THE IMPACT OF ARTIFICIAL INTELLIGENCE (AI) AND BLOCKCHAIN ADOPTION IN CORPORATE GOVERNANCE: ETHICAL PERSPECTIVES

A thesis submitted for the degree of Doctor of

Philosophy by

Hongdan Han

Brunel Business School, Brunel University London

August 2022

Abstract

Purpose

The purpose of this doctoral thesis sets out to explore and elaborate on the impact of artificial intelligence (AI) and blockchain adoption in corporate governance from ethical perspectives. Positioned within the corporate governance domain, this study adopts an explicit business perspective to study corporate governance change with emerging AI and blockchain technological tools in general and focuses on the ethical use of technologies specifically. As such, this empirical investigation aims to help organizations understand the ethical benefits and ethical dilemmas of using AI and blockchain in businesses and draw plans on how to govern these technologies ethically for the benefit of the business and society.

Design/Methodology/Approach:

This study adopts specific techniques and a pragmatic, step-by-step netnography approach to investigate online traces from social media sites and extends these online explorations with online semi-structured interviews. The research design of this investigation follows step-by-step procedures that are methodologically sound to ensure rigor in this investigation to enhance the trustworthiness of this study. In total, this research collects an abundance of data: 34 LinkedIn Posts with Comments; 12 Webinars; 22 YouTube Videos; 19 Videos; 10 Podcasts, and 17 semi-structured interview videos. The video, audio, and interview data have been transcribed into textual data total of 453065 words for thematic analysis using NVivo software. Enough time has been allocated to the iterative process of data collection and data analysis. The analysis moves back and forth to the point when theoretical saturation is achieved. The data structure extracts from data in this study illustrate the analytic claims that match the analysis and data together, to ensure a good fit between described method and reported analysis are consistent.

Findings:

This study develops a thematic framework that constitutes the corporate governance transformation with the ethical use of AI and blockchain technology. This framework provides a holistic understanding of why corporate governance needs to change, especially with the emergence of blockchain and AI technologies, what changes will corporate governance encounter, and how corporate governance can imperatively respond to the ethical use of these technologies. Specifically, it explicitly provides comprehensive understanding of the ethical benefits and ethical concerns of using AI and blockchain technologies in corporate governance, and reveals how companies can govern the use of these technologies ethically.

In general terms, the findings of this study support the notion of corporate governance change to transform business models and processes to leverage the new capabilities of AI and blockchain technologies, to priories creativity, speed, and accountability, to replace the old business model, to foster agile or collaborative governance to deal with uncertainty, agility, adaptiveness, and cooperation in the digital world, to foster a

network and platform strategies to drive success. This study goes beyond the extant corporate governance scholarship to assess the technological impact to capture values for companies in ethical ways to sustain future growth.

Additionally, the notion of corporate governance is further specified and significantly expanded by this study to assess the adoption of AI and blockchain as new corporate governance tools or mechanisms, to enhance ethical benefits when used properly, and mitigate ethical dilemmas with proper checks and balances, safeguards in place, to help organizations stay relevant in this digital transformation and be ethical and sustainable.

This study empirically corroborates that in theory, the use of blockchain and AI can enhance ethical practice by detecting fraud and anomaly activities, due to the unique capabilities of blockchain and AI technologies. Further, this research adds depth and specificity by identifying the ethical concerns of using blockchain and AI in corporate governance. The study empirically reveals the ethical concerns of privacy issues, unethical use of data, job transformation and replacement, and algorithm bias that companies will encounter when they use these technologies. In addition, the findings of this study suggest how companies can ethically govern the use of these technologies in socially responsible ways as they transform digitally.

Originality/Value:

The emergent thematic framework is constructed from the empirical and analytical procedures specifically and purposely designed for this study. This study makes theoretical contributions to knowledge and enriches the extant works of literature, and also provides practical contributions to the ethical use of disruptive technologies, future workforce, and regulations. However, the study was conducted within certain theoretical, methodological, empirical, and pragmatic conditions, which might constitute particular limitations and constraints. Therefore, the last section of this thesis elucidates and suggests the directions for future research.

Keywords: Corporate Governance. Artificial Intelligence, Blockchain Technology, Ethics, Technology Adoption

Acknowledgment

First, my sincere thanks go to my principal supervisor Dr Radha Shiwakoti, my 2nd supervisor Dr Chima Mordi, and my research development advisor Dr David Botchie for their time, invaluable support, guidance, and advice throughout my PhD studies.

Second, I would like to express my gratitude to Brunel Business School (BBS) for offering me this wonderful opportunity to conduct such interesting and timely research. My special thanks go to all the colleagues at CBASS, BBS, the Graduate School, and APDU who made my PhD studies such a worthwhile experience. Also, I would like to thank the CBASS PRG team, especially Natalie Sluman, for their dedication to managing administrative tasks.

I am deeply thankful to Jan Enriquez, Genevieve Bell, Mainak Mazumdar, Sylvain Duranton, Don Tapscott, Bettina Warburg, Kriti Sharma, Zeynep Tufekci, Stuart Russell, Samm Harris, Nick Bostrom, Jeremy Howard, Tom Gruber, Rachel Botsman, Peter Eigen, Kevin Kelly, Markus Mutz, Paul Root Wolpe, Avi Rubin, for their TED Talks, and Bernard Marr for his YouTube, and LinkedIn activities, and Jeff Drew, Neil Amato for their Podcasts, and Webinars from INSEAD Global Institute for Business and Society, Diligent, Citrix, CFA Institute, Forbes CIO, House of Lords, Standford Law School, that allowed substantial access for my empirical online investigation.

I am also privileged to have been able to meet and interview many experts who are competent in this area of research. I sincerely thank them for supporting me and spending time with me to provide fruitful discussions and deep insights into this study under this investigation. My special and sincere thanks go to Frank Hoogendijk (Senior Associate, Legal Tech Specialist at Osborne Clarke); Hagen Schweinitz (Global practice leader, board & governance advisory practice at Eric Salmon and Partners); Josina Kamerling (Head of regulatory outreach EMEA at CFA Institute); Clara Dorodie (Speaker, Author, Investor, Board member, Fintech, Governance and AI); Chris Bunch (Managing Director at CTS); Philippe Nadouce (Top rated blockchain consultant); Donny Shimamoto (CPA, CITP, CGMA, Intraprise TechKnowlogies LLC); Andrew Hobbs (EMEIA public Policy leader at EY); Ansgar Koene (Global AI ethics and regulatory leader at EY); Martin De Bie (Advisor Innovation/Chairman digital working group EFAA); Ryan Carrier (ForHumanity); Matthew James Bailey (Pioneer, advisor, author, Global AI ethics); Michiel Ipenburg (Founder of Social Blox.IO); Reid Blackman (CEO Virtue, AI ethics Advisor); Jane Thomason (Board advisory/Non-Executive director, Co-Founder of the British Blockchain and Frontier Technology Association); Pamela Gupta (Global Cybersecurity & trusted AI); and Peter Brownell (ForHumanity AI Auditor).

Lastly, I would like to thank my parents and my family. My special thanks go to my two girls Sophia and Amelia, for their understanding their mum is always busy with research. They are always there to cheer me up and mentally support me by offering their unconditional love to me.

Table Of Content

Appendix

List Of Figures

List Of Tables

Chapter 1 Introduction

This opening chapter provides an overview and synthesis of this doctoral thesis. This chapter outlines the structure of the study, and details the overview of motivation, purpose, research focus, empirical context, research methodology as well as theoretical and practical contributions. In particular, it introduces the background and context of the study and articulates the rationale for the study. It outlines various gaps in extant scholarly literature in corporate governance, AI and Blockchain technology adoption, and ethics, which are relevant for the general purpose of this study. Next, the chapter justifies the significance of the study to analyze the phenomenon from a business perspective rather than the technology itself. The rationale behind this justification is to generate a comprehensive understanding of how companies can leverage the new capabilities of AI and blockchain to promote better business practice and how companies can govern the use of AI and blockchain to move the business forward and benefit the whole society for the future. AI and Blockchain are among many other technologies companies can choose to adopt. However, the extant literature indicates they are the technologies that possess the most transformative value for future businesses. Artificial intelligence is everywhere in our lives, transforming how humanity works and lives. Machine learning enables machines to think like humans, stimulate the human process, and perform tasks such as reasoning, image recognition, predictive analytics, problem-solving, language processing, etc. Organizations are increasingly using AI to augment decision-making and improve business operational efficiency. AI has been used to reduce fraud in payment transactions, diagnose and treat patients, manage health care, etc. (Sharron and Serwin, 2018). Blockchain has captured the attention of the business world as a new protocol for creating, exchanging and tracking financial asset ownership (Yermack, 2017). Blockchain technology can digitally record every agreement, every process, every task, and every payment (Tapscott and Tapscott, 2016, 2017), provide immutable transaction records shared across network participants, and reduce the number of intermediaries. It offers a novel way of enhancing transparency and trust. When information asymmetry exists, there will be a lack of transparency. Blockchain can offer a solution to enhance transparency and improve business practices. AI can effectively detect any anomaly. AI and blockchain have the salient benefits in corporate governance context to improve trust, enhance transparency, and mitigate

information asymmetry, and enhance control and monitoring to enable companies better comply with legal requirements, only if companies understand these technologies and know how to use these technologies in an ethical and socially responsible way. Based on that understanding, the chapter presents the general motivation, the more specific purpose, and the particular general research questions for this empirical study. It further provides an overview of the research design and justification for the empirical context chosen for this study. Finally, it states the main contributions of the study and outlines the structures of the thesis by detailing the focus of each chapter of this thesis.

1.1 Research background and problem statement of the study

Technology has been embedded in our lives and organizations for many decades. It drives the most fascinating social changes, from water and steam-powered mechanical manufacturing to electrically powered mass production to automate manufacturing. The modern world is largely defined and constructed by the scientific and industrial revolutions since the 17th and 18th centuries, reflecting the external influences over science and technology (Mitcham, 1999) that revolutionize every aspect of our lives in transportation, communication, health care, national security, and consumer products (Fisher et al., 2006). In the mid-20th century, academic scholars have started to develop technology assessments (Schot and Rip, 1997; Guston, 2002; Fisher et al., 2006) to address the societal, ethical, and moral concerns of scientific and technological changes (Shrader-Frechette, 1995). Scholars, policymakers, and scientists have advocated the design, development, and deployment of nanotechnology, biotechnology, information technology, and cognitive technology must be undertaken with due consideration to societal and ethical concerns (Fisher et al., 2006; Lucivero et al., 2011) over their implications on the environment, quality of life and human dignity (Gasmelseid, 2009).

Today, the abundance of data, advanced computing power, the emergence of pattern recognition, machine learning, digital sensing tools, and integration systems are the embodiment of the new industrial revolution. Technologies such as cloud computing, big data, AI, blockchain, Internet of things, lead the 4th industrial revolution with cyber-physical systems. These technologies lead to prominent changes in individuals and

organizations (Benlian *et al.*, 2018). From laptops, tablets, smartphones, biometric devices, social media, and video conferencing to network sensors, machine learning, and autonomous vehicles, our lives have been transformed by those remarkable technological innovations (Pancake, 2018). For businesses, technologies are transforming business models and processes (Gomber *et al.*, 2018). Companies such as Google, Amazon, and Facebook adopting smart business models that leverage new capabilities in network coordination and data intelligence, and are the most highly successful and valued businesses today (Zeng, 2018). Many scholars are exploring the opportunities and new capabilities of the emerging technologies such as AI, Blockchain, Internet of Things, Cloud computing, etc. for businesses (Hinings et al., 2018; Biais *et al.*, 2019; Brennan et al., 2019; Goldstein et al.,2019; Moll and Yigitbasioglu, 2019; Zachariadis et al., 2019). Simultaneously, many scholars have addressed the ethical and social considerations of using these technologies (Dierksmeier and Seele, 2018; Kumaraswamy et al., 2018; Martin, 2018; Ullah *et al.*, 2019; Wesche and Sonderegger, 2019; Lima and Delen, 2019; Lobschat *et al.*, 2021; Mansell *et al.*, 2019; Moore, 2019; Paterson and Huang, 2019; Shank *et al.*, 2019; Sousa *et al.*, 2019).

