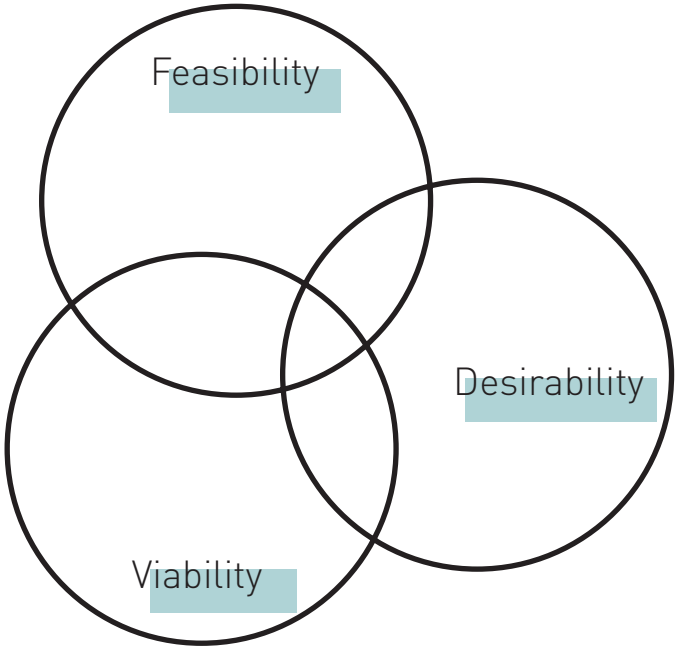


Figure 27: Feasibility, viability, desirability

Feasibility

Gatekeepers
HCD and a technology
Back-end solution
Social trust
Private key
GDPR
Public blockchain as an inspiration
Permissioned vs. Private
Synergy between technologies
Messy IT infrastructure
Click, click, clicking further
One network
Blockchain 1.0, 2.0, 3.0
Distributed ledgers are active
Errors and security flaws
A foundational technology
Collaboration
Machine of trust

Desirability

HCD and a technology
Social trust
Private key
"I don't understand why"
The buzzword
Changing mindsets
Letting go of ownership
Does the user care?
Cost-effectiveness in B2B
Trusting an organisation rather than yourself
User not central in decision
Click, click, clicking further
Machine of trust

Viability

Gatekeepers
HCD and a technology
GDPR
Technology as a tool
Audits, audits, audits
Different departments
Forgetting about existing context
Permissioned vs. private
Conflict of interest
Cost-effectiveness in B2B
User not central in decision
Blockchain - law
Collaboration

Figure 28

5.4. READY TO MARKET

The ready-to-market strategy includes business model, customer experience, brand value, route to market, product context and business process to differentiate in different pillars that need to be considered when presenting an innovation on the market. This framework was chosen to divide the insights into stages of development to prioritize over time.

Result
As this approach is mainly focusing on bringing a new product/service to the market instead of shaping or creating the actual concept it misses a focus on technology. Nevertheless, the differentiation between business and customer from different perspectives is an interesting one.

Although the differentiation between phases and in which of them some insights are important is an interesting one, many of the insights have an overarching meaning that is more important to consider initially, in the creation of vision and ambition instead of during the process. Thus, around 30% of the insights could not be projected on the framework.

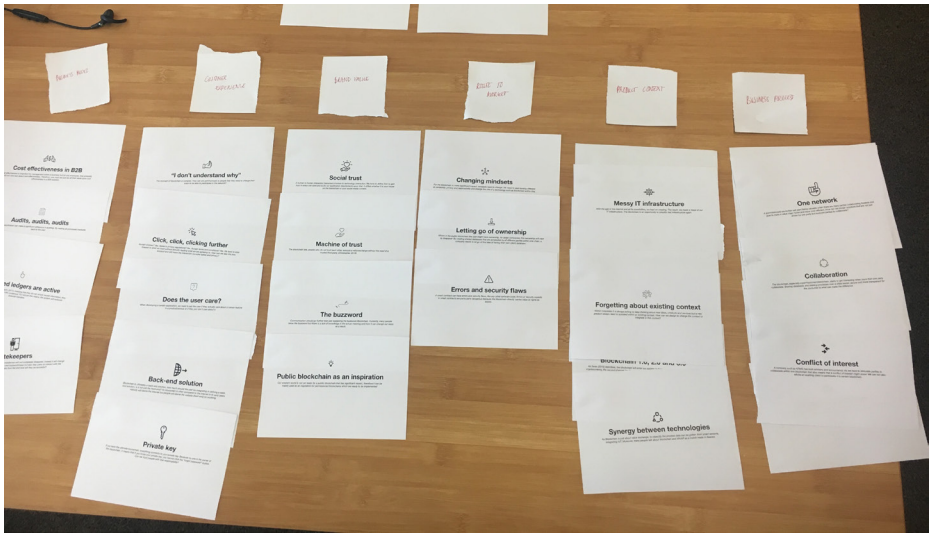


Figure 29: Insights projected on ready to market framework

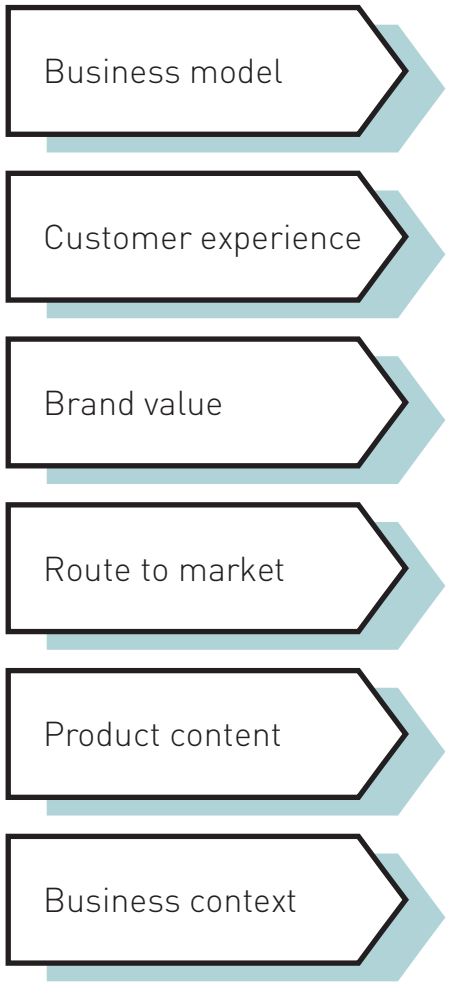


Figure 30: Ready to market elements

5.5 DESIGN CYCLE

The design cycle is a known methodology for iteratively creating and improving new and innovative concepts. There are many variations on the design cycle. The one used in this project contains the five elements: define & observe, empathy, visualize, create prototype, test & refine. The design cycle was also chosen to divide the insights on time like in the ready to market strategy. In this case, it is also by implementing an iterative design process instead of a traditional process as that fits better with the current KPMG strategy (chapter 3.4).

Result
The design cycle is focused mostly on the creation of a product/service iteratively. As a lot of the insights focus on how blockchain can be valuable within a specific application or context, it is often too high level and does not fit within the framework. Also, some insights focus on blockchain as a complex technology in which the process is not as iterative as the design process, or iterative in another way.

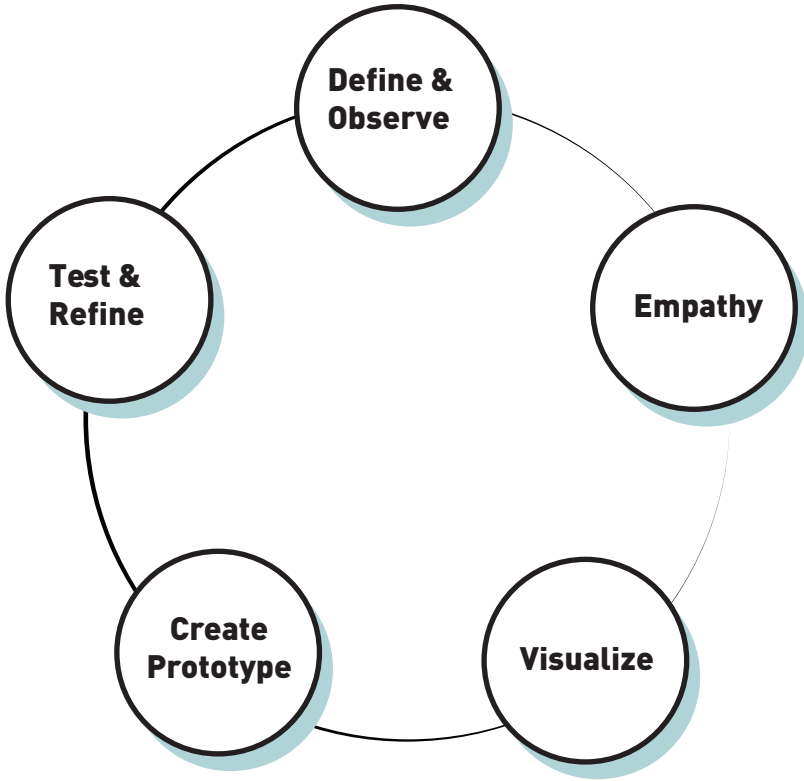


Figure 31: Design cycle

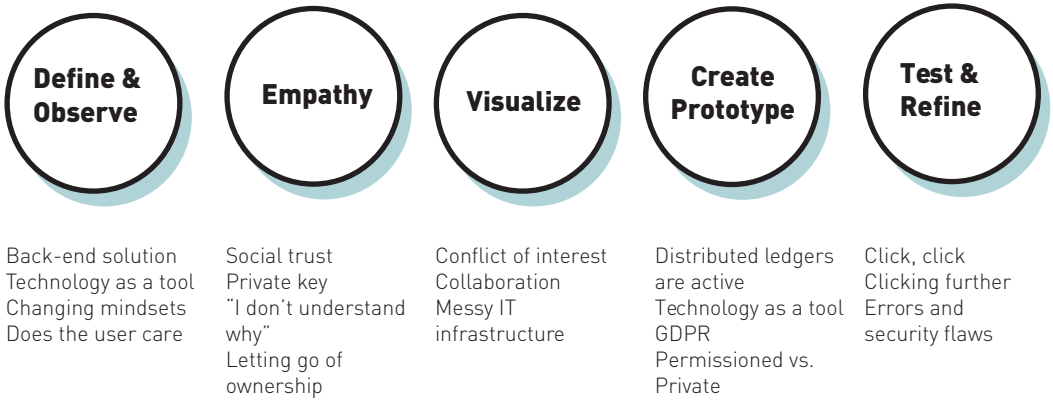


Figure 32: Insights projected on design cycle

5.6 CUSTOMER JOURNEY

The customer journey is a known framework within design. In the customer journey, the journey of the customer will be mapped out from beginning to and, and in every stage describe the interaction with the product/service. Also, it describes the customers' emotional curve is during every step. By doing so, a better solution for every interaction phase can be designed. The customer journey as a framework was chosen to discover stakeholder needs and create a proposition that is entirely devoted to the needs of this stakeholder.

