Elli Sirviö

In the Borderlands of Dusk -

Scuba Diving in the Space of the Blockchain Technology and Smart Contracts within the Compliance Function in the Finance Business World

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Abstract

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Keywords: banking, blockchain, business, business risks, business strategy, compliance, compliance function, compliance surveillance, digitalisation, economy, finance, financial sector, innovation, modern technology, risk management, smart contract, technological innovation

This thesis examines academic and scientific theories and makes a comprehensive, academically significant literature review on compliance surveillance, its rules, principles, and legal requirements in the context of modern technological and innovational tools within the finance business world. The thesis focuses on the concepts and use of blockchain technology and a smart contract from many modern technological innovations. The main idea is to show how the compliance function acts in the banking and financial sector, how blockchain technology and smart contract applications operate, and their advantages in the finance business world. The examination went further on how these three elements can combine their powers in the business to achieve the desired goals and make a better business profit in the end. The thesis was conducted through an academic literature review method as a meta-analysis approach due to the novelty of blockchain and smart contract technology innovations. For that reason there is no commissioner for the thesis either.

The research subject, as a whole, is fascinating and definitely covers one of the essential business elements in the future. Organising compliance functions within the business is a crucial factor in monitoring the legality of the company's business operations and control over the organisation's internal operating controls. Combining novel technological innovations, in this case, blockchain and smart contract technology, into compliance procedures is not an easy task, but highly essential for financial institutions to stay competitive in the harsh business and be able to utilise all the advantages of digitalisation worldwide. However, there are various challenges novel technologies bring along their development and implementation in finance and other areas of the business world. Firstly, at the moment, legislation procedures need to catch up to technological development at a fast speed. Secondly, societies and the economy must change the ways in those which they have operated for centuries. Implementing modern technological tools and applications and digitalisation requires a novel trust among the business world and the people inside it. At the moment, the world might be rolling in the middle of the borderlands' space at dusk with novel digitalised innovations, but bright light is to be seen on the edge of the sky. Changes in the business are a permanent state, not a passing phase. Digitalisation is here for good.

Abstrakti

Tekijä: Sirviö Elli

Lopputyön otsikko: Hämärän rajamailla – Laitesukellusta lohkoketjuteknologian ja älysopimusten maailmassa finanssisektorin compliance toiminnon sisällä

Tutkinto: Master of International Business Management

Avainsanat: compliance (=vaatimustenmukaisuus, vaatimustenmukaisuustoiminto ja -valvonta), digitalisaatio, innovaatio, liiketoiminta, liiketoimintariskit, liiketoimintastrategia, lohkoketju, moderni teknologia, pankkitoiminta, rahoitus, rahoitussektori, riskienhallinta, talous, teknologiset innovaatiot,

Tämän opinnäytetyön tarkoituksena on tutkia akateemisia ja tieteellisiä teorioita sekä tehdä kattava, akateemisesti merkittävä kirjallisuuskatsaus vaatimustenmukaisuuden valvonnasta, sen säännöistä, periaatteista ja lakisääteisistä vaatimuksista modernin teknologian innovatiivisten työkalujen avulla rahoitusalalla. Opinnäytetyö keskittyy lohkoketjuteknologian ja älysopimuksen käsitteisiin ja käyttöön. Pääideana on esitellä, miten compliance-toiminto toimii pankki- ja finanssisektorilla, miten lohkoketjuteknologia ja älysopimussovellukset toimivat sekä esitellä näiden mukanaan tuovia etuja finanssisektorille. Tutkimuksessa pyrittiin myös tarkastelemaan ja esittämään näiden kolmen toiminnon yhdistämisen vaikutukset liiketoiminnassa sekä miten näin ollen on mahdollista saavuttaa halutut tavoitteet paremmin tulevaisuudessa ja tuottaa entistä parempaa liikevoittoa finanssialan toimijoille. Kirjoittaja laati opinnäytetyön akateemisen kirjallisuuden pohjalta käyttäen laajasti arvostettua meta-analyysiä. Opinnäytetyöllä ei ole toimeksiantajaa, eikä tutkimuspohjaa toteutettu laadullisen eikä määrällisen tutkimuksen perusteilla, koska lohkoketjuteknologia sekä älysopimussovellukset ovat edelleen uusia toimintarakenteita liike-elämässä, eikä niistä ole vielä riittävästi käytännön kokemuksia akateemisen tutkimuksen perusteeksi.

Tutkimusaihe kokonaisuudessaan on kiehtova ja kattaa ehdottomasti yhden tulevaisuuden liiketoiminnan keskeisistä elementeistä. Compliance-toimintojen järjestäminen liiketoiminnassa on keskeinen tekijä yhtiön liiketoiminnan ulkoisten ja organisaation sisäisten toimintojen laillisuusvalvonnassa. Uusien teknologisten innovaatioiden, tässä tapauksessa lohkoketju- ja älysopimusteknologian, yhdistäminen compliance toimintoihin ei ole helppo tehtävä, mutta se on erittäin tärkeää, jotta rahoituslaitokset voivat pysyä kilpailukykyisinä ja hyödyntää kaikkia digitalisaation etuja maailmanlaajuisesti. Uudet teknologiat tuovat kuitenkin mukanaan erilaisia haasteita rahoituksen ja muun liiketoiminnan kehittämisessä. Lainsäädännön uudistamistyö vaatii paljon kehitystä, jotta se pysyisi teknologian kehityksen mukana. Yhteiskuntien ja talouden on myös pystyttävä muuttamaan rakenteitaan digitalisaation kehittymisen myötä. Nykyaikaisten teknisten työkalujen ja sovellusten käyttöönotto sekä digitalisaatio edellyttävät uudenlaista luottamusta liike-elämässä. Muutokset liiketoiminnassa ovat pysyvä tila ja digitalisaatio on tullut jäädäkseen. Maailman ollessa vielä osittain sumussa uusien haasteiden keskellä, edessä on kuitenkin nähtävissä menestyksen valo.

FOREWORD

This thesis finalises my Master's degree in International Business Management studies, and herein I want to thank a few super persons who helped and encouraged me throughout the long and partly hard, but still, however, very interesting and developing thesis project.

Firstly, I want to give my appreciation and massive respect to my thesis supervisor, professor Ruey Komulainen. She was unconditionally supportive and encouraging and guided me throughout the thesis project. She had extreme patience for me and enormous trust in my skills and knowledge of the subject I chose to write about. Despite all the adversities I faced during the process, professor Komulainen never gave up on me but pushed me onwards. She always kept on giving credit towards my work and research methods. Professor Komulainen is a true superwoman, and I feel blessed to have had the chance to get to know her also as a person.

I also want to thank all my work colleagues in the financial sector, especially within the compliance functions. All the mentoring I have received has given me much knowledge and know-how and comprehensively raised my self-esteem as a professional compliance officer within practical work. However, learning is a life-long journey, and the journey will continue towards future challenges staying on the crest of the wave of time and development.

In addition, I want to give my appreciation to the KAMK for the professional teaching and to my study group LBY19S for their excellent cooperation. Special thanks go to my fellow student Taru, with whom we created a unique and hilarious friendship along with our studies.

I dedicate this thesis to my parents. Without their unconditional love, care and trust in me throughout my life, I would not be the girl I am today. They are especially important to me and are my most significant role models. Their mutual love is pure gold and carries through even life's challenging moments. I used to choose the best people as my mother and father. I love them beyond the limits of the universe.

Tampere, 25th April 2023

Elli Sirviö

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LIST OF ABBREVIATIONS

AIFMD Directive 2011/61/EU of the European Parliament and of the Council of 8 June 2011 on Alternative Investment Fund Managers and amending Directives 2033/41/EC and Regulations (EC) No 1060/2009 and (EU) No 1095/2010. OJ 174, 1.7.2011, p. 1-73.

ALGORITHM An information technology command or program that contains a series of operations that implement a specific technical function or solve a specific technical problem. Every computerized device uses algorithms, which cut the time required to do things manually. The system can analyze information faster than humans, allowing them to respond instantly to minute price movements.

AML Anti-Money Laundering Regulation

BIG DATA The term refers to the large, diverse sets of information that grow at ever-increasing rates. It encompasses the volume of information, the velocity or speed at which it is created and collected, and the variety or scope of the data points being covered. It can be collected from publicly shared comments on social networks and websites, voluntarily gathered from personal electronics and apps, through questionnaires, product purchases, and electronic check-ins. Its data sets are too large or complex to be dealt with by traditional data-processing application software.

CODE OF CONDUCT

A statement setting out guidelines regarding the ethical principles and standards of behaviour expected of a professional person or company. A set of rules that members of an organization or people with a particular job or position must follow. Codes of conduct have no statutory effect but can have legal consequences: e.g. a code of conduct for the handling of personal data in a particular trade may be referred to by a court in determining whether there is a prima facie case of misuse of data under the Data Protection Act.

CORPORATE GOVERNANCE

The basis of the management and control of business operations, which regulates the operating procedures to be followed in the company and complements those given in the legislation. It forms the structure of rules, practices, and processes used to direct and manage a company. A company's board of directors is the primary force influencing corporate governance. A worldwide functional method of business self-regulation.

CRYPTOGRAPHY

Means the mathematical and computational practice of encoding and decoding data and preventing third parties from accessing encrypted technical data files. It is used for multiple purposes— securing the various transactions occurring on the network, controlling the generation of new currency units, and verifying the transfer of digital assets and tokens.

CDD Means the processes financial institutions use to collect and evaluate relevant information about a customer or potential customer. It aims to uncover any possible risk to the financial institution of doing business with a specific organisation or individual by analysing information from a variety of sources, including the customers, who need to provide certain information in order toss with the financial institution, sanctions lists published by governments or territories, and public data sources, such as company listings private data sources from third parties. It covers a significant part of meeting Know You Customer (KYC) standards.

DLT Distributed ledger technology refers to the technological infrastructure and protocols that allows simultaneous access, validation, and record updating in an immutable manner across a network spread across multiple entities or locations. It is more commonly known as blockchain technology.

EBA European Banking Authority

ECB European Central Bank

EIOPA European Insurance and Occupational Pensions Authority

EMERGING TECHNOLOGY

Means technologies whose development, practical applications, or both still need to be made public. These technologies are generally novel but also include older technologies finding novel applications. These technologies are often perceived as capable of changing the status quo.

EDD Enhanced Due Diligence is a KYC process that provides a greater level of scrutiny of potential business partnerships and highlights risks that cannot be detected by customer due diligence. EDD goes beyond CDD and looks to establish a higher level of identity assurance by obtaining the customer's identity and address and evaluating the customer's risk category. It is specifically designed for dealing with high-risk or high-net-worth transactions. Because these customers and transactions pose more significant risks to the financial sector, they are heavily regulated and monitored to ensure everything is up and up.

ESMA European Securities and Markets Authority

Regulation (EU) No 1095/2010 of the European Parliament and of the Council of 24 November 2010 establishing a European Supervisory Authority (European Securities and Markets Authority), amending Decision No 716/2009/EC and repealing Commission Decision 2009/77/EC5

ESRB European Systematic Risk Committee

FIs Financial Institutions

Fin-FSA Finland's Financial Supervisory Authority

GDPR General Data Protection Regulation is a legal framework that sets guidelines for collecting and processing personal information from individuals outside the European (EU). It aims to give consumers control over their data by holding companies for how they handle and treat this information. It aims at their data by holding them constable for how they operate and treat this information. The rules apply to any website regardless of where they are based.

DeFi Decentralised Finance is an emerging financial technology based on secure distributed ledgers using emerging technology to remove third parties and centralised institutions from financial transactions. It offers financial instruments without relying on intermediaries such as brokerages, exchanges, or banks by using smart contracts on a blockchain and other emerging novel technologies. Its components are stablecoins, software, and hardware that enable the development of applications.

KYC Know-Your-Customer obligation means the requirements to know the customer to detect and prevent money laundering list financing included in the national and international regulations. The obligation consists of the standards used in the investment and financial services industry to verify customers' risk and economic profiles. It consists of three components which are 1) the customer identification program (CIP), 2) customer due diligence (CDD), and 3) enhanced due diligence (EDD). The obligation principle requires that each new customer provide detailed financial information before opening an investment or banking account.

MiFID II Directive 2017/65/EU of The European Parliament and The Council of 15 May 2014 on markets in financial instruments and amending Directive 2002/92/EC and Directive 2011/61/EU (recast). OJ 173, 12.6.2014, p. 349-496.

NODE The starting or ending point of communication or the redistribution point of information in blockchain technology. The role of a node is to maintain copies of blockchain data that cannot be lost or destroyed without destroying the entire individual blockchain system. A set of nodes contains a complete list of transactions completed on that blockchain.

ORACLE IN BLOCKCHAIN TECHNOLOGY

Entities that connect blockchain to external systems enable intelligent contracts to execute based on inputs and outputs from the real world. They provide a way for the decentralised ecosystem to access existing data sources, legacy systems, and advanced computations. Decentralised oracle networks enable the creation of hy-

brid smart contracts, where on-chain code and off-chain infrastructure are combined with supporting advanced decentralised applications that react to real-world events and interoperate with traditional systems.

PRIVATE KEY A secure code or described in more detail, a secret number used in cryptography - similar to a password - in blockchain technology that enables the holder to make different transactions and prove ownership of a blockchain address. It is a large, randomly-generated number with hundreds of digits. The private key represents absolute control and ownership of private civic blockchain transactions. It is known to the user alone and serves as their digital identity. It authorises the user to spend, withdraw, transfer, or carry out transactions from the personal account.

PSD2 Payment Services Directive 2. Commission Implementing Regulation (EU) 2019/410 of 29 November laying down implementing technical standards about the downs and structure of the information to be notified, in the field of payment services, by competent authorities to the European Banking Authority under Directive (EU) 2015/2366 of the European Parliament and the Council. C/2018/7664. OJ 73, 15.3.2019 p. 20-83.

PUBLIC Key A cryptographic code in blockchain technology. It is paired with a private key and allows one to receive different transactions. A sophisticated one item is applied to the private key to generate the public key facilitating transactions between parties and allowing users to receive operations in their accounts. The public key is used to verify the digital signature, which proves ownership of the private key.

RegTech Regulatory Technology manages regulatory processes within the financial industry through technology. The main functions include regulatory monitoring, reporting, and compliance. It consists of companies that help businesses comply with regulations efficiently and less expensively. Its tools seek to monitor transactions that take place online in real-time to identify issues or irregularities in the digital payment sphere.

1 INTRODUCTION – The New Phenomenon of Digitalisation in Finance

"*The biggest part of our digital transformation is changing the way we think.*"

-Simeon Preston-

The speed of digital transformation in financial services depends primarily on legal regulation, which varies naturally from nation to nation and geographical area to another around the globe. It is understandable that in some nations, a conservative operation system inhibits innovations to develop aligned with economic and societal changes, while other countries will use all the possibilities to use regulatory routes to speed up the digital transformation in the finance sector. It would be more than a good thing if the entire financial system worldwide could create everyday appropriate metricated within affecting the whole market area of finance and be monitored by public worldwide financial institutions and the multi-national and over-geographical borders' authorities and supervisors in the economic business world. In the digital world, both maintaining the trust and the problems, vulnerabilities, and rigidities of different technological systems are highlighted. Therefore, the growing need for trust makes modern technologies and their various applications relevant in daily global business and financial markets.

The new digital world era challenges the role of traditional economic and financial systems and institutions in decision-making power over economic and monetary affairs to ordinary citizens and consumers. People need the ability to adapt and create novel strategies and ways of working and simply the desire to learn new things and develop with development. It is possible to predict the direction of the digital revolution. Still, without an accurate crystal ball, the future foresight website involves several unpredictable elements and surprises. Whatever the situation is or will be, we must always read that financial security overall is our common security issue, and we must protect it to protect our lives and businesses –and in the future. Following the money, understanding it, and learning from it are essential. (Tapscott, 2016)

Today's business is very data-driven, and development with digitalisation is continuous. The ability to present data in a sophisticated and, at the same time, quick manner has become a must-have skill in every sector of the global economy. Thanks to a novel generation of technological

tools, creating data visualisations to communicate worldwide powerfully is easier. There is no commissioner behind this thesis, and it has not aimed for constructive analysis; in other words, there are not be found any specific developmental proposals for any particular companies' practicalities.

The research question within the thesis is vast expansive complex. However, it is also interesting because there is still so much to explore with the subject as technology keeps developing constantly. The author wants to emphasise that the writing method in the paper is more contemplative than anything else. The author wanted to paint a multi-colour multidimensional picture of compliance functions, blockchain technology, and smart contract action. The research content is based on wide-ranging studies, scientific articles, and the author's professional finance and financial management knowledge. The author has tried to combine her views with the reference material to awaken the subject to be seen in a novel way in the finance sector, as a part of human life, and how people interact in business alongside novel digital technological tools.

1.1 The Background

The financial sector has always been a very old-fashioned and conservative business field, and it has not easily adapted novel process models or activity types. The financial sector's reform has often occurred only through the banking crisis or financial markets collapsing. In a way, the field is a risky business and, for that reason, also vulnerable even though, at the same time, it is inconsistently described that banking is a stable and honourable business. The development process requires focusing on overcoming the cost increase within the implementation of novel technological applications and enforcement of digitalisation throughout the entire market field. (World Bank, 2020) However, an old-fashion hierarchical banking organisation based on the physical world and a branch network of local and physical offices with honest bank clerks is financially challenging to maintain in today's economic and ever-increasing competitive environment. It is already proved that a competitive business model based on digitalisation is lighter and even more economically viable –especially in the future, where technological innovations are taking more and more space in the business world and our daily lives.

Most of the debate on available financing is cuntly focused on payment transactions. However, the same principles may apply in other areas of financial services in the future, such as securities trading. In this respect, securities trading in the financial markets is far ahead regarding technological know-how, even in the highly technology-friendly and advanced media sectors. Securities trading has long been fully digital in sending orders, trading, clearing trades and money transactions. The roles of securities trading, marketplaces and players in the market have taken shape over hundreds of years and have remained amazingly well during digitalisation. Enacting effective novel legal regulations and rules and bringing them into force in the global financial sector takes time and is a complex process. Supervision procedures also need reformation practical to better monitor the financial parties by the authorities nationally and internationally. Digitalisation applications can help significantly with these tasks and appropriately oversee banks and other financial institutions. (World Bank, 2020)

Regarding securities trading, it should be noted that aborting networks requires a more significant investment in licensing, connection, membership, and information systems. By following the structural development of security preventing venting, it is possible to get a good idea of what to expect in other financial services. However, as digitalisation progresses, the roles of seller, buyer and marketplace, as well as reliable information on the subject of the transaction and reliable telecommunications connections, will remain permanent. It is also noteworthy that the regulation of securities trading has shifted to a review of technological structures, especially regarding the organisation of algorithmic trading at an unprecedented. (Andersén, 2021)

Digital banking overall is entering a novel chapter in its evolution. Financial conglomerates worldwide are embracing digitalisation to improve the delivery of financial services. People are becoming more familiar with digital banking services and goods and their features worldwide daily. Traditional banking has always been based on convenience, comfort and the presence of the human touch, which the digitalised business world needs to improve considerably. Humanising customer experience and interactions in the future's technology-based banking environment will be pivotal for maintaining customer relationships and essential for maintaining competence in the more complex hybrid business and gaining profits in the finance market. Banks and other financial institutions must improve their physical and digital customer service.

