Blockchain: Impact of Fin-Tech on Professional Services- Audit function.

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Dissertation submitted in part fulfilment of the requirements for the degree of Master of Business Administration in finance at Dublin Business School.

May, 2018.
Title: Blockchain: Impact of Fin-Tech on Professional Services- Audit function.

Research question: What impact will block-chain have on the financial function of audit and the profession in 2018?

Year: May, 2018.

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Level: MBA Finance.

Number of words: 20,379 excluding: Title Page, Table of Contents, List of Figures, List of Tables, Appendices and Bibliography.

Pages: 124
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LIST OF ABBREVIATIONS

EY- Ernst and Young
ICAEW- Institute of Chartered Accountants of England and Wales
PwC- PricewaterhouseCoopers
KPMG- Klynveld Peat Marwick Goerdeler.
FEDs- Federal Governments.
SEC- Securities and Exchange Commission
UK- United Kingdom
AICPA- American Institute of certified public accountants
IAASA- Irish Audit and Accounting Supervisory Authority
ACKNOWLEDGEMENTS

Looking back at my journey and growth, it is of importance to show gratitude to God and those who have been involved in the process.

Firstly, I would like to sincerely thank my supervisor Enda Murphy. For his impact as a lecturer of finance in both semesters of my study and mostly his time, advices and guidance through my dissertation. I could not have had a better supervisor for my dissertation.

To the interviewees, Sebastian Diesel, Dominik Walter, Michael Maurer and Ayomikun Ogunkanmi whose knowledge and expertise helped to achieve the goal of this research, my sincere thanks.

Thank you to my family and friends for their continuous support and motivation through the years and particularly believing in me. I am indeed grateful.

To Michael Letic who has supported me immensely through this study. With all my respect.

Finally, to those who contributed directly and indirectly to the achievement of this MBA degree, many thanks.
“Blockchains for all what are these enthusiasts on about? The ‘blockchain’ technology behind bitcoin could prove to be an ingredient of an entire new world of technology, as big as the internet itself, a wave of innovation that drives the middleman out of much commerce and leaves us much more free to exchange goods and services with people all over the world without going through corporate intermediaries. It could radically decentralise society itself, getting rid of the need for banks, governments, even companies and politicians.”

(Ridley, 2015)
ABSTRACT

Technological advancement is really no news. The relationship between the financial industry and the rest of the economy has remained a complex one, however this relationship with technology is simply a long standing and unique marriage involving an intertwined and mutually beneficial development. The driver of this change or evolution in recent days is the new buzz word of ‘blockchain’, described as fin-tech’s game changer. Blockchain platform is already revolutionising various industries, as it has successfully put both the fin-tech start-ups and companies within various industries on their toes.

So, this study has chosen to look at how this technological evolvement called Blockchain is set to affect audit, in what way does validation differ, how is this shock reacted to, and what does the future of not just the firms but the profession and ultimately the global market look from the microscopic lenses of 2018. To carry out this study, relevant data were obtained from two sources beginning with a secondary in-depth analysis of academic journals, official reports, books and corporate business reports published by industry experts. The primary data were obtained from four interviews of experts within the financial service industry and blockchain.

The results of this research have indicated that the blockchain platform as introduced by Nakomoto is doing exactly what is proposed in the published white paper in 2008, which is the eradication of a trust based model. From the four conducted interviews, all participants are of the opinion that blockchain will have an effect on the financial function of audit and even as far as the profession, the effects however on audit processes could be in form of a revolution or a negative impact, with the profession set to see a change as well, but the blockchain platform itself is still largely under review and a bit of speculation as to where it fits in within the processes.

However, in time it becomes clear what the immerse potentials of the platform is, where it can be used in collaboration or eradicating the need for traditional audit according to standards and also the shift in the profession.
CHAPTER 1- INTRODUCTION

1.1 Background

Technological advancements is no news, with various transformations sweeping through industries causing paradigm shifts, the financial services industry is no exception. This industry is a very important global industry and the second largest industry within the Irish economy (IFS Ireland, 2017).

The recent years has seen an exponential increase in the value of cryptocurrencies, just bitcoin alone has seen a popularity rise in the last few years years especially among the younger generation, despite its infancy in meeting the criteria that classifies it as money. According to the conversation 2017, this currency has the potential to become so popular as to decrease the value of euros, dollars and even pounds, further emphasised by Professor of finance Aswath Damodaran, that digital currencies have replaced gold and sooner or later currencies such as bitcoin stand to compete with nation state currencies (Gondo, 2017) (The conversation, 2017). Some experts undoubtedly call them the new gold in our time.

Block chain is simply an open distribution ledger that contains all relevant details for every transaction ever processed from genesis on the bitcoin network stored in fixed structures called ‘blocks’, with each transaction validated and authenticated by digital signatures (cryptography) (Psaila, 2017). As the world is entering the fourth industrial revolution, internet also exhibits its second era based on Blockchain technology. While the first era of internet was based on computing and communication technologies, the forces of cryptography, mathematics, coding and behavioural economics will power the second era (Tapscott & Tapscott, 2017). The Harvard business review on block-chain, explains that in its world, every process, payment, agreement and tasks have a digital signature, which does not require financial institutions for intermediary verifications as it is no longer necessary, this is the potential of block-chain where there is no central administration, and transaction involves little friction (Iansiti & Lakhani, 2017). Blockchain technology holds the potential to disrupt
business models and industries. The technology will foster opportunities for innovative companies and institutions in the middle to streamline processes increase their metabolism, create new value and entry into new market.

According to Kane, 2004, the significance of the auditor’s profession relies on the verification of information included in the financial statements, in which the users of these financial statements rely solely on the auditor’s verifications to accept the credibility of it. However, the idea of modern audit encompasses around a common body of knowledge, codes of standards and a statement of responsibilities. Experts argue that the corporate application of this idea need to take into account the distributed nature of financial information also stored in distribution ledger platforms i.e. Block chain (Vrentzou & Daskalakis, 2012) (Broby & Paul , 2016).

1.2 Research Area: Question and Objectives

Research Question:

What impact will block-chain have on the financial function of audit and the profession in 2018?

Objectives:

- An overall definition of block-chain and its use in verifying transactions, in comparison to traditional audit process within the financial industry.
- Gain expert’s opinion on the plans and preparations made by audit firms and fin-techs alike to accommodate block-chain intervention into the industry and mainly to the audit process as a whole.
- Gain understanding of the effects of block-chain on the audit profession outside the process itself.
- Understanding the market for block-chain within the global financial economy.

This research intends to dig deeper into the financial service industry with a major focus on audit as a corporate financial function. Analyzing the impacts this wave of technological shift will have on the industry and how the existing firms are reacting to this.
Sub-questions in order to contribute to the main research questions are:

- How have the professional services firms made preparations to accommodate the change that block chain might bring to their current audit process?
- What effect does block-chain have on the auditor’s profession?

As block chain is rising just beyond words, various researches have been carried out on the effects of fin-tech on the financial services industry, however the effects that the block-chain platform will have on the audit process is still under speculation. The 2016 ICAEW publication highlighted the opinions of audit professionals in which EY Howell Ball identifies that block-chain has significant implications on the nature of accounting and audit profession, stating that the core summary of audit function is adding and keeping ledgers that reconcile each other. He expressly identified that the implications to auditors are less clear (Institute of Chartered Accountants of England and Wales, 2016).

Experts have anticipated a disruption to the traditional audit process and even the profession as a whole, Nikitin says that the audit profession will remain necessary in many parts of the globe and in many traditional businesses environment for a while. He further emphasises how a new generation of millennial auditors will certainly raise the bar in support of upcoming digital transformations and this will raise the expectations of stakeholders and business owners in this new world (Nikitin, 2017).

This research will also provide more insight to new entrants into the financial services industry, start-ups within the fin-tech industry and also give the existing market a broader view of anticipated effects of this disruption, acting as a platform for further research carried out in this field of expertise in the near future. Personally, the researcher associates her career aspirations with becoming a fully certified chartered accountant in a professional services firm and therefore an in-depth knowledge on the effects that the wave of technological advancements bring to the financial service industry contributes significantly to her chances of success within this industry in the near future.
1.3 Dissertation approach

This research picks an approach in which the literature review partially answers the research objectives and the underlining question of this study. The literature composes of obtained information from secondary sources and addresses the key contents of this research including the global financial industry and how it began, leading on to the history of fin-tech and how blockchain has slipped into the economy as is, however understanding audit and where it stands today.

The author goes further to engage further interrogations in order to obtain primary data using a qualitative-interview approach during the course of this research. Data being obtained from four professionals and researcher directly linked to the line of blockchain and audit: accountant/researcher, software developer, head of financial innovation and lawyer.

These interviews carried out have then been analysed further providing relevant information used by the author to answer the underlining research question, giving an appropriately drawn conclusion by the author for this study.
CHAPTER 2- LITERATURE REVIEW

In this chapter the author looks in-depth into various components of this research. Beginning with the global financial industry and how it began. The financial industry simply is an industry consisting of various economic service providers, it is very dynamic and constantly changing. The Gramm-Leach Bliley Act 1999 made this industry see a big change, forcing it to recognise competition and find new ways to stay on top of the game.

Following the 2008 financial crisis, the financial industry began to reveal vulnerabilities and thus there are risks in various regions around the globe particular to the financial industry as explored by the author. The Irish financial industry is particularly the 2nd largest industry within the Irish economy and has mapped out an action plan 2020 in which one of its main aims of achievement is to drive research, innovation & entrepreneurship with a particular focus on financial technology & governance, risk & compliance.

Following, the author began to look into fin-tech and how it evolved. It is simply a marriage of financial technology and this industry has seen large investments in recent years around the globe with various sectors evolving through this technology, fintech as explained below. The rise of blockchain in recent years is however surprising. A platform for transactions using cryptocurrency is described as having limitless potentials and unending interruptions not just within the financial service industry, but also various industries at large. Block-chain has had some remarkable disruptive moments in recent years as explored and the author explains how the blockchain works, its entrance into various industries and environments, seeing its first legal implementation in the Irish economy as well as important talents and resources being pulled together to maximise its full potential and benefits to industries with the Irish economy at large.

Finally, audit as explained is basically a verification of already occurred transactions i.e. a provision of recent information to historic data and the author explains the processes it involves in order to carry out a full audit according to standards and the issues facing it today.
2.1 What is the Global financial service industry? And how did it begin?

The financial services industry is simply an industry that consists of economic service providers dealing with the management of money. Such businesses include banks, insurance companies, accountancy firms, investment funds, credit unions. These businesses are present in all economically developed geographic locations, providing customers with basic financial services.

The relationships between finance and the rest of the economy is complex, the economic importance of finance collapsed in the 1930s and 40s after its high stand in the 20s and gradually recovered in the 1980s, growing to become a major GPD contributor witnessing significant changes in the following decades until 2006 (Philippon, 2008). This industry being very dynamic and constantly changing has required the regulating, deregulating and systemizing by the governing officials for decades now.

The Gramm-Leach Bliley Act 1999 also known as the financial service modernization act did greatly alter the financial service industry in the US and the world as a whole, forcing financial firms to innovate new ways of conducting business due to the new and improved competition (Zamanian, 2007). The Act required financial institutions and companies that offer consumer financial service and products such as investment advice, loans and insurance to explain their sharing information practices to customers and to safeguard sensitive data (Federal Trade Commission, 2015).
The GLBC Act was simply an evolutionary process removing decade-long barriers within the financial industry, and most importantly the Act was designed in a way which was supplying the Feds with an umbrella of supervision for holding companies and SEC with the regulations of insurance and securities, allowing affiliations of banking and underwriting agencies in insurance and securities, commercial and merchant banks holding equities for resale (Federal Reserves Bank of San Francisco, 2000).

2.1.2 Where are we today?

The financial service industry in almost every developed country is at present growing faster than GDP in-spite of regulatory barriers in place to tame the industry after the financial crisis. The changes experienced within the financial service industry is not new, as evolution is a part of the human nature and this also is an extension into business, the nature of changes developed to meet customer demands and standards are extensive and continual by the financial service providers of every region. There are various factors that drive change within this industry including technological developments,
competitor roles, demographic changes, ranging from the way efficient functions are carried out to methods and currencies of payments (Constâncio, 2017).

The financial services industry in Ireland began in the mid-1980’s with the small IFSC centre in Dublin which has grown into a national industry over 30 years later. This industry is hugely important to Ireland with over 400 companies, in which 200 of the companies are Irish owned, employing over 40,000 people across the country (IFS Ireland, 2017). The Irish financial service industry is exceptionally strong with a combination of high productivity and a competitive cost base with sophisticated ecosystems, growing from just barely three companies in 1989 to over 200 multinational companies in 2015, with high skilled jobs. Ireland has attracted focused attention from 50 of the world’s top banks focused operation such as JP Morgan, Bank of Montreal and Barclays Bank, with approximately 1.8 trillion euros administered from just Ireland alone (Enterprise Ireland, 2010) (Harris, 2015).

2.1.3 Future of the global financial industry

Following the financial crisis is 2008, the financial service industry has revealed un-attractive systematic vulnerabilities, the downside of its interconnectedness which then further resulted in the public loss of confidence in the industries’ ability to deliver, followed by the rapid technological changes reshaping business environments and responses to challenges/services requirements. A reassessment on the relationship between finance and growth being casual had to be carried out, after the financial crisis which showed a non-linear relationship (Constâncio, 2017). The World economic forum on its paper on “the future of the global financial system” explained the core pillars of the future of the global financial system which includes:

- Financial stability, innovation and economic growth including regulating finance and the function of the institutions in restoring public confidence.

- Promoting global financial inclusion which entails the increasing demand for financial services globally and developing regions.
Disruptive innovation in financial services and the role of financial institutions in maintaining global identities and deeper understanding of the decentralised systems (World Economic Forum, 2015).

Emerging markets around the world offer considerable expansion opportunities for the financial service companies which will in turn increase the market share of the global economy (Deloitte, 2012).

Deloitte in collaboration with World Economic Forum report on the five megatrends that will change the financial service industry in six areas including payments, insurance, market provisioning, deposit and lending, investment management and capital raising, identified that the changes within this industry come in clusters which are interlinked. Customer preferences are changing largely due to advancements in digital technology, which can be evidently seen from the use of ATMs, since the 1980s until today. The use of mobile banking however, the “playing field will soon end” with banking as a platform where the banking becomes a virtually customised customer driven experience, with mobility and connectivity heading as buddies, the future of payments is driving towards an economically connected cashless payment system such as cryptocurrencies and eradicating the traditional payment schemes. The availability of alternative capital raising platforms and alternate empowered investors such as robo-advisers (Deloitte & World Economic Forum, 2015) (Oliver Wyman & Fung Global Institute, 2013).
According to the IFS 2020 action plan, the Irish Government has mapped out the strategies for the next 5 years on how to make Ireland the successful global leader in key areas within the Irish financial service industry embracing every advantage that Brexit brings. Under the strategic framework, both private and public stakeholders are to successfully work together to ensure the development and further growth of the Industry. It capitalises on the standing of Ireland after Brexit to withstand changes and the effects it brings to the Irish economy with a focus on emerging opportunities. The plan strategically aims to improve employment within the financial services sector by 30% in 2020 representing an availability of 10,000 jobs (IFS Ireland, 2017).
2.1.4 Risks

According to the S&P 2018 outlook, there are certain risks in various regions around the globe that affect the financial service industry such as on-going Brexit negotiations, recent Italian elections, tension with North Korea, possible protectionist policies in the U.S to mention a few. These risks will remain hard to quantify, for example the emerging risks in the next five years include the rated banks of 2016 and 2017 in Russia and the Commonwealth of Independent States, involving inflated capital values, opaque ownerships of assets which will have lasting effects beyond 2018 for recovery and for large global banks coming to an end of the extended periods of large litigations, it is still an area of major concern for other institutions and regulators. The real “brain-drain” from the finance sector is the relationship between finance and growth at levels of developments.