Results
Relating the insights to these steps gave a better perspective in which insights can make a difference at which point in the interaction. Nevertheless, only a few of the insights were interaction focused. Although more of these interaction-based insights can be searched for, in the context of this research and for KPMG as a collaborator, the initial stages in forming vision, ambition, and strategy is more important than the execution that will often lay at a partner company.

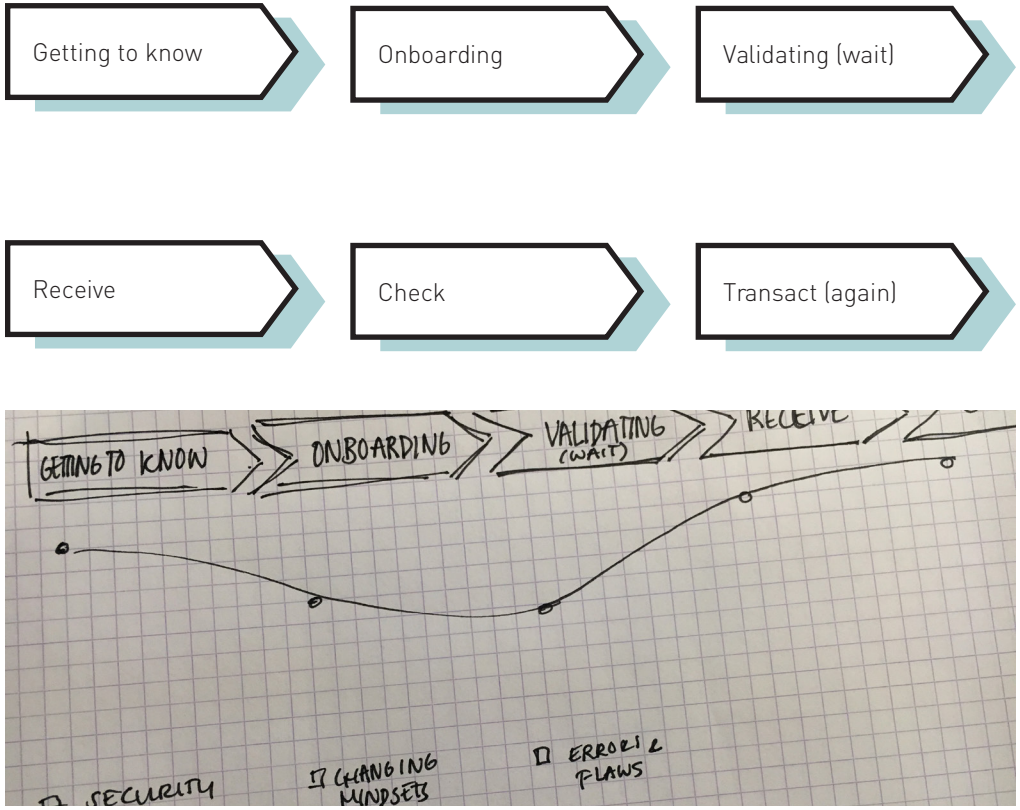


Figure 33: Insights projected on Customer Journey

5.7 CONCLUSION

Current ecosystem
When a client comes to a KPMG consultant, the first step is to find how blockchain can improve, change or impact a business. For this to happen, the consultant needs to be able first to create a vision on how to change that together with the client. A potential framework should mainly be focusing on how to achieve this.

Initial phase and purpose creation
When looking at the context in which the framework will take place, it is in the exploration phase on how blockchain can be impactful within a company as part of their digital strategy. In this sense, KPMG helps these companies to figure out how the technology might be valuable before creating the entire solution. Therefore, the final framework should focus on this first fuzzy front and help explore clients and KPMG consultants together.

Integrating the stakeholders
A potential framework should actively integrate the needs of the stakeholders to create a vision on how blockchain should impact the business. A KPMG consultant needs understandable, easy-to-use tools to do this together with the client as most KPMG consultants are not used to embed stakeholder needs in a designerly way.

Industry-specific content
If we look at the insights collected, some of these insights are more applicable in some industries than others. E.g., audits, audits, audits refer to the traceability that can be very valuable for audit purposes in blockchain. Although decreasing costs by making auditing more efficient is an opportunity, in some industries it is not relevant. Therefore, we propose that a final design should consider the applicability of every insight in the selected case.

Actionable outcome
The project aims to create a framework that can be used by KPMG consultants (together with their clients). In this sense, a model like awareness-inspire-activate, can serve as a sales tool but not as a tool in which actionable outcomes can be created. Creating actionable outcomes should be preferred in the context of this project.

Prioritize on time
Although the ready to market strategy and the design cycle were not ideal, the insights should be prioritized on time in a proposed framework. In this way, the consultant knows which insights are more important at a specific stage within the process.

In this chapter, we explored how the insights can be used for the project; to integrate human-centered design in the creation of blockchain applications. In the concluding chapter, a few recommendations for the preliminary design are defined which will be used in the ideation (chapter 6).

6 IDEATION

The conclusions drawn in chapter five on the interaction, form, and purpose of the framework are the start of the ideation phase. In this chapter, the aim is to iterate upon a design in which the conclusions drawn in chapter five are combined in one framework for KPMG consultants.

Recognition
As the blockchain technology is complex to understand, for consultants it is often difficult to know when there is a fit between problem and blockchain as a solution (Interview Vincent Pluijmers, appendix G). To find more clarity in how and when blockchain can be used, typologies were created. In these, one could recognize a specific case for which blockchain could be interested that would be similar to the client case.

Starting the project
Then how to create such a blockchain consult and definitely how to integrate HCD in such a complex backend solution.

Martin (2014) believes that a good strategy is built by first defining the aspirations and goals and work towards concrete systems and actions that are crucial to getting there. In between, Martin describes it is essential to define market potential, how one will get them and what capabilities are essential to get there.

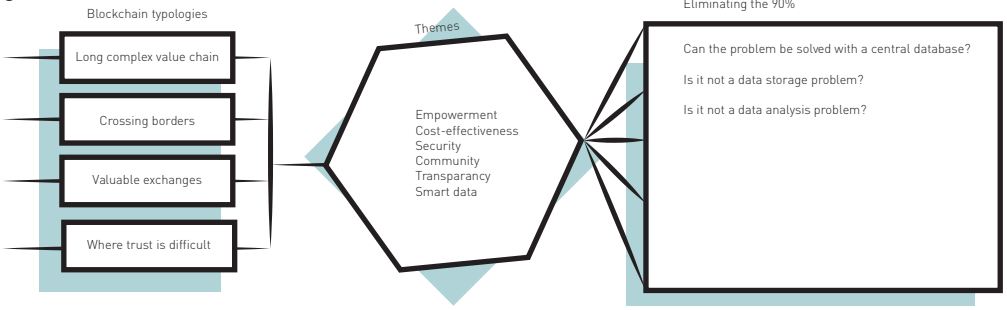


Figure 34: first iteration: typologies

The first iteration (figure 34) focused on typologies, recognizing the context and in addition to that, providing insights that are typology-specific. After a few discussions, we were able to conclude that in blockchain-based contexts, there are just two different possibilities in drivers: operational excellence and competitive advantage.

For the second iteration, we looked at the creational process of blockchain and the blocks feasibility, viability, and desirability and considering first having to define a goal; four phases can be found. In which phase 1 considers the desirability and defines what the stakeholders that interact with a blockchain product or service need. Phase 2 considers the feasibility of the product/ service since the blockchain is a highly technical solution and questions quickly appear around the technology. Phase 3 discusses the viability of the concept; it questions how the solution will be profitable and how new innovative business models might emerge. Phase 4 considers the desirability again, as now the interaction with the end-user will be defined. The end-user needs to be taken into the process. If we project the insights on this framework, it will look as follows:

Phase 1: Purpose x Desire
1. HCD and a technology
2. The Buzzword
3. The user is not central to a decision
4. Trusting an organization rather than yourself
5. Does the user care?
6. Public blockchain as an inspiration
7. Blockchain 1.0, 2.0 and 3.0

Phase 2: Create x Feasible
1. Messy IT infrastructure
2. Synergy between technologies
3. Back-end solution

4. Private key
5. GDPR
6. Errors and security flaws
7. A foundational technology
8. Distributed ledgers are active
9. Gatekeepers
10. Public vs. Private blockchains

Phase 3: Commercialize x Viable
1. Technology as a tool
2. Different departments
3. One network
4. Collaboration
5. Conflict of Interest
6. Blockchain ←—→ Law
7. Cost-effectiveness in B2B
8. Audits, audits, audits

Phase 4: Validate x Desire
1. Click, click, clicking further
2. Forgetting about existing context
3. "I don't understand why."
4. Machine of trust
5. Social trust
6. Letting go of ownership

Conclusion
In this section, the aim is to create some conclusions on the learnings from the iterations.

The difference between operational excellence and competitive advantage
Through an iterative critical discussion on the typologies, the conclusion was drawn that either two purposes often drive blockchain based; operational excellence and competitive advantage. In operational excellence, the viability often is central in the creational process and in addition to that is started with. In finding a competitive advantage in a new solution, desirability is central and therefore also started with.

Downscaling the model
When designing a framework for the purpose of integrating human needs, the scope and purpose need to be considered continuously. For validation purposes, it is not in the scope of this process to validate a framework that would be applicable in the continuation of a long-term project. Nevertheless, integrating the human needs is most interesting in the fuzzy front end of a project. Therefore, the focus is mostly on creating a framework that creates a common understanding of how blockchain can be valuable in a specific company/project.

A difference can be found between the creation of operational excellence and creating a competitive advantage for the client. To find out, which of these is applicable; the suggestion was made to create two models. In which one of these models considered operational excellence and one looked for a competitive advantage.