Humanising customer experiences in the digital business and making multiple technological banking channels more intelligent, empathetic, and easy to use, resolving different customer issues

are in the middle of digital transformation. Banks must take the appropriate measures to put cybersecurity issues as their top technological priorities to stay competitive in the financial markets. It is essential to design targeted processes on the security and privacy issues in digital banking and be able to improve online practices. (Tapscott, 2016)

1.2 The Research Purpose

Digitalising financially secured banking is just one part of our global digitalisation. In general, successful companies need to develop strategies for going business using the help of modern technology. Digitalisation opens up competitive and innovation spaces and allows corporates worldwide to locate their knowledge-based activities, such as R&D, design, and data analytics, in geographical places where they can be produced most effectively. The overall transformation of finance reflects the change in service effectiveness business, which has also occurred due to digitalisation in sectors of the economy. Banks worldwide have acknowledged and realised that identifying novel technological strategies inside their business models and processes has become more challenging due to ever-increasing market competition beyond national borders. The decisions of ever-increasing technologies and methods help to do business in the best and most successful ways to maintain competence in the stiff competition game and simultaneously accelerate growth for the financial industry, which requires patience, time, and thorough thinking and planning. (Andersén, 2021)

Today's and future financial markets urgently require an effective and efficient settlement environment. This future means that there has to be a system able to minimise risks as transactions within the system settle delivery and payments, meaning that cash and securities can be exchanged simultaneously in an electronic book-entry form. Industry transformation happens very slowly, and incumbents can successfully respond to disruptive challenges in one of four ways: retrench, fight back, double down on existing assets, or diversify into new businesses. Digital disruption retrenching has already been for a long time, as the internet revolution started in the mid-1990s, long enough for the winds of change to work through the whole economy. New arrivals are, of course, proliferating. When doing even a simple analysis to evaluate how digital technology affects the business, one finds quickly that it lowers the barriers to entry in some areas and encourages new entrants to increase the power of markets. New technologies are usually

felt across decades, not years, and most potentially disruptive ones endure coexisting with their established counterparts. (Birkinshaw, 2022) Maintaining stability and the effective functioning of society is critical in constantly moving and developing digitalisation. One must remember that the functioning business world requires cooperation between all the market fields, coherent regulations, and common Business principles, rules, and operation ethics covering the entire globe.

Banking is not at the front line of digitalisation or technological innovations, which contributes to safeguarding the old stability of the business sector. However, many new entrants in the financial industry are beginning to offer financial services similar to those within traditional banking. Still, they are under different regulatory obligations than the conventional financial institutions regarding licenses, capital and rules to identify customers and monitoring and reporting sections, which gives them unique competitive advantages in the markets. In many cases, these companies operate from geographical zones where regulation relaxers or are non-existent, even though the orbit of their activities extends beyond borders. The differences are even more patent regarding supervision, where the rules are less uniform internationally. (Cuesta, Ruesta, Tuesta, & Urbiola, 2015) The excellent point is that banks worldwide can only broaden the rand of digital products they offer in geographical areas with a physical presence, but this brings competitive pressure to bear on the financial sector.

Understanding the importance of blockchain technology and smart contract as a tremendous aid in digitalising modern business life in the future is essential. The change, deployment and implementation begin with understanding and combining the opportunities and constraints. At the same time, modern technology offers huge concrete tools for how to work in the increasingly digitalising business world. Technological applications help people to operate in the future worldwide within the common finance business area and its rules and principles.

1.3 The Research Questions

The financial sector is in the middle of the transition period and will change shortly along with the already existing and future modern innovations. The introduction of blockchain and other modern technology in the financial sector and other business areas creates novel challenges for companies' business success and for understanding how the money, the products and the services

will find their way from the producer to the trader and on to the customer from one place to another now and in the future cross-borders over the world. It is already noticed that a ubiquitous modern analogy would be automatic trading rules executed by a computer program that initiates sales or purchases of securities at a pre-defined strike price. Potential applications of smart contracts could be used in the derivatives markets, mergers & acquisitions, and securities transactions, among many others. Within compliance surveillance, intelligent contracts can give more open space to act, reach more actors in the business quickly and make the whole compliance procedure more transparent, reliable, and more useable and understandable for all actors in the field. Blockchain and innovative contract technology make the information, objects and results of monitoring visits available to everyone working in the work community, thus guaranteeing the realisation of future increasing transparency, openness and reliability requirements throughout the organisation. (Johansson, Eerola, Innanen & Viitala, 2019).

Compliance activities are wide-ranging and challenging as a field of work and as a research target. The blockchain and the new applications based on its technology, such as smart contracts, have already been partially integrated into today's business life and are vital to future economic and business activities. In the past, the compliance function has been relatively remote for the entire organisation. However, it is an important area of the organisation's operation. It has only been in the hands and knowledge of a few senior personnel and decision-making bodies with its monitoring methods. (Laininen, 2021)

The research question within the thesis is vast expansive complex. However, it is also interesting because there is still so much to explore with the subject as technology keeps developing constantly. The author wants to emphasise that the writing method in the paper is contemplative within the academic literature environment. The author wanted to paint a multi-colour and multidimensional picture of compliance functions, blockchain technology, and smart contract action. The research content is based on wide-ranging studies, scientific articles, and the author's professional knowledge in banking and financial management. The author has tried to combine her views with the reference material to awaken the subject to be seen in a novel way as a part of business alongside novel digital technological tools.

The main research questions into which the author has searched for answers and based the research study are the following five:

1) What is the state of the compliance function currently in the financial sector, and how can the monitoring process be improved?
2) What is blockchain, and how does it work in practice?
3) What is a smart contract application, and how does it work in practice?
4) What is the purpose of combining the compliance function with blockchain technology and its most important application, smart contract?
5) What are the Future Prospects in the Financial Sector?

Ongoing research worldwide has provided rich insights for studying the effectiveness and importance of the subject. However, there is to be found an empirical research study within this thesis done by the reference material analysis. The author has collected the reference material based on the main keywords of the compliance function, blockchain, smart contract, finance sector, economics, business world and modern technological innovations. However, more than knowledge through theory is needed. Everything powered by academic and scientific research only reviews previous studies, surveys and other publications on the subject. Therefore, the author has also used her professional background know-how from working in the financial sector and with compliance functions as a part of this thesis.

2 THEORETICALL FRAMEWORK AND ACADEMIC LITERATURE REVIEW – The Ideation

"Research is to see what everybody else has seen and to think what nobody else has thought."

-Albert Szent-Gyorgyi-

This thesis aimed to study compliance functions in the financial sector, the importance of new technological innovations, and the changes they bring to the industry. In the thesis, the author has focused on the blockchain system and the application method of smart contracts, and their use aligns with the compliance function. The goal was to discover compliance activities' general principles and lines of action, the definitions and operating methods of blockchain technology and smart contracts, and how these three elements affect business life.

The thesis required hard work, but so was finding the rigid references to provide a steady foundation for the text. However, the more the author did the research more she understood how exciting and captivating the research work is for businesses. When the author opened her mind and began to work in a structured manner, the subject appeared before her eyes in a new way, and a complete picture of the issue came alive. Blockchain technology and its application models are under great debate and research worldwide. The compliance function on behalf is purely a risk management and verification function, which forms a solid foundation for business operations. Legal regulations in the financial field are evolving matters. Still, the essential elements to organise compliance function are supposed to be lasting time but also be able to adapt to technological changes. These insights proved that the chosen subject was very present in today's financial, economic and societal world and is increasingly an instant issue in tomorrow's business world.

2.1 Framework for the Study

Despite considerable research efforts in many different fields around the subject, there has yet to find any coherent theory existing that fully can explain the blockchain technology mechanisms and smart contract application in financial services, especially to compliance function as a whole.

Therefore the literature the author has used as a reference in this thesis consists of various materials. Part of the material is purely judicial, part is strictly technological, and one part mixes judicial matters, blockchain technology, and its applications and tools. Further, the text covers the idealisation of various social and economic situations worldwide. The author aimed to challenge herself by putting the best effort into integrating findings and perspectives from multiple academic, scientific and empirical findings and previous research materials. Understanding all the global changes people face is very relevant in today's business world and therefore researching the digitalisation framework is essential to keep up with the development process worldwide.

The data and literature collection and the creation of the wholeness of the thesis began with a few relevant questions as below:

1) Why conduct this study?

2) Which are keywords helping to select the most relevant literature for the subject?

3) What kind of literature, according to the keywords, gives the most significant contribution to the comprehensive content of the thesis?

4) What kind of title could be the most interesting for readers to excite them about the thesis?

An academic literature review research method is proper when the author wants to present a theory based on data and evidence behind the subject. The method helps to study, justify and motivate the aim of the topic, which creates the appropriate theoretical framework for the academic paper. A scholarly literature review method also provides the best tools to conduct the answers to research questions. This way, it is possible to present valid and accurate theory-based writing. It is essential to research the previous studies on the subject and assess the research area for the author's steps and actions to ensure an appropriate overview of the research subject. The central ideation is to evaluate the state of knowledge on the specific topic, gaps in the research agenda, and, finally, to be able to discuss the subject in the relevant matter. (Snyder, 2019)

An academic literature review research method increasingly takes more space in the business world as it provides the needed theory-based knowledge of particular issues. However, academic research has remained fragmented and primarily interdisciplinary, making it hard to maintain

state-of-the-art and gain appreciation in the business world. Academic research must assess enough proper and useable evidence in a particular business area and, in this way, be at the forefront of research. The academic literature review research method can be one of the essential methodologies giving the foundation for practical operations in the business. The literature review method does not present rough or rigour ideations of the research subject. The methodology aims to provide clear policy and practical guidelines to follow novel ideas and directions towards developmental issues in a particular field. The research study results must base on accurate data making the process easier to evaluate research gaps in substance developing future insights to achieve better research quality. (Snyder, 2019)

The maximum developmental contribution in this thesis was the use of smart contracts due to blockchain technology in the context of compliance surveillance in the different financial business fields' markets worldwide. The innovative development of blockchain technology in all forms of business structures was one of the critical elements. The author has questioned the gap between the theory, existing practices, and novel innovational business tools, aiming to help the business world and compliance act more efficiently and focusing on more relevant issues that they could do under today's rule and regulation jungle.

The speed of digital transformation in financial services depends primarily on legal regulation, which varies naturally from nation to nation and geographical area to another around the globe. It is understandable that in some nations, a conservative operation system inhibits innovations to develop aligned with economic and societal changes, while other countries will use all the possibilities to use regulatory routes to speed up the digital transformation in the finance sector. It would be good if the entire financial system worldwide creates everyday appropriate metricated within affecting the whole market area of finance and be monitored by public worldwide financial institutions and the multi-national and over-geographical borders' authorities and supervisors in the economic business world. In the digital world, both maintaining the trust and the problems, vulnerabilities, and rigidities of different technological systems are highlighted. Therefore, the growing need for trust makes modern technologies and their various applications relevant in daily global business and financial markets. (Lie et al., 2021)

The new digital world era challenges the role of traditional economic and financial systems and institutions in decision-making power over economic and monetary affairs to ordinary citizens and consumers. People need the ability to adapt and create novel strategies and ways of working

and simply the desire to learn new things and develop with development. It is possible to predict the direction of the digital revolution. Still, without an accurate crystal ball, future foresight involves several unpredictable elements and surprises. Whatever the situation is or will be, it is always to be remembered that financial security overall is people's common security issue. (Tapscott, 2016)

This chapter discusses the financial sector and banking widely overall (2.1.), organising the compliance function (2.3), and the features and practical operations of blockchain and smart contracts (2.4) The idea was and is to provide relevant information on the topic. The chapter gives the validity and justification for the thesis objectives and presents the exciting and broad-ranging modern technology applicability in the financial sector for the readers.

2.2 Finance Sector and Banking

"*Banking has to work when and where you need it. The best advice and service in financial services happens in real-time and is based on customer behaviour, using principles of Big Data, mobility, and gamification.*"

-Brett King-

A worldwide description toon of finance is called a resilient, transparent and smooth-functioning system that contributes to financial stability in society and builds up countries' capacity for economic management. Financial systems based on a solid foundation create economic growth and development worldwide. They improve society's economy and balance business life productivity. Finance gives people the confidence to invest and save money. The robust finance sector, banking and cap markets help national governments with nations their investments, maintain financial safety, and speed up trade security over borders between countries and from one continent to another. According to World Bank's Annual Report 2021: "Good access to finance improves a code robust overall welfare because it enables people to thrive and better manage their needs, expand their opportunities and improve their living standards. When people are financially included, managing consumption and payments, starting a small business, and using insurance products to

protect themselves from shocks are easier. Finance also helps level the playing field – making significant wealth and connections less relevant."

During only the last decade banking industry has evolved from just journal and ledger entry paradigm to data and analytics-driven banking operations, which subsumes online and offline customer behaviour. The traditional banks that commit to digital banking are transforming, allowing them to position themselves within the new ecosystem. According to McKinsey Annual World Finance Survey (2017), legacy financial institutions are to decline their profits even up to 60% by 2025 if they cannot utilise digital developments in their business. Shaxson (2018), on behalf, forecasts that financial institutions' developmental procedures take place within the adoption of novel technologies' applications in their internal operations and public actions in the markets. They will combine competitive business ideas with their financial and operational expertise. Further, according to Shaxson's views financial sector wants to transform societies into centres of different valuable operations.

It is a simple fact that banks must create functional digital strategies toward financial markets to remain competitive in the finance business. New ways and methods to business globally are essential for any internationally operating financial conglomerate's life cycle. The digital transformation within financial services takes place slower than in many other economic sectors. The available finance structure can only be realised on a large scale when the digital infrastructure is sufficiently well-established and legally reliable. However, conglomerates build cloud-based applications and product implementations based on modern technology and responsive and functional applications based on customer needs and desires for the stable base ground that the financial sector is building in various ways in cooperation with IT technology innovations at the moment.

At the industry level, the development of financial services follows the same laws as other industries. The world is moving from production-oriented to digitalised product-oriented, and the emphasis is shifting towards the situation where customers will begin operating in a network economy. Many financial institutions continue to work on a production and product basis. The distribution channels are based on a branch network, alongside which there will be a gradual transition to online and mobile banking. In future, financial institutions will have to define for themselves what is transparent and at what level. It is the wrong solution to keep all things confidential; on the other hand, it is also wrong to open too much. Cooperation with partners and customers is

always based on trust and agreements. A culture of open financing can also be seen as a contract culture in which the rights and obligations of the parties are defined on a contractual basis. This has been the case in a previously closed network in the provision of financial services. It has been seen that as technology develops rapidly, cooperation relationships and partnerships can also change rapidly. (Andersén, 2021)

The financial sector is undergoing a significant transformation brought about by the rapid development and spread of novel technologies. It is a hard or even mission impossible to predict future economic, societal, and political sights of the state of the world. Everything can change overnight, lately with the incidents of the covid-19 pandemic (2019-2022) and, more recently, the war in Ukraine (2022 and continue). In one way or another, to cope with the ever-changing economic and social situations, policymakers, governments, and those who hold the power of the world should strike e a balance between curbing the hype surrounding novel modern technologies and unleashing potential transformation for the unities in general around the globe. Legal regulations should be prepared to create levels for the playing field for both old and new industries by adjusting financial oversight, consumer protection, privacy issues, and controls and security.

2.2.1 The Present General Financial and Economic Situation

The recent three to four (3-4) years have been full of massive, unexpected global changes. The world has faced a terrific global health covid-19 pandemic, global warming issues with changing the climate overall, and now a gigantic war situation in Ukraine with no social, economic, legal, or human legitimacy. However, it has been a big surprise but at the same time recently time a massive relief for the whole of humankind is the fact that in the middle of the most significant catastrophic situations, people and nations are standing side-by-side protecting and securing together people's lives and living conditions in the best possible ways.

Global economies and nations worldwide are also facing various financial challenges. However, the mobility of work, services and products across national borders is increasing, which creates confidence in the functioning and development of societies, the economy and the financial sector. During the last decade, there have not been any massive financial crises or national or foreign debt restrictions despite severe global shocks, such as climate crisis, famine in third countries,

refugee floods in Europe and most recently, the war in Ukraine. The international community has created functioning cross-border trade and investments, generating countries' productivity overall. Nations need to guarantee people the possibility to spend on goods and services. At the same time, governments invest with increasing speed in infrastructure, climate and clean energy matters and overall to societies' economic balance. Strengthening financial systems will reduce exchange-rate risks and make the economic powerhouses more efficient. The global trade recovery directly affects people's well-being and societies' economic status in industrial and business development. (World Bank, 2022)

It has been proved that the revival of the demand has recently been such a substantial supply is struggling to keep up. Logistics logjams, strained supply chains, shortages of raw materials, and intermediate in one-for-microchips weigh on production and delivery times. These growth impediments and the current elevated price pressures are carefully analysed. Still, they are expected to be primarily transitory, though more potent and longer-lasting than expected only a few years ago. The level of uncertainty within the economic situation globally remains still very high. (European Commission Report, 2022) The last surveys with covid-19 cases worldwide show that the pandemic is still ongoing and is mostly likely to achieve a permanent virus status. Alongside the pandemic's continuing evolution, there is a growing risk with economic and monetary issues creating bottlenecks for industries and technological innovations to stay in line. Economists worldwide see that the primary upside risks to economic and financial growth are related to potential substantial efficiency gains and durable productivity advances that are well triggered by the social structural changes of covid-19. However, the new environmental requirements may lead to novel kinds of economic and business investments worldwide and accelerate and maintain digitalisation developments overall.

Today's financial services providers will have to move faster on digital business by building different digital platforms or finding novel, other types of products and services to sell on other platforms. These new digital tools also enable easy access to alternative financing options from banks, digital-only competitors, and larger-scale technology-based companies, so the traditional stickiness with old-fashion banks is at risk. However, at the moment, while people will exercise their choices in different ways within financial services, digital banking will likely continue as a simple transactional activity for some time. The traditional banks that commit to digital banking are

transforming, allowing them to position themselves within the new ecosystem. Digital transformation depends on the circumstances with which each business institution starts, and however, includes several phases depending on the maturity level. (Cuesta & Co., 2015)

According to World Bank's Annual Finance Survey (2018), cyclical forces can quickly reinforce one another. Other shocks, such as rising protectionism, jumpstart tensions, and more enormous disruptions, because several dependents to materialise even in a short period. Declaration of growth is expected to be modest, but sharper corrections always remain possible. Less accommodative monetary policy is expected to prompt tighter global financial conditions, putting pressure on modern technology industries and developing scientific innovations. Higher interest rates will make borrowing more expensive worldwide, straining public finances.

Globally, financial policy has tightened significantly in recent years for various reasons. World trade is still living in the aftermath of the challenges caused by the pandemic. However, it is expected that global economic and financial growth will begin to rise in the coming years. As the demand for services and goods increases, also the supply must expand. Globally nations' financial systems and policies must be able to prioritise the key elements to preserve the balance with liquidity issues and expedite orderly debt restructuring where needed. However, despite the chaotic worldwide situation the covid-19 pandemic affected, it also provided a unique opportunity to boost digitalisation efforts and the adoption of novel technologies. Generally, when nations reduce cross-border tariffs and trade barriers, global inflation will ease supply chains functioning within goods trade over a more extended period. Global cooperation on strengthening supply chains would help improve early prevention where possible future crises worldwide occur again. (International Monetary Fund, 2022)

2.2.2 The Framework for Digitalised Financial Environment

A digitised financial environment can be described as the effects of novel emerging technological tools, applications, processes, products, business models and methods in finance. All these have already changed and will change the whole financial market field to an increasing extent. Introduction and utilisation of digitalisation and modern technology’s innovations in everyday business require the enactment of laws and regulations to regulate the use of technology development

met both in the financial sector and other sectors of the business world. Paying attention to compliance rules and principles aligned with modern technology and digitalisation is crucial. (World Bank, 2022) The common goal worldwide is to create a competitive financial sector giving people uniform access to innovative, digitalised products and services over the globe, and at the same time to the sure people's privacy and data protection as well as to guarantee economic stability.

Financial services have already been digitalised, and the development shall continue, and their forms of supply chains are changing rapidly. Also, the business models in the banking sector are changing and in the middle of the transition period. However, it is not in anyone's knowledge in which ways or when the changes are taking place in the banking sector, financial markets or the economic system overall. The answer is to be left up in the sky within the blowing winds of our times. However, one thing is for sure in this case is that technological, economic and social development in the form of digitalisation is one of the vast factors crashing our old-fashion stable financial system. It is a well-aware fact that all business sectors are very closely and deeply about the existing financial system. Therefore it is only clear that the entire business world is in the middle of a transformation. Without hesitation, banking, business and making money are not fading away but just accelerating their power. In this ever-growing world, there are more people, more business markets, and more connections over borders, which no longer exist as they did in the past. There are ever-growing technological innovations to help people's daily lives and our business methods. (Shaxson, 2011) Maintaining economic and financial stability has its limits. Understanding and using economics and financial markets within modern technological innovations requires time and space. Digitalisation is here to stay for good; we have to accept it and learn to live with it side by side.