Also, the outlook exerted that the financial service firms especially in Japan and Europe continue to review their business models to deliver expected returns with changing consumer demands due to the rise of the likes of fin-tech and insure-tech contenders which will become more striking in the near future. Drawn conclusions based on the S&P survey on the emerging risks in the next five years.
within the financial service industry, 36% is politically associated, 21% the rise of financial technology, 17% to cyber risks, while 15% to corporate governance and misconducts and 11% to catastrophic risks. “…political risks will affect developed and emerging economies alike” (S&P global, 2017) (Constâncio, 2017).

![Figure 4- S&P global risk survey. Source (S&P global, 2017)](image)

2.2 What is fin-tech? And how did it begin?

Fin-tech is simply a marriage of financial services and information technology. It is a sector that includes payments, crowdfunding, insurance, personal loans and finance, wealth management, lending and money transfer fees (International Trade Administration, 2016).

Fin-tech today is seen as a new and unique marriage of financial technology however, it has been a long-standing relationship in which developments have been intertwined and mutually re-enforcing. Further enforcing the given role of fin-tech in the functioning of finance warrants a greater regulatory attention. The global financial crisis in 2008, is a major reason why fin-tech is evolving into a new paradigm which possess challenges to market balance of potential benefits and risks of innovations.
and has thus attracted the focus of regulators, market and industry participants and consumers alike (Arner, et al., 2016).

The history of fin-tech as explained in the 2015 Georgia international law journal, highlights its evolution in a 19-step process which began in 1838 until 2013 and its existence up to date. It explains that it all began when Samuel Morse demonstrated the electric telegraph system, which was then used in 1918 by the reserve banks creating a funds transfer network, which was intended to connect the boards and treasury departments of 12 different reserve banks.

The journal highlighted how in 1920, John Maynard Keynes a renowned economist published his book “the economic consequences of power” linking technology to finance. As explained fin-tech isn’t a new marriage, however long existent and this is somehow evident in its history as in 1967, the world saw the advent of the first auto teller machine (ATM) called Barclays bank. Leading on to 1997 when the first virtual bank was launched in Canada and the financial crisis hit in 2008, giving fin-tech what could be called a turning point. Today the world of fin-tech is no news but everyday transaction (Arner, et al., 2016).
2.2.2 Investments/start-ups

The global investments in financial technology has seen a shaky stand in recent years, however according to the ‘world fin-tech report 2018’, since 2010 up until the Q3 of 2017, fin-tech firms have raised up to 109.8 billion with an annual funding growth of up to 28.4 billion in just 6 years. These funding has been linked directly to venture capitalist firms investing billions in over 816 deals in the 2017, with data from PwC DE NoVo platform, fin-tech funding has seen an annual growth rate of 41% in the last 4 years as “cutting edge fin-tech companies and financial innovators are changing the competitive landscapes and redrawing the lines of the financial service industry”. The growth of fin-tech firms in various countries have been as a result of various systems, London and Singapore whose governments and regulators support “entrepreneurial culture and competitiveness” and New York and silicon valley’s availability of resources has been a key boost to driving innovations (Capgemini, LinkedIn and Efma, 2018) (Gibson, 2015) (PwC, 2017).

The ideas of collaboration and win-win solutions between fin-techs and traditional financial service providers has been a new page of opportunities, as regulators, governments and even market players
have seen the need for a collaboration as an increased competitive advantage. The financial conduct authority with the United kingdom’s regulatory authority have introduced conducts and policies of collaboration in order to increase the growth of fin-tech in the UK (Capgemini, LinkedIn and Efma, 2018). The PwC 2017 global fin-tech survey report highlighted that, the fin-techs and financial services are competing less and less and striving harder to come together as 88% expect to increase fin-tech partnership in the next 3-5 years expecting a 20% return on innovative projects, 77% of financial institutions intend to increase internal efforts to innovate, 30% of large financial institutions are investing in artificial intelligence as 77% intend to adopt block-chain as part of organisational process by 2020 (PwC, 2017).

With large global investment on fin-tech, the U.S drove the majority of investments in Q3 of 2017 with USD5 billion consisting of 6 of the top global deals in the quarter. Canada also saw a significant level of direct fin-tech investment of USD 312 million. The Asian fintech investment however experienced a solid increase to USD 1.21 billion in Q3 2017 over 41 deals with China alone accounting for half and the Indian investment dropping to USD 87.7 million in 3 straight quarters. Europe however on the other hand, continues to make strong gains from the fin-tech investments of USD 1.66 billion. Germany accounted for the largest of Europe’s fin-tech investment from the buyout of ConCardis worth USD 806 million and the UK accounted for the 7th of the European deals in 2017 (KPMG, 2017).
2.2.3 Evolution of financial services with fin-tech

As mentioned already, the fin-tech sector includes, payments, crowdfunding, insurance, wealth management, lending, money transfer fees.

A. Crowd funding:

Following the wake of the financial crisis in 2008, banks have restrained from easy lending to SMEs and businesses due to higher risks involved. Smaller businesses in various countries have faced constraints in financing due to size, lesser infrastructures. However, crowdfunding is simply raising the needed capital for small business from a large number of investors using online platforms. Crowd funding in itself is just little amounts of money, from a lot of people and that is the power of the crowd funding a business (Couffinhal, 2014) (Fenwick, et al., 2017).

The Forbes ranking of crowding funding campaign gives examples of companies like pebble e-paper watch whose kick-starter campaign raised over 10million in 37 days, Oculus Vr is also a successfully crowd funded start-up for gaming headsets which was recently acquired by Facebook has proven that
the crowdfunding platform is becoming mainstream and beyond doubt an industry on the rise globally (Schroter, 2014).

B. Insurance:
In recent years with the growth of fin-tech and its effects in different areas of financial services, Insurance has not been ignored. Insure-tech has attracted investors and entrepreneurs as funding for insure-tech has seen a rise in recent years. According to the financial times, the target of start-ups is to reach customers in ways that traditional insurance has not, also looking into analytics to make better underwriting decisions. In the case of a UK based company Cuvva, taking a new approach to car insurance, where instead of a traditional long-term insurance of a driver and the vehicle, the driver can insure themselves using an app for as short as one hour. Despite cuvva being a start-up and new in the industry, analysts say that insurers will begin to follow the trend of breaking down insurance plans into smaller chunks and providing more flexible products for their customers (Ralph, 2016).

Dua 2018, emphasises seven ways in which fin-tech is impacting the insurance industry:

- Online marketplace- tech savvy age.
- Exponential growth- app.
- Convenience matters- e-commerce.
- Customized pricing- from generic to specific.
- Integrating technology- increased efficiency.
- Breaking barriers- intermediary costs.
- Trends.

“Insure-tech is creating its own space within the fin-tech segment” (Dua, 2018).

C. Lending:
In previous years, lending was almost a sole responsibility of the banking institutions and credit unions, however in recent years, the innovation of fin-tech has changed almost every aspect of the lending process, from the banking model of receiving customer deposits to lend to another customer
thereby acting as intermediaries and charging heavy interests on borrowers to the lending between businesses.

Accenture classifies fin-techs into two categories which are “fin-tech fins” which involves peer to peer lending where individuals lend money to other individuals without submitting a traditional application and all risks are born by the individuals themselves, on the other hand, “fin-tech-techs” which involves the fin-tech companies offer loans to individuals and businesses directly. This simply represents the alternative to traditional lending by the banks as the fin-tech companies claim to offer faster and easier loans. Peter Renton explains that the peer to peer platform LendIt can deliver a small business loan in as fast as 7 minutes as data is connected and the more data they connect, the cheaper it is going to be. Fin-techs are creating exciting and refreshing ways to change the loan process, how applications are being made, how profits are being generated, all to the underwriting process and making it more accessible to a larger range of people (Accenture, 2016) (Belatrix, 2018).

D Payments:

The Fin-tech sector that deals with payments has cryptocurrencies, in which bitcoin is the most popular. The bitcoin itself was first described in 2008, a paper by an author Nakamoto who describes a peer-to-peer version of electronic cash allowing payments and transactions without going through a financial institution, it is the currency of exchange without the need for paper hard currencies. He points out the fact that despite systems appropriate function in most transactions and payments, the presence of third parties not only prevents ‘double spending’, but also creates a weakness called the trust-based model (Nakamoto, 2008).

According to the fin-tech global survey, customers are believed to conduct these activities. Despite intentions for collaborations and partnerships in the coming years, fin-tech start-ups do not only require capital, but also customers.
2.3 What is blockchain and how did it begin?

Technology has not only changed the way we relate, work and do business, but also provided advanced solutions to old problems, disrupted traditional business models and helped humans to become more efficient. One of these technologies is the distributed ledger technology called

*Blockchain*. The World Economic Forum listed Blockchain as one of the top ten emerging technologies of 2016 (Cann, 2016).

It is simply a platform for accounting and businesses to be carried out, which is defined by ICAEW as a back-office solution to record data online and transfer ownership of assets from one user to another without being monitored by any third part or maintained and regulated by any particular institution or participant, as all functions are distributed among all participants. Further identified that a good blockchain centres around a good timing and cost reduction through eradicating central parties (Institute of Chartered Accountants of England and Wales, 2017) (Appelbaum & Nehmer, 2017).

The originating white paper released by the still unknown Satoshi Nakamoto in 2008, that triggered the rise of a platform to carry out peer-to-peer transactions without going through a financial institution makes emphasis on, “transactions without the need for third parties” and “inherent weakness of a trust-base model”, continuously stating the need to carry out transactions without a
third party acting as a mediation and thus limiting transaction size, increasing cost and the full benefits being lost due to the presence of the third party (Nakamoto, 2008). Could this white paper ideology suddenly change the financial sector is the major question asked by the Financial professionals’ themselves.

The concept of the Blockchain was to bridge the gap in digital trust. The technology solves the “Byzantine general’s problem”, which is the ultimate online problem (Wu, 2018). Many enthusiasts believe that blockchain technology is the missing piece that will allow societies to operate entirely online. The technology tends to reframe trust by recording relevant information in public space permanently making deception more difficult.

Countless platforms exist on the blockchain network and cryptocurrencies including Bitcoins, Ethereum and many others, but this research focuses on bitcoin as it is the most popular with the highest market capitalisation at this time.

Figure 8- Cryptocurrency market capitalisation. Source: https://coinmarketcap.com/coins/ on 14 May 2018.
The following events exhibit, the important moments of the disruptive financial instrument – Bitcoins, are as follows.

The first bitcoin transaction record in 2009, which was referenced in the newspaper times head line as “03/Jan/2009 Chancellor on brink of second bailout for banks” (Nakamoto, 2009), in October 2009, on the 12\textsuperscript{th} to be precise, a self-proclaimed “Anarchist cyberpunk ninja” exchanged 5,050 BTC for US$5.02, this equates to 1/10th of a cent per bitcoin and as at April 2018, this transaction would roughly worth US$41.44 million (Blockchain Luxembourg, 2009). The first known user to purchase real goods in exchange for Bitcoin is Laszlo Hanyecz. He asked the community of Bitcoin Forum on 18 May 2010 if anyone could buy him two pizzas in exchange for 10,000 BTC. The US dollar value of 10,000 BTC at the time was about US$25. Lazlo gets a deal on 22 May and the transaction completes. 22 May of every year, Bitcoin community always celebrates “Bitcoin Pizza Day” in memory of the epic event (Bitcoin-Forum, 2010).

On 9 February 2011, 1 BTC is worth US$1 for the first time. This period marks an incredible rise in price from merely 1/10th of a cent to US$1. Because of people’s acceptance, suddenly ecommerce sites start to embrace the use of Bitcoin for payments. Particularly on sites in the deep web, Bitcoin becomes the “currency of choice”, as a genuine purchasing power. While these major countries debt and default concerns plague global markets, the global turmoil create the perfect storm that will see one BTC hit more than US$1,150 by the end of November 2013 (Farrell, 2013). In February 2013, a company built around the processing of Bitcoin payments for merchants wanting to accept Bitcoin called Coinbase sold more than US$1 million in Bitcoin in a single month with an average price of US$22 per BTC.

On 23 June 2013, the US Drug Enforcement Agency seized asset of 11.02 BTC belonging to Eric Daniel Hughes. This period presumed the first instance a law enforcement agency seizing actual Bitcoins from an individual. 20 November 2013, the price of Bitcoin is now trading upwards around US$645 per BTC. The hype is building continuously. People are exchanging Bitcoin through their smartphones in cafes, there is even a Bitcoin ATM in downtown Vancouver.
Then the People’s Bank of China weighs in on the Bitcoin debate. They decide to give Bitcoin the green light as they declare freedom to participate in Bitcoin market (The New York Times, 2013) (Shah, 2014). The fears of another banking crisis, US debt ceiling, trouble in Europe, bailouts, bail-ins, and threat of all-out financial “Armageddon strike”. With the favourable involvement of China and US in Bitcoin, it skyrockets again and every major news outlet in the world begins to cover Bitcoin. “The speed and veracity of its price movements make it akin to Tulip Mania in renaissance Holland (Hamburg, 2018) (Volkering, 2017). On 28 November 2013, one BTC worth an average US$1,000 and two days later, the price of Bitcoin peaks at US$1,156. US government had been trying to figure out exact action about Bitcoin for over two years. By March 2014, the Internal Revenue Service decided that Bitcoin is “property” not a currency. The idea was that Bitcoin should be treated as stocks and barter transactions (Rubin & Dougherty, 2014). Eventually, the decision sent the price of Bitcoin to fall from US$586 to US$360 by 10 April 2014 because of the government interference, which disrupts the fundamental purpose of Bitcoin.

The real potential of Bitcoin starts to surface by 2014. This is emphasized as more merchants start to accept Bitcoin as mean of exchange for goods and services. For instance, the computing giant, Dell decides to accept Bitcoin as payment and it uses Coinbase as its Bitcoin payments processor (Pevehouse, 2014). Then in December 2014, Microsoft announces its acceptance of Bitcoin as payment for apps, games and content online through Windows and Xbox online (Tansanchai, 2014). The Economist publishes the potential of blockchain as a disruptive financial technology on its front-page article titled, “The Trust Machine” in October 2015, it explains how the technology behind Bitcoin could transform how the economy works. It also highlights the tremendous potential to revolutionize how the world’s economies and payment systems operate in an increasingly digital and interconnected world (The economist, 2015). The world re-enters familiar territory as the government begins to form interventionist and introspective policy. Trade wars and currency wars seem to be bubbling up to the surface. As the world is in turmoil, Bitcoin’s fiat conversion price is benefitting. Year 2016 into 2017, with so much global instability, the price of Bitcoin marches onwards and
upwards beyond US$1,000. Bitcoin has never been alone since inception. Until 2017, when there is widespread awareness not only Bitcoin but also all cryptocurrencies. The earliest investors of other crypto, such as Ethereum, Ripple, NEM, PivX and others, saw an incredible growth. The crypto revolution started in 2013 but really began in 2017. Volkering in 2017 affirms Crypto as “the most significant and powerful technological revolution in the history of mankind.” In late 2017, although the milestone seems impossible, but Bitcoin breaches through the US$ 10,000 barrier (Volkering, 2017).

2.3.2 How does block-chain work:

Blockchains adopt many ancient technologies used by the society. For instance, cryptography and payment method are merged from cryptocurrency, in a way of secure communications not monitored by third parties. Cryptocurrency also transforms the concept of money to an online presence with the ability to trade value securely through a token. The digital currencies are different from traditional fiat currencies as no government issues or controls them.

(Tapscott & Tapscott, 2017) suggest the six qualities of blockchain:

- Each blockchain, like the one that uses bitcoin, is distributed and it runs on computers provided by volunteers around the globe, there is no central database to hack or shutdown.
- Blockchain is also encrypted: it uses heavy-duty encryption involving public and private keys to maintain virtual security.
- Blockchain is made public, that is anyone could have access to it anytime because it resides on the network, not within a single institution charged with auditing transactions and keeping records. No one can hide a transaction, and that makes bitcoin traceable than cash.
- Blockchain is inclusive. This means that anyone can participate in global economy on mobile device, no documentation is required to be trusted.
- Blockchain is immutable. Within minutes or seconds, all transactions are verified, cleared and stored in a block that is linked to the preceding block, thereby creating a chain. Each block must refer to preceding block to be valid, which prevent anyone from altering the ledger.
Blockchain is historical. The technology is a distributed ledger representing a network consensus of every transaction that has ever occurred.
Consider a scenario where a normal transaction is enacted by 3 parties, the payer(A), payee(B) and the issuer(intermediary), where the issuers main role is to verify and ensure the transaction between A and B are valid and further gives receipts to B and A ensuring that records are updated on both sides. However according to Grigg in Simoyama at al as published, the idea of block chain proposes a triple entry accounting where all parties involved are guaranteed to hold the same information in real time which completely eradicates the reliance of power in one hand (Simoyama, et al., 2017).

