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MSc Business Administration and Information Systems

The influence of Blockchain Technology on Loyalty Reward Programs

A multiple case study research on the Loyalty Reward Programs Industry.

Keywords: Archetypes, Blockchain Technology and Loyalty Reward Programs.

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Abstract

In recent years, blockchain technology has received considerable attention. All around the world, several industries with completely different backgrounds are now investigating the technology in order discover the potential applications that could improve their businesses. This is due to the potential of blockchain to drastically modify the way on which existing systems deal with any kind of transactions, by introducing new procedures. The Loyalty Reward Program industry, dealing with transactions of loyalty points may be able to seize the potential of blockchain technology. However, the Loyalty Reward Programs industry is characterized by different Loyalty Reward Program models.

Hence, the research in hand explores how blockchain technology can influence the creation of a new Loyalty Reward Program archetype. An exploratory multiple-case study was used to tackle the research. The companies selected as case studies represent different Loyalty Reward Programs typologies, namely, the Stand-Alone Program and the Multi-Vendor Loyalty Program. The case studies data was extracted with a qualitative multi-method analysis based on in-depth interviews and documents. Additionally, in order to evaluate the technical aspects of the potential blockchain application in the LRPs context, a blockchain expert was consulted.

From their investigation the researchers present the LRPs archetype extracted from the analysis of the two case studies, which is composed by six common dimensions, namely level of interoperability, program speed, IT infrastructure complexity, depth of data collected, customer freedom of choice and customization level. Then, an archetype matrix displaying the difference of the two LRPs typologies is presented. Thereafter, the researchers present the potential application of blockchain technology in the LRP industry. Consequently, the blockchain application is evaluated in regards to the potential impact on the presented LRPs archetype. The resulting LRP archetype based on blockchain technology, is then added to the LRP archetype matrix. Consequently, this matrix can be used as a reference guide for businesses on the LRP industry interested in exploring the potential of this technology.

Table of Contents

Abstract **1**

Chapter 1: Introduction **6**

1.1 Motivation 7

1.2 Loyalty Reward Program Industry 9

1.3 Problem Identification 10

1.4 Objectives 11

1.5 Research Question 12

1.6 Delimitations 12

1.7 Advance Organizer 13

Chapter 2:Technology Review **16**

2.1 Methodology applied to the Technology Review 17

2.2 The Blockchain 18

2.3 Decentralized Consensus Systems 19

2.3.1 Ledger Architecture 19

2.3.2 Network Architecture 19

2.3.3 The four Ps of the Blockchain 20

2.3.4 Consensus Mechanism 21

2.3.4.1 Byzantine Fault Tolerance 21

2.3.4.2 Proof-Of-Work 22

2.3.4.3 Proof-Of-Stake 22

2.3.4.4 Delegated-Proof-Of-Stake 23

2.3.4.5 Proof-Of-Authority 23

2.4 Ecosystem 24

2.4.1 Smart Contracts 24

2.4.2 Tokens 25

2.4.3 Wallets 25

Chapter 3. Literature Review **27**

3.1 Methodology applied for literature review 27

3.2 Research on Loyalty Reward Programs 28

3.2.1 Previous studies on LRPs effectiveness and performance. 29

3.2.2 Previous studies on LRPs design 30

3.2.3 Studies comparing different LRPs typologies 31

3.3 Research on Archetypal studies in Business 32

3.3.1 Electronics Marketplace archetypes 32

3.4 Research Gap 34

Chapter 4. Theoretical Underpinnings **36**
4.1 Defining the scope of Loyalty Reward Programs 36
4.2 Loyalty Reward Programs type 38
4.3 Defining the interpretation of Archetype 38
4.4 Weill & Ross Matrix comparing IT Governance Archetypes 40
4.5 Conceptual Framework 43

Chapter 5: The Research Methodology **44**
5.1 Definition of the Case Study Research 44
5.1.1 When to use case study research method 45
5.1.2 The application of a multiple case study research design 47
5.2 Research Philosophy 47
5.3 Research approach 48
5.4 Nature of the research 49
5.5 Methodological choice 50
5.6 Time horizons 51

Chapter 6: Data collection techniques and procedures **52**
6.1 Data sources selection 52
6.2 Case study protocol 53
6.3 Sources of evidence 54
6.3.1 Documents 55
6.3.2 Interviews 56
6.4 Interviews Guide 56
6.5 Analytic strategy 58
6.6 Analytic technique 58
6.7 Evaluation of the research process 59
6.7.1 Construct Validity 59
6.7.2 External validity 61
6.7.3 Reliability 61

Chapter 7: Empirical Case Studies **62**
7.1 Returntool (private) 62
7.1.1 Company overview 62
7.1.2 Client Base 63
7.1.3 Core activities 63
7.1.4 Returntool Loyalty Reward Point System 64
7.1.5 IT Architecture 66
7.2 Nectar (coalition) 67
7.2.1 Company Overview 67
7.2.2 Client Base 68

7.2.3 Core activities 69
7.2.4 Loyalty Reward Program System 70
7.2.5 IT Architecture 72

Chapter 8 :Cross-Case analysis and findings 74
8.1 Cross Case Analysis 74
8.1.1 Level of Interoperability 74
8.1.2 Program Speed 76
8.1.3 IT Infrastructure Complexity 77
8.1.4 Depth of Data collected 79
8.1.5 Customer freedom of choice 80
8.1.6 Customization level 81
8.2 Summary and presentation of the LRPs archetype Matrix 82

Chapter 9 : Considerations in Blockchain Technology Applications for LRPs 84
9.1 A new Platform for Loyalty Reward Program 84
9.2 New Interactions in Loyalty Reward Programs 86
9.3 Digital Tokens to replace Loyalty Points 86
9.4 LRP Blockchain based system 87
9.5 Impact of Blockchain Technology applications on LRPs Matrix 88

Chapter 10 : Discussion 92
10.1 Implications of the Findings 93
10.1.1 Level of Interoperability 93
10.1.2 Program Speed 94
10.1.3 IT Infrastructure Complexity 95
10.1.4 Depth of Data Collected 96
10.1.5. Customer Freedom of Choice 97
10.1.6 Customization Level 98
10.2 Theoretical Implications 98
10.3 Technical implications of Blockchain applications 99
10.4 Limitations and Further Research 100

Chapter 11 : Conclusion 102

Bibliography 104

List of Abbreviations

BFT - Byzantine Fault Tolerance

CEO - Chief Executive Officer

CSO - Chief Strategy Officer

CTO - Chief Technology Officer

DAO - Decentralized Autonomous Organization

DCS - Decentralized Consensus Systems

DPoS - Delegated Proof of Stake

EVM - Ethereum Virtual Machine

EMs - Electronic marketplaces

FFP - Frequent Flyer Programs

LS - Loyalty Schemes

LRP - Loyalty Reward Programs

PoS - Proof of Stake

PoW - Proof of Work

RQ - Research Question(s)

Chapter 1: Introduction

From its inception in March 1989, the World Wide Web has helped change many world paradigms, producing a wide variety of new opportunities and becoming essential to our everyday work and economic development (Dutton, 2014). Unexpectedly, two decades later another technology with an unseen revolutionary potential not seen since the invention of its predecessor the World Wide Web is currently rising (Herman, 2000), the blockchain.

Today, blockchain technology is considered the most important, groundbreaking innovation of the recent era (Abeyratne and Monfared, 2016) and has currently drawn immense attention on itself mostly for being known as the technology behind 'Bitcoin', the protocol that constituted the foundation of the truly *trust-free* digital economic transactions (Risius and Spohrer, 2017). The blockchain is a truly distributed and decentralized technology that allows *peer-to-peer* exchange of value in a immutable manner and, therefore, has the potential to rewrite the world's economic landscape (Raskin and Yermak, 2016). This emerging technology is still currently considered early, with hyped inflated expectations (Panetta, 2017). Nevertheless, it is inspiring a wealth of governments, corporations and research institutions across the globe to investigate innovative applications across a wide range of industries. To fully acknowledge the significance of Blockchain, we must take note that it is considered able to be applied to "any sort of asset registry, inventory, and exchange, including every area of finance, economics, and money; hard assets (physical property); and intangible assets (votes, ideas, reputation, intention, health data, information, etc)" (Seppälä, 2016). Therefore, against this backdrop, it is easy to understand the reasons for the high level of awareness about this technology.

Nowadays, blockchain's development suggests that organizational leaders of traditional companies — CEO, CTO, CSO and other Officers involved in a company development — should learn and analyze on how to effectively exploit the benefits of such emerging technology in order to maintain and improve their company market position, avoiding becoming obsolete. Consequently, gaining a deeper understanding about how this technology may shape the future structure of their businesses and foreseeing the managerial implications

that this technological shift will generate will contribute to the company growth and to its survival.

Therefore, the research at hand aims to critically analyse the technology and provide an objective description of the potential changes this technology will generate when applied to the Loyalty Reward Program sector. Such a specific industry focus has been taken by the researchers due to their personal interest in the industry.

1.1 Motivation

Certainly, blockchain is on the discussion agenda of many governments around the world, either looking for stronger control mechanisms towards its applications or as potential technological solutions to improve their internal economical conditions, such as the cases of countries with economic frictions like Venezuela or Nicaragua.

Furthermore, in the international scope, blockchain economical machinery and its industry penetration by market applications has evolved significantly in a short time, only a couple years ago, in 2015, it was divided in Financial Services on top with 73.6%, Technology, Media & Telecom 8.3%, Transportation 8.0%, Healthcare 5%, Consumer Products 2.6% and Public Sector 2% (Figure 1). Nowadays, Financial Services still stand as the strongest industry possibly influenced by the strength of public blockchain assets like Bitcoin and Ethereum, among others which only in the last quarter of 2017 reached an unprecedented market capitalization of over $75 billion USD aggregating the highest market capital in the blockchain history with $600 billion USD, almost nearly as much as the whole 2017 GDP of Argentina (Coindesk, 2018).

Moreover, the evolution of blockchain in a variety of business sectors and its market applications looks promising. Indicators from the Garner's *Top Strategic Predictions 2018* forecast that by 2020 the business value of blockchain-based cryptocurrencies inside the financial industry will derive on US $1 billion, opening new doors for other industries (Panetta, 2017) like Energy and Internet of Things (IoT), in addition to the current industries like Technology Media & Entertainment, Consumer Products (Retail) and Healthcare which

are forecasted by 2022 to reach a Compound Annual Growth Rate of around 43%, estimating to reach in one year $6 billion USD (Business Wire, 2017). Nevertheless, the peak of Blockchain as an emerging technology is expected to happen by 2027 (World Economic Forum, 2017).

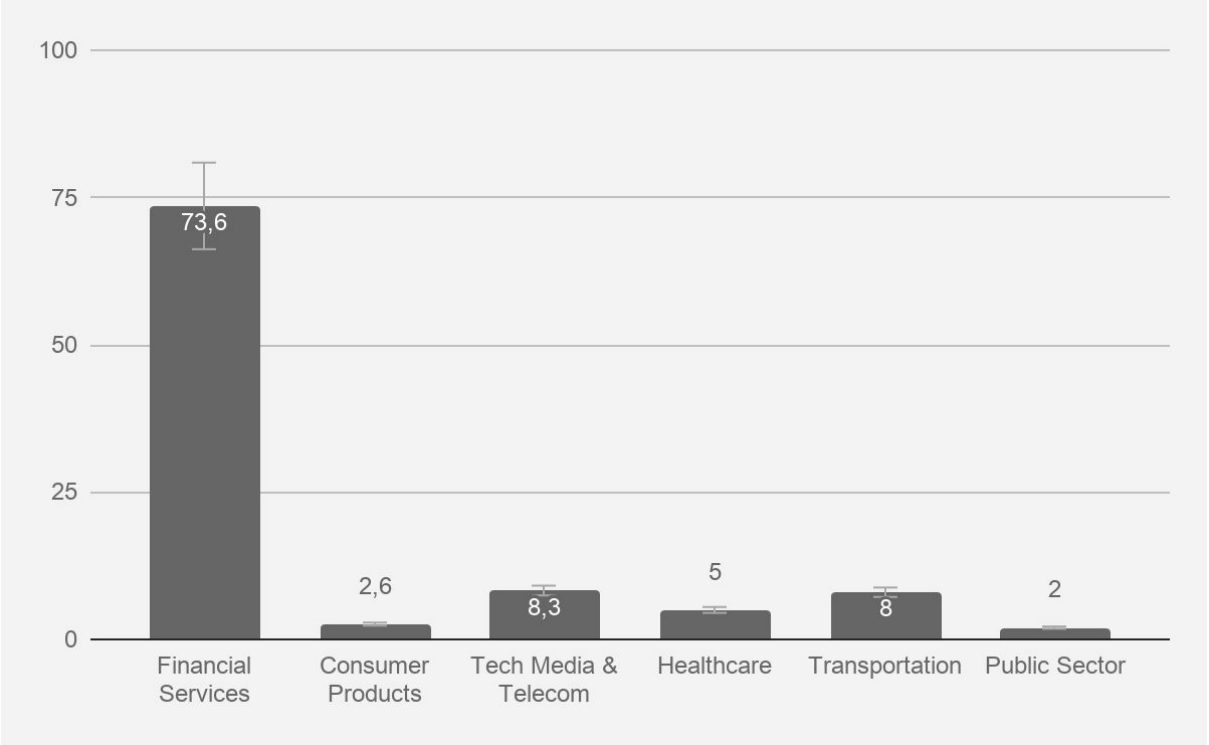

Figure 1: 2015 Blockchain Technology by Market Application in North America (Grand View Research, 2016)

Furthermore, the exponential interest in blockchain and its related applications has triggered an unprecedented interest from a variety of sectors regardless of demographics. In December, 2017 Google searches for the term "*blockchain*" reached peak all-time high, with disparate economies like Ghana and China leading the ranks (Google Trends, 2018). Meanwhile, the Blockchain phenomena is also triggering the interest of many enterprises and individuals, where the first time awareness over topics such as the so-called "*smart money*", "*bitcoin*" and "*cryptocurrencies*" has permeated into previously unseen sectors, opening a new chapter on the history of finance and economics (Coindesk, 2018). Consequently, driven by the fast propagation of blockchain based *cryptographic-assets* like Bitcoin among individuals and

investors, and the fast growth of enterprise solutions, like for example the open-source project Hyperledger Fabric from IBM and the Linux Foundation (Mohan, 2017).

Therefore, if you as the reader of this thesis believe that your business requirements involve the secure and immutable exchange of information, perhaps you can be benefited by the implementation of blockchain technology. Consequently, the research in hand may serve you as the initial guideline that may help your investigation.

1.2 Loyalty Reward Program Industry

Loyalty Reward Programs are widely used in consumer retail, primarily serving as mechanisms for consumer acquisition and retention. Nowadays, the Loyalty Reward Program industry, only in the United States, reaches 3.8 million members in multiple industry sectors (Goel et al., 2016). Nevertheless, this industry operates globally in almost any market. From big corporation loyalty schemas to more localized and smaller businesses programs, the reach of loyalty and engagement programs has been gradually extended to almost every customer oriented industry (Fruend, 2017). However, the early roots of customer loyalty go back to the 18th century with the introduction of *premium marketing*, which initially spread among retailers rewarding their most loyal customers with copper coins, interchangeable in further purchases for other products. Over times, coins were taken out of circulation and evolved into what we know today as loyalty stamps, still seen today among brick and mortar retailers. Moreover, later in the 20th century, the peak among vertical markets came from the airlines industry, where one of the most successful loyalty rewards categories arose, the “Travel and Hospitality” which covers “Frequent Flier Programs”. American Airlines with AAdvantage is the most popular example, reaching 67 million members in October 2011 (The Travel Insider, 2011). Nevertheless, Travel and Hospitality is only one of the five major categories that complement the loyalty ecosystem along with retail, financial services, emerging and coalition industries (Fruend, 2017). Retail and “Travel and Hospitality” are the leaders of this industry with 42% and 29% respectively, with a market size equivalent to 1.6 billion subscriptions (Figure 2), according to the North America Colloquy Loyalty Census 2017.

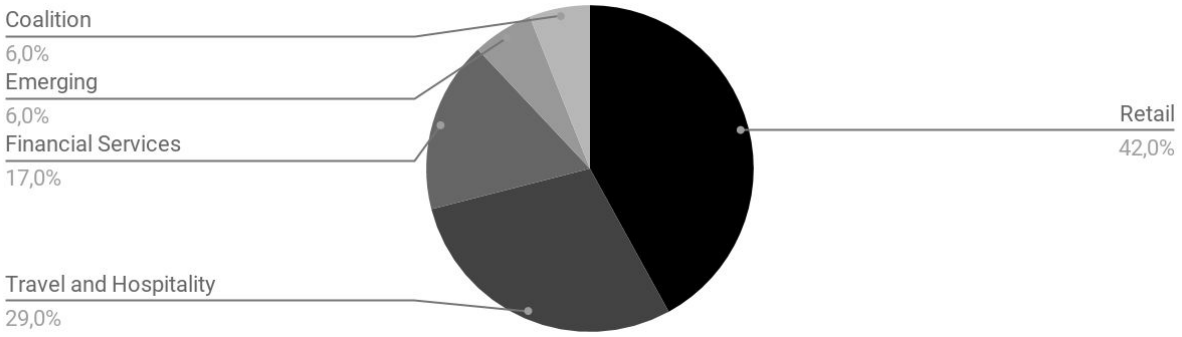

Figure 2 - Loyalty Industry Market Disclosed (Fruend, 2017)

Nevertheless, while growth in loyalty memberships was 15% only in the last year, there are reasons to believe that while businesses are worried about delivering rewards to more customers, they constantly forget about satisfying their current loyal customers (Fruend, 2017), underutilizing strategies towards their most loyal customers, who, according to market studies, tend to spend between 50% and 60% of their budget with one single merchant (Pearson, 2016). Therefore, parallel to aggressive loyalty schemes, expansion strategies are necessary to gain a better understanding of customers. Loyalty schemes can no longer be managed the way they have always been. While loyalty programs proliferate, consumer behaviour remains unchanged. This allows the repetition of common mistakes, for example, the so called loyalty program shams that only produce liabilities, as promises of future rewards rather than assets (Shugan, 2005) that can be easily redeemable, consequently leaving 54% of the loyalty memberships in the United States inactive (Fruend, 2017). On the other hand, the growth in loyalty adoption has brought consumers a wide offer of programs to choose from. Now, loyalty programs have become more demanding, smarter and localized towards increasing the levels of engagement. These more innovative models aim to disrupt the industry, leveraging new technologies to increase personalization and faster redeeming experiences capable of removing the frictions that currently exist in traditional programs.

1.3 Problem Identification

The Loyalty Reward Program Industry is a widely known sector that in the United States alone reaches 3.8 billion members. However, the 54% of the members are labeled as inactive

participants (Fruend, 2017). In fact, LRP's participation has seen a steady decrease since 2010.

Finding a proper solution to why some customers are inactive and why some customers are not, has been the central problem and a common painpoint among LRPs for a long time (Hamilton et al., 2017). Often, in order to cope with this issue, LRPs owner explored the application of new technologies able to improve the current LRPs models. Nevertheless, a technological transition is not a simple topic, empirical studies have shown that the migration to digital loyalty of exchanges and transactions from non-digital environments into digital environments is a deceptively complex problem (Suhonen et al., 2010). However, to preserve their market position, prevent disintermediation and to avoid obsolete management, change management departments of companies in the loyalty industry need to consider exploring new technologies.

In the case of blockchain technology, there are reasons to believe that the loyalty industry can potentially benefit in many different ways by exploiting its applications (Abeyratne and Monfared, 2016). In fact, the medium of exchange applied by Bitcoin technology, in the case of goods and services, is considered to be applicable to loyalty points and other monetary tenders (Kowalewski, McLaughlin and Hill, 2017).

1.4 Objectives

Taking into consideration the problems elaborated on above, the research at hand aims to display how blockchain technology can influence the current Loyalty Reward Program (LRP) archetypes. Thus, the research at hand may serve as a guidance for traditional LRP companies to remain competitive in the evolving economic landscape by allowing them to identify some dimensions subject to improvement by the contributions of blockchain technology. Hence, the research focuses on achieving three main sub-objectives:

1. Understanding the current LRPs archetype common dimensions.
2. Exploring the potential of Blockchain technology application within the LRPs archetype dimensions.

3. Displaying the influence of blockchain technology on the LRPs archetype dimensions and the creation of the new archetype.

1.5 Research Question

Following the logic introduced above, the research in hand aims to answer the following research question:

How Blockchain Technology can influence the creation of a new Loyalty Reward Programs archetype?

1.6 Delimitations

The research in hand has been shaped by several choices the researchers made and that act as a limit in one way or another. The selected research design aims to answer the research question by the application of a multiple-case study research, through it the researchers intend to collected the necessary knowledge to create the LRP archetype.

Firstly, in regards of the qualitative multi-method nature of this research, the researchers chose to refer to non-numeric data gathered primarily from in-depth interview transcripts and secondary data, documents. Qualitative data is often associated with concepts characterized by their richness and fullness based on the opportunistic exploration of a topic in a legitimate manner (Robson, 2002). Employing only such kinds of data supports the study's objectives and the exploratory nature of the research, as well as increases the effectiveness of its analysis. Therefore, the researchers have chosen to use only this type of data during this project.

Secondly, neither the Loyalty Reward Programs nor blockchain findings will be investigated from a deep technical perspective. Therefore, this study does not intend to serve as a guidance for real-life technical implementations of blockchain application in the LRPs systems. However the technical feasibility of the potential blockchain application on the LRP will be

supported with expert knowledge and may serve as a general guideline for companies interested in this topic.

Thirdly, the researchers acknowledge that even though the research in hand investigate two LRPs cases, increasing the number of LRPs case study would have made possible to investigate the topic from other perspectives.

Lastly, the literature review comprehend only peer-reviewed article written in english. Consequently, the knowledge gathered may have been limited because if this. Additionally, due to the youth of the blockchain technology in the technology review, the researchers had used some articles that albeit relevant, were not peer-reviewed.

1.7 Advance Organizer

The structure of the entire thesis can be visualized in the following advance organizer:

Chapter 1: Introduction

The research in hand aims to critically analyse the implications of blockchain technology and provide an answer on how this emergent technology can influence the current Loyalty Reward Program archetypes.

Chapter 2: Technology Review

The Blockchain is presented under the framework named from Brenig et al. (2016). Consequently, other relevant to the research in hand concepts are introduced.

Chapter 3: Literature Review

This chapter presents the prior body of research of Loyalty Reward Programs and Archetype studies as well as the respective research gap.

Chapter 4: Theoretical Underpinnings

This chapter presents the theories, models, ideas and knowledge that relate to the topics presented on the research in hand.

Chapter 5: The Research Methodology

The information about the methodological choices made by the researchers during the process of the research in hand.

Chapter 6: Data collection techniques and procedures

The data collected and employed is presented in order to extract the final findings.

Chapter 7: Empirical Case Study

The two case studies are presented, from *company overview, client base, core activities, loyalty reward system and IT infrastructure.*

Returntool	NECTAR

Chapter 8: Cross-case Analysis and Findings

A cross-case analysis is done to identify the findings that arose during the data analysis, here all the extracted dimensions are presented from the angle of each one of the case studies.

Chapter 9: Considerations in Blockchain Technology Applications for LRPs systems

The discussion in regards to the potential application of blockchain technologies is presented on each one of the six dimensions.

Chapter 10: Discussion

The implications and findings are presented individually in each of the six dimensions.

Additionally, the theoretical implications, the technical implications and the limitation and further research are presented.

Chapter 11: Conclusion

In this chapter, the researchers summarized the motivation, methodology and findings of the research. Lastly, the final considerations are displayed.

Chapter 2:Technology Review

The following chapter aims to provide a solid introduction to Blockchain as a business feature set and as an ecosystem, both concepts necessary to understanding the research at hand. Despite extensive research made on the topic, the researchers advise the reader that there is a scarcity of peer reviewed sources at present. Nevertheless, a complete analysis of different academic articles, journals and contemporary sources of information are displayed in our Concept Matrix (Figure 3).

	Decentralized Consensus Systems		
	Evaluation Framework		
		Ecosystem	
	Decentralized Consensus System	Applications	Services
Antonopulos (2014)	X	X	
Baldwin (2018)	X		
Brenig et al. (2016)	X		
Buterin (2015)		X	X
Castro and Liskov (1999)	X		
Jacobson and Juels (1999)	X		
Lamport et al. (1982)	X		
Luu et al. (2015)		X	
Nakamoto (2008)	X	X	
Nofer et al. (2017)	X		
Peters et al. (2015)		X	X
Popov (2016)	X		
Risius and Spohrer (2017)		X	X
Schuh and Larimer (2017)	X		
Szabo (1996)		X	X
Walsh et al. (2016)	X		
Wust and Gervais (2017)	X		

Figure 3: Technology Review Concept Matrix

2.1 Methodology applied to the Technology Review

The appliance of blockchain characteristics to business models varies depending on requirements from one business to another. Different features like speed, security, transparency and efficiency can also be offered on a variable scale by different blockchain designs (Walsh, et al., 2016). Therefore, in order to begin this chapter, the researchers have selected the framework conceptualized by Brening, Schwarz and Ruckeshauser (2016) named "*The Contextualization of Decentralized Consensus Systems*" (hereafter DCS) as the introductory step to the blockchain technology, which introduces DCS as a contextualization of digital infrastructures and provides a basic assessment. Thus, the original conceptualization of the DCS framework is divided into three main layers: "Decentralized Consensus System", "Ecosystem" and "End-users". Nevertheless, in this context the researchers have decided to apply only the first layer and the first element of the ecosystem, applications (Figure 4) (Brenig et. al, 2016).

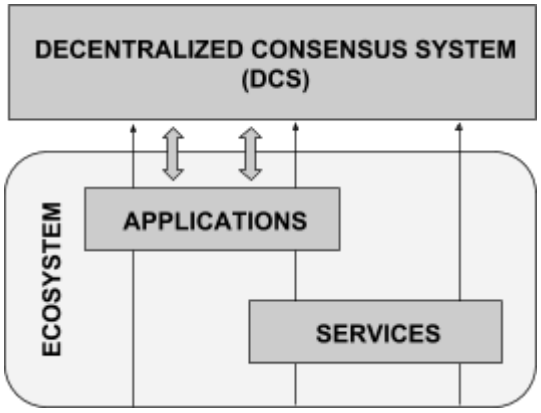

Figure 4: Framework for the assessment of concrete Business Models (Brenig et. al., 2016)

The DCS identifies the Blockchain Platform Infrastructure. Today, many DCSs exist and operate in production and test environments. While many of them share similarities like openness strategies and even sometimes parts of their source code, it is common for new DCSs to introduce additional features and standards.

The *Ecosystem* refers to the organizations and the value capture that is offered through their complementary applications and services.

Additionally, this layer serves as an intermediary between the DCS infrastructure and interactions. Consequently, it is divided into two different layers, *Application* and *Services*.

First, the *Application* refers to the variety of use cases built on top of the given platforms that create and extend functionalities, providing additional value to a DCS. They can range from currencies to decentralized business operations (Brenig et. al., 2016).

Secondly, the blockchain *Services,* opposite from the application, do not add new functionalities to the platforms and they do not require being technically linked to any blockchain, because they only render available platforms or application functionalities (Brenig et. al., 2016).

2.2 The Blockchain

Originally conceptualized in 2008 as the first practicable decentralized payment system and authored under the pseudonym Satoshi Nakamoto, the Bitcoin Blockchain was the pioneer combination of cryptographic operations and a technical design capable of transferring digital funds without relying on third party physical intermediaries and solving, for the first time in a decentralized fashion, a potential economic flaw known as "the *double-spending problem*" (Brenig et al, 2016) — the risk that a single unit transaction can be sent simultaneously to two or more recipients (Bonadonna, 2013). Additionally, from a monetary perspective the Bitcoin Blockchain introduced its own virtual currency as a unit of account, "Bitcoin" (Peter et al., 2017). Thus, as will be further explained in this research paper, blockchain is often seen as the technology that underpins the Bitcoin network and it is often considered the blockchain pioneer application. Therefore, while describing many of the features of the Blockchain, we will use the Bitcoin Blockchain as an example, nevertheless, Bitcoin is nowadays only one of many blockchains. Consequently, it is relevant to mention that a blockchain universal standard implementation doesn't exist in the blockchain ecosystem; different applications can use a variety services and have diverse blockchain requirements (Risius and Spohrer, 2017), certainly, due to a wide variety of features like scalability, writing permissions, consensus mechanisms, interoperability and anonymity that in certain blockchain networks have become crucial value propositions.

2.3 Decentralized Consensus Systems

The concept of Decentralized Consensus Systems has been applied in the area of Distributed Computing for several years, in order to ensure the agreement of all the parties in regards of the state of the system (Chen et al., 1992). Nevertheless, in the recent years the concept gained popularity with the increasing growth of Bitcoin and Ethereum and its own blockchains. However, the blockchains are only the underlying technical backbone of the DCS, which from an organizational perspective are only applied when referring to the system as a whole (Brenig et al, 2016).

2.3.1 Ledger Architecture

The blockchain ledger is conformed by a list of data sets that contain a chain of data packages named *blocks* (Nofer et al., 2017). Each block is a sequence defined by the previous block hash point (Figure 5). Additionally it is composed by a list of transaction record ids, a timestamp and a 32 bit arbitrary number named *nonce* (Nakamoto, 2008). Furthermore, the creation of new blocks consists of a process known as mining. The length and requirements may vary from one blockchain to another. For instance, in the case of the Bitcoin blockchain it takes approximately 10 minutes and is done through so-called miners (Nofer et al, 2017).