For businesses, the bar on organizational innovation will rise in response to the 4th industrial revolution. Organizations need to be agile, adaptive, and resilient to the changing business environment. However, a recent McKinsey report indicates the old business model built on uniformity and bureaucracy cannot fit the purpose in today's business environment (De Smet et al., 2021). In addition, many extant scholars have found some invisible barriers in modern companies, such as information asymmetry, lack of transparency (Arrow, 1985; Nowak and McCabe, 2003; Liu and Lai, 2012; Wiseman et al., 2012), and lack of trust (Caldwell and Karri, 2005; Cuevas-Rodríguez et al., 2012). Many of us are familiar with stories about top managers "cooking the books" in one way or another (Shi et al., 2017). Mindful of many corporate scandals corroborate financial professionals such as accountants, auditors, bankers, and financial advisors can fail to detect managerial suspicious actions (Gill, 2009) in deliberately creating fabricated financial statements to mislead creditors or investors to gain an unfair advantage (Dong et al., 2018). The major surge in corporate governance research over the past decades was accelerated by the increased call for greater accountability and responsibility from the board and senior management of

corporations (Christopher, 2010) to seek the most effective corporate governance model. The existing studies on corporate governance have focused on internal and external monitory and control mechanisms to align the diverse interests of those involved in corporate governance. The main internal governance mechanisms investigated are board of directors and ownership structures (Fama and Jensen, 1983; Daily et al., 2003; Anderson et al., 2007; Clarysse et al., 2007; Elsayed, 2010; Horner, 2010; Grove *et al.*, 2011; Filatotchev et al., 2013; Elbadry et al., 2015; Bao and Lewellyn, 2017; Lai et al.,2017), CEO compensations (Coles et al., 2001; Brandes et al.,2006; van Essen et al., 2015; Kovermann and Velte, 2019; Till and Yount, 2019). The external governance mechanisms examined are the takeover market, the CEO's external advice network, market power, and the legal systems (Ryan and Schneider, 2003; McDonald et al., 2008; Grove *et al.*, 2011; Cuomo et al., 2016).

1.1.1 Research motivation

As such, this study is motivated to explore how companies can leverage the new capabilities of new technological tools ethically to enhance transparency and accountability in corporate governance to help companies combat the problems faced by contemporary businesses due to information asymmetry, lack of transparency and trust. As we all know, the worldwide financial scandals have become perpetual (Awolowo *et al.*, 2018), leading to corporate failure and massive shareholder losses (Minkes et al., 1999; Bonn and Fisher, 2005; Palazzo and Scherer, 2006; Claessens and Yurtoglu, 2013). Many companies such as Enron, WorldCom, Tyco, HealthSouth, Adelphia, Parmalat, Palmer, Harvey, etc. have hit the headlines, causing shock among the general public (Hogan *et al.*, 2008; Hail et al., 2018). It is estimated Enron scandal cost shareholders $74 billion, and the WorldCom fraud lead to $180 billion and cost 30,000 jobs (Dong et al., 2018). The latest Carillion and Wirecard scandals are pushing the reform in the audit. Recently, UK Financial Reporting Council has launched a consultation on the government's proposal to restore trust in audit and corporate governance (FRC, 2021). The financial scandals have revealed how accounting and auditing failures, together with the abuses of managers can create major problems (Uyar et al., 2017), causing a major loss to shareholders and investors, eroding trust in financial markets, increasing overall cost of financing in an economy (Ullah *et al.*, 2019). The scandals have also lead to the questions about the role of

professional auditors and audit firms (Roy and Saha, 2018), and the accountability and responsibility of the governing systems.

The societal implications of financial reporting fraud have surged calling for a re-examination of corporate governance and regulation (Ndofor et al., 2015). Laws and regulations remain insufficient to act as proper prevention for illegal or unethical behaviour for many managers (Adam and Schwartz, 2009). Many extant scholars have investigated the antecedents of the wrongdoings (unethical or illegal behaviours) in financial scandals (Schnatterly et al., 2018; Ullah *et al.*, 2019; Akaah, 1996; Desai et al., 2006; O'Connor et al., 2006; Davis et al., 2007; Dionne et al., 2009; Liu et al., 2015). Gill has found the process of making accounting decisions is contested and not transparent based on his interviews with chartered accountants in the largest accountancy practices in London (Gill, 2009). Schnatterly et al. (2018) have found CEOs have more internal opportunities to misbehave by overruling the board or ignoring organizational control when they have more power. Grant and Visconti used case studies of 12 US and European companies involved in major accounting scandals during 2001-3 to reveal some factors (such as the pursuit of inappropriate strategies, unethical behaviour among executives (moral failure), incentives for personal financial gains, and weak systems of monitoring and control) contributing to accounting scandals (Grant and Visconti, 2006). Ndofor et al. (2015) have found that industry-level complexities of information asymmetry increase the likelihood of wrongdoing. Schnatterly et al. (2018) identify industry culture and norms regarding pay-back periods, and investment horizons set the tone for the industry players that provide opportunities for CEOs to commit or facilitate wrongdoing. The unethical behaviours or moral hazard problems largely depend on the internal and external opportunity available to commit wrongdoing, a motive for doing so, and the ability and willingness to rationalize misbehavior and challenge legal boundaries (Greve et al., 2010).

Atkin (1999) believes ethics is the best choice for business practice. Every time big financial fraud happens, there will be additional corporate governance mechanisms and new regulations proposed and introduced to restore trust. However, rules and laws are not adequate therefore ethics in corporate governance is paramount important (Carroll, 2004). "Ethics deals with values related to human conduct,

concerning the meaning of right or wrong of certain actions and motives that provoke these actions" (Halter et al.,2009:376). Adam and Schwartz (2009) suggest a more positive empowering approach based on ethics may also be necessary to guide the ethical behaviour of directors. They outline the core values of corporate governance used to guide the ethical behaviour of directors: transparency, accountability, integrity, and public responsibility. These values embody the fundamental ethical values of transparency, accountability, responsibility, and probity (Rossouw, 2005). These values can promote company integrity, empower companies and executives to "do the right thing" (Roman, 2019), enhance directors' moral & ethical obligations for better decision making (Carroll, 2004), foster long term success, enhance company reputation (OECD, 2004), contribute to corporate legitimacy and accountability (Purcell, 1982), establish credibility and trust (Gilbert and Behnam, 2009), a better approach to all stakeholders (Claessens and Yurtoglu, 2013), increase truthful disclosure (Gaa, 2009), enhance credibility and integrity (Potts and Matuszewski, 2004).

However, Bonn and Fisher (2005) indicate bureaucratic & formalized approaches, lack of implementation, and lack of integration throughout the organizations are the 3 areas of potential weaknesses in incorporating ethics into corporate governance. It is estimated the front-line workers are buried under an average of eight levels of management in more than a third of US firms with more than 5,000 employees (Hamel and Zanini, 2018). Information asymmetries and lack of transparency between top managers and their diverse shareholders offer the opportunity for unethical behaviour (Ndofor et al., 2015).

As such, this study sets to explore how the adoption of AI and blockchain technologies in corporate governance as new technological tools can help to mitigate information asymmetry and improve transparency to enhance ethical business practice and build resilience and be adaptive. Among the emerging technologies, this study is particularly interested in AI and Blockchain. These two technologies are the most prominent, trending, and disruptive technologies. They are believed to be able to generate the most transformative value for future businesses (Cong and He, 2019). PWC predicted global investment in AI technology will be as much as $15.7 trillion by 2030 (PWC, 2017). Mckinsey estimated AI could potentially increase global GDP by approximately

1.2% (Fox et al., 2019). World Economic Forum predicted that 10% of global GDP will be stored on blockchain by 2027 (WorldEconomicForum, 2015). EU has pledged about $110 million to set up an investment fund to push AI and blockchain in 2019 (PaymentsSource, 2019). According to the European Investment Fund, based on the International Data Corporation, AI spending in Western Europe is expected to hit $5.2bn and blockchain to reach $674m in 2019. The figures only reveal the funding directed at the research and proof-of-concept stage. They do not cover the spending on development at a larger scale, which could be more substantial (EIF, 2019).

1.1.2 Brief review of literature

In recent years, scholarly literature addressing Artificial Intelligence (Arntz et al., 2017; Barnett and Treleaven, 2018; Carter, 2018; Davenport and Ronanki, 2018; Androutsopoulou *et al.*, 2019; Sun and Medaglia, 2019; Engin and Treleaven, 2019; Hartley and Sawaya, 2019; Hoffmann and Dahlinger, 2019; Seeber *et al.*, 2019; Singh et al., 2019) and blockchain (Cohen, 2017; Dai and Vasarhelyi, 2017; Ølnes et al., 2017; Yermack, 2017; Gomber *et al.*, 2018; Hinings et al., 2018; Biais *et al.*, 2019; Zachariadis et al., 2019; Cong and He, 2019; Du *et al.*, 2019; Goldstein et al., 2019) are developing. AI and blockchain together make a more secure ecosystem for transactions and data exchange. The lasted trends in AI applications such as explainable AI, Digital Twins, Automated Machine Learning, Hybrid learning Models, and Augmented Data Learning can draw support from the main benefits of trust, provenance, and reliability from the blockchain (Salah *et al.*, 2019). The integration of AI and blockchain can enhance blockchain's underlying architecture and boost AI's potential. Their applications are evolving in different areas of the businesses, for example, accounting, auditing, finance, supply chain, medical records, stock exchange, etc. (Dai and Vasarhelyi, 2017; Moll and Yigitbasioglu, 2019). Leaders from different industries are starting to envision a future shaped by these technologies (Bérubé *et al.*, 2018). The insurance sector is starting to think of auto insurance claims and approval on autonomous vehicles. The retail sector is beginning to offer personalized products based on AI predictive capabilities to transform customer acquisition and retention. The financial industries are transforming to branchless banking, real-time transactions, credit monitoring, credit scoring, and approval, cross-

border payments, global remittances, and foreign exchange are all real-time with fewer intermediates (Gomber *et al.*, 2018). They are the pioneers in embracing blockchain technology to leverage fintech innovation (KPMG, 2017; Kelly, 2019). Bank of America, JPMorgan, the New York Stock Exchange, Fidelity Investments, and Standard Chartered are testing blockchain technology as a replacement for paper-based and manual transaction processing in such areas as trade finance, foreign exchange, and cross-border settlement, and securities settlement. The Bank of Canada is testing a digital currency called CAD-coin for interbank transfers (Iansiti and Lakhani, 2017). A recent report published by Santander and Financial Times predicts only 20% of heritage financial services firms will have survived by 2030. Everyday banking experience could be entirely virtual with money-changing hands virtually in real-time. The financial service firms will be facilitated by digital banks on digital platforms, fuelled by data stored and shared on the cloud, and made faster and safer by blockchain technology (Santander, 2020). Coinbase has created a bitcoin debit card using blockchain protocols. Goldman Sachs invested in Circle Internet Financial powered by blockchain technology (Fanning and Centers, 2016). Ripple, a San Francisco-based blockchain company, offers the most developed financial services using a blockchain system. It has partnered with over a hundred banks around the globe to transfer money anywhere in the world in a highly efficient, secure way at a very low cost (Murray, 2018). NASDAQ has tested voting at shareholders' meetings using blockchain technology on the Tallinn Stock Exchange in Estonia (Nasdaq, 2017). Blockchain-based Know Your Customer (KYC) can reduce administrative burdens and costs and save substantial duplication efforts between financial institutions (Shumsky, 2019).

With the arrival of AI and blockchain technology, corporate governance will change in many ways (Yermack, 2017; Mergel et al., 2018; Bindu et al., 2019; Brennan et al., 2019; Zachariadis et al., 2019). Companies need to think seriously about their corporate governance practices. After decades of talks, a new AI era is finally arriving to transform businesses (Falk, 2019). Lord Clement-Jones (2020) addresses AI will have a significant impact on and implications for corporate governance. Yermack (2017) predicts blockchain innovations will potentially change corporate governance far more profoundly compared to the 1933 and 1934 Securities Acts in the USA. AI and Blockchain will be the key developments for future boardrooms. It is critical for

every organization and every profession to keep pace with these technological changes to stay relevant. Zachariadis et al. (2019) explore how to govern blockchain in financial services. Moll and Yigitbasioglu (2019) explicate concerns about the profession's legitimacy in the digital era with new technologies such as AI and blockchain. Fenwick et al. (2019) elucidate businesses need platform governance to leverage digital technologies to create more community-driven forms of organizations to build an open and accessible platform culture. Daniels (2018) illuminates some legitimacy of corporate governance would be restored using blockchain as the technology provides new tools and offers networks to eliminate structural obstacles and encourage shareholder involvement in corporate governance. Smart contract built on blockchain automates contracts when preconditions are met and can mitigate moral hazards (Yermack, 2017).