Simply, whenever a user carries out a transaction on this platform, it is time stamped and recorded on a block, where every block is directly linked to the previous using cryptographic algorithm (hash) and all transactions form a chain which are updated, synchronized and transferred among all user laptops in real time and so the degree of shared data and encryption provides a high degree of security, as all nodes of the network have to be hacked at once to get used by an unauthorised person. It can be used to process payments, create a verifiable audit trail and also register and transfer digital assets such as stocks and bonds (Ernst and Young, 2016).

These transactions are put into a block, every 10 minutes with users fighting to verify the transaction within that block and an incentive of 12.5 bitcoins is rewarded to whoever “solves the giant math problem”, and for the first time we have “a financial system where there is financial incentive to ensure security… which is not part of the system it is the system. The lifeblood of bitcoin” (Smith, 2016). Block chain works with a very simple principle, which the World Economic Forum describes as a train track where bitcoin is the train car, and you can put in whatever ever you want and to any destination with limitless possibilities (World Economic Forum, 2016)
2.3.3 Blockchain in other industries and environments

Blockchain technology is more involved in more than just the financial services industry. Innovators are programming this new digital ledger to record anything valuable to humanity ranging from birth and death certificates, marriage licenses, deeds and titles of ownership, rights to intellectual property, educational degrees, financial accounts, medical history, insurance claims, citizenship and voting privileges, location of portable assets, provenance of food and diamonds, job recommendations and performance ratings, charitable donations tied to specific outcomes, employment contracts, managerial decision rights and anything else that can be expressed in code.

A. Trade Finance

Businesses can streamline the process of obtaining approvals from multiple legal entities for the movement of goods across borders with blockchain. Blockchain can be used by the legal entities to sign all approvals when goods are received, and when payment is transferred from the importer’s account to the exporter’s bank. This technology will enhance trust and accountability among enterprises, regulators and consumers (Deloitte, 2017).

B. Insurance

Insurance providers can also provide an efficient way to process, verify an insurable event and provide customers with fair and timely pay outs through blockchain. With automated insurance claim processing, policy conditions are written into a smart contract stored on the blockchain and connected to publicly available data via the internet. Once an insurable event occurs and is verified by a trusted source, the insurance policy is automatically triggered, the claim is processed according to the policy specified and the customer is paid. This will eventually eliminate the cost of processing insurance claims and reduce the opportunity for insurance fraud (McKinsey & Company, 2016) (Mainelli & Manson, 2016).

C. Healthcare
The healthcare industry can be more efficient and provide secure system for managing medical records, pre-authorizing payments, settling insurance claims and recording other complex transactions with Blockchain technology. Blockchain can hold the complete medical history for each patient, with multiple granularities of control by the patient, doctors, regulators, hospitals, insurer, providing a secure mechanism to record and maintain a comprehensive medical history for every patient (Deloitte, 2016) (Capgemini, 2017).

**D. Government**

Government is involved in recording transactions and tracking ownership of assets. These responsibilities can be made more efficient and transparent through blockchain technology. Establishing trusted identity remains a problem within the government systems, due to forgery and expensive background checks required in verification. Government can apply blockchain by issuing digitally authenticated birth certificates that are unforgeable, time-stamped and accessible to anyone in the world (Killmeyer, et al., 2017) (Martinovic, et al., 2017).

![Blockchain potential applications & disruption](http://btcs.com/index.php)
2.3.4 Issues facing Blockchain

Blockchain has attracted various interests and has shown significant uses in various industries outside the common finance. However, past the “technology trigger phase of the hype cycle”, vendors, users and companies are beginning to uncover the challenges it brings in its practical application. Based on Yamada et al report on over 50 blockchain users survey carried out and all 50 identified the issues facing practical blockchain include: user privacy protection, processing speed/scalability, regulation and governance and culture among many others. (Yamada, et al., 2017).

A. User privacy protection

Unlike cryptocurrencies which are linked to personal users via a wallet, blockchain platform involves transactions that have to be indisputably linked to individuals with known and publicised identities and this raises the issue of privacy and security. However, it could be argued that the safety of identities is reliant on the generated addresses of users rather than real identities, based on the survey of the international journal of web and grid, it is concluded that blockchain cannot guarantee transactional privacy as all values of transactions as well as balances which are made publicly visible and despite address remaining pseudonymous, the survey exerts that it is still possible to link transactions to user addresses and identities if used frequently (Zheng, et al., 2017).

Also, the report by Swanson 2017 explains that driving public acceptance of blockchain will proactively frame the discussion on privacy and security (Swanson, 2017).

B. Processing speed/ Scalability

On the blockchain network as mentioned earlier, transactions are approved almost as soon as the transaction takes place making it reliable and fast. However, the more the number of transactions carried out, the more the processing time of each transaction and this platform becomes heavy. The bitcoin blockchain platform as at 2018 has exceeded 100GB storage data. The survey explains that based on the restrictions on the platform such as block size and time interval needed to generate a new
block, the platform can currently only process nearly 7 transactions per second and is far from fulfilling the requirement of processing millions of transactions in real time. The report concludes that the scalability problem is quite a tough one for the platform (Zheng, et al., 2017) (Yamada, et al., 2017).

C. Regulation and governance

This is seen as not just sensitive but crucial issue of the blockchain platform. From the initial white paper introduction of Nakamoto in 2008 until now, the place of a centralised regulatory system has become questioned. Regulation has had a hard time keeping up with technological advancement, but generally, regulations and centralised systems act largely as shock absorber, most especially within the financial industry with examples from far back as the 2008 financial crisis and the intervention of government to bail the entire system.

The platform imbibes a decentralised system, with almost no need for an authority or regulator and this has brought into question the level of risk attached to using this platform, as errors or meltdowns result in 100% borne risks directly to users (Swanson, 2017).

2.3.5 Current implementation of blockchain

Most of blockchain based developments are taking place within the financial service sector, with Nasdaq working with blockchain infrastructure providers (chain.com) to offer technology for the validation of financial transactions and financial organisations such as JP Morgan, Bank of America, NYSE and Standard Chartered are continuously testing blockchain as a replacement for manual paper based transacting in the areas of foreign exchange, trade finance cross-border settlements and many more (Iansiti & Lakhani, 2017).

Following the first ever launch of a law-focused block chain in November 2017 called Hackathon, its introduction emphasised innovation at its core in a system within the Irish economy where trust and transparency is enhanced in the society. Following its launch participants such as big 4-Deloitte, IBM
and Dublin City University are in pulling resources and talent to maximize the block-chain potential within the Irish financial and legal Industries (Tannam, 2017).

Various surveys and approaches are being carried out to fully explore the challenges the platform facing, the issues it could prospectively face in the near future as most organisations wonder where exactly to fit it into their current daily processes and business.

2.4 What is Audit and what is the history?

Audits are referred to as “self-check” with a purpose of enhancing the degree of confidence by intended users on the on the financial records of any concern (Republic of Macedonia, Ministry of Finance, 2004). Overall the auditor objectives are to certify that the financial statements are free from material misstatements due to fraud or error, and where the auditor cannot express a qualified opinion or issues an opinion that is insufficient, the auditor can withdraw from the engagement (Office of the Data Protection Commissioner, 2014) (Irish Audit and Accounting Supervisory Authority, 2016).

Traditional accounting as we know it relies on a double entry book-keeping, where every debit has a corresponding credit entry. This mechanism has been adopted, adhered to and maintained since its initial documentation by Luca Piccioli in 1494. Audit primarily existed for governmental accounting, which was largely concerned about book-keeping rather than accounting procedures. The industrial revolution which took place in the 1750-1850 made a turn for audit improving its scope further into financial accountability and fraud detection. As businesses grow so did the need for this profession, with an increasing need for expert findings on the accuracy of the financial statements presented at the end of any trading period and these findings were then presented with statements as a back-up stamp (Manal, 2017) (Simoyama, et al., 2017).

The first organisation of auditors was established in Venice, 1581. In 1880 however, the merger of five major local accounting communities resulted in the Institute of Chartered Accountant in England and Wales (ICAEW), followed by an enacted law within the UK for limited liability companies in
1990 on external audit requirements and then the US in 1934 (Dubravka, 2016). In 1936, the SEC was authorized to publish accounting standards as well as auditors oversight following the focus of American Institute of certified public accountants (AICPA) to ensure the analysis of financial statements by independent public accountants. The AICPA later in 1936 published the first statement of accounting procedure SAP No 1 (Saglam, 2017).

2.4.2 The audit process:

According to the office of the New York State comptroller, the audit process is simply guided by professional auditing standards and broken down into several stages of activities that are interrelated. Ngigi 2017 explains that the audit process begins from a pre-engagement to completion which is reviewed before signing the auditors’ opinion. The goal of an entire audit process is to obtain relevant, accurate and necessary evidence to form and support whatever objective opinion is drawn as regards the financial statements of a given client. The process is however broken into 7 stages as explained by (DiNapoli, 2016) (Ngigi, 2017) (Financial Reporting Council, 2016) (Financial Reporting Council, 2016):

The first step is the **Pre-engagement procedure**. The professional auditing standards require audit firms to establish procedures and policies on the acceptance of new clients and retainment of existing ones. The aim of this is to minimize the risk of auditors being compromised in terms of objectivity, integrity and actual ability to carry out the function. In the case of the acceptance of a new client, the audit firm must satisfy that it has the required professional competence, ethical values such as objectivity and independence to carry out the function, threats are to be identified through these required values and also facing the clients’ entity through background checks. In the case of continuity with a previous client however, the firm has to ensure they understand the recent changes in the clients’ entity as well as circumstances that could pose as a risk. An engagement letter is then signed. This letter in audit is like an agreement to a marriage and requires careful understanding and agreement of both the client and the audit firm.
The next step of an audit process is **planning an actual audit and survey**. According to ISA300, this is the point where the auditor generates a strategy and outlines the plan on conducting the audit function. The planning phase includes: understanding the entity and its environment, understanding of internal controls, assessing the risk of material misstatement, planning materiality, response to assessed risk, audit strategy and audit plan.

The next phase to an audit process involves the **data collection/field work/obtaining evidence**. This is where the auditor obtains evidence and analysis it, this is often the focused audit effort and this phase requires the largest amount of time to be completed. The auditor tests key controls in order to place reliance on the figures represented on the financial statements, monitors on the job performance and efficiency, carries out substantive procedures of sampling and stratifying information in order to confirm balances represented in financial records. The working papers used during this phase include meeting write-ups, spreadsheets, printouts and documented interviews.

The next phase represents the **audit completion and the reporting of preliminary audit findings**. The auditor at this point enough evidence in relation to financial statement assertions where the sufficiency of the evidence is evaluated. All information obtained at this point is gathered and merged into a comprehensive document and a draft report is then issued.

The final stage is that of **reporting and post-audit evaluation**. This is where the auditor has independently reviewed the audit report, and issued a final audit report on findings, the appropriate audit opinion is then issued according to ISA700. The post-audit evaluation is then carried out to assess the strengths and weaknesses of the audit, suggesting ways to improve the quality of future audit efforts.
Figure 11 - The Audit Process. Source: (McGraw-Hill, 2012)

2.4.3 Issues facing Audit:

The issues facing Audit as a financial function includes data reliability, data Security and transaction transparency. Audit can be argued to be backward in nature, providing a verification system from sampling a small spot of the financial statement which results in providing relevant information to an outdated transaction (Appelbaum & Nehmer, 2017). The Statement of Auditing standards 106 no 1 states that Audit evidence is “all the information used by the auditor in arriving at the conclusions on which the audit opinion is based” and no 8 further explains that “the reliability of audit evidence is influenced by its source and by its nature and is dependent on the individual circumstances under which it is obtained” no 20-25 further highlights the procedures for obtaining an audit evidence as:

- Inspection of records or documents and tangible assets.
- Observation of process or procedures being carried out and appropriate inquiry.
- Confirmation, recalculation and re-performance.
- Analytical Procedures.

(Statement of Auditing Standards Section 106, 2006).
However, the audit procedures as highlighted by SAS 106 are being replied, as carried out in real time by the performance of the block-chain in carrying out transactions. The observation of the process is a major audit procedure where the actual activity such as inventory counting is being carried out and this directly connects the auditor with the reliability of the financial records but the block-chain framework in itself provides proof of “voluminous observation” in continuous real time (Dai, 2017).

Recalculations are procedures carried out by auditors to verify accuracy and this function is carried out on the block-chain platform where each block is verified by peers before the transaction is carried out, linking all transactions through chains as every new one is built on the previous block. (Appelbaum & Nehmer, 2017).
CHAPTER 3- RESEARCH METHODS AND METHODOLOGY

3.1 Introduction

Research is simply a specific inquiry to a search of new facts in any branch of knowledge. “Research in common parlance refers to a search for knowledge. One can also define research as a scientific and systematic search for pertinent information on a specific topic, in fact research is an art of scientific investigation”. The purpose of research involves the use of various scientific procedures and the movement from the known to the unknown when confronted by the instincts of inquisitiveness. The various methods employed to satisfy this inquisitiveness is simply research (Kothari, 2004). Business research however as seen by Dr Greener is an umbrella for various academic principles such as mathematics, psychology or even economics as business itself is multi-disciplinary. The simple aim of business research is to achieve a “practical outcome” which is best relatable in a context (Dr Greener, 2008).

Kothari 2004 further explains that research methodology is a systematic way of solving a research problem, and in itself is a science of study. Researchers need to understand the need to draw out tests and methods of measuring variables in a research context, however an understanding of the variables, methods and techniques required to draw appropriate conclusions is itself methodology (Kothari, 2004).

The intention of this study is to analyse the effects of block-chain on the audit process in professional service firms within the financial service industry. Block-chain being a new and trending aspect of fin-tech, a concern on the use of block-chain to replace or affect the traditional means of carrying out transactions and the use of financial institutions is under review. Also, focusing on the impact the implementation of the block-chain itself and the adoption in the new future will have on the audit profession beyond the process. This section simply outlines the authors approach in carrying out the research with a focus on academic and scientific techniques to answer the research question.
3.2 Research question:

Duke writing studio 2014, describes the research question as the core and centre of the study which provides a unique argument (Duke writing studio, 2014). For the purpose of this research and in order to gain a comprehensive understanding of the impact of block-chain on the audit function within financial service firms, the author will employ qualitative data regarding the main research question:

“What impact will block-chain have on the financial function of audit and the profession in 2018?”

For the purpose of this research, the author follows the systematic process as defined by the “research onion” shown below by (Saunders, et al., 2006). Using the onion process to develop and map out methodology for this study, from the research philosophies, research approach, the research strategies, making a choice of study methods, setting time horizons as well as techniques and procedures of data collections and analysis.

- Figure 12- Research onion. Source: (Saunders, et al., 2006).
3.3 Research Philosophy

According to (Saunders, et al., 2006), there are three main ways in which a researcher should view the research philosophies and could largely influence a researcher’s view and thoughts on the research process, which include Epistemology, Ontology and Axiology.

Epistemology simply exhibits the feelings of the researcher based on knowledge. The expression of this knowledge may result in various stances of feelings such as:

- The positivist philosophy - this adopts the philosophical stance of natural science and is undertaken in a value-free way. The positivist researcher claims to be external to the process of collecting data due to the researcher’s independence, as little can be done to alter obtained data.
- The realist philosophy - this position related to scientific enquiry, where what the senses show us that the reality is the truth. This emphasises that only the reality of the mind exists.
- The interpretivist philosophy - this epistemology advocates that the social world of business and management is far too complex to be understood like the laws of physical science and so not only are business situations unique, but they are also complex to understand.