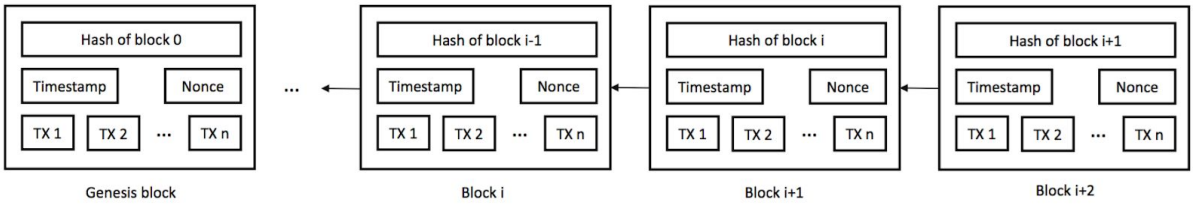

Figure 5: The bitcoin blockchain genesis block structure (Nakamoto, 2008)

2.3.2 Network Architecture

Nowadays, some networks are often presented and assumed to be decentralized and democratic due to their existence without central command (Baldwin, 2018), the blockchain networks are among them. While in the original Bitcoin blockchain whitepaper released by

Satoshi Nakamoto (2008) is the proposal of an open peer-to-peer distributed timestamp server where everyone could participate and exchange value, was the original intended ambition, some argue this technological development was overshadowed by what it actually represents for digital cryptography and networks of distributed ledger technologies (Baldwin, 2018).

Therefore, a significant part of the study of blockchain networks should be seen from the decentralized and distributed computing networks perspective. Firstly, distributed computing networks are the systems where no central geography exist, spreading the computing resources and data among many nodes which interact with each other in order to achieve a common objective (Chen et al., 1992), this is possible due to the distribution of the processes among the nodes, done instead of having complete reliance upon a single dedicated node (Baran, 1962). Therefore, this network architecture helps to decrease the consequences in the case of a system failure, due to its independent node architecture (Rutland, 2017). Secondly, decentralized networks, similar to the distributed networks where no center of authority exist and where a complete reliance upon a single point is not always required, nevertheless, the destruction of a small amount of nodes can affect the distribution of information (Baran, 1962).

2.3.3 The four Ps of the Blockchain

While the original Bitcoin blockchain was released as an open and distributed ledger technology, today the blockchain architecture can be classified into a two-dimensional system, first regarding the network platform accessibility (Public/Private) and second related to network permissions (Permissionless / Permissioned).

Additionally, in regards to what is *private* and *public*, this distinction is allocated to the level of platform accessibility. Thus, while in the private model the direct access to the data is limited to predefined users who are trusted and known, in the public model data reading permissions are not restricted (Walsh et al., 2016), and permission for external entities to join the network is not required.

Additionally, in the two dimensional classification system, the level of network permissions represent the level of authorization required in order to perform an on-chain operation, like, for example, the right to vote or submit information into the blockchain. This is classified as *permissioned* vs *permissionless*. Permissioned platforms represent a restricted data environment where only predefined users are allowed to perform operations like transactions, while, on the other hand, in permissionless platforms no restrictions exist in regards to the identity of the processors, and the written content becomes readable by any peer (Wust and Gervais, 2017).

2.3.4 Consensus Mechanism

While in the traditional payment systems central authorities provide clearinghouse services where pre-authorized individuals are in charge if verifying and clearing all the transactions. On the other hand, blockchains are mostly operated by unknown and untrusted parties. Hence, the mechanism that achieves the *network agreement* among individuals is known as the *decentralized consensus* — the universal single truth that everyone on the network agrees upon (Antonopulos, 2015). Consequently, once a block attempts to add a new transaction record, it needs to be appended into the blockchain. In order to achieve this cryptographic algorithms are applied. In blockchain distributed systems four main algorithms exist: *Proof-Of-Work* (hereafter PoW), *Byzantine Fault Tolerance (hereafter BFT), Delegated-Proof-Of-Stake (hereafter DPoS), Proof-Of-Stake (hereafter PoS) and Proof-Of-Authority (PoA).*

2.3.4.1 Byzantine Fault Tolerance

BFT is derived from the Byzantine Generals Problem, where the goal is to agree on a strategy among reliable and unreliable actors in a potentially compromised network order to avoid a systematic failure (Antonopulos, 2015). Thus, it can be explained allegorically as: “Different army groups represented by one general, camping outside a fortress aimed to be conquered, the generals communicate their invasion plans through messengers, nevertheless among the groups are traitors who will create confusion and aim to compromise the simultaneous

invasion plan". This algorithm required two things. Firstly, the generals who are loyal should have the same reaction plan, regardless of the traitors. Secondly, the traitors, as a small minority, should not compromise the application of the plan, thus allowing the loyal generals to reach an agreement with a reasonable strategy (Lamport, Shostak and Pease, 1982). Furthermore, in computer science one example of replication from the Byzantine fault-tolerance algorithm is the *Practical Byzantine Fault Tolerance* (PBFT). In this variation, each general can be seen as if the cluster leader had an internal state, where, the request to any computational operation within the internal state is performed only by reaching an internal decision, which each leader share with the others of the same kind. Lastly, the consensus is achieved based on the total submitted decisions (Castro and Liskov, 1999).

2.3.4.2 Proof-Of-Work

The PoW was originally conceived as a computational technique for controlling access to a shared resource, preventing DoS attacks and combating junk mail (Dwork and Naor, 1993). Additionally, this is done by the nodes demonstrating to a verifier that a certain amount of computational work has being performed in a certain specific amount of time in order verify its authenticity, nevertheless, doesn't require all the nodes inside the network to submit their decisions, instead a "*hash function*" creates conditions for "*computational work in a certain interval of time*" (Jacobson and Juels, 1999). During this process the participants can announce their conclusions and allow the submission of certain information in order to prevent false information. When this algorithm is applied into the Bitcoin blockchain, the demonstration tasks are performed by the role denominated *miners*. Consequently, the first miner who publicly achieve to verify the information is rewarded with the creation of a new block. This incentivizes the network members to participate on an anonymous manner. Additionally every 2016 blocks the difficulty of the PoW is adjusted by calculating the average block mining time of 10 minutes. If the average mining time is less, the difficulty increases while, on the other if hand, if it is more it decreases (Antonopulos, 2015).

2.3.4.3 Proof-Of-Stake

The PoS is similar to the PoW, but instead of having to solve complicated cryptographic puzzles and allowing the participation of every node inside the network, the PoS algorithm takes currency as an *interest-bearing collateral*, where earning new blocks is restricted to nodes that have a stake in the network, which, along with a digital signature, can prove their stake ownership. Additionally, in PoW the blocks are originally *forged* or *minted,* having created all the coins at the beginning and keeping the total without changes (Popov, 2016). Nevertheless, allocating the chances of getting rewarded in proportion to the wealth in the network is seen by some as centralization and inimical to a robust network. While it can be argued that increasing the possibility of being chosen depends on the stake proportions, different selection variants like the *NXT* and *Black Coin* for block discovery have arisen adding randomization instead of wealth stake probability (Antonopulos, 2015). An example of a hybrid PoW and PoS algorithm is Peercoin. Originally released in 2012 it has an unlimited currency in circulation limit, which provides additional incentives to the participants of the network.

2.3.4.4 Delegated-Proof-Of-Stake

Built in order to solve the problems found in PoW and PoS, the DPoS algorithm introduced the figure of *the delegates*. Nowadays, known as *witnesses*, a role in charge of signing the blocks and voting for every transaction made (Schuh and Larimer, 2017). Furthermore, the advantages of DPoS are that instead of including all the members inside of the trust circle, it allows faster transactions without waiting for untrusted nodes to verify transactions, checking that those remaining trusted nodes who sign blocks on behalf of the network have done it correctly. Therefore, this algorithm allows the trustworthy owners of the stake to become delegated representatives, gaining a representative position in the block *minting* preferences. Nevertheless, it can be argued that by concentrating the block validation into a few representatives it tends to become a centralized algorithm, with the additional risk of losing the interest of regular users who can not easily gain trustworthy status.

2.3.4.5 Proof-Of-Authority

Proof-Of-Authority was originally conceived for its use among private blockchains. Proof-of-Authority shares many similarities with the DPoS. Both rely on pre-approved accounts that participate as validators, which need to have a stake in the network in order to participate. Nevertheless, the main difference is that the right to become a validator is earned by trust gained through good behavior. Thus, if a party falls out of the consensus expectations the other parties assume the un-agreement party liabilities and assets, reducing the damage to the end-users (Parker, 2017).

2.4 Ecosystem

This section is conformed by the layer where the services and applications are executed on top of the blockchain, capturing value through intermediary services, extending the capabilities of the DCSs. Consequently, these additional set of features help the blockchain platforms to increase their user base by adapting the services and applications provided to the market needs (Brenig et al., 2016). For example, applications like the Ethereum *smart contracts* can add into the blockchain the capability of verifying automatic interactions between parties (Peters et al., 2015). Thus, *smart contracts* are often characterized as the maxim "*code is law*" (Risius, 2017). Additionally, an example of service is bitcoin API, which once connected to its endpoints it can operate as a payment processor, offering out-of-the-box online shopping solutions, like the "*we accept bitcoin*" button widget that facilitate the integration for digital merchants.

2.4.1 Smart Contracts

Smart contracts were originally intended for businesses who practice contractual law in order to apply the use of electronic commerce protocols among strangers as "*promises in digital forms*" (Szabo, 1996). Therefore, based on the definition provided by Luu, Chu, Olickel, Saxena and Hobor, smart contracts are the combination of user interfaces and computer protocols programmed to facilitate and verify a negotiation without the need for third parties. For instance, smart contracts can be implemented in a wide range of applications, such as the automatized execution of contracts after a specific event, self-governance applications,

decentralized gambling, and a wide range of financial applications (Luu et al., 2015). For example, in the case of the Ethereum network, a smart contract is identified by an unique alphanumeric address to which users can invoke and send previously defined digital funds, which can be specific *currencies* known as *tokens*. Furthermore, if a transaction is approved by the blockchain, all the participant nodes execute the contact content. Nevertheless, in order to prevent resource exhaustion attacks, two countermeasure variables on the execution side are applied. One variable is the maximum price to pay for the computation, known as *gasLimit*, and the price for each unit as defined as *gasPrice* (Luu et al., 2015).

2.4.2 Tokens

Today, in the crypto-economy context the meaning of the term *currency* has gained a variety of value connotations where the ownership of *units of value* — like tokens, altcoins and cryptocurrencies — has added new options to the venue of currencies' multiplicity. Consequently, this variety has unlocked access to a whole new set of features in the economic system (Swan, 2015). Furthermore, while some tokens are equivalent to currencies like Bitcoin, others simply operate as utility units of service. Nevertheless, while both are *units of value* issued by private entities, some utility tokens can be also created by organizations in order to empower private customers through self-governed business models. Moreover, today the most popular implementation of standard API tokens within smart contracts is known as the ERC20 token and operates inside of the Ethereum Ecosystem (Buterin, 2015). Additionally, ERC20 tokens similar to other *currencies* on the blockchain present unique identification characteristics. For instance one Ethereum token transaction consists of a unique transaction hash (*txHash*), the container block id and the destination smart contract address, among other values (Dhillon, Metcalf and Hooper, 2017).

2.4.3 Wallets

Widely used among blockchain ecosystems in order to allow the transfer of funds from one account to another, the wallets are to blockchains what customer account numbers are to

banks. Nevertheless, digital wallets like Bitcoin contain only keys (one public and one private), not coins (Antonopoulos, 2015).

Furthermore, in the case of Ethereum two types of wallets exist, accounts and wallets, both providing a unique identification address. First, accounts are similar to the Bitcoin wallets, with a public and a private key. Second, wallets are smart contracts deployed on the blockchain, which are controlled by their contract code and allow diverse features like multi-signatures and withdrawal limits, among many other smart contract features (Buterin, 2015).

Chapter 3. Literature Review

The following chapter displays the literature review developed by the researchers. As Webster & Watson (2002) explained, "a review of prior, relevant literature is an essential feature of any academic project. An effective review creates a firm foundation for advancing knowledge. It facilitates theory development, closes areas where a plethora of research exists, and uncovers areas where research is needed." (p.13) Therefore, following Webster & Watson (2002) guidelines, this literature review will present the prior body of research regarding Loyalty Reward Programs and about Archetypes studies in a Business which relate to the research question of the research in hand. Through such overview, the authors will be able to highlight the discrepancy between prior research and to clarify the specific research gap the research want to fill and finally will help recognizing the specific positioning of the paper. Therefore, the following chapter firstly presents the methodology applied while conducting the literature review, thereafter presents the relevant material divided by its topic and finally the research gap is displayed.

3.1 Methodology applied for literature review

In order to fulfil its purpose, the final collection of material utilized for the literature review has been picked from a much larger set of articles. Initially, the search for the literature started with the keywords "Blockchain", "Archetype" and "Loyalty Reward Program", searched in combination. Unfortunately, such combinations of keywords brought no relevant result. The lack of literature concerning blockchain application of LRP was expected given the youth of the technology. Therefore, the authors decided to search for literature by employing the keywords "Loyalty Reward Program" and "Archetype" alone. The authors searched for literature about LRPs using keyword such as "Loyalty Reward Programs", "Loyalty Scheme" and "Customer Reward Programs" in order to extend the reach of the research. Moreover, in order to remedy the lack of knowledge about LRP archetypes, the authors combined each of the previous LRPs keywords with others such as "attributes", "classification" "typologies" or "components" in order to investigate if previous researchers had identified some fundamental LRP elements. On the other hand, the authors used keyword

such as “Archetypes” or “Business Archetypes” in order to unveil the approaches used by other studies while aiming to create an archetype within a business context.

3.2 Research on Loyalty Reward Programs

Despite the comprehensive approach used to search for literature about this topic, the results of previous studies highlighting specific LRPs elements were quite scarce. Despite these scarce results, by re-organizing the collected literature, two themes emerged tackling the design of LRP and their typologies respectively. From these groups of papers the authors were able to identify four general attributes, namely two types of LRP design structures and two type of LRP typologies. On the other hand, the search highlighted one mainstream line of studies of paramount importance, which focuses on investigating the effectiveness or the performance of LRP to influence the repeat-purchase behavior of the customers. Therefore the authors decided to present an overview about the topic below by presenting a sample of papers that will help illustrate the final research gap. In order to display the main lines of study found and the few LRPs elements discovered, a concept matrix is presented below (Figure 6). The units of analysis which compose the “design” and “typology” line of studies are the attributes discovered.

	Effectiveness / Perfomrance	Design		Typology	
		Reward Structure	Program Structure	Stand-Alone Program	Multi-Vendor Loyalty Program
Jorna Leenheer et al, 2007	x				
Blanca García Gómez et al, 2006	x				
Michael Lewis, 2004	x				
Sharp and Sharp, 1997	x				
Yuping Liu, 2007	x				
Bridson et al, 2008		x			
V.Kumar & D.Shah, 2004		x			
S. Tanfod, 2013		x			
Mc Call & Voorhes, 2010			x		
M.Rese et al, 2013				x	x
Meyer-Waarden & Benavent 2006				x	x
Liu and Yang 2009				x	x
Dorotic et al, 2011				x	x

Figure 6: The Literature Review Concept Matrix

3.2.1 Previous studies on LRPs effectiveness and performance.

Despite the previous researches on LRPs, the analysis approach used by many authors is generally quite predictable and repetitive, namely, measuring the effectiveness or the performance of these programs by alternating the measurement of different metrics and of different components.

In particular, several studies focused on the effectiveness of LRPs to influence the repeat-purchase behavior of the customers, sometimes referred as customer behavior or as behavioral loyalty. On this matter, an analysis by Jorna Leenheer et al, (2007) aimed to understand such effect of the LRPs on behavioral loyalty by exploiting a peculiar metric, namely, tracking the share-of-wallet of non LRP-members against that of members. The research found that the real influence of LRPs is small, but positive and significant. Another

similar study that investigated the benefits of LRPs in terms of increasing members' behavioral loyalty toward the company, showed that the variation of behavior was still of little importance (Blanca García Gómez et al, 2006). Nevertheless, the research did highlight a set of new LRP qualities such as the ability to retain the loyal customer and to increase satisfaction, trust, commitment and positive attitude of the members (Blanca García Gómez et al, 2006). In the same vein, another empirical result from a study conducted by Michael Lewis (2004) who, by employing data from an online grocery and drugstore, suggested that LRPs increase the behavioral loyalty for a substantial proportion of customers by switching the customers decision making from a single-period decision to dynamic multiple-period decision making. Similarly, another study confirmed that when considering competitive repeat-purchase markets, loyalty programs seem able to alter, in a small degree, the normal patterns of repeat-purchase (Sharp and Sharp, 1997). Taking a different perspective on the same issue, a study by Yuping Liu (2007) analysed the long-term effect of loyalty programs, and introducing a new variable, namely, the "dynamic change in consumers' spending". The research highlighted that the ability of LRPs to increase behavioral loyalty depends on the initial usage level of consumers. For the customers that were heavy-buyers from the beginning of the program their spending levels and exclusive loyalty did not increase over time. On the contrary, for customers that were light or moderate-buyers at the beginning of the program, their purchase frequency, transaction size and behavioral loyalty did increase.

3.2.2 Previous studies on LRPs design

The second line of study about LRPs that emerged through the authors' reorganization of the papers focused on analyzing the design of the tool, aiming to understand how to fine-tune its components in order to achieve better performance.

An example of such a study regarding LRP design is the paper by Shugan (2005) in which the author claimed design is the factor that impacts the most on the future success of every LRP. Therefore, the researcher suggested applying the ideas of Marketing Relationship to LRPs in order to ensure that the LRP will become a company's asset rather than a liability. Another study by Bridson et al (2008) concerning LRP design presents a similar idea, namely, to need to redesign LRPs in order to increase the overall satisfaction of customers

toward company stores. The study then suggests utilizing a set of hard and soft attributes which describe the LRP reward typology, and by employing an iterative process it aims to find the right mix of elements which will allow the desired goal to be achieved. Another study investigating LRPs design suggests that to sustain loyalty it is necessary to focus on the design of the rewards and suggests a two-tiered reward approach — the ability to offer flexibility to the marketers and the ability to understand the right actions to take when considering loyalty programs (V.Kumar & D.Shah, 2004). Last but not least, McCall and Voorhees (2010) suggested the implementation of an LRP Management Program which has to be designed considering the program structure, the reward structure using a series of customer factors as a framework, which will allow for understanding and acting toward the right combination of elements for each specific store and each specific customer. The main reason presented by McCall and Voorhees (2010) for implementing an LRP Management Program is argued by the fact that, if not re-designed, loyalty programs often will not translate into effectiveness and they will possibly become a cost for the companies instead of a profit.

3.2.3 Studies comparing different LRPs typologies

The last line of study identified by the authors emerged as organized around the topic of LRP typologies. It is important to highlight that when searching for studies that specifically focused on comparing competing LRP typologies, the results were quite sparse. This is caused by the fact that in the past "research on loyalty programs has often studied such programs in a noncompetitive setting and has often focused on a single program in isolation" (Liu and Yang, 2009). Additionally, most of the past research on LRPs "usually do not distinguish between different types of loyalty programs. Either the type of program under investigation is not specified at all, or only one type of program is being investigated" (M.Rese et al, 2013).

Nevertheless, in order to fill the scarcity of the research in this area a handful of authors have studied competing LRP typologies. One example of this research is the study by M.Reese et al (2013), where, through a comparison of Stand Alone Programs (S.A.P.) and Multi-Vendor Loyalty Programs (M.V.L.P.), they investigated the impact on the loyalty effect based on

these different typologies. Another study by Meyer-Waarden and Benavent (2006) compared S.A.P. and M.V.L.P. in its investigation, but focused on their impact on repeat purchase behaviour. Unfortunately the study ended without ultimately investigating which differences between the programs can be attributed to this effect. Similarly, another study that compared different loyalty programs was presented by Liu and Yang (2009) was focused on understanding how the market saturation and the company's competitive positioning influence the performance of the company's LRPs. Finally, Dorotic et al. (2011), also compared individual loyalty program against joint promotions basing the study on the customers of a Dutch MVLP. Therefore, the authors pursuit of studies that tackled the LRP topic using a similar archetypal approach was again unsuccessful.

3.3 Research on Archetypal studies in Business

As stated before, the search for studies investigating the creation of a Loyalty Reward Program Archetype leaved the researchers with no evidence. In spite of the unsuccessful research while reviewing the existing knowledge regarding archetype studies within business context the authors identified and extracted one paper with high explanatory capacity about the creation of an archetype in a business context. Therefore the authors decided to include the paper in the literature review to give the reader an overview of the processes and ideas involved in such investigation.

3.3.1 Electronics Marketplace archetypes

In their study about Electronic marketplaces (EM) Soh & Markus (2002) aimed to created a classification of such tools in order to unveil the economic effect generated by each of its type. The study based its development on previous EM studies that approached the process of classification using two different methods. On one hand, previous research tackled this topic adopting a classification of EMs based on empirical observations (Kaplan and Sawhney ,2000; Wise and Morrison, 2000; Lennstrand et al. ,2001). On the other hand, many researchers motivated their classification of EMs using theoretical foundation (Bakos ,1997; Choudhury et al. ,1998; Lee and Clark ,1996). Soh & Markus (2002) argued that both approaches have some benefits but also several disadvantages. In particular, regarding

classification based on empirical observation, the authors highlighted the fact that all the previous studies adopting this approach used a large amount of attributes to classify EMs that, while capturing the complexity and diversity of the phenomena, created a lack of parsimony which can generate unnecessary confusion. Thus, in regard to theoretical classifications the authors argued that while providing types of parsimony and theoretical links between its effects they also lack a clear action implication, because in a real-life scenario the "correspondence between the theoretical type and the empirical instances is often very low" (Alvin Roth, 2002). Moreover, Alvin Roth (2002) "strongly recommends working iteratively between simple theoretical models and empirical data. This recommendation implies the need for classification schemes that have both theoretical parsimony and empirical fidelity". Therefore, Soh & Markus (2002) proposed a new approach to EMs classification called strategic archetype that merges the benefits of the previous approaches, theoretical parsimony and empirical fidelity.

Following the guideline presented above, Soh & Markus (2002) selected Porters (1985) theory of strategic positioning as a fundation for their strategic archetype. Such theory was selected for two reasons. "First, the specific constructs of the theory subsume most of the important attributes identified in prior studies of EMs. Second, the theory does two things a good classification scheme should do: it provides a basis for parsimoniously differentiating types, and it hypothesizes a link between types and outcomes" (Soh & Markus, 2002). Thereafter, the authors empirically collected all the EM attributes investigated in previous studies and tried to match these attributes with the three key concepts of strategic positioning theory, namely, value proposition, product-market focus, and value activities. The mapping process was successful with most of the EM attributes falling neatly into the three key concepts except for two important attributes, "ownership" and "market structure", which the authors added as key attributes to the final framework. Lastly, the authors operationalized each key construct with the practitioner and the academic literature on EMs.

Finally, to display the usefulness of the strategic archetype framework, Soh & Markus (2002) analyzed two successful EMs both from the same industry sector. The decision of using successful EMs from the same sector allowed the researchers to facilitate valid comparisons in terms of configuration and performance. In order to prove the benefit of the strategic

artchetype, the authors decided to initially explore the two EM cases using the empirical and theoretical approach and to compare their result with the strategic archetype approach. Therefore, the authors obtained the necessary data "from company Websites, annual reports, analyst reports and press articles" (Soh & Markus, 2002) and then started the comparison.

First, the authors found that through the purely empirical approach the classification of EM results were empirically rich but entirely idiographic, and that drawing meaningful conclusions was difficult because it was limited by the absence of theoretical foundation (Soh & Markus, 2002). Thereafter, the theoretical approach was able to draw meaningful conclusions regarding the outcome of each EM type, but was able to do so by ignoring some interesting and potentially relevant facts. Therefore, such an approach was considered weak by the authors when applied to a messy empirical reality. Finally, when applying the strategic archetype approach the authors found some meaningful results. The approach was able to highlight the different ways these EMs achieved their success while exhibiting a considerable internal coherence with the theoretical attributes. Therefore the authors determined that the strategic approach has considerable potential to inform future investigations of EMs, stimulate systematic building theory that will benefit future analysis of hybrid EMs, and also has the potential to help translate empirical and theoretical results into meaningful prescriptions for practice (Soh & Markus, 2002).

3.4 Research Gap

Thanks to the presented literature review, the researchers were able to identify the final research gap. In particular, during the review an important and mainstream line of study which investigated the effectiveness of LRP to influence the repeat-purchase behavior of the customers emerged. But when searching for studies that analyze different Loyalty Reward Programs aiming to display an archetype, the search left the researchers with no evidence. Furthermore, regarding blockchain technology, the review of academic material available so far produced scarce results due to the youth of this technology, and similar to the previous search it showed no evidence of studies focusing on LRPs. Additionally, LRP studies that compare diverse typologies of LRPs were scarce and there was no evidence, at least from our literature research, of any study that implicitly tried to create an archetype.

In conclusion, is fair to say that the current research landscape regarding Blockchain-based LRPs is missing. Therefore, with the research at hand the researchers want to investigate the intersection between Blockchain Technology and Loyalty Reward Programs, focusing on understanding how this technology will enable the creation of a new business archetypes for LRPs.

Chapter 4. Theoretical Underpinnings

The following chapter displays the theoretical underpinnings related to the key concepts "Loyalty Reward Program" and "Archetype". The theoretical underpinnings or theoretical frameworks aim to present the basic knowledge, ideas, models and theories that relate to the topics presented through the scope of the thesis. The purpose of such display of knowledge of the key concepts is to 'frame' the current research and to provide scientific justification for the research at hand. Therefore, below an outline is presented of the basic knowledge, and more advanced models of these core topics are also presented.

4.1 Defining the scope of Loyalty Reward Programs

During the past decades, customer-oriented strategies have been adopted by many companies (e.g. Brown, 2000; Kalakota and Robinson, 1999; Peppers and Rogers, 1997). One of the favorite tactics adopted by many firms to satisfy the requirements of such strategy was to establish a customer loyalty program (Uncles et al, 2006). In recent years, such tools have taken hold inside companies, becoming a core component for marketing strategy of many firms (Yuping Liu & Rong Yang, 2009).

Throughout its lifetime, different terms were used in order to classify this tool, such as customer reward program, Loyalty Reward Programs (hereafter LRPs) or Loyalty Schemes (hereafter LS). In spite of this difference of name, all the existing LRPs tools are based on the same previous experience from the AAdvantage Program, a Frequent Flyer Program (hereafter FFP) presented by American Airlines in 1981 and considered one of the most successful marketing tools that came out of the 1990s (O'Malley,1998). American Airlines, exploiting a system used by the hotel industry in 1970, developed a system which was able to transfer the benefit of the ticket purchase (that at that time was generally performed by a company, given the high costs of flying) to the individual traveller, in the form of rewards such as class upgrades or free round-trip tickets to an American destination (Mason & Barker, 1996). This program was a real success and spread very quickly especially due to the fact that companies followed one of marketing's most familiar strategies — "If you see a

good idea, copy it" (G.R.Dowling and M.Uncles, 1997).

Afterwards, the competition between different companies' programs inevitably grew until it forced companies to improve their LRP in order to remain relevant in the new market. As an example, American Airlines fine tuned its FFPs program introducing new types of customer's rewards such as, club lounges, personal gifts and express check-in (Mason & Barker, 1996), and other programs adopted similar improvements. After these early years, LRPs gained even more notoriety among companies and customers, and currently they are a huge reality for both. Nowadays, American companies spend more than $1.2 billion every year on LRP, the overall participation has reached 2.6 billion users and on average U.S. households are subscribed to 21.9 different programs simultaneously (Berry, 2013; Wagner et al, 2009).

Interestingly enough, in spite of decades of evolution and diffusion the fundamentals characteristics of this tool remains the same. Firstly, the basic goal of a Loyalty Program remain unchanged, namely:

- "to reward customers repeat purchasing and encourage loyalty by providing targets at which various benefits can be achieved" (O'Malley,1998).

The aim of this tool remains twofold. First, it aims to:

- "increase sales revenues by raising purchase/usage levels, and/or increasing the range of products bought from the supplier. A second aim is [...] by building a closer bond between the brand and current customers [...] to maintain the current customer base" (Uncles, Dowling and Hammond, 2006).

Another way to present the LRPs basic function, through a more comprehensive definition including its nature and its goal, is:

- "to establish a higher level of customer retention in profitable segments by providing more satisfaction and value to certain customers" (Bolton, Kannan, and Bramlett 2000).

4.2 Loyalty Reward Programs type

As presented in the previous literature review, usually LRP can be classified into two types namely, the Stand Alone Program (S.A.P.) and the Multi-Vendor Loyalty Program (M.V.L.P.). Both LRPs follow the same goal presented in the previous section and basically work in a similar way. The difference between these two is in their architecture.

On one hand, the Stand Alone Program is an LRP that works individually, meaning that it is employed by a single company or brand that has complete control of the tool. On the other hand, the MVLP bases its architecture on a series of loyalty program partnerships exploiting a networking principle (Dorotic et al, 2011). In particular, unlike S.A.P., the M.V.L.P. model of loyalty generally consists of "three or more companies banding together to share the branding, operational costs, marketing expense and data ownership of a common loyalty currency [...] offering strong economic benefits to cash-strapped program sponsors and a higher velocity of earning for program members" (Capizzi and Ferguson, 2005).

4.3 Defining the interpretation of Archetype

Unlike its counterpart in psychology, when searching for a set of studies investigating the definition of archetypes in a business context the results are quite sparse. The reason for such results is determined by the fact that for a long period of time there wasn't a clear line of study concerning archetype. Instead those studies that actually investigated archetypes within business contexts, were using words such as "constructed type" and "configuration", among others, while they were were actually tackling archetype study.