7 PRELIMINARY DESIGN

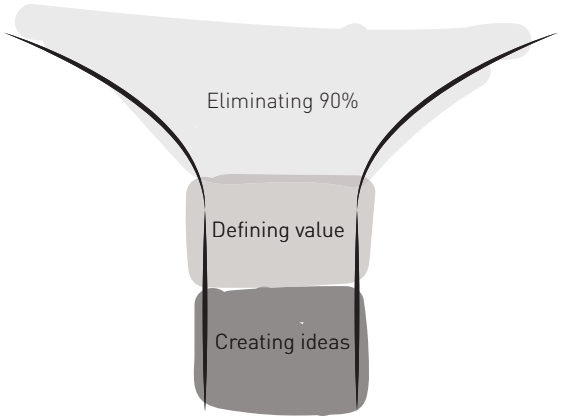


Figure 35: Based on Hyperledger's Blockchain Decision Path (Zubko, 2018)

From the iterations, in the previous chapter, a preliminary design of the framework was created. This framework consists of three steps within a funnel; eliminating the 90%, defining value and creating ideas.

For many of the current blockchain-based projects, a centralized database is often a faster, more cost-efficient and better solution. Therefore, the first part of the funnel is about eliminating these. In the second phase, the value of blockchain within the company will be defined and in phase four ideas will be created.

7.1 THE FUNNEL

For the preliminary design, we designed a funnel consisting of three steps; eliminating 90%, creating value and creating ideas. The funnel was designed to integrate human needs in the creation of blockchain applications. In which this particular framework focusses on creating a common understanding of how blockchain can be valuable for a specific stakeholder for a certain company within a session between the company and KPMG.

Step 1: Eliminating 90%
A high number of the current blockchain-based projects is not in need of blockchain specifically. The fact that blockchain is a buzzword, makes it attractive for companies to invest and explore in projects to innovate with the technology. Blockchain nevertheless, is still in early maturity as discussed in chapter 3.2. Accordingly, there are often a lot of cheaper and more sustainable solutions.

To assess whether blockchain might be interesting in a specific case and if so, if it needs a permissioned or a public blockchain. Hyperledger published a Blockchain Decision Path. E.g., the inclusion of more than one party

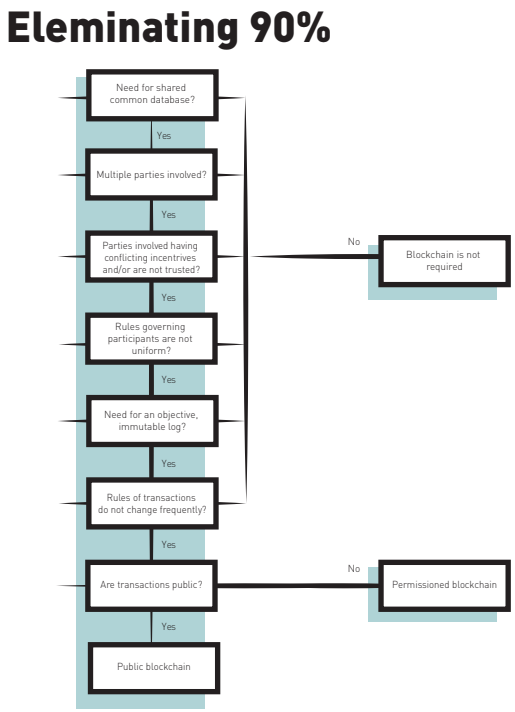


Figure 36: Based on Hyperledger's Blockchain Decision Path (Zubko, 2018)

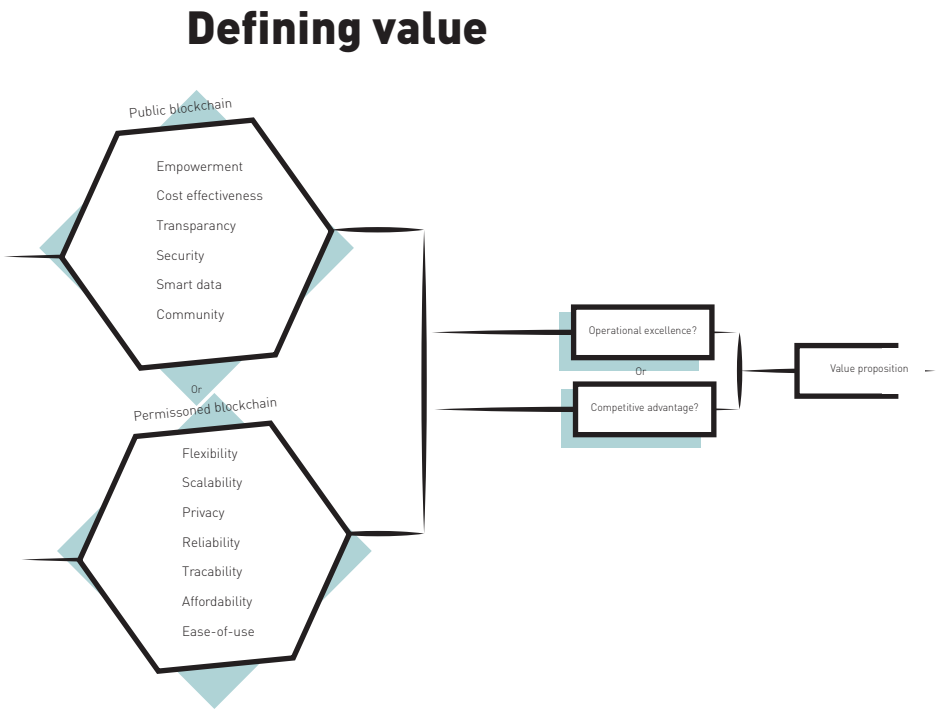


Figure 37: Preliminary design: defining value. Stakeholder needs & Values

with different incentives to participate makes a trustless exchange more interesting. The preliminary design uses the Hyperledger model to help KPMG clients start thinking whether or not blockchain is the right solution for the case or if other solutions need to be explored.

Step 2: Defining value
The second step in the funnel is defining value. The project aims to integrate human needs in the creation of blockchain applications. Therefore, it is necessary to first find the stakeholders before starting to think about possible solutions. When these stakeholders are defined, the needs of every stakeholder should be explored. Accordingly, it is about first defining the real problem before pinning down on an end-solution

The gap between stakeholder needs and a blockchain application is significant. Therefore, we used values to close this gap. In the second step, the aim is to link stakeholder needs to values that are important to include in the blockchain application if the needs are considered. The most common values within public and permissioned blockchain are shown to inspire. These most common values were drawn from the value proposition analysis as described in chapter 4.3.

Finally, the aim is to create a customer benefit. In the customer benefit, the most important customer is chosen with their most crucial need. Moreover, they needed to formulate a statement of benefit on how a blockchain product/ service could react to this need while looking at the values chosen before.

Step 3: Creating ideas
In the last part of the funnel, the focus is on idea generation. With different needs in mind, it is the participant's task to think of a feasible blockchain concept that would solve these needs. The goal of this step is preferably to create a tangible and aligned idea between the participants of the value of blockchain in this context than actually creating a feasible concept. When

looking at the limited amount of time, creating a feasible blockchain solution is unrealistic.

Desirability, feasibility and viability insight cards.
All the insights that which were collected during the literature review and the analysis were finally divided into desirability, feasibility, and viability. In the idea generation phase, these insights are meant to help guide the participants towards creating desirable, feasible and viable blockchain-base solutions.

Next step
The preliminary design is created based upon content. For the continuation of the project, the content should be tested. To test this, the content should be fitted into a form or shape which discards as many variables as possible and creates comparable environments. This form or shape will not be considered being final upfront as the analysis mainly is focused on content and assumptions cannot be drawn yet.

“Blockchain is really exciting technology because it’s actually providing both transparency but also agility in a contractual relationship that any organization should have.”

—Jean-Philippe Courtois, VP Microsoft

8 TESTING

The preliminary design was created upon knowledge gained from the literature research and analysis and interpreted through explorations and iterations. To validate these assumptions, the next step was testing. In this chapter, we will go deeper into the testing phase of the concept and how this has influenced the final design.

First, we will go into the set-up of the test, after which the results will be discussed. Finally, we will focus on the reflections from all participants and feedback to conclude with recommendations for the final design.

8.1 SETTING UP THE TEST

Controlled observation
The framework was tested in 2x2 sessions, in which two companies both opened up their case for two sessions. In the first sessions, one group was introduced to the framework, and the other was not. In the second session, both groups had to use the framework to see whether the framework would impact and verify the same quality within both groups.

Both sessions were held in a KPMG conference room for 12 people to take away variability in context as an influencing factor of the tests. In this conference room, there was one large table with post-its, the workbooks and various pens in different colors. An introducing presentation on the case and the session was given on a large screen.

Participant selection
The project aims to introduce a new structure for blockchain-based projects within the digital advisory practice within KPMG. Therefore, the participants are consultants, senior consultants, and managers from the Digital Advisory department.

The two groups were the same on both case days with six consultants divided into groups of three in every case. Each company had a problem owner present who would answer questions from both groups and think along with one group during the idea creation. This setting is similar to the known workshop format within KPMG.

Flow of the experiment
To test the flow of the experiment, workbooks were created that would guide the participants through the session step by step. Therewith, the facilitator or host of the session would limit influencing the way in which the framework was used.

Structure of the assignment
Workbook
To test a workbook was designed which would lead the participants through the framework (figure 38, 39 & 40). In this workbook, the first step