Ontology is concerned with the nature of reality in itself and is divided into two aspects which include objectivism (implies that the existence of social entities is objective and separate from that of the social actors concerned with their existence) and subjectivism (implies that the situation has to be critically studied, as the actions of the social actors result in the social phenomena created).
Pragmatism has a traditional approach as relativistic approach, where action comes before knowledge, as it begets the starting point to any explanations given to a phenomena (Kilpinen, 2009). This approach simply states that the primary determinant of any research philosophy is the research question itself and if the question does not clearly suggest what philosophy to be adopted, that is a pragmatic stand as both the positivist or interpretivist approach could be adopted (Saunders, et al., 2006).

Saunders et al classifies the functionalist, interpretivist, radical humanist and radical structuralist philosophies under the four conceptions of paradigms including radical change (concerned with organisational changes), subjectivist (the actions of the social actors create the phenomena), objectivist (social actors are separate entities from entities) and regulation (concerned with regulations within business organisations and how they can be improved).
The researcher understands that business people are different and so business situations are responded to differently (Lane 2017), therefore for the purpose of this research, the research has chosen to consider the interpretivist philosophical epistemology and the subjectivism ontological approach which involves analysing the impact on the audit function of audit within professional service firms. As Holden et al 2004 explained, the subjectivism approach as the view of reality is all a projection and estimation of the human imagination, the perceived impact of blockchain is largely based on the perception of social actors within this industry which are interviewed (Holden & Lynch, 2004)

3.4 Research Approach

The next layer of the “research onion” is the research approach which is divided into two: the deductive and the inductive research approach.

Deductive approach is concerned with developing a research theory and hypothesis for further testing. Zalaghi and Khazaei 2016, explain this approach as moving from the general to the specific, it all begins with identifying the objectives and then moves on to develop a logical structure to reach the identified objectives, emphasising that the validity of any theory (hypothesis) deducted from this
approach is highly dependent on the interrelations of the variables in a logical way (Zalaghi & Khazaei, 2016). This approach is associated with the quantitative data collections methods as hypothesis are focused on relationships between variables.

**Inductive approach** is concerned with moving from the specific to the general observation. The purpose of this approach is simply to understand the feel and the nature of the research problem. This approach is associated with the qualitative data collection method. Soiferman 2010, illustrate that the reason why this approach is different from the deductive is in its view of the nature of reality, as a multi-constructed reality, with different meanings and views for different individuals in which the interpretations are solely dependent on the researcher’s lenses (Onwuegbuzie & Leech, 2005) adapted from (Soiferman, 2010).

For the purpose of this research, the author has chosen to use the Inductive research approach as this is more suitable for the qualitative research strategy, used where data is collected and analysed from a small sample of industry professionals. The interviewees providing data are accounts and blockchain professionals within both the financial and technological industry, and this approach creates an excellent opportunity of an indent understanding within the industry and areas of interest.

**3.5 Research Strategy**

The next phase of the “research onion” is looking at the research strategy. According to Saunders et al 2006, there are several research strategies that could be employed which including (case study, survey, experiment, action research, grounded theory, archival research and ethnography), however it can be classified into three broad studies: exploratory, descriptive and explanatory.

**Exploratory studies** involves simply a means of seeking new insight, asking questions and having a new insight on existing phenomena. The goal of this studies is to gather explanations, clarify ideas, and eliminate impractical ideas and case study research, literature research, focus groups and surveys
are generally used to carry out exploratory study (Dinesh, 2016). According to Saunders et al 2006, there are 3 principal ways to conduct this study which include

- literature search
- field expert interviews
- focus group interviews

**Descriptive studies** are used when there is an accurate and descriptive data to the phenomena in view prior to the data collection, this study defines the data, people and the questions accurately before beginning the actual collection process, as it is based on well-grounded knowledge of the field of study. This should be seen as a means to an end rather than an end in itself (Saunders, et al., 2006) (Dinesh, 2016).

**Explanatory studies** focus on a cause-effect relationship, as the variables are studied and their relationships. It is more concerned on the effects on relationship between variables answering the questions of why and how rather than the causes or variance (Dinesh, 2016). This is a study of the problem to understand the relationship.

The researcher intends to use the qualitative approach and carry out non-standardised interviews in which the researcher contacts respondents and reads them questions in a structured manner with responses recorded appropriately, on the current effects of the implementation of block chain on the audit process and future plans to embrace or curtail this disruption.

For the purpose of this research, the author has employed the exploratory studies helping herself with appropriate secondary data to build literature on the whole concept of fin-tech, blockchain and audit as a financial function and conducting appropriate interviews with industry experts.
3.6 Research choice

The next layer of the onion is looking at the choice of research referring to the methods employed to carry out the quantitative and qualitative research and further analysis.

![Figure 15- Research Choices. Source: (Saunders, et al., 2006)](image)

According to Saunders et al, **qualitative research** is simonized with any data collection technique or analysis procedure that involves numerical data while **quantitative research** is simonised with a data collection technique and procedure that generates non-numerical data. The qualitative and quantitative techniques and procedures do not exist themselves in isolation, as the use of a single collection and analysis technique is referred to as the **mono-method** and the **multiple methods** involves the use of more than one procedure or technique (Saunders, et al., 2006).

The author has decided to use the qualitative research and given the view of the study she has chosen the mono-method of data collection technique and analysis procedure. She has chosen this method as it is most appropriate for this study with the use of in-depth interviews, the interviews are however semi-structured giving the author and interviewee room to respond to questions and follow on questions within the context of research.
Interviews are carried out with experts within the field of finance and blockchain and data further analysed in a qualitative manner.

3.7 Time horizon

The next layer of the “research onion” is the time horizon. This can further be classified into the Cross-Sectional or the Longitudinal study.

Longitudinal study

This is a study that imbibes change and development over a long period of time, Saunders et al refers to this as a “diary perspective” where the study is being spread out over a long period of time. This study is largely that of an observation, measurement and continuation and not suitable within the authors frame.

Cross-Sectional study

This is simply a study of a particular phenomenon at a particular time, Saunders et al refers to this study as a “snapshot”, a study that seeks to describe an incidence in a particular organisation or place at a given time which could change (Saunders, et al., 2006).

For this research carried out by the author will greatly be linked to the cross-sectional study as the research has time constraints to this research. The underlining research question associated with this research looks at the impact that blockchain will have on audit function in a given time, the blockchain concept is largely evolving, with new approaches and ideas of the use of the platform itself with countries continuously implementing it and so this research can be referred to as a snapshot.

As a matter of fact, this research is intended to be completed in order to obtain a degree and so the research has a time constraint to conclude the study carried out.
3.8 Data Collection

For the purpose of this research, the research used the qualitative method of data collection only.

This research is solely dependent on the information acquired from the secondary and primary data involving the use of interviews as the major source of primary data to answer the research question using outlined objectives:

**What impact will block-chain have on the financial function of audit and the profession in 2018?**

- An overall definition of block-chain and its use in verifying transactions in comparison to traditional audit process within the financial industry.
- Gain expert’s opinion on the plans and preparations made by audit firms to accommodate block-chain intervention into the industry and mainly to the audit process as a whole.
- Gain understanding of the effects of block-chain on the audit profession outside the process itself.
- Understanding the market for block-chain within the global financial economy.

**A. Secondary data collection**

This was obtained from existing literatures such as journals, articles, books and verified posts within relevant context. Also, information as obtained from specific identified company websites in relation to this research and remains within scope.

Engaged sources include

- Books.
- Journals.
- Newspaper articles.
- Previous studies within context.
- Organisational websites such as audit firms.
- Organisational reports and publication.
- Use of google trends.
B. Primary data collection

As mentioned earlier, the author has made use of in-depth interviews as a major source of primary data which are non-standardised allowing her to fully explore the research objectives, achieve them and ultimately answer the underlining question of this research.

The author decided to take on one-on-one interviews giving full attention to a particular interviewee at a time and engaging in a more communicative and specific manner. Interviews were conducted on skype as interviewees were not necessarily based in Ireland at the time.

In order to answer the research question and achieve objectives, 4/5 interviews were carried out by the author involving experts within the field of blockchain and finance-audit which include

- a software developer and engineer at ProLeap GmbH in Germany, who earned a scholarship to work on the effects of blockchain within the banking system. A keen researcher undertaking various projects within his company which involves bringing processes into the blockchain network and providing an exquisite knowledge of the blockchain network and its potential invasion into the financial industry from experience.

- An Accountant working in a trust company based in Zurich area of Switzerland. A researcher who believes that blockchain will invade the financial world and has thus researched continuously understanding the Swiss financial industry and the plans to make his country a financial hub. He is strongly vested in this area of study with relevant accounting experience to balance his ideas.

- The head of innovation at a middle sized financial consulting firm based in the Zurich area of Switzerland. Working for a firm that provides personalised financial advice and plan models for the financial futures of companies, understanding its trends, innovative ideas and how these innovations merge with financial functions is his daily life.
A financial lawyer, currently head of innovation within his practice, with a well-developed knowledge of multiple jurisdictions and technological innovation in Nigeria and abroad. The researcher thought that gaining a legal insight would lead to a broader understanding of the effects of blockchain on audit function, however outside the circle of influence.

3.9 Data Analysis

The researcher for the purpose of this research intends to use the qualitative content analysis to analyse obtained data. Due to a large portion of research findings intended to rely on primary data which is gotten from interviews and discussions, the following steps is intended to be engaged by the researcher for the qualitative content analysis:

- Preparing appropriate data- the primary data obtained from various interview are further transcribed, and transcripts are the summed up for analysis.
- Defining units for analysis- due to confidentiality and ethical reasons, the interviewees were informed about the use of codes to identify unless otherwise agreed. All interviewees agreed to their names used for the study and duly signed appropriate consent forms.
- Code or name and categorize all obtained data- the researcher used all data relevant to the research question, discarded all distracting, indirect or irrelevant data provided objectively. The author compared all answers to interview questions as discussed with interviewees aligning similar answers and easily pointing areas of difference.
- Drawing appropriate conclusions from categorised information- at this stage the raw data obtained began to make sense and appropriate conclusions drawn from it. The author carefully compared all answers to interview questions as discussed with interviewees aligning similar answers and easily pointing areas of difference.
3.10 Sampling section

The probability sampling technique gives each population in context an equal chance of being selected. Saunders et al refer to this as the “representative sampling” with a process which is divided into four including:

- Identifying a suitable sample frame based on research question and objective.
- Decide the sample size.
- Select sample and most appropriate technique.
- Finally check that the sample is the representation of the population (Saunders, et al., 2006).

The non-probability sampling technique however as explained by Saunders et al, the non-random sampling provides an alternative technique based on subjective judgement.

Non-probability Sampling technique was used for this research, in order to measure the effects of blockchain on the financial services function of audit. The purposive or judgemental sampling simply allowed the author to apply her judgement as to the best fit for this study, relevant enough to provide...
information and considering the time and budgetary scope of this research, samples are not selected randomly.

Therefore, suitable interviewees were chosen within the financial industry and blockchain expertise and start-ups including

- A software engineer and blockchain expert,
- An accountant and researcher,
- Head of innovation within a financial service firm and
- A financial lawyer and head of financial innovation within a leading law firm.

The block chain association of Ireland is an association which facilitates business leaders, citizens as well as educators on the implementation of block chain in Ireland with a goal to make Ireland the number most literate block chain country. For this research, appropriate information was sought directly from this association, keeping updated with published articles and held workshops in order to fully understand the potential strategy of implementation in the near future.

3.11 Research Ethics

This author on issues of ethics gave serious deliberations on the effects of a wing of technological advancement on an aspect of financial services. The researcher fully understood the need for confidentiality, with the financial services industry being one that deals with large public and client data.

And therefore, for the purpose of this research the/a

- Concept and purpose was communicated to respondents early enough with all respondents given appropriate time for consideration.
- Letters of consent, as well as confidentiality agreements was drafted and appropriately signed by respondents before any actual interview was carried out for this study.
Involved parties were duly informed of the use of any recording device used during interviews and informed of the time frame for destruction of obtained data upon research completion.

All respondents were informed of the right of refusal to give data or use obtained data for the purpose of this research.

3.12 Limitations of Methodology

The researcher had time constraint as a major limitation to this research as the time frame of completion was limited. Due to professionals’ busy schedule in the work place, the researcher found herself continuously trying to fix appropriate times to carry out interviews within the busy schedules of experts and her busy schedule as well. However, prior appropriate planning was being made, with designed and well-structured time plan to adhere giving the researcher an edge

With fin-tech and blockchain being a new area of concentration, the author found it hard to obtain enough information to build her literature due to the lack of previous research and studies.

The interviews were carried out with respondents within corporate organisations and so therefore there are company policies to adhere to, the amount of information respondents were willing to provide were somewhat limited and as such the probability of receiving false or tainted information was high.

The implementation of block chain is still widely anticipated in most countries and this posed as a limitation to the researcher in trying to get respondents to answer certain interview questions as they largely depended on professional speculation making errors viable.
CHAPTER 4- DATA ANALYSIS, FINDINGS AND CONCLUSION

As explained in chapter 3-research methodology, the author using a qualitative approach to obtain primary data conducted 4 non-standardised interviews in relation to blockchain and the effects its implementation will have on audit as a financial function. The results of this interviews are intended to help the research author achieve her objectives and ultimately answer the research question:

*What impact will block-chain have on the financial function of audit and the profession?*

Interview was conducted in English and transcribed in writing as attached in appendix….

4.1 Interviewees background

- **Mr Sebastian Diesel**

  Mr Sebastian Diesel is a software developer and engineer, at ProLeap GmbH in Germany for over 2 years. This company specialises in legal modernisation as a service collaborating with IT consultants and businesses. In addition, he earned a scholarship to work on the effects of blockchain within the banking system, and as a researcher undertaking various projects within his company, which involves bringing processes into the blockchain network (trial and progress) and making services automated, he is relevant to this research as he is hands on working within the blockchain network and largely understands its invasion within various industries particularly the financial industry.

- **Mr Dominik Walter**

  An Accountant working in a trust company based in Zurich area of Switzerland. Mr Walter is also a research student who has contributed greatly to his company’s knowledge of the blockchain idea, he believes that blockchain will invade the financial world and has thus researched continuously to understand the Swiss financial industry and the plans to make the country a financial hub. The researcher wanted a co-researchers’ perspective on the concept of blockchain leading it to the
financial world and Mr Walter is strongly vested in this area of research and has relevant accounting experience to balance his ideas.

- **Mr Michael Maurer**
  Head of innovation at a middle sized financial consulting firm based in the Zurich area of Switzerland. Mr Michael has over 7 years’ experience in the technological innovation world and offers excellent insight knowledge to the industry. Working for a firm that provides personalised financial advice and plan models for the financial futures of companies, he is well suited within the financial industry understanding its trends, innovative ideas and is keen to understanding these innovations and how they merge with financial functions.

- **Mr Ayomikun Ogunkanni**
  Mr Ayo has worked with the leading service law firm in Nigeria for many years. He is currently the head of financial technological practice and innovation within Olaniwun Ajayi LP, a firm that specialises sophisticated commercial transaction ranging from broad financial and commercial functions to regulatory advisory practice. Working with a firm with such global influence, he developed knowledge of multiple jurisdictions and technological innovation in Nigeria and abroad. The researcher thought that gaining a legal insight would lead to a broader understanding of the effects of blockchain on audit function, however outside the circle of influence.

### 4.2 General awareness of Fin-tech specifically blockchain

*Original Question: This is a basic and easy question to start-off question, how well aware of Fin-tech specifically block-chain are you in general?*

Fin-tech as explained earlier is seen as a new and unique marriage of financial technology however, it has been a long-standing relationship in which developments have been mutually re-enforcing (ITA 2016). This concept of blockchain in relation to accounting function is relatively new and coming into
light for the companies and firms and so the interviewees knowledge is this area is significant to enhance the reliability on the information given and that is why this particular question is being asked.