According to McKinney (1966:3) an archetype, which he refers to as "constructed type," is:

- "a purposive, planned selection, abstraction, combination, and (sometimes) accentuation of a set of criteria with empirical referents that serves as a basis for comparison of empirical cases."

Thereafter Miller (1996), developing on the literature about conceptual typologies and empirical taxonomies, tackled the archetype issue which he refers to as "configuration", introducing the important concept of organizing archetype around a "thematic focus". In particular, Miller (1996) stated that:

- "Configuration, in this sense, can be defined as the degree to which an organization's elements are orchestrated and connected by a single theme. Such themes can be found within or across categories."

Moving forward, according to Greenwood and Hinings (1993), an archetype is:

- "a set of structures and systems that reflects a single interpretive scheme."

Moreover, Greenwood and Hinings (1993) explained that there are two general statements that justify and support their definition. Firstly, the definition talks about structures and systems due to the authors' belief that reflects the "holistic" perspective presented by Miller and Friesen (1994), who state:

- "Organizational structures and management systems are best understood by analysis of overall patterns rather than by analysis of narrowly drawn sets of organizational properties".

Secondly, the definition states that these patterns refer to a single interpretive scheme, which idea reflected in Miller's (1996) idea of "thematic focus". Therefore, with a more comprehensive perspective, Greenwood and Hinings (1993) explained that:

- "The pattern of an organizational design is a function of an underlying interpretive scheme, or set of beliefs and values, that is embodied in an organization's structures and systems. An archetype is thus a set of structures and systems that consistently embodies a single interpretation".

In conclusion, Greenwood and Hinings' (1993) definition of archetype highlight two important components. It stressed the need for holistic approach when addressing archetype studies and highlight the importance of recognizing a "thematic focus" for providing the basis of pattern classification.

4.4 Weill & Ross Matrix comparing IT Governance Archetypes

Following the development of strategic archetype studies within a business context presented in the literature review and searching for a study able to combine the archetype approach with the specific needs of the research at hand analyzing two LRPs with different governance, the authors identify a seminal paper by Weill and Ross (2004) titled "*IT Governance in One Page*", which provided the theoretical grounding and thematic focus for the creation of the LRP Matrix.

In their seminal study, Weill and Ross (2004) tackled the topic of IT Governance combined with decision making and strategic alignment. The study by Weill and Ross (2004), investigated almost 300 organizations in 23 countries, and using the collected data the authors were able to map "six mutually exclusive organizational structures or archetypes against five key IT decision areas" (Brown and Grant, 2005). The six resulting archetypes are divided between the traditional tripartite governance structures: centralized, decentralized, and middle ground or blended. First, Business and IT Monarchy representing the strict centralized decision making structure. Secondly, the Federal and the IT Duopoly belonging to the blended category and, third, The Feudal, which along with the IT Duopoly was absent in the previous research (representing a decentralized decision making structure) (Brown and Grant, 2005). The last archetype is *the anarchy* representing the case where each small group makes decisions still represented by the decentralized structure, but due to its incompatible nature with the common vision of business was not comprehended in the final matrix. On the other hand, the five key areas of the IT decisions as presented by Weill and Ross (2004) are namely: IT decisions, IT principles, IT architecture, IT infrastructure strategies, business application needs, and IT investment and prioritization. The key issues faced by each IT decision are presented inside (Figure 7) .

IT Principles	How do the business principles translate to IT principles that guide IT decision making? What is the role of IT in the business? What are desirable IT behaviors? How will IT be funded?
IT Architecture	What are the core business processes of the enterprise? How are they related? What information drives these core processes? How must this data be integrated? What technical capabilities should be standardized enterprise-wide to support IT efficiencies and facilitate process standardization and integration? What activities must be standardized enterprise-wide to support data integration? What technology choices will guide the enterprise's approach to IT initiatives?
IT Infrastructure	What infrastructure services are most critical to achieving the enterprise's strategic objectives? What infrastructure services should be implemented enterprise-wide and what are the service-level requirements of those services? How should infrastructure services be priced? What is the plan for keeping underlying technologies up-to-date? What infrastructure services should be outsourced?
Business Application Needs	What are the market and business process opportunities for new business applications? How are strategic experiments designed to assess success? How can business needs be addressed within architectural standards? When does a business need justify an exception to a standard? Who will own the outcomes of each project and institute organizational changes to ensure the value?
IT Investment and Prioritization	What process changes or enhancements are strategically most important to the enterprise? What is the distribution in the current IT portfolio? Is this portfolio consistent with the enterprise's strategic objectives? What is the relative importance of enterprise-wide versus business unit investments? Do actual investment practices reflect their relative importance? How is the business value of IT projects determined following their implementation?

Figure 7: Key Issues for Each IT Decision Area (Weill and Ross, 2004)

In order to evaluate and compare the archetypes proposed against the key decisions, Weill and Ross (2004) proposed a matrix able to summarize all the information in one page (Figure 8).

Governance Archetype	Decision Domain					
		IT principles	IT architecture	IT infrastructure strategies	Business application needs	IT investment
	Business Monarchy	X				X
	IT Monarchy		X	X		
	Federal				X	
	Duopoly					
	Feudal					
	Anarchy					

Figure 8: Decision Domain vs Governance Archetype

This one-page "matrix approach, together with the IT governance design framework, provides practitioners with a succinct set of tools for determining the best IT governance arrangement for their organization" (Brown and Grant, 2005).

The researchers identified some elements of the Weill and Ross (2004) study which matched the specific orientation of the research at hand. In particular, the two LRP types that this research will investigate are differentiated by their governance structure. The Stand Alone Program has a private centralized structure, and it seems fair to identify this with the centralized governance structure, while the coalition Multi-Vendor Loyalty Program, being based on a partnership, seems to belong to the blended or middle ground governance structure. Moreover, the decentralized nature of blockchain may overlap with the last

governance structure, namely, decentralized. Therefore, the authors decided to borrow these elements of governance while creating their own set of dimensions in order to create a LRP Matrix and to support the research moving forward.

4.5 Conceptual Framework

To develop the archetype study the researchers will draw upon the IT governance framework by Weill and Ross (2004) to create the archetype Matrix of the two LRPs, namely the Stand-Alone Program (S.A.P.) and the Multi-Vendor Loyalty Program (MV.L.P.). Thereafter, the Breing et al (2016) framework of Blockchain Technology presented inside the technology review (chapter 2) will be applied to the LRPs Matrix obtained to display the creation of the new archetype based on this technology. The final framework (Figure 9) used to create the Matrix has been developed employing the empirical data gathered from the previous studies and the theoretical foundation selected.

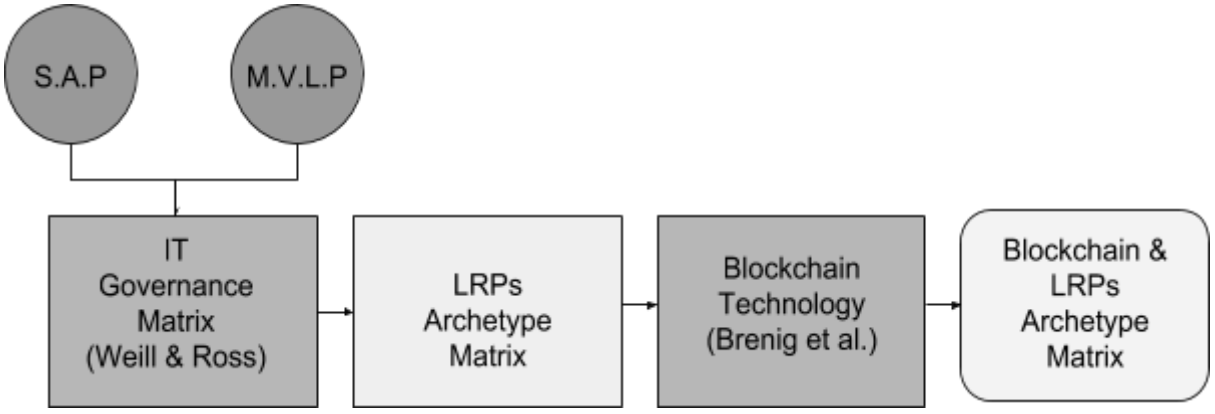

Figure 9: The Conceptual Framework

Chapter 5: The Research Methodology

The method chapter aims to supply the reader with necessary information about the methodological choices made by the researchers during the building process of the research at hand. Building on the scope of the research at hand, identifying how blockchain technology will enable a new type of LRP archetype, the researchers opted for an exploratory multiple case study in order to answer the research question. The cross sectional multiple case study employs qualitative multimethods in order to provide the necessary data to complete the study. Moreover, to validate and resolve certain problems, an expert has helped to identify how blockchain technology can resolve certain situations. First, the following section will introduce the reader to the main concepts of the case study methodology that shaped this research project, then demonstrate the reasons supporting the choice for using this specific method for this research. Thereafter, the other elements of the research design are presented (Table 1). The final research design was created following Saunders et al's (2014) template for the research design.

Research Philosophy	Positivism
Research Approach	Inductive
Nature of Research	Exploratory
Methodological Choice	Multimethod qualitative
Research Strategy	Multiple case-study
Time Horizon	Cross-Sectional

Table 1: Research design

5.1 Definition of the Case Study Research

Case study research method has been defined in different ways throughout its historical development. Today, a twofold definition presented by Yin (2014), which was fine tuned by the author through four editions of his book on the topic, seems to be the best representation

of this research method. For this reason the twofold definition by Yin (2014) has been chosen to build this project and therefore it is presented below. Yin's definition of case study is namely:

1. "A case study is an empirical enquiry that
    a. investigates a contemporary phenomenon ("the case") in depth and within its real-world context, especially when
    b. the boundaries between phenomenon and context may not be clearly evident.
2. A case study inquiry
    a. copes with the technical distinctive situation in which there will be many more variables of interest than data points, and as a result
    b. relies on multiple sources of evidence, with data needing to converge in a triangular fashion, and as another result
    c. benefits from the prior development of theoretical proposition to guide data collection analysis"

Albeit giving only general information, this definition still remains really important because it allows the reader to sense the general environment of case study research, and also it supplies an overview of the general path that can be followed to develop this research method. In the following sections all these topics will be presented, the structure of the case study research will be highlighted and deeper practical elucidations will be given.

5.1.1 When to use case study research method

Doing case study research remains one of the most challenging of all social science endeavors (Yin, 2014 pp.3) and, therefore, it is important to understand when to use this method. Three conditions help the researcher understand if the case study method can be properly applied to a specific case, rather than other research methods. The three conditions are respectively questioning three separate issues, namely:

(a) “the type of research question posed,
(b) the extent of control a researcher has over actual behaviors event, and
(c) the degree of focus on contemporary as opposed to entirely historical events” (Yin, 2014 pp.9).

Generally, case study research method it is identified with research question(s) that start with the defining focus on “how” and “why” (Yin, 2014; Myers, 2009) and, therefore, is considered appropriate for exploratory and descriptive studies (Mouton, 2001). We must remember that these questions are likely to favor the case study method, but this is not a one-way decision. In fact, also experimental or historical methods are suitable options with these questions. Therefore, in order to dissipate the remaining uncertainty about when to use the case study methodology, the ensuing conditions come to give assistance. Concerning the second condition (b), a case study is preferred in a situation where the relevant behaviors cannot be manipulated, even though informal manipulation can occur during participant observations (Yin, 2014 pp.13). Finally as the last condition (c) points out, case study focuses on examining contemporary events. Unlike case study, the historical method does not focus on contemporary events and the experimental method requires control of the relevant behavior. Moreover, unlike historical study the case study research method is able to deal with “a full variety of evidence — documents, artifacts, interviews and observations” (Yin, 2014 pp.13).

Method	**(a) Form of the Research Question**	**(b) Requires Control of Behavioral Events?**	**(c) Focuses on contemporary events?**
Case study	How, why ?	no	yes

Table 2: The three conditions applied

Therefore, since the phenomena we are investigating fulfil every requirement presented above through the three conditions (Table 2), the initial decision to apply a case study research method was confirmed and also validated.

5.1.2 The application of a multiple case study research design

The multiple case study research selected for the development of this research ensures various theoretical advantages such as replications and contrary replications, elimination of alternatives, explanation and extension of theory (Eisenhardt and Graeber, 2007). Moreover, this design allows the researcher to perform cross-case comparisons of the findings, and to ascertain if the emergent finding is consistently replicated or if it is idiosyncratic to one case. Therefore, the multiple case study design is preferable over a single case study because it ensures a more robust structure (Yin 1994, 2003). Likewise, importantly, multiple case study design provides extreme flexibility from a philosophical standpoint. Multiple case studies can adopt an interpretive/constructivist philosophical lens (Walsham, 1993) or a positivistic way to look at the world (Yin, 1994; Benbasat et. al, 1987). Finally, the multiple case study design choice finds validity due to the fact that this design is fit for studies such as this one, which aims to "investigate a contemporary phenomenon in depth and within its real life context, especially when the boundaries between the phenomenon and context are not clearly evident" (Yin, 2003:13).

5.2 Research Philosophy

Throughout the early development of research it is fundamental to clearly define the paradigm — the lenses — that the researchers are adopting when analysing the "world" that they are looking at. This Paradigm, can be elegantly defined as "the basic belief system or worldview that guides the investigator, not only in choices about method but in ontological and epistemological fundamental ways" (Guba & Lincoln, 1994).

Ontology is concerned with the nature of reality; the way the researcher sees how the world operates and their commitment to particular views (Saunders et al, 2009, pp.110). On the other hand, epistemology is concerned with defining what constitutes acceptable knowledge in a field of study (Saunders et al, 2009, pp.112). Philosophy needs to be selected by looking at the influence it has on those two concepts and consequently on the final shape of the research. There are different types of philosophies available and all of them contribute

differently toward the way to frame research. Moreover, the selected philosophy will underpin the research strategy and the methods that will constitute that strategy (Saunders et al, 2009, pp.108).

Regarding this, the researchers found that positivist philosophy was the philosophy type that was more in compliance with their vision for the research development, and therefore it was the philosophy of choice. First of all, positivist philosophy adopts the philosophical stance of the natural scientist. As presented by Remenyi et al (1998), positivism is "working with an observable social reality and that the end product of such research can be law-like generalizations similar to those produced by the physical and natural scientists". Then, another important component of the positivist approach to research is data collection. In order to generate research that leads to the production of credible data, the positivist strategy requires the use of existing theory even if plain and simple. Last but not least, another important component of the positivist approach to research is the value-free approach (Saunders et al, 2009, pp.113). Again, Remenyi et al. in 1998 defined this value-free approach as the assumption that "the researcher is independent of and neither affects nor is affected by the subject of the research". Therefore, this aspect of positivist philosophy is another advantage when pursuing a research question like the one at hand investigating new technology from a technical standpoint and aiming to extract technical-centered insights.

Finally, because of its scientific nature positivism is generally associated with the quantitative research method. In spite of this tradition, today there are various examples of qualitative-based research that exploit the positivist approach to understanding the nature of the knowledge and the conditions that the data collected need to meet (Yin, 2003). Relating to the current research, the study adopts a positivist stance. Therefore, the researchers look at the reality in an objective way, using structured methods to investigate its different aspects.

5.3 Research approach

The research approach concerns the methodological choice about whether the research should apply a deductive approach or an inductive approach. When, "research into a topic that is

new, [...] and on which there is little existing literature, it may be more appropriate to work inductively by generating data and analysing and reflecting upon what theoretical themes the data are suggesting" (Saunders et al, 2009, pp.127). The inductive approach "is based on the principle of developing theory after the data have been collected" (Saunders et al, 2014). To increase the possibility of uncovering a real understanding of the topic presented through the research question of the research at hand, the approach selected for this research is the inductive approach.

5.4 Nature of the research

Consecutively, to advance the development of this research methodology the authors of this study had to decide what the nature of their research was. Therefore, the authors analysed the experience of previous researchers using the case study method. Similarly to the exemplary case study Yin (1994, 2003) developed, the authors chose the exploratory research approach.

Besides previous experience, when investigating phenomena that are still murky from certain perspectives, such as "how and why blockchain technology can enables the development of a new kind of LRP", the exploratory research approach is capable of uncovering the necessary layers of knowledge to pursue the research (Yin ,1994, 2003 ; Denzin ,1970). In fact, "the objective of exploratory research is to gather preliminary information that will help define problems and suggest hypotheses" (Kotler, P. & Armstrong, G.,2006 p. 122). Furthermore, the nature of the exploratory approach through the production of preliminary information about a murky phenomena (Kotler, P.& Armstrong, G., 2006 p. 122), defines the role of this kind of research to be the starting point for future social research. Therefore, also this study aim to facilitate future research about "how and why blockchain technology can enable the development of a new kind of LRP archetype", and to inspire future researchers.

5.5 Methodological choice

Another methodological choice the authors had to define to advance the research regarded the nature of the data to be collected. For this particular paper, the researchers decided to collect data of qualitative nature.

Qualitative data can be defined as non-numeric data or not quantified data, which is generally collected with techniques that span from a short list of answers, open-ended interviews and in depth interviews to entire documents (Saunders et al, 2009, pp.480). The strength of qualitative research method is to highlight the "objective analysis of subjective meaning" (Erickson, 1986). This data can be used for both exploratory and explanatory research purposes and for inductive or deductive investigations. Moreover, when a phenomenon under scrutiny lacks prior insights or they are modest, the flexibility and the exploratory nature of qualitative methods prove to be an appropriate and efficient tool to fill this gap (Ghauri and Gronhaug; 2002).

On one hand, qualitative research methods were able to shed new light on issues that quantitative research wasn't able to investigate, increasing the overall understanding of that topic (Eriksson & Kovalainen, 2008). On the other hand, perplexity about this method was spread by some authors who see this research method as challenging, because it "does not rely on unified theoretical and methodological concepts as quantitative analysis does" (Eriksson & Kovalainen 2008:30). Nevertheless, researchers like Robert K. Yin (1994, 2003) and Robert E. Stake (1995) have demonstrated that qualitative research methods, when designed with rigor and carefully planned within a positivist paradigm, can be successfully adopted for case study research. Moreover, unlike other research methods, case study research generally manages a population sample that is smaller and under representative of the entire population. Therefore, within this context the statistical generalisation achievable by using quantitative data is not as useful as qualitative data, so consequently the latter method is preferred by the authors.

5.6 Time horizons

The research at hand works in cross-sectional time horizons, as it seeks to display the current scenario for the application of blockchain technology to the Loyalty Reward Program industry. The blockchain technology is still at the beginning of its development and other new technology it is evolving rapidly. Therefore, pursuing a longitudinal study about such technology is not recommended because the study will have to follow the evolution of the technology and potentially become a never-ending project.

Chapter 6: Data collection techniques and procedures

The data chapter aims to supply the reader with all the necessary information about the data collected and employed to extract the final findings of the research. When doing case study research the data collection phase is a cornerstone that requires the researcher to utilize particular skills and is a complex task to perform overall. To allow the reader to fully understand the different rationales the researchers employed, the various steps of this phase are presented below. Starting with the strategies the researchers employed during the preparation of the data collection, to the techniques, procedures and strategies adopted during the final analysis of the data collected, this chapter will give the reader all the keys to understand the researchers' work.

6.1 Data sources selection

An important preparatory task to accomplish before the data collection is the selection of the data sources.The research at hand identified data sources to cover both the LRP industry and the Blockchain technology in order to fulfil its scope. First, the researchers tackled the selection of the case studies for the LRP industry. The relevance of this step is given by the amount of time a researcher may lose in investigating a case that, in the middle of the data collection, reveals itself as not viable. Case selection may not occur when cases are pre-determined due to a special agreement or when the researcher is studying a unusual and well known case. In another situation, the researcher must screen the candidates using different strategies in order to select the right one. For this research the researchers adopted a one-phase approach. Following the recommendation of this approach the researchers defined a set of operational criteria that allowed them to determine when the candidates were qualified to become a case or not. In particular, the criteria selected by the researchers concerned the type of service provided by the company under analysis, namely a Stand-Alone Program and a Multi-Vendor Loyalty Program. Additionally, the ability of the companies to communicate using the English language and the ease of data collection through secondary sources. Then, after collecting a minimum amount of data to verify the fulfillment of the

selection criteria of the candidates, the screening process started and the final candidates were selected. The final candidates whose data will be analyzed to investigate the scope of this research are the companies Returntool and Nectar, respectively a service provider of Stand-Alone Program and a service provider of Multi-Vendor Loyalty Program. These cases will be extensively presented in the next chapter. Thereafter, the researchers tackled the selection of the blockchain technology expert. In this case the researchers' criteria for selection were the trustworthiness of the the expert knowledge on the topic, the knowledge of the english language and the willingness to collaborate on this particular research. The final search for the expert led to the collaboration of an expert from BrainBot Technology, a company that worked in the core development of Ethereum and that now provides consultancy services to enterprises that want to leverage the capacity of smart contracts to innovate their business processes.

6.2 Case study protocol

The protocol for case studies contains the instruments, the procedures and the general rules to follow when using the protocol to conduct the research, and it is always directed to a single data point or single case even if the case is part of a multiple case study (Yin,2014, pp. 84). The overall purpose of the protocol is, by guiding the researchers through the data collection process, to increase the overall reliability of its research. While creating the protocol the researchers are forced to anticipate several problems that are thus planned in advance avoiding future pitfalls.

The suggested format to tackle this issue is a protocol composed of four sections: The first section is the overview of the case study. It covers all the background information about the case and all the relevant readings about the case issue. In particular, this section must contain the mission and goals reflecting the case study sponsor if there is one and the audience. Plus, a statement presenting purpose, sponsor, people involved and letter of presentation (Appendix 3) to the interviewees, if needed. Thereafter, the rationale for selecting the case, propositions, hypothesis, theoretical framework and key readings for all topics (Yin,2014, pp. 87). This section, in addition to informing the reader about all these aspects also serve as the

basis for the development of the introductory section of the final case study report. The second section is about data collection techniques. Unlike other methodology, the data collection for case study research doesn't collect data in a protected context like a laboratory, which can take the form of a survey or of an experiment. Consequently, a major shift in the standard dynamics between researcher and participants appears. Instead of limiting the behavior of the participants, here, the researcher's behavior is likely to be constrained because it needs to adapt to the request, availability and openness of the participants. Therefore, in such an uncertain environment some operational procedures helping the data collection are highly recommended: a data collection plan, preparation before field work, carefully displaying privacy protection measures, and including informed consent of the participants. The third section is about the data collection questions. This section contains the set of questions reflecting the researchers' line of inquiry. Unlike other tools, case study questions for data collection are posed to the researcher, not the participant. Therefore, the purpose of the protocol questions is to keep the data collection on track, reminding the researchers which is the data to collect. Thereafter, the protocol distinguishes five different levels of questions. The first level questions need to be asked to the specific interviewees. The questions of the second level are targeting the individual case. The third level contain questions investigating findings across multiple case. The fourth level focus on the entire study. Finally, the last last section is about the general guidelines for the case study report. In particular, some preparatory planning about the case study report format, the basic outline and the audience is recommended. This preparation will decrease the possibility of collecting data in the wrong format, or even not relevant data forcing the researchers to inspect the case study site repeatedly.

6.3 Sources of evidence

Firstly, it is necessary to highlight that no single source of evidence has a complete advantage against the other sources, instead, the sources of evidence available are highly complementary and therefore a good case study should exploit this synergy and combine as many sources as possible (Yin, 2014 pp.105). The six commonly used sources of evidence are documents, archival records, interviews, direct observation, participant observation and

physical artifacts. For this reason, the researchers combined two different source types, documents and interviews (Yin, 2014, pp 103). The reason for this selection was guided by the type of information needed which needed to be quite extensive and rich. Moreover, "documents and interviews complement each other" (Blumberg, et al., 2005 p. 194) and, while documents can be used to prepare an outline for the interview by identifying some issues of the case study, the interviews can also allow the identification of "the documents that will corroborate information obtained in an interview" (Blumberg, et al., 2005 p. 194).

6.3.1 Documents

The category of documents comprise a wide variety of document types such as letters, agendas, administrative documents, annual reports, news clippings and other articles from mass media or newspapers (Yin, 2014, pp 106). These documents are useful in a research project because they are able to validate or contradict information collected through other means. Moreover, documents can provide additional details on a specific argument, providing a deeper understanding of a particular them under investigation. In addition, thanks to the Internet, such types of data are easy to gather. Nevertheless, despite the facility to collect such documents, some precautions need to be taken when making use of these document types. One important recommendation is to ensure the validity of the document itself. This is required due to the fact that several documents publicly available were written and shared with a specific purpose. Therefore, not all documents can be part of a case study, because not every document contains the unmitigated truth, and instead of helping the research process they can actually mislead the researchers because of the bias embedded in the paper (Yin, 2014, p108). Moreover given the availability and the size of such types of data, the researcher should carefully determine the amount of documents to review in order to not spend an excessive amount of time to complete the screening process. Following these rules and recommendations for the collection of documents, the researchers used the documents collected to create the background and the narratives of the cases. Moreover, the data collected from the documents have served as the initial base to create the outline for some of the questions presented in the final interviews. In regard of this research, all the documents utilized are listed in the appendices at the end of the paper.

6.3.2 Interviews

Interviews are among the most important sources for case study, usually taking the form of a guided conversation instead of a structured inquiry (Yin, 2014 pp.110). The interviews for case study research can be of three main types: open ended, in depth (semi-structured) and survey interviews (Yin, 2014 pp. 110).

For this research, in-depth interviews were selected to guide the collection of the data regarding the case companies as well as for the expert interview. In regards to the case company interviews, semi-structured in-depth interviews were considered able to provide the knowledge necessary to complete the research. Such decision was validated by the ability of this type of interviews to produce data regarding the predetermined structure as well as providing interviewee the possibility to share with the interviewers their personal knowledge. This is enabled by the fact that in such interviews the conversation can be controlled and directed toward interesting themes that arise during the interview (Morgan, 1997). In regards to the expert interview, the in-depth approach was also employed given its ability to tackle predetermined themes as well enabling the interviewee to contribute with their own knowledge.

6.4 Interviews Guide

Both company interviews followed an interview guide (Appendix 4). The interview guide is composed by semi-structured and open-ended questions created with the purpose of allowing the interviewee to answer the questions in detail, clarify their responses and to share their personal knowledge on topics, which may lead the researcher to extract unplanned findings. The main themes tackled by the interview guide were outlined from the analysis of the documents concerning the companies which thereafter were transformed into key questions. The interview guides were delivered to the interviewee some days before the interviews in order to allow the interviewee to prepare and to collected some data if necessary.

The companies interviewed tackled the two typologies of LRPs, the Stand-Alone Program and the Multi-Vendor Loyalty Program. The structure of the company interviews is shown below. First, the interviews were opened with the greeting to the interviewee and thereafter the purpose and the necessary information about the project was presented. Thereafter the necessary information about the modality of the interview was presented, reminding the interviewee that the questions presented will be the same as the interview guide, and that the purpose of the interview was not find a correct or wrong answer, was of paramount importance. Additionally, within this process the consent of recording was reiterated to the interviewee ensuring the possibility of the recording. Thereafter, the real interview started by tackling some general information about the companies gathered from the document analysis, with the purpose to corroborate the initial data collected from the documents. Then, the questions focused on more specific elements of the company, such as the core activities that compose the company, the resources needed to maintain these activities and the infrastructure. Successively, the questions focused more on the service itself, investigating the overall capacities of the service, investigating the features provided to the customers, its ability to understand the customer preference and then a general assessment of its security level. Finally, the questions focused on the possibilities the customers have when using the service. Additionally, the interview guide's last section acted as a reminder for the researcher to perform the necessary closing goodbye, and to review the notes taken right after the interview in a separate post interview session.

The time frame of the company interviews was of about sixty minutes for Returntool interview and about forty minutes for Nectar interview. The interviews were conducted in the presence of both the researchers. The questions were asked alternating between the researchers. While one of the researchers was asking the questions the other research was in charge of note taking in order to reduce the possibility of losing information. Moreover, the interviews were recorded with the consent of the interviewee, which the researchers obtained following a formal request (Appendix 5). Finally, the interviews were conducted in different settings. In the case of Returntool the interview took place in the meeting room at the Copenhagen headquarters of the company, while for Nectar the interview was conducted

through the video conference software “Skype” because of the geographical distance of the interviewee (U.K.).

The expert interview was conducted on the topic of blockchain technology. The structure of the interviews followed the structure of the solution envisioned by the researchers (Chapter 9). Initially the solution was presented and the expert worked as a validator for the overall solution. Thereafter, the researchers presented the different thematics extracted from the case studies and presented them to the expert. The expert in this case served as validator as well as a source of additional knowledge which the researchers employed to polish their solution. The time frame of the expert interview was of about sixty minutes. Similarly to the Nectar interview, the expert interview was conducted through video conference software “Skype” because of the geographical distance of the expert (Germany)

6.5 Analytic strategy

The “analysis of case study evidence is one of the least developed aspects of doing case study” (Yin, 2014, pp.133). Therefore, an analytical strategy able to orient this process is of paramount importance. The purpose of the analytical strategy is to link the “case study data to some concept of interest” (Yin, 2014, pp.142), so these concepts provide a direction to follow in order to analyze the data. The analytical strategy adopted by the researchers is based on the inductive approach, working the data from the “ground up” (Yin, 2014, pp.138). Therefore, for the research at hand the researchers started the analysis process by “pouring” through the data collected, with the purpose to find some initial pattern which can suggest some useful concept and eventually some embedded units of analysis. The process will help to created a fine-grained analysis.