In general, digital financial services are characterised by marginal costs and greater transparency. They can respond to supply-side barriers to access financial services, such as high operating costs, limited competition, and the d barriers, including volatile and small incomes for people experiencing poverty, lack of ID, trust and formality and geographical borders. In connection with digitalisation, the change in the customer's positions and the growth of bargaining power are often considered also. The security threats and rising scenarios of digital finance changing compared to analogue world models are also worth noting. Types of abuse are changing, and indirect attempts at ecosystems lead to new risks. Those previously found safe can suddenly turn their activities into dangerous ones. However, the most important thing about security is verifying identity and

authority, just as in the physical world. (Andersén, 2021) The development of digital financial transformation has added a novel kind of vitality to economic growth, but the existing laws and regulations come far behind technological and societal development. Reforming laws and regulations is slow, time-consuming and bureaucratic work, often involving political goals, unfortunately leaving economic and socially significant aspects to the side. Technological innovations are headed toward creating better-functioning societies and better ways to do business and live daily life. Legal and regulatory reforms are often considered at too long a period. When they are in the execution phase, more novel innovations occur, leading to an ever-lasting rat race between technology and legislation.

It is already to be seen that the future of the economic and finance world is constantly evolving to utilise modern technological applications within their business operations and procedures. It is a simple fact that to remain competitive; every business must accelerate its digital transformation processes. Today financial services can already be run through mobile phones, internet services, and some credit cards assigned to digital services that are protected in a sufficiently reliable manner to different payment systems. Academic IT researchers and economists have proved that when all the necessary digital components of the business are in place, payments and transfers, as well as credit, savings, insurance, and even securities, can be offered digitally to everyone worldwide. (Andersén, 2021)

The financial sector has always been affected by multiple economic and social functions accelerated by modern technological innovations and tools. Generally, it is to be understood that modern digital technology is changing the competitiveness, know-how to do business, and capabilities of financial conglomerates worldwide. The traditional business strategies and processes are breaking down like waves of the ocean, crashing against the harsh cliffs of the shore when meeting the novel technological innovation possibilities and requirements.

2.2.3 Decentralised Money Management Challenging the Old Finance System

Even today, different centralised systems still dominate almost every part of finance. People are forced to deal with their banking and business issues through intermediaries to get access to their financial, economic and social matters. The decentralised finance (DeFi) system gives a different

way of dealing with and managing an individual's information in the business world. DeFi is a blockchain-based financial cyber system letting people act without any middlemen with financial services and goods. People's actions on DeFi platforms are secured with an individual's access keys and a digital authentication method called a public key holding individual identification data. The traditional financial system usually personally checks individuals' personal data with the monetary authorities. (Napoletano & Curry, 2022)

Modern technological systems are the critical elements of decentralised money management. The main idea is to simplify and democratise finance and banking overall. DeFi platforms use peer-to-peer relationships providing financial services and goods to be accessible to everyone worldwide around the clock. Decentralised systems utilise digital identity as a means of identification, which allows the possibility to do business and allows people to purchase services and goods cross-border operating in various jurisdictions globally. However, the national regulations vary a lot from each other in identifying digital identity features in a legally binding way, which creates uncertainty about the legal validity of decentralised digital identity issues. Therefore digital signatures and identity identification must be valid in the specific nation's jurisdiction area, where the original cyber business function occurs, and due diligence principles are conducted. (The World Economy Forum, 2022)

In a decentralised money management system, only a universal computer code records transactions in a public ledger. In centralised money management, a transaction in a conventional bank account is recorded in a private ledger owned and managed by a large financial institution. Blockchain technology is an excellent example of a decentralised money management system in which all its users use an identical copy of the public ledger's computer code to record each transaction within this encrypted code. The system secures the anonymity of the users, verifies payments and records asset ownership that is almost mission impossible to be altered by fraudulent activity or any other cyber criminality. Each used blockchain system is unique, solving only complex mathematical problems and riddles, adding new blocks of transactions to the chain in hand for each case. In this way, financial money transactions and money management overall are much more transparent than the old-fashion centralised money management system has ever been or can be. The novel and more competitive economic environment force banks and other financial institutions to proceed with digitalisation matters at a faster speed. The technological changes require practical actions, not just design on paper, to keep up with the development.

In recent years, start-ups with a high technological leaning have burst into the financial sector and exploited the divide that exists between the new demands of customers in the financial industry and exploited the range that exists between new needs of customers and the sometimes outmoded services which the traditional banks offer, where these are that burdened by the limitations of industry regulation, as well as their structure and corporate culture. These new competitors unbundle the value chain of banks by specialising in their different components, such as payments, foreign exchange, lending, access to capital markets, financial advisory services and others. Conceived around new technologies, modern financial companies are typically highly flexible, adept at the swift incorporation of change and tend to have a low-cost structure. In most cases, they also exhibit sharply redefined business models, which are highly disruptive of traditional paradigms. For example, this is true of financial crowdfunding platforms and virtual currencies, which can cut bank intermediation out of the equation entirely. (Cuesta & Co. 2015)

People's behaviours have changed enormously with digital technology applications and tools executed in finance. Their expectations of services and goods have risen on a massive level, and the awareness of digital developmental changes is remarkable. The arrival of modern technology in finance has pushed banks and other financial institutions to modernise their strategies, operations, and procedures with increasing speed. Digital technology applications and tools help to serve customers in a lighter, easier and more transparent way. They also help to reduce human errors and improve communication systems. Technology-based applications framework simplifies customers' identification models between the parties involved in specific finance procedures and secures individuals' personal data storage and use in more trustworthy manners. Digital applications can also protect against illicit transactions and combat money laundering. (Independence University, 2020. Blog Post)

Blockchain technology is an essential example of decentralised digital platforms. All the necessary data needed for a specific action is recorded with an encrypted digital code securing the proper steps in the platform. These encrypted digital codes also verify the entire negotiation, drafting and execution process and secure the parties' personal data and identification features excellently. Blockchain-based platforms use methods that make it almost impossible to meet cybercriminality or other fraudulent activity in the system. Demand for using decentralised digital platforms is rising enormously. Banks and other financial institutions invest significant amounts of

money in digital development to improve their services and goods in daily banking matters and more complicated contractual processes. (Napoletano & Co. 2022)

When acting in a decentralised money management environment, it is good to remember that the rules cannot ever change in the middle of the process, and everyone has access to the block-chain system. Digital money is always programmable by using smart contracts meaning that procedures can go beyond storing and sending value for something. Once a person is in the system, they can always keep control of the assets to outside sources, intermediaries or the so-called gatekeepers. This modern technology is much the same as any currency exchange when visiting abroad, except that decentralised money management is open around the clock all year. The technology on behalf guarantees trade acceptance at every second. In its most straightforward manner, the decentralised money management system gives everyone access to global liquidity worldwide. Decentralised money management offers various benefits and guarantees the individual the right to freely manage their money transactions without intermediaries when conducting transactions in the broad environment of business life.

2.3 Compliance Function

"*Laws continue to be enacted, and the regulatory environment has become more complex due to unacceptable conduct remediation. Consequently, entities continue to be compelled to demonstrate compliance with legal mandates through documented assurance assessments.*"

-Robert E. Davis-

In recent decades the volume of legislation, regulations, and code of conduct on financial jurisdiction has increased exponentially in the worldwide banking sector. All different kinds of financial institutes are increasingly subject to various regulatory rules, as are all financial transactions as well. To manage the financial crisis all over the world, not explore like the bomb of Hiroshima destroying everything close by, there has been created a system of compliance surveillance known as the obligation of obeying the legal and social requirements for ethical and responsible

business. The code of compliance surveillance covers the entire business world. Standard ethical rules and responsible work matters are the critical factors for a good company and success under legal regulations and social rules worldwide.

Several central legal issues arise in the context of compliance surveillance in banking, which makes it essential to be aware of the tensions and interplay between the economic and social aspects of the provisions in the field. Today, however, compliance risks are addressed in a new, structured and systematic way, in which programs aim to demonstrate an organisation's commitment to compliant and ethical operations. Compliance can best be described as a verification function aligning with the corporate business strategy. Organising compliance function is highly and precisely regulated, and multiple instructions, orders, and principles arise from mandatory legislation, lower-level provisions, and official authorities' guidance. (Ratsula, N. 2016) It is good to remember that even under worldwide uncertainties in economics, finance and societal environments and the business world, further research, estimates and surveys done by scientific and academic researchers, authorities, and governments tell a lot about how the world is running at the moment and also give hope for the better tomorrow. As the world changes, so do business activities, models, and methods.

The new world era of digitalisation has already changed and will continue to change business world activities, interaction models, and people's daily life. It is essential to find clear and standard rules for protecting individuals' privacy issues and processes in personal data information in finance. Companies should be able to play the long game by staying alert, plotting scenarios, being proactive, and finding the best adaptation strategies to cope. The ideation of open, cooperative, transparent, and correctly regulated financial system requirements and expectations requires closer review to achieve desired solutions soon. (Laininen, 2021)

According to the mandatory legislation, each company acting in the financial sector must have an inner surveillance unit monitoring compliance. The requirements have their base on the conditions of business license and registration. To receive the required information about how ethically and according to the rules, regulations, and principles the company or the organisation operates in practice, it is essential that control and inspection activities work correctly. The surveillance must occur in each activity over than e organisation daily alongside the vital functions. One of the supervisors' primary tasks is to ensure and maintain an awareness that everyone in the workplace is aware of the company rules and code of conduct used commonly and that everyone is following

them correctly. One must also remember that while control and inspection activities are part of the day-to-day running of the company's actions, the audit activities are carried out at specific intervals and documented daily by an independent control body. (Ratsula, 2016) For this reason, compliance surveillance is an essential part of the company's annual plan and is implemented every quarter as a basic rule.

In today's world, and especially when facing future yet unknown sights behind the multicoloured curtains, the compliance functions must concentrate on designing and implementing novel processes to be able to meet risk management's challenges on the first line of the defence against critical areas of the cyber world, on protecting organisation's IT- and other security issues, privacy issues, anti-money laundering, environmental issues and overall activity manners, as well as quality and quantity units' procedures within the company and many other situations that operational and management functions meet daily knowingly or suddenly. The whole surveillance and audit activities must take place over the several activity units in the company to avoid duplication of certification activities and, consequently, unnecessary inefficiencies while providing vital information on the status of control and compliance activities across unit boundaries. No compliance surveillance system would provide complete protection for the business. The critical element here is to focus on responding appropriately to abuses or infringements that have already taken place and make the best possible efforts to prevent irregularities and global business practices.

2.3.1 The Status and Meaning of the Concept

In general speaking, compliance surveillance means complying with all rules and principles reunited to the order to state that the compliance surveillance system would cover some compliance risk. The business's principal responsibility for risks rests with the business lines, common rules, and standards to achieve. It is more than necessary that the compliance surveillance management processes and procedures are built on a stable and durable base by legal regulations and provisions, global business principles, and good governance practices. A key factor to remember within good governance issues is that alongside following laws and regulations, all business activities must also comply with the principal ethical requirements and other operating principles set by third parties worldwide.

Each organisation defines the content of its compliance based on its value. The compliance function creates the base for the company's ethics and responsible actions following binding legal rules and regulations. Compliance functions must be an independent unit inside the company's organisational structure. Compliance officers' main tasks are to provide accurate and up-to-date information and present proposals for the development of operations for the management. Compliance surveillance aims to safeguard business operations and increase the company's value by providing well-prepared risk-based analyses, advice, and insights into the business field. The supporting role of compliance to management and the entire work community shows in systematic work in evaluating and improving risk management procedures, processes, and outcomes. (Ratsula, 2016) In the end, the main focus on compliance lies in obeying the laws, regulations, standards and internal policies, and thus on the effectiveness and efficiency of the business.

Every business has a set of internal rules and regulations that must be followed. Companies must also adhere to industry rules and laws to maintain compliance. However, the problem is that regulations are constantly changing and staying up-to-date can lead to severe financial strains and damage to the company's reputation. Compliance management is essential for every company's success and comprehensive management systems ensure that the company remains compliant with the most current policies and help to avoid business businesses on procedures. Appropriately, organised compliance management helps the company overcome possible or existing security risks and misbehavioural actions. The surveillance unit needs specific security tools to maintain compliance. Data security, privacy legislation, and industry standards need businesses to closely manage their cybersecurity and maintain governance over their supply chain. Although privacy and security differ, they do go hand-in-hand. Organisations must also perform due diligence on third-party vendors to ensure they adhere to industry standards and organisational rules. (Security Scorecard, Blog 2021)

Many research papers show how using decentralised cooperation procedures, networks, and services promises to unlock greater financial freedom for the global economic system. The role of compliance is essential as a unit supporting both management and personnel to perform their work tasks appropriately. Risk management evaluation processes are critical pieces of the compliance function. Training, advising, internal monitoring, and drafting and implementing operational guidelines for the company are also essential parts of compliance. Monitoring reports and

functional developmental propositions based on reports' notions concerning the company's operational functions, risk-based findings and other relevant considerations are done quarterly and given to the management. On a half-year basely, monitoring reports' results are given to the personnel. General Data Protection Regulation is one the essential legal acts banks and other financial institutions must obey within their business operations. The act regulates on prevention of money laundering and terrorist financing, risk assessment preparation and impact assessment. (Official Journal of the European Union, 2016, L 119).

The technological development has proven that the inherent anonymity of DeFi platforms runs against the laws governing traditional finance and opens up the doors to potentially malicious behaviour. On the other hand, national governments impose heavy-handed solutions that stifle innovation, undermining what good blockchain services can deliver. While these truths seem at odds, this does not have to be the case. Novel techniques involving encryption, decentralisation, and standardisation have been designed to provide the level of verification, privacy, and accountability regulators need while allowing DeFi protrudes to preserve its promise. This is all done while enabling compliance through identity checks, such as KYC, AML, and accountability. (Johnson, 2022)

Responsible financial companies are devoted to accelerating business progress and sustainability to gain better content and market profits. Companies' business strategies must align with their values and the brand image they want to look outward to the customer base and competitors. The compliance function is an essential part of the companies' practical operations, acting appropriately and according to the rules of the law. Financial institutions invest significant amounts of time, money, and training personnel know-how to be able in the top of the competition game in the markets. They search for better tools, applications and resources to better their competitiveness. Responsible business principles are common worldwide. Good practices and respectful operating methods benefit everyone in the financial industry. The prudent internal control by compliance functions creates the basis for gaining success and good profit businesses in the markets for each openly and transparently operating organisation that also obeys the laws and regulations and authorities' official instructions and practical guidelines scrupulously kinds in an appropriate manner.

2.3.2 Organising Compliance According to Global Business Principles

Organising the compliance function properly within the organisation is often seen as complex, and it must fit simultaneously into strategy lines for administrative actors and practical operations. However, the compliance unit must be objective and independent from the company's basic procedures to do appropriate inner monitoring. Compliance supervises that business operations are following the provisions of the law. The essential task of compliance is to produce instructions for risk management and present developmental proposals to better practical business operations. Compliance officers must also clarify the legal obligations and global business principles and rules. Monitoring these issues is daily work. Complying with the mandatory requirements binding on the business corporation is a joint obligation of the entire work community and a measure of success. According to ESMA 2022 guidelines 10 (70&71), page 20: "Compliance personnel should generally not be involved in the activities they monitor. However, a combination of the compliance function with other control units at the same level (such as money laundering prevention) may be acceptable if this does not generate conflicts of interest or compromise the effectiveness of the compliance function. Whether personnel from other control functions also perform compliance tasks is relevant in determining the appropriate number of personnel necessary for the compliance function."

The business' risk management frame and inner surveillance are like a puzzle consisting of "a model of three lines of defence". The model is applied broadly to all kinds of companies engaged in the financial industry, both in the financial sector and outside. The parts, according to the model, are therefore divided into three parts;

1) Functions that own and manage risks (the first defence line)

2) Functions that monitor risks (the second defence line)

3) Functions that provide independent assurance (the third defence line)

According to this model of three lines of defence in business risk management, the compliance function belongs to the business verification functions, which directly support the risk owner by producing financial reporting, implementing the reporting obligation and taking care of the reliability of the entire operation. (Laininen, 2021)

According to ESMA Survey (2022), it is possible to summarise the basic common principle guiding compliance function in the business globally into ten (10) guidelines;

1) Independence. Meaning that the compliance function does not make operational decisions about compliance risks

2) Generating added value for the business. The purpose is to focus on actions that prevent the realisation of compliance risks and act as an essential part of the operational business structure (e.g. advisory role).

3) Procedural orientation. In addition to ad hoc advice, the compliance function must be based on an action program planned precisely in advance, including training, monitoring, and updating internal work instructions. The action program must be up-to-date and able to adapt to rapidly changing conditions.

4) Efficient operation and sufficient resourcing. Compliance functions must always be arranged reasonably and appropriately to the operations of the organisation's nature, scope, and most significant business risks.

5) The ability to bring up even tricky issues. The compliance function must have the courage to carry out its task in managing the business even when current and essentially relevant issues arouse opposition both in the management and personnel.

6) Risk-based. Identify the organisation's most significant risks, which means the standard mapping of risks and the organisation of the function's tasks to the priorities of the identified risk areas.

7) Reporting. The most important way of transmitting the information ensures the proper and up-to-date organisation of operational management activities.

8) Cooperation with other verification functions within the organisations. It helps significantly in mapping, outlining, and developing tasks of the organisation's overall risk picture.

9) Cooperation with the authorities. An essential and integral part of business law, the authorities must always know what is happening in the organisation, how it is managed and how the law, rules, instructions and policies are followed.

10) Supporting the compliance culture. The purpose is to bring appreciation and stability, create trust in the entire work community, and clarity in pursuit of common goals and to guarantee success.

When studying regulations, instructions, and recommendations regarding various compliance functions, it is possible to observe the repetition of specific, precisely defined points regardless of the industry. This also applies to actors in the financial sector even though several economic, business legal, and administrative measures and regulations vary depending on the type of activity the organisation carries out and the type of licenses it has. It has become apparent to researchers, economists and the entire business world that the traditional approach to preventing wrongdoing, misconduct, and misbehaviour in economic business no longer protects businesses. There is a clear need for more decisive steps in risk management functions. A forward-looking risk management approach and a more wide-ranging compliance function among the entire business world are highly appealing.

2.3.3 Supervisory Authorities and Internal Compliance Surveillance

Increasing regulations and official supervision significantly weaken the possibility of correctly following existing rules because the regulatory jungle is vast and dark, and official supervision needs to be more cohesive and bureaucratic. No one can and does not control this branch of science and art, reducing the ability to interpret and understand mandatory regulations and control mechanisms. However, the authorities' main universal task is to foster financial stability and confidence in the business markets and enhance protection for customers, investors and the insured. The supervision process can be envisaged as a cycle of regulation and supervisory policies providing the foundation for the developments, methodologies and standards which underpin the day-to-day supervisory activities and are aimed at achieving consistent and efficient supervisory outcomes.

According to judicial regulations and rules, businesses must report their activities to the supervising authorities. The reporting information includes information on possible risks related to the operation and organisation and comprehensively on the business's financial situation, the finan-

cial statements and the fulfilment of capital requirements. According to the Anti-Money Laundering Act, the risk assessment is one of the most important reports to the authorities as it also covers the international aspect with its regulations. The reporting and notification obligation to the rules is always before changes and development projects in the business. Several laws have been issued regarding reporting and the commitment to provide information based on which the company is managed and directed appropriately and regularly.

The European Financial Supervision System has been operating in the EU since 2010. The system consists of three supervisory authorities; EBA, EIOPA and ESMA. In addition, the entity includes the ESRB, which operates under the ECB, as well as the cooperation committee of supervisory and national supervisory authorities. The common goal is to improve the uniform, efficient control activities in the EU's internal market. It is important to note that each body is independent of the other and has its separate task supporting another authority's work. Most standards of the EU's regulatory and supervisory authorities have been adopted as nationally applicable instructions and recommendations in Finland as part of the FSA's collection of regulations and instructions. (Laininen, 2021)

Finland's financial sector's primary outer surveillance authority is mainly in the hands of the FIN-FSA. It supervises banks, insurance and pension companies, other companies operating in the financial market, and Helsinki Stock Exchange. FSA works closely with the Bank of Finland but is an independent decision-maker while doing its surveillance tasks in the financial market field. The principal aim of the FSA is to ensure balanced operations between different actors and maintain a stable financial market field protecting the insured's rights and fostering public confidence. FSA is also responsible for promoting compliance surveillance and good governance practices and disseminating general knowledge about the financial markets. FSA provides different kinds of decisions regarding the operational principles, gives guidelines to follow and obey, and assesses the operational reliability of market processes, functions and systems. FSA cooperates with authorities covering regulatory and supervisory issues and manners abroad. FSA is a part of the European System of Financial Supervision and operates in connection with ECB. There are also several other international forums where FSA participates regularly. (FSA, 2021)

The ECB is the highest supervisory authority in the EU's financial area. Its monitoring and evaluation process is based on the financial institutions' riskiness vulnerability. The supervision process

and content vary depending on the financial institution's size. The compliance function's multidimensional monitoring processes prove the vitality of the need for compliance as a part of the financial institutions' practical operations and legal framework. The monitoring procedure is called the Supervisory Review and Evaluation Process (SREP). Its main task is to evaluate risk management processes, administrative operations, and practical operations towards customers and with inner models' of the organisation. (ECB Working Guide, 2022)

The control procedures for compliance operations can be described as risk management measures as a whole. Compliance plays a significant role when unpleasant risk situations have escalated into problem areas. Promoting and maintaining a reasonable and appropriate compliance culture in the organisation go hand in hand with risk management activities. The suitable governance methods and procedures, as well as control tasks - which are closely connected to the administrative tasks in the organisation – are also closely linked to cooperation with the compliance function. The collaboration leans on observing all the actions within the organisation beforehand and in real time, making it possible for activities, procedures, and daily operations to remain continuously compliant.