Mr Sebastian explains how himself as a software developer and researcher personally finds this area of fin-tech and particularly blockchain interesting as “I work with a firm which continuously exploits the opportunities the platform brings and how we can use it to aid processes”. He further emphasises that himself as a software developer cannot claim to know all about blockchain and its immense potentials however can claim to have a vast knowledge about it at this time with further exploration at hand.

Mr Dominik expresses how he understands the technology behind blockchain, is keen to researching about it and despite not having a real hands-on experience with the platform, is a committed researcher to these areas of interests. He states, “mostly I follow the news about cryptocurrencies”.

Mr Michael on the other hand describes himself as a “trans-scout”, who screens within the Swiss area for start-ups and in collaboration with his financial consulting firm work hand to hand with the platform. He claims to own bitcoins himself which makes him personally vested in this and of technological evolvement. He has a good and in-depth understanding of not just the technology itself but the whole idea and concept. He further explains how his firm fully researched, presented and produced fact sheets for their customer and this process was led by himself.

Mr Ayo describes himself as well-versed, explaining how involved he was in blockchain and cryptography space since the advent of Silk road right from his degree days. He further explains that he currently works in the technological arm of his firm and has developed a concrete knowledge as well as legal insight into technological developments particularly blockchain.

4.3 Cryptocurrencies particularly bitcoins vs traditional currencies, blockchain platform vs traditional transacting
Original Question: In your opinion, what influence does bitcoin have as a digital currency and the use of block-chain as a platform for various transactions in comparison to ‘traditional’ means of transacting?

According to Laurence 2017, the ultimate online problem is the “Byzantine general’s problem” and the concept of the Blockchain was to simply bridge the gap in digital trust. This question was asked as the author needed to understand what the underling difference is in transacting using bitcoins i.e. on the platform and traditional currencies outside the platform. An understanding of the difference in transacting creates a flow into understanding how these transactions are then validated and verified.

Mr Dominik states that bitcoins aren’t even real currencies but merely objects of speculations. He further explained that the cryptocurrencies are highly volatile at the moment but however, assets of value. Mr Dominik thinks that the underlining factor of difference is the need of an intermediator, giving the example of how the wiser forum handles 24,000 transactions in just one second and this he said is incredible and shows the potentials of this platform.

Mr Ayo states. That bitcoin is gradually gaining a reserve status online and explains his key takeaway as the use of blockchain platform simply eliminates intermediaries and also the fact that the platform possess a greater understanding of privacy and data security. He explains bitcoin and blockchain technology acts as catalysts for the development of a new means of transactions based on privacy and what he called a P2P ethos.

According to Mr Sebastian, the difference between blockchain as a platform of transacting and traditional means is simply defined in the difference between the old world and the new world. Further explaining that the whole idea of the old world is a platform where one entity almost owns the whole power of validation in comparison to the new world where the power becomes spread out and the transacting parties are also the validating parties. He said that the whole gear of transacting is
‘nothing’ when you have to trust a middle man who could influence transactions based on
judgements. Further stating that “I simply think the trust shifts to many people which can verify. The
trust is no longer on one place, it is now decentralised.

Backed by Mr Michael’s idea of the main difference is the middle man missing, where the traditional
systems and transactions involve a middle man who coordinated it and so further fees have to be paid
however, the blockchain platform shows there is no need for this control and which he describes as
“direct and free of control”.

4.4. Verification of transactions: Use of Blockchain vs Use of the audit process

Original Question: As an experienced auditor / expert in your field, what is the difference in verifying
transactions using the block-chain platform and traditional audit processes according to standards?

It is important for the author to understand what the underlining difference is between how concluded
transactions are being verified on the blockchain platform in comparison to the use of audit using a
process as explained in the literature.

As mentioned earlier, the way blockchain works is made public, which could be accessed by anyone
at any time as it resides on a network and not a single institution.

Mr Sebastian voices his opinion stating that “I am no auditor, rather an expert in the field of
blockchain” however he emphasised that the whole idea of audit is simply about being the middle
man which has to be trusted and the blockchain world is simply a distributed ledger where no trust is
required. Mr Sebastian went further to state that in the old world it was a case where only the
developer involved in the systems and transactions knew what was going on and now however,
“everybody can take a look inside the transactions and everybody can prove that this is, no not prove,
can see that a transaction has been placed or a transaction actually has taken place”. The trust partially
lies on the blockchain platform yeah and so the future doesn’t need this trust on one entity and that is
my opinion. It eradicates trusting the man in the middle and trust everyone and the platform as well but not fully based on trust as such”.

Mr Sebastian however went further to advocate that it is important that there are enough people on the platform, in real time transacting and validating transactions and “so the trust is decentralized and it works. You can trust the code as it is basically the trust”.

Mr Michael explained that somewhere in the future the typical audit process is not necessary anymore as everything is automatically on the system and validation is carried out based on historical blocks and so there is no need to have all the documentation and “book”, the platform makes it all visible and easy. He went further to explain that there is however a problem on the platform which involves the discussion of it happening in real time, giving an example of December when transactions on the platform had a really high volume and thus resulting in a slow validation period which had a minimum of twenty to thirty minutes. Mr Michael describes this as “a problem of the blockchain technology”, and he said “the validation is much more broader and honestly I will say it is just a matter of time”.

According to Mr Ayo, verification based on the traditional process relies on a third-party authentication of funds that gives a confirmation from a middle man as to the sufficiency of funds to carry out a particular transaction. But he explains that, currently the traditional processes handle a larger number of concurrent transactions in comparison to the blockchain platform and thus the traditional approach brings a degree of certainty and assurance compared to the blockchain network, as he describes, there is a wait by consumers for the relevant addition of blocks to certify the certainty of the occurrence of any transaction.

4.5 Plans made by firms and Fin-techs to use blockchain in recent times
Original Question: Audit firms are well aware of the potentials of block-chain and in fact set up new units dedicated to understanding the potentials and offering it brings, however what further plans has your firm or fintech start-up made to further use blockchain in recent times?

For Mr Sebastian who is a software developer in a fin-tech start-up spoke about two projects embarked on by his company, which entails an artificial intelligence loyalty platform, developing tripod applications for fast manufactured consumer goods companies such as Coca-Cola, Nestle, stating that the products of these companies come with a barcode for identification. In recent times however, customers have been largely interested in loyalty programs provided by companies and stores alike and so get loyalty points and tokens for the purchase of these products. He said that “we as a firm wanted to bring the loyalty tokens on the blockchain platform, so it is exchangeable and crypto validated and so it has an immediate value to the customer collecting the tokens. That is just one example of my firm’s new project and of course there are so many other start-ups here in Germany who experiment with this technology of blockchain bursting excitedly into various places and markets”.

Another project as described by Mr Sebastian is the plan to make production processes such as beer production more transparent and faster. He said that for production processes, there are standards to be met and quality to be achieved and so most companies contract the process to smaller companies, meanwhile this could be done automatically on the blockchain platform. In his words, “When you make measurements on the blockchain that is actual values such as temperature measures for example, it could be done automatically without any expensive hands on worker for the production process and that’s an idea within just a few industries here in Germany and on this topic of blockchain, you can put some many industries and processes into it and its automated and verified by the blockchain itself”.

According to Mr Dominik, giving an example of Zug area in Switzerland, where there are companies producing their own cryptocurrency and exploring the use of the blockchain technology. He states
that his firm being medium sized understand that the blockchain technology is a huge topic at the moment, however in his words “we cannot imagine where to use this technology in the continuous functioning of the firm and providing services at the moment”.

Mr Michael accepts that for his firm, concrete plans are not on the table at the moment and he further expresses that small and middle sized firms do not see it viable at the moment to set up research units or explore this concept as it is new and are really not ready to lead the path of change however, he talks about how the swiss financial market is and that most companies are coming to understand what the concept is, but are questioning how the future of companies’ adoption of this platform will be. He simple refers to this as a stage of realisation and a bit of research but not actual plans and projects. Mr Michael gave an example of the Swiss exchange market and how usual bank transactions and transfers are already being used on the blockchain platform and also looking into the future when there will be a full adoption by banks themselves and financial companies.

According to the world economic forum 2016, Block chain works with a very simple principle, as a train track where bitcoin is the train car, and you can put in whatever ever you want and to any destination with limitless possibilities.

For Mr Ayo’s legal firm however, practical exploration is being carried out as to ascertain the use of blockchain for record keeping. He explains how his unit is actively holding series of seminars and presenting the potentials of blockchain in service delivery to key players within the firm and also in the provision of advisory services to clients

4.6 Blockchain: A threat or an Opportunity to audit and what does the future of blockchain look like within the financial industry

Original Question: Does block-chain pose as a threat to audit or an opportunity to revolutionise it, creating a new approach and is this sustainable?
Is there a future of block-chain adoption in audit firms and what use will it be towards improving or dis-improving audit functions for various firms?

This pose as a vast array of opportunities for the start-ups as identified by Mr Sebastian but he however said the flip side of the coin is the threat to companies and institutions such as banks which he defines as possessing a major product surrounding trust. He talks about how banks and accounting professionals will ultimately be eliminated in the long term.

Mr Sebastian further explains that, of course not all banks will definitely be killed by this threat of blockchain in terms of their middling trust-based function but are set to face many difficult times in the near future within the financial industry due to “many old systems”. However, he expressly stated that these decisions lies largely in the hands of customers, with the paradigm shifts and the greater demands of customer expectations and satisfactions institutions need to transform or else it is the end of the game for them.

However, Mr David Dalton according to the Deloitte press release 2018 seems to think differently saying that “Blockchain technology is disrupting the financial services industry for the better when it comes to transparency, efficiency, and improving trust”.

Mr Dominik describes the disruption however as a revolution for audit firms and the financial industry at large in terms of processes and efficiency, however he expresses how this could be threatening to the middle man. He states clearly that the approach of the blockchain platform cannot however be said to be sustainable at the moment as it needs time. Giving the example of a few firms in Zurich area who are currently testing out blockchain, taking on small contracts to test out new processes and functions.
According to ISACA publication 2017, Nikitin expresses that “a different professional audit mindset and additional expertise will be required to satisfy the expectations of stakeholders and business owners in this new world”.

Mr Ayo expresses how blockchain currently is a threat to audit functions due to it being a “self-validating” system, he said that the technology itself is likely going to reduce the number of audit processes required and even the auditors needed, he simply describes the technology as “the biggest revolution in the audit sector since the invention of double-entry bookkeeping”. In terms of global standards as well, he states that blockchain will remain one of the key tools in authenticating transactions once it meets global standards and clearly stated that “As such, its adoption by audit firms is unavoidable in the long term”.

According to Tannam 2017, 22 banks in India and 5 middle east banks formed a group called Bank Chain which creates a blockchain solution for the banking industry, this is intended to roll out launches of smart contracts in which are public on blockchain, traceable eliminating the need for enforcement agencies. It seems after all that the banks realise the need to eradicate their own middle men and do away with “old systems” as called by Mr Sebastian.

Mr Michael talks about how the blockchain network is both a threat and an opportunity to audit as he said it has “the possibilities to make some transactions and some businesses more efficient, more cost sensitive”, but could also describe it as a threat in terms of bitcoins ordinarily becoming a currency of financial use and everything becomes more complicated. Giving a time frame of 10-15 years has expresses how he doesn’t see how the technological platform will largely change the financial work for both companies and banks alike, and this time could be used by financial institutions to build a system that works. However, he fears that despite this all the near future proposes a moment where this companies are not needed anymore and then he returns to his favourite quote “basically it needs some time”.
4.7 Blockchain and the audit profession outside the process

*Original question: As an expert with years of relevant experience in your profession, how much effects do you think this wave will have on the audit profession itself outside the process?*

According to ISACA publication 2017, Nikitin expresses that in our profession, traditional auditing will remain necessary in many parts of the globe and in many traditional businesses environment for a while”.

Mr Sebastian’s opinion is somewhat on the positive as he believes that despite much pressure on the middle men largely auditors inclusive, a good system could be developed to make both work. As he said “I am not saying a 100% that they will be eliminated however it is possible that the pace of this paradigm shift will largely eliminate middle men, auditors inclusive”.

Mr Sebastian concluded by stating that the audit process today involves so much more and some functions are not on the blockchain platform itself, as it is impossible to put the whole audit process on the blockchain platform but a lot will be changed in the audit world because blockchain is simply very relevant.

Mr Dominik on the other hand thinks the current processes within the audit firms are very efficient and blockchain will revolutionise it, but he states that the audit job is more complex than a technological platform and a change might occur in the process however eradicating the profession itself is almost impossible.

Mr Michael sheds light with the example of robotics and how its appearance affected industries and the automobile industry is still a working industry, but he explains that the profession is definitely changing and all parts of the job will certainly change, but not be eradicated completely. He further emphasises that from the legal perspective alone there is need for people in charge and who are responsible and so these are the financial experts themselves, so removing the profession completely is not possible.
Mr Ayo thinks that the blockchain technology will tremendously have an effect on the market, and very likely that record-keeping will be done using the blockchain and “It is likely going to reduce the number of auditors required”.

4.8 Market for blockchain in the global economy

*Original Question: Following the launch of block-chain in almost every developed country, would you say there is a market for block-chain as a technological game changer within the global economy?*

*Given the history of audit and its wide adoption, will there be a market for blockchain as such?*

Following the first launch of blockchain in Ireland called Hackathon, followed by Enerport a peer-to-peer energy trading through the blockchain technology.

Ukraine according to Cooking 2018, has become one of the world leaders in the implementation of blockchain, using the first online auction in the world called Open Market on the blockchain platform. Examples include Singapore airlines which has recently launched a private blockchain wallet for the companies frequent flyer programme, Australia accepting bitcoin payments at shopping facilities at airport terminals, USA Surf Air announced its recent intentions to accept cryptocurrencies as airline ticket payments, this platform and technology is piercing through every country, every division and even smaller processes.

Mr Dominik explains how the Institute regulating the financial markets in Switzerland have made their plans public, to create a Swiss cryptocurrency, showing that even the government are highly interested in this area with plans of bringing this technology into various industries within the economy and he emphasised that he would say the same about of investment applies to developed countries within the global economy.
Mr Sebastian highlights that blockchain isn’t as popular as it should be in Germany as both the Techies and Companies are immensely researching its potentials and uses, however he explained that the people don’t necessarily need to understand the technology as it is, but will be widely adopted with time “Maybe it will take longer than five years as we never know but it works”.

Mr Michael expresses how Switzerland is a big financial hub in the world with provision of services around the world and also striving to bring technological innovations up to that standard and from this perspective there is definitely a really big market for blockchain. He gives an example of how the Swiss industry has radically changed in recent times embracing this technology and how insurance can now be gotten outside the companies and places like Zug which is referred to as the Tech hub in the Zurich area. He says “Yes! of course”.

Mr Ayo simply states that “Yes, there will be a market for block-chain”, as it is already a game changer with companies continuously discovering it numerous applications and where to fit in.

**4.9 Analysis of data obtained and conclusions drawn**

The trends seen from the literature up to the data obtained from interviewees is consistent in the fact that the world is changing and technology is a leader or this evolution and will continue to be in the near future, fin-tech particularly blockchain is evolving various industries from the insurance to payment and the financial service industry is no exception to this. The blockchain platform as introduced by Nakomoto is doing exactly what is proposed in the published white paper on the eradication of a trust-based model and a new concept of transactions without the need for third party interventions.

From the four conducted interviews, all participants are of the opinion that yes blockchain will have an effect on the financial function of audit and even as far as the profession. The effects however on audit processes could be in form of a revolution or a negative impact, the profession is set to see a change as well, but the platform itself is still largely under review and a bit of speculation as to where
it fits in within the processes. The whole research pointed out the market for blockchain in various countries, economies and the global market, however the underlining factor just like any other concept in 2018 remains time. In time, it becomes clear what the immerse potentials of the platform is, where it can be used in collaboration or eradicating the need for traditional audit according to standards and also the shift in the profession.
CHAPTER 5- CONCLUSION AND RECOMMENDATION FOR FUTURE RESEARCH

In this chapter, the researcher intends to correlate the research from secondary sources (literature) to methodology and information obtained from the primary source (interviews) in order to answer the underlining research question:

What impact will block-chain have on the financial function of audit and the profession in 2018?