In November 2018, the European corporate governance Institute (ECGI) held a roundtable discussion on AI and blockchain in a corporate governance context. The EU Directive 2007/36/EC (has amended to EU Directive 2017/828) and UK corporate governance code 2018 have all required listed companies to identify their shareholders and encourage long-term shareholder engagement. Blockchain could help organizations to better comply with these legal requirements and enable better shareholder engagement. Additionally, the board could use AI tools for risk management and internal control oversight to better comply with directors' duty of care under section 174 of the company Act 2006 (Fu, 2018). Board can use AI to assist shareholders, investors, directors, and auditors with corporate control and monitoring, investment, and management decisions. Australian boards start to think about using AI and machine learning to improve the quality of their decision-making (Fox et al., 2019). VITAL is an AI system appointed to the board by Deep Knowledge Ventures and has saved the firm from multiple bad investments (Sands, 2019). Salesforce has introduced Einstein AI as a smart assistant to increase productivity. Blockchain can be used to record stock ownership, which could solve many longstanding problems related to companies' inability to keep accurate and timely records of ownership (Kahan and Rock, 2008). The decentralized governance (Brennan et al., 2019; Yin *et al.*, 2019; Zachariadis et al., 2019) facilitated by blockchain technology improves the transparency of ownership and transaction information, changes the relative power between directors, managers, and shareholders, and whose who involved in the

corporate governance ecosystem (Yermack, 2017). Decisions are made more collaborative through consensus mechanisms in a non-hierarchical fashion (Brennan et al., 2019). Corporate governance must respond to those changes. It argues that blockchain technology will be a new "foundational technology" (Iansiti and Lakhani, 2017), with vast promises for every business and all of us individually, and eventually change our society with prosperity (Tapscott and Tapscott, 2016, 2017). In addition, AI experts have predicted AI could potentially run corporations in 20-30 years with highly advanced machine intelligence (Petrin, 2019).

As indicated above, the overall business environment is experiencing unprecedented changes with the advancement in technological innovation, especially with AI and blockchain technologies. As such, organizations with traditional hierarchies or matrix structures are no longer fit for today's business environment (De Smet, et al., 2021). Businesses are transforming their business models and processes to leverage new capabilities of emerging new technologies in every industry (Gomber *et al.*, 2018). Corporate governance determines a company's ability to move and undertake structural changes. Investors are willing to pay a premium for well-governed firms (IFC, 2019). To survive and grow, all businesses need to be properly governed. "If management is about running a business, governance is about seeing that it is run properly. All companies need governing as well as managing" (Tricker, 1984). Corporate governance will change in many ways with the adoption of AI and blockchain technologies. Artificial intelligence will assist and augment boards to make better decisions using the trusted information on blockchain technology. Blockchain technology will fundamentally change transparency and trust in corporate governance by offering a new way of recording, sharing, and validating transaction information through a consensus mechanism. As we all know, internationally, the current regulatory systems rely principally on transparency as a mechanism for governing the global financial market crisis (Mehrpouya and Salles-Djelic, 2019). Transparency is a regime value linked with ethics (Piotrowski, 2014). Previous studies such as Roberts (2009); Mehrpouya and Salles-Djelic (2019) support that transparency can be used as a tool to reduce corruption and enhance ethical behaviour and improve company image (Halter et al., 2009). Corporate governance promotes ethics in corporations to enhance their responsibility for their impact on societies and on their stakeholders (Rossouw, 2005). Particularly, the adoption of new technologies like AI and blockchain

will offer new ways of working and learning, new products and services, and new industry standards. Businesses need to be adaptive and innovative, proper corporate governance needs to be in place to ensure the digital transformation is beneficial to the company and our society in general.

1.2 Research gaps addressed by the study

In light of the literature review in the fields of corporate governance, artificial intelligence, blockchain, and ethics in corporate governance, this study reveals three research gaps addressed by this investigation.

Research gap one: The major surge in corporate governance research over the past decades was accelerated by the increased call for greater accountability and responsibility considering the societal implications of worldwide financial scandals. The extant scholarly works on corporate governance have not covered much on the transition from a centralized, vertical hierarchy to a decentralized, horizontal, unmediated organization, initiated and accelerated by rapid technological changes (Fenwick et al., 2017). The extant study on the impact of technology applications on corporate governance is slight (Scott et al., 2017). Currently, organizations and their operations are undergoing a fundamental transformation in this digital era (Fenwick et al., 2019) due to the advancement in technologies. Decisions making process is moving from top-down to consensus (PEGA, 2020). Specifically, current scholarly studies on corporate governance have not covered much on digital transformation accelerated by AI and Blockchain, and the disruption of corporate governance by networks and platforms enabled by these technologies is still at a nascent stage (Scott et al., 2017). The new features of AI and blockchain represent inherent benefits of transparency and trust, which have much broader instrumental & analytical relevance in corporate governance to help enhance ethical practice. As such, it is relevant and appropriate for this study to explore the ethical benefits of using AI and blockchain in the context of corporate governance.

Research gap two: Increasingly, many scholars are exploring the opportunities and new capabilities of using AI and blockchain to improve business operational efficiency

and enhance decision-making (Hinings et al., 2018; Biais et al., 2019; Brennan et al., 2019). Simultaneously, many scholars have addressed the ethical and social considerations of using these technologies (Kumaraswamy et al., 2018; Martin, 2018; Ullah *et al.*, 2019), indicating ethics matters when businesses transform to be tech-enabled companies (Sniderman, 2020) and ethics must be addressed at this critical moment in history (WorldEconomicForum, 2018). This is because many companies have already suffered reputational risks and real damage when their algorithms encounter problems, for example, Goldman Sachs was under investigation because its AI sets credit limits lower for women than for men (Blackman, 2022). Therefore, when technology enters the corporate governance agenda, the board must pay more attention to the ethical issues in their decision-making using and involving AI and blockchain technology, especially, they need to understand what ethical dilemmas will encounter when they use AI and blockchain in their business operations and decision-making.

Research gap three: Theoretical development is needed to help businesses understand how their corporate governance can transform to leverage the new capabilities of AI and blockchain (Brennan et al., 2019) as new governance mechanisms to mitigate agency problems, empower people, encourage stakeholder collaboration, and establish new institutional standards. Business leaders are eager to explore the opportunities that AI and blockchain can deliver. At the same time, businesses still have a lot to learn, to be familiar with these technologies and understand the ethical benefits and ethical concerns of the technological impacts to know how to govern the use of these technologies in an ethical and socially responsible way to mitigate misuses and unwanted consequences.

Therefore, this empirical investigation is situated within the field of corporate governance, examining the impact of adopting AI and blockchain technologies within corporate governance, focusing on the ethical issues of using AI and blockchain technological tools within the corporate governance ecosystem to deliver growth. The interrelated fields of corporate governance, AI and blockchain adoption, and ethics represent the general research framework of this research. This study examines the ethical benefits and ethical concerns of using AI and blockchain within corporate

governance and further elucidates how businesses can govern the use of these emerging technologies in a socially responsible and ethical way.

1.3 Main perspective of the study

Following on the justifications of situating this investigation in the domain of corporate governance. This section explicates the main business perspective of this study to incorporate advanced AI and blockchain technologies in businesses to leverage new technological capabilities to drive growth. This investigation emphasizes the ethical perspective of the impact of AI and blockchain technology adoption in the context of corporate governance. This is because in the 4th industrial revolution the world is at crossroads between ethics and technology (Altshuler, 2019). Businesses must deal with ethical dilemmas in developing, distributing, implementing, and using disruptive technologies within their ecosystems properly so that they can further enhance ethical benefits by leveraging the new capabilities of these technologies to deliver growth (Bannister, et al., 2020).

As indicated in the previous section 1.2, the fundamental difference today is the advancement in technologies. These innovative technologies like AI and blockchain are profoundly transforming the way we work and interact with each other. Businesses must anticipate and respond to these technological changes to build resilience and stay robust. The benefits of technology adoption will become even more apparent as our society incorporates new perspectives toward the digital future of work.

Recently, Pegasystems Inc. traded as PEGA, surveyed over 3000 senior managers and frontline IT staff, indicating organizations are motivated by the state of the world to adopt new technologies to serve their customers and employee better. However, around 50% of the respondents think senior leaders need to improve their understanding of how technologies will change their business processes and affect jobs (PEGA, 2020). In addition, the latest McKinsey report further indicates the old business model built on uniformity and bureaucracy cannot fit the purpose in today's business environment. The report suggests radically changing the old model to rethink how companies will be directed and controlled in response to the technological changes in terms of who they are, and how the companies operate and grow (De Smet et al.,2021).

However, the challenges are only beginning for boards, managers, shareholders, institutional investors, accountants and auditors, employees, customers, creditors, etc. to understand the changing business environment, what technology can and cannot do, and which technology fits their overall business strategy, what governance protocol needed in place to ensure AI and blockchain use incorporate technical and societal elements to be ethical and sustainable. As such, this investigation aims to study the adoption of AI and blockchain in the context of corporate governance to ensure the social-technical nature of AI and blockchain use to balance human and technical demands created by rapidly shifting waves of technologies and societal needs (Ølnes et al., 2017; Gomber et al., 2018; Brennan, et al., 2019; Fleming, 2019; Moore, 2019; Shank et al., 2019; Sun and Medaglia, 2019). Boards and senior management need to have a real understanding and genuine engagement (Falk, 2019; Sands, 2019) to leverage the immense capability of AI and blockchain to support ethical practice to enhance transparency and accountability in corporate governance. And at the same time, they need to ensure the ethical design, deployment, and use of AI and blockchain because machines cannot make moral judgments and the technologies have not matured to the point where AI can replace human directors yet (Sands, 2019).

Therefore, the main perspective of this study is to investigate the impact of adopting AI and blockchain in the context of corporate governance in general terms and the ethical perspective of adopting AI and blockchain in particular. This investigation argues that the unique features of AI and blockchain technologies can bring ethical benefits to corporate governance practice to enhance transparency and mitigate information asymmetry. Simultaneously, this research further argues that appropriate controls, checks and balances, and safeguards need to be in place in corporate governance systems to mitigate the ethical dilemmas of using these technologies to transform businesses and offer new products and services. The justifications for choosing an ethical perspective to investigate the impact of AI and blockchain in the context of corporate governance fall into three observations.

First, most corporate failure is associated with financial fraud. The worldwide financial scandals call for reforms in corporate governance to bring more transparency and accountability to companies' governing systems. Back in May 1991, the Financial Reporting Council (FRC), the London Stock Exchange (LSE), and the accountancy profession set up a committee to address the financial aspects of corporate

governance due to some unexpected failures of major companies. The committee has focused on the control and reporting functions of boards and the role of auditors. It was formed to address “the concerns at the perceived low level of confidence both in financial reporting and in the ability of auditors to provide safeguards which the users of company reports sought and expected” (Cadbury 1992: para2.1). Auditing is one of the cornerstones of corporate governance, dealing with the financial aspects of corporate governance (Cadbury, 1992). Auditors provide checks and assurance on every part of the business. Auditors report on directors’ statements in the reports and account for the effectiveness of their internal control system. Audit matters with those charged with corporate governance: (a) corporate trustee(s) with responsibility for overseeing the strategic direction of the entity and obligations related to the accountability of the entity; or (b) management- the person(s) with executive responsibility for the conduct of the entity’s operations (FRC, 2020: para10). The most direct method of ensuring that companies are accountable for their actions is through open disclosure by boards and audits carried out against strict accounting standards (Cadbury, 1992: para5.2). Auditors are the guardians of various interests from shareholders, investors, creditors, etc who have financial interests in companies (Woolf, 1997). The role of auditors is to provide an objective check and reassurance on companies’ financial statements to help raise the level of confidence in financial reporting and the standards of corporate governance. Although auditors serve the purpose of assurance on the accuracy of financial statements, the delays in reporting under the current accounting and auditing process offer room for the age-old problem of “cooking the books” for some managers to create fabricated transactions to manipulate financial information (Dong et al., 2018). Auditors can fail to detect those fabricated transactions (Gill, 2009). This is because different organizations maintain their own ledgers in different formats that drive up the cost, risk, duplication, and error (Brown et al., 2016). Auditors often spend a significant amount of time gathering and verifying transaction information (Cai, 2019). The auditing process is costly and time-consuming and prone to human error (Deloitte, 2016). Most recently, the FRC in the UK has launched a consultation on the government’s proposal to restore trust in audit and corporate governance after the recent Carillion and Wirecard scandals (FRC, 2021). In addition, increasingly, after so many financial scandals and increased regulations globally, many scholars suggest the importance of ethics in corporate governance, which can fundamentally address issues that rules and regulations

cannot reach (Carroll, 2004; Halter et al.,2009; Atkin, 1999; Adam and Schwartz, 2009).