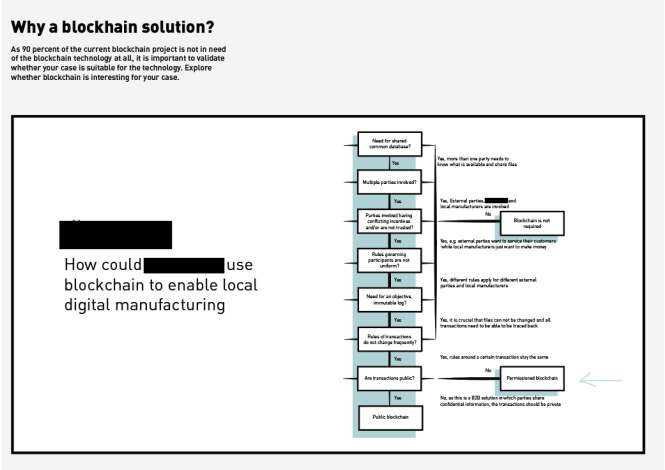


Figure 38: Workbook 1

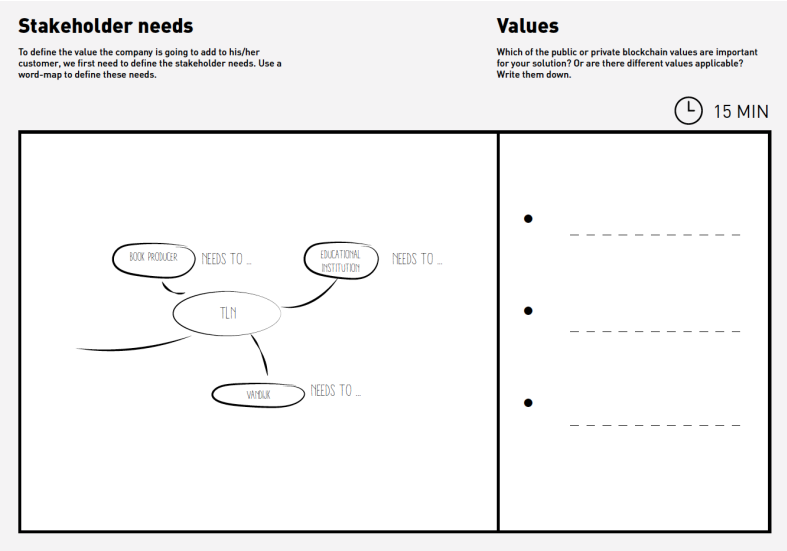


Figure 39: Workbook 2

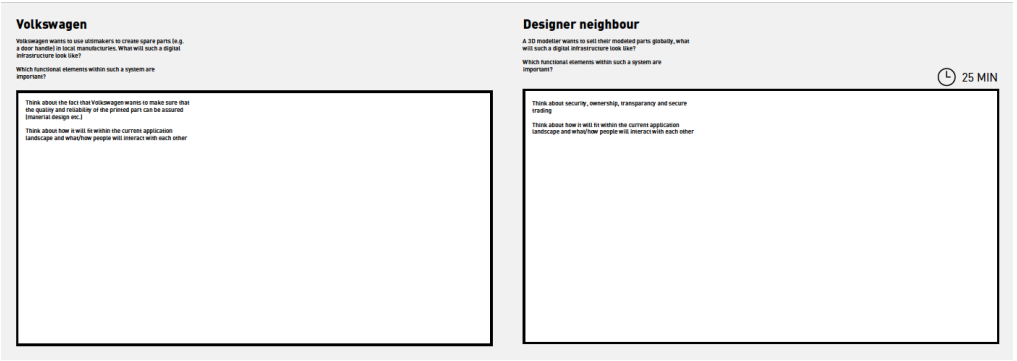


Figure 40: Workbook 2

eliminating 90% was already done in collaboration with the companies providing the cases to create a context in which a permissioned or a public blockchain would be interesting to explore. Secondly, the participants were asked to fill in the stakeholder need mind map in which the client company was central. Also, they were asked to fill in the most important values that would be important in a blockchain product/service to fill those stakeholder needs.

In the stakeholder need a mind map, the client company is in the middle, linked to them are the most important stakeholders (figure 39). The participants were asked to write down their needs and see if any other stakeholders are essential to include.

The task for the participants was to write down three of the most important values that a blockchain service/concept needs to react to the stakeholder needs (figure 39). These values could be similar to the ones from the value proposition analysis, or new ones could be introduced, and the suggested values could be used just as inspiration.

In the workbook, two specific cases were presented (figure 40). The participants were asked to design a digital infrastructure for these two specific cases.

Pilot testing

The time limitation of the sessions was strict, just one and a half hour to create a concept on how blockchain could be valuable within a specific case. Therefore, a tight schedule had to be followed. A pilot test was executed to assess whether it was possible to execute the experiment in the dedicated time. A TU Delft student was introduced to the case, after which she worked through the workbook.

The pilot test showed that in the stakeholder map, it was difficult to come up with stakeholders in a case that was just introduced. The student did not know how to decide upon these stakeholders and if they were the most important. With a few example values, the student was able to figure out what values could be essential to fill the stakeholder needs. The statement of benefit was quickly drawn from the stakeholder mind map and the values. The three concepts, on the other hand, were the most difficult. The gap between the customer benefit statement and the creation of the concept was huge. As a defense mechanism, the student started to read every insight card given and still after a while she needed help creating ideas. Also, it was unclear what was meant with 'concept,' especially in the context of blockchain.

After pilot testing, a few alterations were made within the workbook. Firstly, it was within the stakeholder mind map where the first few most important stakeholders are already filled in. In this way, it is up to the consultants to write down their needs and optionally add some stakeholders that the group finds essential. Secondly, the concepts that needed to be created were transformed into two cases with questions of a potential stakeholder. Within these cases, the consultants needed to create a digital infrastructure for a known entity and the client company in question. In this way, the consultants had a more hands-on case to think about and draw assumptions upon.

Cases

3D printer manufacturer Case

During the case, the portfolio manager gave a short introduction to the 3D printer manufacturer to sketch the context of the case. After with the main question was introduced:

How can the company use blockchain to enable global digital manufacturing?

After the short introduction of the company, a workbook was presented in which the participants in two groups of 3 could walk through a session step by step.

Educational services/book/services distributor case

The Learning Network is an overarching Dutch instance that is responsible for selling and distributing educational books/services. One of their largest companies distributes high-school books/services, which is responsible for high school educational books. These books are both physical and digital and due to the digital licenses, challenging to keep secure. Moreover, the Dutch government supports these books and therefore the business model is a bit different with another stakeholder in the middle. Overall, there are many involved stakeholders with all different intentions. Therefore, the case states:

How could educational services/book/services distributor use blockchain to enable digital learning systems?

8.2 RESULT: WORKBOOKS

The workbooks were used to guide the participants and problem owner through the creative session. The workbook consisted of three separate small assignments that needed to be carried out in groups. In Appendix K, the two different workbooks for the two cases can be found.

The quality of the content is very depending on the preexisting knowledge that was present within the members of each group and the flow in which the discussion was going, and the iterations would follow up on each other. As the workbook could only be tested with eight groups in total, in the conclusions we will focus mainly on the reflections of the participants and observations done during the session instead of the quality of the workbooks itself. Nevertheless, we will shortly discuss the most critical outcomes results from the workbook in the two cases.

Stakeholder Needs & Values (3D printer case)
In the group without the framework (in this case common blockchain values), the stakeholder needs and values were on a higher level. The values like 'singularity' and 'standardization' are not common in blockchain based products/services but often applicable in many cases. In the group with the framework present, the values and stakeholder needs described were more extensive and concrete.

Customer benefit statement (3D printer case)
From the four groups, two groups chose the end-user as the most important customer and two groups chose an external collaboration partner. The fact that the framework was presented or not, did not influence the decision as the end-user was chosen once in either case and vice versa.

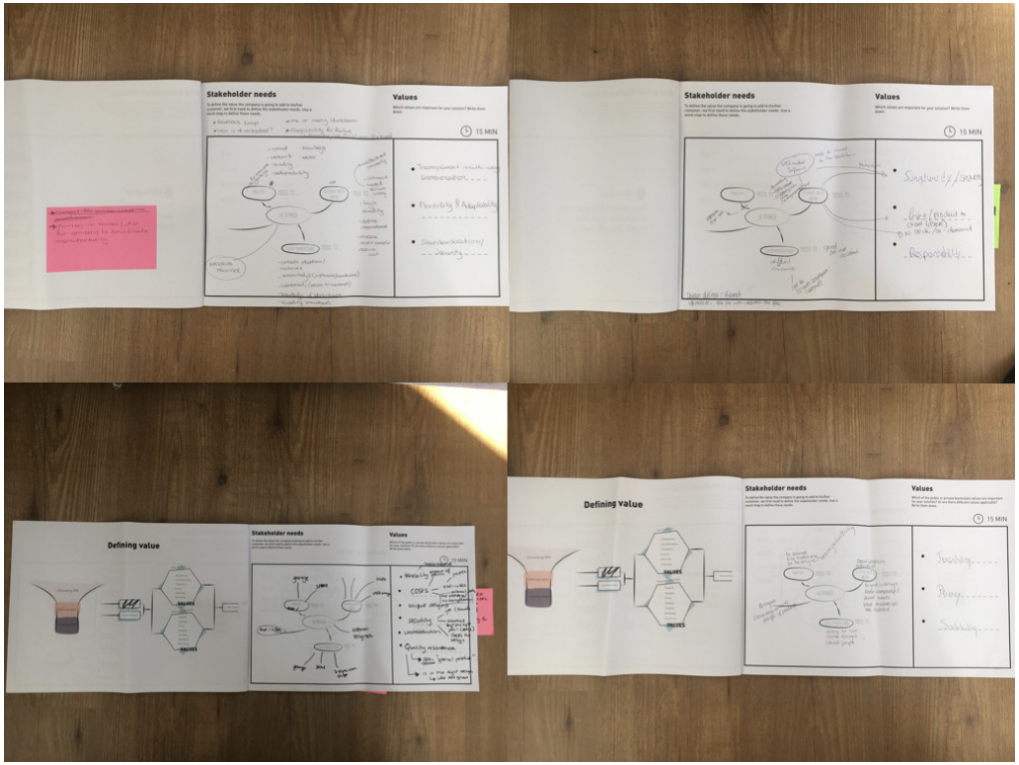


Figure 41: 3D printer manufacturer case: stakeholder needs & values

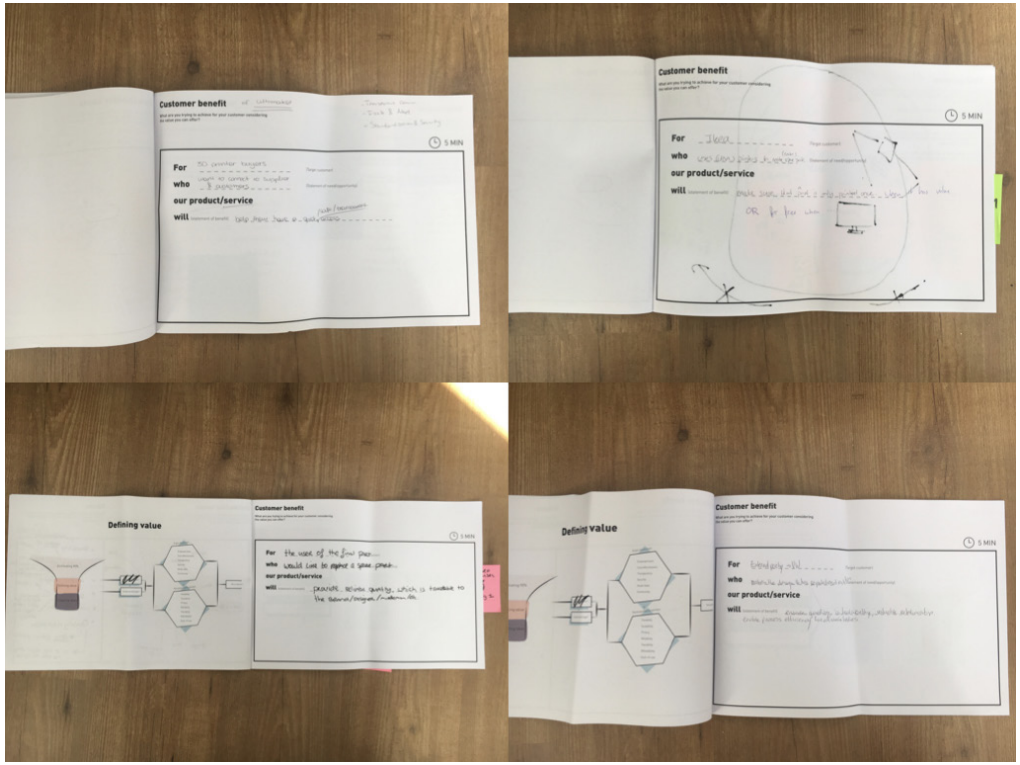


Figure 42: 3D printer manufacturer case: customer benefit statement*

Larger images can be found in appendix L*

Cases (3D printer case)
From the cases, not many conclusions can be drawn because these were very specific and solution-based. There was a variety of solutions that were described with icons but also text was used often to explain the blockchain concept for this case.