The internal control of compliance risks is called monitoring which concerns the organisation’s compliance with practices and processes and the implementation of operating instructions and regulations. Monitoring takes place through personnel interviews, customer feedback and review of various documents, systematic testing of technical systems, filling out control charts, and written quarterly reports. The nature of monitoring is to ensure a second line of defence and to observe in advance possible control deficiencies and reductions in the level of requirements. The purpose is to provide appropriate scheduling of corrective measures and guarantee the reliability of operations. When planning and implementing monitoring, the risk-based nature of the process must always be taken into account, which is why monitoring must always have a goal and a reason why it is carried out in a specific way and at a particular moment. The goal in every control situation should be to identify possible critical risks in advance and find a solution for managing them so that they do not escalate into reality. (Laininen, 2021)

The central goal and purpose of internal reporting are to produce information about operations compliance for the organisation’s management and board of directors. The compliance function's communication and cooperation with the organisation’s management primarily focuses on pre-

venting risk factors in daily operational activities. Reporting to management and the board is usually done quarterly. However, the reporting includes recording deficiencies and wrongdoings and tells about novel regulations and sanctions issued by the authorities in the same business field, analyses customer feedback, and clarifies the updated work and operational guidelines. (Laininen, 2021) Reporting is, as a rule, an activity carried out according to regulations, rules and global business principles and protocols. If necessary, reporting can also be carried out with an ad hoc procedure if the guidelines or laws change unexpectedly, something surprising happens in operation, or the worst scenario, an unforeseen risk escalates. The assessment of conformity with the requirements must be done by drawing the overall picture of the organisation's operations in a clear, verified and objective manner.

Internal compliance surveillance must align with outer authorities' monitoring processes. The financial institution must be able to deliver informational and relevant data to stakeholders and business partners. The financial institution's strategic lines, methods, and models must match the organisation's values and practical operations. Vital and appropriate compliance function enables business growth and competitiveness in the markets. Properly, legally produced, and verified compliance surveillance can communicate with outer authorities to enforce necessary corrective actions. An effective monitoring system ensures that the institution obeys existing laws and regulations and gives the best practical outcomes. The internal compliance quarterly reports protect the effectiveness of daily operations. Management needs to be aware of possible problematic issues and correct them promptly. The compliance function prepares and executes reliable and accurate informational data and financial statements for the institution, and the outer official surveillance authorities, without forgetting stakeholders, other business partners, shareholders and clientele. The financial institution's management is responsible for organising appropriate and expert internal control following the provisions of the law and the general guidelines of business life. However, it is to remember that internal surveillance also involves assessing the effectiveness of operational management functions and the entire risk management functions, so the compliance function must be differentiated into its independent unit within the organisation. (Reciprocity, 2021)

The work of the compliance function involves a strong tolerance for constant lack and uncertainty. In addition, the compliance function requires the acceptance that everything in the work community and operating methods is never ready and excellent. This is because the legislation

lives on all the time, and the successful maintenance of business requires continuous development processes. Novel products and services must be able to reflect the demands coming from the outside, which also change and develop all the time. Supervisory work is challenging and long-term, and sometimes even fast-paced, when novel official requirements are given for the business. Successfully acting the compliance function requires proper project management ability, tolerance of uncertainty, understanding of essential issues and, in the very end, iron nerves.

2.3.4 The New Challenges Created within Modern Technology Innovations

Compliance has been created to ensure that the disciplines of business work correctly and in a friendly and acceptable manner around the world. Risk management has always been one of the biggest challenges each successfully operating company must face. There are many issues and matters to cover in the business. Without a precise and well-functioning atmosphere, actions and operations taking place in a-day-to-day functions business are complex, and everything becomes more or less difficult to go on with. Taking into notion and implementing novel technologies into old-fashion models of business requires time and money. However, innovations can help the company deal with its challenges to keep in the speed of ever-increasing market competition and all-the-time growing amount of regulations and rules in a novel kind of jungle of principles, decisions, and regulated or non-regulated but more commonly used practices.

In today's business world, the management wants to centralise their scope approach on managerial risks aiming toward better success and profits, analysing more behavioural elements within the organisational structures to identify the trigger points affecting risky behaviours. It has been a clear insight inside the business world that in risk management, the traditional ways to prevent misbehaviours and frauds within companies can no longer ensure only the business's protection. This kind of attitude change within compliance functions and other surveillance and audit protocols acknowledges that behaviour in the workplace is driven by factors in people's professional context, such as the teams employees work on, the goals they have to achieve, the direct leadership they receive, and the processes they work with. It is stated that a forward-looking risk approach informing the dialogue between the parties is highly appealing. For behavioural risk management to succeed in all the operational functions with braveness for successful business

spreading from the top management level to the grass-root level and vice versa is extremely important. In the future, financial sector regulators will embrace the show-me-proofs-mindset broadly. Therefore it will only be necessary to demonstrate the evidence that everyone acting in the market field is controlling their risk management correctly. (Scholten, de Vries, & Besieux, 2022)

There are no hesitations that standard approaches to managing risks in the business, especially in the financial sector, assuming that all the actors are rational, similar and predictable in behaviour is wrong and simply old-fashion. However, it seems that one thing always remains the same – the importance of money as a part of societies worldwide. The way people use money, how they trust to look after it, and how people expect to be treated when using the money for services or buying products, and overall what is their relationship with money seems to be stable but still quite sensitive to change alongside with economic and other global situation changes. In the future, even more of people's personal data information and different kinds of identified details can be embedded into the used currency and its transactions in which payment systems can be more or less invisible, taking payments automatically for services and products based only on person's identity that actually seems to include a lot of transformative issues and also carrying with enormous risks around data and personal security as well as identity frauds (Marr, 2022).

Financial businesses worldwide are preparing themselves for the vast technological transformation. All financial institutions must reorganise their operations around the changing fundamental rules, insights for the future and digitalisation flow. Competition in the markets is getting more complex, and the cyber world is changing the interaction procedures from the old face-to-face business models to take place in a digital, online environment.

Governments' actions nationally and internationally and regulatory changes will take time, and those issues must align with technological development. Financial industry practices and procedures and the entire economic world were born far before the arrival of cyber technology's possibilities, advantages and tools and are due to historical traditions challenging to change to reflect modern innovation and operating methods. Businesses must worldwide start to provide novel structures to facilitate novel kinds of data-sharing arrangements. Wealth management will be distributed better and more equitably in the future, carrying fewer privacy and security risks than today. People will likely be ready to share personal information drawn from their data for financial institutions to gain better products and customer services from the financial sector. Blockchain-

based platforms, e.g. smart contracts, will be excellent operational models to benefit banks, other financial institutions, individuals and corporate customers. Modern technological applications and tools help also to improve cooperation with stakeholders, business partners and shareholders.

2.4 Modern Technological Tools in Banking

"Technology, like art, is a soaring exercise of the human imagination."

-Daniel Bell-

Technology is called scientific knowledge created for practical purposes. In the early stages, industrialising society laid the foundation for developing novel know-how in business. The business requirements and the demand and supply of services and products have changed and grown significantly over the decades. Technological innovations, equipment, and novel digital tools have changed people's communication, business, trading, and daily living. However, it is good to notice that technology is ever developing and searching for better applications, methods, and models to improve the business world's operations. Privacy, security, interoperability, and legal and regulatory issues are remarkable scientific to which researchers and regulators want to find appropriate outcomes to implement in the real world. (World Bank, 2017).

It has already been proved that blockchain is among the most disruptive technologies. In principle, the blockchain is an advanced technological version of the public registers that were once used in a society's villages and towns to record everything necessary. Such matters as the purchase and sale of different kinds of assets, property transfers, births, marriages, deaths, loans, election results, court decisions and everything similar, one way or another, are considered worthy of recording. Instead of a bearded pen master with an actual quill writing down each social event, the blockchain uses advanced cryptography and a distributed digital system architecture to achieve a better result. With the help of blockchain technology, it is possible to create a secure, transparent and unchanging source of truth designed to withstand various attacks and manipulations in the cyber world. (Johansson & Co. 2019)

Blockchain provides the internet of value, which can leverage to acquire new skills and datasets independently. This novel modern technology enables person-to-person transactions and information flows without a trusted intermediary. It is proved that blockchain technology will accelerate the evolution of contemporary technology models, making it possible for other innovations to evolve into autonomous economic agents via reliable digital ledgers such as smart contracts. The blockchain can thus assist in legal work in drafting contacts, storing commercial agreements, and validating documents. However, a smart contract is "only" a computer program. It is only protected by copyright law as written work, provided that the computer program meets the conditions for a work threshold. Whatever the situation is or will be, we still have to bear in mind that when in the future, with technological innovational tools, the financial sector will face additional challenges navigating the global tightening of economic and financial conditions and the rising tendencies toward protectionism shortly.

2.4.1 Blockchain Technology

A group of Japanese IT- technological researchers created in 1991, after many years of studying, gathering data and doing complex research work, ideation of novel digital platform which they called blockchain innovation. The original ideation was to timestamp digital documents securely. The main push factor was to create a platform that is impossible to backdate or be misused by criminal activities. However, blockchain ideation raised its head only in 2008 when a Japanese IT – inventor and innovator, Satoshi Nakamoto, adapted blockchain technology for technical innovation purposes. As a curious fact, Nakamoto is thought to be a pseudonym by a group of IT researchers because no one has ever met Nakamoto in reality, and his true identity, domicile, and other personal data remain still a big mystery. However, Nakamoto is a true legend in the field of blockchain technology, whether or not a human or an actual person at all. (Blockchain, 2019)

Today the blockchain invention speeds up with an increasing volume through space and helps corporates worldwide make better content and better profits within their businesses. Technology has created many digital tools and applications for business operations and procedures. Blockchain technology is made up of various data blocks linked together into a continuous chain of immutable records of different kinds of data. These blocks are added to the chain via each com-

puter of those network users attached to a specific blockchain application. Blockchain is a distributed ledger and aims to avoid a single point of failure by supporting security in transactions without any intermediary, such as a bank, government, or other outer third parties not involved in the digital application. Blockchain is "only" a digital chain of blocks in the cyber world containing various information and data packages, which cannot be modified. This justifies digital technological applications acting as legitimate actors in different business fields. (Blockchain, 2019)

Blockchain platforms and applications are freely open to the parties involved in the unique digital platform. The operation method of the technology is exciting as it consists of three parts: data, a hash of the block, and a hash of the previous block. The block's hash is created to be compared with a human fingerprint, making it unique, immutable and secure as there can be no other like it. The hash is always digitally calculated by the encrypted code in the cyber world before attaching it to the blockchain. The hashes can detect possible changes in the blockchain and will give an alarm if they notice attempts of criminal activities. Blockchains contain proof-of-work that slows the creation of new blocks inside the chain if those are not needed. The hash of one block tampers with other blocks creating validity and security for the whole particular chain of blocks in the digital platform. Blockchains can also distribute by the peer-to-peer network, which gives more protection for the technology in practice. One proven fact with blockchain technology is that when a new user joins the network platform, he gets all the previous data in the blocks. In this way, a new user and already present users can verify that all the information needed inside the operation of the blockchain is still in order within the specific blockchain in hand. (Blockchain, 2019)

Blockchains are known for their constantly evolving feature. Technology holds a vast promise for every business, society and individual of the internet of value. This means that any outer intermediary cannot come in between the blockchain network users, and each operation is managed by only the exact parties of the blockchain. The creation of blockchain technology and its platforms, applications and tools have made it possible for the first time in human history for people can trust each other and transact peer-to-peer. (Tapscott, 2016) The trust is built by collaboration and some clever codes that are easy to use but difficult enough to tamper with and misuse in criminal matters. However, it is crucial to remember that technology does not create prosperity, but people do it. Blockchain is only a limited system to ensure the reliability of the information

because it does not guarantee the ways or methods of the original details creating the records used to help business in action nor the processes of recordings.

2.4.1.1 The Digital Identity

In general speaking, identity is an integral part of a functioning society and economy. The traditional identity systems of today need to be more cohesive, secure, and exclusive. At its basic level, identity tells information about a person, place or thing. According to the UN Legal Identity Agenda Task Force (UNLIA TF) public statement published in 2018: "Legal identity is defined as the basic characteristics of an individual's identity, e.g. name, sex, place and date of birth conferred through registration and the issuance of a certificate by an authorised civil registration authority following the occurrence of birth. Without birth registration, legal identity may be conferred by a legally-recognised identification authority. The civil registration system should be able to ensure every individual's right to legal identity from birth to death." However, for one reason or another, the physical forms of identification are not available to every human around the globe.

The UN E-Government Survey from the year 2022 proved that more than 10 million people worldwide lack legal identity completely. This leaves people in a highly vulnerable state overall in society. The inability to attain identification documentation also jeopardises a person's access to the social, economic and financial system limiting in every stage their freedom of right to live. People who lack officially recognised identification can never control their identities and lack total ownership of society. In addition, these people have a fragmented online identification experience. They can, therefore, unknowingly lose even the little value that their incomplete and deficient data may generate in society and acting in the business world.

The degree of anonymity provided by blockchain technology is defined based on the desire of its users and the needs of the application to be public, consortium or private. Decentralisation and resilience are the main elements of blockchain technology, providing a solid basis to its potential users all over the economic societies and the business world globally. There have been several global attempts to find a proper description for digital identity, but the task is complex. The definition of a universal digital identity should involve both philosophical points of view and technological aspects to guarantee an individual's right for their data to use and audit in practice. There

also lies problems with the legal consequences of what digital identity means and how it can be aligned with traditional legal identity concepts. (Zwitter, Gstren, & Yap, 2020)

Self-sovereign identity is the base of societies' functions. However, digital identity gives enormous advantages to act in the different fields of business in a cross-border context and is therefore highly appealing. The interaction between countries and their people requires a greater understanding of digital identity's underpinnings from legal, technological, and philosophical points of view. There are to be found many ways of digital representations. Still, many countries sometimes need help with fundamental infrastructural challenges in their societies. They may fall out from the development easily without the help of worldwide cooperation around the subject. Globally digital identity management's procedures, processes, and guidelines aim to standardise and streamline people's living conditions and human rights over nations and borders. (The UN E-Government Survey, 2022)

The UN's International Telecommunications Union (ITU) defines digital identity as: "a digital representation of the information known about a specific individual, group or organisation". ITU states that digital identity consists of all the individual's data that is available online. It can all be encompassed by an e-mail or physical address, pictures, bank account information, shopping preferences and other physical identity information. Digital identity is not uniform and can vary across technological and digital platforms like banking systems, telecom and social media platforms. It is a convergence of offline and online identities, where the latter refers to those stored or used by computer systems and embedded software. A digital identity can, according to ITU, be assigned to an individual, a legal entity, a company, and sometimes even assets. It is to be seen that digital identity, alongside the expansion of the global digital economy, is becoming increasingly important. Public and private service providers are moving into the digital cyber world at an accelerating speed. At the same time, individuals' possibilities diminish in proving their identity and getting access to benefits and services via digital platforms. This movement towards different digital identity platforms can increase the efficiency of service delivery, reduce transaction costs, and drive innovation and development. All are good points for global economic, social, finance and business sectors.

A commonly accepted scientific fact is that a robust, globally used digital identity platform can enormously help deliver multiple services and touch our lives in various ways. In blockchain-based

systems, the metadata used for communications is maintained in the distributed ledger. The authenticity of the data on behalf is verified through multiple nodes through a consensus mechanism. Blockchain technology has been designed to preserve data in an encrypted and immutable manner, and secured through cryptography, thereby keeping the ID protected and traceable. The blockchain network does not, however, have a single point of failure, making it difficult for hackers to break the integrity of the data set. It also has a tremendous ability to maintain each identity across all the nodes in the network. Blockchain technology only solves problematic matters by combining encryption and digital signature through pseudonymisation. In addition, affixing the digital signature to all transactions carried out by each user makes the process foolproof and a solid global platform. (Anjana & Raman, 2021)

A sound framework for digital identity management needs to consider privacy questions, the relationality of identity data, and data ownership. Digital identity and individual self-sovereignty must be defined with legal, economic, social and philosophical aspects. This way, creating a solid foundation to overcome obstacles in researching coherent standards in cyber world activities is possible. In reality, an individual is tied into various usernames, passwords, and login details data when acting in the digital environment doing business, purchasing goods and services or using time for various leisure activities. The expressions of digital identity's dimensions are practically impossible to explain in a simple bowl because the action results arise from different digital platforms tied to proprietary digital tools and applications. However, developing digital identity systems based on blockchain technology might offer a good, practical, resilient opportunity for change. (Zwitter & Co., 2020)

Worldwide, digital identity management is transforming in various manners. One of the key reasons is the terms of the use of digital technology applications and tools. The traditional concept of identity is in many ways parallel to the standards of digital identity because both of them rely on an individual's self-sovereign right to own data and how it is used for different official purposes, purchasing services and goods, and for other activities requiring to proof one's identity. Blockchain technology changes the meaning of self-sovereignty and digital identity management. It is crucial to face identity management with a bold and resourceful attitude. The question of using biometrics within digital identity requirements has been raised just like they are used in traditional identity rules. Biometrics can restore data and create access to the digital environment in a novel way. Biometrics are persistent and can never be lost, which gives them the advantage

to use as a part of modern technological applications and tools. However, biometrics can also create problems because they contain highly detailed data about individuals and their life events, interactions, and business and pleasure activities worldwide. (ITU, n.d.)

Self-sovereignty and identity questions are closely connected with an individual's socio-economic status. Digital identity terms are getting space in the right to vote, to do business in the banks and other official actors, and to gain access to healthcare and education. Blockchain can provide the framework and accompanying benefits for digital identity issues. Nevertheless, like every system, it comes with its pros and cons. One is the evolving nature of the technology itself, and the other is the need to standardise data exchanges. (Anjana & Co. 2021) Ultimately, most identity aspects, whether physical, philosophical, legal, social, economic, or digital, are necessary, specifically legal personhood or identity associated with expressing individual identity overall and everywhere around the globe.

2.4.1.2 The Judicial Matters of Blockchain

Blockchain is a modern, unique and universal technological method used worldwide which creates very rough regulatory challenges due each nation has its very own legal standards and rules providing how for example, personal identity, intellectual property, and data privacy rights, as well as cyber security and force majeure issues and contract law matters, are solved within national legislation. It is a global fact that laws governing the different kinds of digital transactions must be pre-determined by an internal governance system. Clear and precise common judicial standards would help all blockchain users to determine the validity of the contracts made by modern technology and the rights and obligations guiding the users' actions under the large umbrella of the blockchain model. There should also be a standard global model for different kinds of dispute resolutions which could be useable and acceptable to all the parties involved within the digital transactions happening in the more or less unknown cyber-world. The business world needs these standards at the moment.