Second, in this ever-changing business world, the advancement in technologies, especially AI and blockchain, are transforming business models and processes (Gomber et al., 2018). These technologies will make many changes in corporate governance with enhanced transparency and intelligent analytics (Yermack, 2017; Davenport and Ronanki, 2018). AI helps automation evolve by combining machine learning, predictive and adaptive models, and natural language processing (NLP) with operational insights – putting the right intelligence into action for every process and interaction (PEGA, 2020:18). Smart contracts powered by blockchain technology automatically execute transactions if both exchange parties meet specific pre-defined criteria. It is argued that the improvements in automation, data transfer, and data analytics will improve monitoring, and the increased data timeliness and usability will enhance transparency (Errichetti and Roohani, 2018). Using the accounting and auditing mechanism of corporate governance as an example, they are buffeted by new forces of technical innovation, process disruption, and business transformation accelerated by AI and blockchain (Brennan et al., 2019; Moll and Yigitbasioglu, 2019). Rozario and Vasarhelyi (2018) suggest it is vital for the conventional audit model to change progressively towards automated audits. Today, we are increasingly witnessing the Big 4 companies are using advanced AI systems for general ledger review, tax compliance, audit work papers, data analytics, fraud detection, and decision-making in auditing (Munoko et al., 2020). Deloitte's LeasePoint (partnered with IBM Watson); PwC's GL.ai (collaboration with H2O.ai); KPMG ignite are all the AI-enabled systems adopted by leading accountancy firms to analyze documents and prepare reports (Faggella, 2020). As we all know that AI relies on a large amount of structured or unstructured data to assist and augment human decision-making (Androutsopoulou et al., 2019). If the training data used to perform auditing procedures are biased, audit quality will be affected which could lead auditors towards higher risk areas (Brown-Liburd et al., 2015). As such, this study explores alternative ways of recording, storing, and sharing financial data using blockchain technology in financial recording to ensure the trustworthiness and transparency of data. With the quality data feed from blockchain technology into an AI system, audit quality can be enhanced and auditors will be better at performing their fiduciary roles with new technological tools.

This is because blockchain has many unique and promising features that can transform future businesses. The key findings from the World Economic Forum suggest blockchain "*has great potential to drive simplicity and efficiency through the establishment of new financial services infrastructure and processes*" (McWaters et al., 2016:19). The technology is increasingly used in commercial banking, trade finance, regulatory compliance, payments, and asset liquidity (Vysay and Kumar, 2019) to reduce costs, improve efficiency, and enhance transparency. Blockchain is now successfully adopted by financial institutions, which are the pioneer in building, testing, and implementing this technology to transform their business models. Now, these financial institutions can maintain accurate and shared transaction records, and keep synchronized databases among blockchain consortia, where institutions collaborate on blockchain platforms (Brown et al., 2016; Brown, 2018; Hearn and Brown, 2019). It is estimated by experts that blockchain could provide a digital record of transactions by 2050 (Fletcher, 2019). At the moment, this technology has also attracted much attention from scholars, industries and policymakers. Dai and Vasarhelyi (2017) have proposed a real-time, verifiable, and transparent blockchain-based accounting ecosystem, where accountants, managers, investors, and business partners can actively cooperate to verify transactions and provide reliable audit trails. Rozario and Vasarhelyi (2018) have suggested the use of blockchain-based smart contracts to improve audit quality for more timely and transparent financial reports to meet the information demands of various stakeholders. Deloitte established the Rubix division which specializes in blockchain technology (Leung, 2016). It is generally agreed that blockchain has the potential to address the challenges faced by today's accounting practice, shifting the nature of financial records being created, kept, updated, and verified (Boillet, 2017; Dai and Vasarhelyi, 2017; EY, 2018). Blockchain will enable real-time accounting/auditing (Buterin, 2014; Dai and Vasarhelyi, 2017; Tapscott and Tapscott, 2017; Yermack, 2017; Rozario and Vasarhelyi, 2018; Sheldon, 2019), triple entry accounting (Dai and Vasarhelyi, 2017; Cai, 2019; Carlin, 2019; Karajovic et al., 2019; Schmitz and Leoni, 2019; Tapscott and Euchner, 2019), which can fundamentally improve transparency and trust to ensure effective corporate governance (Dai and Vasarhelyi, 2017; Brennan et al., 2019; Moll and Yigitbasioglu, 2019). The immutability of blockchain data reduces the incentive and opportunities for manipulation and fraud (Tan and Low, 2019).

Third, as indicated above, advanced AI and blockchain technology are changing business practices. Especially, automation enabled by AI and blockchain technology is fascinating, which can help streamline business processes and improve efficiency. However, if contracts are automated, then what will happen to intermediaries like lawyers, accountants, auditors, and banks (Iansiti and Lakhani, 2017). Lobschat et al. (2021) indicate AI assists in human decision-making and blockchain smart contracts execute contracts autonomously and are subject to moral norms and ethical considerations. Butterworth (2018) has raised the issue of job losses due to automation or self-executing smart contracts. Ransbotham et al. (2017) have alerted AI might be used to endanger the safety of humans. Other studies have expressed other concerns such as algorithm decision-making (Martin, 2018; Winter and Davidson, 2019), and data privacy (unethical use of data) (West, 2019; Whelan, 2019). There are many ethical concerns about using these technologies in businesses, and their corporate governance system needs to carefully address these issues to ensure the ethical use of these automated systems.

As such, the research utilizes an ethical perspective to study the impact of AI and blockchain adoption in corporate governance. As outlined above, ethics is very important and should be at the heart of corporate governance to drive good business practice beyond any rules and regulations for sustainable and ethical business. And ethics is also critical when businesses transform and operate their business using AI and blockchain to improve transparency and efficiency. These technologies will deliver huge value if companies learn how to use these technologies properly and they are not ethically compromised. The ethical perspective will help businesses understand the ethical benefits and ethical dilemmas of the practical concerns of adopting these technologies in businesses. The ethical awareness of the good or bad impacts of these technologies will help board and C-suit level directors make better decisions on how to govern these technologies to deliver growth. It is well acknowledged that any technological changes can be a blessing for social wealth creation and a curse of mass unemployment (Clemons *et al.*, 2017; Fleming, 2019). The above three observations justify this investigation to incorporate social-technical considerations of any technology, because all products, services, and infrastructure are based on societal demands (Gomber *et al.*, 2018). Us humans are the ones who design and use these systems and will be impacted by these systems, either AI or blockchain or any other

technological systems. Social norms will get challenged when the advancement in technologies gets ahead of society (Khanna, 2018). Personal harm could occur from the unethical use of information technology (Mason, 1986). Currently, the public debate on emerging technologies is increasingly focusing on their social rules and ethical issues (Sun and Medaglia, 2019). Many scholars have drawn ethical concerns about using disruptive technologies such as AI and blockchain in terms of unethical use of data, job transformation, and algorithms (Martin, 2018; Fleming, 2019; Lobschat et al., 2021; Winter and Davidson, 2019), and suggested proper governance needed to be in place to ensure the design, development, and deployment of disruptive technologies to integrate social and technical elements (Ølnes et al., 2017; Gomber et al., 2018; Brennan et al., 2019; Moore, 2019; Shank et al., 2019). Buttarelli (2018) suggests companies need to ensure technology ethics in place to ensure human beings, not technology, remain our priority and main consideration in this digital era. The recent McKinsey report indicates companies overall are making some progress in mitigating the risks of AI, but most still have a long way to go (McKinsey, 2020). The AI gap between Europe and the frontier (represented by the United States) has already increased by 20% in the past three years (Bughin et al., 2019).

1.4 Research aims and objectives and research questions of the study

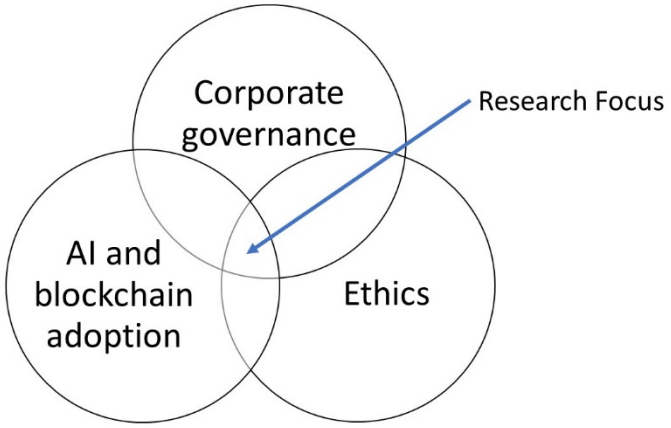
Following explicating the research gap and the main perspective of this study, this section illuminates the detailed and specific research aims, objectives, and research questions of this study.

As indicated above, corporate governance will change in many ways with the adoption of AI and blockchain technologies to drive efficiency and improve transparency and trust. As we are aware, businesses today are moving too fast and too complex for corporate CEOs or boards, or managers to make good decisions without the use of intelligent systems (Libert et al., 2017). Organizations are looking to communicate the insights from the data and information they have collected (Bertino et al., 2019). Managerial processes have changed with the company's data-led strategies (Davenport, 2014). Frequently, organizations are increasingly adopting new techniques to exploit the abundance of data (McAfee and Brynjolfsson, 2012) to better understand their businesses, customers, and competitors to survive and strive in this digital age. Indeed, this world is rapidly changing. It is harder for the board to exercise

control and manage new risks and opportunities accelerated by disruptive technologies. AI and blockchain have salient benefits for individuals and businesses and redefine the nature and scope of our work and social life. As indicated in the previous sections, when technology gets ahead of society, our social norms guided by values, beliefs, and cultures will be questioned (Khanna, 2018). Companies must alter their corporate governance practice to enhance their business strategy to take into account the use of AI or blockchain to improve transparency in corporate governance ecosystems. In addition, companies must enhance the awareness of the importance of ethical practices in corporate governance to help address issues that rules and regulations cannot reach (Shamir, 2008). The values and ethics of technological development must be addressed at the top level of corporate governance and communicated to everyone involved. Ethics is critical and matters when every organization is increasingly changing its business model to be a tech-enabled organization (Sniderman, 2020). Increasingly, the board will have to pay more attention to ethical issues in their decision-making using and involving AI and blockchain technology as machines are unable to make moral judgments (Montagnon, 2019; Clement-Jones, 2020). Boards will encounter additional responsibility for risk oversight on the challenges with AI and blockchain. They need to get familiar with these technologies and understand what AI and blockchain can do and cannot do and learn how to use them in an ethical and socially responsible way. The board has the responsibility to make sure their use of technology does not breach individual rights and endanger the company's reputation (IBE, 2019). In the future, if companies do it right with the ethical use of disruptive technologies such as AI and/or blockchain, they will be more trusted and in a better position to gain a competitive advantage (Montagnon, 2019).

1.4.1 Research aims and objectives

The primary aim of the research is to study the impact of AI and blockchain adoption in corporate governance from ethical perspectives, as shown in Fig 1 below.



Core values of corporate governance that guide ethical behaviour of directors: transparency, accountability, integrity and public responsibility (Adam and Schwartz, 2009)
Fundamental ethical values: transparency, accountability, responsibility, and probity (Rossouw: 2005)
Blockchain adoption enables transparency, traceability, visibility, accountability; integrity (Swan, 2015;Yermack, 2017; Ølnes, et.al., 2017), enhance accurate AI decisions
AI adoption enables analytical capabilities to detect anomaly activities like financial fraud (Seeber et al, 2019; Devenport and Ronank, 2018)

Figure 1 Scope of this research

This study situates the research focus of this investigation in the intersection of corporate governance, AI and blockchain adoption, and ethics (see Fig 1.1 for the scope of this research). This refined research scope intends to better support the aims of this research to investigate the impact of AI and blockchain adoption in the domain of corporate governance to ensure ethical considerations of using these technologies. As such, the ethical considerations of using these technologies within the context of corporate governance constitute the main purpose of this investigation emphasizing three aspects. First, this study explores the ethical benefits of adopting AI and blockchain in the context of corporate governance. Second, this investigation also examines the ethical concerns of AI and blockchain adoption in corporate governance. Third, this study further explicates how companies can ethically govern the use of these technologies for the good of the wider society.

As such, to support the research aim, the objectives of the study are:

- To explore the ethical benefits of using AI and blockchain due to the unique features of these technologies.
- To examine the ethical issues of using AI and blockchain in businesses and
- To provide comprehensive understanding of how companies can govern the use of AI and blockchain to mitigate misuse, questionable design, and unintended negative consequences.

1.4.2 Research questions

Therefore, this empirical investigation is guided by the three following research questions:

- Q1: What are the ethical benefits of adopting AI and blockchain in the context of corporate governance?
- Q2: What are the ethical concerns around AI and blockchain adoption in businesses?
- Q3: How can companies ethically govern the use of these technologies?