6.6 Analytic technique

A fundamental element of the analytical strategy is analytic technique. Analytic techniques are generally intended to deal with the issue of creating internal validity and external validity

(Yin, 2014, pp.142). In this case study, the analytic technique selected by the researchers is cross-case synthesis. The cross-case synthesis technique can be applied only in to multiple-case studies such as the research at hand. When dealing with a qualitative study like the research at hand, in order to create the cross-case synthesis, some additional tactics are needed such as a word table. The word tables are used to display the grouping of the data from each individual case into one or more categories or features which profile each case (Yin, 2014, pp.165). Thereafter, thanks to the display of data, the researchers are able to verify if the cases effectively share some similar categories or features that can be considered a replication. Therefore, following this technique, the researchers analyzed the case study individually and then extracted the categories shared by both cases. The final set of categories extracted from the data analysis are extensively presented in the following chapter.

6.7 Evaluation of the research process

The following section displays the tactics adopted in order to ensure the quality of the research by tackling issues of validity and reliability of the research which limit the presence of possible errors and bias. Generally, Yin (2014, p.45) suggests to evaluate the research process by means of four tests: construct validity, internal validity, external validity and reliability. In the case of exploratory or descriptive case study, Yin (2014, p.46) specifies that the second test, internal validity, doesn't need to be tackled. Therefore, following Yin's suggestions for the exploratory case study approach, below the researchers will present the measures regarding construct validity, external validity and reliability adopted in the research in hand.

6.7.1 Construct Validity

In order to construct validity a researcher needs to identify the correct operational measures to analyze the concept of the study. The reason behind this requirement is guided by the fact that without a detailed operational approach subjective judgements may influence the collection of the data (Yin, 2014, p.46).

The first tactic used in this research in order to increase the validity is the use of multiple sources of evidence. In fact, the research is based upon an depth qualitative investigation that employed both primary and secondary data. Such use of multiple sources of evidence allowed the development of a converging line of inquiry, which increased the construct validity (Yin, 2014,p.120). In particular, the researchers adopted the strategy of data triangulation to corroborate the findings of the companies case studies using the interview data to corroborate the documents' data. Then, an effort was made to maintain chain of evidence, allowing the derivation of any evidence from the beginning to the case study conclusions to follow (Yin, pp.127). Therefore, the report presents the citations and the necessary references of the evidence that are presented in the appendices. Moreover, for the in-depth interviews with the case company and the expert several precautions were taken to ensure a quality interview and lowering bias. First, the creation of the interview guide and the delivery of these to the interviewee ensured both a sound structure to start the interview and the preparation of the interviewee, increasing the validity of the research. In order to create the interview guide, the researchers collected several documents to gain as much knowledge as possible in order to sustain a quality interview. The interviews took place in different settings. In the case of Returntool the interview setting was quite and comfortable for the interviewee as it took place at the meeting room of Returntool headquarters. However, due to the lack of experience of the interviewers the interview may have been unintentionally biased. In the case of Nectar and the expert interviews the interviews took place through the video-conference software "Skype". For this reason the quality of the interview may have been lower then if executed face-to-face. Moreover, in all cases the data quality of the interviews may have been biased by personal interest as the interviewees may have kept some information secret regarding the company and regarding the smart contract under development in the case of the expert. Nevertheless, having the blockchain solution presented to the expert in order to validate it also helped to increase the internal validity of the research. Finally, all the interviews were recorded and notes were taken at the same time in order capture all the information presented. Moreover, after the interviews the researchers executed a post-interview session to immediately discuss the data, reducing the bias that a later revision of tha data may create. Then, the interviews were transcribed to enable a correct analysis.

6.7.2 External validity

External validity concerns the problem of assessing "whether a study's findings are generalizable beyond the immediate study, regardless of the research method used" (Yin,2014, p. 48).

The multiple-case study design used for the research instead of the single case study contributes to strengthening the external validity of the research. In fact, unlike single case study the multiple-case study design is founded on the comparability strength between the case studies, which is the first variable able to enhance external validity. Moreover, the replication logic applied to the case studies also positively influences the external validity of the research. Hower, by using a larger sample of companies from different locations the findings of the research will have a higher chance of applying to other business.

6.7.3 Reliability

The last test regards the reliability of the research. In this case, this concept of reliability has the objective to ensure that if a researcher conducted the same case study and followed the same procedures they will arrive at the same findings and conclusion (Yin, 2014, p. 48).

Therefore to ensure the reliability of the research the researchers have put a lot of effort into document the procedures followed in the research. The first measure applied by the researchers to deal with the documentation problem was the creation of the case study protocols for the companies case studies and the creation of the case study database. According to Yin (2014, p.84) the case study "protocol is a major way of increasing the reliability of case study research". Then, the second one was the creation of a database for the documents collected. Moreover, for future researcher the research design, methodology and data collection technique and procedures are precisely described in the previous chapters.

Chapter 7: Empirical Case Studies

Following the multiple case-study reporting format presented by Yin (2014), the next chapter presents the case study individually and the following chapter presents the cross-case analysis and results. In line with the scope of the research in hand the authors investigated two companies working in the Loyalty Reward Program industry. The first case-study presents the data collected from the Danish company Returntool which provides a Stand-Alone Program loyalty solution as a service. Then, the second case presents the data collected from the U.K based company Nectar, which provides Multi-Vendor Loyalty Program solution as a service.

The general data presented below comes from the secondary data and from the interviews the authors collected for each company. It is presented without involving any discussion or speculation, which instead will be tackled inside the cross-case analysis section that follows this chapter.

7.1 Returntool (private)

7.1.1 Company overview

Returntool is a Danish company headquartered in Copenhagen with international presence in Sweden and Spain that provide private Stand-Alone Program loyalty solutions. It was founded in 2011 as a digital marketing facilitator targeted at small and medium businesses in order to optimize and strengthen customer relationships. Today, Returntool offers a customized LRP application for bars, pubs and nightclubs as well as a CRM system capable of providing its customers with relevant data.

Returntool App was officially released to the public in January, 2011 under the name of *Poteo App*, later on acquiring its current name as part of the international expansion of the company. In the beginning, a word-of-mouth process started by spreading 100 QR Codes across random spots in Copenhagen, including links to a variety of benefits in some of the partnered restaurants and bars. Later on, during 2014 and 2015, the Returntool application gained its peak in popularity in featured publications in a variety of Local Danish online media channels such as uniavisen.dk, cphpost.dk, thelocal.dk and medium.com. As a consequence, the app reached a position among the 10 startups in the Greater Copenhagen Area.

Regarding Returntool, from an organizational perspective, it is currently conformed by two full time employees who play the roles of CEO and CTO, but perform additional tasks such as sales and customer support, additionally complemented by four freelancers, three developers and one person responsible for marketing. Therefore, it is possible to determine that Returntool has a high dependency to external human resources, which represent 66.6% of the employee base. Additionally in regards to social media presence Returntool can be classified as a small company with its Facebook fanpage close to reaching 104 likes and on Twitter its has 35 followers. Nevertheless, in regards of the customer base, according the company website, more than 120,000 customers are currently users of the multiple applications.

7.1.2 Client Base

The Returntool client base consists of 55 businesses, each one with its own application available in both the Apple Store and Google Play. Thus, it is formed by the following business sectors: 23% bars, 13.7% restaurants, 10.34% nightclubs, 6.8% cafes and 24.13% other types of businesses.

7.1.3 Core activities

Returntool has two main core activities. First, the maintenance of the LRP customized application. Returntool provide the application and offers to train small and medium sized

business owners who are not using digital loyalty programs to use digital schemas, or want to switch their current loyalty system into the Returntool LRP. Moreover the Returntool application is initially customized to the customer's graphic requirements, having the possibility to customized certain features like product images, offers and prices. The second core activities is the maintenance of the CRM system. For the CRM system, Returntool offers a customizable dashboard with access to customer behaviour statistics like purchasing habits, segments, campaign management, sms administration, and control of offers and discounts across the application. Additionally, the Returntool CRM is capable of providing live data about consumption habits, consumers and campaigns which can be integrated with Mixpanel and Google Analytics. As a consequence, the data provided by Returntool CRM allows clients to make decisions based on customer base data insights, offering more precise benefits to their target groups. Furthermore, in 2016 Returntool released its Intelligence API tool, adding the capability of allowing businesses to integrate their own ERP and CRM systems with the Returntool dashboard, simplifying the data exchange and improving the data compatibility between businesses partners. Additionally, another subsidiary product of Returntool ApS named *NightlifeCRM* is a product specialized for small and medium sized businesses that can be integrated with both the Returntool app and Returntool CRM, but, additionally, it includes the feature of allowing direct purchases on the client's custom application.

7.1.4 Returntool Loyalty Reward Point System

Regarding the point redemption system, Returntool serves as an intermediary that provides its clients with a custom-made Loyalty Reward Program application. The system architecture can be defined as a stand-alone loyalty scheme (Figure 10), meaning that each business unit has private control over its own application and the rules that apply for their customers, who are limited to exchanging their points within that unique business. In the Returntool application there are two main sections — stamp cards and offers. The first is a digital point card equivalent to the traditional physical card reward system and the second is a list of offers that can be redeemed as a traditional voucher.

Digital points card, Steps:

1) Application Installation: The process starts when the client promotes among their customers a free of charge customized application to download and install on their smartphones. It starts with the registration of the user account, requiring email and password, followed by a request to authorize the geo-location and notification services.

2) Point Earning, when a customer purchases an item they get access to a QR code, which releases a digital stamp after being scanned.

3) Point Redeeming, After reaching 10 stamps, the customer will have access to a predetermined benefit. For example: In the case of Australian Bar, the client gets access to a free beer for every 9 purchases.

Furthermore, the application flow is short but confusing. First, in order to have access to the LRP benefits and point system it is necessary to register the user-access information, a process that takes time and requires the user to type a username and a password that must be remembered for further access. But once the customer has gained access to the reward screen, the point collection mechanism is simple and intuitive.

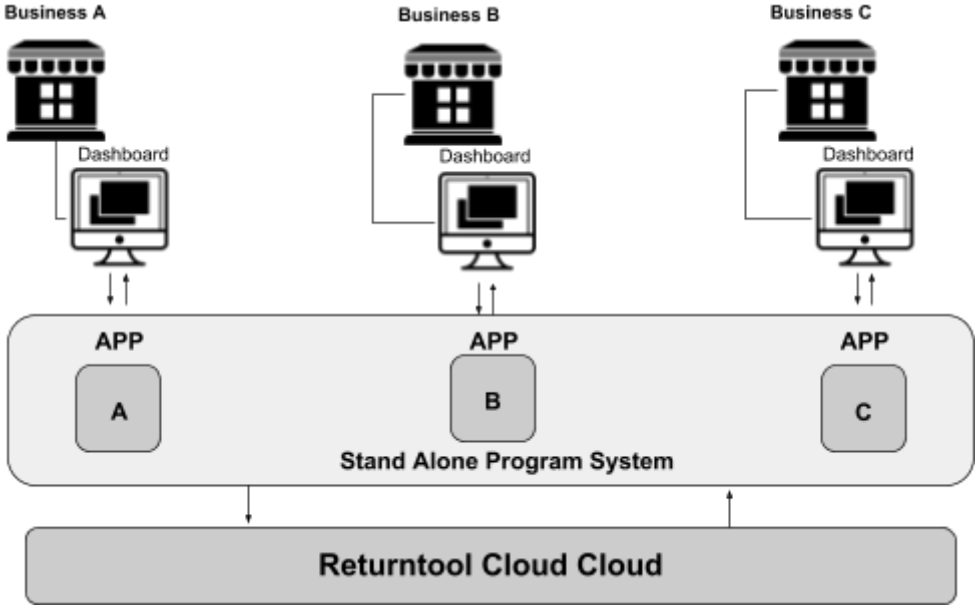

Figure 10: Returntool stand-alone program

Then, the revenue structure of Returntool LRP consists of a subscription model where the clients pay an entry fee (to cover initial development and digital strategy expenses), then a

recurring monthly fee is charged as for server infrastructure maintenance and customer support. Finally, the pricing model is complemented by additional requests of product customization, which are charged for the cost of additional maintenance.

7.1.5 IT Architecture

Returntool has two different platforms which are are intended to be executed from different types of devices, a mobile application and a desktop CRM tool. The mobile application is a client-customized content version that shares common properties with the other customized applications and is available in two different operating system versions: IOS and Android. In regards to its development, on the frontend it was developed with native language code Objective C for IOS and Java for Android, additionally, the media content (images, video and other files) are hosted on an Amazon S3 Bucket. On the backend, a common API built on PHP is in charge of the handling of requests and services, as well as a MYSQL database, both hosted on Amazon Web Services (Figure 11).

Additionally, regarding privacy and, as a requirement from the Apple store and Google Play, Returntool uses an SSL encryption protocol for its digital applications API requests. This helps preventing non-secure information referrals and middle-man attacks by using encrypted communication. Furthermore, SSL helps Returntool preventing fake API requests from non-authenticated users, avoiding the possibility of exploiting vulnerabilities such as requesting fake purchase coupons. Lastly, the customer data stored in the Returntool servers is co-owned between Returntool and its clients.

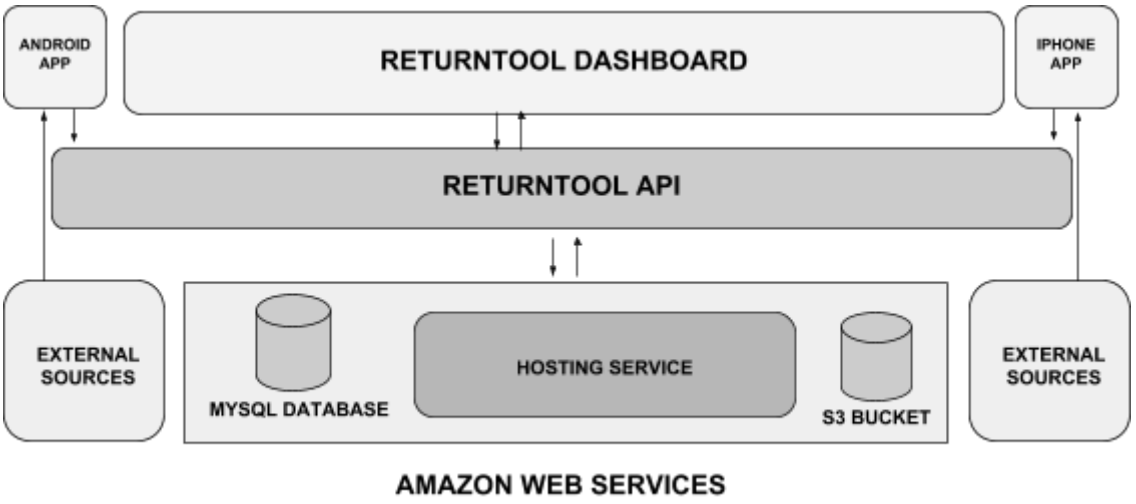

Figure 11: Returntool IT Infrastructure

7.2 Nectar (coalition)

7.2.1 Company Overview

Launched in 2002, Nectar is a coalition Multi-Vendor Loyalty Program with its headquarter in the United Kingdom. From its inception the company has been subjected to great development, achieving in recent years the rank of largest LRP in the entire United Kingdom. At the initial stage of its development the company was supported by four partners or launch members: Sainsbury's, BP, Barclaycard and Debenhams. Not only were these companies the initial partners but Sainsbury's, BP and Barclaycard, which already had legacy LRP systems up and running, actually merged their previous LRP projects into a unified LRP which was used as a model to create the final Nectar Loyalty Scheme.

The final Nectar scheme was runned and managed by the Loyalty Management Group, which at the time was chaired by the founder of Air Miles, another successful LRP. At the time of

the launch, Nectar managers presented all the necessary documents to the public and shared the details about the company that were still undisclosed, and, as expected, they extended the program from the four initial partners to any company interested in joining the program, with the only exception being companies which were direct rivals of the existing members. During this initial period the company experienced a steady and constant growth, gaining new clients, both in the brick and mortar space as well as in the online retail space.

Thereafter, in 2007, the Nectar Business was purchased by the Canadian Groupe Aeroplan (re-branded as Aimia in 2011) which continued its development without changing the fundamental business logics of the established Nectar scheme. This development brought the company to achieve an impressive clients portfolio by 2010, with 14 companies working in the brick and mortar space and almost 500 companies working in the online retailer space, and a market penetration of 16.8 million people. Thanks to Aimia management, Nectar achieved an even bigger market penetration in 2016 estimated at 19 million people. Recently, in February 2018 Sainsbury's, one of the initial partners which was also the biggest partner in terms of issuance and redemption of point, announced the purchase of the entire Nectar Business from Aimia. The purchase agreement was settled for 60 million pounds. Through this acquisition, Sainsbury's aims to use the Nectar Scheme to improve the control of customer habit data, which will now process Sainsbury's stores data as well as other partner operators' data.

7.2.2 Client Base

Nowadays, the partner portfolio of Nectar is composed of more than 500 retailers between brick and mortar and online-shops. The company involved in Nectar loyalty works in very different industries, offering the Nectar cardholder various advantages. For example, two of the companies involved in Nectar are Sainsbury's and Argos which are some of the biggest supermarkets in the U.K., offering products that range from groceries to home & entertainment products. Companies working in the oil and gasoline sector such as BP, or online stores such as eBay, as well as online travel shops such as Expedia, also use Nectar. Other companies use the platform for food distribution, such as Pizza Express, or for train

tickets with partners like Great Western Railways, even specific locations for family trips to places like Legoland, and many more.

All the companies that are part of Nectar allow the Nectar cardholder to earn points on the purchases that are made at their shops, plus the customers are allowed to redeem these points at other shops which are part of Nectar. This mechanism allows the customers to decide which available reward they want to redeem in order to best satisfy their needs and, at the same time, it offers the company the possibility to make better insights about customer behavior, which can be translated into more personalized rewards offering. Moreover, as the management of the program is outsourced for data analysis, the clients involved in Nectar can concentrate on their business and also, thanks to the multiple partners, the cost that a similar program will require to be supported alone are greatly reduced.

7.2.3 Core activities

The Nectar core activities are operated by the management company which has, as presented in the overview section, changed three times. Given that the last company acquisition is extremely recent and because the new Nectar owner, Sainsbury, hasn't showed any proposal to change the way Aimia was running Nectar, the core competencies presented below are based on Nectar's latest information available.

Overall, Nectar has two main core activities namely the points management and the data collection and analysis. Additionally, there are other day-to-day operations of minor importance. Both activities require a great amount of resources to be maintained. Firstly, In the case of the point management the magnitude of this activity will be displayed further in this chapter. However, is important to highlight that the point management logic of Nectar share some similarities with the logic behind a bank, following a complex process that will be presented in the next section along with some interesting financial aspects. Then, the data collection and analysis is the other core activities of Nectar. At the time of this research, the data analysis was provided by the department for Loyalty Analytics Business of Aimia. The service provide the business participating the loyalty program with the analytics about their customer habits so they can strategically create the new discounts offers. Additional

information regarding the architecture of these core activities and more insights about their working principles will be presented in the further sections and chapters.

7.2.4 Loyalty Reward Program System

Nectar Loyalty offers customers various possibilities to collect their points. Initially, the customers needs to become a Nectar cardholder by subscribing to the company's service. Thereafter, with their personal card the customer can collect points on each purchase they made, both from real stores and from online stores, as long as the brand purchased is part of the Nectar client list. Generally, the collection of points from a brick and mortar Nectar client is determined by a general reward rule, beginning at one point per hole pound spent, while for purchase at gas stations like BP the reward rule begin with one point for each liter purchased. In the same way, for purchases from Nectar clients with online shops, the redemption rule remains the same as for the brick and mortar companies, with the only difference being that the Nectar points are accredited to the cardholder, only when the company's online shop has been accessed through the Nectar website. Moreover, additional redemption rules are applied for a particular promotion as related to a specific time period as well as for particular products. Another solution provided by some Nectar partners are the e-vouchers. In this case, the retailer supplies the customers with an e-voucher based on the amount of points the customers decided to redeem, with which the customers can request a money discount on the purchase they will make at the Nectar retailer they chose. It is important to highlight that the Nectar program, thanks the coalition of business clients they operate, is able to generate a much broader appeal to its customers for two reasons. On one hand, the broad range of businesses and products involved supply the customer with a wide variety of rewards the customers can choose from. On the other, based on their purchases, Nectar frequently sends its customers a large variety of coupons or special discount offers aiming to fulfil their needs in the best way possible and to enrich their overall experience.

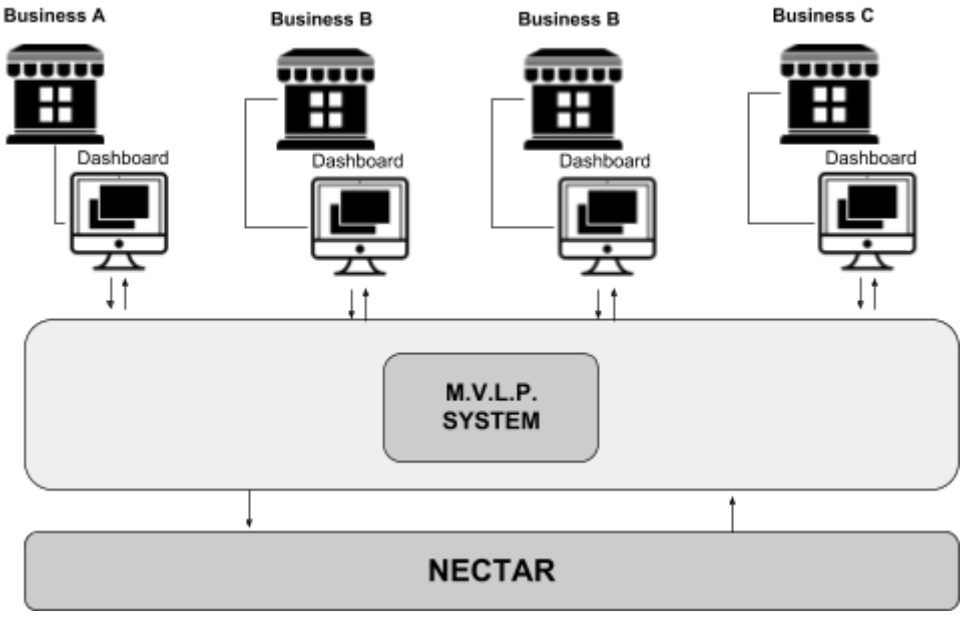

Figure 12: Nectar M.V.L.P system

Besides the modality by which Nectar offer its rewards to the final customers, another fundamental logic needs to be unveiled in order to understand the functioning of the M.V.L.P in its entirety, namely, the points redemption and issuance logic. Unlike a stand-alone program, an M.V.L.P needs to manage the loyalty program points while respecting several rules that govern the business coalition. In order to to do that, the M.V.L.P owner needs to act as an anchor for the entire network of clients applying a specific process regarding points redemption and issuance. The points redemption and issuance logic is composed of several steps. Firstlt Nectar issue the loyalty points and give them their value, the price. Then, the points are sold to the companies willing to use the Nectar points. The companies use these points to reward the customers after their purchase while paying to Nectar a small fee on each points. Finally the points are bought back from Nectar upon redemption.

Additionally, a complementary aspect to highlight the financial side of the issuance and redemption logic, the cash flow stream of the M.V.L.P "anchor" needs to be displayed. In the case of Nectar there are three main streams: spread, interest and breakage. Generally, these streams are part of every M.V.L.P even is the business model applied is different from the case of Nectar. The first cash flow, "spread", is also generally regarded as the biggest form of revenue for a M.V.L.P. "anchor". The "spread" happens after the business client purchases

points and issues them to a customer as a reward for a purchase. At that point, when the points are issued to the customer, the business pays a fee on each point issued to Nectar, the M.V.L.P. anchor. The second cash flow stream called “interest” is created by an interest rate. The “interest” is generated through another monetary obligation the Nectar business clients have toward the “anchor” company. The monetary obligation consist of the delivery of the value of the points issued to the “anchor” in order to constitute a provision. Collecting this provision from all the business clients, allowing the “anchor” to ensure that each business client will be paid after the final customers redeem the points for products. Therefore, when the final customers redeem the points, the business that rewards them is refunded by its provision. Finally, with the provision collected, the program “anchor” generally invests the amount in a conservative investment operation, which can be compared to the interest earned through a bank deposit, and the revenue is then added to the program’s “anchor” revenue streams. The last revenue stream comes from the so called “breakage” and it leverages the expiration date of the points. Therefore, when the points are not redeemed before the expiration date, the “anchor” recognizes the monetary value of these points as income.

7.2.5 IT Architecture

In order to provide its core competencies Nectar, needs various types of IT infrastructures. On one hand, Nectar needs an IT infrastructure (Figure 13) able to manage the loyalty points program, which is composed by two main technologies — the platform able to manage the loyalty settlement program and the server able to store all the necessary data. From the platform point of view, Nectar uses a third party software for revenue management and billing. In particular, the software takes care of the issuance and redemption operations, manages the expiration date as well as the date of occurrence. Such a settlement system is the key component of the M.V.L.P. system. Moreover, the settlement system requires a considerable amount of data storage in order to function. Nectar is managing this need by offering its own database space and it is integrating a third party service provider to store the data that exceeds its capacity. In order to ensure security and privacy, Nectar stipulated an agreement with the third party concerning specific rules and procedures the service provider needs to respect. On the other hand, Nectar needs IT infrastructure in order to manage the customer data collection and analysis. In a simplified way, the customer data collection

process needs two technologies to work —the data analytics and the server that hosts all the data collected. The data analytics were run by Nectar owner, Aimia, at the time of this research, in their own department for Loyalty Analytics Business. While the analytics were run in-house, the databases were divided. Although Aimia already has a great amount of data storing capacity by owning a vast fleet of databases, the size of the Nectar M.V.L.P added to the other Aimia operation required supplementary data storing capacity. Therefore, the company partnered with a third party data storing provider (undisclosed) in order to satisfy its need, making sure to establish a series of common security and privacy rules and procedures before the start of the collaboration.

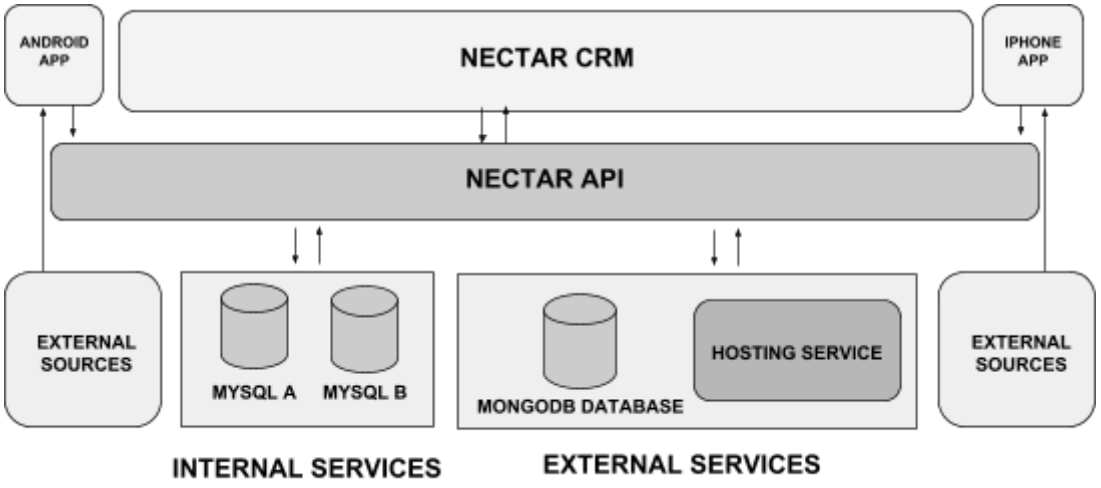

Figure 13 : Nectar IT architecture

Chapter 8 :Cross-Case analysis and findings

The next chapter introduces the cross-case synthesis and the findings the researchers discovered during the data analysis. The chapter is structured in two main sections. The first section presents the cross case synthesis or comparison of the case studies along a set of six common themes the researchers identified from the data analysis. “The process of synthesis entails organizing the relevant evidence extracted from the [...] sources and then finding some way of bringing it together” (D.S. Cruzes et al, 2014). In particular, the themes extracted by the researchers are the level of interoperability; the program speed; IT infrastructure complexity; Depth of data collected; Customer freedom of choice and lastly the Customization level. Then, the second section presents a summary of the findings and presents the LRPs archetypes Matrix created with these findings as dimensions.

8.1 Cross Case Analysis

“Cross-case analysis is a method that facilitates the comparison of commonalities and differences in the events, activities, and processes; the units of analyses in case studies” (Daniela S.Cruzes et al, 2014). In the next section the researchers present the results of the comparisons made across the case studies and, one at a time, tackle every theme identified, explaining the elements and the facts related to each theme for both case studies.

8.1.1 Level of Interoperability

The first theme the researchers identified while analyzing the data collected from both cases was the level of interoperability each system — the Stand-Alone Program and the Multi-Vendor Loyalty Program — is able to provide to the business adopting the LRP.

While analyzing the data collected for the Stand-Alone Program created by Returntool, some elements were identified to defined the interoperability of the service. Generally, the level of

interoperability of the loyalty service provided by Returntool appears to be distinctly influenced by the centralized governance structure in place, which determines the capacities of the service. In fact, while searching for interoperability insights during the data analysis, the researchers lingered on a proposition, regarding the ability of the program to establish a collaboration with other similar types of programs when they are owned by similar companies. In this scenario, the Stand-Alone Program created by Returntool seems to have serious limitations. In fact, since this type of program has been created aiming to fulfil only the needs of the program owner company, the program rules for the point management are tailored by the owner company to work in a closed system. This set of rules lacks any particular strategy able to tackle a possible exchange between two or more companies. Likewise, the data highlighted another interoperability issue, this time concerning the customers. In fact, from a customer point of view, this kind of program does not include any rules for point exchange or transfer. In particular, the customers are not authorized to exchange their points with other customers belonging to the same company program and, moreover, they are also not allowed to transfer their own points from one stamp card to another. This is because the program investigated tackles the point collection in a compartmentalized way, namely, the company owner of the program creates different cards for different items and each card has a different implicit value and rules for redemption. Therefore, the interoperability between cards, owned by the same customer or not, is limited by the inability of the system to manage all the necessary information required to perform the exchange or the transfer. Hence, due to the results of the investigation across many aspects of the program, the level of interoperability offered by the Returntool program seems to be very low or not existent.