Stakeholder needs and values (Educational services case)
As in the first case, also in the Educational services/book distributor case, different stakeholders were added to the stakeholder need mipmap. An extensive amount of insights were described, and three critical values were chosen to focus on.

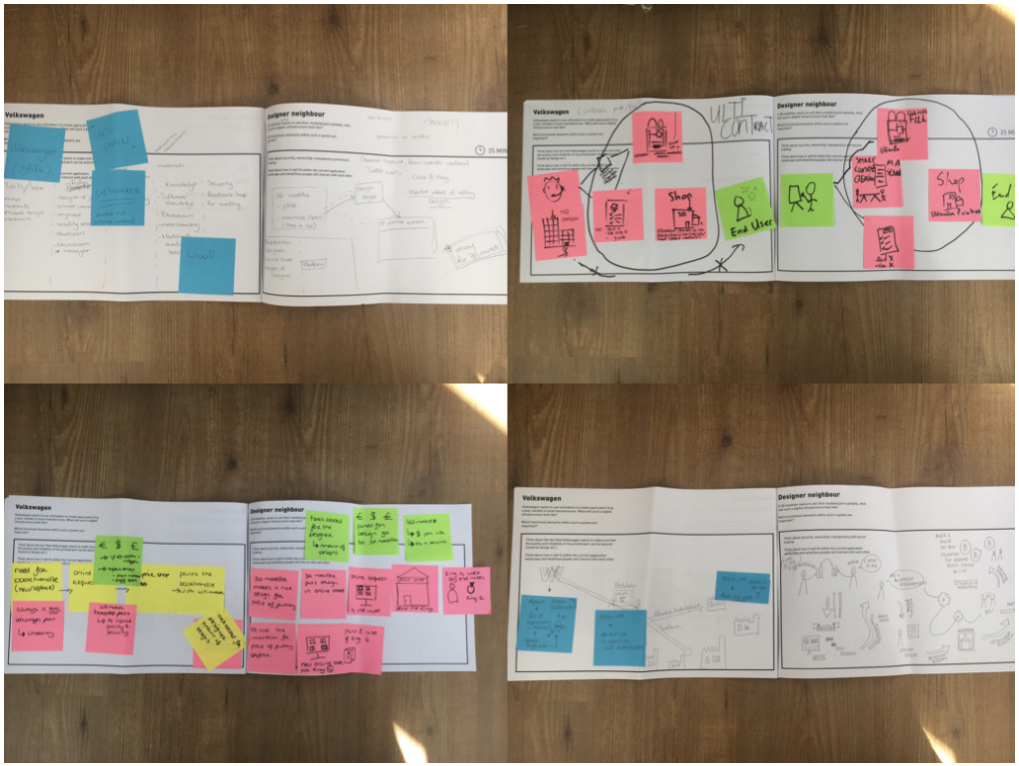


Figure 43: 3D printer manufacturer case: cases*

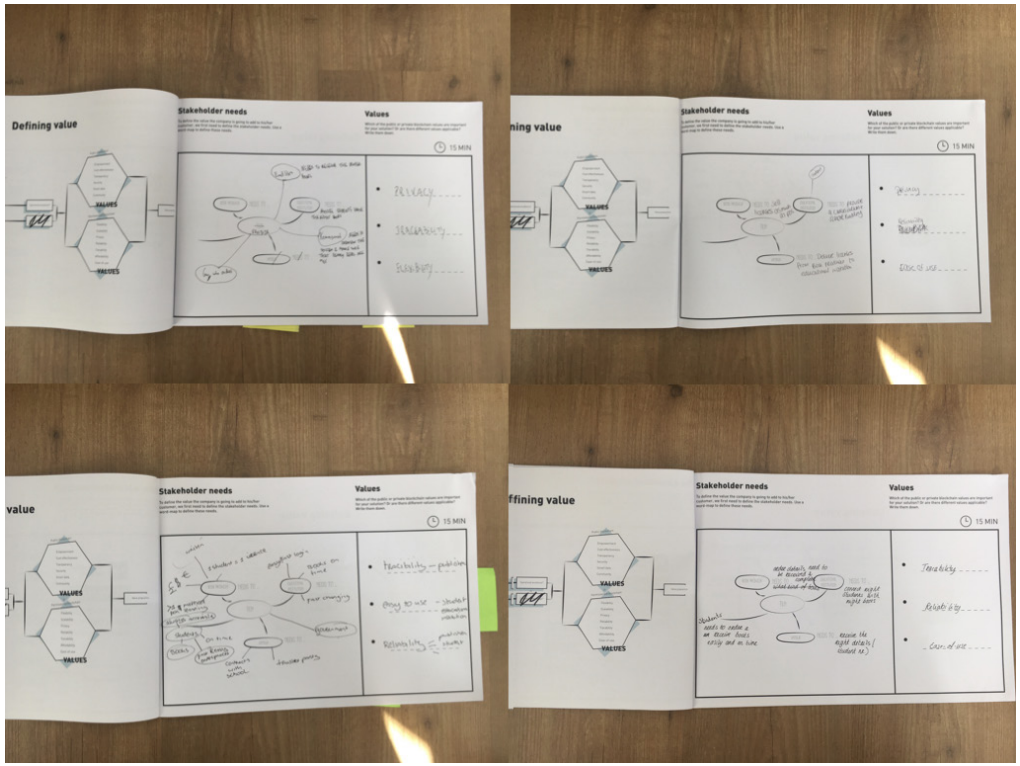


Figure 44: Education services/book distributer: Stakeholder needs and values*

Customer need benefit (Educational services case)
In the customer need a benefit statement, different perspectives on who is the most important customer could be seen. In which it would differ from supplier to student and government. All groups had a valid argument to support their decision.

Cases (Educational services case)
For the educational services/book distributor case, the cases were more difficult to execute. The value chain in question was complex and different needs from different parties needed to be included. Therefore, most groups just focused on one or two main needs to solve in a blockchain application to start with.