This research is important because digital technologies are increasingly embedded in our society, changing the nature and scope of our work and life. It is a highly relevant trend for organizations and our society to further explore disruptive technology adoption (Vial, 2019). The advancement in digital technologies increasingly leads to major shifts in how value is captured and exchanged in society (Cohen, 2017). Companies should treat AI and blockchain adoption as a business issue (McKinsey, 2018; Davenport and Ronanki, 2018; Falk, 2019) because the real issue is how organizations can properly use these machines or technologies to leverage new technical capabilities to do things faster, better, and cheaper (Fleming, 2019). Everyone and every institute must stand ready to embrace and direct the technological change to help shape the future of business and society (HouseOfLords, 2018). Nowadays, we are constantly producing digital traces of our social and work life. It becomes very challenging for businesses to process the abundance of data without intelligent systems (Bertino, et al., 2019). Increasingly, businesses are adopting advanced techniques and systems to collect and analyze large volumes of data (McAfee and Brynjolfsson, 2012) to better understand their businesses, environments, customers, competitors, etc. As such, the ethical issues are increasingly apparent when companies use these advanced technologies to analyze employees and customer behaviours, determine what people see using algorithms, predict what they like, and recommend products or services based on their analysis (Buttarelli, 2018). Companies must deal with the ethical issues of using these advanced technologies (Thomson, 2019). Currently, the public debates are increasingly focused on social rules and ethical issues regarding the use of digital technologies (Dierksmeier and Seele, 2018; Cong and He, 2019; Lima and Delen, 2019; Mansell *et al.*, 2019; Sousa *et al.*, 2019; Sun and Medaglia, 2019; Ullah *et al.*, 2019). Many people feel Facebook

collecting and selling around 50 million users' data to Cambridge Analytical in 2018 was wrong, which adversely impacted Facebook and Cambridge Analytical. The European Union General Data Protection Regulation (DGPR) came into force in 2018 and was viewed as a general pushback against the ethical misconduct of the way data was collected and used (Rouse, 2019). Technologies such as AI and blockchain can bring many benefits to businesses such as reducing transaction costs, streamlining processes, making the job easier, enhancing transparency, improving business efficiency, and building business resilience. However, on the other hand, organizations need to have proper governance in place to ensure the use of AI and blockchain in an ethical and socially responsible way, to ensure the use of those technologies does not endanger our society.

1.5 Methodological design of the study

Due to the emerging nature of AI and blockchain technologies, this study aims to develop a thematic framework to provide an insightful understanding of the impact of AI and blockchain adoption in the field of corporate governance emphasizing the ethical perspectives. As such, it does not seek statistical generalization across different empirical domains. Therefore, the focus of this research is on the abstract qualities and themes, not the empirical quantity and frequency of the technological impact on corporate governance.

Consequently, this investigation adopts netnography (Kozinets, 2020; Jeacle, 2021; Costello et al., 2017; Aleksandrove et al., 2018; Kozinets et al., 2018) and semi-structured interviews. These two approaches are broadly situated within the qualitative research strategy. They are prevailing to the use of interpretive or constructivist paradigms to gain knowledge through immersing in social media and interviewing social actors to understand how they shape, understand, and interpret the digital world. Pragmatically, the research design (see figure 8 in Chapter 3) combines netnography and semi-structured interviews to ensure relevant data is accessible and can be collected online using these two approaches. The whole data collection and analysis are iterative processes throughout this investigation until theoretical saturation is achieved. The research design follows Bell et al.'s (2019) main steps of qualitative research and is tailor-designed for this study. The investigator is committed to incorporating relevance and rigor in designing, conducting, and reporting the research,

to achieve methodological rigour and trustworthiness of this study for better knowledge accumulation (Maula and Stam, 2019).

Pragmatically, this study applies Kozinet's method-embedded research communication triangle, and six step-by-step procedural movements of netgnography to investigate online traces to social media data (see figure 9 in Chapter 3). The pragmatic procedural steps of netnography investigation are following the sequences of initiation, investigation, immersion, interaction, integration, and incarnation, which are explicitly illuminated in the methodology chapter 3. The netnography investigation generates 5 datasets: 34 LinkedIn Posts with Comments; 12 Webinars; 22 YouTube Videos; 19 Videos; and 10 Podcasts. Additionally, this research also conducts 17 semi-structured interviews using online platforms such as MSTeams, Zooms, and Google Meet. The initial informants are identified when the researcher is immersed in online investigations. Then this study applies a snowball or chain referral technique recommended by Biernacki and Waldorf (1981) which results in an evolving sample of informants for the interviews. This study follows ten procedure movements under four categories of arranging, scheduling, closing, and transcribing interviews (see figure 10 in Chapter 3). The informants' length of work experience, current knowledge, and expertise are used in this investigation as the specific measures of their competency.

Then this research follows Corley and Gioia's (2004) study, inductively analyses the data once it is collected, adhering closely to the guidelines specified for methods of naturalistic inquiry (Lincoln and Guba, 1985) and constant comparison techniques (Glaser and Strauss, 1967). These approaches provide the basis for rigorous data collection and analysis to determine if more data needs to be collected (Corley and Gioia, 2004). Therefore, the data analysis is a recursive process (Locke, 1996) and moves back and forth throughout the data collection and analysis phases (Braun and Clarke, 2006). Further, this study thoroughly describes the thematic analysis procedures followed by this investigation (see figure 13 in Chapter 3). The specific techniques and the pragmatic step-by-step approaches adopted in this investigation in collecting and analyzing data aim to achieve the methodological rigour and trustworthiness of this study.

1.6 Main contribution of the study

This study develops a thematic framework as a result of this investigation that signifies the primary theoretical contribution. In addition, this research provides secondary contributions in theoretical terms and empirical contributions to the nascent area of AI and blockchain adoption within the corporate governance realm from ethical perspectives.

Primary theoretical contribution: As a result of this empirical investigation, this thesis develops a thematic framework that provides a holistic understanding of the impact of AI and blockchain adoption in corporate governance from ethical perspectives. The framework explicates three dimensions with detailed themes based on the empirical evidence from different informants' views and experiences. First, three specific themes related to the triggers of corporate governance change: change in social reality; current business problems; and blockchain and AI for fraud detection. Second, four specific themes related to corporate governance change context: structural change; new capabilities; ethical concerns with automated systems; and adoption challenges. Third, five specific themes related to corporate governance imperative response to the ethical use of blockchain and AI: ethical design fit for purpose; ethical use of data; leadership (board support); people, and culture. As such, this thematic framework provides a new conceptual framework for future inquiries into corporate governance to incorporate technological mechanisms to transform businesses for future growth.

Secondary theoretical contribution: This research adds a conceptual understanding of technological mechanisms within corporate governance to enhance transparency and trust, which improves variety in conceptual terms for future research in the corporate governance domain to incorporate the nascent area of AI and blockchain adoption. It further represents an expansion of the conceptual reach of applying new technological tools to improve transparency and accountability in corporate governance. In addition, this study contributes to enhancing the existing scholarly literature on the well-established field of corporate governance, and the emerging field of AI, blockchain. The notion of ethics is further specified and significantly expanded by this study to examine the ethical benefits of using AI and blockchain and the ethical dilemmas organizations will encounter when using these

technologies, and further elucidates how companies can ethically govern the use of these technologies. Further, the findings of this research are explicated using the multi-theoretical approach from the perspectives of the existing agency theory, stewardship theory, stakeholder theory, and institutional theory so that the empirical findings of this investigation can be better understood.

Empirical contributions: This study successfully expands the current AI and blockchain studies to empirically study the impact of AI and blockchain adoption in the field of corporate governance, emphasizing the ethical perspectives, and corroborating the applicability of AI and blockchain within the corporate governance realm. The empirical findings are based on qualitative data collected from 34 LinkedIn Posts with Comments,12 Webinars, 22 YouTube Videos, 19 Videos, 10 Podcasts, and 17 semi-structured interviews. More future studies are needed to expand the thematic framework developed from this study to integrate different empirical methods and settings to further refine, test, and compare the results to enrich the knowledge

Practically, this study extended beyond the original field of technologies by showing the relevance of AI and blockchain in the domain of corporate governance to empower a thoughtful, careful consideration of the implications of technological disruption, to help organisations stay relevant and build resilience in the digital era. The empirical findings of this investigation provide practical implications for shareholders, boards, managers, accountants, auditors, policymakers, and other stakeholders involved in corporate governance ecosystems. The articulation of the practical contribution of this study covers three main aspects in Chapter 5: the ethical use of disruptive technologies, the future workforce, and the regulations.

The results indicate companies can leverage the new technological capabilities of blockchain-enabled network coordination and AI-enabled data intelligence to create value and deliver growth, based on the condition that only if companies know how to use them properly and are very confident that these systems have the right intention and are not ethically compromised. This study further explicates if the board members governing a company are technology competent, they can drive the company's success in digital transformation by fostering the right strategies, embedding ethical design of AI or blockchain systems that fit for purpose, creating an organizational culture values ethics first, and continuously training and educating the workforce to

enhance ethical awareness, and having the right policies and processes, controls, safeguarding in place to ensure ethical use of these technologies. The findings of this investigation also reveal that if companies try to experiment with AI or blockchain, they need to have everyone involved in the projects go through the entire process of building it, testing it, and working on robust constant feedback loops to improve it. People must prepare themselves for the future. Society as a whole needs to adjust to the new realities and get it right in terms of reskilling and upskilling and starts building pathways forward before displacement happens, to ensure the digital transformation is ethical and socially responsible. In terms of regulations, they should focus on what are the impacts of technologies on people, and the good operations of society. Regulators have to get away from these sorts of high-level ethics principles and get into something more concrete like role-specific responsibilities, a risk mitigation strategy, and keep it simple so that people can understand and operationalize them. As such, collaboration is critical to enable multi-stakeholder perspectives and international efforts to anticipate and be proactive in having a framework that, in a sense, assesses the risk, to make sure people understand what is happening out there and their radar is fully alert and be quite forensic about the use of these technologies.

1.7 Structure of the thesis

This study organizes and synthesizes the thesis in six chapters.

Chapter 1: The introductory chapter introduces the research background and provides the rationale for this study relevant to the general purpose of this investigation. Further, this chapter articulates three research gaps in section 1.2. Following on from that, section 1.3 justifies the ethical perspective adopted for this study to investigate the impact of AI and blockchain adoption in the domain of corporate governance. Based on that understanding the chapter presents the aims of this research, the more specific objectives, and the particular general research questions for this empirical investigation in section 1.4. It further provides an overview of the methodological design for this inquiry in section 1.5. Finally, it elucidates the main contributions of this study in section 1.6 and outlines the structure of the thesis in section 1.7.

Chapter 2: This chapter extensively and systematically reviews the extant scholarly literature on the well-established field of corporate governance, and the emerging area

of AI and blockchain technologies. General conceptual and empirical gaps are identified that warrant further scrutiny in the field of corporate governance to incorporate new AI and blockchain technologies within its ecosystems to deliver growth. This chapter starts with reviewing the relevant literature on corporate governance in section 2.1, revealing the weaknesses in contemporary corporate governance linked to financial fraud due to information asymmetry and lack of transparency. A growing stream of literature in corporate governance studies emphasizes the importance of ethics in corporate governance to restore trust and the importance of transparency in corporate governance to promote ethical decision-making. Following on from this, this chapter also provides relevant literature on AI in section 2.2 and blockchain technology in section 2.3, revealing the salient capabilities of these technologies that can be used in corporate governance to fundamentally improve transparency and trust. This chapter further presents the benefits of integrating AI and blockchain to improve data security and enhance accurate AI decisions in section 2.4. Then this chapter explicates AI and blockchain ethics to help organizations understand the ethical issues of using AI and blockchain within their ecosystems in section 2.5. The final section of this chapter consolidates the relevant literature and develops a multi-theoretical framework from the perspectives of agency theory, stewardship theory, stakeholder theory, and institutional theory to guide this investigation in section 2.6. As such, this chapter addresses a general focus on corporate governance to enhance transparency by adopting new AI and blockchain technologies. More particularly, its focus is on the relevance and importance of the ethical dimension of using these technologies within the domain of corporate governance to enhance ethical benefits and mitigate ethical dilemmas and help organizations survive and thrive in digital transformation.

Chapter 3: This chapter illuminates the research methodology adopted in this research. This study applies specific techniques and a pragmatic, step-by-step netnography approach to investigate online traces, and extends these online explorations with online semi-structured interviews. This chapter starts with the articulation of the philosophical orientation of the study in section 3.1. Following on from this, section 3.2 explains the research design of the study. The subsequent section 3.3 elucidates the different methods (netnography and semi-structured

interviews) adopted for data collection. Then, section 3.4 illuminates the thematic analysis of the data. Finally, section 3.5 evaluates the research quality.

Chapter 4: This chapter presents the data analysis and reports the findings. In this findings presentation, this study coordinates, integrates, and marshals four data displays: a) the findings narrative itself, b) the supporting data with representative quotations to each theme; c) the progressive data structure (1st order concepts, 2nd order themes, aggregate dimensions), and d) the emergent thematic model. This study collates similar themes into several overarching dimensions that make up the basis of an emergent thematic framework. This way of reporting findings makes it easier for the interested reader to discern the evidence of the findings. As such, this chapter is divided into two main parts. Section 4.1 outlines the themes identified from the thematic analysis of the data collected purposefully for this inquiry. This section is then organized into sub-sections to analyze and interpret each theme with supporting evidence of representative quotations from the informants, and further, this study builds a data structure to make a meaningful and insightful understanding of the data. Following on from this, section 4.2 explicates the thematic framework developed from the data as the main findings of this investigation.