It is good to pay a notion to this point that there is currently underway a debate around the world among authorities, supervisors, economists, researchers and academics concerning the concept of self-sovereign identity alongside digital identity. Scientists and researchers have described the term as the next of beyond user-centric identity, meaning the user must be central to identity administration. Self-sovereignty is a part of digital identity. Individuals can control their data by

creating, registering, and using it among decentralised entities and different identifiers, especially underlying encryption keys. As an essential notion of the ever-increasing presence of digitalisation around the business world, clarifying the concept of digital identity is gaining more and more space in judicial decision-making. It is a huge push factor for the new data protection regulations. Even though it is proven that blockchain technology can provide better and a high level of security for individuals' data protection issues, it is to be understood that the system requires individuals to use blockchain tools and applications in practice. This on behalf is not possible for everyone and creates another novel problem with the digital identity question. (World Bank, 2021)

Because several nodes with specialised digital code mainly carry out blockchain applications, there is also a fear of increasing cyber criminality. This thread presents current worldwide news reports about unwanted criminal attacks at regular intervals. Many institutions are invested in the technology, and continuous efforts are on to make blockchain-based systems foolproof. However, no mechanism can be proven entirely devoid of vulnerabilities. Continuous technical innovation and awareness can significantly bring down the risk and help us move towards a safer world. (Anjana & Co. 2021) The lying global dilemma is quite analogous to determining who is to be held liable for the possible actions of violation or criminality. It is ahead that national regulatory authorities and courts will most likely find it very difficult to decide disputes and may even want to act against the joint global type adoption of modern technology if there are no regulatory rules and standards in place at the national level despite that there would be international judicial guidelines in order. There is a huge need to reform new laws and regulations covering blockchain-based platforms and their application worldwide.

2.4.1.3 Blockchain within Business Operations

The decentralised nature of authorising and recognising blockchain transactions is the most novel part of the blockchain. It is often provided as "the raison d’être of blockchain". The beauty of blockchain is that its authority is in the consensus mechanism at its heart, where there is neither a single point of control nor an infrastructural centre. Investing in blockchain technology for the need of the business rises simply for its validity to enhance market competitiveness. (Eisenman, 2021) Everyone who is willing to succeed in the business fears missing out on the competition, which is the hugest motivation behind the interest in novel technological applications existing within blockchain technology. These novel process methods involve multiple parties who can

benefit from the same data even though each participant has a specific way of using the information created by the blockchain. The old way of collecting information needed in the business has taken enormous amount of time and money just for reconciling data. Blockchain technology now gives a modern and easier way of processing data information, making business more open and reachable for everyone.

One only needs to look at the agreed position across the nodes for a credible account of what transactions have occurred in the blockchain. A node is an individual point in the network which, about other nodes, validates data before adding it to the blockchain. The result is simply one central database shared across the whole platform. These databases are open; anyone with the requisite hardware and software can participate in the forum. There is no designated authority controlling admission to the blockchain or verifying identity. The strength of blockchain is that it cannot be removed once a new block has been added to the chain. (Blockchain, 2019)

Moreover, because of the way cryptographic programming occurs, it is impossible to modify a block in the chain once a subsequent block has been added because it would require all of the blocks that come after it to be updated across every connected node to the blockchain. In this way, the transaction data contained in the individual blocks of the blockchain is highly resilient, and the standard of resilience is exceptionally high, given the vast network of nodes involved in verifying the blockchain. (Catchlove, 2017)

Blockchain technology creates better privacy, security, data integrity, and transparency for businesses. However, in this context, it is to remember that, at the same time, there also lies a complex dilemma within these issues because the legal regulations fall far behind the technological development in the business. Nevertheless, it is still precisely the trust in the technology which makes it possible to do business with unknown parties and people also in globally. In contrast, in turn, a business can boost its profits. All this novelty in business processes cuts costs around the entire business architecture, makes data more accurate and facilitates auditing of the data needed.

The key element within the blockchain is to have an accurate picture of what this novel technology does and what it does not. It is crucial to be aware as much as possible of the effects of blockchain network architecture. That is the only way to get the best value from blockchain technology, and wasting money on something that needs to be fixed creates only failures and huge

business costs. Because blockchain removes intermediaries and automates time-taking processes, it helps businesses expand their customer bases and reach potential people, co-parties, and partners more efficiently, expanding their supply chain to cover the whole world. The transparency of blockchain technology benefits enormously from its visibility and traceability. The novel methods make it easier to shore up trust in information about product provenance as the goods and even services move through the supply chains to customers, other parties, and partners within the business. (Essex, 2021)

In truth, there is much hype in the industry. However, there is also much hard work required. The research in the field is concentrated mainly on increasing trust and transparency, protecting privacy and data information collection, creating efficient marketplaces, and otherwise providing people and businesses with digital tools for a responsible and sustainable future. It is a fact that taking a novel technology into action is always a challenging task to do. Blockchain technology's practical implications and applications can be hard to grasp for businesses that use old-fashion techniques, methods and models. Blockchain is known for being laden with concepts like consensus algorithms, hashing, distributed ledgers and cryptocurrency mining. (Eisenman, 2021)

However, even though these terms seem to be understandable only by super-hyper-techies and IT engineers, they are the defining terms for creating a blockchain. They are useable for all and all over the world. It is the business itself that has to make the final decision about which technological applications are worthwhile to use and best suited for their goals, what are the most effective ones, and what are the ways to implement them in practice with reasonable price costs when taking account the desired profits in the end.

2.4.2 Smart Contract

A smart contract is, without hesitation, the most impactful application of blockchain technology. It is a digitalised program in which conditions are predetermined by the parties involved. Smart contracts are designed to be used when the parties do not want or need any outer intermediary, such as a bank or other social or economic actor, to be part of the agreement process. The main idea is to automate the execution process of closing the agreement or other judicial papers. Using smart contract applications also helps to save time during the process. The contract terms use

computerised transaction protocols and rules directly written into blockchain-based hashes lines with their codes. The agreement's terms and conditions exist only in a decentralised blockchain network. The technology controls the entire execution. Smart contracts enable transactions without an outer central authority, the legal system or external enforcement mechanism. The application of smart contracts makes the agreement process easier, quicker, and transparent as the transactions are trackable and irreversible. (Johansson & Co. 2019)

Smart contract was first coined by cryptographer Nick Szabo in 1997 with a paper where he used a vending machine to illustrate the idea. The vending machine, a mechanical device, controls ownership of an asset, the candy bar, and executes the transfer of ownership when triggered by a defined input, the event of entering a coin into the machine. Therefore, the vending machine enforces the pre-agreed contract terms that describe the underlying assets, information, and meaningful actions. Szabo has since worked with purely digital currencies and a computerised contract language. His work has laid the groundwork for developments that have enabled modern-form smart contracts in blockchains. One of his most significant achievements is the digital way to combine the human language of the contract language and the programming language used in the computer world into an understandable form. (Johansson & Co. 2019) A ubiquitous modern analogy would be automatic trading rules, executed by a computer program that initiates securities sales or purchases at a pre-defined strike price. Potential applications of smart contracts could be used in the derivatives markets, mergers & acquisitions, and securities transactions, among many others. (World Bank, 2017)

After Szabo innovated a vending machine and computerised contract system based on blockchain technology, the first open digital platform called Ethereum was launched in 2015, two decades later, allowing the creation of decentralised online services. The new web-based platform was originally designed to permit software to be written in any programming language. It made the writing process in various applications on any platform simple but highly efficient. Even today, Ethereum makes it possible to develop an unlimited number of applications on its basis rather than creating a new blockchain every time. The rules of Ethereum technology allow the user to register any transaction with any asset without restrictions, excluding intermediation between the parties of intelligent contracts. (Johansson & Co. 2019)

Smart contracts are compelling infrastructure for automation because a central administrator does not control them and is not vulnerable to single attack points by malicious entities. Smart

contract applications reduce risk factors between the agreement parties providing a high level of transparency with strict identification rules. Smart contracts also increase the efficiency of the agreement processes as they operate 24/7 and define the exact standards of what input and output results. This way, smart contracts reduce costs and control who can act in the specific contract process. (Smart Contract Chainlink Ltd. 2021)

It is also seen that smart contracts are significant in the financial markets because they create a structural change in how people relate to financial services and products which will have a natural effect on both risk and returns. For these reasons, it is only natural that the financial sector's member-owned computational and data storage resources are moving straightly towards blockchain-based action and a single source of truth models of finance. Smart contract application plays a multiple-way street ball game between the entire blockchain infrastructure and software development as a novel technological innovation. Already now, it is easy to see many businesses use possibilities with intelligent contracts in practice as they can automate all the money exchange around the globe, deliver goods and services available to everyone, grant complete access to digital components in the network and as one of the most critical issues enforce privacy and data protection management around the entire business markets.

2.4.2.1 The Oracles of Outer Data

Smart contracts are very good at storing data. The blockchain oracles are entities connecting blockchain to external real-world systems enabling smart contracts to execute along with practical operations. The oracles are a vital part of the blockchain infrastructure and facilitate smooth communication between the external world and the on-chain environment in a trustless way. They take out real-world information, such as market price or exchange rates, pass the data into the blockchain, and enable the smart contracts to act upon them. Oracles create a functional link between on-chain and off-chain data. The oracle mechanism, creating data necessary for blockchain to determine outcomes of smart contracts, must be correct. This validates the execution of the agreement precisely, as expected. Oracles can offer universal gateways to blockchain technology for different types of digital contracts. This enables the valuable security issues of the blockchain, which it supports directly. The finance and other significant industrial sectors can benefit from combining oracles and smart contracts in the different business fields. (Smart Contract Chainlink Ltd. 2021)

Current developments are creating ways to integrate blockchain with the outside world better. The need to add external data has made new and exciting products in the field. With the help of oracles, blockchain can, in principle, contact any digital application and thereby enable, for example, the connection of traditional payment systems to transactions performed by the blockchain. The oracles allow blockchains to communicate with each other and facilitate data transfer between different blockchain systems and conventional systems. Thus, blockchain can retrieve the information they need from where they need it, and through this, it is also possible to use smart contracts more widely for different purposes. The oracles provide the software with the necessary information to enable the agreement itself to verify that the conditions laid down for it is met and then to complete its operations. Oracles are thus the only way for smart contracts to interact simultaneously with the blockchain and the outside world. Access to information on what is happening in the outside world is necessary for smart contracts to reach their true potential. With the help of oracles, it is possible to see possibilities to use smart contracts in every business field. (Johansson & Co. 2019)

Scientists specialised in digital technology worldwide have discovered that blockchain can obtain their most valuable properties, such as solid consensus on the validity of user transactions and mitigation of network downtime, especially when they are purposely isolated from external systems. An oracle bridges the two environments and secures data transportation from one system to another. The system is quite simple, and smart contract executes precisely as written but with a much higher certainty, scalability, privacy and security issues and many other enhancements than any traditional contract system. (Smart Contract Chainlink Ltd. 2021)

2.4.2.2 The Judicial Matters of Smart Contract

Many types of social control operate under the supervision of and by the requirements of law. The law's primary goal is to settle social conflicts and achieve civilised relations between people worldwide. Regulations and legal rules should strengthen societies' harmony and authorities' cooperation over cross-borders. The heart of traditional contract law is the freedom of commerce and the freedom to conclude contracts. Freedom of contract means simply the freedom to engage in economic transactions without any risks coming and interfering from outside the negotiation protocols. Generally speaking, freedom of contract means the freedom to engage in economic transactions without the risk of statutory interference voluntarily.

The global development of social, economic, financial, and scientific environments is characterised by the profound impact of novel, modern technologies. The legal systems worldwide are constantly developing and improving to keep up with technological progress. New norms are created continuously, and existing ones are changed when needed. There is also a huge desire and willingness to do the best to eliminate unnecessary gaps and contradictions in legislation. However, economic situations and societal environments change more rapidly than legal regulations and laws. In this context, the most novel and flaming example with the absence of proper legislation is blockchain technology and the rise of smart contracts' use in the business world, which requires quick and without no doubt the development of new legally regulated avenues to control the economic and financial market for these novel objects and tools to be in use. (Catchlove, 2017) The standard principles of traditional civil and contract law apply to smart contracts and, in general, to agreements written by technological code according to computerised language. However, the academic judicial literature still needs to address the nature of smart contracts by considering different understandings of them. Therefore, the existing legislation adapting to regulate and enforce smart contracts is under tremendous debate.

There is a clear need for greater awareness concerning the main conditions of the smart contract. Due to the lack of codified acts, the participant has the responsibility to provide in advance all the details of the smart contract in a clear and accessible form. Each party involved in a smart contract process must perform in good faith and with a humble and trustworthy attitude giving all the relevant material information to the other party or parties. All parties must take care of the necessary inquiries concerning a contract's terms during the contract's negotiation and drafting period. This gives a solid foundation for an agreement to execute correctly. However, one has to remember that most jurisdictions worldwide still need specially developed regulations on smart contract applications used in practice. Worldwide there is a transition period, making new legal regulations and combining them with applying smart contracts. The change is inevitable for blockchain technology to become commonly used worldwide in business. (Kasatkina, 2021)

Smart contracts are built using blockchain technology's terms and conditions in computer code text. When all the pieces or blocks are met, the smart contract is triggered automatically, and its data information is stored on the particular blockchain. The special smart contract blocks in the financial blockchain are records of ownership and ownership transfers. Each smart contract is an individual and unique one. Each differs from the others in terms of and content of the agreement.

Proof-of-work and proof-of-stake provide a solid foundation for the parties involved to trust transactions to occur. Digital protocols and procedures vary depending on the content of the agreement. Facilitation, verification and execution of smart contracts require that the agreed terms and conditions set by the parties are met at the end of the process. Unfortunately, legal regulation lags far behind technological innovations, especially blockchain and smart contracts' application procedures and raises problems in practice with jurisdiction issues. (InnReg, 2022)

It is noticed worldwide that in some business and social environments where the trust lies mainly on scientific bases, a smart contract does not refer to a contract in a legal sense but instead, only a computer code that automates business processes without the need for a resource to the court of law to resolve disputes. However, in some other economic fields' a smart contract is taken purely as a legal contract partly or wholly represented and performed by software. This means, in other words, that the contractual obligations of a party to the contract are discharged through the automated performance of the software. It should also, therefore, be noted that rather than viewing smart legal contracts and smart contract code as two separate concepts, the reality is that there is a strong relationship between them, meaning that for a smart contract to be implemented, it needs to embed one or more pieces of code designed to execute specific tasks if predefined conditions are met. (Kasatkina, 2021)

Smart legal contracts are functionally made up of pieces of digital codes. Each smart contract exists under the umbrella of an overall relationship that creates legally enforceable rights. As a result, every smart legal contract can contain one or more pieces of digital code, but only some fragments of the code comprise a smart legal contract. However, the fact that there is no specific regulation on such matters does not directly mean that existing laws, regulations and rules or general financial business principles do not apply to them or smart contracts should not need to be regulated. In the absence of specific rules, existing laws should regulate these technologies in the same manner as they regulate traditional, formal agreements. (Kasatkina, 2021)

When parties of a smart contract fulfil the contract offer's requirements in the digital platform, contractual acceptance occurs between the parties. An offer is a web page containing a proposal, negotiation notes, and terms of execution. The smart contract is signed with a specific program code that is digitally given personally to each party according to their digital identity data allowing the verification of identity and signature of the correct parties. The contract is placed in the distributed contract registry, from where it is found only with the specific digitally programmed

code. The digital platform for a specific smart contract must contain the essential contractual terms binding to every party involved. Any interference or restrictions cannot take place. However, in some countries or jurisdictions, blockchain-based contract platforms are already recognised as a part of public economic and legal systems. In these cases, the smart contract is addressed to an indefinite circle of people whom all can perform with the contract terms and execution requirements. This means that every person who accepted the relevant conditions and actions within the contract is to be authorised to the acceptance process, fulfilling the contractual rights and obligations. (Catchlove, 2017)

The initial stage of a contractual agreement always begins with negotiations in which the parties agree to a particular set of contractual terms. On the other hand, when signing a smart contract is even more crucial as it happens in the cyber environment using digital identity elements. The assignment phase must be well determined because it executes the time of acquisition of all the required rights and obligations of the contract. (Koulu, 2016)

2.4.2.3 Smart Contract within Business Operations

The first blockchain-based specific platform for the smart contract was Ethereum in 2015. Since then, the concept has been widely associated with the sharing economy in the business world. It has been evolving during the last years and has truly blossomed among business academics, economists, and finance professionals and within the other market fields' operators. It is even possible to create smart contract platforms using a different technological infrastructure than Ethereum. Still, those are much more complicated systems and, therefore, seldom used in practice.

Smart contracts are programmable tools which are embedded in software codes. A smart contract is based on a digital contractual arrangement. The parties of the smart contract must be able to govern by themselves the preconditions and the actual execution of the contract necessary for the contractual obligations to take place in reality. (Koulu, 2016). Parties create the need for entering into an agreement on the mutual issue, service or product concerning all parties involved. After the first-hand negotiations, the terms and conditions of a contract are transformed into a digital model and created into digital code format within the blockchain system, where they are stored and duplicated. Throughout the whole negotiation and drafting period till the end of

execution, all the terms and conditions are supervised, and the changes are approved by the parties and computers running the blockchain. This is the foundation for smart contract applications' high security and trust. (Chen, 2022)

Further, due to the unique digital-based nature lying on the digital nodes based on blockchain characteristics, each smart contract is unalterable and can only be changed with each party's approval to make corrections to terms and content. The nodes facilitate the outcome and execution of the smart contract and protect data from potential cyber-criminal attempts. In essence, however, smart contracts can, if needed, connect to other related contracts providing more utility and dimension for the process. For this reason, especially the finance sector is interested in switching to smart contracts as one of their competitive service tools to experience better digitalised and accurate operations for their customers and their internal organisation operations. The entire process guarantees conformity to strict regulations of requirements of compliance functions by using smart contracts in a multi-dimensional way. (Chen, 2022)

The role of blockchain as a strategic tool within the business is already creating an improvement in financial inclusion and remittances, strengthening cybersecurity, protecting the privacy and sensitive data information, eliminating institutional intermediaries, developing a trustworthy technology in the business environment, facilitating global commerce, creating self-sovereign identity, and accelerating distributed collaborative organisations. However, despite the novel sharing within the economy, the linkage between blockchain technology's innovations like smart contracts and the business's old, highly valued and respected ethical methods still needs to be clarified for most smart contract users. The dilemma could be more comfortable as the novel methods needed in modern business offer a strategically important, transparent, and visible way to enforce agreements and achieve cooperation and coordination between business parties and partners worldwide anywhere. This novel technology can radically change the business world and drive them toward decentralised management. If businesses face a situation where they cannot use smart contracts properly, they may even lose competitive advantages in the markets. This may mean companies become obsolete if they cannot cope with operational efficiency in the new business markets. Financial institutions and other business companies must transform their business models to align with novel technological achievements. (Ming Tan, & Salo, 2021)

Because smart contracts have a vast potential to revolutionise existing business models and practices globally, applications to use them should be implemented within companies as quickly as

possible due to their confident structure requiring no kind of manual verification by any third party, giving an extraordinary chance to meet all the needed obligation during the execution of the agreement. These novel blockchain-based platforms are economically efficient and much safer due to their distribution channels on the technology, making any exploitation of failures or exposures impossible better than traditional contracts usually made by intermediaries and some institutions between the agreement parties. The parties must also have unobstructed access to the contract platform during the whole agreement process, which reduces any failures and thereby protects both or all the parties, if there are several, in the event of any disagreement.

In every case, one has to always keep in mind that it is more than essential to conduct an audit of a smart contract after each agreement is done to be able to ensure a proper execution process as well. This method guarantees the structure of the smart contract done in the platform to be accurate and exploits any loopholes to take place also in the future. A smart contract is a clever tool, as its name already tells that several different criteria can be met within the agreement convincing the involved parties of the precise and wanted result. All the parties involved with the contract must agree on the rules and principles governing the required transactions, investigating possible exceptions and eventually creating a framework for resolving conflicts to set terms that may occur or occur afterwards. The platform environment where the smart contract takes place must be logical to verify the preciseness of the entire execution process where the so-called internal professionally specialised business security review panel reads it through using the cryptographic code language. After the smart contract has been validated by each party involved, it is implemented through the existing, specially created only for this one contract, blockchain platform. After this phase period, the agreement is set to listen for event updates from an outer oracle (described earlier in this paper, chapter 2.4.2.1) or oracles and finally execute when the right mix of events is acquired through oracles. (Szakiel, 2022)

2.5 Description of the Research Material

"*Creativity requires input, and that's what research is.*

You are gathering material with which to build."

-Gene Luen Yang-

The academic and scientific literature references the author has used cover the thesis's subject comprehensively. Studying the material and creating the ideation of the complex research subject chosen to write this thesis was interesting. All the used academic research works thoroughly covered the topic. The author has used a variety of academic literature, articles and judicial regulations, as well as highly respected online speeches, university-based data information and various international business reports and surveys to give the basis for the thesis to show how the business world acts in the eyes of compliance function today and what are the prospects tomorrow to make a good profit and excellent business in the end.