The design of this research began with understanding the global financial industry and how it all began, where we are today and understanding of how the whole idea of fin-tech evolved, the areas it affected linking to blockchain and how it works both in the financial industry and others.

This section intends to clarify, analyse and explain the findings of the researcher also drawing appropriate conclusions which will provide other researchers and practitioners more insight into this area of blockchain and audit in the near future.

The overall plan of this research was to understand the rising concept of blockchain and its use within the financial industry particularly the effects it will have on audit processes and the profession itself in 2018. The plan was however, was further broken down into various achievable research objectives:

- An overall definition of block-chain, its difference in transacting and its use in verifying transactions, all in comparison to traditional audit process within the financial industry.
- Gain expert’s opinion on the plans and preparations made by audit firms and fin-techs to accommodate block-chain intervention into the industry and mainly to the audit process as a whole.
- Gain understanding of the effects of block-chain on the audit profession outside the process itself.
- Understanding the market for block-chain within the global financial economy.
A. An overall definition of block-chain, its difference in transacting and its use in verifying transactions, all in comparison to traditional audit process within the financial industry.

The Global financial industry has been around for decades. Since the Gramm-Leach Bliley Act 1999 however, has experienced various alterations also technologically causing the industry to continuously shift to adapt and incorporate various transformations to what we have today. The literature review explains how despite this global financial crisis that creped many economies around the globe, the financial industry remains an industry on rampant growth. The financial industry is a large contribution to the GDP of every country in the civilised world and the Irish financial industry is hugely important employing about 40,000 with over 200 companies. The IFS2020 action plan has set the Irish financial industry to grow tremendously in the next 5 years and this, not only shows the importance of this industry in Ireland, but globally.

Financial technology as defined by Arner et al 2016 is seen as a new and unique marriage of financial technology however, it has been a long-standing relationship in which developments have been intertwined and mutually re-enforcing. And one of its arms or relations in the terms of transactions called blockchain which only came into light in 2008 following Nakomoto’s white paper release introducing a platform for transactions without institutions and third parties also with the aim of eradicating completely the weakness of a trust-based model.

All findings and research show that cryptocurrencies particularly the bitcoin are currently objects of speculation. Mr Dominik specifically talked about how they are not even real currencies and currently volatile, Mr Ayo exerts how they are gradually gaining reserve online, however the underlining difference between transactions on the blockchain platform in comparison to traditional means of transacting is simply the elimination of the intermediator. Mr Ayo as a lawyer talked about how blockchain platform eliminates intermediaries and proposes a greater understanding of privacy and data security.
Mr Sebastian a software developer highlights how transacting power is then being spread out among the transacting part and not horded by one. Mr Michael an innovation leader talked about how the middle man goes missing on the blockchain platform and thereby reduces not just the cost but also makes transactions direct and control free. Mr Dominik capped by expressing how there is no need for an intermediator for transactions using the blockchain and thereby making a faster process. It makes it very interesting to consider that the practical transactions based on the blockchain network in comparison to the traditional means of transacting is almost going on the tracks as described by Nakomoto 2008 which described the presence of intermediaries in traditional tractions as that which limits transaction size, increases costs and ultimately results in transaction benefits being lost.

Verification works hand in hand with trust. when it however comes to verification of carried out transactions on the platform, it is easier, more visible, faster and participative on the blockchain network in comparison to traditional means of verification by an auditor. Mr Michael exerts that every record and documentation is readily on the platform making it visible and easy to verify and Mr Sebastian talked about how trusting the judgement of an expert outside the circle of activity gears towards nothing and so blockchain provides a platform where the transacting parties are also the validating parties. Mr Ayo had a view that awoke from the angle of authentication, he talked about the traditional process relying on an expert to authenticate availability and sufficiency of funds which can however be done directly on the platform.

In addition, the platform seemed to have its short-comings which was highlighted from the findings in comparison to traditional audit processes. As identified in the literature review, one of the issues facing the blockchain platform today is the processing time and scalability. The amount of current transactions handled on the platform has resulted into a processing time of 7 transactions per second and Mr Michael talked about how the blockchain platform took 20-30 minutes to verify a transaction in December when it saw a high volume of transactions. Also, the limitation of block size since inception, is an issue of the platform today and Mr Ayo implying further that the traditional audit process handles a larger volume of concurrent transactions in comparison to the blockchain platform
and he explains how the traditional audit approach somewhat brings a degree of certainty and
assurance in comparison to the platform. In the end it is a matter of time as this concept of blockchain
is still being explored.

B. Gain expert’s opinion on the plans and preparations made by audit firms and fin-techs to
accommodate block-chain intervention into the industry and mainly to the audit process as a
whole.

The intervention of the technology could pose as a threat and opportunity to audit. Fin-tech start-ups
are bombarded with a vast array of opportunities within the financial industry as emphasised by
software developer Mr Sebastian, however could be of a serious threat to the audit process and he
described as filled with “many old systems”. This new platform could largely affect the audit process
and ultimately the financial industry for good as it brings new ideas and efficiency as stated by Mr
Ayo, blockchain is the biggest revolution to the audit sector since the invention of double entry book
keeping. According to the CPA report ‘Blockchain Technology and Its Potential Impact on the Audit
and Assurance Profession’ in 2017 highlights that experts believe that the financial industry is on the
verge of disruption from blockchain and its workforce by automating many activities that are
currently carried out by humans.

With the rise in this technology, most firms have set up research and technological units to gain
further understanding into the concept of blockchain, where we are now and how this technology can
be harnessed and incorporated into their processes. From the literature review, most large financial
institutions have looked into incorporating blockchain and exploiting its platform, Ireland saw its first
implementation in 2017 called Hackathon with the big four firms actively involved in the growth of
this concept and setting up research units.

From the discussion with interviewees, the findings of the plans made by firms to accommodate
blockchain in recent times has been divided into two. Mr Sebastian expresses how his firm (fin-tech)
start-up has fully blown, exploring the uses of the platform and carrying out projects injecting into
various industries and processes and Mr Ayo expresses how his legal firm has in fact began to use the platform for record keeping and its use in advisory services on financial issues.

On the other hand however, Mr Dominik explains how his financial trust firm cannot imagine a way to incorporate this technology into their processes and functions at the moment, which also applies to Mr Michaels financial consulting firm which has made no concrete plans whatsoever. The underlining factor is time, enough time needed to explore this technology and firms begin to understand the need for adoption.

C. Gain understanding of the effects of block-chain on the audit profession outside the process itself.

The profession of auditors reassures trust to the public on a company. Despite regulated by professional codes and standards, it is a profession that requires professional expertise and scepticism. The auditors however are required to understand risks associated with financial statements and how companies are respondent to these risks. This simply implies that the audit profession is more complex than some simple verification. Mr Sebastian believes a good system could be developed to make both work in terms of keeping that profession intact however “A different professional audit mind-set and additional expertise will be required to satisfy the expectations of stakeholders and business owners in this new world”, where instead of the year end audits, audits firms are in a position to carry out continuous online assessments through the period under audit (Psaila, 2017).

The (CPA Canada, AICPA, UMCISA, 2017) report 2017 suggests a future highly skilled auditor who is able to provide assurance to the users of the technology, and as clearly stated by Mr Dominik, eradicating the profession itself is almost impossible.

In the terms of collaboration however, as explained in the literature the PwC 2017 global fin-tech survey report highlights how 77% of financial organisations intend to adopt blockchain as part of their organisational process by 2020. This shows how the times might not be so troubling for audit
processes as seen, where a collaboration might be viable as explained by the CPA 2017 report on how a recorded blockchain transaction might not be sufficient evidence in relation to the nature of the transaction and could be “off-chain”, incorrect or even illegal and so therefore requiring an audit procedure on a blockchain recorded and verified transaction.

D. Understanding the market for block-chain within the global financial economy.

As highlighted in the literature, the S&P outlook exerted that the financial service firms especially in Japan and Europe continue to review their business models to deliver expected returns with changing consumer demands due to the rise of the likes of fin-tech and insure-tech contenders which will become more striking in the near future. However, there is a 21% probability that the risk coming the global financial industry is directly linked to the rise of financial technology affecting developed and developing economies alike.

There is a global market for blockchain as agreed by all interviewees, “Yes of-course”.

As mentioned earlier, Ireland has launched Hackathon, Ukraine has used the first online auction called Open Market, Singapore airlines has launched a frequent flyer programme on the platform, Australia has begun accepting bitcoin payments at airport terminals and the USA Surf air intends to accept crypto-payments for flight tickets.

The Swiss financial markets for example as mentioned by both Mr Dominik and Mr Michael, the Zug area of Switzerland hosts companies who specialise in the production of their own cryptocurrencies and explore the blockchain platform and using it for smart contracts. The financial market regulators have publicly. Set out plans to explore not just the technology, but further create a Swiss own cryptocurrency which is used to carry out transaction. Mr Dominik concludes on how he cannot say much for the global economy, but within the Swiss economy however, there is a huge market. The ideas of Mr Michael however, encompasses on the fact that Switzerland today as a financial hub is striving continuously to raise its technological advancements to that standards and so the market is wide.
German start-ups have begun testing the platform into customer loyalty programs to production processes and the invasion of the platform into various industries. The idea presented by Mr. Sebastian views the market for blockchain in comparison to how the first currency of exchange began and how the first bank developed decades ago, pointing out that it’s the same for blockchain today and the market as people do not necessarily need to understand it or trust it but will use it. The market in Germany he emphasises will accept the technology in no time and yes there is a market.

Zhiyong Li, sums it all up by saying:

“Blockchain technology will due to its features heavily facilitate the audit work and change the way of audit work to be done, e.g. traditional audit work is implemented after balance sheet day, with blockchain the audit work can be done immediately after a transaction is completed. But the blockchain itself still has some problem to solve. Auditors should not totally count on it.” (Li, 2017)
5.2 Recommendation for future research

This research on the impact of blockchain on audit, shows that blockchain is relatively new as most companies are still in the research phase. This could be a very interesting area for further research, particular the blockchain platform and the functions that are still coming into light.

Another interesting area would be a look into the audit of the blockchain platform itself. In recent times most professionals are gradually beginning to question what to audit when it comes the blockchain platform, the blockchain itself or the transactions on the platform and this could be particularly interesting. The author feels an in depth research into the blockchain process and the difference between auditing the platform itself or the solely the transactions that have been stored on previous blocks.

Blockchain as is, is invading largely into various industries and exploring processes to change or eradicate, a further research into the application of blockchain in production processes, medical industry, the gaming industry or even the fast consumer goods could be of interest. A qualitative research could be carried out understanding the effects blockchain will have on functions within a different industry.

A look into the legal perspective of blockchain adoption could be of great attraction, the audit profession as mentioned is guided by standards and codes and so the blockchain has a height to reach in terms of regulatory and legal standards and so this could be particularly interesting.

A research into the cryptocurrencies and volatility could be of great interest. Bitcoin being just one of the many available cryptocurrencies is seen as an asset of value however largely speculated and has seen a few wavering slopes in the financial market and an understanding of the value of a bitcoin and its market presence could be fascinating. Also, a look into the requirements to be satisfied for it to become a legal money and how this could come to be is intriguing.
A research into the use of bitcoins to make payments is very interesting, following Dell and Microsoft’s acceptance of bitcoins as a form of payment, it is now used in places like USA and Australia to pay for air tickets and store purchases at airport terminals. This area of research is quite interesting.

Finally, a look into the area of fin-tech is interesting. Fintech is relatively new and so there are adoption barriers to this concept. Most fin-tech are worried about adoption rates of their services and wide acceptance as the factor of trust is crucial. And so, a quantitative research on this area could be very rewarding.
CHAPTER 6- SELF-REFLECTION AND LEARNING

This part of this dissertation simply explains the authors journey from the start of this MBA program right through to the end of the dissertation, the learning styles that helped in the development of this dissertation.

Reflection is very important in our everyday lives as humans, thinking of the past, how to make the present better and incorporating lessons into the future events. Dr Cheng et al 2015 discusses how self-reflection is particularly an important skill that aids transition of students and it is described as skill developed during university studies. So, reflection is simply a process involving an examination of past practice, come up with present ideas of improvements and then integrate those ideas into the future practice as Schon 1983 explains it as a cycle of “appreciation, action and re-appreciation”.

The need for reflection is indescribable however this only came to light over a year ago when the journey started at Dublin Business School for the MBA finance program when the researcher had to undertake a core module Personal and Professional development. This module simply opened up the author to understanding her story as an individual to making sense of her current situation and expectation as well as the opportunities and plans for development in the near future as she was tasked with the completion of personality tests, understanding her locus of control, and learning styles ultimately writing a portfolio which dwelt on reflection precisely reflective thinking and judgements.

6.1 Learning styles

John Dewey 1993 claims that learning has to be grounded in experience and McLeod 2013 explains that the Kolb’s learning cycle is concerned with the internal cognitive process of the learner and so divided into four learning stages in a cycle (Dewey, 1933) (McLeod, 2017). Kolb’s idea explains that effective learning is only possible when four stages are completed and a person’s learning cycle is influenced by various factors such as educational experience, social environment and even basic cognitive structure of an individual.
“Learning is the process whereby knowledge is created through the transformation of experience” (Kolb, 1984).

According to the Kolb cycle, the four learning stages which include:

- **Concrete experience**: this is mainly about doing and having the experience of an activity.
- **Reflective observation**: this involves reviewing the experience and a further reflection considering success and failures in the activity.
- **Abstract Conceptualisation**: this is the application the theory to the activity and concluding.
- **Active experiment**: planning for future activities using previous experiences.

Learning is a continuous practice and individuals learn in many ways. Peter Honey and Alan Mumford based on the learning cycle of Kolb identified further four learning styles and preferences which include: Activist, Theorist, Pragmatist and Reflector.

- **Activist**: this is an individual who learns hands on, they have a receptive way of learning which is simply self-inclusion.
- **Theorist:** this individual is bent on ideas, theories, models to comprehend the hypothesis behind activities. Simply enjoys theoretical studies.

- **Pragmatist:** This individual prefers to put conceptual idea into real practice, their main mode of action involves experimenting ideas and making speculations.

- **Reflector:** This individual abstains from ‘jumping in’ and watch, observe from the side lines, gathering alternate views and information enough to make suitable conclusions.

Based on the Honey and Mumford questionnaire developed in 1982 to understand the different learning styles particular to individuals, the author upon the completion of the test realised her leaning style is towards both the pragmatist and reflector styles. The author prefers to however put conceptual ideas into real practice, experimenting new ideas and making sense of it however she does not necessarily ‘jump in’, but observes curiously from the side lines gathering alternate views to make...
conclusions of her own. The learning cycle based on the learning style of the researcher as agreed is at reflecting on actions and putting theory into practice planning the next step.

6.2 Learning and development through MBA and Dissertation

The author has learnt a lot and developed through the whole MBA process and the dissertation inclusive. Skills developed have helped her accomplish this degree program and will also be very relevant in her future career as a certified accountant.

A. Professional Skills- career direction

The MBA program has been very tasking and demanding for the author. This has helped the author understand the expectation of the professional world and prepared appropriately towards it. An in-depth research into the fin-tech industry particularly blockchain has helped the author gain a broad knowledge into an industry of her career interest and well as an up-to-date concept. The financial industry is ever changing and as mentioned earlier this change is largely due to technological advancements and so the requirements of this thesis has helped develop the authors mind professionally.

B. Research Skills

This is a skill developed from the first lecture at DBS through to the dissertation process and it is a very important skill. From assignments to literature review all involved thorough research and an understanding of what the text in correlation with what the author intends to write about. Research to the author is simply a well thought, time consuming and demanding process and the researcher has gained this skill from working with a well-structured time plan.

C. Critical thinking skill

This is a skill developed directly from research. As mentioned research is cumbersome and time consuming and the ability to interpret obtained data or information into a well-suited work involves a
critical thinking process. The author has particularly developed this skill from the whole period of the MBA program at DBS.