Chapter 5: This discussion chapter evaluates the substantial empirical results by demonstrating their impact and contribution relative to the appropriate theoretical literature and assessing the strengths and limitations of the methods and results. In this chapter, the results of this study and the resulting thematic framework as the main findings of this research are first discussed in Section 5.1 in the context of extant scholarships in corporate governance, blockchain, AI, and ethics to evaluate the impact of AI and blockchain adoption in corporate governance from ethical perspectives. Further, the contributions of this study in theoretical and practical terms are explicated in Section 5.2. The findings of this study are interpreted using a multi-theoretical approach from the perspectives of the existing agency theory, stewardship theory, stakeholder theory, and institutional theory so that the empirical findings of this investigation can be better understood. Finally, the methodological, empirical, and practical limitations of this study are summarized in Section 5.3.

Chapter 6: This final chapter first concludes this thesis and then outlines some future predictions from this empirical investigation regarding technological development in

section 6.1. Following on from this, this chapter also provides some recommendations on how companies can refocus and rethink their approaches to digital transformation to deliver growth and sustainability in section 6.2. Lastly, in section 6.3 of this chapter, this study elucidates and suggests the directions for future research to integrate different empirical methods and settings to further refine, test, and compare the results to enrich the knowledge.

Chapter 2 Literature review

This chapter reviews the relevant scholarly works of literature, which frame and inform this study in general terms. It purposefully provides an extensive review of the extant literature on corporate governance, artificial intelligence, and blockchain technology, which are relevant to this empirical investigation that broadly situates the study within the domain of corporate governance to examine the impact of adopting AI and blockchain in corporate governance. Further, this chapter provides a more specific discussion by reviewing the works of literature pertinent to the particular ethical focus of the importance of ethics in corporate governance and ethical considerations of using AI and blockchain within the context of corporate governance.

This investigation is informed by the key literature on the domain that presents the argument that corporate governance is a suitable field for understanding the new capabilities and challenges of AI and blockchain adoption at the corporate level due to current societal conditions, which organizations face in general in terms of digital transformation, which forces businesses to transform business models and adopt new ways of working in this digital era. More importantly, corporate governance has been an area of research for many decades, the major surge in the research was accelerated by the increased call for greater accountability and responsibility from the board and senior management of corporations. This part of the chapter highlights that corporate governance is based on theoretical foundations that make it an appropriate meta-level context for this current inquiry: its agency problems, its stewardship view of trust, its stakeholder orientation, and its institutional focus. However, corporate governance has not yet reached a wider acceptance of more decentralized corporate governance structures and practices facilitated by the technological revolution. Theoretical understanding needs to be further developed and explored to help organizations understand the digital transformation in their businesses.

Further, the emerging literature on AI and blockchain are mainly conceptual, and empirical investigation is slight, which is understandable that AI and blockchain are at early stages of development and adoption. The salient benefits of AI and blockchain adoption represent inherent features of transparency and trust, which may have much broader instrumental and analytic relevance in corporate governance if companies know how to ethically use these technologies as new governance mechanisms which

can fundamentally improve transparency and trust, and foster collaboration in corporate governance.

As such, this chapter is structured into six main sections. The first section of this chapter outlines the concept of corporate governance, the existing models and mechanisms, the importance of ethics in corporate governance, and the emerging decentralized corporate governance practice. This part of the literature reveals the weaknesses of contemporary corporate governance linked to financial fraud due to information asymmetry and lack of transparency, and further emphasizes the importance of ethics in corporate governance to restore trust. The extant literature suggests the importance of transparency in promoting ethical decision-making to enhance integrity and company reputation. Following on from this, the second section of this chapter provides relevant literature on Artificial Intelligence, followed by the relevant literature on blockchain in the consequent section. These two sections explicate a basic understanding of these two technologies in general and elucidate the opportunities for using AI and blockchain to help companies move forward in digital transformation and fundamentally enhance transparency and trust in corporate governance. The fourth section of this chapter illuminates the benefits of integrating AI and blockchain to improve data security and enhance accurate AI decisions. Then, the following section five of this chapter explicates AI and blockchain ethics to help organizations to understand the ethical issues of using AI and blockchain within their ecosystems to ensure the ethical design, development, and deployment of AI and blockchain technologies. Lastly, section six outlines a multi-theoretical framework developed in this literature review from the perspectives of the agency theory, stewardship theory, stakeholder theory, and institutional theory to guide this empirical investigation so that the impact of AI and blockchain adoption in corporate governance from ethical perspectives can be better understood.

2.1 Corporate governance

This section elucidates the extant scholarly literature on corporate governance and explicates the emerging new trend in this field with digital transformation. It first outlines the concepts of corporate governance in section 2.1.1. Then it explains the basic corporate governance models in section 2.2.2, followed by the corporate governance mechanisms in section 2.2.3. Following on from that, section 2.2.4

illuminates the importance of ethics in corporate governance. Then, section 2.2.5 explicates the emerging corporate governance with AI and blockchain technologies to fundamentally improve transparency and trust.

The existing corporate governance scholarly literature indicates the importance of corporate governance lies in its contribution to accountability and business prosperity (Hampel, 1998). The topic of corporate governance and firm performance has attracted great attention from many scholars (Berger and Bonaccorsi di Patti 2006; Brandes et al. 2008; Choi et al. 2012; Al Farooque et al. 2019; Gedajlovic and Shapiro 2002; Grove et al. 2011; Jackling and Johl 2009; McDonald and Westphal 2010; Ngo et al. 2018; Nicholson and Kiel 2007; Perrini et al. 2008; WITHERS and Fitza 2017). The extant scholarly studies on corporate governance span across different disciplines such as management, accounting, finance, economics, and law (Coles et al., 2001). Over the past decades, the major surge in corporate governance research was accelerated by the increased call for greater accountability and responsibility from the board and senior management of corporations (Christopher, 2010) to mitigate agency problems and create value for firms. The extant studies on corporate governance have focused on internal and external monitory and control mechanisms in seeking the most effective corporate governance model (Kumar and Zattoni, 2019). However, the enhanced regulations and additional monitoring and incentive mechanisms have not stopped the financial scandals resulting from unethical behaviour or wrongdoings (Adam and Schwartz 2009; Bonn and Fisher 2005; Claessens and Yurtoglu 2013; Minkes et al. 1999; OECD 2004; Palazzo and Scherer 2006). The importance of ethics in corporate governance can help address issues that rules and regulations cannot reach (Shamir, 2008). The recent study by Ullah et al. (2019) restates the agency problem as ethical tension between managers and corporate governance mechanisms. Profit maximization is a part of the theory of the firm, however, “it is only a part, and certainly not the central focus”, firms need to reflect “ethical as well as economic precepts” (Hosmer 1996:33). No corporate governance system can be effective without public trust (McCarthy and Puffer, 2008). Directors need to deal with ethics in corporate governance to enhance trust in the capital markets (Anderson et al. 2007). Today, our business world is changing from hierarchy, centralized organization to a more open, decentralized autonomous organization (Fenwick et al., 2017). The business environment is changing fast with the advancement in

technologies. It has become nearly impossible to perform daily activities without the use of digital technologies (Lobschat *et al.*, 2021). “As society becomes increasingly entrenched in the digital information era, ethics in computing continues to be an important and widely discussed issue in both academia and practice” (HouseOfLords 2018:21).

2.1.1 Concept of corporate governance

There are many definitions of corporate governance, UK Cadbury Report defines corporate governance as “the system by which business corporations are directed and controlled” (Cadbury, 1992). The important contributions of corporate governance outlined in the Hampel Report are business prosperity and accountability (Hampel, 1998). Corporate governance involves “a set of relationships between a company’s management, its board, its shareholders, and other stakeholders (investors, creditors, employees, etc) in the governance system. Corporate governance also provides the structure through which the objectives of the company are set, and the means of attaining those objectives and monitoring performance are determined” (OECD 2004:11). Good corporate governance is “an essential means to create an environment of market confidence and business integrity that supports capital market development and corporate access to equity capital for long-term productive investments. The quality of a country’s corporate governance framework is of decisive importance for the dynamics and the competitiveness of a country’s business sector” (OECD 2019:9). Good corporate governance ensures financial stability, business integrity (Potts and Matuszewski, 2004), and trust (Gilbert and Rasche, 2008; Rezaee, 2008). Paine and Srinivasan (2019) have summarised six core functions of a corporate board: 1) selecting, monitoring, advising, and compensating the chief executive, 2) monitoring the company’s financial structure and declaring dividends, 3) deciding on major transactions and changes in control,4) monitoring the company’s financial reporting and internal controls, 5) overseeing the company’s strategy, performance, risk management, and 6) compliance with relevant legal and ethical standards.

This study addresses the changes in corporate governance facilitated and accelerated by the adoption of disruptive technologies like AI and blockchain. On one hand, the new technological tools can improve transparency, efficiency, and data quality,

enhance analytical capabilities, reduce human error, and enhance trust. On the other hand, intelligent automation will cause ethical dilemmas such as job loss, bias, privacy, and unethical use of data. The emerging new corporate governance needs to be agile, and collaborative to “have the ability to detect and respond to opportunities in a timely and flexible manner”, and “can be able to work together” (Brennan et al. 2019:7) to utilize decision rights, incentives and accountabilities empowered by AI and blockchain for organizational and economic coordination (Ziolkowski et al.,2020).

2.1.2 Corporate governance models

Currently, in the economics and management debate on the subject of corporate governance, there are two different models of corporations: the shareholder model and the stakeholder model (Maher and Andersson, 2002). On one hand, the shareholder model is to maximize shareholder value, and ensure the firm is run in the best interests of shareholders. This model helps to provide clear guidance in setting priorities and establishing monitoring and control mechanisms to improve a firm’s profitability. The shareholder's approach to corporate governance is primarily concerned with aligning the interests of managers and shareholders (controlling shareholders and minority shareholders) to reduce agency problems (Jensen and Meckling, 1976; Fama and Jensen, 1983).

On the other hand, the stakeholder model extends the shareholder model to take account of other stakeholders, such as employees, suppliers, customers, creditors, and social constituents such as the local community, environmental agency, local and national governments, and society at large. The problem associated with this model of the firm is that it is difficult to ensure the inclusion of all the stakeholders’ interests. A mechanism encouraging cooperation and coordination among stakeholders is required to support the interests of all stakeholders to create value for the firm (Freeman, 1984, 1994; Donaldson and Preston, 1995).

Due to different legal systems (Ping and Andy, 2011) and the institutional context of a specific country (La Rosa et al., 2019), corporate governance factors such as the board of directors, ownership structures, value, manager’s primary function, forms of control, sources of financing, governance approach, firm objectives, and strategies are different (Filatotchev and Boyd 2009; Filatotchev et al., 2013) under these two models (see table 1 below).

Corporate governance models		
Model	Shareholder model	Stakeholder model
Ownership	Dispersed	Concentrated
Board Structure	One-tier (board of directors)	Two-tier (supervisory board and executive board)
Value to be reached	Shareholder value	Stakeholder value
Manager's primary function	Profit producer	System maintainer
Form of control	Exercised by the stock market (Indirect)	Exercised by the company's stakeholders (Direct)
Sources of financing	Stock market mainly	Reinvestment of earnings and bank credits mainly
Governance Approach	Monitor and control	Coordinate and collaborate
Firm objectives	Shareholder value creation	More diversified objectives
Corporate strategy	Encourage radical innovation and cost competition	Facilities incremental innovation and quality competition
Legal systems	Common law	Civil law
Countries	Unites States of America United Kingdom, Canada, Australia (British territories or colonies)	Continental European countries (Germany, Netherlands, Sweden, Austria, Denmark, Norway, Finland, France, Italy, Spain, Belgium) and Japan, Latin America

Table 1 Corporate governance models (Sources: Caldwell and Karri (2005); Ping and Andy (2011))

However, the major invisible barrier in modern companies under these two models across the globe is the lack of transparency (Ndofor et al., 2015). Although many efforts have been made in both common law and civil law jurisdictions to promote the principle of transparency in corporate governance, information asymmetry still exists due to different institutional contexts, and different ways of recording transactions using different ledgers between counterparts. The process creates duplications and inconsistency and causes delays in the processes, which creates opportunities for managers to manipulate transactions. Based on the corporate and governmental information flows, Errichetti and Roohani (2018) have proposed an ideal corporate governance model (see figure 2 below) to assess the merit of the Digital Accountability and Transparency Act of 2014 (DATA Act). Their study suggests that "*increased data timeliness and usability will enhance transparency, while improvements in automation, data transfer, and data analytics will improve monitoring*" (p107). Transparency enables principles to mitigate undesirable agent behaviour and determine the most productive principle-agent relationships.