The data collected from the M.V.L.P. offered by Nectar highlighted very different results. Because of its nature as a Multi-Vendor Loyalty Program, Nectar has different levels of interoperability than Returntool. From a company point of view, Nectar allows the companies belonging to its network to collaborate thanks to a shared points collection system that the intermediator, Nectar provide. This shared system, puts different companies into communication, which can add their personal set of discounts to the card, or they can join compounded special discounts, offering non-competing items. The outcome of such a shared system is a card filled with discounts of various items that are part of various sectors.

Therefore, from an interoperability point of view, this card actually allows the utilization of points between companies. In fact, within this M.V.L.P. context, the customers collect points on the mix of discount available created from companies and redeem the points within the same mix of discounts without any mandatory rules for redeeming a specific item. Finally, given the two types of Nectar reward, points and vouchers, the researchers analysed the interoperability of each. In this case the points and the voucher can be exchanged in a unidirectional way. Nectar points can be transformed into voucher when the prearranged goal as been achieved. Thereafter, the voucher has several limitations. In fact, it cannot be converted back into points and it cannot be transferred to another person or used to redeem an item that is not specified on their own voucher. Finally, Nectar cardholders are also not allowed to exchange points between each other.

Company	Returntool	Nectar
Level of interoperability	Absence of interoperability	Intermediated Interoperability

8.1.2 Program Speed

The second theme the researchers identified while analyzing the data collected from both cases was the program speed of each system, the time required for the systems to update points balance and to complete point transfers.

In the case of Returntool, the process that governs the point management is performed in a centralized way by the company that adopted the Returntool loyalty service. In particular, the researchers found that generally companies utilize an automatic process. The process is made seamlessly and consists in scanning a QR code which is coded to add one point to the digital stamp-card of customers after each purchase. However, the process is possible given the simplicity of the adopted system, as there is no collaboration with other companies. Therefore, more complex systems can not achieve such speed because they operate a more complex service which gives more value to the customers.

In the case of Nectar, the data highlighted a different situation. Point managements is one of the most complicated task Nectar executes and, despite the use of sophisticated software, the speed of the program was often an issue. In particular, the data highlighted that Nectar balances are updated every 72 hours and therefore the customers are often forced to wait before redeeming the points on their favourite discounts until the points are accredited to their account. Moreover, in the case of online shopping purchases, the time required to accredited the points earned can reach a maximum of 35 days. The reasons for this delay are not completely ascribable to the point management process, in fact, some companies deliberately slow down the process for marketing purposes. However, in a normal situation the process will generally require four days. Additionally, the point management process also includes the coupons that are sent directly to the customer. In this case, after the customers hande in the coupons at the shop to earn Nectar points, the time required for the balance update is up to 28 days. In this case, the low speed of the program is mainly caused by the process of collecting and transforming the coupons collected into digital form, a process that is executed partially manually.

Company	Returntool	Nectar
Program Speed	Fast	Slow

8.1.3 IT Infrastructure Complexity

The third theme the researchers identified was the IT infrastructure complexity of each system, namely, the amount of IT infrastructure required to maintain the system and the complexity of the system itself.

In order to provide a reliable and stable service for its customers, the Returntool IT infrastructure complexity is based on what the researchers have identified as the main IT platform components. Accordingly, each one is directly or indirectly communicating with another, creating a single platform instead of having isolated clusters with independent nodes.

Moreover, these component groups were classified into three main layers, separated by the frontend user interfaces, service API and hosting providers.

First, in regards to the user interfaces, the researchers have identified three different frontend applications. Two of them are generic mobile templates, an Android app built with Java and an IOS app built with Objective C, while the third is a desktop application that serves as a CRM dashboard customized on top of a PHP based content management system named Wordpress. Second, for the Returntool service API, the importance of the service role inside of the platform relies on its capacity of allowing the connectivity and exchange of information between internal and external services. Consequently, in order to provide this feature in a secure way, the Returntool API delivers a JSON formatted Rest API through SSL. Third, regarding the hosting layer, the relevance of this set of infrastructure components relies on its capacity to store and provide organized and controlled access to the data. Returntool storage is controlled by a single centralized SaaS (Software as a Service) provider named AWS, which is in charge of hosting three different storage means. First, a MYSQL database with all the transaction records and customer information, among other data. Second, a hosting plan responsible for hosting the website code filesystem information. Third, an AWS S3 bucket with all the heavy files, for example, images, video and audio. Consequently, by having a single centralized SaaS provider, Returntool concentrates its IT infrastructure complexity into one provider, which results in a recurrent monthly fixed cost of around 100 usd monthly. Moreover, with this structure company expenses become easier to anticipate, nevertheless, this pricing distribution may represent a single point of failure.

In the case of Nectar, the MVLP service provider, the IT infrastructure complexity is at a different level from the previous example. In order to provide its core competencies Nectar needs various type of IT infrastructures. On one hand, Nectar needs an IT infrastructure able to manage the loyalty points program, which is composed by two main technologies — the platform able to manage the loyalty settlement program and the server able to store all the necessary data. From the platform point of view, Nectar uses a third party software for revenue management and billing that provide a unified issuance and redemption functionalities for the loyalty program. In particular, the software take cares of the issuance

and redemption operations, and it manages the expiration date as well as the date of occurrence. Such settlement systema are the key component of the M.V.L.P. system. Moreover, the settlement system requires a considerable amount of data storage in order to function. Nectar is managing this need by offering its own database space and it is integrating a third party service provider to store the data that exceeds its capacity. In order to ensure security and privacy, Nectar stipulated an agreement with the third party concerning specific rules and procedures the service provider needs to respect. On the other hand, Nectar needs an IT infrastructure to manage customer data collection and analysis. In a simplified way, the customer data collection process needs two technologies to work, namely, the data analytics and the server that host all the data collected. At the time of this research data analytics were run by the Nectar owner, Aimia, in their own department for Loyalty Analytics Business Software. Meanwhile, the analytics were run in-house and the databases were divided. Although Aimia already has a great amount of data storing capacity by owning a vast fleet of in-house servers, given the size of Nectar some supplementary data storing capacity is required. Therefore, the company partnered with a third party for data storage provider in order to satisfy its needs, making sure to establish a series of common security and privacy rules and procedures before the start of the collaboration.

Company	Returntool	Nectar
IT Infrastructure Complexity	Fragmented	Partially Unified

8.1.4 Depth of Data collected

The fifth theme the researchers identified while analyzing the data collected from both cases was the depth of data collected through their LRP, specifically, the depth of the data collected through the loyalty program.

Regarding Returntool all their customers' data insights stay under a single merchant database namely, mono-sector, complying with the traditional SAP structure. The level of data collected by the CRM tool covers many areas from both end-customer systems (CRM and

apps) the most relevant being usability and customer data. The first refers to user insights on behaviour across the platform, the second refers to the small unit dump of each customer dataset that Returntool stores on its cloud server provider. Then, the investigation highlighted that the data collected using the system supplied by Nectar offer a good amount of insights to the companies that adopt the system. The main reason behind the richness of the data collected can be ascribed to structure of the MVLP itself namely, multi-sector. In particular, the system is able to supply the company with data that describes the consumption of multiple items and multiple services by a single customer. The data displays every item and service bought by a customer and therefore allows the company to understand the purchase behavior of the customer. Furthermore, the data displays the redemption behavior of the customers. identifying any item and service redeemed by the customers and the business that offered that particular item or service.

Company	Returntool	Nectar
Depth of Data	Mono-sector	Multi-sector

8.1.5 Customer freedom of choice

The fourth theme the researchers identified while analyzing the data collected from both cases was the freedom of choice the customers had with each system, the choices available to the customer in terms of discounts.

The Stand-Alone Program structure in which Returntool operates as a single reward system, provide their customers with a small predefined, limited amount of choices to choose benefits from. Small and medium business units have total control over the value and validity of each one of the points issued under their own application, providing their customers with their own valid offers and defining for which products they are interchangeable. This is possible in two different scenarios. For example, the customer of a client bar can have the option that for every 10 beer purchases a free beer of similar or lower value is provided for free. Additionally, other benefit option is the so called "*deal of the day*" where customers can take

and redeem the “e-voucher” available with the authorized business, this is possible without previously purchased items. However the system does not allow the exchange of points between customers. The data analysis highlighted the rewards choices available to the customers using the Nectar system. In this case, the amount of rewards is considerably high because the amount of rewards available is supported by the network of companies participating in the MVLP. Therefore, even though the customer is limited to choose from a predetermined group of discounts, the collaboration between companies allows the customer to select their preferred discounts from a great variety of items and services belonging to different sectors. For example, the customer is able to redeem their points at a grocery store, at an online shop offering clothes or other items, at a gas station or at an amusement park during a family weekend. However, similar to the previous system the customers are not allowed to exchange points between each other. In conclusion, is fair to say that the freedom of choice the customers has among the discounts Nectar offers is higher in respect to the freedom of choice a customers has using a Stand-Alone Program such as Returntool.

Company	Returntool	Nectar
Customer freedom of choice	Low	Medium

8.1.6 Customization level

The sixth theme the researchers identified while analyzing the data collected from both cases was the customization level offered by each system, namely, the level of customization of the rewards to the individual customers.

Returntool, as a private stand-alone program allows its business clients to have a brand customized application, valid only within the limits of that business location. Moreover, this customization is limited to the existing features and functionality that are already present inside of the common application templates. Additionally, this limited set of predetermined features can be directly edited by business customers from the dashboard inside of the CRM system. This section is divided into eight sub-sections: Stamp-cards, Offers, Promotions,

Push Messages, Statistics, Segments, Venues, and Terms. Where, the first four sections are dedicated to customer customization features and the rest are dedicated to data insights and legal information. Nevertheless, regarding the automatic customization of data presented to customers based on customer behaviour and preferences, Returntool does not include any feature like this, consequently, business administrators are responsible of analyzing their own data insights and making reward decisions. The Nectar coalition system distinguishes itself by focusing a great amount of effort on the personalization level delivered to customers. In particular, after the data collection, taking advantage of the Aimia data analysis team, Nectar allocates a good amount of resources to the analysis of this data in order to the deliver customized discounts. Through the data analysis, Nectar coalition creates customized segment for their customers. The data of a single segment is analyzed with regard the items and services purchased, and is used to offer tailored discounts through different media. The discounts are delivered both at brick and mortar stores as well as at online shops. Moreover, a monthly catalog in which an entire section is dedicated to personalized offers for that particular card is delivered to the cardholder's home.

Company	Returntool	Nectar
Customization Level	Generic	Segmented

8.2 Summary and presentation of the LRPs archetype Matrix

Through the above-mentioned cross case analysis, the researcher identified six particular common LRPs thematics. These dimensions will be used for the creation of the LRPs archetype Matrix. The dimensions are summarized and their description presented in Table 3.

LRPs Dimensions	**Description**
Level of interoperability	The capacity of the system in place to communicate with other loyalty system.
Program Speed	The time required for point management, update points

	balance, to do point transfers.
IT Infrastructure Complexity	The amount of IT infrastructure used to sustain the program.
Depth of data collected	The depth of the data collected through the loyalty program.
Customer freedom of choice	The choices available to the customer in terms of discounts and transfer or exchange the point with other customers.
Customization Level	The level of customization of the rewards to the individual customers.

Table 3. Thematic LRPs Dimensions description

These six common dimensions extracted from the cross-case analysis, were used as the basis for the developments of the LRPs archetypes Matrix. In particular, the matrix (Table 4) presentes the comparison of two LRPs archetypes investigated by this research highlighting each individual dimensions**.**

Dimensions	**Returntool (private)**	**Nectar (coalition)**
Level of interoperability	Absence of interoperability	Intermediated Interoperability
Program Speed	Fast	Slow
IT Infrastructure Complexity	Fragmented	Partially Unified
Depth of data collected	Mono-sector	Multi-sector
Customer freedom of choice	Low	Medium
Customization Level	Generic	Segmented

Table 4. LRPs archetypes Matrix

Chapter 9 : Considerations in Blockchain Technology Applications for LRPs

In this section the researchers discuss the potential application of blockchain technologies, in regard the six dimensions of the LRPs archetype matrix presented in the previous chapter. To evaluate the role of blockchain on the Loyalty Reward Industry, this research has differentiated the technology based on the DCS framework of Brenig et. al (2016), using two of the three different areas, namely, DCS and ecosystem. The Blockchain DCS has been presented with the elements composing the technical backbone: ledger architecture, network architecture, the four P's and the consensus mechanism. While, for the ecosystem, which is composed by the applications that run on top of the ledger to provide additional functionalities, examples of the smart contracts and the tokens are selected for the research at hand.

First, the next section will present the blockchain technology applications considered by the researchers as applicable to LRP systems. These applications were validated with the expert interview (BrainBot Technologies expert). Then, the potential impact of these applications in different dimensions, extracted from the LRP cross-case analysis, will be presented through an impact matrix.

9.1 A new Platform for Loyalty Reward Program

Blockchain technology can offer a new platform for LRPs based on the "decentralized consensus system" (Brenig et al. 2016). The DCS will work as a permission distributed ledger which can be accessed by all the actors in the LRP industry, specifically the LRP "anchor", the business offering rewards, and the customers.The new platform will connect all the actors while ensuring the validity of the transactions, needed for the collaboration, thanks to the reach of the consensus. The consensus will be without the need for an centralized intermediary to perform the clearing of the transactions. Such an ecosystem will allow issuance, redemption and exchange of the loyalty points between the LRP industry actors

while ensuring trust and security.

Certainly, such an application can be performed using different configurations, but, for the research at hand, in line with the nature of the LRP industry, the researchers have decided to present one particular solution. In the loyalty Industry the use of a permissioned blockchain seems the best option, because the analyzed environment in which LRPs operate is formed by enterprise or companies that usually prefer non-anonymity of collaborators in order to assess the risk of a financial transaction. Moreover, in such a case, the consensus algorithm takes the form of a private consensus algorithm such as proof-of-authority, which does not require the presence of miners but instead uses a set of validators to verify the operations, which once they have been validated, the funds are automatically transferred from the smart contract wallet into the customer wallet (Figure 14).

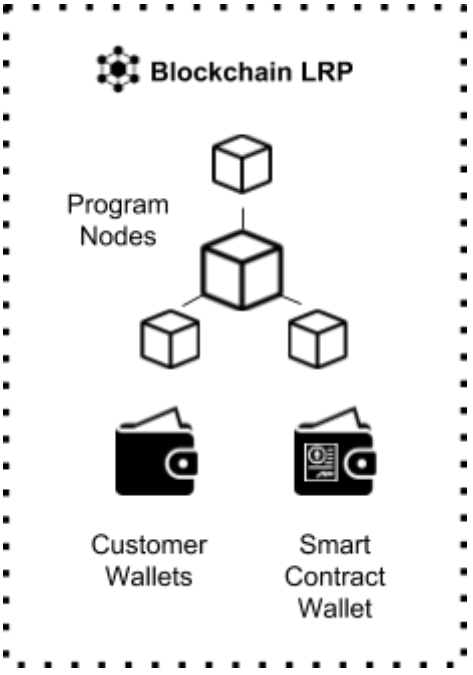

Figure 14: The blockchain based LRP

9.2 New Interactions in Loyalty Reward Programs

Other components of the Brenig et al. (2016) blockchain ecosystem are formed by the applications and services layers. Smart contracts are categorized within the former as applications that run on top of the platform, providing additional functions such as automatically performing the operations between parties (Peters et al. , 2015). In the case of the LRP industry, such applications seem to be able to automatize the cumbersome processes in the system. In particular, the smart contract technology can effectively be used as the standard for the issuance and redemption of points, as well as for the point management process. In fact, thanks to their programmability, smart contracts can contain a set of rules accepted by the parties involved in the contract that will be executed when a particular event happens, triggering the contract execution. Currently, the invoicing and payments between companies is regulated by standard contract clauses, this technology can be applied to replace that process. Moreover, the smart contracts are immutable because once they are deployed they can't be modified, respecting the principle that "*code is law*" (Risius, 2017). Consequently, as the process will be automatized, the issuance and redemption of the points will potentially be executed instantaneously, creating new advantages for the companies involved. Additionally, another advantage of a blockchain based LRP, is the ability of integrating external legacy systems through service APIs capable of interacting with smart contracts. Moreover, it allows access to the ledger data for permissioned users who can create requests and insert the returned data into their own legacy systems.

9.3 Digital Tokens to replace Loyalty Points

The loyalty tokens are minted initially by the *proof-of-authority* algorithm which will provide loyalty tokens with their own personal identifier. The information about the loyalty tokens generated will then become accessible to the entire network.

The rules behind the loyalty tokens regulating the exchange rate of the points are decided during the upfront architecture of online protocols, in addition to the rules needed for due-diligence of the LRP system.

9.4 LRP Blockchain based system

The proposed blockchain based solution explores the journey that a customer needs to follow in order to earn and redeem digital tokens. The researchers have based this process on the main features that a blockchain based decentralized ecosystem can provide to existing LRPs by analyzing the empirical information gathered from the stand-alone program named Returntool and the company Nectar as a multi-vendor loyalty program.

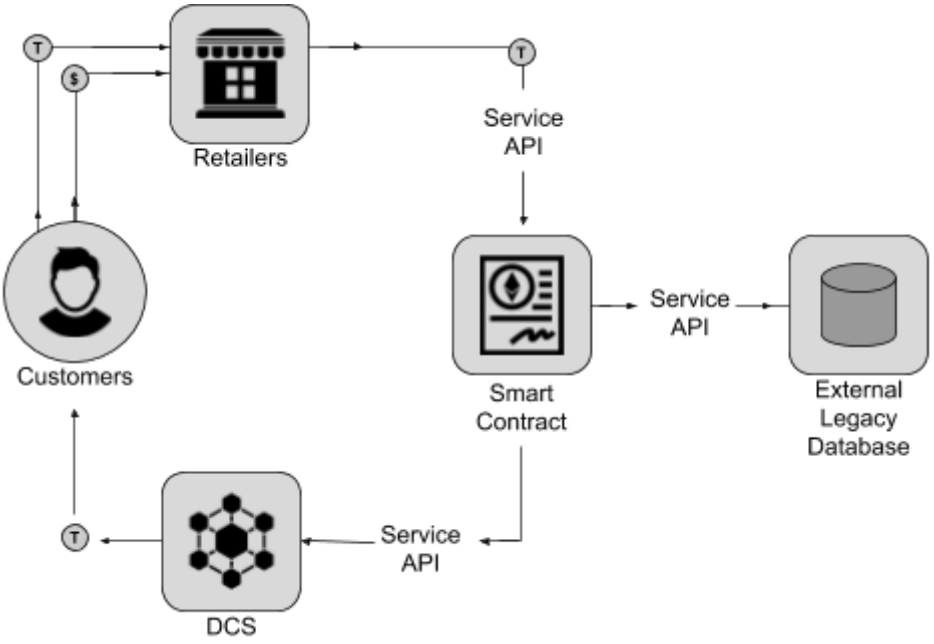

Figure 15: The blockchain based LRP journey

Firstly, the journey starts when a customer purchases an item which has been previously defined by the retailer as a *point generating item*, which due to the payment integration system API communicates with the smart-contract performing two different operations. First, communicating with the legacy system API in order to insert a transaction record copy. Secondly, communicating with the DCS in order to include the transaction as a record into the immutable ledger. Next, the customer wallet is now able to hold the new loyalty token, that can be used on the next purchase. Thanks to this solution the redemption process can be as fast as the blockchain validation speed, which respectively to the Multi-vendor program speed, is a significant improvement.

9.5 Impact of Blockchain Technology applications on LRPs Matrix

The above mentioned blockchain applications for LRPs systems, if applied, will influence the current state of the LRPs archetypes. As presented in the previous chapter, through the cross-case synthesis of this multiple case study research, the researchers extracted several common dimensions that characterize both the Stand-Alone Program and the Multi-Vendor Loyalty Program. Hereafter, the impact of the blockchain applications will be considered by the researchers, and the extracted LRPs dimensions will be presented. The impact is summarized through a impact matrix (Table 5), and, moreover, each impact is individually presented below. Finally the Matrix composed by the two case studies is extended to comprehend the blockchain impact and makes a comparison.

Level of interoperability	Potentially a single ledger on blockchain shared by all companies participating in the loyalty program, can make transferring points simple, fast, secure and cost-effective.
Program Speed	Blockchain smart contracts executed automatically will allow near real-time point management; Invoicing and payment settlements between partners; Instantaneous redemption and issuance of points and rewards.
IT Infrastructure Complexity	Blockchain ledger will remove the need of a centralized storage as well as the requirement of providing security and validity on the data. Additionally, smart contracts will substitute the current issuance and redemption management of points. Customer data will remain part of the legacy system.
Depth of data collected	Points issued as tokens with unique identification will be registered on the blockchain and can be tracked. Therefore, by allowing to trace an immutable point journey the companies will be able to extract more powerful and reliable data on how customers spend points through the network of companies.

Customer freedom of choice	The blockchain based loyalty can enable more companies to collaborate, consequently providing more choices for discounts. Additionally, by having a single ledger can enable customers to exchange points to each other, increasing their freedom of choice.
Customization Level	With specific data gathered from unique loyalty tokens, companies will be able to tailor better discounts and offers to individual customers.

Table. 5: Blockchain Applications on LRPs dimensions - Impact Matrix

First of all, a new blockchain platform application can improve the overall *level of interoperability* of the system. The blockchain platform can be used to provide a single ledger which, in the context of LRPs, will connect companies willing to establish their LRPs. Therefore, LRP providers, administrators and customers are able to interact in a immutable system with less friction and high security. Thanks to technical capabilities of this application companies may collaborate freely.

Regarding the *program speed* for executing tasks such as managing the points or transferring and updating the token balance of the customers, there is the potential application of smart contracts. The researchers found that currently points are transferred through cumbersome processes among program partners. Smart contracts, properly programmed, can perform several tasks such as invoicing as well as payments between program partners and due to the automatic execution, the process may be performed in real-time. Additionally, if the points are managed instantaneously a customer may see its points accredited almost seamlessly, and therefore the customer may be able to redeem the points at a faster rate.

Thanks to the blockchain application the *complexity of IT infrastructure* used to sustain the program will be reduced. On one hand, the space needed for data storage of transactions will not be an issue, given the transfer of the data on the common ledger, and therefore the presence of a centralized database will not be mandatory anymore. Then, the issuance and

redemption system for the point management will be replaced through the smart contract technology which will run on the common ledger without requiring any company resources. Finally, the infrastructure employed to ensure the security and verifiability of the data, previously stored in the centralized database, may be removed, given the encrypted nature of the blockchain data and because of its immutability. Therefore blockchain will partially unify the LRP IT infrastructure

The *depth of the data collected* through the loyalty program will also be improved thanks to the technical capabilities of the digital token. In this context, the technical aspects of the blockchain technology, namely, the unique identification of the points issued through the blockchain will be exploited. In fact, implementing such a type of system will shift the current approach, which considers all the points as equals. The company will be able to trace the journey of every single point, allowing the data analyst to extract new information about customer behavior from an ubiquitous source.

As a byproduct of the abovementioned blockchain applications the *customer's freedom of choice* can potentially also be improved. In particular, the new platform will enable collaboration with a greater amount of companies, and consequently may offer more discounts to customers. Moreover, the exchange of points between customers will be possible, providing customers with other options of how to manage their points and therefore increasing their freedom of choice providing a high freedom of choice to the customers.

The last byproduct of the application of digital tokens will be the improvement of the *level of customization* of the rewards to individual customers. Using blockchain will provide the ability of collecting unique immutable data so that the companies can analyze this new set of data and therefore, potentially, they will provide the customer with personally refined and customized discount offers.

Finally, through the analysis of the effects of the blockchain applications on the LRPs archetypes dimensions, the researcher have extended the existing matrix to the new LRP blockchain archetype created (Table 6).

Dimensions	Returntool (private)	Nectar (coalition)	Blockchain (decentralized)
Level of interoperability	Absence of interoperability	Intermediated Interoperability	Free Interoperability
Program Speed	Fast	Slow	Instantaneous
IT Infrastructure Complexity	Fragmented	Partially Unified	Partially Unified
Depth of data collected	Mono-sector	Multi-sector	Ubiquitous
Customer freedom of choice	Low	Medium	High
Customization Level	Generic	Segmented	Personal

Table 6 : LRPs archetype matrix & blockchain

Chapter 10 : Discussion

This research project was tackled with the objective to investigate potential blockchain applications on the current LRPs archetype and the consequent creation of a new LRP archetype based on blockchain. In the current scenario, characterized by the presence of LRPs provided by private companies in the form of Stand-Alone Programs and LRPs provided and by coalition of companies in the form of Multi-Vendor Loyalty Programs, the researchers perceived the advent of the blockchain technology as a factor able to influence the current LRPs.

The research at hand offers new unstudied perspectives, both on competing loyalty reward programs and on this particular blockchain application. While precedent LRP studies generally focused on the LRP's ability to influence the final customer in various ways, no previous research highlighted a set of common LRP dimensions and common archetype, through a comparison of competing LRPs. Thus, the findings extracted from the comparison of the two typologies of LRP may serve as an initial step to expand the knowledge base regarding the common aspects of competing LRP typologies. Moreover, precedent studies on blockchain completely lack investigation regarding the application of the technology in the LRP industry and its potential influence. Hence, the research at hand will provide an initial knowledge base about the influence of this technology in the studied LRP context.

First, the researchers present the six dimension of the LRPs archetype, highlight their significance and their implication regarding the implementation of blockchain applications. Second, some theoretical implications are presented. Third, technical considerations of blockchain applications in a real-life scenario are displayed. Finally, the limitations of the research at hand are presented followed by some suggested areas for further research identified by the researchers.

10.1 Implications of the Findings

The researchers presented a LRPs archetype matrix composed by six dimensions, comparing the difference of the three models and highlight the potential influence of a blockchain on LRPs archetype. Below, the six LRPs archetype dimension are presented individually displaying their significance, differences and highlighting the influence of the blockchain.

10.1.1 Level of Interoperability

The first of the six LRPs archetype dimensions extracted from of the research, highlighted that competing LRPs share a common dimension regarding the *level of interoperability* provided by the systems, namely, the capacity of these system to allow collaboration between LRPs owned by different companies. The significance of such dimension relies on the fact that the level of interoperability determines the ability of the LRPs to take advantage of the opportunity for collaboration the market may present to the LRP owner. Collaboration between companies may allow for the creation of unprecedented mix of discounts able to provide more value to the final customers for both LRP types. Currently, the Stand-Alone Program and Multi-Vendor Loyalty Program provide different levels of interoperability. On one hand, the Stand-Alone Programs work as a private system, and due to these settings the system lacks the capacity to interoperate, there is an absence of interoperability. Collaboration with other companies is not contemplated and the system is not ready to execute this task. On the other hand, the Multi-Vendor Loyalty Program (MVLP), which work as a colatoin, has natural abilities of interoperation given the network of partners that operate the program. However, the MVLP works through a program “anchor” which allows for collaboration while acting as the intermediary for the execution of the processes needed to perform the interoperation. Such intermediation reduces the ability of companies to interoperate because of the rules established by the anchor itself and because of the technical limits of the infrastructures to execute the necessary processes, such as the points management process. Such common dimension of interoperability, allow for overlapping with the main elements of the blockchain technology, namely, the DCS, which was presented by the researchers as able to create a new platform for the LRP industry. Using a loyalty platform based on a blockchain single-ledger will allow companies to freely collaborate

without the need of an authority to approve the terms of the collaboration, because the consensus algorithm can provide that function. Using a blockchain, immutable solution will increase the interoperability of the LRP and can result in different advantages. On one hand, a common, trustless ledger can potentially enable an unprecedented number of collaborations. Small size or medium size firms, as well as established firms, might easily join a collaboration in order to give their customers the best discount solutions. Likewise, such blockchain solutions will simplify the process of leaving a collaboration without the need for intermediary approval. Therefore, the researcher argue that potentially the implementation of the presented blockchain solution for the LRPs dimension of interoperability, compared to the LRPs archetypes studied in this research, can have a positive influence on the LRPs level of interoperability.

10.1.2 Program Speed

The second of the six LRPs archetype dimensions extracted from of the research highlight that LRPs share a common dimension regarding the *speed of the program* provided by the systems, namely, the time required to perform the points management tasks as update balance, issue and redemption of points and rewards. The significance of such dimensions relies on the fact that the program speed directly determines the speed at which the customers can redeem the points, and consequently determines the speed at which the companies can achieve their points redemption goals. Currently, the private Stand-Alone Program and coalition M.V.L.P. provide different modalities for points management. On one hand, the Stand-Alone Program doesn't have problems of points settlement, it relies on point management with high automatization, but it is only possible given the simplicity of the system, which does not offer high quality to their customers. On the other hand, the Multi-Vendor Loyalty Program manages the points through the program anchor software for points management, which is able to process a high quantity of data, but, given the amount of clients that belong to the program, the program speed is low. For example the point balance are updated every 72 hours for in-store purchase or up to 35 days for online purchase (section 8.1.2). The program speed can be increased by adopting one of the blockchain applications, namely, the smart contract. Smart contracts, given their automatic nature, can enable near real-time invoicing and payment among business that are part of the program. Moreover,

such technology will also allow for an almost immediate issuance and redemption for both points and the rewards. Such an application will therefore increase the speed of the loyalty program enabling the company to explore completely new scenarios where a customer may be able to earn points at a local shop and redeem those same points just few minutes after their purchase in order to satisfy a compelling need that just arose. Such shifts of program speeds enabled by the smart contract technology can be a game changer for the loyalty industry, while ensuring the security and the reliability of the management process through the technical capabilities of the blockchain. Therefore, the researcher argue that potentially the implementation of the presented blockchain solution for the LRPs dimension of program speed, compared to the LRPs archetypes studied in this research, can have a positive influence on the LRPs level of interoperability.