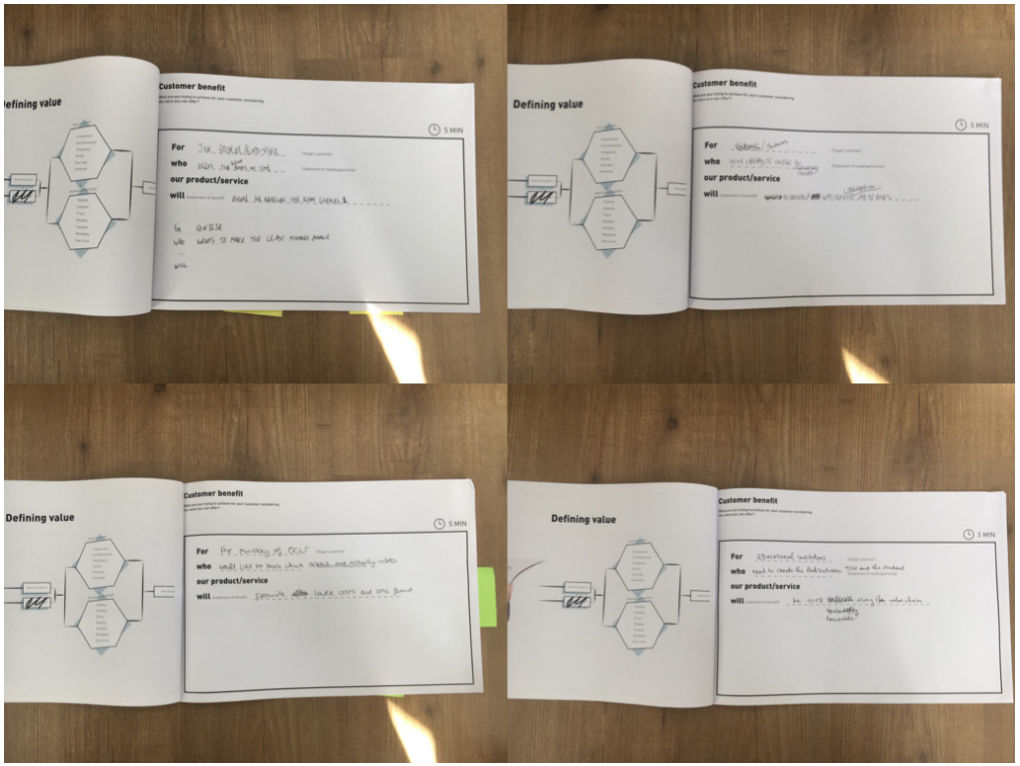


Figure 45: Education services/book distributer: Customer need benefit*

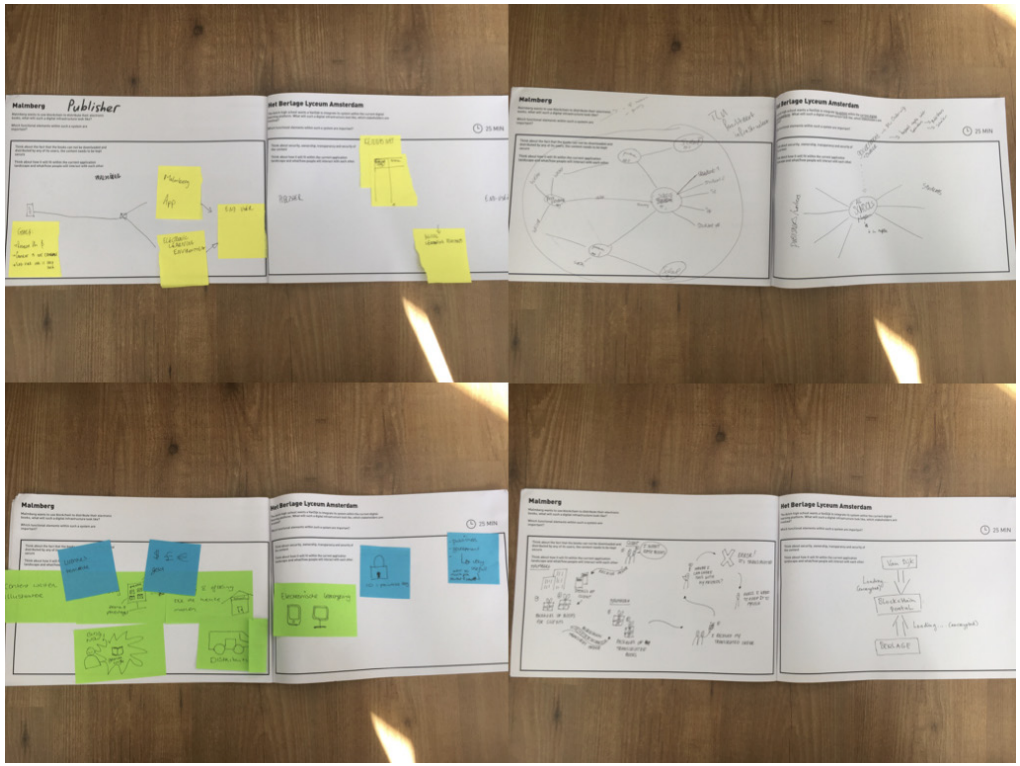


Figure 46:Education services/book distributer: Cases*

Larger images can be found in appendix L*

8.3 QUESTIONNAIRES

After both sessions, a list of questions was given to each of the consultants to reflect upon the session. In this section, the results of this questionnaire are discussed.

3D printer manufacturer case

Structuring the process

Although the participants mention that they are not used to integrate a process that is similar to this, overall, they enjoy the openness of the framework and the interactive elements. Moreover, especially the participants in the group with the entire framework emphasize upon that different perspectives are integrated into the creation of a concept whereas they usually focus on one perspective of the client. *"Normally you just think of one perspective" (Participant)*

Both groups of participants feel like the tools in the workbook are useful in structuring the session (without framework 3,8/5, with framework 4,3/5).

The openness of the framework helped the participants to be creative and work without constraints: *"By drawing and using other materials we felt more creative and got rid of any constraints" (Participant). "Because it allows you to think outside the box." (Participant)*

Some of the consultants do explain that they start thinking about a solution immediately and this tool is useful for breaking through that process and first look at the problem.
"We did not properly follow the steps. Thinking about the end solutions too quickly. However, maybe that is why the tool is a good idea!" (Participant).

One of the consultants missed concrete actions at the end of the session: *"It is useful for generating new ideas, but I miss the point where concrete actions are defined." (Participant).*

Although within the session, there were many discussions on choosing the values and it was challenging to integrate these in the cases in a short time. People mention the usefulness of the values. *"First think about the values does structure idea creation. The values are taken into the design." (Participant)*

Involving the client

The group without the framework felt that they are more capable of integrating the client (4,5/5) than the group with the framework (3,5/5). Nevertheless, the group with the framework feels that the tool is useful in a session with the client (4,2/5) whereas the group without the framework feels that this is less the case (3.2/5). This was the result of the first case being more relatable than in the second case, and in addition to that, it was also easier to include the client in the process.

Involving human needs

The group with the entire framework feels that they are integrating human needs more (4,5/5) than the group without the entire framework (3,8/5) even though they both created a stakeholder need mind-map.

Educational services/book distributor
In the Educational services/book distributor case, the first group which had only part of the framework in the first case was now introduced to the entire case. The second group was already introduced to the full framework and therefore was doing the same session within a different context.

Structuring the process
Both groups believed that the methods and tools introduced in the workbook helped structure the process significantly (4,6/5 and 4,5/5). Especially in group one that was introduced to the entire framework for the first time, the value of the framework was mentioned: *"The framework guides better thinking. Especially about needs and values" (Participant). "The value chain and the stakeholders involved were way more clear for me" (Participant). "More structured: from ideas step by step more clarity in solution" (Participant).*

Again in the second case, the consultants discuss the increase of creativity due to the framework: *" I think this method allows to include and think about all parties since it is graphical and stimulates imagination" (Participant)*

Furthermore, the structure helped the participants to first think about the actual problem before creating solutions: *"Good structure in the way that it introduces the company first, then the problem statement, then a possible solution." (Participant) "Gave us more time to think about the problem before bashing into a solution." (Participant)*

Involving the client
Both groups had difficulties integrating the client within the second session (3,4/5 and 3,2/5) but were of the opinion that it would be useful to use the tools within a similar session (3,8/5 and 4/5).

Involving human needs
The first group was of the opinion that they were better able to involve human needs (4,5/5) than the second group (3,7/5). In which they explain that overall, it was easier to get a grip on the human needs in the first case because the chain of people involved, was less complex. Moreover, the involved people were further from the consultants in their day-to-day life and therewith it was challenging to create assumptions. Nonetheless, they did find it essential to integrate human needs in this way. "because people need to think outside the box and need to take into account all important stakeholders in this way." (Participant)

In comparison
Most consultants (10/12) found it easier to get a grip on the first case (3D printer manufacturer) than the second case (Educational services/book distributor). Some were of the opinion that in the first case more parties had an advantage with the integration of blockchain. *"More party have an advantage because of the blockchain." (Participant). Also, there was less stakeholder's existent, and their needs were clearer. "There were fewer stakeholders. Moreover, the responsibilities were clearer." (Participant) "Fewer parties involved, less governmental rules and regulations to take into account" (Participant)*

However, also, some discussed that this was due to the complexity that was less apparent in the first case. *"Less complex scenario, fewer parties involved, less political shit" (Participant).* It is only the more complexity, the more there are different incentives among parties and the complex the scenario, the more it makes sense to create a blockchain application instead of a centralized solution. Both of the cases were taken through a Blockchain Use Case Checker provided by Wallet. Services (Blockchain Use Case Checker | Wallet.Services, n.d.) in which the 3D printer manufacturer scored 70% and Educational services/book distributor scored 73%.

Using the insight cards
The participants explained that the cards were not used too often due to a variety of reasons. Sometimes because they were too caught up with their initial idea: *"Stimulates extra opportunities. However, we often stay at our first idea anyway." (Participant)*

Nevertheless, the participated also discussed the impact of the cards when they started to use them. *"Gave the option to generate out-of-the-box ideas" (Participant). "It makes you think about important factors to take into account" (Participant). "Very useful if you're not familiar with the concepts involved in blockchain" (Participant) "More information which can be used to solve the case" (Participant)*

To stimulate the uses of the insight cards, the participants suggest making them mandatory within the session: *"Making their use mandatory, we used them too little" (Participant). "Perhaps push them more aggressively to be used" (Participant). "Make participants more aware of the fact that they're there, and how they can help you think about possible insights and solutions" (Participant)*

Alternatively, think about how to integrate them more structurally: *"By deciding them in a structured way. Create an order to follow. By consciously building them in at critical points." (Participant)*

However, others believe that they should not be forced upon the participants: *"it is good to think about it for yourself first and then uses the cards." (Participant)*

8.4 REFLECTIONS

The experiments were both with a different case to collect data with a different perspective. Moreover, the experiments were just one and a half hour; therefore, not a lot of significant conclusions can be drawn from the results of the workbook. For this reason, interviews were conducted with the problem owners, participants from both sessions and the facilitator to gain more insights on what they thought about the processes, tools, and context. In this session, the main insights are discussed.

Lack of blockchain knowledge
Although all consultants are based in the Digital Advisory department within KPMG, their knowledge on blockchain is not very extensive. Throughout the sessions, many differences in blockchain expertise between de consultants were present. Moreover, the problem owners and facilitator mentioned that the lack of knowledge often resulted in discussions on what is feasible or not. These discussions often stopped the creative process in idea generation and held back detailed thinking.

Feedback
The facilitator and problem owner Educational services/book distributor mentioned the use of feedback during the sessions. During the experiments, the groups were working in two groups of three separately, and there was no time for peer-to-peer feedback or feedback from the session leader. Both mentioned that the inclusion of feedback or pitching would improve the session to stimulate the two groups to think further but also to receive insights from each other's creative processes.

Education
Although the tools in the workbook were specific, the cases at the end asked for a digital infrastructure of which the meaning was perceived as ambiguous. The problem owner Educational services/book distributor mentioned an educational part in the

Examples
Both consultants enjoyed a specific methodology in a session like this with a client. Nevertheless, they both felt that examples throughout the session would improve the result as they both were inexperienced with the tools. Both consultants felt that examples would give them a better feel of what the goal of the session should or should not be.

Presence of the problem owner
The facilitator mentioned that the existence of a problem owner within the sessions helped form the concepts extensively. By questioning throughout the session, a better grip on the context and the involved stakeholders. This also resulted in concepts that better included all stakeholder needs and could be thought out in a more detailed way.

Extrovert consultants
The problem owner Educational services/book distributor and facilitator mentioned that due to the lack of knowledge at the consultants' side, often a few more extrovert people were leading the discussions and therefore were also steering the concepts towards their side.

Influence of the cards
The consultant of the second group was overall positive on the use of the cards. Nevertheless, he mentioned that due to the time pressure, his group could not read all the cards and therefore the insights on the cards they did read had a significant influence on the final concepts created.

Writing down values
Both consultants found the values an exciting element to think about, although they did not use these values in the concept creation, they both felt that it influenced the concepts that were created. The problem owner 3D printer manufacturer explained that in the group without the example values, the consultants did not understand the meaning of values whereas, in the group with the example values, this was done way better.

All over the place
The problem owner 3D printing manufacturer explained that sometimes the group of consultants went further away from the case question, his task also was to keep questioning the value for his company and where that company would fit in the infrastructure of the blockchain concept. Also, both consultants explained that due to the lack of knowledge in blockchain and the lack of examples, the ideas went all over the place. Although a level of creativity could be achieved here, they would like to see more structure and examples within a session with an actual client.

8.5 CONCLUSION

After finishing the testing phase, we can draw a series of conclusions that should be considered in the creation of the final design and proceedings of the project.