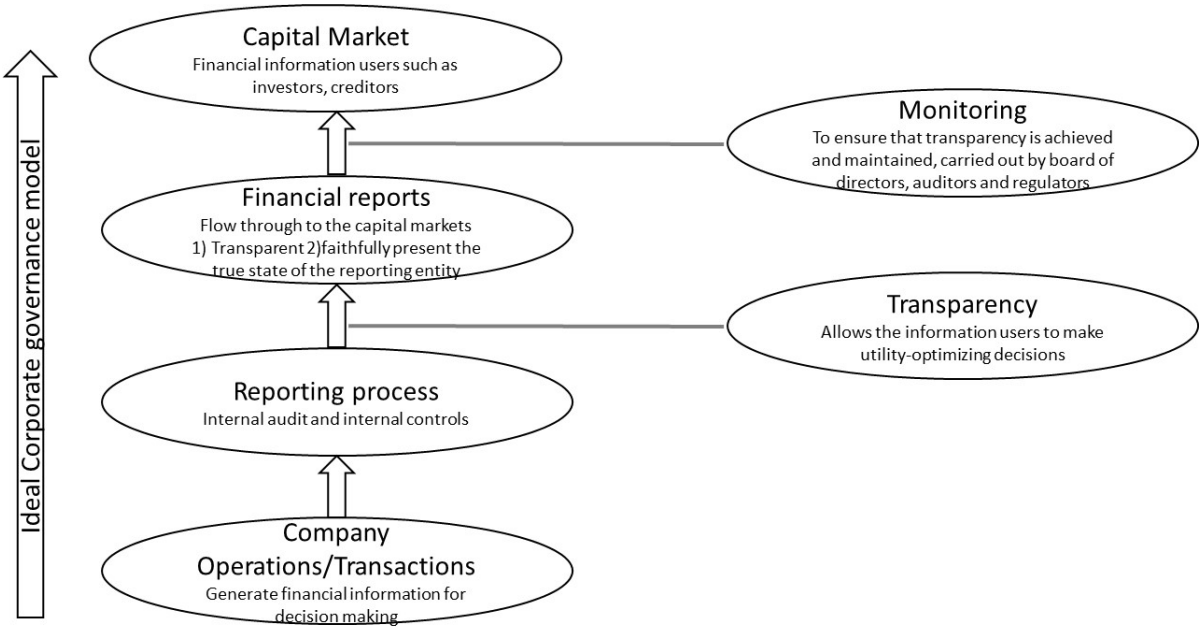


Figure 2 Idea corporate governance model (Source: Errichetti and Roohani 2018:115-116)

Errichetti and Roohani's (2018) idea corporate governance model suggests companies generate trustworthy financial information for end-users to make better decisions to comply with the DATA Act. Their model has acknowledged the importance of transparency and monitoring in the information flow process. However, their model has not considered the use of more advanced technological tools such as AI and blockchain which automate the process and detect anomaly transactions, and fundamentally enhance transparency and monitoring in a timely and continuous manner.

2.1.3 Corporate governance mechanisms

Recently, the study of Lumineau et al., (2021:504) has combined the views from both economic and management scholars, and they have conceptualized "a governance mechanism as the institutional arrangement through which an agreement is enforced". Gulati et al. (2005) have noted businesses turn to governance mechanisms to seek solutions for challenges to help them organize their interactions and manage interdependencies.

Over the past decades, studies on corporate governance have focused on internal and external monitoring and control mechanisms in seeking the most effective corporate governance model. The primary internal governance mechanisms consist of the board of directors and ownership structure (Anderson et al. 2007; Bao and

Lewellyn 2017; Clarysse et al., 2007; Elbadry et al., 2015; Filatotchev et al. 2013; Grove et al. 2011; Horner 2010; Lai et al.,2017; Nowak and McCabe 2003), compensation incentives (Coles et al., 2001; Brandes et al., 2006; van Essen et al., 2015; Lai et al., 2017; Chari *et al.*, 2019; Kovermann and Velte, 2019; Till and Yount, 2019). The external mechanisms have devoted renewed attention (Aguilera et al. 2015; Coffee 2006; Shi et al., 2017) are reflected by the takeover market and the legal system (Denis and McConnell, 2003), such as the threat of takeover (Grossman and Hart, 1988), product competition (Hart, 1983), managerial labour markets (Fama, 1980).

The positivist agency theory has historically identified two governance mechanisms that can be used to reduce agent opportunism: (1) outcome-based contracts, and (2) information systems (Eisenhardt, 1989). Outcome-based contracts are thought to be an effective governance mechanism because they align the interests of the principle and the agent. Contracts can serve as a mechanism for facilitating coordination (Reuer and Ariño, 2007). Contracts can be used to build a collaborative environment to reduce misunderstandings between parties enhance accountability, predictability, and common understanding and reduce honest mistakes (Lumineau, Wang and Schilke, 2021). Information systems can inform the principle of the agent's activities and discourage agent opportunism because the agent realizes that it will not be able to deceive the principle (Eisenhardt, 1989; Errichetti and Roohani, 2018).

Further, the extant scholarly literature has identified contractual governance and relational governance. The contractual governance is based on contract, while the relational governance focuses on trust and relational norms (Macneil, 1980). Therefore, different corporate governance mechanisms have been adopted under the systems of contractual governance and relational governance (Macneil, 1980; Rousseau *et al.*, 1998; Faems *et al.*, 2008; Lumineau et al., 2021) to promote cooperation and coordination between different parties (Gulati et al., 2012). The recent study by Lumineau et al., (2021) has provided a very good comparison between the different governance mechanisms (see table 2 below).

	Contractual governance	**Relational governance**
Defining feature	Agreements in writing (rights and obligations)	Flexible arrangements, shared expectations about behaviours of each partner

Focus	Emphasizes the importance of contracts	Emphasizes the importance of trust for safeguarding and coordinating alliances
Principles	Law	Social Norms Shared value system Sense of solidarity
Enforcement	Enforcement through third parties (court, arbitrator)/government authorities	Enforcement through the parties themselves
Form	Formal	Informal
Illustrated studies	(Macneil, 1980; Heide and John, 1992; Rousseau *et al.*, 1998; Zhang et al.,2003; Faems *et al.*, 2008; Lumineau et al., 2021)	

Table 2 Comparison of corporate governance mechanisms (Source: Lumineau et al., 2021)

In the light of the above, the main purpose of the corporate governance mechanisms is to ensure effective cooperation and coordination between different parties to align interests and aligning expectations between transacting parties to build trust (Gulati et al., 2012; Lumineau et al., 2021). Trust is "a psychological state comprising the intention to accept vulnerability based on positive expectations of the intentions or behaviour of another" (Rousseau *et al.*, 1998:395). The study of McEvily et al.(2003:93) has conceptualized trust "as an expectation, which is perceptual or attitudinal, as a willingness to be vulnerable, which reflects volition or intentionality, and as a risk-taking act, which is a behavioural manifestation". Trust is based on anticipated behavioural integrity (Mayer et al., 1995). In addition to trust, trustworthiness influences the pervasiveness and efficacy of trust (Barney and Hansen, 1994). According to McEvily et al.(2003), without trustworthiness, trust is not sustainable. The distinction between trustworthiness and trust is "based on the actual versus perceived intentions, motives, and competencies of a trustee" (P93).

However, trust has been an issue in modern companies (Caldwell and Karri, 2005) due to information asymmetry. As such, corporate governance mechanisms need to find a way to improve trust. This research argues that companies can consider using advanced technological tools like blockchain technology as a governance mechanism to facilitate cooperation and coordination to fundamentally improve trust through a consensus mechanism.

2.1.4 Ethics in corporate governance

As mentioned above, trust is important to sustain the business. Many of us are familiar with stories about top managers "cooking the books" in one way or another. The famous Enron scandal cost shareholders $74 billion, and the WorldCom fraud leads to $180 billion and cost 30,000 jobs (Dong et al.,2018). As a result, companies and

regulatory bodies often implement strict controls to try to prevent financial fraud. The latest Carillion and Wirecard scandals are pushing the reform in the audit. Recently, UK Financial Reporting Council launched a consultation on the government's proposal to restore trust in audit and corporate governance (FRC, 2021).

The worldwide corporate scandals have surged the demand for an explanation of the antecedent of corporate wrongdoing committed by top executives (Schnatterly et al.,2018). Wrongdoing is behaviour that an individual decides to transgress the line between right and wrong, causing negative outcomes for organizations (Greve et al., 2010). Unethical behaviours are the violation of societal norms on the expectation of moral behaviour (Akaah, 1996; Cialdini et al., 2004).

Extant scholarly studies have noted the available internal and external opportunities are necessary preconditions for fraud and wrongdoing (Schnatterly et al.,2018). Opportunities arise because information asymmetries that are often labelled as a lack of transparency exist between top managers and their diverse shareholders (Ndofor et al., 2015). Information asymmetry (lack of transparency) is well documented and suggested as the main cause of agency problems (Godfrey et al., 2003; Acharya et al., 2011; Cuevas-Rodríguez et al., 2012; Jiraporn et al., 2012; Liu and Lai, 2012; Wiseman et al., 2012; Hail et al., 2014; Elbadry et al., 2015; Lai et al., 2017; Errichetti and Roohani, 2018). The existence of information asymmetry between top managers and shareholders contributes to a moral hazard risk for shareholders (Ndofor et al., 2015). Financial reporting fraud is a moral hazard problem that occurs when managers behave in ways that reduce shareholder value (O'Connor *et al.*, 2006). The study of Schnatterly et al. (2018) reveals internal forces such as the CEO's power, duality, a sizable ownership stake, and external forces such as industry cultures and norms regarding payback periods and investments horizons set the tone for industry players and dictate CEO, provide opportunities to commit or facilitate wrongdoing. Ndofor et al. (2015) have found that industry-level complexities in information asymmetry increase the likelihood of wrongdoing. Ramdani and van Witteloostuijn (2012) have found CEOs who have a significant ownership stake are more like to engage in wrongdoing than their counterparts without this ownership stake. Excesses in stock-based incentive compensation can have the unintended effect on CEOs to use overly aggressive accounting practices or misreport a firm's financial results to engage in financial misbehaviour (Desai et al., 2006; O'Connor *et al.*, 2006). According to Ullah

et al.(2019), a corporate scandal is morally or legally wrong that generates a negative public reaction and creates controversies. Their study restates the agency problem as ethical tension for managers and corporate governance mechanism as a way of mitigating the agency problem to restore trust and confidence. McCarthy and Puffer (2008) indicate no corporate governance system can be effective without public trust.

The importance of ethics in corporate governance can help address issues that rules and regulations cannot reach (Shamir, 2008). Ethical values and principles such as transparency, accountability, integrity, and public responsibility (Rossouw, 2005; Adam and Schwartz, 2009) (see table 3 below), if formally set out, can also help provide the moral justification for the law and guide ethical behaviour of directors (Bonn and Fisher, 2005), which might lead to greater compliance with the law (Schwartz et al., 2005). Atkin (1999) believes ethics is the best choice for business practice. Ethics "deals with values related to human conduct, concerning the meaning of right or wrong of certain actions and the motives that provoke these actions" (Halter et al., 2009:376). The rise of ethics in corporate governance gives hope to restore trust in business (Caldwell and Karri, 2005; Cuevas-Rodríguez et al., 2012). Ethics can be an alternative or rather more positive approach to empowering the board of directors, guided by ethical values and norms, by accurately reviewing corporate actives and financial reports to prevent financial damage (Adam and Schwartz, 2009).

Corporate governance and Ethical values	
Transparency	Certain information about what took place is made public and is accessible to its applied audience transparency value leads to norms that guide the board's decision-making process (business strategy, resource allocation, accessibility of information) Transparency increases trustworthiness, improves investor confidence
Accountability	The value needs to be expressed through a corresponding set of norms which should guide the requirement of directors to render an account and explain to the shareholders the reasoning behind the decisions made, the constraints that were faced, and the actions taken
Integrity	Integrity refers to the desired set of norms that enable the impartiality of decision-makers while observing the right rules of conduct (putting the interests of the shareholders first in any decision while balancing the interests of other stakeholders) in a consistent manner
Public responsibility	It refers to a set of norms that reflect the responsibility of a specific person to make a given decision or take action given one's legal and moral obligations while holding a post as an executive in the organization within the scope of his post. The behavioural norms based on this value specify the conduct within the scope of the post which is specified in what needs to be done, and who should do it

Table 3 Corporate governance and ethical values (Source: Adam and Schwartz 2009: 228-229)

Many extant scholarly studies have suggested ethics can improve a company's reputation (OECD, 2004; Bonn and Fisher, 2005), enhance integrity (Boyd, 1996; Potts and Matuszewski, 2004), contribute to corporate legitimacy and accountability (Purcell, 1982), establish credibility and trust (Gilbert and Rasche, 2008), increase truthful disclosure (Gaa, 2009), enhance transparency, accountability, integrity and public responsibility and promote and motivate ethical behaviour of directors (Adam and Schwartz, 2009).