The academic and financial world debate over the importance and effects of blockchain technology and its applications and the ethics of blockchain technology in business has arisen enormously. The problem around the subject is not the financial business sector itself but a broad economic business with too much power and a wrong kind of rule jungle that is not under control nowadays. The results have varied more or less from each other in the previous studies, even though they have met a shared willingness for a coherent alignment for the subject to use over the market fields' borders in the business world. A clear need for massive improvements with binding laws and global principles using blockchain technology and compliance function procedures has existed for a long time.

Overall, the author's reference literature in this thesis handled the financial sector intensively, compliance function in the business world, and significantly more deeply the organisational base of technological applications within finance and banking. Other parts of the literature and materials used as a reference were handling blockchain technology and its innovative smart contract application. There was clearly to be seen complexity in the combination of all the subjects, but simultaneously a pure and big desire to put blockchain technology tools into practice in the business world, especially in finance.

Many reference authors have written quite critically about blockchain technology and its applications and methods. However, at the same time, they have still been willing to present all the advantages the new technology can give to businesses and people's everyday life. The literature allowed the author to examine the validity and to find the relevant data on the blockchain, smart contracts and compliance functions separately and together. The literature provided a good understanding of these complex areas from judicial, economic and societal perspectives. The author has done her best to make the result and writing as transparent and understandable as possible and the text to be aligned with the references. The arguments for judgements giving in the literature are reasonable and identify the forms between the research questions. Even though the topic is broad, the literature has given a chance to put issues into a good line that is also useable in practice.

The importance of finances has always been plentiful in the business sector. The last decade has shown how economists worldwide have begun to rethink national governments' role in issuing money and how academics must research novel possibilities to determine future challenges. In contrast, legislators are doing their best to maintain the existing legislation to keep up with the massive change so that business systems and structures do not start to falter. (Birkinshaw, 2022). Over the past decades, the business world has influenced the outcome of political and social upheavals worldwide through the operating structures they maintain. The most notable changes have been the growth of global markets, multi-national business conglomerates, and more over the digitalisation of the whole business sector. Individual company roles have changed enormously, and continental over-border business has raised its volume to a novel level—the same issues concern compliance surveillance, corporate governance rules and principles, and modern technology tools. (Malnight, & Buche, 2022).

The table below lists some essential references the author has used as the foundation for this thesis. All of them have used academic and scientific literature review methodology and, therefore also, justify the author's choice to use the same research method.

Table 1. The Essential Literature to validate the Thesis

AUTHOR, THE PUBLICATION YEAR,	TITLE OF THE PUBLICATION	RESEARCH METHODS	CONTENT IN SHORT
Andersén (2021)	Digitaaliset Rahoituspalvelut	Academic and Scientific Literature Review Method Based on Previous Academic Studies and Literature Review mixed with practical experience from the financial markets	The present situation of digital monetary and financial services and prospects for the future insights
Anjana & Raman (2021)	Impact of Blockchain on Digital Identity: Building Trust in the Cyber world	Academic and Scientific Research Method Based on Previous Academic Studies and Literature Review	Explains the concepts of blockchain and digital identity and how they help actions within the digital environment
Camilleri (2022)	Blockchain in Compliance; Can technology be an enabler towards core aspirations for stakeholders within the compliance ecosystem?	Academic and Scientific Research Method Based on Previous Academic Studies and Literature Review	Explains and shows possibilities of how blockchain operates within compliance function and how blockchain technology gives an added value from the compliance monitoring results

Catchlove (2017)	Smart Contracts: A New Era of Contract Use	Academic and Scientific Research Method Based on Previous Academic Studies and Literature Review	Explains the concept of smart contract and its functioning models
Chen (2022)	Improving Business with Smart Contracts	Academic and Scientific Research Method Based on Previous Academic Studies and Literature Review	Explains the advantages smart contract application can give to the business world in practice
Johansson, Eerola, Innanen & Viitala (2019)	Lohkoketju	Academic and Scientific Research Method Based on Previous Academic Studies and Literature Review with practical experience from the financial markets	Shows the multiple possibilities for using blockchain in the business world. Also handles smart contract applications and their use in practice
Kasatkina (2021)	The Interpretation of Smart Contract in the EU and the USA	Academic and Scientific Research Method Based on Previous Academic Studies and Literature Review with practical experience from the financial markets	Shows the need for improvement and updates in the international legislation to enact smart contracts' use in practice

Laininen (2021)	Compliance Toiminnon Järjestäminen. Käsikirja Finanssialan Toimijoille.	Academic literature review method combined with qualitative research, including interviews conducted with compliance officers in the financial sector	Shows the present situation of compliance in finance and illustration of solutions related to control measures, both legislative and general compliance principles and rules

The table shows the primary materials the author found as the most relevant for the thesis. However, the author also studied various other materials listed in the reference list among the material in the table. All the relevant information from the references was reviewed critically and profoundly, honouring their achieved results.

3 METHODOLOGY – An Academic and Scientific Research Study

"Methodology is applied ideology."

-Mason Cooley-

This thesis study is concerned with the compliance surveillance function and the impact of blockchain technology and smart contract application in monitoring procedures within financial businesses. The author had three different research approaches from which to choose the most suitable one, and these methods were qualitative, quantitative and academic literature research methods. Qualitative and quantitative research methods are the most often used in academic and scientific research studies. An academic literature methodology on behalf is not that commonly used in the thesis, but the author found it best suitable for the chosen topic. The author presents here below the main features of these three methodologies in short.

1) A qualitative research method is usually based on conducting interviews and content analysis. It aims to create novel insights into the research questions. When using qualitative research, meeting the results requires time and analysing a considerable amount of data collected from the interviewees. Qualitative research takes place where there is a need to create new ideas for traditional and old-fashioned practices which are not suited anymore to business practices. A qualitative research method does not examine statistical data on the subject but researches previous research in the subject business field in a detailed manner, implements studies with practicalities in a realistic environment, and focuses on presenting results gained from these. The method offers clear and direct outcomes for a particular topic and focuses on analysing research results and creating specific and practical proposals for a particular company. However, the method strategy is usually highly based on the researcher's professional experience on the subject and may therefore provide misleading results forgetting the objectiveness needed in reliable research. It is more sensitive than rigorous because of the personal touch and the features of interviews of individuals. (Bem & Lunenburg, 2008)

2) A quantitative research method concentrates on collecting statistical information on the research subject. The numerical data is analysed through a selected group specific to a particular company or business field. The results are usually generalised to a broader amount of companies and purposes in the research field. The method studies different variables and seeks cause-and-effect results. Usually, the research method includes a variety of graphics and frequency tables helping to visualise the hypothesis and estimates of the collected sample data. A quantitative method is proper when studying a large amount of data providing direct comparisons between different statistics. When using the method is easy to replicate research as the results of data collection procedures are standardised and reported. However, the method is inadequate to present complex and novel concepts and subjects. Further, the method is concentrated only on a specific subject target that, narrows its operating research environment and lacks the understanding of outer contexts. (Bhandari, 2022)

3) An academic literature method is based on reviewing previous research on a specific topic. The method requires searching for relevant information using particular keywords and identifying gaps to justify new research on the subject. The process involves seeking interesting arguments that give a solid foundation for the thesis by summarising and criticising the reference literature materials. The academic literature method also teaches how to learn the study subject's essential elements and critical factors. When using the literature review as a basis of the thesis research project, it is possible to highlight the strengths and controversies in the subject area. However, finding proper and comprehensive reference material can be challenging, especially if the research topic is novel or covers only a niche and specific subject area. (Knox College Library, n.d.)

The author wanted to do the work accurately and concluded that an academic literature methodology gives the best practical writing and firm ground for facilitating the job correctly. The research question lies on a novel technology to be used in the financial sector and within compliance function, where there still needs to be more a real-life and practical experience of these technologies which the author could have used as a basis for the thesis research. Therefore, the author concluded that conducting interviews does not give enough or any added value to the thesis because the knowledge of the subject is still a very niche basis in the financial sector. For the same reason, producing statistical information was also out of the question to use as a basis

for the thesis. Qualitative and quantitative research methods were simply unsuitable based on the novelty of blockchain technology innovations and smart contract applications. Because of the novelty phase of the subject, there is no commissioner in the thesis either. Instead, theory-based academic literature review research addressed a solid base for the author to form perspectives and findings to idealise the ways how to proceed in the thesis research presenting blockchain technology tools and applications in compliance within the financial sector environment.

3.1 Designing the Research Strategy and the Data Collection

"Research is formalized curiosity. It is poking and prying with a purpose."

-Zora Neale Hurston-

Appropriate thesis research requires a functioning design method to conduct relevant content for the chosen topic. The strategy helps the author identify the research questions and search for useful material to base the thesis on. Considering the reference criteria requires a thorough overview of the topic and thinking of which materials could contribute the most to the desired outcome. The ideation begins with reviewing what has previously been studied and formulating the purpose and scope of the thesis. The research strategy includes first deciding the keywords and drawing the framework for the thesis on which base the appropriate databases and materials can be found. Inclusion and exclusion criteria for the sources are based on the strategy and research method. The author must conclude the aim of the topic and have an idealisation of the importance and interest features of the study on the subject field. All these issues give the reasoning and validity for the research. The author must transparently provide the decisions to conclude a proper research approach. The quality of sources also gives validity and justification for the thesis. (Snyder, 2019)

The author has used an academic literature review as a research method because knowing the theory basis appropriately is necessary to properly understand practical operations, processes and business models. The other essential reason for using the chosen research method was that blockchain technology and its smart contract application are such novels that there needs to be

more practical and experimental knowledge of these innovations before conducting verified research by quantitative or qualitative methods. The author concluded that quantitative or qualitative research methods could not give at this point any added value dimensions for the content of the thesis or its results to be suitable for the subject.

The creation of standard lines for a detailed thesis to examine the issue in multiple ways and being transparent with references, in the end, is one critical advantage of academic literature review methods. An academic literature review method allows the presentation of essential evidence of the subject on a meta-level to show areas in which more academic, economic and societal research is needed. The method also helps to present critical elements of the theoretical framework and create conceptual models that can be implemented into practical procedures. Knowledge production is accelerating tremendously, and it is hard to keep up with all the novel innovations in the field and stand at the forefront of the change. An academic literature review is a research method which is a more or less systematic way of collecting and synthesising previous research. The literature that creates the research's foundation should be diverse yet cover the subject in its entirety clearly and comprehensively. (Snyder, 2019)

The data collection process within academic literature review method consists of systematic research of the materials that have been previously done and in some cases also tested in practice. Studying previous data researches helps to understand the present situation in the research field. Also, it gives tools to predict possible future prospects and provide novel kinds of solutions for the gaps found in the research material. Data collection within the method must be done systematically and by an accurate evaluation manner. The selection process includes evaluating relevant material among basic published literature, researches and surveys, articles, documents, records, experiment works, and even some cases interviews if these have been suitable for the research topic. (Snyder, 2019)

As mentioned, the author conducted the thesis study using a literature research method, searching the existing academic and scientific literature monologues, articles and social, economic, and judicial research studies on the subject. The material included written works, officially published articles, academic and scientific online-based research and global universities' online-data library materials. In addition, the references also included webinars and online lectures in which the author took part, as well as some online educational video speeches in which the author listened

with an intensive learning spirit. The reference sources were selected with the help of well-defined keywords and within a precisely named and delimited subject area. The critical keywords through which the author searched for the relevant data for the thesis were; banking, blockchain, business, business risk, business strategy, business world, compliance, compliance function, compliance surveillance, digitalisation, economy, finance, financial sector, modern technology, risk management, smart contract and technological innovation. The research field of the subject was selected as the financial sector, as it is one of the significant business fields supporting the world economy and strengthening the global social structures and infrastructures of nations for the better. The financial sector is also at the centre of digitalisation and facing significant changes, which made the research project enjoyable. The author did not conduct any thorough and detailed field research, such as interviews or questionnaires, because the novelty phase of blockchain-based technological applications adoption in the financial sector is still going on even after 14 years of their first public presentation, and proper experimental data of their use in practice is not yet published.

The academic and economic world is currently debating the importance and effects of blockchain technology and its applications and ethics when using them in business. The outcomes of the thesis background material sources varied more or less from each other even though there was to be seen a shared willingness to a coherent alignment for the subject to use over the market fields' borders in the business world. The debate and criticism between the materials showed up depending on the perspectives from which point of view they were written. Purely academic and scientific sources have based their views on only previous theory-based studies (e.g. Anjana & Co, (2021), Camilleri, (2022) and Catchlove, (2021)). Mixed-based material sources on behalf have based their knowledge base of the subject on both academic and scientific data and practical experiences of the subject (e.g. Andersén, (2021), Johansson & Co., (2019), Kasatkina, (2021) and Laininen, (2021)).

From the author's point of view, evaluating the reference literature and other material was a challenging and time-consuming process. Considering the importance of every research, the work was done appropriately and thoroughly. The reference data information consisted of descriptive, scientific and practical knowledge of the subject or a combination. The chosen research strategy offered novel insights and opened the path beyond previous research providing purposeful ideas

for the thesis content. The academic literature research method allowed the formation of a specific style for the research structure. However, it paid, at the same time, also close attention to previous studies' content analysis and their findings. In the end, the contribution of the research study was to create value for the aimed business field. The research strategy made it possible to explain the reasons behind the decisions and development proposals for the market field to be used in practice.

3.2 Methodology Approach towards the Subject

"Nothing is right and wrong in research. Research is addiction with an endless search for its drug."

-P.S. Jagadeesh Kumar-

Academic and scientific knowledge is based on rigorous literature approach research that analyses previous research findings and the present state of the topic. One of the most popular approach techniques of the academic research literature method is meta-analysis. It uses multiple research sources and aims to provide well-analysed and synthesised outcomes. Meta-analysis is one of the most effective and accurate ways to conduct appropriate research studies in business and management, having still scientific solid features. With meta-analysis, it is possible to create more insights on the topic and include novel operating models to be put into practice in the business world. Usually, the meta-analysis approach combines single studies and conducts precise and accurate research results. The meta-analysis also combines reference collections into integrated form, providing a valuable summary of knowledge of the subject, indicating different directions between the studies towards a common goal. The approach offers and secures the validity and reliability of the thesis structure to be comparable in the academic environment. (Paul & Barari, 2022)

There are two main definitions for the meta-analysis approach in the academic world. However, these differ a lot from each other and have created confusion on how the approach is carried out in different research. The first definition describes meta-analysis as a large amount of sources and their findings being studied and evaluated statistically with an in-depth discussion on the topic,

including the specific purpose of the results (Glass, (1976) in Shelby & Vaske, 2008). The second definition explains meta-analysis as a quantitative measurement method, which concentrates on the source materials amount and common strengths between the sources and analyses them coherently (Gliner et al. (2003) in Shelby & Co., 2008). However, there is not a clear, precise single approach to conducting a meta-analysis, but it still forms a rigorous strategy and framework for an academic-based research study. Specifying the relevant source material needs a systematic and thorough conceptualising process of the problem, keywords, and independent style to create justified study results (Shelby & Co., 2008).

The methodology consists of researching, analysing, evaluating and uniting the used reference combined with the author's perspectives and insights on the subject. The literature review approach is an integral part of the thesis, enabling the study of the topic's history and features and giving justification for the research. Searching for relevant literature and other material to assess the content and findings of references is one of the process's hardest and most time-consuming parts. The determination process requires precise accuracy to understand the most critical parts of the key results and divide them into different categories depending on whether they are similar to each other or do they vary from one another. Finally, it is essential to consider the argumentations in the literature to create a solid research foundation to develop the subject further. (Auraria Library, 2023)

The purpose of selecting the literature review method approach is to support understanding the previous evidence around the research topic and give the justification for the novel research project. The process can be described as a puzzle where finding the right pieces in the right places is evident to create a coherent picture of the research subject. Conducting a literature review approach appropriately requires identifying all the areas of the thesis in detail. (Western Sydney University, 2017) The author needed to be critical towards the references to write novel academic research text that adds value to the previous research. This meant summarising and analysing the references with the acknowledgement of proper citing and referencing manner. The author's task was to present novel arguments, development proposals and opinions based on previous research and evaluate the current state of the research topic. All the novel thoughts were to be aligned with the references used, with the key points contributing to the knowledge of the subject.

The meta-analysis method relies on various strategies in the selection of relevant previous research. The task is, however, challenging as it requires a broad understanding of the subject. The validity and justification for the research project are based on the specificity of the used academic and scientific material and being able to cut off the irrelevant research studies. Meta-analysis focuses on knowing what has already been studied and what strength factors provide the validity elements for further research. The reference material used in the meta-analysis must be sufficiently broad to study the earlier findings critically and provide additional information on the topic compared to previous research results. Overall, meta-analysis's strength is its flexibility in adapting novel ideas to the research subject. (Mikolajewicz et al., 2019)

The author carried out the research process of reference materials by comparing the contents and results of different sources with each other aligned with the selected keywords, the current state of the financial sector and business life, and the possible future prospects of the topic. The keywords have been explained in the previous chapter, 3.1. "*Designing the Strategy and the Data Collection*". The author used domain-, theory-, and method-based reviews when conducting meta-analysis in the research process. Combining various perspectives gave the author various ways to evaluate the validity of the references and find academically applicable and appropriate manners to conduct the research. The multidimensional perspectives in the materials required careful and strict evaluation throughout the whole process to achieve enough coherent thesis content and outcome to present as an academic study and to encourage also further development within the topic.

The method allowed the creation of a detailed thesis being able to examine the issue widely through various sources of information. The used academic literature also made it possible to create reliable and transparent research results throughout the process. With the help of meta-analysis data sourcing, it was easy for the author to eliminate unimportant material from the references by using the keywords and the concepts of compliance, blockchain technology and smart contract application placed in the financial business framework. The relevant literature and materials were studied constructively. The main content of the thesis is discussed in Chapter 4, which explains as clearly and logically as possible the findings and their justification for verifying the importance of this thesis.

4 DISCUSSION – The Essential Content of the Thesis

"The aim of argument, or of discussion, should not be victory, but progress."

-Joseph Joubert-

The discussion part of the thesis is the most significant one. It presents the essential content of the research. The discussion explains what has previously been studied and provides information on past and present situations, and gives insights into the possible future prospects. Writing the discussion part of the thesis also requires critical thinking to enable the author to provide novel insights towards the subject and the gaps inside of it. The discussion gives the validity and justification for the research study as a whole. It is more than essential to study the theories behind the practice. The author has explored the subject's meanings, concepts, and practical procedures in the context of the financial sector.

There has been massive attention on integrating blockchain technology innovations, especially smart contract application use in the financial sector and banking worldwide. Academic and scientific researchers have begun to study the features and functionalities from both theoretical and practical points of view. The development actions have provided a lot of interest towards implementing various technological operations in the field. There are multiple directions to go further with blockchain technology innovations in finance in practice. However, it is to be remembered that practical actions require more added theoretical research for which the academic and scientific research community is ready. (Liu et al., 2021) Today's business is very data-driven, and development with digitalisation is continuous. The ability to present data in a sophisticated and, at the same time, quick manner has become a must-have skill in every sector of the global economy. Thanks to a novel generation of technological tools, creating data visualisations to communicate more powerfully is easier worldwide.

However, many obstacles still exist to overcome in adopting and implementing digital processes in finance. All societies worldwide should join forces in all sectors of business life to develop the practical procedures to integrate modern technology innovation applications to promote better the security of individuals and business actors in the digitalised environment in business activities.

Many academic and economic researchers are very interested in developing modern technological innovations, which require intense analysis of operating mechanisms in the finance field. Worldwide cooperation in creating and adopting potentially practical blockchain-based technical applications is needed. The central banks and regulatory and surveillance authorities worldwide should provide a good and properly functioning regulatory system for the financial institutions and other business companies to secure individuals' and customers' legal rights and business interests and reduce the possible risks in the monitoring operations. Banks and other financial institutions should view the advantages of blockchain and its application with an open mind to provide better content in their services. (Liu et al., 2021)

4.1 The Execution and the New Functionalities in Finance

”The challenge for banks isn’t becoming “digital” – it’s providing value that is perceived to be in line with the cost – or better yet, providing value that customers are comfortable paying for.”

-Ron Shevlin-

Today and in the future, the financial functions’ main element lies in the management processes within the used methods to help with decision-making procedures in business finances allowing businesses to manage in the modern technological-based world. The business world environment is in the middle of constant change. Even though financial conglomerates’ monitoring and surveillance is placed chiefly internally within the business, the entire industry observes the time external aspects and sights changes happening. One of the essential functioning processes for financial services is to ensure and provide accurate, up-to-date data information for all visible in a trustworthy manner. The range of provided information by financial institutions varies a lot. The most common and important are the business costs, revenues and cash flows, break-even points, profits and losses, and business performance framework.