Integrating digital
KPMG's new internal strategy, the vibe on in the office and the current management consulting movements all point towards the creation of digital assets. Although the integration of stakeholder needs cannot be optimally discovered in a digital asset, some of the elements within the framework can be digitalized. Therefore, the advice is to create a combination between a digital asset and an offline session.

Flow of the session
Time pressure has a positive effect on the creativity and decisiveness of the session. The facilitator role in the tests helped keep an eye on the time and introduced the new topics and should be integrated into the design of the offline session. The workbook also contributed to the decisiveness within the session and the clarity of the assignments. Therefore, the advice is to keep a physical workbook to lead the session next to the facilitator.

The two groups of consultants were in their process and missed pitching moments during the session, after an assignment. These pitching moments to share knowledge and inspire new ideas should be integrated into the design of the creative session.

As discussed in chapter 8.4 and 8.5, the difference in the level of knowledge between the participants (both consultants, problem owner, and facilitator) created difficulties in the execution and difficulties in creating assumptions. An introduction to blockchain should be available, and a clear statement on not focusing on feasibility in concept creation should be made.

As described in chapter 8.5 reflections, for both the problem owners as for the consultants it was difficult to get aligned on the purpose of the session. The purpose of the session should be discussed or stated up front so that every participant is aligned on the level of detail or feasibility that will be aimed for.

Eliminating 90%
The 'eliminating 90%' should be digitalized to enable the company to explore the blockchain technology and education for a more extended period. Nevertheless, there should still be room for the KPMG consultants to discuss the outcomes case checker to interpret the data and establish a client relationship.

9 FINAL DESIGN

9.1 DESCRIPTION

The final solution designed to integrate stakeholder needs in the creation of blockchain applications within KPMG is a framework that consists of two parts. A digital tool for awareness, education, and potential and a potential offline session to find value and meaning within the context of a potential client.

Why a combination of physical and digital?

Cost-efficiency and scalability

A digital asset is more cost efficient and less time consuming than a physical consult between client and KPMG consultants. Therefore, we should look at creating digital assets of partial digital assets as a solution. Moreover, it is easier to reach a larger amount of people through a digital asset instead of a physical consult.

Creating innovative business models

Consults between consultant and client create most of the current consulting revenue. These processes can often entirely or partially be digitized and will create a more innovative interaction with the client.

Education

In 8.4 the conclusion was drawn that an educational element on blockchain should be available, since not every level of knowledge on blockchain is the same within participants, this should be optional, thus integrating it in a digital asset would be ideal. Since it does not have the time pressure that is present at a session, a digital asset gives a person time to learn.

Real-time integration of stakeholder needs

In a physical session, stakeholder needs were explored. As the creative session, and discussions between client and consultant inspired new perspectives; this part of the framework should be kept offline and interactive.

Visualizations

The workbook inspired the consultants to visualize and therewith inspire imagination and creativity. Visualizations should, therefore, be stimulated in the offline sessions.

All by all, a combination will be designed between a digital tool that creates time and cost efficiency and an offline session that will integrate real-time human-centered thinking.

DIGITAL ASSET

The digital asset

Education

The digital asset contains educational tools on blockchain and how to use it in different use cases. It has an interactive environment in which the value and use of blockchain are clearly stated.

Eliminating the 90%

The digital asset empowers clients to assess their businesses on the potential of blockchain. Since many of the current blockchain based projects do not need blockchain (see chapter 7.1), this should be part of the digital asset which can be executed autonomously, by the client.

Preparing the session

If the result of the assessment on whether or not blockchain is a potential solution for a company is positive, the session can be prepared. For an offline session, data on the company and the case will be collected through the digital asset so that the session will be ready to go when the consultants and clients come together in real time. The results of the digital asset will be discussed and interpreted with the KPMG consultants in the creative session also, to support and advise on continuing the exploration of blockchain technology within the digital strategy.

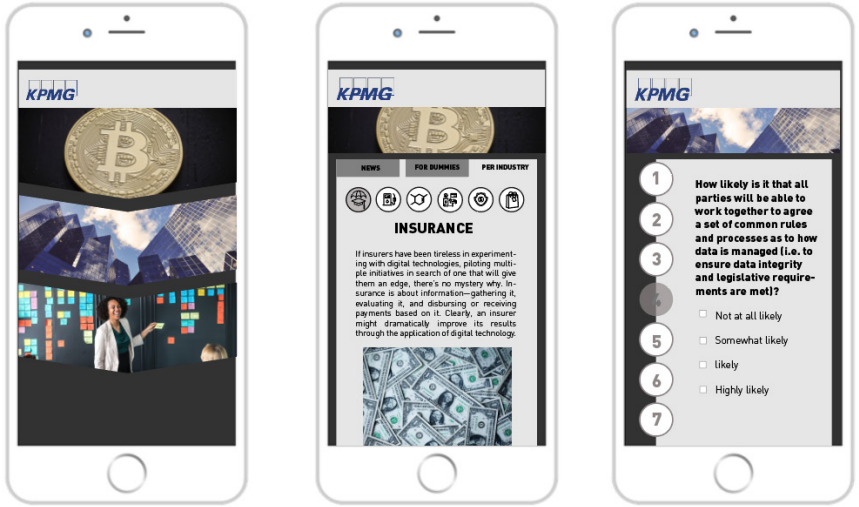


Figure 46: Final design digital asset

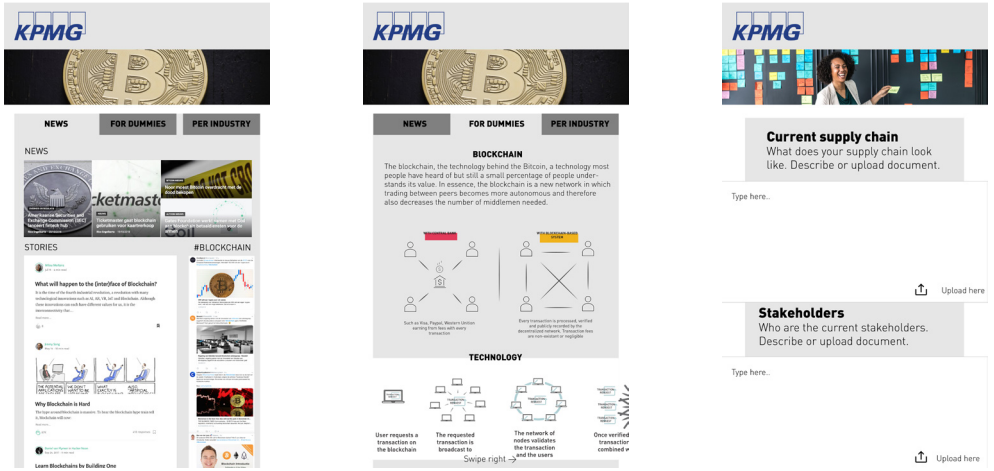


Figure 47: Final design digital asset screenshots. More screenshots can be found in appendix x

The creative session
In the offline session, a series of (design) tools are used to explore how blockchain can be valuable within a company. These offline tools are prepared specially for the company with the digital asset.

Stakeholder needs
By defining stakeholders and their needs, the context of the blockchain product/service will be explored. Through the digital asset, the stakeholders involved in the current value chain are already mentioned, but together with consultants, a mind map will be created to find out their potential needs and eliminate and/or add new stakeholders.

Defining value
These stakeholder needs will be linked to a definition of value. The suggested values (chapter 7.1), inspire value propositions which are common within public or permissioned blockchains. This critical step is to define the ultimate customer of a blockchain product/service and their most important need.

Iterating on real cases
Similar to the preliminary design (chapter 7.1), by brainstorming on digital infrastructures, shared understanding of value for blockchain between the participants is created as described in chapter 8.4. In these iterations, the insight cards (figure 48) will be used. These cards will structurally be introduced: (1) desirability, after 10 min (2) feasibility and after the second 10 min (3) viability.

Creating concrete actions
As described in chapter 8.4, the participants missed concrete actions. To commonly get aligned future actions. Three actionable statements will be formed.

Figure 48: insight cards

CREATIVE SESSION

As has been described in the description of the digital asset, the creative session will be organised by KPMG to follow up on the outcome of the digital asset together with the client.

Purpose
The purpose of the creative session is to explore the value of blockchain within the context of the company. According to the explanation on blockchain in the digital asset, the integration of an emerging technology such as blockchain will drastically change the way stakeholder interact with each other. Thus, the session will start by creating a vision on the current existing value chain with its current stakeholders. Then, together with KPMG we will discover how this will change with the integration of blockchain.

Time schedule
To do this, an introduction of the case will be given. This is done by the client in which all the participants will be able to ask questions in a dedicated Q&A time frame. (20min presentation, 10min Q&A)

The workbook will be introduced in which different assignments are described (10min). In this, the facilitator will also make clear that the main purpose is exploring the needs of the stakeholders instead of creating a feasible blockchain concept.

Workbook
The workbook exists of three sections; an introduction to the case, exploring the company and defining a purpose, and brainstorm on potential ideas. These three parts of the workshop are introduced and done through a workbook in which every step will be explained and tools will be given to lead the creativity towards a certain direction

Assignment 1: Eliminating 90% (15min)
Assignment 2: Finding stakeholder needs and values (20min)
Assignment 3: Create a customer benefit (10min + 5min pitch)
Assignment 4: Brainstorm on cases (20min per case + 10min pitch totaal)

After the workbook, concrete follow up actions will be formed to discuss what the next steps will look like or if the conclusion can be drawn that blockchain does not fit within the context of the digital strategy. This will be done by KPMG together with the client and is depending on the context of the entire project.

Goal
The ultimate goal is to get a tangible perspective on what blockchain can mean for a specific product/service. The creative session is a follow up from the digital asset which is designed for the client to educate themselves on blockchain and go through the first valuable stept in assessing if blockchain might be a possible solution. In the creative session, we will go from general to specific to the case..

Roles
Problem owner
The problem owner is one person who defends why he/she thinks blockchain should be included in the digital strategy of the clients company. He/she is the driver behind the session.

Facilitator
The facilitator is a consultant from KPMG that introduces the session, keeps track of time, and facilitates during the assignments to keep all participants on edge.

Client(s)
On the client side, it is important that not just the problem owner is representing the companies. The stakeholder needs will be based on pre-knowledge, assumptions and experience, therefore there needs to be input from different employees to get the most truthful input.

Consultant(s)
The consultants of KPMG have more blockchain knowledge and consult the client on the topic. Together with the client they do the different assignments and try to dig deep to the obvious but also latent stakeholder needs to create a wide-range perspective on the actual problem and assess whether it fits with blockchain or not.