D. Interpersonal and leadership skills
The format of the MBA program entailed group projects and interactive classes. The author developed these skills from numerous group work done which required organisation, communication and acceptance of other ideas. There is a saying that “more than two people require a leader” and the author found herself having to organise groups in order to finish projects and carry out presentations placing her in a position of a leader.

The author has developed confidence from in class presentations and completed projects.

E. Intercultural adaptation
Being able to study in a different country, in a class full of mixed races has provided the author with this skill. The MBA program created room from interaction between students and this opened the author up to conversing with individuals from different countries, giving her the opportunity to be open minded.

Peer learning is very important in every society and the author found herself learning about life from the MBA program beyond the classroom.

The system of education in Ireland allows an interactive class in comparison to Nigeria, this helped the author to understand the different systems and appreciate learning in a different country.

F. Time management skill
In order to obtain primary research, the author carried out interviews with experts in the field of concern and this has helped her tremendously to develop preparation skill. The interviewees are experts in their various fields and had busy schedule and the author had to find appropriate timing.
6.3 Application of learning in the future and conclusion

The Masters of Business Administration at Dublin Business School has been a life changing experience. It not only provided the author with a platform to advance educationally and obtain a higher degree but opened a door of opportunities to unlocking the potentials within her.

From the first day of lecture preparing and training the author to abide by a schedule and be on time, to the well-founded lecturers providing up to date information and guidance, to the class full of so many different nationalities and providing a space to experience cultures and mind-sets, to working out of the door to a multi-diversified streets of Dublin composed of so much opportunities. This experience has impacted the author with a positive expertise, a developed intellectuality and a new level of confidence.

The MBA experience is however a spring board to the authors future on a new page, facing a new phase.


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Mr Sabastian Diesel- Software developer and engineer at ProLeap GmbH in Germany (May, 2018)

AB: It is all set up now and I am sure I can hear you. Good day and I hope you are well.

SD: Yeah sure sunny day here in Germany, a bit of the summer and Dublin?

AB: Ahh! Grand! Yeah so to begin how much about fintech do you know, cryptocurrencies and all it involves?

SD: sorry I didn’t get that question

AB: you previously spoke about not being broadly familiar with Fin-tech as in the financial aspect however how familiar are you with cryptocurrencies especially bitcoins?

SD: Yeah, so as I told you I am a software developer and currently working with a start-up, it is one of my topics of concern. Blockchain is of interest to me as I work with a firm which continuously exploits the opportunities the platform brings and how we can use it to aid processes.

AB: Ok. So, what can you tell me is the difference between the use of hard cash for transactions and the use of bitcoins which is more like dealing with online transactions?

SD: you mean cash or paper transactions?

AB: Yeah as you know the whole bitcoin idea is more about internet transactions and what is the difference then with using cryptocurrencies to transact in comparison to how we are generally used to transacting now with hard cash and cards and stuff?

SD: Well in the blockchain world there are many validators, validators who can validate each transaction of one another, yeah and in the old world the banks can validate one transaction of their customers. In the old world there is one entity which validates it and the power lays, that is they have the power to. Yeah and in the new world where everybody can transact and verify transactions, the power will be distributed or spread.
**AB:** So, you are trying to say to me that the major difference is actually the fact that the power lies more with the central authorities when it comes to traditional means, and when it comes to the modern means you know, its diverted between everyone and everyone holds the power as well?

**SD:** Yes! And well in the old world where banks are just verifying transactions and nobody knows except the developer about what is going on in the systems and in the new world, (laughs) I call it the new world. And in the new world, everybody can take a look inside the transactions and everybody can prove that this is, no not prove, can see that a transaction has been placed or a transaction actually has taken place.

**AB:** Thank you very much and that leads me to the next question. Obviously, you know the whole blockchain and bitcoin thing as you are really into it as a researcher, as a developer and I can address you as an expert in this field yeah?

**SD:** sorry?

**AB:** So, I said obviously you are into the whole blockchain thing, you are more like an expert in this field as far as the bitcoins are concerned are you?

**SD:** I am a software developer, it is still an area of development and cannot claim to know it all, so I can prove I am an expert in terms of having a vast knowledge but I cannot say that I have all the knowledge about it.

**AB:** Ok, so basically the whole concept of audit is, cause really you have no knowledge about audit and so I am going to give you a brief background about it, and the whole concept evolves around the verification of documents and transaction. So, a company has a transaction with another company and then they call the middle men who come to say both companies and legit and every transaction is legit. Simply audit is more about being the middle man. But the major problem based on my research with audit is the fact that it can take forever! In terms of a whole accounting year from January to December and then you call an auditor in December to verify the transactions that took place from January to December, so audit is a present work for past transactions if you get what I mean. So basically, based on my explanation, what would you say is the difference between using blockchain to verify transactions and the audit verification itself?
SD: Hmm, I am no auditor rather an expert in the field of blockchain and as you said there has to be a middle man which you have to trust and in the blockchain world, there is distributed ledger with all previous transactions and nobody, except you have enough power to calculate it can change transactions in the past, and in the old world there is a middle man how has to be trusted and the whole gear of transactions is nothing when you have to trust one entity which could potentially change transactions based on judgements.

AB: So yeah, in light of what you said as now we are talking about trust. Because in the old world in your words by the way, its all about trust where you have to trust someone else to verify that the other person you are transacting with is real basically. So now in the new world, are we saying it eradicates trust completely before having a transaction? Does it eradicate trust completely or the trust has shifted form the person to the platform?

SB: Oh! wow good question. I simply think the trust shifts to many people which can verify. The trust is no longer on one place, it is now decentralised. The trust partially lies on the blockchain platform yeah so the future doesn’t need this trust on one entity just resting more on the platform in my opinion.

AB: So more like moving from trusting the humans to the platform?

SD: well, not the human, we eradicate trusting the man in the middle and trust everyone and the platform as well but not fully based on trust as such.

AB: I understand you I think

SD: person or technology yeah or even entity. Maybe the code which is used to validate but it is important that there are enough people in the platform who participate and validate transactions and as long as there are enough people who do this, you don’t have to trust one single as long as you got enough people transacting in real time, the trust is decentralised and it works. You can trust the code as it basically the trust.

AB: So, based on research I found out that people actually get paid on the blockchain platform for the first person to solve the big giant problem when it comes to verification and could you tell me more about that?

SD: About what?
**AB:** I was reading that the blockchain platform, there is more like a time frame for the verification of a transaction among people participating and whoever solves it first gets a certain amount of bitcoins.

**SD:** Aha its about the incentives you mean?

**AB:** Yeah exactly.

**SD:** yeah, the first one who finds the block solves the mathematical puzzle, and are the first to verify that all transactions happened in one block, but everybody has to confirm that the block is true and a valid block. One person can find the block, but everybody on the network atleast 50% have to confirm the validity of the block. So its not just about the first person who verifies or validate the transaction and gets a reward, its about finding the block and need some proof of work. You know anything about that?

**AB:** No no.

**SD:** yeah okay, to keep it simple there are many people who gather PCs at home and are working on the platform and so if they find a block and can validate other transactions. so they solve a mathematical problem on every computer, some x plus five equals ten and they set x to one and need to solve this puzzle and then the first to solve that x needs to be five and five plus five equals ten, so the puzzle is solved and can validate the block where the transactions are placed in and then you get an incentive which is a bitcoin and that is simple the proof of work.

**AB:** Thank you. Moving on to the next question, so in Ireland for example as I am based here most firms have set up units of blockchain literarily to know about it, research it. So what would you say is the plan so far in Germany?

**SD:** in Germany?

**AB:** Yeah, so how far has it gone in terms of fintech start-ups, accounting firms having this unit which I am not sure you will know much about, but generally within the financial economy and blockchain? Are there plans being made?

**SD:** Well that’s a blur question really but I will give you an example of my company, our second project entails an AI loyalty platform and in short we developed tripod applications for FMCG companies.
AB: Sorry to cut in but speak English now please I am no tech person here.

SD: It’s a fast consumer product such as nestle, Coca-cola all have codes on each product like a barcode, and customers have now been interested in the loyalty programs provided for these products and get a points and tokens. And we as a firm wanted to bring the loyalty tokens on the blockchain platform, so it is exchangeable and crypto validated and so it has an immediate value to the customer collecting the tokens. That is just one example of my firms’ new project and of-course there are so many other start-ups here in Germany who experiment with this technology of blockchain bursting excitedly into various places and markets. Another example is another project where we want to make production processes more transparent like beer production for example has certain standards to be met and are many institutes which controlled the production units and there are many people who go to the firms to control the processes, and many ideas that this could be done automatically. When you make measurements on the blockchain that is actual values such as temperature measures for example, it could be done automatically without any expensive hands on worker for the production process. And that’s an idea within just a few industries here in Germany and on this topic of blockchain, you can put some many industries and processes into it and its automated and verified by the blockchain itself.

So every time you need to trust one entity for example, banks or productions or sales it involves always a middle man and being smart enough to recognise that this issue and be solved with blockchain, you have a bright future.

AB: Interesting. So, moving on, technology developments as you just said has gone from payments to processes and various platforms, so would you say blockchain posses as a threat or an opportunity to the financial world.

SD: So, if I understand correctly, is it a threat to the individuals or the processes or the banking world?

AB: the financial world in general in terms of the processes, and the people cause blockchain or the whole fin-tech idea is creeping into every industry as it is just form your examples even and is it a threat or an opportunity?
SD: So, I will like to say it’s a good opportunity for start-ups, its definitely a threat for companies and institutions such as banks somewhat, which major products is all about trust to provide services and as it is these banks will die in a long term.

AB: So, hold-on a second, did you just say the banks will die in the long term?

SD: yeah, many banks will, not all of course, but I definitely think that they have many problems in the future because they have so many old systems, legacies which I think will definitely result to problems in the future as the customers will decide if banks which by the way have long term transaction durations and costly in comparison to using the blockchain and most customers will change and adopt blockchain. This is my personal opinion and of course there will be banks in the future which will survive but everything is a paradigm shift and it is just a matter of time where entities need to die. So, institutions need to transform basically to the new standards and try to adopt the use of cryptocurrencies maybe or else it’s the end of the game for them.

AB: So, with the audit explanation earlier, would you say blockchain is working towards eradicating audit as well entirely? Cause you implied that banks will not survive this paradigm shift in the near future but then when it comes to audit which focuses on verifications, would you say it is heading the same path as the banks?

SD: hmmmm. Let me think. The audit process itself involves more today and some processes of audit functions as it is are not on the blockchain platform itself as it is impossible to put the whole audit process on the platform of course but, a lot will be changed in the near future simple because blockchain is a good concept and it is relevant.

AB: yeah grand. So, when you hear about an accounting firm, which are referred to as audit firms as audit is a major pillar in the financial world, so if audit will be affected so much what is the future of accounting/audit firms in terms of the effects blockchain will bring on the profession itself as it is already established that the process will be affected?

SD: So yeah, in my opinion the firms and processes can be automated and firms can find a good approach to bring the audit processes on the blockchain network and it will not be an easy task for them however they have to find a good way to do it or I am sorry to say the accounting guys will be eliminated too largely.
AB: So that’s interesting, looking forward to a future with lesser banks and firms, just the blockchain start-ups.

SD: So basically, it is going to be really hard and much pressure on the middle men in every industry and area as they will not be needed as much, but a good system could be developed to make both work. I am not saying a 100% that they will be eliminated however it is possible that the pace of this paradigm shift will largely eliminate middle men, auditors inclusive.

AB: So, take in Ireland for example the first lunch of blockchain happened a couple of months back called Hackathon, and it is focused more on law. However, what is the market like in Germany? Is it just launching as well?

SD: it is certainly not as popular here as it should be, however researches are being done here both for the “teches” and the companies I think as it is huge and has potentials.

AB: So, in the global economy then, would there be a market for blockchain?

SD: Yes definitely. Because for example when it comes to investment say from Ireland to any other country say Germany or so, you have the option of having it happen trust less and across borders without using a bank which has interest rates and charges, so there is a good opportunity for them and the investor. So yeah there is a market for blockchain applications because there are many businesses which need other entities to carry out transactions or a production or an event even which are like connections, but the future with blockchain a connection from one entity to another can happen immediately and so this is so much better and definitely there is a market for ‘better’.

AB: Basically, audit has been around for ages and decades, and blockchain is pretty new and with the few hitches in previous times from the fall in the value of cryptocurrencies and the hack and theft though not directly linked to blockchain, would you say in comparison to audit blockchain is ever going to get there, to the point of wide adoption?

SD: so yeah definitely, because when the first coin was made 600 years BC. It was just another system where a king printed an emblem on a coin and everyone valued it and trusted it, it’s the same as banking since years ago, it’s the same verification process based on trust and it is no different when it comes to blockchain. Every human needs time to accept this and there is definitely a market for global application in the economy. The people don’t necessarily have to understand the
technology itself, however they will use it because it’s simpler, quicker and it simply works and I think there will be a wider adoption in no time. Maybe it will take longer than five years as we never know but it works.

AB: Well, thank you so much Sebastian.

INTERVIEW 2

Mr Dominik Walter - A Swiss Accountant working in a trust company based in Zurich (May, 2018)

AB: Good day Mr Dominik

DW: Hello Amina

AB: So, the first question is basically how much awareness have you got about fin-tech, particularly blockchain?

DW: Ok, so I understand some technology behind it, mostly I follow the news about cryptocurrencies, but I haven’t worked directly with it as I am focused on the research area.

AB: So, you particularly do not have any experience working with the blockchain platform itself, just solely a researcher as regards this?

DW: Exactly.

AB: what can you say to me about bitcoins, cryptocurrencies? so what effects does the use of bitcoins have in comparison to traditional currencies?

DW: It is an interesting question I think because cryptocurrencies are not real money I’d say, at the moment they are just objects of speculations with low transaction rates and the four conditions to be a real currency or money and take for example the condition of very low volatility, looking at the crypto-market, they are so volatile and that shows they are not real money but assets with value. And so, the blockchain technology behind it that’s another frame and I consider that as a real value and with this technology, some industries will change or can be changed.
AB: So, tell me the difference between using blockchain as a platform for transactions in comparison to the way we do transactions now, I mean transactions between two parties. So, what could you point as the difference?

DW: Okay, so I think at the moment the underlining factor is the need of a bank or an intermedierator and simply on the cryptocurrency platform, no one needs this intermediary third party and that is an advantage for the blockchain technology.

For example, Wiser forum can handle 24,000 transactions in one second and just for bitcoins alone and so this time frame is incredible.

AB: Could you tell me what is the difference in the verification of transactions using the blockchain platform vs audit verifications?

DW: The blockchain itself does not totally deal with real currencies as I mentioned in comparison to normal transactions and the platform makes verification easier and faster in comparison to audit which might be a while, but also talking about trust, the customer will have to trust in the technology and the platform of blockchain, but we know that there are hackers and platforms are not a 100% safe in comparison to actual auditors who handle documentations. So yeah, the blockchain platform itself has to be improved.

AB: Not sure about Switzerland, but in Ireland plans are being made by firms dedicated to understanding blockchain, setting up units to research and understand it making preparations. So what the current situation in Switzerland?

DW: Okay, this is somewhat a wide question. I think in Zug for example there are firms or rather companies there that produce their own cryptocurrency and use the blockchain technology and for accounting firms to be honest I am not sure. However, for the company that I work for the blockchain technology and bitcoin is not a huge topic at the moment, everyone talks about it and perhaps follow the news as well, but we cannot imagine where to use this technology in the continuous functioning of the firm and providing services at the moment. Some firms might probable be making preparations here in Switzerland in general, but mine being a medium sized firm has not pushed forward any plans.
AB: Moving on then, basically the technological disruptions has gone from payments to platforms to processes, would you say that blockchain posses as a threat or an opportunity to the audit within the financial world?

DW: I am pretty sure the blockchain technology will be a revolution and also for our firms that is the audit firms within the financial industry, in terms of making work processes more efficient and on the other hand I also think there will be a lot of jobs lost as the third part falls away, I think these jobs will also fall away. Is the revolution of the blockchain platform sustainable is a question I cannot be sure to answer myself, we need time.

AB: you are saying to me that the blockchain will be a revolution in terms of audit processes however it has its side effects in the financial industry in terms of the eradication of the middle man almost completely.