The execution in finance also covers a remarkable amount of information and contribution to business plans and decisions, providing needed advice for business growth and the winds of economic changes. One of the primary elements in the execution of financial information is to help

businesses to achieve their desired goals and gain better profits from their services and product supply. (Marr, 2022) Financial execution is also known as financial management in general. It has been proved by economists and academic researchers around the world that finance is mostly the blood running in vessels of the company's entity, meaning that without it, business would not work as wanted, decisions to make cannot be made with confidence, and profits do run over costs. When acting correctly and according to the legal rules and regulations, different business obligations and principles, other guidelines coming internally and externally and obeying the instructions of compliance surveillance following the code of conduct, finance management gains profit and a good reputation in the markets as well as acquires success for the business.

An ability to drive business productivity and cut costs within business procedures and processes simultaneously, staying competitive and being at the top of the mountain of technological changes and novel innovations is a driving factor and an essential element for economic transformation execution within modern specialised tools and applications. The traditional forms of providing financial services and supplying financial products have increasingly been placed almost totally with digitalisation and its different functionalities. The novel waves of digitalisation are taking more and more space within the business markets, creating new forms of payments and multiple applications to use by customers, partners and others globally, gathering people into closer connection with each other via online and different network processes and platforms to act in real-time around the clock. (Marr, 2022) People expect these modern and intelligent services and products to be offered around them. Therefore it is also to be understood that if the traditional companies and providers do not provide these technological applications to use, it will be natural truth that novel tech and digital-born start-ups (so-called FinnTech companies) will step out from their foxhole offering a super-hyper variety of everything possible and even impossible for enthusiastic customers and potential partner and co-parties possessing modern thinking encouraging technological changes in the business.

It is evident that any business, including banking, must change its tactics and pace to catch up with modern development. This may mean having the ability to invest in dramatically different value propositions or business models before, which on behalf requires an ability and a willingness to take risks to maintain the competition in the markets and gain more growth for a successful business. There has risen a new wave of competition in the financial markets. New entrants,

commonly called FinnTech companies, do not have the burden of traditional banking legacy systems. They are to operate in the financial sector more lightly, effectively utilising the tools and applications of modern technology.

In contrast, the traditional banks and financial conglomerates need to catch up with the reforms due to the traditional operating models on which they were once built and still operate to a large extent. However, a change can also be seen here, and traditional banks are boldly striving to participate in the competition by developing their old services and products into a digital format. Traditional banks must trust their inherent strengths and improve operating methods and models. However, there is also a problematic issue with digitalisation in finance. The transition period always creates uncertainty in business. When the availability of different information and the amount of various data increases, people's ability to work with a good command decreases. However, modern technology tools and applications can give a chance to work at a higher level, make better content, and gain better profit in business. (Malnight & Buche, 2022)

A well-known fact is that no technology is a guarantee, but many innovations have much to offer. Therefore it is more than essential to explore all the possible options, adapt those that work in the business, and continue to expand and grow those options within the financial services. Smart contracts and blockchain technology enable better efficiency and create novel models providing better user information. The technology can develop more streamlined and more straightforward processes in the near future. In the middle of the transition period, development happens daily. Smart contracts and blockchain technology give an extremely trustworthy digital system for the markets to act more stable, flexible, and transparently to support the business.

The fundamental dynamic within modern technology is that the financial sector becomes more and more competitive as they create more efficiencies and more novel tools to use in banking. There will no longer be a need for intermediaries to generate financial services and products. Asset management wants to give power to users at a lower price but a higher level of security and risk mitigation. Blockchain technology and smart contracts can enable this in real-time and with the maximum possible degree in different business fields and every business area. In essence, a smart contract is just a pile of digitally executed sentences designed to verify, carry out and participate in the performance of an action. In the context of current developments, it is now possible to see how software agents coded in smart contracts can be directed dynamically to manage many different activities across several other business sectors in the near future. Smart

contracts enable real-time visibility for business procedures. Enhanced monitoring and certification at every stage of the contract process reduce the risks associated with security issues and misuse of the technology. The development of smart contracts is on the rise. In the near future, more and more different actors and people will have a practical opportunity to use smart contracts in other business models, especially in the financial sector.

Blockchain-based cryptographically coded smart contract platforms typically involve multiparty collaboration, improving asset transfer efficiency and transparency. Apart from enhancing businesses' efficient action mood and competitiveness on the markets, most technological solutions, especially smart contract models, are positioned to achieve common goals for all actors in the business relating to their well-being in the modern sharing economic business world and which are more or less assessed from the perspective of each party's engagement within the smart contract. Smart contracts are beneficial today and in the future for facilitating and creating trust in the business markets and widely in different economic contexts. Smart contracts are valuable and clever tools, especially in trading digital financial assets with valid ownership transfer, banking and credit services, logistical procedures, tracking the provenance and course of items, distributed storage, and using renewable energy. Overall, smart contracts are only helpful in building successful business services and supply of products for people over the world. (Ming Tan & Co. 2021)

Smart contracts take advantage of the security of blockchain to create a heightened level of trust that traditional contracts cannot provide. Smart contracts are saved and enforced accurately and immediately. Furthermore, these agreements are encrypted and thus cannot be lost or manipulated easily. Smart contracts and the blockchain provide significant autonomy and transparency for consumers and producers. With smart contracts, no legal intermediaries are needed, allowing for convenient consumer deals. (Chen, 2022) Despite the nature of smart contracts and their primary mission being only cryptographically to implement business conducts and principles conducting different activities, processes and transactions encoded into them reacting to a specific set of parameters and seeming extremely complicated, they are real-time and money savers applications effectively. Today's modern technology tools only starters for the future's aspects. It is up to humankind to implement and adopt modern technology properly into practical use and as a part of our business. Smart contracts are here to stay for good without any hesitations.

4.2 Combination of Compliance, Blockchain and Smart Contracts

"The essential characteristic of digital information is that it can be manipulated easily and very rapidly by computer... Computational tools for transforming, combining, altering, and analyzing images are as essential to the digital artist as brushes and pigments to a painter."

-William J. Mitchell-

Blockchain technology gives a unique and novel method to store digitally signed documents in the cyber community securely. Especially in finance and banking, the exchange networks of different documents and agreements are emerging. People can follow the state of their papers in the blockchain network systems and make needed changes throughout the negotiation process. Blockchain technology enables cost-effectiveness in business functions and, in this way, gains better profit at the end of the process. The transparency feature of the DLT system makes it possible to achieve content for the documents that please all the parties involved.

Businesses exploring and willing to use blockchain technology and smart contracts must examine the potential compliance implications of rules and regulations and different tax issues related to using smart contracts and blockchain technology, which will present novel kinds of compliance nuances and objects for surveillance monitoring and reporting matters. Compliance requirements are closely connected with each business' operational models, financial scenarios, and business goals. Therefore the objectives of compliance functions and their need to use blockchain technology advantages vary from corporate to another. (InnReg, 2022)

It has already been proved that businesses and their compliance functions will benefit tremendously from blockchain technology and smart contracts simply because they simplify and automate otherwise complex, challenging and tedious processes. However, despite many advantages coming along with the smart contract, the regulation and the rules of law concerning blockchain technology and smart contracts are still in their infancy. Therefore it is more than necessary to carefully follow up on national and international regulatory authorities' statements and guidelines about using smart contracts within compliance surveillance. Before there are enacted laws

directly applicable to smart contracts' use situations, the traditional non-digital contract regulations will apply equally regardless of whether the form of contract is on paper or digital. However, these do not cover the nuances and characteristics of smart contract features. Emerging smart contract regulations will create requirements that need enhanced compliance surveillance capabilities. (Liu et al. 2021)

Blockchain technology can secure and simplify each decentralised transaction. Most payments will be transformed by blockchain in the next few years. Other financial services and products will create a mainstream manner to operate with banking systems and other businesses in which protocols and operations compliance function is monitored daily even though reporting happens only quarterly. However, adapting business blockchain technology advancements in the real world will take some time. At the same time, authorities and legislators need to catch up in the technical development procedures with the enactment processes of novel laws and regulations to control the methods and operations in finance and business. The introduction of encrypted smart contracts may be the lifeline for the financial sector and business life. The use of smart contracts will help with privacy issues and obeying data protection rules. All the systems will become quicker and automated while the cost volumes will drop significantly. Overall, blockchain technology enables faster transactions, which helps to prevent hackers and cybercriminal assaults from attacking encrypted data and abusing financial and financial services and products.

As time passes and businesses and people are using more and more increasingly modern technology tools and equipment. However, appropriate legislation, rules, proper guidelines and surveillance methods must catch up to the development. It will likely take longer before they align with novel technological models and methods. At the same time, businesses and individual investors must stay alert and open towards future outcomes of using blockchain-based applications because there are yet to be legitimate legal regulations and rules which can control suitably smart contract applications. There need to be proper standards for using proof-of-stake, which could prohibit illegal business operations. Smart contracts will become a crucial part of finance, economics, and society sometime in the next five years. Blockchain technology tools and applications, especially smart contracts, will significantly impact compliance functions. Using these novel technological tools and applications within compliance will help compliance officers from the operational burdens of their work tasks. Smart contracts can make the traditionally complex and

bureaucratic operational processes within compliance functions less tedious and ensure that all the legal requirements of the surveillance are met accordingly. (InnReg, 2022)

Numerous international IT - researchers and economists worldwide have proved that blockchain technology can make compliance monitoring of business operations lighter and more transparent in practice. It also makes it possible for the relevant results of the monitoring to be available for each part of the work community whose work tasks and operating methods have been monitored. The compliance system was initially built to be narrow and only available to a specific party (mainly top management). The blockchain system and smart contracts enable the transparency of compliance monitoring and the results and development proposals for the entire work community. With the help of smart contracts, however, it is possible to limit essential information to the group of the work community to which it belongs explicitly because no data needs to be shared widely. This feature of smart contracts protects the confidentiality obligation even within the business. Blockchain technology can also prohibit unwanted or questionable transactions and agreements if there are notions of misused, illegality or other misbehaviour in operational procedures. The data and outcomes provided by DLT are immutable, verifiable and traceable, which creates a solid foundation for transparency obligation. This achieves one of the main goals of FIs' operations, ensuring everything is done according to due diligence principles and rules. (Camilleri, 2022)

When desiring better success and better profit for the business, actions require boldness and strength of will. When implementing novel technologies, procedures and processes into action within the entire organisation, there will inevitably be many challenges to face and overcome to meet the desired goal. Blockchain technology and smart contracts are widely considered more secure than traditional databases and "old-fashion" contract models. However, many areas of performance and security still pose smaller or more significant barriers to adopting novel technology. However, we must remember that blockchain and smart contract models are specifically designed to consistently ensure data integrity across the network, although more robust infrastructures are prerequisites to widespread adoption. Within the unification of compliance rules and principles, overcoming obstacles and breaking down the walls to the emergence of novel technological tools is possible.

4.2.1 Legal and Regulatory Rules of Compliance align within Blockchain and Smart Contract

When combining compliance function with novel technological tools, one must focus on legal and regulatory issues, which regulate the business world's requirements within the economy and society. Because compliance functions are traditionally quite rough and bureaucratic, adopting blockchain and smart contract models into business poses challenges and some risk factors to face and overcome during the implementation phase. It is also good to remember that technological development moves faster than legislative reforms.

Transitioning to cutting-edge technologies has often involved a significant hurdle, and transitioning to blockchain technology makes no difference. It is common knowledge that the existing laws were not written and implemented into action with distributed data exchange (blockchain) or self-executing contracts (smart contracts) in mind. Therefore, the compliance requirements within novel technological developmental methods have raised the need to bed uncertainty about what laws and regulations are applicable and to think thoroughly about the differences and powers between regulators in different jurisdictions who are in charge. There is no settled "*law of blockchain*" nor "*law of smart contract*", so the business world must interpret existing legal and regulatory concepts in the light of novel technology. As the scope and breadth of use cases increase, the legal certainty will also increase, but this will take time. Any project must embed legal and regulatory compliance into the design at the outset. (Legal and Regulatory Compliance, 2022)

In the business world, compliance function is one of the most critical processes for organisations to manage during challenging competition games in the market fields. Compliance function tasks are complex, requiring time, iron nerves, persistence, patience, and creative ability to see beyond challenges and willpower to take things, even difficult ones, forward to the management ladder and the administration's awareness. However, there need to be more sufficient resources, and the obligation to prevent with all possible matters violations of laws, regulatory rules and organisational operating instructions, as well as market field standard policies, creates stress factors and additional pressure factors for work tasks. For this reason, it will be essential to enact novel uniform laws covering the holy trinity of compliance, blockchain and smart contract in the future. Compliance functions will benefit significantly from blockchain technology tools, especially smart contracts, as they will comprehensively simplify the traditional bureaucratic and tedious compliance system. However, these novel technologies can only be used, in a usefully practical manner, when appropriate laws, regulations, economic rules, and international guidelines are in place.

Blockchain technology-based documents are secured by each party's digital signature or cryptographic hash, described earlier in this paper. This creates special privacy issues for the documents and is aligned with GDPR. Blockchain is technologically designed to ensure the cyber network's data correctness. However, there is a great need for even more strictly formed transaction models from the technology to be adopted widely in different business fields. (Camilleri, 2022) Within compliance surveillance functions, it is necessary to understand that the lack of legally binding laws giving certainty for the daily business challenges the business participants in their duties. However, blockchain can cross international borders and different jurisdiction areas worldwide because the nodes acting in the blockchain can be located anywhere. As a result, in the near future, blockchain-based applications can choose the valid legislation suitable for its functions and in whose jurisdiction one of the parties to the blockchain is located. Naturally, this legislation selection procedure requires the approval of each application used as a basis for operation.

Compliance obligations' financial and judicial challenges with properly unregulated blockchain applications can negatively affect customer service and experience, causing business and customer losses. Furthermore, KYC protocols and complex AML and CFT regulations raise challenging procedures for banks and other traditional financial actors to follow up, giving an unwanted advantage to FinnTech companies to gain profit in the markets as their operating models are easier to manage in terms of structure. The financial sector's compliance functions are increasingly searching for solutions for the active and legally acceptable manners to use blockchain and its applications within their daily processes to stay in the harsh competition in the business field. (Camilleri, 2022)

When examining the liability issues concerning blockchain and smart contracts in the context of compliance surveillance, we must focus on the technology's regulatory regime. This means carefully assessing the nature and activities of a blockchain network and its participants and determining where the specific platform and its participants sit within the regulatory landscape. Blockchain poses novel and different risks due to the nature of the technology and manner of operations, including security, confidentiality, regulation, taxation, data protection, immutability, automation and decentralisation, among other risks. The network must be carefully assessed and documented within each layer of network participation. Smart contracts' use on behalf may present enforceability questions if attempting to analyse them within the traditional legal contract definition. Many smart contracts are structured to automate actions, instructions or clauses of

separate legal agreements, and others are structured directly as legal contracts and have the full force of law. In each case, it is essential to understand how the smart contract in hand meets the preconditions for contract formation in different jurisdictions. (Legal and Regulatory Compliance, 2022) In compliance, clear legal documentation is necessary in each use case of blockchain technology and smart contracts. Attention to data protection regulations, AML actions, and general cybersecurity issues is inevitably essential.

4.2.2 Re-Innovating Business Strategy Rules and Practical Operations

In today's and especially tomorrow's business world, novel business strategies and management methods are necessary to gain better content and profit for businesses. Companies must update their business strategies and operating models to a novel level to succeed. An innovation strategy is essential for companies wishing to gain a competitive market advantage. It is a detailed plan and everyday innovation mission to create novel values, products, and services that potential customers are willing to pay for and accelerate future organisational growth with a clear vision and an effective mission statement (Dieffenbacher, 2022). Introducing blockchain technology and using smart contracts within business operations requires persistence and belief in future insights into developmental issues in the business world. These novel technological innovations must be implemented into business strategy to promote the entire work entity. The basic rule of an operational strategy is to construct a commitment to coherent, mutually reinforcing methods aimed to achieve a common specific competitive goal in the markets.

Choosing the best strategy requires analysing various options to achieve the desired goals. One of today's and especially tomorrow's strategic business plans has started to utilise the so-called innovation strategy, saying an explicit roadmap for desired future. It is essential to separate the terms innovation and design from each other. Innovation is about creating novel value for practical services and products people are willing to pay for and use. In contrast, on behalf, strategy is the plan for harnessing marketing, operations, finance, and R&D to support achieving the competitive goal. However, it is possible to mix these two components e a re-innovated business strategy, which concerns more mapping of the organisation's mission, vision, and value proposition for defined customer markets and better cooperation with stakeholders and business partners. (Kylliäinen, 2018)

When examining the benefits of business innovation strategy, we can quickly notice the value of blockchain technology and smart contracts as very handy in facilitating strategy planning, especially the requirements for its implementation. By combining this novel IT innovation with the strategy structure, compliance monitoring tasks will also become more accessible, and the preparation of operating instructions will become more open and reliable, covering all task areas of the organisation. It is proved by various market fields' most successful operators that innovation strategy method and model simplifies and structures the organisation's principal procedures, processes, and goals to achieve the best possible outcome and give an extra competitive advantage in the competition between businesses.

Overall, the business innovation strategy model, which means the development of novel, unique concepts supporting an organisation's financial viability and the processes for bringing those concepts to fruition, aims to realise novel revenue sources by improving product value and how they are delivered to customers. The functional model level focuses on driving profitability, competitive advantage, and value creation. The most important aspect of the process is that novel innovations are brought into the strategic alignment and seamlessly integrated into the organisation's everyday operations. Therefore, organisations must communicate clearly and support the workforce in coping with their work tasks per the management's instructions. This action helps to make innovations' adoption a continuous practice maintaining the competitive advantage in the markets and gaining better profits and excellent customer experiences. (Kylliäinen, 2018)

When desiring better content and better profit for the business, the management must include the implementation of blockchain and smart contracts in the business strategy directly so that using these technological applications is openly, clearly displayed, and visible to all. Implementing novel technology models is challenging, so it is good to do it at the start openly and honestly. Blockchain functions and the use of smart contracts should also be included as an integral part of the compliance program. In this way, their monitoring is continuous, and risk assessments can be performed appropriately. The compliance action programs include various detailed control plans as part of business strategy planning, where the encrypted and well-protected operating models of smart contracts can be used precisely.

The financial sector invests amounts of money into research and developing programs and processes to utilise blockchain technology and smart contracts within their businesses. Smart contracts execute themselves to save time and money and potentially lead to fewer opportunities

for error, misunderstanding, delay or dispute. Smart contracts manage the approval process between the counterparties, calculate the settlement amounts and transfer the funds automatically. Blockchain technology, on its behalf, applies to moving any object. There are various use cases for smart contracts inside financial services. When managing expectations, it is essential to understand what can and cannot be done. Smart contracts can be powerful instruments enabling people to do business with others without knowing them. Still, they have the security offered by blockchain technology, which is necessary for them to take measures because similar encrypted information security is impossible in a reliable way offered through traditional intermediaries. (Planet Compliance, 2022)

An essential part of the organisation's strategy is the annual calendar of the compliance function, which describes regularly repeated actions to ensure regulatory compliance and manage compliance risk. The purpose is to map compliance procedures periodically and to predetermine the timeline by which the policies will be implemented. In this way, the implementation of the strategy, also in terms of compliance operations, is organised efficiently, systematically and promptly. In the strategic planning of the compliance function, it is essential to consider the national and international obligations that regulate the organisations' business operations equally to a consistent extent. (Laininen, 2021)

In tomorrow's business world, ever-increasing competition raises the stakes for success and challenges companies to innovate their operating methods to an increasing extent. The challenges and applications related to the introduction of modernising technology are here to stay. To survive at the heart of the change in business life, one must be able to adapt traditional methods to the application systems of novel technology, specifically blockchain and smart contracts. The new era of information transfer in business services and products is at hand. It challenges business life, people's ways of working, and viewpoints in managing business affairs. Using blockchain-based smart contract applications help the burden of compliance officers' work tasks, especially within financial conglomerates, bigger banks with multiple offices and other more extensive financial institutions where the management is dispersed in different offices and diverse location. Through the online functions of the cyber world, it is possible to be in up-to-date communication, and everyone gets to see the results of compliance monitoring and development proposals simultaneously. The inherent feature of smart contracts also enables the content of necessary documents to be examined, negotiated, and signed simultaneously.