9.2 VALIDATION

The form and shape of the digital asset have been introduced rather late within the process. Therefore, the content, structure, and shape in which the digital asset was presented was validated with a series of people within KPMG that already have experience with the creation or usage of digital assets in their practices.

To do this, a series of five interviews was executed in which an MVP of the digital asset was shown to collect feedback for further development and implementation. The refined version of the feedback that was received in each interview can be found in Appendix N. In this section, the most important quotes described after which, a conclusion is formulated with recommendations.

Steven Koppens
Senior Consultant Data & Analytics

"An increasing demand for dashboards for direct feedback on data is occurring within KPMGs clients."

"There is no standard layout available; different assets have different layouts due to the partner structure within KPMG."

"A tutorial to introduce the client to the application is a must. "

"The initial investment of a digital asset is high, but it can become modular for more than one purpose and different clients."

Christina Papathanasi
Senior consultant Digital Advisory

"On UX specific, the client should have a logical walkthrough instead of being able to click independently through all pages. Also, contact information for support should be available."

"The digital asset should contain content that is industry specific (insurance, oil & gas, chemicals, utilities, banking, and CPG) and include updates on blockchain instead of just educating people on the blockchain technology."

Barbara Teunissen
Senior consultant Digital Transformation and Data & Analytics

"An increase of digital assets in management consulting can be seen. These tools are less vulnerable to human errors."

"The integration of digital assets will change consultancy significantly. As digital assets are black-white and consultancy is often in the grey area."

"The creation of these assets is time-consuming."

"Integrating a new tool within a large organization like KPMG is difficult, making them aware of the tool but also making them use the tool in their day-to-day practices. She advised, creating a structured plan to introduce the tool. "

Interview Guido Soonius
Senior Manager Digital Advisory

"Assets can be used to inspire, stimulate and trigger your customer before going into a brainstorm, workshop or session and works better than a slide deck."

"A digital asset and a human consult strengthen each other. Many tools can only be valuable with a good team of consultants behind it."

"An application can never be finished. For a digital asset, it is an iterative process in which one should not be scared to show and use the tool with the client. "

"A digital tool will be a great medium to take the client along in the process, but for that to happen, a change needs to be activated within KPMG."

Interview Pien Lucassen
Consultant Smart Tech Solutions

"The increase of digital assets within management consulting will improve the traditional business."

"Your asset fits into the asset portfolio as an enabler well."

"There is a difference between tools used as enablers (used together with KPMG consultants) and autonomous tools (which are used by clients alone."

"The transition towards asset-based consulting can be scary, but if we don't do it, others will."

"It is difficult to make consultants start using digital assets in their daily practices."

Conclusion

Transition to asset-based consulting
The transition from traditional management consulting is happening. Although it will take the effort to start using digital assets in daily practices, KPMG is investing in the transition.

Modularity of digital assets
Digital assets come with a high initial investment, but when built, they can be used for different purposes and become modular.

Fit with KPMG
The digital asset as an enabler fits within the context and asset portfolio of KPMG to enable consultants to execute blockchain-based consults.

Taking the client along
The tool will enable consultants to take their clients along with the process, but to be able to do this, a transition in the mindset of the consultants needs to take place.

Improve user experience design
When looking at the design of the digital asset, we can conclude that the level of UX design is not that high. A useful application, digital tool should be designed with good UX but due to the time limitations of this thesis and the lack of expertise within the field, the decision was made to create an MVP that aims to explain the requirements of such a digital tool and decide upon the content that should be included into the digital tool. The aim is that the MVP can be sent to a digital asset developer and can be used to create a final version of the tool within the required style, fonts, and interaction that fits with KPMG.

10 DISCUSSION

In this chapter, the results of the thesis will be interpreted. Moreover, we will discuss the limitations and implications that occurred but also stress the relevance of the project within the context.

Integrating stakeholder needs in a back-end solution
There is a large gap between a back-end solution such as blockchain and stakeholder. In a solution which is not entirely understood by the users, it is difficult to find the needs and then relate them to the possibilities in blockchain technology. In this project, this gap was closed by using values to link stakeholder needs to interaction within a back-end solution. The values were gained from a value proposition analysis which resulted in reoccurring values in blockchain companies' value propositions. Reflecting on the design, we also see other approaches to possibly being able to solve this gap. For example, by visualizing the possible blockchain interactions that would directly impact the stakeholder.

Integrating blockchain-based projects within digital strategies
In digital strategy projects at KPMG, the demand for integrating emerging technologies such as blockchain is increasing. For this reason, the project proposes a framework to explore the value of blockchain for a company to advise them on integrating blockchain in their digital transformation. These digital transformation projects are often already running when the topic of integrating blockchain comes to light. Nevertheless, there should be a difference in interaction between new clients and existing clients for KPMG, and this should be integrated into the design of the framework for the future. For example, the digital asset should be used as a sales tool in new projects whereas it should be used as an awareness tool in projects that already started.

Introducing both design thinking and blockchain to non-designers and non-blockchain experts
In the digital transformation practice of KPMG, there are not many design educated consultants. The design was created to enable non-designers to use design tools to uncover stakeholder needs. Both participants and problem owners mentioned the creative process that was enabled through the framework and out-of-the-box thinking. The final design introduces a set of tools that allows a culture that is still learning to become more human-centered.

Introducing a digital asset as an enabler within a management consulting practice and more specifically in the digital advisory department of KPMG
The final design consists of a digital asset for preparation of the session and education on blockchain. From the validation interviews with people that already created a digital asset within KPMG, we found that the integration of a digital tool in an organization like KPMG can be challenging. This is due to a large number of employees and the different departments which all have different methods preferred by their partners. It is difficult to make the consultants use these digital assets in their day-to-day practices. Asset-based consulting is increasing, and the need for digitization within management consulting practices is high. We currently are still in a transitional phase and therefore the success of implementation within a short period is still questionable. A structured implementation process should be defined to ensure the success of integration.

10 CONCLUSION

The research aimed to define how to integrate stakeholder needs in the creation of blockchain applications.

A framework was designed to find these stakeholders and their accompanying values and translating this into a digital infrastructure for blockchain applications. The framework consists of a digital tool in which news, industry-specific updates and blockchain education, a use case checker for the potential of blockchain and a tool to prepare for a creative session with KPMG consultants. In the creative session, the stakeholder needs are defined and linked to permissioned, and public blockchain values after which a customer benefit statement is created and finally use-cases on the topic in the context of the company are explored.

This framework was designed to enable KPMG consultants to advice clients on integrating an emerging technology such as blockchain in a company's core digital strategy.

The final design inspires creative thinking and the use of design tools in a culture which is still learning about human-centered design.

11 RECOMMENDATION

In this chapter, a recommendation will be made on the implementation phase of the framework. First of all, we believe in appointing a group of consultants to become ambassadors of the framework. KPMG is a large enterprise, making it difficult to reach a large number of consultants with the framework; therefore, this group of ambassadors can be contacted as an expert within KPMG.

Moreover, a blog or article should be written on the main findings of the research and as an introduction of the framework. This article should elaborate upon some use cases in which it can be used within KPMG practices. The article should reach a high number of employees and stimulate the people driven innovation within KPMG.

For the implementation of the framework, first, a pilot study should be done together with a company for KPMG to get acquainted with the framework and experience the framework in an existing commercial context. As the introduced tools are relatively new to the KPMG culture, the level of abstract thinking on customer needs in a yet to be defined context will be challenging. The recommendation is to appoint a design educated consultant to ensure the flow of the creative session and protect the execution of the framework.

13 REFLECTION

In this chapter, I will reflect upon the process towards the final design from a personal perspective. The reflection will be divided into four phases ending with an overarching reflection on the context:

1. Discover
2. Define
3. Develop
4. Deliver
5. KPMG consulting

Discover
In the discovery phase, the most frightening but also exciting part is 'losing yourself' in the amount of literature that can be studied. Design Thinking, Blockchain, and Digital Transformation are topics on which an extensive amount of literature is available. It was sometimes tricky but challenging to scope the frame of reference in which literature was studied. With the help of the supervisory team and iterations on proceedings, this challenge was solved by giving an outside perspective and trial and error.

Moreover, in the discovery phase, it is essential to embrace ambiguities. Only by embracing these ambiguities, I believe one can come to a relevant design solution.

Define
In the definition phase, the most difficult challenges were found in making decisions, which also meant, letting go of a number of interesting findings which are left out of the scope of the project. In this particular project, insights focusing on the fuzzy front-end of the creation of blockchain applications were chosen to focus on. The insights focused on the final interaction of a blockchain platform were left out of the scope although many interesting learnings could be drawn from that research.

Develop
In the develop phase, the insights were projected on a set of well-known frameworks. The challenge was to explore these frameworks without having a solution in mind, due to the difficulty in defining requirements for success if the result is not yet defined. Nevertheless, I believe that only without a solution in mind, one can discover the real value in design.

Moreover, the time and effort it takes to set up a genuinely relevant test are often underestimated. As I was working with human variables, unexpected issues emerged in which the second test was almost canceled. Nevertheless, with the help of colleagues and my supervisory team, a solution was found. I learned that, no matter how difficult the situation is, it is always better and more realistic to ask others to help.

Deliver
In strategic projects like this thesis, the solution is an MVP which gives an example of what the final design should look like. For example, in a digital asset, the exact form, shape, and interaction should be tested and defined by a real user experience designer. Therefore, it is essential that the final design is presented as an MVP and not a finished design. It is difficult to draw the line, in strategic projects, for which stage should a concept be developed. The key is to discuss with the stakeholders what is expected, to be aligned on one deliverable. During the project, the meetings with the supervisory team contained more and more alignment discussions as the end came closer.

KPMG consulting context
In a consulting context, because a piece of advice is given on the future, we should always work with assumptions. Although working with assumptions might sound difficult, it urges a level of creativity in handling these situations. During this project, I concluded that this environment in which a high level of creativity is needed to solve complex problems, I find very interesting to pursue.

Moreover, the quantity of highly motivated people that surrounded me in an office like KPMG's was also very inspiring. In the future, I would like to continue exploring similar contexts.

Finally, to improve my future projects, I believe reflecting upon the process throughout the process and reflecting on the initial goal, will increase efficiency. Furthermore, it is easy to get lost in curiosity but writing conclusions and findings down is essential. I have learned to write down my insights structurally to be able to communicate progress and the decision-making moments fully. Moreover, I believe in collaboration, especially in the creation of technological innovations. In my future career in strategic design, I would like to collaborate with passionate people to share ideas, be critical and inspire each other to bring a project further.

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