10.1.3 IT Infrastructure Complexity

The second of the six LRPs archetype dimensions extracted from of the research highlight that LRPs share a common dimension regarding IT infrastructure complexity, namely, the amount of IT infrastructure used to host the LRP. The significance of such dimensions relies on the fact that IT infrastructure complexity determines the costs of the LRP system, which will determine the cost of the service requested to the client companies. The private Stand-Alone Program and the coalition Multi-Vendor Loyalty Program investigated have similar fragmented IT infrastructure complexities. Despite the difference in size, both IT infrastructures are composed by some common elements. In both cases the infrastructure is composed of a by the CRM, the security system, and the annex centralized database for data storage of these systems. Unlike the Stand-Alone Program, the MVLP also adopts a unique point management system for transactions management service in which non-sensitive data is stored. With regards to IT infrastructure complexity, blockchain technology offers some direct benefit able to decrease the complexity of the entire system. The blockchain solution the researchers envisioned will enable a simplification of two IT infrastructures in the current system — the point management system and the security system. As partially presented in the "Level of Interoperability" section, the blockchain solution will work on a single-ledger shared between the companies, on top of which the smart contracts necessary for providing the points management system will run. In this way, the current infrastructure needed to

provide the point management system will disappear and with it also its costs. Moreover, the security system needed to provide the management system will be replaced because the encrypted and immutable nature of the transaction stored in the distributed database, without the need for additional resources to perform this task. Therefore, this blockchain solution will enable the LRP provider to streamline some heavy tasks that are inflating their operational costs which are consequently dumped to the cost of the service companies need to pay to join the program. However, the blockchain solution presented, only partially unify the LRP infrastructure, similarly to the M.V.L.P. case. Therefore, the researcher argue that potentially the implementation of the presented blockchain solution for the LRPs dimension of infrastructure complexity, compared to the LRPs archetypes studied in this research, can have a positive influence only on the LRPs level of interoperability of the Stand-Alone Program.

10.1.4 Depth of Data Collected

The second of the six LRPs archetype dimensions extracted from of the research highlight that LRPs share a common dimension regarding the depth of data collected, specifically the richness of the data collected through the loyalty program. The significance of such dimension relies on the fact that the depth of data collected serves as a base to provide a quality service to the final customer, while allowing the company to capitalize on a satisfied customer. The private Stand-Alone Program collects data through its centralized system in a mono-sector fashion and, therefore, the depth of the data collected is limited by this sectorial nature. The coalition M.V.L.P. collects data in a multi-sector fashion thanks to the network of business clients. The limitation of this system is given by the fact that once the points are issued to the customer they all become the same. With regards to the depth of data collected, the blockchain solution envisioned by the researchers, if applied, will enable companies with a new set of possibilities. New blockchain-based points will be tokenized and therefore they will have an unique identifier which is not possible to modify. Therefore, this solution will enable companies to track the journey of each unique point in an ubiquitous way, providing an unprecedented depth to the data collected. Therefore, the researcher argue that potentially the implementation of the presented blockchain solution for the LRPs dimension of depth of data collected, compared to the LRPs archetypes studied in this research, can have a positive influence on the LRPs archetype.

10.1.5. Customer Freedom of Choice

The second of the six LRPs archetype dimensions extracted from of the research highlight that LRPs share a common dimension defined as the customer freedom of choice provided by the systems. The significance of such dimension relies on the fact that customers' freedom of choice, namely, the ability of the customer to choose between different discounts and redemption modalities, directly affects the ability to satisfy the customer. In the case of the private Stand-Alone Program the customers' freedom of choice is limited by the mono-sector nature of the program in place. Customers can only choose discounts from a narrow pool of options the company presents to them, and there is no option for conversion. In the coalition MVLP, customers are able to choose from a significantly bigger pool of discounts provided by the business clients and, moreover, they are provided with the possibility to transform the point into an e-voucher, which can be used to request money discounts on a purchase made at one of the businesses that form part of the program. In this case, the blockchain solution will provide a new set of opportunities to the final customer. As presented in the previous chapter, the blockchain application will potentially enable a smart contracts based points management system that performs the process between a group of companies interlinked through the blockchain single-ledger almost instantaneously. Therefore, as a byproduct of such an application, the customers will be able to manage their points in a nearly real-time fashion, allowing the customer to redeem points just earned in order to buy another service or product just minutes after the first purchase. Moreover, such a system will allow the customers to easily transfer points to each other in order to satisfy their personal needs. Finally, the companies will not have to worry about such exchanges of points thanks to the automatic nature of the smart contract which will be programed to handle this situation, thanks to the common ledger with the immutable record of all the transactions performed and verified through the consensus. Therefore, the researcher argue that potentially the implementation of the presented blockchain solution for the LRPs dimension of customer freedom of choice, compared to the LRPs archetypes studied in this research, can have a positive influence on the LRPs.

10.1.6 Customization Level

The second of the six LRPs archetype dimensions extracted from of the research highlight that LRPs share a common dimension regarding the customization level provided by the systems to their customers. The significance of such dimension relies on the fact that the levels of customization, like customer freedom of choice, will determine the quality the system provides to the final customers and, therefore, determines the opportunity of monetization of customer behavior for the company providing the loyalty points. For the private Stand-Alone Program the level of customization is generic, while the coalition M.V.L.P. offer segmented customization. Instead, as a byproduct of the application of blockchain-based loyalty points, which will allow the companies collect unpreced complex customer data, the company will be able to use the data to provide offers personally customized on each individual customers. Therefore, the researcher argue that also in this case blockchain have a positive influence on the LRPs archetype.

10.2 Theoretical Implications

The focus of the research at hand, namely, investigating how blockchain technology can influence the creation of a new Loyalty Reward Programs archetype, lacks of existing theoretical foundations able to guide the researchers. Consequently, the results of this research are not able to substantiate or corroborate the results of previous explorations. Therefore, in order to guide the research, the researchers identified one previous study whose focus seemed to overlap with the scope of the current research.

In particular, the study by Weill & Ross (2004), which tackled the topic of IT Governance combined with decision making and strategic alignment was identified as able to provide some theoretical grounding and thematic focus for the research at hand. The study presents a Matrix which compares different types of governances, centralized, blended and decentralized and their decision making. Given the fact that the research aimed to compare two LRP programs characterized by different structures, which overlap with the examples of centralized and blended structures presented by Weill & Ross (2004) namely, the private Stand-Alone Program and the coalition Multi-Vendor Loyalty Program the use of the study

as initial guideline was validated. However, the decision making dimensions presented in the study were not used in the creation of the Matrix for this research. In fact, the common LRP dimensions were identified during the cross-case analysis of the case study, providing a more accurate set of common dimensions. Therefore, the dimensions extracted from the empirical findings — the level of interoperability, program speed, IT infrastructure complexity, depth of data collected, customer freedom of choice and the customization level — are believed by the researchers to be an accurate representation of the commonalities between the LRPs analyzed able to represent the LRPs archetype. Consequently, given the lack of knowledge in this particular field, the researchers believe that these dimensions are a contribution to this understudied topics. On the other hand, within the context of blockchain technology presented through the DCS framework (Brenig et al. 2016), the empirical findings highlighted that elements such as the permissioned ledger, smart contracts, wallets and digital tokens are the elements able to influence the LRP dimensions presented. Therefore, the researchers believe that identification of these elements and their impact on the LRPs archetype dimension can contribute to the lack of knowledge on this topic.

10.3 Technical implications of Blockchain applications

While many authors refer to the blockchain — as the dawn of a new era, the ground-breaking innovation (Abeyratne and Monfared, 2016) — in reality its development is still on a early stage. Therefore, the immutability benefit of the blockchain may only represent an immediate disruption in certain domains of applications like, finance, manufacturing and many others. Nevertheless, this is not the case for every single industry.

Furthermore, after validating the findings with the blockchain expert from BrainBot Technologies, a question aroused — why would you need a blockchain in the first place? —. The question drove the researchers towards an reasonable consideration of alternative technologies, capable of achieving similar benefits. In particular, regarding the data reliability and cost of implementation. Firstly, the proposal of a private blockchain with a proof-of-authority consensus algorithm like the one proposed, offers an immutable ledger capable of holding the transactional data of the LRP, allowing to the LRP owners to have an

absolute trust on the system. On the other hand, a centralized system offers also a reliable and stable management of the data, where depending on system configuration the reliability of the information can variate, nevertheless, in this configuration there will always be a central entity involved, who by having access or breaking through can get to modify the information. Therefore, in the scenario where a company need the immutability of the data, blockchain seems the best option, while on the other hand, if a company do not require this element a centralized solution can still provide similar benefits. However, if the company do not require the immutability of the data, the decision regarding using one solution or another relies on the cost of the implementation. Unfortunately, since the blockchain is still a young technology, building an application on top of it may encounter additional complexities.

10.4 Limitations and Further Research

In the first place, the researchers highlighted some limitations regarding data analysis tackled by the research at hand. In particular, this research derives its results from a limited group of interviewee representing the LRPs investigated, due to time and geographic constraints. Therefore, further research should develop the analysis investigating several respondents.

Second, the blockchain applications and their influence on the LRPs system has been assessed as a potential given the absence of real-life applications to study. Hence, the assessment might be not consistent with the science. We therefore suggest further research to validate the influence of the proposed blockchain LRP applications with real-life applications, if they will be available in the future.

Moreover, the research at hand explores the topic by limiting its data collection to qualitative data. Therefore, a quantitative approach could be used to cross-validate the findings. Further research might take this approach to study blockchain's influence on LRP archetype, increasing the reliability of their research.

Last but not least, the research at hand was limited to two case studies. Thus, adding additional cases to the analysis will enable the researchers to verify the strength of their

findings. Therefore, we suggest that future researchers extend their case study sample, adding more companies and extending the the reach of the research beyond the borders of the countries investigated for this paper.

Chapter 11 : Conclusion

In recent years, a steady increase in interest around blockchain technology characterized technological debates around the world. Several industries with completely different backgrounds are now investigating the phenomena in order to discover potential applications able to improve their businesses. The Loyalty Reward Program industry may be one of the industries able to seize the potential of blockchain technology given the similarity of loyalty points to currency, which was the original application of the blockchain. However, there is a lack of research and knowledge about the potential influence of this technology on the current LRPs.

The aim of the research at hand was to explore the potential influence of blockchain technology on current LRPs archetype and the creation of the new LRP archetype. The researchers presented a Matrix composed by LRPs' archetypes, highlighting the influence of blockchain and presenting a LRP based on blockchain archetype. An exploratory multiple-case study was used to investigate the research topic. Two companies representing different typologies of LRPs, namely, the private Stand-Alone Program and the coalition Multi-Vendor Loyalty Program models were studied in order to extract the common dimensions to create the LRPs archetype. A qualitative multi-method analysis based on documents and in-depth interviews were used to extract knowledge about LRPs. Moreover, an expert interview was used to evaluate the technical feasibility of the blockchain applications on LRPs presented by the researchers.

Through the exploration of the case studies we found six dimensions able to describe the LRPs archetype, namely, level of interoperability, program speed, IT infrastructure complexity, depth of data collected, customer freedom of choice and customization level. Thereafter, four elements of the blockchain were considered to be potentially applicable in the LRP systems — permissioned ledger, smart contracts, wallets and digital tokens. In particular, considering the LRP industry context, the researchers identified the permissioned ledger architecture as a suitable application in the LRP industry, given its ability to identify actors involved in the transactions which fit the need of the actors currently involved in the LRP industry. The smart contracts can be applied as a potential substitute of the current process of points management, which requires cumbersome interactions between companies

that can be automated. Digital tokens were considered as a potential substitute for current loyalty points.

The above-mentioned blockchain applications were then investigated together with the six LRPs archetype dimensions, highlighting their influence. The researchers found that level of interoperability will benefit from the blockchain solution. In fact, a blockchain single ledger connecting all the companies can make transferring points simple, fast, secure and cost-effective and consequently enable free collaboration. The program speed will benefit from the application of smart contracts which will allow almost instantaneous invoicing and payment settlements between partners as well as redemption and issuance of points and rewards. The IT infrastructure complexity may be partially unified with blockchain technology. In particular the immutable blockchain ledger will store the transactions record, removing the need for centralized database along with the requirements of providing security and validity for the data. Moreover, smart contract will streamline the current point management process. However, it appears that the private LRPs will certainly benefit from the impact of blockchain application while the coalition LRP, which is already partially unified need additional studies to assess if it will benefit from the implementation of this solutions. Then, the depth of data collected and the customization level will benefit from the application of digital tokens as loyalty points. In particular, given the ability to be uniquely identified, the digital tokens will allow the company to track the journey of each point, equipping data analyst with deeper information, which can be used to create individual customized rewards. Lastly, the customer freedom of choice can benefit from the single ledger, which may potentially allow unprecedented collaboration and, consequently, a higher amount of discount offers, plus the possibility of exchanging points between customers, made possible and cost-efficient through the single ledger.

We therefore argue that LRP systems can benefit from the influence of blockchain technology. However, the benefits presented are not assessed from a financial perspective and, therefore, in spite of the benefits presented, before implementing a blockchain solution and pursuing its benefit, costs must assessed compared to other solutions.

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13. Appendices

Table of Appendices:

Appendix 1 : Letter of Introduction

Appendix 2 : Script for Telephone Introduction

Appendix 3 : Script for Presentation of the Credentials

Appendix 4 : Interview Guide

Appendix 5 : Script for Oral Informed Consent (IRB Guidelines)

Appendix 6 : Case study Protocol @Returntool

Appendix 7 : Case study Protocol @Nectar

Appendix 8 : Interview transcript @Nectar

Appendix 9 : Interview transcript @ReturnTool

Appendix 10 : Interview transcript @ BrainBot Expert

Appendix 11 : Process Document @ReturnTool

Appendix 12 : Documents Database

Appendix 1 : Letter of Introduction

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To Whom It May Concern,

We are CBS Master's Students Elia Bottega & Alejandro Gatica
and we are undertaking a Case Study Research Thesis to investigate how Blockchain Technology can influence the creation of a new Loyalty Reward Programs archetype?

Ultimately, by means of this Case Study Research, we hope to identify and documents answer to such questions : What blockchain technology can enables the development of a new kind of Loyalty Reward Program archetype? What changes will this technology generate upon the LRPs archetypes? What this changes mean for the LRPs businesses sector?

This letter is directed to entrepreneurs, administrative staff and tech enthusiasts. We must ask you to give your time and experience and participate to an interview session. Your cooperation is most essential to support the study.

Moreover, when the findings will hopefully give meaningful managerial implication they will allow you to gain knowledge and a competitive advantage on your competitors.

Thank you for reading this far,

Best Regards,

Elia Bottega & Alejandro Gatica

Appendix 2: Script for Telephone Introduction

Hello, Good _ _ _ _ _ _ .

I am calling from Copenhagen Business School (CBS). I am CBS Master's Student _ _ _ _ _. I am currently undertaking a Case Study Research Thesis to investigate the effect of Blockchain Technology when applied to a Loyalty Reward Program type of business as yours.

May I speak with you about such topic?

Ultimately, by means of this Case Study Research, we hope to answer questions such as :
What changes will this technology generate upon the LRPs archetypes? What this changes mean for the future development of the LRPs businesses sector?

We must ask you to allow us to have an interview with a member of your staff because, your cooperation is most essential to support the study.

Moreover, when the findings will hopefully give meaningful managerial implication they will allow your company and the interested entrepreneurs to gain knowledge and a competitive advantage on the competition.

Great! Thank you! I am sending you a follow up email right now, with all the information you need!

Have a nice day!

Appendix 3: Script for Presentation of the Credentials

We are CBS Master's Students Elia Bottega & Alejandro Gatica and we are are undertaking a Case Study Research Thesis to investigate the effect of Blockchain Technology peculiarities when applied to a Loyalty Reward Program type of business. Ultimately, by means of this Case Study Research, we hope to identify and documents the structural Archetype that characterize LRPs businesses and thereafter to identify the changes this technology will generate upon this Archetypes. Such findings will hopefully give meaningful managerial implication and therefore allow the interested entrepreneurs to take gain knowledge and a competitive advantage on their competitors

Appendix 4 : Interview Guide

A.Gatica & E.Bottega Master Thesis

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Copenhagen Business School Company: - - - - - - - -

INTERVIEW GUIDE

1. **Opening & Greeting :** First of all we want to thank you for accepting to be interviewed. We know your time is precious and we really appreciate your participation! For us, your contribution will be fundamental for the development of our research!

2. **Purpose and Providing Info:** So, the interview today will be structured as a guided conversation. We have a list of topic that we would like to openly discuss with you, all strictly tied to your business. We want to clarify that this is not a test, a wrong answer does not exist, for us every information will be really useful. Moreover we want to remind you that we will record this interview exclusively for thesis purpose and we will also take notes during the conversation. It is all ok for you?
   Ok, then, we want to remind you that the topic of our thesis research is the LRPs Industry and how Blockchain technology will impact this sector. In particular, we are comparing two models of loyalty services, - - - - - as a centralized service and - - - - - - as a coalition service. Do you know - - - - -? and are you familiar with the concept of Blockchain Technology? Ok, the final goal for this research is to provide a new archetype of decentralized loyalty service based on the blockchain. We hope once the research is complete that you may find the insights useful and interesting.

THE INTERVIEW ***("Ask the question, and then listen, listen….and listen some more!")***

➔ The Company :

- ◆ Of how many activities is your company composed? (e.g. development, marketing, ecc..)

- In order to maintain your service up and running, do you outsource any of those activities? Which one(s)? and which one(s) are not? Why?

- Which infrastructure is needed? Why?

- What is/are your revenue model(s)? Why?

➔ The Service :

- For every business the app has certain customized rules (or all of them share the same?) Who decides this rules and why? What are these rules for?

- How deep is your company able to learn and understand what the customer preferences are and which are the limits?

- Have you ever had any security or problem caused by the technology you are using to provide your service? which problem? and also any reliability issue?

- Which are your fixed and variable costs per year in order to maintain the service.

- Who has access to the information recorded from the service?

➔ The Customer :

- Are the customers free to use the points on every item inside of the store or they have a limited selection? Are customers able to exchange points with other customers? Are they able to exchange points for money?

5. **Closing**

Thank the interviewee for their time, and their input. Also be sure to ask for permission to follow up if needed

6. **Post Interview**

Review your notes and add to them as needed. It's important to do this immediately after the

interview, as thoughts are still fresh in your mind.

Appendix 5 : Script for Oral Informed Consent (IRB Guidelines)

.. We are undertaking a Case Study Research Thesis to investigate the effect of Blockchain Technology when applied to a Loyalty Reward Programs. Ultimately, by means of this Case Study Research, we hope to identify and documents answer to such questions : How Blockchain Technology can influence the creation of a new kind of Loyalty Reward Program archetype? Moreover, we are focusing on understanding what changes will this technology generate upon the current LRPs archetypes and what this changes mean for the LRPs.

Your participation will involve one informal interview that will last between thirty minutes and an hour. This research has no known risks. This research will benefit the academic community because it helps us to understand the capacity of Blockchain Technology. Please know that I will do everything I can to protect your privacy. Your identity or personal information will not be disclosed in any publication that may result from the study. Notes that are taken during the interview will be stored in a secure location. Would it be all right if I audiotaped our interview? Saying no to audio recording will have no effect on the interview

Appendix 6 : Case study Protocol @ReturnTool

Section A. Overview of the Case Study

1. The overall scope of this research is to clarify the capacity of Blockchain Technology to develop a new type of LRP's archetype, thanks to its technicals peculiarities. In particular, by investigating ReturnTool the researchers aim extract the necessary knowledge in order to create the archetype of a Stand Alone Program (S.A.P.), that is one topology of LRPs.

2. The current research has no Sponsor. The expected audience for the research is composed by the thesis committee and by a few of entrepreneurs working inside the LRPs sector. Consequently, the researchers attempted to use a vocabulary suitable for these categories

especially for the technicalities, moreover, special attention was dedicated by the researcher into explaining the methodological choice they made to improve readability and reliability.

3. The case was selected because matching all the criterias requested by the researchers. In particular, the LRP' typology (S.A.P.), the geographical location (Copenhagen, DK), the interviewee was fluent in English. The purpose of the investigation is to extract, through a guided conversation (interview), the necessary information to allow the researcher to illustrate the LRP archetype.

4. The Theoretical Framework to follow for the LRPs is Weill & Ross (2004) IT governance archetype matrix which structure comparing, centralized, middle ground and decentralized will be used to compare the two different type of LRPs. The dimension of the LRPs will be extracted from the cross-case synthesis of the cases studiedes. Finally, the DCS Blockchain framework from Breining et al (2016) will be used to provide the information about blockchain technology. The elements used from the framework are the DCS and the Application namely, smart contract, wallet, tokekens.

5. Official Introductory Statement: We are CBS Master's Students Elia Bottega & Alejandro Gatica and we are are undertaking a Case Study Research Thesis to investigate the effect of Blockchain Technology when applied to a Loyalty Reward Programs. Ultimately, by means of this Case Study Research, we hope to identify and documents the structural archetype that characterize LRPs businesses and thereafter identify the changes this technology will generate upon this archetypes creating a new one. Such findings will hopefully give meaningful managerial implication and therefore allow the interested entrepreneurs to take gain knowledge and a competitive advantage on their competitors.

6. Letter of Introduction :

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To Whom It May Concern,

We are CBS Master's Students Elia Bottega & Alejandro Gatica
and we are undertaking a Case Study Research Thesis to investigate how Blockchain Technology can influence the creation of a new Loyalty Reward Programs archetype?

Ultimately, by means of this Case Study Research, we hope to identify and documents answer to such questions : What blockchain technology can enables the development of a new kind of Loyalty Reward Program archetype? What changes will this technology generate upon the LRPs archetypes? What this changes mean for the LRPs businesses sector?

This letter is directed to entrepreneurs, administrative staff and tech enthusiasts. We must ask you to give your time and experience and participate to an interview session. Your cooperation is most essential to support the study.

Moreover, when the findings will hopefully give meaningful managerial implication they will allow you to gain knowledge and a competitive advantage on your competitors.

Thank you for reading this far,

Best Regards,

Elia Bottega & Alejandro Gatica

7. Remember: the purpose of this protocol is to help the researcher to maintain their line of inquiry through all the several steps of the process, helping constructing a valid and reliable research. Moreover "the protocol is for data collection from a single case (even when part of a multiple-case) and is not intended to serve all the project" (Yin, p.86).

Section B. Data Collection Procedures

1. Contact for fieldwork: Gorka Cardona, CEO @ReturnTool, Copenhagen, DK .

2. Data collection Plan : Gathering schedules availability of the interviewee; Collect the role of the interviewee inside the company; Through the interview guide collecting the Information regarding all the aspects of the company that compose the archetype structure following the theoretical framework. ()

3. Preparation prior to fieldwork: Skills and values of the case study researchers; Prepare the fieldwork material such as recorder, notebook, pens, additional papers and additional interview guide; Preliminary Information about the company, products and interviewee (when possible) ; Check the fieldwork materials.

4. Script for Presentation of the Credentials :

   We are CBS Master's Students Elia Bottega & Alejandro Gatica from the Master's degree of Business Administration and Information System (E-Business). We are are enrolled in our last semester of study and we are currently undertaking a Case Study Research Thesis that will be presented to the CBS thesis committee in April 2018. The Thesis aim to investigate the effect of Blockchain Technology peculiarities when applied to a Loyalty Reward Program type of business.

5. Script for Oral Informed Consent (IRB Guidelines):

   .. We are undertaking a Case Study Research Thesis to investigate the effect of Blockchain Technology peculiarities when applied to a Loyalty Reward Program type of business. Ultimately, by means of this Case Study Research, we hope to identify and documents answer to such questions : Why Blockchain Technology can enables the development of a new kind of Loyalty Reward Program archetype? What changes

   will this technology generate upon the LRPs Archetypes? What this changes mean for the future development of the LRPs businesses sector?

   Your participation will involve one informal interview that will last between thirty minutes and an hour. This research has no known risks. This research will benefit the academic community because it helps us to understand the capacity of Blockchain Technology. Please know that I will do everything I can to protect your privacy. Your identity or personal information will not be disclosed in any publication that may result from the study. Notes that are taken during the interview will be stored in a secure location. Would it be all right if I audiotaped our interview? Saying no to audio recording will have no effect on the interview

Section C. Data Collection Questions

Level 1. (*verbal* line of inquiry)

1. Describe
2. Evaluate

Level 2. (*mental* line of inquiry)

1. Display to the interviewee some basic background information about the company and the product and ask to validate or reorganize them correctly; what is a real description about the company and the product? how they work?

- Individuate the right description for both concepts by comparing the official presentation of the company against the interviewee personal interpretation.
- Collect Data:
    - Official presentation for company and product (website or other official documents)
    - Personal interpretation for company and product
    - Look for any preliminar problem

2. Now focus individually on both subject and collect a description about how they work; and define the structural design of the company and the product? What are the components for both of these?

- Pinpoint the structure by listing the components by name and organize them describing their role and tasks
- Collect Data related to any aspects of each components:
    - Names of the Areas of the company / components of the service
    - Find informal names used (when there is no such thing as area/components to describe the findings)

3. Focus the description (it may be too detailed) on understanding what are the key components that make the company and the product work? There is any components that is not essential for the company/product the work?

- Pinpoint the the components that have a fundamental role inside the structure, the one without which the structure will crumble or not able to operate correctly.
- Collect Data related to any aspects of each components:
    - The purpose of this area/component
    - Role and Daily tasks of this area/component
    - Relevance of this area/component to the final structure

4. What are the role and tasks of these components? How they are composed internally? There is any link between any main components? If yes, Why? How?

- Pinpoint the design internal design of the component/area; how many worker?which equipments? which cost?

5. There are any rival explanations about the final structure for both company and product?

- Pinpoint the weaknesses highlighted through the interview
- Collect Data related to rival explanation:
    - Interviewee personal opinion
    - the most important component/area

Section D. Guide for the Case Study Report

1. The case study by thesis committee and possibly entrepreneurs from the LRPs sector. Therefore, considering this an opportunity to supply the audience with the information they are seeking, the report tackle three aspects. Firstly, the report attempt to use a not extremely technical vocabulary in order to allow the reader without prior knowledge to grasp the concepts. Secondly, the report also attempt to perpetrate clarity of process and transparency and to supply the reader with clear, justified and practical managerial implication.

2. The report will give a comprehensive overview of the LRP case displaying the general information needed to understand the purpose of the company and of its product. Then, both the structures will be presented explaining the each components deeply. How they are composed, what is their purpose and relevance inside the overall structure.

3. In order to create the research the researchers took advantage of data sources such as documents, interviews and expert interviews which will be provided to the reader through the Appendix section of the final report. Moreover, the methodological section will provide any extra clarification.

4. The bibliography employed for the research was selected by ensuring to match criterion such as being peer-reviewed, valid in the case of the books and reliable in the case of major companies researcher

Appendix 7 : Case study Protocol @Nectar

Section A. Overview of the Case Study

1. The overall scope of this research is to clarify the capacity of Blockchain Technology to develop a new type of LRP's archetype, thanks to its technicals peculiarities. In particular, by investigating ReturnTool the researchers aim extract the necessary knowledge in order to create the archetype of a Stand Alone Program (SAP), that is one topology of LRPs.

2. The current research has no Sponsor. The expected audience for the research is composed by the thesis committee and by a few of entrepreneurs working inside the LRPs sector. Consequently, the researchers attempted to use a vocabulary suitable for these categories especially for the technicalities, moreover, special attention was dedicated by the researcher into explaining the methodological choice they made to improve readability and reliability.

3. The case was selected because matching all the criterias requested by the researchers. In particular, the LRP' typology (MVLP), the geographical location (Copenhagen, DK), the interviewee was fluent in English. The purpose of the investigation is to extract, through a guided conversation (interview), the necessary information to allow the researcher to illustrate the LRP archetype.

4. The Theoretical Framework to follow for the LRPs is Weill & Ross (2004) IT governance archetype matrix which structure comparing, centralized, middle ground and decentralized will be used to compare the two different type of LRPs. The dimension of the LRPs will be extracted from the cross-case synthesis of the cases studiedes. Finally, the DCS Blockchain framework from Breining et al (2016) will be used to provide the information about blockchain technology. The elements used from the framework are the DCS and the Application namely, smart contract, wallet, tokekens.

5. Official Introductory Statement: We are CBS Master's Students Elia Bottega & Alejandro Gatica and we are are undertaking a Case Study Research Thesis to investigate the effect of Blockchain Technology peculiarities when applied to a Loyalty Reward Program type of business. Ultimately, by means of this Case Study Research, we hope to identify and documents the structural Archetype that characterize LRPs businesses and thereafter to identify the changes this technology will generate upon this Archetypes. Such findings will hopefully give meaningful managerial implication and therefore allow the interested entrepreneurs to take gain knowledge and a competitive advantage on their competitors

6. Letter of Introduction :

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To Whom It May Concern,

We are CBS Master's Students Elia Bottega & Alejandro Gatica
and we are undertaking a Case Study Research Thesis to investigate how Blockchain Technology can influence the creation of a new Loyalty Reward Programs archetype?