4.2.3 The Real-Time Confidence for Transparency and Accountability in the Business and Monitoring Process

In today's business world, trust, transparency, and open honesty within organisational operations, both in the inner working functions and towards customers and stakeholders as well as competitors, is the main key element for a successful business. At this point, we must notice that on the other side of the coin, the cocktail of intense competition, nontransparent financial products, and unsustainable yields is an actual poison for a vibrant business. Economic magazine Forbes (2.3.2022) has stated that "*business transparency is the process of being open, honest, and straightforward about various company operations. Transparent companies share information about performance, small business revenue, internal processes, and sourcing, pricing, and business values*". Transparency is one of the most valuable assets in customer acquisition and making good content with stakeholders and business partners. Successful businesses are making an enormously golden profit economically and reputationally by openly sharing most of their operational procedures, methods, and processes in the markets.

It is common knowledge that trust is an antecedent and consequence of transparency, which is necessary to create a sense of trustworthiness and accountability in business. Trust implies a willingness to assume the risk that goes along with taking action based on reliance on another. Transparency on behalf implies that organisations will go further the extra mile to ensure stakeholders and business partners are well-informed of up-to-date business information, from which, as a result, the business itself will achieve success and a better market position. There is no hesitation that trust is the main advantage accruing to transparent organisational operations. Social responsibility and ecological sustainability, in addition to profitability, are the core ethical principles by which an organisation will be evaluated as to whether or not they are engaging in responsible business management. Internally and externally transparent organisations have a more tremendous competitive advantage. Transparency enhances organisation-wide understanding of the competition, which allows organisations to improve the differentiation of their product offerings to targeted consumers. This benefit is further facilitated by greater collaboration and cooperation with stakeholders. Transparent organisations are also generally more committed to stakeholders than nontransparent organisations, leading to healthier stakeholder relationships and better business practices. (Parris, Dapko, Arnold & Arnold, 2016).

The transparency of financial and non-financial information is one of the critical factors which governs the stakeholder's trust in businesses. Multiple scholars show that businesses seek only to publicise positive non-financial information and conceal no-so-good news. Usually, transparency is related to organisations' public communication, ethics and reliance on it. Consequently, transparency is often described as conscientious communication, contrary to partiality, advertisements and manipulation. Transparency is generally acknowledged as the companies' financial and non-financial information accessibility for external users. Hence, the transparency of business subjects' activities depends on the business information, i.e. financial and non-financial information, disclosure in financial and social responsibility statements, annual reports, Internet websites, communication channels, and the spread of information. Therefore, quality attributes like accuracy, relevancy, clarity, and so on assessment are being used to measure business information transparency. (Kundeliene, & Leitoniene, 2015)

When stakeholders, business partners and other shareholders invest in businesses, they want to have accurate data information on the strategy, management procedures and decision-making processes, the overall picture of the financial situation, turnover, results from facts and balance sheet, as well as the company's values, mission, and goals with future Insights. Information sharing must happen in transparent cooperation with the parties involved in an honest, open, transparent, and reliable manner. It is proved with multiple types of research that leverages the business's strengths with a positive mindset of everyone involved,, which fosters creativity and leads to better success in the markets. Blockchain technology and smart contract applications can prevent misconduct in business procedures and create trust towards the processes. It is good to remember the crucial role of trust as one of the essential elements in the financial sector. Modern technology helps to do business cross-border with various international financial business operators. (Sedlmeir, Lautenschlager, Fridgen & Urbach, 2022)

Introducing blockchain technology and smart contracts within a company's operations requires adding them directly, clearly, and openly in the business strategy protocol. In this way, their use in the business also becomes transparently evident to competitors, customers, stakeholders, business partners and to business actors in the other market fields, which supports the implementation of the transparency requirement throughout the entire business world. As a whole, transparency improves the performance of the company's operating methods. This also includes a comprehensive understanding of the organisation's structure and the characteristics of services

and products offered, which is the basis of the risk assessment of the compliance function throughout the entire company structure. Identifying the official and legislative requirements for the organisation and the business life validates the transparency principle. Responsibility for this task belongs to the compliance function. It must report immediately to the management after noticing misjudgments or risk-based issues concerning these requirements in the organisation's operations. (Sedlmeir & Co.2022)

In the context of transparency, it is essential to remember the relevant compliance function in the organisation's management. When monitoring the policies and principles of transparency, compliance controls the entire organisation through various reports and reliability assessments. Using smart contracts in this task will lighten the burden of control measures and facilitate cooperation patterns with stakeholders and business partners because transparency and the sharing of encrypted data will be more reliable than before. However, transparency issues take work to take into the practical part of the business procedures. The full realisation of transparency is often limited because business companies must also be able to protect the innovations made within their own business from competitors.

It is necessary to preserve business secrets, while the transparency policy requires compliance with the rules of the fair game in the market. This is also where the security of blockchain technology combined with the use of a smart contract model brings the possibility of secure mutual connection between different actors, preserving business secrets and sharing sufficient information about the status of business operations. Using blockchain-based smart contract applications help the burden of compliance officers' work tasks, especially within financial conglomerates, bigger banks with multiple offices and other more significant financial institutions where the management is dispersed in different offices and diverse location. Through the online functions of the cyber world, it is possible to be in up-to-date communication, and everyone gets to see the results of compliance monitoring and development proposals simultaneously. The inherent feature of smart contracts also enables the content of necessary documents to be examined, negotiated, and signed simultaneously.

4.3 The Next Generational Prospects for Future Aspects

“Let’s go invent tomorrow instead of worrying about what happened yesterday.”

-Steve Jobs-

The world will be digitised in many ways and on many levels of society, economics and finance in the near future. The traditional, common and well-known practices of life and business operations will change and modify their forms. Blockchain technology has achieved significant milestones throughout the decade of its existence. Its only path ahead is a steep climb towards the top of the IT Technology Mountain before it takes shape into a conventional practical application known and used by all at the grass root level. The business world within economic, technological and societal challenges will change in the next few years due to novel emerging technological innovations and exploitations.

Initially, blockchain technology was designed to provide appropriate digital solutions for the financial and business sectors globally. However, today's and especially tomorrow's business aims to create digital online networks where common infrastructural over cross-institutional lines work properly. The GDPR has often been criticised as an inhibitor to innovation by the blockchain community. However, it has already been noticed that blockchain technology will become a beneficial tool in particular cases, especially in finance, where data-sharing protocols will be part of the future's prospects. Strict privacy regulation can contribute to digital applications' better role in business, justifying and verifying the hard decisions they are willing to use in practice. The rules and regulations to regulate exposing business-based data on blockchain applications must be detailed firmly. (Sedlmeir & Co. 2022)

The business world faces multiple challenges and novel opportunities within the coming years. Businesses must prepare themselves to be ready for necessary actions aligned with technological developments and innovations. Regulators must be able to enact novel laws and regulations concerning privacy, data protection, anti-money laundering, and legal contract issues, among many other judicial matters. The combination of technical, economic, legal and societal research is well needed to help us to understand and be ready for future challenges we are facing and to make

compliance functions align with novel legal requirements and other official regulations as well as taking into account changing operational guidelines and principles of business life.

4.3.1 Development of Digital Applications and Tools

Applications of blockchain technology are today mainly related to financial services, and the same development will continue during the coming years. Trillions of assets move in the global financial system every day, and at the same time, the system serves billions of people. This paper has shown that blockchain is a distributed ledger that works on millions of devices and can store almost any valuable product and service. The most significant blockchain applications require deep cooperation with actors in the financial sector, inventors and experts in the IT sector, and legislators nationally and internationally. However, such a widely formed cooperation increases the complexity of the development methods and requires a lot more resource capacity.

However, blockchain technology can significantly help to manage the customer's identification obligations, saving the effort of repeatedly pointing to the same data source for identification, for example, a passport or an identity card, when acquiring services or making purchases. From the perspective of service providers and other businesses, utilising blockchain technology in connection with KYC procedures reduces costs. This process also saves time, as strict regulations make checking personal data laborious and bureaucratic. The empowering idea of this novel kind of blockchain system is to enable the adequate performance of KYC obligations required by the legislature. Once the KYC information has been verified with the blockchain's private and public key, the customer can use their own key to give access to the same data to other parties in the system if necessary, for example, when the customer has completed the identification process in one bank, one can authorise another bank with whom one does business to see all the necessary identification information in the blockchain system from the data archive. (Johansson & Co. 2019)

When examining the effects of smart contracts in the context of compliance, there are many benefits. Smart contracts can facilitate automated contracts and reports entering into force in specific predefined circumstances and do not require separate monitoring. Within the scope of smart contracts, they are translated into a code and then saved and reproduced. The decentralised blockchain system oversees the entire procedure and consists of signatures, the subject of the agreement and its specific conditions. The transfer of property, stocks, money and other assets without the interference of an intermediary via a smart contract system model is possible, which

can help to define rules and sanctions within the scope of a contract in hand as well as the duties of compliance related to it. Smart contracts will also be used individually and interdependently with any other smart contracts. In this context, blockchain technology saves and reproduces the transaction's receipt and guarantees users' security with procedures. One of the most significant points is that smart contracts can also be programmed to enter into force automatically when specific requirements are met. Therefore with smart contracts, the monitoring of and compliance with contracts can be automatised and operated at any time without human interference. (Teichmann &Falker, 2020)

4.3.2 The Changes in Compliance

The pressures on the compliance function are arising within the coming next years – both internally and externally. The Blockchain technology and adoption of smart contracts as a part of compliance will change the entire system, and they force regulators and other authorities to check the functionality, flexibility and use of the legislation with novel operating models and also to modify general instructions and regulations to guarantee the correctness of the system. There will be a growing need for additional capacity and resources to invest in the blockchain system and smart contract process. Undoubtedly, there will become novel kinds of emerging risks that will challenge the entire compliance function. In the coming next years, the authorities will do extent more investigations in the financial sector on the matters of privacy, data protection, and intellectual property rights, among many others increasingly, without forgetting the effectiveness of the compliance and its commitment to laws, regulations and legal rules as well as obeying authorities' instructions and guidelines.

In an ever-increasingly regulated global business landscape, many FIs are turning to RegTech to help them cope with greater scrutiny and the potential for hefty fines for non-compliance. The demand for RegTech products – be it machine learning, biometrics, cloud computing, blockchain or distributed ledgers – is particularly timely, with the implementation dates of new and complex regulations, such as the updated PSD2 and the revised MiFID II among various other regulations, laws, and legal rules on the horizon. With RegTech solutions having scope to make regulatory compliance monitoring and risk reporting a more straightforward affair for FIs, any barriers to implementation need to be thoroughly analysed and, hopefully, overcome. While the RegTech concept is innovative, many FIs are already pushing the envelope and utilising RegTech as part of more complex collaborations to achieve regulatory compliance. It enables understanding national

and international obligations, interpreting vast quantities of data and computing precise findings in a way that humans and legacy infrastructure simply cannot. FIs and regulators recognise the concept as likely part of future compliance strategies. (Financier Worldwide Magazine, 2017)

RegTech technology has already made an entrance into the financial sector as well as into the entire business world. The principal instances are cognitive compliance, risk sensing and robotics-integrated governance, risk management and compliance function. The opportunities of Big Data and analytics are critical factors for the further development of the compliance function. The increased use of high-volume data to drive risk identification can enhance the monitoring processes.

The novel solution for struggles of compliance is simply digitalisation. The range of skills the compliance function needs is widening and deepening simultaneously. The financial sector is under continuous changes in laws and regulations and directly impacts compliance surveillance processes functionality. There is a great need for further improvements to better the present situation in the financial field.

Compliance functions are trying to keep up with these increasing demands, although they often need help to stay ahead of the developments, preventing them from being in charge of their agenda. In light of the challenges the compliance functions face, the capability to leverage technology for compliance tasks is a crucial factor. Novel technologies, like blockchain and smart contracts, are in a critical position with developmental issues overall. Within these operations, it will become a valued strategic partner to the organisation's management and board of directors with a clear vision. However, the latest time to start investing in the future of compliance is now so that processes are ready to take a big step into the secrets of the cyber world in the coming years. (Schakken, Westmaas, Kramer & Nieuwveld, 2021)

4.3.3 The Legal and Business Changes to Take Place

Technology is evolving, and digitalisation is gaining ground. Certain things are permanent and are largely human-made connections between each other as the laws of trade and commerce for centuries. It has already been proved by many financial sector surveys that training modern technology tools to understand the range of emotions of human experiences can make people's interactions with digital channels and equipment much more personal and human-like. Therefore,

banks must maintain humanism within digital banking experiences to further make the whole digital banking system behaviours by people even more stick to their banking relationship.

Every organisation has to understand and manage many laws, regulations, instructions and norms to act in a responsible and ethically acceptable manner as a part of its field of activity and the whole business world in the future. Compliance's main task will continue to be to produce informative and reliable information about the compliance of the organisation's operations and the appropriate commitment to the legislative regulations and the authorities' instructions and rules. Commitment to compliance activities within the organisation means the management's statements and decisions about the business, as well as the commitment of each employee to standard-defined operating instructions. It is a universal fact that a genuine commitment to working together and achieving common goals creates trust among the entire work community. Compliance operations are successful when all work community members know their place and the organisation's operating rules and instructions. They implement them daily with a positive and innovative attitude and mutual appreciation and respect, even when concerns arise.

Blockchain technology and its applications are the next generation's digital tools which show as "proof-of-process" in practice. Financial institutions and banking can already adapt and implement blockchain-based applications as part of their traditional operations, and they do not need radical changes to the existing processes. Blockchain technology is here to stay for good and will gain more traction in critical areas of financial services, including compliance, in the near future. The need for professional blockchain technology knowledge and skills is essential but in its infancy. The potential aspects of the novel technology are recognised globally. However, because the technology is still comparatively novel, there are many career opportunities for those interested in blockchain technology's advantages, especially in the financial sector. With the specific professional training and certification for particular blockchain-based job roles, promising blockchain careers will be available with good remuneration in the future.

As an overwhelming glory full notion for the final end of this thesis as a good-tasting candy, the author wants, in short, to present a new EU Regulation (2022/858) based on a pilot regime for market infrastructures based on distributed ledger technology. The Regulation became applicable on 23 March 2023 and will cover the entire European Union Area. It is the first-ever legislation explicitly including modern technological innovations applications and is, therefore, a significant step forward in implementing blockchain-based technologies into business practices. This new

Regulation lays down all the relevant requirements to market infrastructures, operations and companies to conduct specific permission rules, terms and principles. The Regulation also includes legally binding definitions to terms previously only defined by technical vocabularies, such as “distributed ledger and network nodes and outer oracles”. The Regulation further obliges all operators in the field to cooperate with each other. According to the European Blockchain Sandbox for Distributed Ledger Technology Department: “*The new regulation creates a pilot regime for DLT market infrastructures and presents a great opportunity to all relevant operators to gain experience on how legislation should adapt to new technologies*.”

Just as the author has titled this thesis “I*n the Borderlands of Dusk – Scuba Diving in the Space of the Blockchain Technology and Smart Contracts within the Compliance Function in the Finance Business World*”, this great and significant judicial development step gives faith for the future and shows that financial business world will keep on running towards challenges, overcoming them and beginning to work side by side with the novel technological innovations, applications and tools.

5 CONCLUDING REMARKS

"I'm interested in all points of view, and I draw conclusions based on facts, not just on opinions. However, both are equally relevant to achieve a conclusion. Because in the end it is all about storytelling, nothing more."

-Tom Brokaw-

The research project within this thesis was challenging. Collecting, analysing and examining the multiple data information, monographs and many other sources appeared like a many-edged sword. Compliance functions are tedious, traditional, rigid and bureaucratic operational systems within a business, trying only to help the management and board of directors in their duties and to support requirements and adherence to laws and regulations in every aspect of the company. Blockchain technology and smart contract are on their behalves in one point only abstract concepts. Still, from one other point of view, they are very well-functioning technological innovation tools in practice. There is plenty of information available. Still, it is fragmented, and no one has yet been able to form a clear and coherent picture of the blockchain and smart contract technology or their usability and exploitation with traditional business operations, mainly in this thesis context of compliance surveillance functions.

Globally, the research with the subject from a general point of view requires academic, economic, technological, societal, and legal aspects. The work to be done is multidisciplinary and affects all activities around the business world. Combining these three methods – compliance, blockchain and smart contract – is not an easy task, but a necessary one for successful business operations today and in the future's business world, especially at the core of the ever-growing competition in the financial sector. It is seen that technological innovations have huge effects on the market economy, social systems and administrative actions overall, both nationally and internationally. Central banks worldwide are investigating these novel innovations' usability, and virtual currencies' usability instead of traditional cash in the shortly are to be found various dimensions and layers within the compliance function's usability in finance and business.

The characteristics of blockchain technology and smart contract give an utterly novel perspective to organise the compliance function in practice, bringing benefits and relief. At the same time, unknown technological innovations challenge and turn all traditional and familiar methods that have been considered highly reliable on their heads. When combining old and new functions, procedures, and processes, the most challenging aspect is how the components merge to function correctly and achieve the desired goals. It is already to be seen that blockchain technology and smart contracts will change the global economic and financial system into a completely new one. Researchers, economists, companies and states worldwide are working all the time to develop blockchain technology and ways to use it better in interpersonal activities, interactions and commerce. In this context, compliance functions face radical challenges to maintain their agenda as monitoring operators. There lies a dilemma because, on the other side of the coin, the compliance function must remain impartial, open and transparent towards outsiders of the company. In contrast, on the other side, it must strongly support the organisation's management and the board's activities to maintain competitiveness, develop business, serve customers and achieve market advantage and profits in the competitive global markets.

The pandemic era of Covid – 19 (2019 – 2022) showed us all that anything, even the most impossible, can happen overnight. When the threads and tentacles of a global catastrophic human-breaking virus were spread and reached everywhere, nothing was like it used to be. Everything worldwide was to be rebuilt from the bottom to the top. The chaotic problem with the pandemic made significant changes to the economy, health care, banking systems, purchasing behaviours, and business overall. However, global financial conditions were able to remain overall supportive and willing to take risks to recover the global economy even though, at the same time, there was an uncomfortable fear of inflation and economic depression, increasing general uncertainty over growth, generating some market volatility and reinforcing regional disparities. Digitalisation has taken over the entire human way of working, and modern technological tools have begun replacing previous action methods. The global financial sector and the entire business world are at the centre of a massive revolution. Space comes closer to Earth, and understanding of the meaning and dimension of the universe has descended among humanity in a novel way. However, because there is no particular kind of telescope to see into the future and how things will be transformed for good, planning for tomorrow and not only designing but taking the necessary actions to be ready for the changes is necessary.

Predicting the future is like gambling on poker, and there is either a victory or a total loss. However, in the near future, the concept of money will change its structure from what it has known for decades. Blockchain system gives the base for automated reality for the currency that a cunning cryptographic ledger can establish. This change will inevitably affect compliance functions' monitoring tasks as the economic and financial procedures will change their structure entirely. There are many excellent and good reasons for the change to significantly improve what there is now by giving each person the same level of possibility globally. Keeping our feet on the ground and our minds clear is still necessary because the possible risks of misconduct and abuses will also increase along with positive changes. It is more than necessary to put the regulated requirements in order globally. Compliance and good governance will maintain their risk management and legally binding verification functions, as well as their supporting role for the business management and the entire work community in the future.

As people's lives increasingly intersect between the natural and the digital, it is always important to remember to put love for humanity and humanness at the centre of technological development. When people's identities are forever etched in immutable stone, saying "Do not forget me" may be a more enduring tune than has ever been imagined. Finding proper answers to the right questions and perfect solutions to complex problems is always challenging because what suits one situation may not apply to the other. Nothing stands forever. Therefore it is undeniably a clear fact that novel technologies are replacing traditional ways of operating in finance and within the business over the entire global market. The economic system is being modernised, and people's lifestyles and activities are changing and renewing.

Modern technology, its innovative equipment, and digital tools seek to further advancements to benefit businesses and people. However, there is still much to do. Many changes must occur before modern technology takes its place permanently. Modern technology tools, applications, methods and processes will replace old systems of sharing data information, and digital networks will become available for everyone in practice in real-life. The novel frameworks are proving digitalization’s viability, usability, and effectiveness. Technological innovations are needed as the world rules change and business and economy become increasingly global and part of daily lives more intensively. Digitalisation and IT technology will continue to cross all border fences, and people change their behaviours alongside it. The future has a lot to offer humankind.

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