DW: Exactly

AB: Somehow, I have to ask this question, do you think the blockchain platform actually will bring a completely new approach to the audit process or it will merge with it working towards making it better in terms of the actual process of carrying it out?

DW: I will say both a new approach and a merge to the old. It will use the known approach in a way we cannot imagine I like to think. I know of a few firms at least here in Zurich area more like start-ups who try to make small contracts also within the financial industry just to test out processes and functions using completely new approaches than is being used now and on the other hand it also goes in line with regulations within the financial industry and there has to be a point of acceptance and implementation also within this industry.

AB: So, you think that at some point there has to be a point where the financial industry opens up to this technology.

DW: Exactly, say at the moment that banks are at the point of acceptance and exploring its use in processes such as Goldman Sachs, JP Morgan implemented and invested in the market activated cryptocurrencies riddle. As I said earlier this is a huge deal and I think it’s a matter of time and the industry from firms to banks will go in line with this technology.
AB: Well that’s Interesting. You are obviously an accountant and within the profession and what effects do you think this whole wave will bring to profession itself, I mean outside the process. As you mentioned earlier about eradicating the middle man completely and so there will be loss of jobs. Can you tell me more about the effects on the profession?

DW: This is a good question. For the firms, the current processes are very efficient and I think the blockchain will revolutionise the way the job is done, but for the workers themselves, hmm… I cannot say. To be honest I don’t know, I mean there are speculations and expectations within this industry, but I think the whole audit job is more complex than a technological platform and it might change the processes yes! but eradicating the whole profession itself is a whole new page of blanks.

AB: So, you cannot say what the effects will be on the profession at the moment?

DW: Yes

AB: So, speaking to an expert yesterday based in Germany, he explained to me how the plans are being made to accommodate blockchain from start-ups to the banks and firms themselves, and in Ireland here it has had researches and implementation. So, about Switzerland, would you say there is a market for blockchain?

DW: Yes absolutely, because like I mentioned about Zug earlier, there are companies and start-ups specialising particularly on exploring these cryptocurrencies, making their own and also the blockchain platform itself. In Zurich there are banks that create their own cryptocurrencies, also the institution of regulation for the financial markets in Switzerland have also made public their plans and ideas to create a Swiss cryptocurrency. It is really interesting at the moment as the government themselves are fully vested into making plans to bring this into their industries. I cannot say how far these plans have gone or even if they will continue but there are definitely plans being made and a space is being created in the market to accommodate this technology and I will largely say the same for the developed countries.

AB: In comparison to audit which has been around for decades, do you think there will be an adoption of blockchain in terms of processes as such?
DW: Well, I cannot imagine a scenario at the moment where audit firms are adopting this technology 100%, but within other industries probably and the simple reason is the fact that audit is well rooted, blockchain needs time for assurance and acceptance.

AB: Thank you Mr Dominik.

INTRODUCTION

Mr Michael Maurer- Head of innovation at a middle sized financial consulting firm based in Zurich (May, 2018)

AB: So, to start off with, how well aware of fintech are you particularly blockchain?

MM: well its part of my job because I am trans-scout in my firm where I have to screen for other fin-techs especially in the Swiss area, particularly in Zug where there are a lot of start-ups and companies and I work directly with them as well, so I will say I have a good awareness and knowledge about the companies, the technological base of blockchain. I would say I actually have a good understanding and in-depth knowledge into the concept. Of-course I also have some bitcoins myself and I have had several presentations in my firm about blockchain and bitcoin and yeah I know how it works and what the advantages and disadvantages are as well. In my firm we had to write a short fact shit about it for our customers in which I was in charge of.

AB: Basically, you are family with bitcoins and what can you say to me about it? And what is the difference between transactions based on the blockchain platform in comparison to the traditional means of transacting really?

MM: the main point really is the missing of the middle man, if it is clear but the traditional system or transactions involves a party in the middle who coordinates it and gets fees for that and with the blockchain platform involving all the crypto stuff, there is no more of this middle man and its direct and free of control also.

AB: So basically, it is all about the middle man who isn’t there as well as control?

MM: Yeah, I think that is the main point.
AB: As an expert in this field, when it comes to the verification of transactions as you know, blockchain transactions happen in real time.

MM: Just to stop you there, the platform doesn’t happen in real time because if you see for example bitcoin in December when the volume of transactions on the network was really high, minimum of up to twenty or thirty minutes until a transaction is validated and this is also a problem of the blockchain technology.

AB: Okay, so audit is really about the verification of transactions, and so companies call in auditors to verify the past records and give a judgement if it shows a true and fair view of the financials of any company. So, based on what audit entails in comparison to blockchain as a platform, what would you say is the big difference?

MM: Well I am not certain, but I think it could be somewhere in the future that the typical audit is not necessary anymore as it is automatically on the system, validated and historically recorded on blocks and there is no more people who have to go through all this books and systems and records because the blockchain platform makes it more visible easily and correctly. But I will say that the validation is much more broader and honestly, I will say it is just a matter of time.

AB: So, accounting firms for say Ireland have set up various units to research into blockchain, know what it brings and the disruption it will have on the industry basically. So what plans has your firm made towards blockchain, accommodating it and general adoption or not?

MM: well, really concrete plans are not here, but I think it also depends on the size of the company and we as a firm are middle sized and it is not viable that research in-depth setting up units and setting examples for other companies to follow no! so many companies are still coming to learn the use of blockchain and perhaps the mortgage sector and companies. I will give you an example in Switzerland now there is the swiss exchange market where exchanges are coordinated and transactions from banks are coordinated and it is really questionable about how long in the future it needs if we have blockchain and all companies and banks participate in. So, we as a company don’t have concrete plans and will participate sometime in the future.

AB: okay grand. So, will you say blockchain is posing as a threat or an opportunity to the financial world?
MM: Both. I think it’s a big chance, because you have the possibilities to make some transactions and some businesses more efficient, more cost sensitive, but it is also a threat if you think about it. I do not think that bitcoin will be the currency which will have financial use but other systems or industries such as insurance that can now be done without a company, but largely all is a matter of chance.

AB: do you think that blockchain is going to disrupt financial functions? It could pose as both a threat and an advantage, but does it disrupt audit particularly cutting the process short?

MM: well I think this is also a question of time, in the next 10-15 years I don’t think it will disrupt the banking or financial world largely in terms of processes but afterwards. In my opinion it is a two-faced situation, in which we have the banks and financial institutions working together to build a system that is flowing and sometime in the future, people will get that these companies are not needed anymore and you can directly have currency exchanges or transactions or insurance, but basically it needs some time to get the majority which is needed for this.

AB: So, if I get you correctly the deciding factor in this case is largely time?

MM: In my opinion yes!

AB: you spoke earlier about the middle man who might be completely eradicated and considering an auditor as a middle man, do you think blockchain in the near future is actually going to eradicate the profession itself?

MM: No, I do not think so. I think the profession is definitely changing and its with robotics as well, it will disrupt all the parts and the job inclusive as the job itself will change, but not eradicate it completely. Also, simply from the legal perspective, you need some people who are in charge and responsible and can be blamed, so a part of the job will change absolutely but not removing it completely.

AB: Well, that’s interesting. Okay so moving on to the last question, the launch of blockchain has taken place in almost every developed country as it is, or are making plans to launch it in the near future, so would you say there is a market for blockchain in terms of wide adoption in Switzerland?

MM: A market?

AB: Yeah
MM: Yes! Of course, I think the questions is where in Switzerland right now cause currently there are several cases and talks of majorly the insurance sector and also about the ecosystem. Places like Zug where most start-ups have their headquarters and some other big blockchain companies and yeah, I think there is a big market in Switzerland and especially because Switzerland is a big financial hub in the world, it is also striving to bring technological standards to that, perhaps not only for Switzerland, but as a country Switzerland is expanding around the world in provision of services and I think from this perspective yeah of course there is a very big market.

AB: Okay, so basically there is a market for blockchain in Switzerland and in the global economy yes?

MM: Exactly.

AB: Perfect and that leads me to the end of this interaction and thank you so much Mr Michael.

MM: No problem.

INTERVIEW 4

Mr Ayomikun Ogunkanmi- Head of financial technological practice and innovation at a Law firm(May, 2018)

AB: This is a basic and easy question to start-off question, how well aware of Fin-tech specifically block-chain are you in general?

AO: I am well-versed; I’ve been an involved in block-chain and cryptography space since the advent on Silk Road while I was in university. Now I work in the Technology Practice of my firm.

AB: In your opinion, what influence does bitcoin have as a digital currency and the use of block-chain as a platform for various transactions in comparison to traditional means of transacting?

AO: My key takeaway from the dawn of bitcoin and the use of block-chain as a platform is the elimination of intermediaries as well as a greater understanding of privacy and data security issues. As such, bitcoin and the block-chain have been the catalyst for developing new means of
transactions based on privacy and a P2P ethos. Bitcoin itself is slowly gaining reserve currency status online.

**AB:** As an experienced auditor / expert in your field, what is the difference in verifying transactions using the block-chain platform and traditional audit processes according to standards?

**AO:** Verification using traditional processes generally rely a third party to authenticate the availability funds, meaning that the third-party must have a way to confirm that there are sufficient funds to settle transactions. On the other end, traditional processes are currently able to handle a larger number of concurrent transactions than the block-chain. Furthermore, there is more certainty that a transaction has truly occurred using the traditional methods, as consumers typically have to wait till the relevant block is added to the block-chain, and even then true certainty only occurs when subsequent blocks are added.

**AB:** Audit firms are well aware of the potentials of block-chain and in fact set up new units dedicated to understanding the potentials and offering it brings, however what further plans has your firm made to accommodate block-chain in recent times?

**AO:** Currently the firm is exploring the use of block-chains for record keeping. Furthermore, as part of our Technology Unit’s remit, we are to begin a series of seminars to sensitize members of the firm on the potential for block-chain in service delivery, as well as issues that may arise in advising clients on block-chain related matters.

**AB:** Does block-chain pose as a threat to audit or an opportunity to revolutionise it, creating a new approach and is this sustainable?

**AO:** Block-chain currently poses some threat to audit functions as it is meant to be a self-validating system. It is likely going to reduce the number of auditors required and procedures. In many senses it is the biggest revolution in the audit sector since the invention of double-entry bookkeeping.

**AB:** Is there a future of block-chain adoption in audit firms and what use will it be towards improving or dis-improving audit functions for various firms?
AO: Certainly, block-chain will remain one of the key tools in authenticating transactions once global standards for its use come into force. As such, its adoption by audit firms is unavoidable in the long term.

AB: You as an auditor with years of relevant experience in this profession, how much effects do you think this wave will have on the profession itself outside the process?

AO: It is very likely that record-keeping using block-chain will become the norm and as such will have a tremendous effect on the market.

AB: Following the launch of block-chain in almost every developed country, would you say there is a market for block-chain as a technological game changer within the global economy?

AO: Block-chain is already a game changer as companies are continually discovering its numerous applications.

AB: Given the history of audit and its wide adoption, will there be a market for blockchain as such?

AO: Yes, there will be a market for block-chain.
Honey and Mumford: Learning Styles Questionnaire

There is no time limit to this questionnaire. It will probably take you 10-15 minutes. The accuracy of the results depends on how honest you can be. There are no right or wrong answers. If you agree more than you disagree with a statement put a tick. If you disagree more than you agree put a cross by it. Be sure to mark each item with either a tick or cross. When you have completed the questionnaire, continue this task by responding to the points that follow.

1. I have strong beliefs about what is right and wrong, good and bad.
2. I often act without considering the possible consequences.
4. I believe that formal procedures and policies restrict people.
5. I have a reputation for saying what I think, simply and directly.
6. I often find that actions based on feelings are as sound as those based on careful thought and analysis.
7. I like the sort of work where I have time for thorough preparation and implementation.
8. I regularly question people about their basic assumptions.
9. What matters most is whether something works in practice.
10. I actively seek out new experiences.
11. When I hear about a new idea or approach I immediately start working out how to apply it in practice.
12. I am keen on self-discipline such as watching my diet, taking regular exercise, sticking to a fixed routine etc.
13. I take pride in doing a thorough job.
14. I get on best with logical, analytical people and less well with spontaneous, "irrational" people.
15. I take care over the interpretation of data available to me and avoid jumping to conclusions.
16. I like to reach a decision carefully after weighing up many alternatives.
17. I’m attracted more to novel, unusual ideas than to practical ones.
18. I don’t like disorganised things and prefer to fit things into a coherent pattern.
19. I accept and stick to laid down procedures and policies so long as I regard them as an efficient way of getting the job done.
20. I like to relate my actions to a general principle.
21. In discussions I like to get straight to the point.
22. I tend to have distant, rather formal relationships with people at work.
23. I thrive on the challenge of tackling something new and different.
25. I pay meticulous attention to detail before coming to a conclusion.
26. I find it difficult to produce ideas on impulse.
27. I believe in coming to the point immediately.
28. I am careful not to jump to conclusions too quickly.
29. I prefer to have as many sources of information as possible - the more data to mull over the better.
30. Flippant people who don’t take things seriously enough usually irritate me.
31. I listen to other people’s point of view before putting my own forward.
32. I tend to be open about how I’m feeling.
33. In discussions I enjoy watching the manoeuvrings of the other participants.
34. I prefer to respond to events on a spontaneous, flexible basis rather than plan things out in advance.
35. I tend to be attracted to techniques such as network analysis, flow charts, branching programmes, contingency planning, etc.
36. It worries me if I have to rush out a piece of work to meet a tight deadline.
37. I tend to judge people’s ideas on their practical merits.
38. Quiet, thoughtful people tend to make me feel uneasy.
39. I often get irritated by people who want to rush things.
40. It is more important to enjoy the present moment than to think about the past or future.
41. I think that decisions based on a thorough analysis of all the information are sounder than those based on intuition.
42. I tend to be a perfectionist.
43. In discussions I usually produce lots of spontaneous ideas.
44. In meetings I put forward practical realistic ideas.
45. More often than not, rules are there to be broken.
46. I prefer to stand back from a situation and consider all the perspectives.
47. I can often see inconsistencies and weaknesses in other people’s arguments.
48. On balance I talk more than I listen.
49. I can often see better, more practical ways to get things done.
50. I think written reports should be short and to the point.
51. I believe that rational, logical thinking should win the day.
52. I tend to discuss specific things with people rather than engaging in social discussion.
53. I like people who approach things realistically rather than theoretically.
54. In discussions I get impatient with irrelevancies and digressions.
55. If I have a report to write I tend to produce lots of drafts before settling on the final version.
56. I am keen to try things out to see if they work in practice.
57. I am keen to reach answers via a logical approach.
58. I enjoy being the one that talks a lot.
59. In discussions I often find I am the realist, keeping people to the point and avoiding wild speculations.
60. I like to ponder many alternatives before making up my mind.
61. In discussions with people I often find I am the most dispassionate and objective.
62. In discussions I’m more likely to adopt a “low profile” than to take the lead and do most of the talking.
63. I like to be able to relate current actions to a longer-term bigger picture.
64. When things go wrong I am happy to shrug it off and “put it down to experience”.
65. I tend to reject wild, spontaneous ideas as being impractical.
66. It’s best to think carefully before taking action.
67. On balance I do the listening rather than the talking.
68. I tend to be tough on people who find it difficult to adopt a logical approach.
69. Most times I believe the end justifies the means.
70. I don’t mind hurting people’s feelings so long as the job gets done.
71. I find the formality of having specific objectives and plans stifling.
72. I’m usually one of the people who puts life into a party.
73. I do whatever is expedient to get the job done.
74. I quickly get bored with methodical, detailed work.
75. I am keen on exploring the basic assumptions, principles and theories underpinning things and events.
76. I’m always interested to find out what people think.
77. I like meetings to be run on methodical lines, sticking to laid down agenda, etc.
78. I steer clear of subjective or ambiguous topics.
79. I enjoy the drama and excitement of a crisis situation.
80. People often find me insensitive to their feelings.
### Scoring

You score one point for each item you ticked. There are no points for crossed items.
Circle the questions you ticked on the list below:

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