Ultimately, by means of this Case Study Research, we hope to identify and documents answer to such questions : What blockchain technology can enables the development of a new kind of Loyalty Reward Program archetype? What changes will this technology generate upon the LRPs archetypes? What this changes mean for the LRPs businesses sector?

This letter is directed to entrepreneurs, administrative staff and tech enthusiasts. We must ask you to give your time and experience and participate to an interview session. Your cooperation is most essential to support the study.

Moreover, when the findings will hopefully give meaningful managerial implication they will allow you to gain knowledge and a competitive advantage on your competitors.

Thank you for reading this far,

Best Regards,

Elia Bottega & Alejandro Gatica

7. Remember: the purpose of this protocol is to help the researcher to maintain their line of inquiry through all the several steps of the process, helping constructing a valid and reliable research. Moreover “the protocol is for data collection from a single case (even when part of a multiple-case) and is not intended to serve all the project” (Yin, p.86).

Section B. Data Collection Procedures

1. Contact for fieldwork: Partick Rigby, Graduate Analyst @Nectar Ltd., London, UK.

2. Data collection Plan : Gathering schedules availability of the interviewee; Collect the role of the interviewee inside the company; Through the interview guide collecting the Information regarding all the aspects of the company that compose the archetype structure following the theoretical framework.

3. Preparation prior to fieldwork : Skills and values of the case study researchers ; Prepare the fieldwork material such as recorder, notebook, pens, additional papers and additional interview guide; Preliminary Information about the company, products and interviewee (when possible) ; Check the fieldwork materials.

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   Your participation will involve one informal interview that will last between thirty minutes and an hour. This research has no known risks. This research will benefit the academic community because it helps us to understand the capacity of Blockchain Technology. Please know that I will do everything I can to protect your privacy. Your identity or personal information will not be disclosed in any publication that may result from the study. Notes that

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- Pinpoint the the components that have a fundamental role inside the structure, the one without which the structure will crumble or not able to operate correctly.
- Collect Data related to any aspects of each components:

- The purpose of this area/component
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4. What are the role and tasks of these components? How they are composed internally? There is any link between any main components? If yes, Why? How?

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- Pinpoint the weaknesses highlighted through the interview
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Section D. Guide for the Case Study Report

1. The case study by thesis committee and possibly entrepreneurs from the LRPs sector. Therefore, considering this an opportunity to supply the audience with the information they are seeking, the report tackle three aspects. Firstly, the report attempt to use a not extremely technical vocabulary in order to allow the reader without prior knowledge to grasp the concepts. Secondly, the report also attempt to perpetrate clarity of process and transparency and to supply the reader with clear, justified and practical managerial implication.

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3. In order to create the research the researchers took advantage of data sources such as documents, interviews and expert interviews which will be provided to the reader through the Appendix section of the final report. Moreover, the methodological section will provide any extra clarification.

4. The bibliography employed for the research was selected by ensuring to match criterion such as being peer-reviewed, valid in the case of the books and reliable in the case of major companies researcher

Appendix 8 : Interview transcript @Nectar

Elia: First of all we want to thank you for accepting to be interviewed. We know your time is precious and we really appreciate your participation! For us, your contribution will be fundamental for the development of our research! So, the interview today will be structured as a guided conversation. We have a list of topic that we would like to openly discuss with you, all strictly tied to your business. We want to clarify that this is not a test, a wrong answer does not exist, for us every information will be really useful. Moreover we want to remind you that we will record this interview exclusively for thesis purpose and we will also take notes during the conversation. It is all ok for you?

Patrick: I am happy to help you and yes you can go on!

Elia: Ok, then, the final goal for this research is to understand the influence of loyalty service based on the blockchain. We hope once the research is complete that you may find the insights useful and interesting.

Patrick: Ok

Elia: Ok, then.. as the first question I would like to have your general description of Nectar? and then we would like to know by how many activities are done here at Nectar to maintain the service?

Patrick: So, Nectar is the U.K. largest loyalty program with over half of the british households participating. This means for millions of people that the everyday active shopping can be a huge rewarding experience. Collectors can earn points is thousands of places and even reactive targeted offers directly to their phones. Every purchase made at one of our partners stores earns points whether the customers buy groceries, products for their homes or for their families...Nectar gives fantastic benefits while providing valuable insights to the retailer at the same time, On average shoppers collecting nectar points spend more than the customer who aren't nectar members.

Elia: Ok, then, of how many activities is Nectar composed?

Patrick: Well there are many activities. Firstly, the point management that is need to provide the service, that is a big one...Then just think that reward our customer with targeting coupons to help strengthen their loyalty … And it's not just at the supermarket but shoppers can collect points also to high street partners and online retailers. We send our collector regular mailings their points balance updates include targeted offers from our retail partners and information about earning and spending nectar points ...we also sent targeted communications and product offers relating to their shopping behaviours . Moreover, our Website is a portal for online shopping balance checking and most importantly finding out how to spend points. The offer spread from eating out, going abroad , improving their home , there is something to suit every taste. So there is a collaboration between the companies that are part of Nectar and we as the anchor of the system we need to coordinate all of the processes.

Elia: Oh, ok. so i think that i ìt can take a long time to manage all these points?

Patrick: It does… let me see… i can give you some ideas …. i am looking up this page, you can look inside this documents to know more if you want!

Elia: Yes thank you some much!

Patrick: Anyway, for example here you can see that the customers often asks about their points...common question...from here you can understand a little of the process. For example..."from time to time, we may send you coupons which you can hand in at the checkout to earn bonus Nectar points. These points won't show up on your receipt straight away, as it takes up to 28 days for them to be allocated to your Nectar account." or also "Nectar balances are updated every 72 hours, so recent transactions may not be included".... another one is this "Check how much time has passed, as points from online purchases can take 35 days to show on your account. Some partner brands wait until after your cooling-off period has passed so please always check the Brands Page T&C's — so if you're missing points for a financial product or credit card based service, it's best to add another 14 days to that period … If it's been more than 35 days, the item you bought may have been excluded from collecting points. To see if that's the case, just search for the brand you bought from on the Nectar website and click 'terms and conditions'".... you see there are many situation. But overall the process require time yes. Sometimes are the companies that are not willing to speed up the process for their personal reason….they may want the customer to wait…. But in general the process requires time… even by using our software that is a quite complex one and also pretty good we still have some delays to perform all the operations…. the reason os that we are actually acting as the intermediary for the system…. so we need to ensure that everything is ok for the companies using the service… small hiccup are allowed but not major draw back…..

Elia: Wow, ok. then… another questions is….In order to maintain your service up and running, do you outsource any of those activities? Which one(s)? and which one(s) are not?

Patrick: Well the Nectar architecture is quite complex and i don't know if i can help you with all the technical components actually.. if you want i can outline the major activities..

Elia: Sounds good, also because we would like to know more about your infrastructure so maybe we can talk about both at the same time..?

Patrick: Ok, yes I can try that. So generally lets just say that a loyalty program as Nectar need to use some third party services given its size. In particular, to operate the points management we use a third party system for revenue management and billing take care of the issuance and redemption of the loyalty program..and we also have a server that is used for the transactions. We own our server infrastructure we don't rely on third SaaS or PaaS providers and we have full control over the system scalability for the transaction. However we also use SaaS or PaaS providers to record the data that are not sensible. Then we the data analysis which is done through the Loyalty Analytics Business Software of aimia that is the owner of Nectar. So the process in this case is provided without a third part...however the storage of some data is actually partially delegated to a third party given the size of data we process every day…but in this case we also have our bunch of server that we own.

Elia: Ok, so the infrastructure can be summarized into point management system and the CRM system with the data storage in house for the point management and partially outsourced for the data analysis.?

Patrick: Correct, unfortunately i am not a technical guy i can give you some general aspects only.

Elia: Its ok, these are already good insights, we can try to search for other data about it.

Elia: For every business the app has certain customized rules (or all of them share the same?) Who decides this rules and why?

Patrick: Well the app is one like the card. All the discounts are inside the card and all the business have to use the Nectar card. The discounts are different anyway…every companies decide the items to put on discount based on the goal they want to achieve in that particular period…

Elia: Ok.. now, we would like to know how much Nectar is able to learn and understand about the customer preferences are and which are the limits?

Patrick: Well, data analysis is one of our strength. We are leveraging the network of companies to provide target insights to our customers… we can understand in a good way in which segment the customers belonging because of its purchase behavior and with that profile we send the targeted offers that i was talking about before. So….In particular, the system is able to supply the company with data that describe the consumption of multiple items and multiple services by a single customer.

Alejandro: So the discounts or offers are based on a profile?

Patrick: Yes, but i am not sure i can say how it is done.

Elia: Its ok, but can you give us your opinion about it… do you think this system allow for good customization?

Patrick: Yes! we are using all the data we have and we are constantly improving, we are doing as much as possible to ensure customization. it will be nice to have even more data… the amount of data it is what really drive the customization ability of a company, and we are using everything we have. Anyway it will be nice to have even more data… i mean , if we had more that we will be able to understand the customer at an even deeper level...an this for Nectar will mean more satisfied customers that are always a good things to have! I can say that the level and the success of our service is based on our ability to satisfy the end customer… only enabling such service we can stay relevant among our clients and therefore continuing to be successful...it is all connected in some way!

Elia: Its ok...we have another question...have you ever had any security or problem caused by the technology you are using to provide your service? which problem? and also any reliability issue? (like, any incorrect records)

Patrick: Well, human error is always a possibility but we try to prevent these things, always. In general they are not common but i can not say that there are no errors.

Alejandro: Ok

Elia: Who has access to the information recorded from the service? (Internal, Clients, Public dashboard)

Patrick: Well we have the access and our clients also does on their own data. The overall access is maintained by Nectar as an asset… that is how we can provide the data analysis to the customer. It is an asset of the company… and the majority of the clients are happy with that because our data analysis department is very good they are never disappointed by its performance… and moreover the cost needed to maintain these whole process are really high. So, they are easy to maintain if you apply a structure like Nectar were the costs are basically divided among the companies that are part of the system.. doing all the process individually but how you can already understand the main asset is the size of the customers reached through this service… i mean there are other important assets for sure…basically all the activity that Nectar offer to the clients are asset to the individual company… a program like Nectar offer a lot of advantages to the company, and it is a good deal given the size of the customer base, the functionalities, features, security and the price of the service… I hope

this answer your question… it was a little out of theme,but as i said everything is connected when you talk about program like Nectar.
Alejandro: No it's okay!

Elia: Yes, we actually liked your answer… we are now understanding more about the overall structure and functionalities that is what we wanted!

Patrick: Ok, good! but again i am sure that if you need more you should really check some of the internet content!

Elia: Ok! We will follow your suggestion for sure! Now, going on… we are changing topic...even though may be repetitive in some way..as in Nectar all the topics are connected...but anyway...the question is : Are the customers free to use the points on every item inside of the store or they have a limited selection? Are customers able to exchange points with other customers? Are they able to exchange points for money?

Patrick: companies belonging to its network to collaborate thanks to a shared-points collection system, the Nectar card. This shared system put into communication different companies which can add to the card their personal set of discounts … therefore the amount of reward is considerably high because the amount of reward available is supported by the network of companies … then, customer is able to redeem where he wants, inside the mix of discount supplied by Nectar... at a grocery, at an online shop offering clothes or for other items...so he is free to choose i will say. Then, no customers are not allowed to exchange points… the process will require additional management and now it is not in place… anyway if a customer as more than one card he can decide to merge the point…. it require some time, but it is possible! About, the exchange for money… we have e-voucher. So basically every 500 points a customer can actually decide to convert the points into a money discount that can be redeemed on the purchases they are doing that day at one of the partner shops. And generally this is it… but again, you can check more on the documents.. sorry if i am not aware of all the nuances..

Alejandro: No it's okay!

Elia: Yes, no problem! Using documents for us will enrich our research!

Patrick: Ok good!

Alejandro: Ok, then we don't have any other questions and moreover we are running out of time...and you have another meeting in few minutes correct?

Patrick: Yes, unfortunately now i have to go!

Alejandro: We totally understand! then thank you for the interviewee and for your time, you gave us really important input. In case we need a follow up can we contact you?

Patrick: Hope it will help you! About the follow up , unfortunately i am very busy this period, bu try sending me a email and i will see if I can find some time! Okay?

Elia: Perfect thank you again we will do that and yes you were really helpful! thank you again, goodbye! have a nice day!

Alejandro: Thank you very much! have a nice day!

Appendix 9 : Interview transcript @ReturnTool

Elia: First of all we want to thank you for accepting to be interviewed. We know your time is precious and we really appreciate your participation! For us, your contribution will be fundamental for the development of our research! So, the interview today will be structured as a guided conversation. We have a list of topic that we would like to openly discuss with you, all strictly tied to your business. We want to clarify that this is not a test, a wrong answer does not exist, for us every information will be really useful. Moreover we want to remind you that we will record this interview exclusively for thesis purpose and we will also take notes during the conversation. It is all ok for you?

Gorka: You welcome, Yes it's ok.

Elia: Ok, then, we want to remind you that the topic of our thesis research is the Loyalty Industry and specifically how Blockchain technology will impact this sector. In particular, we are comparing two models of loyalty services, Return Tool as a centralized service and Nectar as a coalition service. Do you know Nectar? and Blockchain?

Gorka: I know Nectar yes...and I have also know something about the blockchain, the general stuff...is basically a distributed database, right?

Elia: Yes that is the initial concept yes! perfect! Ok, then, the final goal for this research is to understand the influence of loyalty service based on the blockchain. We hope once the research is complete that you may find the insights useful and interesting.

Gorka: Ok!

Elia: Ok, then.. the first question is, I would like to know, how many activities are done here at Return Tool to maintain the service?

Gorka: Well, essentially the development is on here. Obviously we´re not hosing ourselves, we are using a hosting provider for that. So, obviously the development goes on here, so what we call production, which is essentially skinning our system to each file, setting it up, submitting it to the actual [00:59] that goes on and here as well and then of course we´re not huge but, but sales, marketing, for certain degree here we also have agents that sell our product, so...

Elia: Okay

Gorka: So they're obviously around and about ending on which agents there is. Yea so basically is mainly, yeah, and of course cost and service is also mainly here, in Sweden we have our agents taking care of cost and service but we take care of the custom service from here

Elia: Okay, So development in... is now custom relationships, also with the Sweden department and a little bit of sales outsourced, and the hosting of the app is outsourced too

Gorka: Yes, the operations part, we use a digital option to... essentially we have a short server, a server which sells service that we are running, it is located in Amsterdam ..so that's essentially it, and then of course in our development part we have all our development in house, but because we're sort of organizes, ummm, we´re a small company we have three developers, we have one guy he's the CTO, he's here full time, and then two

others that are here sometimes and sometimes they're working from home or, so they're sort of distributed, semi-distributed, let's call it that. They both live in Copenhagen but we work fine with the, you know, using Jira and Slack and somewhat distributed, or semi distributed, let's call it that, because obviously it does have its value to meet up and sit and see each other, that's also why weren't, we don't have people like in Belarus, or US

Gorka: So in that sense is not really distributed but only semi

Elia: Going on with the data question that is really related to what we just said. So just to narrow down that a bit. What you're talking about is interesting, the main part of the service is the hosting right? Can I ask you like what is the cost? Is it possible?

Gorka: Our CTO actually knows the cost of that. I as remember the last costs live going up and down because we spin other server here and there to test some things, something like that, but it's really not that much. I think we are doing less than a hundred dollars a month in hosting costs. Yeah

Gorka: The costs at the minimum in general, I think

Elia: So, okay, about infrastructure, we already talked about development, we talked about hosting. For, so, I think that what you create an app and you sell it to new clients, you will also have the storage of the data on display somewhere?

Gorka: It's also on the same cloud

Elia: In the same?

Gorka: It depends a little bit on the data we are using an S3 server to host some of our images and stuff like that, but mainly it's also on digital option. The same server set up. And I'm not a hundred percent sure how it's set but I know we have, we have different servers hosting different parts of our system

Elia: Yeah

Gorka: Like, for example sending our push notification, we have dedicated server that only does that, for example, so most of the data is also hosted in digital option. Some of its images we use S3 and amazon

Elia: Okay

Alejandro: Yeah, I actually… I understand that you guys are hosting that host provider on digital option but using a bucket of amazon history for images.

Gorka: Exactly

Alejandro: That's usually… we usually put use a bucket for all type of like heavy content so on amazon you can just distribute the amount like they distribute the cost to that sort of information, and you can just like spend many like, they call it load balancers

Gorka: And you keep everything like up all the time so you have to show the deliver assignment response time on those sort of more heavy things like images and stuff like that and using, using an optimized server for serving that kind of things

Alejandro: But your database is stored on digital option?

Gorka: I store in digital option, I'm not the technical guy so I, forgive me if, but yes, the database is on digital option and it's the bucket on amazon we only use for images so

Alejandro: Okay

Gorka: So that's also data is like we have users that have via key cards, for example. So they have an image of themselves that are on the digital via key cards. So that's yeah, that's more or less sort of the level of detail that I know

Alejandro: Okay. That's fine. We just needed like a general overview of how its distributed on.

Elia: Okay then, yeah, so the revenue model of Return Tool is typical sales model?

Gorka: Yes, exactly, the revenue model is a typical sales model. So companies pay a monthly fee per location, so chains pay per location, pay more, than small businesses that only have one location pay less, and then we have a startup fee to that essentially entails the sign, the set up because we deliver an app that is their own sort of… their own visual identity to each client… and also our education like we do...training, so like an online training curse with each of our clients…. So that's basically it. The set up cost and then the monthly fee and then there's only one team, at this file. So you get everything

Alejandro: So, if I understand correctly, it's a… when a new customer on boarded you have a… do you have any entry price for, or it's just the recurring monthly fee?

Gorka: No, no there is an entry price, there is a setup fee

Alejandro: Okay

Gorka: So, the setup fee, that is one-time fee, no matter the size of the client, and then there's the monthly fee that is dependent on how many locations you have. like most of our clients have one location but we have up to 17 locations of like, chains that are running … they have one app.

Alejandro: Okay. And is there a variation on the app like… customize on the, on the… towards locations, if there is like a franchise?

Gorka: There is a customization on several levels, like obviously there is visual customization that is the sort of main part, and then there are also things that are sort of… the app obviously is essentially adapting to the user interfaces… is adapting depending on whether you have one location or whether you have a chain and it does that automatically, and if you have one location and you add another location it will just adapt based on the feed it gets from the server. And then there are also different configuration possibilities that are sort of, smaller details in terms of setting up some things like, specially with chains, some chains do for example require that they want to ask people about having like… which is their favorite venue, or the venue they want to hear from, for example. That's the configuration possibilities, and some chains are just like… now we don't want to know that because whatever we post through this channel is going to go to everyone anyway so, there's some like, some different configuration possibilities that are minor in terms of, yeah, how we set up the app, like they can choose also if they want to put an email address permissions, specifically to use in other channels, for example, and usually they don't want to do that and of course the tradeoff is every time you ask people something people get more annoyed so the question is… is annoying worse than the value you get from collecting email permission, for example, right?

Alejandro: Yeah

Elia: Sure, yeah

Gorka: So there are different ways for doing that targeting and it depends on ... it's an option for example, some of the chains want to ask people specifics explicitly and the other option is also an option that we use is that we can sort of guess which location that the users are… would like to hear from based on geolocation, stuff like that .And that's just sort of whether you want to hear specifically from people that they can sort of subscribe to news from certain locations or… and that's something that you have to enable specifically. In the

setup and of course also there's some other things like some of our clients have some url form that they would like to direct people to from the app for example some of them for example, run a separate system for booking tables for example, some of the [00:16:06] and they were like 'so that's something we can set up very easily', but still has to be configured for the individual clients that they want… to show what to do with this particular for inside the app for example

Elia: Okay. Thanks

Gorka: So depending on what sort of things they have… and we also have a couple of clients that have on their own custom integration with our API . And we also have that as well but in those cases today we haven't done the integration, they've done it themselves

Elia: Okay

Gorka: But that's sort on consultancy basis based on how many hours we estimated it would take

Elia: Yeah, okay. And in general with the relationship is when the client needs something to be changed… ask you any changes…

Gorka: No, no, just to go back, yeah, no, what I was talking about was in the set up phase there's some configurations but when it's up and running like changing text columns and sending push notifications

Gorka: Yeah, doing [00:17:15] all that they can do from their custom managements

Elia: Okay

Gorka: So that's themselves, yeah, the other thing was more like in the setup phase they can add some configurations, once it's up and running the CMS system allows them to do all of the things they need to do themselves

Elia: Okay

Gorka: In the everyday except a few of the configurations that we were just talking about and of course like, the visual part they can't change themselves that's if they want to redesign… yeah

Alejandro: But they can take care of the loyalty scheme as they earn the points

Gorka: Yes, they can have that they can run different kind of promotions, different ways they can run some sort of more informative… like… we call them banners that are more like…

Elia: Advertising

Gorka: Yeah exactly, like classical advertising they can run some coupon offers, they can do loyalty rewards like a digital stamps card, they can assign via key stages to some of their users if they want to give them special benefits. Exactly and the through that target special advantages to those people that have that stages and so on. So all of that they can do from their custom management system

Elia: Okay, cool [00:18:44] we only have one question, the last one is if for… so… do you do data analysis for the company, for the clients, they have a software because [00:18:55] sooner right?

Gorka: Yeah, so, I mean we have some in the custom management system, we have some statistics that we display to the client… not everything, we have partially, because many of our clients are small business owners that typically don't dig so much into the data

Elia: Yeah

Gorka: So it's about sort of limiting what they can see because otherwise it becomes too much

Elia: Yeah

Gorka: And the then we do some data analysis sometimes, we've done it for some of our bigger clients that they've asked for something specific. And yeah that's how it is today we are sort of we've been going back and forth about whether we should expose some sort of data API… either though something we set up ourselves or through a service that we… already provides that kind of things, there are different providers

Elia: So the data… are you're giving to your clients the analysis of the data?

Gorka: Yeah that's right

Elia: But we can say that the data are not open totally to the clients, right?

Gorka: No, it's not totally open to the clients, Its partially open. I mean like yeah, we say like, this in reality it's open because we are… our sort of agreement is that we have co-ownership over the data with our clients, so if they ask for some specific data that is not exposed to them we will provide it

Elia: Yeah, but they don't own a record of the transaction

Gorka: No, okay, we have that and we host that

Elia: Ok

Elia: Then we have… have you ever had a security problem caused by the technology you're using? That's, we want to know, we want to see if there is any, you know, problem with the current technology that maybe with an added technology we can solve.

Gorka: Yeah, I mean we… I mean before, we didn't always necessarily encrypt the transaction between all the data between the app and the server, and obviously that was a… that was something that could have been a security problem. We haven't experienced anything but we know that you can you can… you could manipulate the data from the… in the app if you did

Alejandro: Or reach it from the client, as a client I can manipulate the data?

Gorka: No, not as a client if you do a man in the middle then you could… back then, manipulate the data in the app

Alejandro: Yeah

Gorka: That could essentially ... yeah pretend to be the server

Alejandro: It's a, when you submit the request like any transaction initially is not encrypted. What you can do is just to pretend the submission in the request kind of [...] from any like… you can block a request, it's called like that, over some sort of over any sort of information you move around

Gorka: Yeah, yeah

Alejandro: So yeah that's… Facebook solves that for example, with when you open [00:22:36] as a developer on Facebook and you want to use their API, they give you like some token that basically is a guarantee that you are you, so you can nobody can use that API on your behalf.

Gorka: That it's your property

Alejandro: Yeah exactly, well, you have public that is accessible to everybody but this is like a private key that you own yourself so that's the way to just guarantee

Gorka: Yeah exactly to encrypt and to yeah somewhat these kind of things. Obviously SSL solves a lot of that problem and that's also why Apple and Google have been pushing for everyone to move to actually using SSL on their apps, specially over the last year they've been pushing quite hard. I mean we haven't had any sort of breaches of the server or anything like that so like I mean obviously we're using SSL some of our clients are using static QR codes but it also low tech breaches you could say

Elia: Yeah

Gorka: This you can publish… but I can tell you because you will figure out anyways. Obviously a customer could take a picture of the QR code and claim fake purchese, you could use that, right?

Alejandro: Sure

Gorka: We have a digital solution where you're running if you are on a device and it changes all the time

Alejandro: Okay, that is perfect

Gorka: So you don't have that issue. But it depends a little bit on what the clients are willing to pay for… essentially and whether they want to have a device that they also have to make sure is not

Elia: Yeah. That's actually a really good point of view

Gorka: Yeah, and we're doing some security issues on the static QR code, we're doing some analysis on usage patterns and some of the data we get from the phones of some of our, we get to internally if there's something suspicious going on, and then we can just close down the program if it's been compromised, for example

Alejandro: Okay

Gorka: So were doing, we have another security layer to avoid that particular sort of low-tech way of gating the system

Alejandro: That's nice

Gorka: So, but of course statistical analysis is not a 100 percent, but that's of course the, what is within what's acceptable in our case, and if you want 100 percent we have a solution for that, that's the digital QR code, so that you can, you know, yeah

Alejandro: People will always say, they will always find a way to play...

Gorka: Yes, exactly

Alejandro: Play around, you know, like playing towards like the smarter...

Gorka: And this is not a secret to our clients either, we have this solution and if you want a 100 percent, the thing is that there's only a few people that tries to gate the system, and the question is… is the advantages of the system bigger than the disadvantages

Alejandro: Sure

Gorka: And so far it's proven that the advantages that we have for our clients are way, way outweighing the few sort of times that someone has tried to compromise the QR code, for example, by taking a photo or something like that

Elia: Okay. We are… security is done

Alejandro: It's like which are your fixed and variable costs per year in order to maintain the service, but this only means technology such as the hosting provider and the human resources, this question goes more towards, we want to understand more the whole like to see the whole pic, well not the whole picture, because it's more service oriented, but it's like to maintain loyalty the loyalty scheme that you guys have

Gorka: It's a good question because the thing is the reason why I don't have that exact number is that the two other developers are not working full-time, and we're also using them for all kinds of different, other assignments, so our revenue strings are a little bit mixed.

Elia: But I guess that you have two full-time employees?

Gorka: Nah, nah, I have one full-time and two that are doing maybe say 15 hours a week or something like that

Elia: Okay

Gorka: And then of course the hosting cost which is that around of a 100 dollars a month. And then if you want to put in the tools we use, is that an expense as well, or like

Elia: Yeah, this goes towards all the technology expenses

Gorka: Yeah, so including for example we are using Jira and paying for that to do our product management and so on. And I guess like… that I talk to maybe another 150 dollars in terms of all the tools we pay a month

Elia: They're monthly

Gorka: Yeah, exactly. And that's...

Elia: But the real cost is actually the people...

Gorka: The real cost is the people, no doubt about that. The real cost is the people and the sales Data storages are not the cost because of the plummeting cost of the storage. It's the people and the...

Elia: Security also is not super expensive?

Gorka: No, no, but that like that's something we develop ourselves, it's human cost it's not something that we're that's something that we develop ourselves and the

Elia: Ok, if your technology has no problem over, a security problem, because it's incorruptible, your developer will have more time to do other stuff, I'm sure right?

Gorka: Ummm... yes, I mean there is definitely a cost to developing and maintaining the security, no doubt about that, `how big that cost exactly is I don't know because it's mixed in with all the other development time,

but definitely I mean, if that can be sort of outsold to some sort of service, obviously that's interesting just as well as like where, just as well as outsourcing, and just as well as... yeah we're using for example. I think we changed but we were using Mantra for email for example right? You know, like get to transactional emails. So the security part can be one sort of service, that's definitely something that is interesting because just like transaction email won't want to have to you know make sure that we don't get blacklisted, and all that kinds of things

Elia: Sure

Gorka: Right. So, in general I mean we are trying to use as many services as possible to know our development costs

Elia: Yeah, and it scares you with free uptime for developers and free uptime for the clients if I mean, it's not super big as sales, but it's something

Gorka: Yeah, no definitely, definitely, I mean like, it's not in the overall picture insignificant I mean, like I've been, way back, we were doing, I was doing another concept but some of the same people, and for example back then we had the idea that it was best, for example, for us develop our own serum system, which was completely Brainiac laughs because you know, serum systems have come a long way, but still to say like that, sort of , maintaining our own serum system because we thought we had some very, very specific demands that we wanted our serum system to do, was just a total waste of development time, and definitely anything that is outside the call is interesting to look at whether it can be handled by some sort of service that specializes in that

Alejandro: Perfect. I have another question. So, from one customer, in this case, we, I am a customer of Berlin Bar so I will use that one instead, as an example, Berlin Bar when they approach to you and they say, we want you to join this, imagine that they want, that they only have one bar, the one bar plan, and I'm just guessing

Gorka: Berlin Bar does, even though they are the same owner of a couple of our other clients, but they, they work as an independent one bar place

Alejandro: Okay, that's a good thing for example. So, from the percentage on joining Return Tool, of the 100 percent, how much of that are you using in order to maintain, you know, the percentage...

Gorka: Yeah, yeah, I also thought about it when I read the question, and the truth is it's I think it's, one we have the client, I think it's 1 or 2 percent in maintaining, or maybe even less, so the big expense, and it's not very big, the big expense is actually the time spent on custom service, like, they write us they can't figure out how to reset the password because they forgot it again or something like that

Alejandro: Yeah that's normal

Gorka: Exactly, and they haven't checked the little button that says reset your password, or something like that, so, or, I mean of course sometimes there are some issues, but that's the, essentially, the main expense once the system is up and running. Yeah, that's sort of, the custom service time is the main expense and it's not that much we have, because, well, our system has been in the market now for more than 4 years so it's now stable, in that sense, but of course things happen every time there's a new operating system coming out, we cross our fingers and we test everything on the beta version, and of course that's where you see a spike that there are some like obscure android phones that have some mistakes or something like that, and of course that's partly development because it's part-fixing, but it's also the time to do, to talk to the people that are talking to you, that's general custom service and that has a cost but it's very, very little. Yeah

Alejandro: That's, actually that question I thought was really, really interesting, just to understand the, once you get a custom is okay just maintaining...

Gorka: Yeah, exactly

Alejandro: That's interesting

Gorka: It's very little what it actually costs

Alejandro: Okay, so, there's one last question. So, the many tasks, could be like done automatically, or many tasks done like manually, could you, from the service flow tell us what is automatic from the moment of one service operation happening

Gorka: You mean, when you say one service operation, I don't actually understand what it means, like...

Alejandro: Yes, I mean with service, the service time of the service is when, for example, one customer approaches to one of the bars and redeems one of the benefits

Gorka: Okay

Alejandro: So, by the time this happens, something happens in the application as well

Gorka: Yeah

Alejandro: I guess there's a record that could be manually moved or automatically moved into the database, and to the CRM system that you guys have, or I don't know, that's kind of what we want to know

Gorka: Yeah, I mean like, we can provide real time data analysis tool to our customers that we use to give insights to our customers. Tell me if I... So essentially all the interaction that goes on between the consumer and the business that is our client essentially, everything is automatic except the thing that happens when you redeem something, the bartender looks at the customer's phone and sort of confirms that, okay you have the right of 2x1 offer or you have actually filled out this stamp card and you actually get a free beer or whatever it is, and so that part is manual, and it's the bartender that sort of says, ok, I'll give you the free beer or what it is. But in terms of our system, everything is just, is automatic, like from the, the custom of pushes that they want to redeem, they show to the bartender but the data that is then sent to our server and everything is just, there's no manual part to that

Alejandro: There's no guy behind the office that is like: yeah, this guts, redeemed instantly

Gorka: Yeah, there's no manual part of that.

Alejandro: Yeah, that's exactly the question. That's perfect. You want to go to the customer level?

Elia: I think we are; this is the last one basically. In general, when one of you clients, the clients that you have, they allow the customer to redeem the point in different ways? Like, because we saw that level of scheme to the customer to maybe exchange the point for money, if they thought they didn't found some of their delight, or they may, can allow the customer to exchange points, maybe, you know, have you seen something like this?

Gorka: In terms of exchanging for money, it's essentially up to our client, the business or of decides its own policy. But, I think they have to actually offer... Like a discount. Yeah, they have to say, if you sort of have a stamps card and you collected the 10 stamps, you bought ten beers and you're going to get the 11th for free, they have to sort of sign t a certain value to one stamp, and then...

Elia: Like nectar is doing something like for a thousand points or a hundred points, you have like, 5 servings

Gorka: Yeah, exactly, but we don't see that simply because people are not used to it. Because our loyalty reward system is based on, yeah, is based on a stamp that is assigned a certain bonus, and you can run several loyalty programs simultaneously but one stamp that gives you, say, the seventh beer for free, like the value of

that compared to another stamp card where you get the tenth coffee for free, there is no real way to exchange that, there is not real value

Elia: Yeah, because the points are different

Gorka: Yeah, exactly, they're different card by card

Alejandro: Oh, sure, yeah. That's actually interesting. So the businesses set up their own rules?

Gorka: Yeah, they can want more than one scheme but it very sort of simple and straightforward in the sense that usually it's sort of based on the old-fashioned model of having stamp cards, those physical stamp cards, and that simply, you know, once you've made x amount of purchases, you get some reward, some businesses give you the option to choose between two rewards for example, on the same stamp card, but that's essentially up to them. They set that up, what is the reward for this particular stamp card. And, there's no sort of way of interchanging, no within the application, and not either across applications, so different businesses cannot exchange their...

Elia: Yeah, There's no coalition

Gorka: Yeah, exactly, it's not a coalition. Yeah

Elia: Then … you're having, you're keeping the data for Return Tool as an asset basically, and the company... but you're also giving to the clients a lot of freedom with their interface so they can play around, if they.... you… remember the password

Gorka: Exactly, they're incapable

Elia: Sure, right. And the, yes, so the points have different value depending on the card. They cannot exchange business to business, and everything is automatically

Gorka: Yeah, yeah.

Elia: What will happen if one customer, one client, one of your businesses asks you for a new data analysis, you will do it now, then you would've... Then it could be done, like, analogically

Gorka: Yeah, actually we've done it analogically, in some cases, we say: okay, this is an interesting data we haven't exposed it to our clients, but we'll put it in our backlog, and it'll come in some sort of update for everyone, if it seems valuable to everyone. SO it depends a little bit on what the request is, but otherwise we'll do it in the house if it's also something that's a little bit more complex

Alejandro: I have one question: dealing with, I guess, dealing with small businesses must be challenging from... many ways, let's just say they forget the password...perhaps because I think of the bar, that they don't have someone on charge of like dealing with the... maybe they don't. It's kind of like a mess on their side. So like, what... that could be one challenge, but what do you think is the biggest challenge to work with small and medium businesses?

Gorka: I... I would say there are two things: once they're out client, the biggest challenge is to, is to make sure that they continuously use the system. Because, I mean, all value come from say it's the same from if you buy a fitness... a subscription for fitness, if you don't go there, you're not going to get slim, right? And the same with our tool, if you don't use it, you're not going to get value out of it, right?

Alejandro: Sure

Gorka: So that's sort of one of the challenges, like, if we look at something like [00:45:19] for example, it's quite simple because they use the stamp car functionality a lot, and that's very much driven by the consumers, right?

Alejandro: Yeah

Gorka: So, we see, they're using it a lot, because their customers are coming and saying 'hey, I want my stamp, and I have the app', and... You know, so, there is easy to solve [00:45:40] but we don't, it's not all of our clients to whom the sort of loyalty reward functionality is the key, some of them are much more into, sort of the direct marketing capabilities that the system has. And that is more challenging. But in general is sort of, yeah, make sure that they keep using it and indicate them the possibilities that are, or the possibilities as they are sort of developed, and we are adding more features and adding more things because a lot of them just don't have time to, sort of, go through tutorial, for example, or something like that. Most of them are sort of running, standing behind the bar, or they're, in their own shop or, whatever, and at the same time they're sort of trying to do marketing

Alejandro: Yeah, I guess the marketing is a side of their like, daily tasks

Gorka: Yeah, I mean the thing is of course it's essential to their business but, but it's not, it's not immediate in the sense that, if they don't have. say, let's say you're running a bar, and if you don't have vodka, you're in trouble. Because people are going to order it and, and you're going to know that. So ordering vodka is a higher priority than going into your system and doing the Friday bar offer. But if you don't do the Friday bar offer you're going to get less clients, but you're not going to notice, because you don't know what you didn't get, right?

Alejandro: Yeah. That's true, but, so... Like the customers, it's important for them to be aware of how many customers they're getting through the app by having access to the dashboard

Gorka: Exactly, and that's sort of what we're trying to sort of quantify for them

Alejandro: Exactly, they won't know what they're missing

Gorka: Exactly, they won't know what they're missing but we try to at least communicate what they're getting, and then obviously trying to also sometimes do some comparisons as to different periods in time when the did something and when they didn't do it. but, the other thing is if they're not a client, the challenge for small business is essentially getting time to talk to them because they're super busy.

Elia: Sales is a challenge....

Gorka: Definitely, definitely, and a lot of them are not used to buy-in software products, so it's a bit of a sort of, it's a bit of a step sort of mentally, where they... I guess, people like us are more comfortable buying something, some software program service, self-service, sign up your credit card and you're good to go. And a lot of these people, they don't, they're not used to...They don't know how, you know, how that works

Alejandro: Yeah. This is interesting. It's the intersection between the, like, the physical brick business and the digital, and trying to push the digital product there is. That is interesting

Gorka: Exactly

Alejandro: Ok.I think we are okay

Elia: I only have one... Like, with your client that has several locations, they notice some advantages using a loyalty system for every, for all the locations. Like, they have one location that was going pretty bad, and with the loyalty system the sales went up? Yeah, something like this?

Gorka: Yeah, I mean, what we at least can see is that, they have used it to, to sort of, specially we have some customers that have some, some young owners, on some of them, essentially a franchise but they sort of work as a chain. SO the franchise takers, some of them are young, and some of them are old. And what we see is that, what we also hear from them, is specially that after they sort of implemented our app, the older owners have gotten an incentive to actually try to use a digital use, our tool in this case, simply because some of the younger users were using it and they can see that, oh, you know like, hey now, my colleague, 15km away, he's running a special in this order. He's doing a loyalty scheme on this, or something like that. So, in that sense, we hear that they have sort of started using it more. We don't the actual, sort of, bottom-line impact, because we don't have that data from the... But from what we hear it's had an impact. And then from the market... this particular example, they're organized... there's a marketing company that is a franchise owner and then they're sort of franchise, and the marketing company takes care of... a part of the marketing goes through our sort of... they have a master log in, each of they have their own log in that restricts them of doing certain things that are restricted to their own... but it's the same system, it's the Return Tool. And, then the marketing company has used this to sort of, they're running a loyalty, a loyalty reward program that is across all of them. So you can get stamp in one place, and then in another place for the same thing and you can redeem it wherever you want. And, they like that because they can then use for the marketing company also, this app to sort of highlight some of their individual franchise takers that maybe needs a little bit more help

Elia: Ok. If they're still using it, we can probably assume that probably something good...

Gorka: Yes, we've had clients for more than three and a half years, so we assume that they, that it has an impact on their bottom-line. But it's, the exact size of the impact we don't know

Alejandro: No, okay, but it's interesting how maybe sharing customers, because in this case is sharing the customer, but having the same loyalty system can actually in some case increase, or at least level a little bit different locations.

Elia: Ok, then thank you for the interviewee and for your time, you gave us really important input. In case we need a follow up can we contact you?

Gorka: You welcome guys it was my pleasure and yeah sure, just send me a email some days in advance!

Alejandro: Perfect thank you again!

Appendix 10 : Interview transcript @ BrainBot Expert

Elia: First of all we want to thank you for accepting to be interviewed. We know your time is precious and we really appreciate your participation! For us, your contribution will be fundamental for the development of our research! So, firstly we will present present you the project which we already discussed via email. Then, we will present you our blockchain application in the LRP industry, so you can give us you point of view! Moreover we want to remind you that we will record this interview exclusively for thesis purpose and we will also take notes during the conversation. It is all ok for you?

Gustav: Ok. So it's okay you can record it.

Alejandro: Okay perfect, so Elia will start giving you a little intro just about the project.

Elia: Yes so just update you really big, we are doing exploratory multiple case study on the loyalty reward program industry, we have two type of companies; one that is operating a loyalty reward program for satisfying, so only one business basically one company is not loyalty reward program and the other one is a coalition loyalty program okay, so basically the network of business that are interacting sharing point sharing customers, so they have different system to work. We are doing an inductive approach they did our curriculum and the area, so how we work through all file is how to chain enable the development of a new kind of loyalty reward program, so what we've done is we collected the data from open company and we found some common domestics around which we will activate that, what we have found is this; so we found some common domestics about the level of interoperability that both system had, so on one hand we have the single private party system which don't allow for any communication between other company because every company owns its own network program and certain rules and is no attention on this, on the other hand we have collaboration within the company because it's a coalition loyalty program but the interoperability has some limitation because there is a settlement point management for the redemption and the issuance of the point that needs to be distributed across the network that takes up one month to be updated for the distribution of the point, so this is the issue we found.

Alejandro: Okay, so I'm sharing my screen now, so you can follow it better I think. So um okay in this case, this is the quick intro to the levels, okay so we have this these levels program speed is the time required to update the points balance, the IT infrastructure complexity is the amount of IT you're required to sustain and the type of data is the richness of each one of data collected to the loyalty, we could say how deep we can get from the customers and the freedom of choice is basically the ability for the customers to receive some sort of e-voucher they can review for benefits. This and the customization level which is like a yeah how flexible is a platform to the end.

Gustav: Yes, what this mean they are different endless levels, or a parameter you are looking at, or what?

Alejandro: Yes, what happens is that we are the purpose of the project is to analyze a three different as earlier I was saying, one are private loyaltyone are collision royalty and the blockchain base solution, so we analyzed the three different type of companies we could say under these six parameters and then what we want is that if you already know what they are each one of them, we present to you a which is the yeah which is like what our finding and then you can tell us what you think about it.

Elia: But you always get these three different case studies?

Alejandro: Yes is actually two case studies and the third one is the block chain based solution that we want to present you.

Elia: Okay so that's the one I have to enjoy here, there's nothing to do [04:55 unclear] it's just my experiment duration on the requiring findings.

Alejandro: Exactly

Gustav: That's different but you have featured a good point of view on how that thing can be applied in ideal case scenario and yeah there's some similarities that can lead loyalty reward program yeah.

Elia: Yes, so let me go straight to the point, so we have find all this different level and yeah I can continue to explain how it works for this company. the program speed is the time they require them to the point to be updated and as you said the corrective structure takes time because in the coalition loyalty program, we can say that the anchor the owner of the card of them that is providing the system to the network is actually acting as a banker, so they are basically selling going and finding the backup after them shown having the fear on that if they rejecting them as a bank, so if is the time to you know check the [06:14 unclear] and the transaction in

order to be sure that they are being correct. The potential complexity that they support of the business is also quiet complex in this case and they have offer in house with storage and also providing for the best, they have security and there's a data in house [06:39 unclear] for the data breakup the difference here is that they did a collected through the coalition, through the card that is part of coalition, allow the data analyzer to quickly have a database composed by data come from different items, from different companies that are working in same sector and then they are able to build it better inside for each card holder, while for the drive of the company you cannot do that because is basically it's based on your own one center by them that have been a full at one company there is no interaction, so you are not able to understand more about the customer. The customer freedom of choice is basically just we said the companies of bringing only one set of further generally the coalition money and then the customization level is based on their PDP of the company that provides the loyalty reward program. What we are found is this; we later that the level of interoperability between companies can be increased if all of the schema shared a single lighter on the block chain because we find that the spelling point is difficult is expensive, over here the first idea that you want to connect through that we think that using our share symbolizer based on the blockchain will make transferring the point simple, fast, cost-effective and network will allow collaboration through companies, what do you think about it?

Gustav: So, what ledger are we talking about?

Elia: We are thinking about permissioned blockchain, permissioned ledger because the companies that are working inside of the ledger are not really happy with the anonymity of the ledger

Gustav: So a private setting the number of visitors would agree that we intended in the network and we would like to use cool loyalty points in quick environments we are all whitelisted, everyone knows who we are, perhaps we have to sign an agreement for this and the way that this network is validated is also known by a set of other known validators which again all know who they are, and good or bad they can decide who transactions can be made, that's what you mean with the private setup?

Alejandro: Yeah

Gustav: Okay and then the question was if it will be you said what

Elia: Yeah if you think is viable?

Gustav: So if you only want to do it within the people network then yes, of course this lecture will be enjoyable, within only the participants within this network and at this point in time not be interact full with people from the outside the network, non that says right now there are new developments, so relatively soon perhaps this could more as a side chain and then it might be possibilities that say there is one network with all the supermarket's and one network with all the auto, let's just say like they are airplane companies and at some point if they want also to be interoperable, they can also be able be that, but not at this point in time.

Alejandro: Okay

Gustav: Just depend, in terms of the interoperability i would say yes, it's truly high interoperability between the people only inside the network but in the sort of distributed ledger context it is not interoperable, it is more sort of why would you need a blockchain in the first place for this, why would we not just have a normal centralized database because you're already in this private setup, so if you trust some people who takes care of this they can just edit the polarity, so in that sense the interoperability in that sense it depends on what we're talking about the blockchain or distributed ledger context, it's not interoperable.

Elia: Okay I agree and for the second dimension to be speed there but yeah in speaking of having a company that is managing the settlement process, the idea is to use a smart contract to do that, yeah because the idea is

that can allow you will increase the speed of the operation is because having like a bank type company that is an intermediary between all the other.

Alejandro: In this case the idea is that basically we know that the centralized system has pretty much any company operating network systems of a wide systems are faster than what we think now on a public blockchain such as for example as a theorem, so we would like you to tell us what do you think about the program speed in regards of private and coalition centralized system, do you think is feasible to put it as what a variable here?
Elia: As viable for facilitating the throughput needed for private network loyalty scheme, number of transactions there, what is the question?

Alejandro: Yeah your program speed is imagine that you perform a transaction on whatever ledger that is like private and centralized right now, we are talking about immediate perhaps like or not like not immediate but a really short delay on those registries like being inserted into a database and then therefore running the query in order to get it and show it like almost immediately as a Ajax request to a user, in this case a what do you think would be the same experience on a block chain based platform?

Elia: So again I mean depends very much what are the specific private blockchains consensus you have, there is not only one solution for this and what are the transaction per second needed.

Alejandro: Okay in this

Gustav: Its frequent-flyer miles for example; maybe it could be hard because let's say maybe we could do ten thousand transactions per second right in the private setting but maybe they're doing more on this. And we know for the normal system you maybe have the capacity of something along the lines especially that you think that's how now but you can probably see the news, a test from visa is something like fifty eight thousand per second something like this that taken all these transactions worldwide basically that visa can do, so depending on this and then what are the required, how many transactions would this private let's say proof of authority network need to entry. That's first question to say as possible to say is equivalent but in general then when we have this setup then you can do a lot of transactions, well, I don't know what is the number of transactions needed.

Alejandro: What is a consensus algorithm that you just mentioned proof of what?

Gustav: Proof of authority

Alejandro: Proof of all authority and what is the blockchain that is currently using in that?

Elia: It is mostly private chains, so there not so known normally, I know for example there is a specific version of the *multybug* in the testnet, is just proof-of-authority, I know that if you mention, you can see the United Nations World Food Program have computer testing for sending a food vouchers within food vouchers to refugees in Kenia.
in a convenient test that's also food operating

Gustav: Then they have a project called building blocks which is a world food program which they are experimenting the project solutions and that's normally where most banks and big enterprises do as well where they first trying out on some private set up and that's also non private chains setup which is not in this ethereum space which is in the for example; the hyperledger space, there for example you can ask to talk to some of the guy from maersk, that at the end they developed this platform. Again, these are different types of permissioned ledgers as this proof of authority is still trying to do some type of centralized proof-of-work with them, that can also be a private chain with delegated-proof-of-stake, other type of consensus mechanisms and so forth.
First comment on the project would be that when you are specifically looking into blockchain solutions i think it's I think it's important to remember that cryptocurrencies, many of those are not relying on blockchain

technology, some of the [...] are sort of more distributed ledgers with also perhaps have units of accounts which are cryptocurrencies which are cryptocurrencies which are using, they are still being validated by underlined cryptography, but they are not structuring the data on the traditional blockchain, and there is also some which are not very good with currencies but they are using just a more traditional belt of federated examples and these are also distributed ledgers, eh some will say that it is not as robust as blockchain and so forth, that's some elements, of different possibilities a loyalty points.

Alejandro: Okay so I just have a question do you think is possible to run a proof of stake on top of a private blockchain?

Gustav: Yes.

Alejandro: I mean it possible in regards of trust it's something you could because obviously you can run a set up in a in a controlled environment of known nodes but do you think that's a reliable blockchain?

Gustav: Yes the examples of then, as I understand then you will call it delegated-proof-of-stake, because there you have whitelisted some persons like in the proof-of-authority where you have miners, but they are not called miners the right is staters and I think that is maybe more complex right now because you there are better you know... solutions, more they will be tested. But i think that is good as well, then know then consensus mechanisms but the proof-of-work for example if you can only only lose, if you lose your badge you can only lose what you have right now. Maybe you have a miner for one year and now they have all the money for one year and now they are gone, and now you are cheating one time and that's the energy for this one transaction that you may get caught but you will not get this reward, but in the proof of stake you have a stake in there and if you get caught lying you will lose everything, so there you are punished a lot more if you are caught doing front-running malicious transactions or any of all these names, all these bad things, or validators, will not be a miner on this case will be a validator and it is possible. And I think for example in the project like vertcoin from specially Barcelona Spain then they are using a dedicated-proof-of-stake in a federated setup, where every community has their own node, that's because they think that it is very expensive to have another blockchain transactions, so this I would say that this is also trustfree. For example, how many maybe just wanna do something that is not to reinvent anything, maybe just to try some standard solutions.

Alejandro: Okay we can move to the next is in regards to the IT infrastructure complexity;

Elia, do you want to continue again on this?

Elia: No yeah is ok but this is yeah this is easy actually, we just found that the company they have a lot of infrastructure in order to run their program especially thinking about the management system for the issuance retention point is been distorted, the security to the fiction and that, here the ideals that we think that are using smart contracts and the blockchain, we'd agree that for surety of the complexity of the overall infrastructure and the code.

Elia: Do you think that is a:

Gustav: Just say, is just a college. Okay there again, so you were saying it will increase complexity in the current system. The current system is?

Elia: The loyalty reward program program that we have right now is to composed by a management system for the issuance and redemption points that can be exchange with smart contract and they have been the data storage and they have data analysis and they have security because of the ability of the blockchain to operate automatically to ensure security and to distributed the network of the ledger, we think that for sure the

infrastructure will be less complex right? We are also unsure if it will also decrease the cost, i mean ,on how big is the company for sure. Do you have any suggestion on why this cooperation between…

Gustav: In regards of complexity it is less, very very small in terms of smarty contracts you will need a relay server or some confident, but in order to create your setup cost, it is a lot more than normal systems right now because not many people know about this and people that develop here are not easy, also you need to reach some. Maybe on loyalty points, you need an open source solution. Then for the the longer cost perspective, normally consultants and stuff only accept in advance. The example I have I don't know if it's the loyalty points but they say, is all okay, is so much better, is so much cheaper, and i think is very different, of course it sounds very nice would be able to have and also nice and we should not have this third party settlement company to do this and maybe have it [25:32] but because also now, sort of at least somehow in the blockchain setup you also want to make sure that there also [...] data how much you can delete, is there .. come together.. the finance to come together, is really what you don't wanna do. And I think that it is very different from process to process isn't actually good or bad and this is still very new software and [...] don't get that many blockchain based solutions in production. So in that sense is now more in the research and development space, the value gains right now are more in that space. The value gains right now are in this space right now, there are all these ambitions that you could also like that I don't know about you, but I don't know a lot about blockchain based solutions that are actually POC1 POC2, this that and they are coming out there and treated as normal blockchains systems. It is a long way to talk about this but for the sessions this brings a leading question.

Alejandro: We are almost at the end, you think you are able to collect more data to the blockchain because. And you can write the journey of the single point, and you can describe the behaviour of the people, now you don't know this journey, where it was issued. So you think blockchain can be used to track the origin of the data collection.

Gustav: Again, this depends on how it is migrated, and what is the purpose, what is the privacy on things, maybe you want to see by default some transparency, it depends. Is not too common in this day, now is the basics of the blockchain spaces, people are trying to bring more in into the blockchain spaces. In terms of transparency I would say yes, but in the case of these centralized systems there is a lot of metadata and many blockchains have been dealing with this problem, so that's also another way of keeping few data as possible in the blockchain.

Alejandro: So in a current imagine that we're talking about a current project on the blockchain perhaps on the ethereum blockchain, you are saying that it's not feasible to store a lot of data because we know that we need it's expensive to store data

Gustav: We can talk about this part too, but I am talking about the issue points process on the blockchain, to really wanted to make this point,.

Alejandro: Yes running computation on the blockchain is expensive in nowadays, well in a proof-of-work
so I think it is okay that's something that will improve, so the next I mentioned is a customer freedom of choice in regards of this that I mentioned I think we need to add it because the model requires more in the private and multi-vendor environments but the idea is, do you want to say something on this one again?

Gustav: No, the problem for Gustav is more the functioning, once we have the data.

Alejandro: Okay, the last one is more relevant is the customization level, this is how do you think you can get to customize imagine the system as Elia was explaining based on a system based on smart contracts running on the ethereum blockchain as it is now on as I understand is still based on proof of work even though there are still like a efforts of hate getting like a hybrid or steal or they are already happened I'm not aware of it.

Alejandro: Yes it's still proof of work right, there are likes some force that we're going through but still

Gustav: Now that we have also talked about proof-of-origin, also if you google this, once you do some proof-of-authority change, in terms of blockchain settings it might be easier at some point, this will develop more in some areas, and once is ready it will be … There are two things, the short-term interoperability and the long-term interoperability.

Alejandro: The question is regarding the customization level of a system like this

Elia: I think is okay

Gustav: In the sense that you want to customize your own blockchain, or?

Alejandro: The idea behind is that you are not the infrastructure you can customize it, I think if you take a public approach to the blockchain.

Gustav: No, of course you can make your own public blockchain.

Alejandro: Okay you could do a brand talking about more like taking a blockchain already that exists like ethereum and then building your own like inside ecosystem for your own project such as like I don't know like...

Gustav: Private Chain

Alejandro: Not the private chain because I think if you're already on ethereum you can't do private since you already a public.

Gustav: Also many with proof-of-authority, there are many frameworks, like this company now, is named "hydro-blockchain" that was the first framework for private chains on ethereum. There is also another popular that is called Tendermint (Private, Public), there are many different more with different levels of customization.

Alejandro: Okay that's it for the questions on this

Gustav: That is all open source, for customization. Maybe, there is a big consultancy company that is has a legacy system, that maybe is a license software, in this case this is open source and this makes it easy because it is open source, wo we have the ability to build on top of those openframeworks.

Alejandro: Okay I think that was a really insightful for the project as you wrapping up as you know this is a business project oriented more than IT, so the idea is basically coming up with a model that could be released as a thesis and then people could just read pros and cons and this feedback that they give us is something that they can or they will go to the librarian and be able maybe if it cause problem.

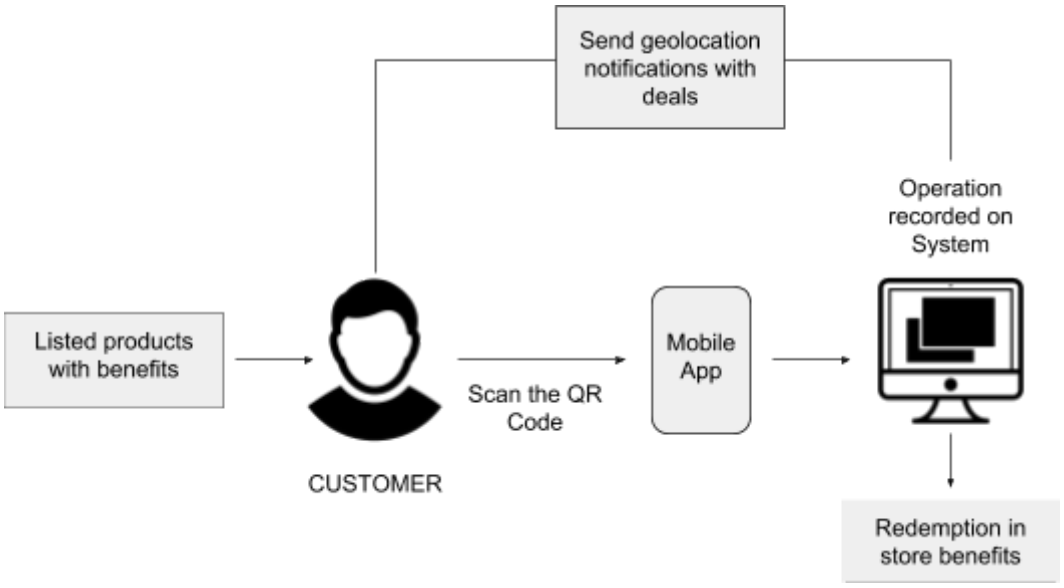
Gustav: Okay

Alejandro: Thank you for the interview it was nice to have you.

Gustav: Have a nice day guys, take care!

Alejandro: You too! Bye!

Appendix 11 : Process Document @ReturnTool



Appendix 12 : Documents Database

NECTAR		
Title	**Topic**	**Link**
Aimia 2016 Annual Report	Infrastructure	https://www.aimia.com/wp-content/uploads/2017/11/Aimia-2016-Annual-Rport_Final_EN.pdf
Aimia 2016 Annual Report	Interoperability	https://www.aimia.com/wp-content/uploads/2017/11/Aimia-2016-Annual-Rport_Final_EN.pdf
Aimia_ Nectar report 10th anniversary	Point Managent	https://www.aimia.com/wp-content/uploads/2017/11/Aimia-2016-Annual-Rport_Final_EN.pdf
Main Site	Revenue logic	https://www.nectar.com/#benefits
Nectar points the Sun review.	customer discounts	https://www.thesun.co.uk/money/3362565/nectar-points-stores-spend-sainsburys/
A quick guide to Nectar	General info	https://www.bp.com/en_gb/united-kingdom/products-services/loyalty/Nectar.html
Which loyalty scheme is best?	Interoperability	http://www.mirror.co.uk/money/tesco-clubcard-nectar-mywaitrose-boots-10247220

RETURN-TOOL		
Title	**Topic**	**Link**
Returntool private Document	Infrastructure	http://www.returntool.com/en/product-tour/document
Returntool private Document	Interoperability	http://www.returntool.com/en/product-tour/document
Returntool private Document	Point Managent	http://www.returntool.com/en/product-tour/document
Returntool private Document	Revenue logic	http://www.returntool.com/en/prodct-tour/
Returntool private Document	customer discounts	http://www.returntool.com/en/prodct-tour/
Returntool Document	General info	http://www.returntool.com/en/prodct-tour/