According to O'Fallon and Butterfield (2005), there are two streams of ethics

1. Normative ethics (or normative model) is more theoretical. The model focuses on how individual should behave,
2. Descriptive ethics (or positive model) is more empirical. The model focuses on how individuals behave or think when faced with ethical dilemmas.

In practice, managers often adopt the normative theory of ethics, such as stockholder theory, stakeholder theory, and social contract theory to make ethical accepted decisions in the changing business environments, and focus on how individuals should behave (Hasnas, 1998; Bose, 2012).

The field of descriptive ethics lies largely in the realm of business and management to predict an individual's actual behaviour. Studies such as O'Fallon and Butterfield (2005), and Craft (2013) have reviewed a large number of articles published from 1996 to 2003, and from 2004 to 2011. Many studies have empirically tested a wide variety of proposed constructs (see figure 3) that influence Rest's (1986) four-step model for individual ethical decision making (see table 4 below).

Rest's moral decision-making model	
Components (steps)	Explanation
Moral awareness	Identifying the moral nature of an issue
Moral judgment	Making a moral judgment
Moral intent	Establishing moral intent
Moral behaviour	Engaging in moral action

Table 4Rest's (1986) moral decision-making mode (Source: O'Fallon and Butterfield, 2005)

Rest's (1986) moral decision-making model is made up of four components: Moral awareness, moral judgment, moral intent, and moral behaviour. The model explicates the awareness of the moral nature of an issue, the ability to make a moral judgment,

establish moral intent, and engage in moral action (Rest, 1986; O'Fallon and Butterfield, 2005).

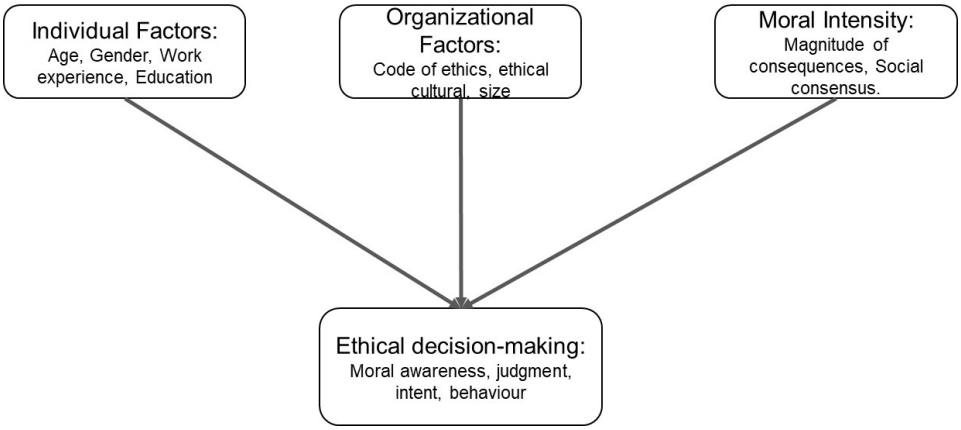


Figure 3 Positive model of descriptive ethics (Sources: *Lovell, 2002; O'Fallon and Butterfield, 2005; Craft, 2013; Musbah et al.,2016)*)

The positive model of descriptive ethics further illuminates factors that influence ethical decision-making in terms of moral awareness, judgment, intent, and behaviour. The factors can be individual factors such as age, gender, work experience, and education; organizational factors such as code of ethics, ethical culture, and size; and moral intensity such as the magnitude of consequences, and social consensus (O'Fallon and Butterfield, 2005; Craft, 2013). Further, in philosophy, the extant scholarly studies have produced consistent results in examining idealism and relativism, which reveal that "idealism and deontology are generally positively related to ethical decision-making, while relativism, teleology, and other factors, such as economic orientation are generally negatively related to ethical decision-making" (O'Fallon and Butterfield, 2005:379).

In the light of the above, ethics deals with how people should behave and how people behave when they face ethical dilemmas. This study argues transparency is the key to mitigating information asymmetry and reducing opportunities for wrongdoing to improve ethical behaviour. Butler (2005) explicates the potential of ethics for a more realistic and compassionate practice of accountability, infusing self-understanding as an economic subject with a moral obligation that exceeds our own self-interest (Schearer, 2002:569). "*The development of accountability increases the transparency*

of organizations. It increases the number of things that are made visible, increases the number of ways in which things are made visible, and in doing so encourages a greater openness. The inside of the organization becomes more visible, that is transparent" (Gray, 1992:415). Further, the extant scholarly literature also suggests transparency can help combat corruption (Klitgaard, 1998) and encourage ethical behaviour and enhance company image (Halter et al., 2009). Transparency can be used for moral persuasion toward the self-managing state (Mehrpouya and Salles-Djelic, 2019) to counter opaqueness (Roberts, 2009) and enable self-control of organizational processes and the systems of internal control and risk management (Power, 2007).

This investigation further argues that transparency can be enhanced by adopting new technological tools such as AI and blockchain technology to enhance ethical decision-making. This statement can be supported by extant scholarly studies. Gasmelseid (2009) has explored the use of software agents in promoting ethical decision-making. Halbouni et al. (2016) have examined the role of corporate governance and information technology in fraud prevention and detection within the United Arab Emirates (UAE), technology is capable of identifying unusual activities using effective software. Li et al. (2018) have found increasing information quality improves takeover efficiency.

2.1.5 Emerging corporate governance

Today, the evolution of technology has brought unprecedented changes in our lives. The growing accessibility to advanced computing power and large databases (Sousa *et al.*, 2019) facilitated and accelerated technology innovation, leading to prominent changes in individuals and organizations (Benlian *et al.*, 2018), transforming business models and processes (Gomber *et al.*, 2018). The traditional hierarchies or matrix organizations are no longer fit for today's business environment (Hamel and Zanini, 2018; De Smet, et al., 2021). At present, technology has played a key role in facilitating the changes (PEGA, 2020). Digital transformation initiated by disruptive technologies is vital for every business (Vial, 2019), leading to a major shift in how value is captured and exchanged in society (Cohen, 2017), all parties must stand ready to embrace and direct that change in shaping the future for business and society (HouseOfLords, 2018). Organizations are depending more on the new capabilities of the emerging disruptive technologies (McKinsey, 2020). The world's most highly valued companies

today have embraced new capabilities in network coordination and data intelligence (Zeng, 2018). The study of Brennan et al. (2019) has provided an overview of corporate governance implications of distributive technology. Their study reveals agile governance and collaborative governance which relate to organizational capabilities to deal with agility, adaptiveness, and cooperation to deal with uncertainty in the rapid market transformation. Their study also reveals decentralized governance and distributive governance which relate to authority, power, and decision-sharing dimensions.

From an organizational perspective, business is moving too fast and too complex for corporate CEOs or boards, or managers to make a good decision without the use of intelligent systems (Libert et al., 2017). The recent McKinsey report suggests the company priories creativity, speed, and accountability to replace the old business model with something radically better to address “Who we are” (purpose; value agenda, culture); “How we operate” (radically fatten structure, turbocharge decision making, treat talent as scarcer than capital); and “How we grow” (take an ecosystem perspective, build data-rich tech platforms, accelerate organizational learning) (De Smet et al., 2021).

From a technological perspective, after decades of talks, a new AI era is finally arriving to transform businesses (Falk, 2019). The term AI has been mentioned in earnings calls almost 800 times in the third quarter of 2017 (Sands, 2019). It is predicted that AI will contribute as much as $15.7 trillion to the world economy by 2030 (PWC, 2017). Lord Clement-Jones (2020) addresses the significant impacts of AI on corporate governance. AI is making its way onto every board’s agenda, driving discussions on how it can be leveraged, what risks it introduces, and how best to govern its use (Sands, 2019). And for blockchain, the World Economic Forum (WEF) predicted that 10% of global GDP will be stored on blockchain by 2027 (WorldEconomicForum, 2015). Yermack (2017) predicts blockchain innovations will potentially change corporate governance far more profoundly compared to the 1933 and 1934 Securities Acts in the USA. AI and blockchain are what lies ahead of us (Ferguson, 2018), they will be the key developments for future boardrooms. Academic literature starts to emerge to explore the impact of the potential impact of blockchain on corporate governance (see table 5 below). Decentralized organizational business operations pose major challenges for corporate governance to ensure who has decision-making

powers to consider the interests of all the stakeholders (Fenwick, et al., 2017). "*Markets will move towards models where organizations collaborate to maintain accurate and shared records rather than maintaining their own independent and inconsistent systems which require extensive reconciliation processes to ensure consistency*" (Brown, 2018:3). The following sections explicate the emerging literature on artificial intelligence and blockchain, and further elucidate a multi-theoretical framework to guide this investigation to help understand the technological impact on corporate governance.

Illustrative studies	Journal	Title	Type	Main research focus
(Ziolkowski et al., 2020)	Journal of Management Information Systems	Decision Problems in Blockchain Governance: Old Wine in New Bottles or Walking in Someone Else's Shoes?	Qualitative	This research pays special attention to the governance of blockchain systems and illustrates decision problems in 14 blockchain systems from four application domains
(Zachariadis et al., 2019)	Information and Organization	Governance and control in distributed ledger: Blockchain	Conceptual	Challenges facing blockchain technology in financial services such as decision rights; control mechanisms and incentive structure in digital infrastructures.
(Yermack, 2017)	Review of Finance	Corporate governance and Blockchains	Conceptual	Evaluate the potential implications of the adoption of blockchain technology for managers; institutional investor, small shareholders; auditors and other parties involved in corporate governance
(Brennan et al., 2019)	The British Accounting Review	Corporate Governance implications of disruptive technology: An overview	Conceptual	Introduces the special issue of innovative governance and sustainable pathways in a disruptive environment. Identify the defining features of emergent DTI-related structural models that shape the demand for the changes to corporate governance and accounting mechanisms
(Moll and Yigitbasioglu, 2019)	The British Accounting Review	The role of internet-related technologies in shaping the work of accountant: New directions for accounting research	Conceptual	Concerns about the profession's legitimacy in the new technologies
(Magnier and Barban, 2018)	Inter EU law East	The potential impact of blockchain on corporate governance	Conceptual	Open access to real-time information Vote and shareholder's investment Improved management tools The emergence of new governance risks (confidentiality; open-access; potential conflict of interest issue, etc.)

(Tapscott and Tapscott, 2017)	MIT Sloan Management Review	How Blockchain Will Change Organizations	Conceptual	Blockchain will transform how businesses are organized and managed, allowing eliminating transaction costs and using resources outside as easily as resources on the inside.
(Fenwick et al., 2019)	ECGI Working Paper Series in Law	The End of "Corporate" Governance (Hello "Platform" Governance)	Conceptual	Business needs platform governance to leverage digital technologies to create more community-driven forms of organization to build an open and accessible platform culture
(Daniels, 2018)	University of Pennsylvania Journal of Business Law	Blockchain & Shareholder voting: A hard fork for 21st-century corporate governance	Conceptual	Some legitimacy of corporate governance would be restored. New tools and networks could eliminate structural obstacles impeding shareholder involvement in corporate governance
(Trump *et al.*, 2018)	IEEE ENGINEERING MANAGEMENT REVIEW	Governing the Use of Blockchain and Distributed Ledger Technologies: Not One-Size-Fits-All	Conceptual	While the technology is still emerging, its application to and success within various organizations will be largely dependent upon these key governance concerns: governance structures; institutional arrangements, decision-making protocols, and stakeholder engagement
(Shermin, 2017)	Strategic change	Disrupting governance with blockchains and smart contracts	Conceptual	explain how blockchains and smart contracts bypass traditional principal-agent dilemmas of organizations, and radically reduce transaction costs, thus creating the emergence of new decentralized organizational structures—decentralized governance—that were not feasible before.

Table 5 Emerging academic studies on the technological impact on corporate governance

2.2 Artificial Intelligence

This section starts to explicate the literature on artificial intelligence and the emerging AI applications in corporate governance. The recent advancement in artificial intelligence is accelerated by a string of scientific developments, the availability of big data, and cheap computer processing power (Wooldridge, 2017). The diffusion of AI in the public sector is in its nascent stage, and so is the body of research on the phenomenon (Sun and Medaglia, 2019). However, the literature on this AI field is emerging and developing. Scholars are exploring AI applications in many different fields. For example, AI application in humanoid robots as tools, agents, and experiences (Appel *et al.*, 2020); human-machine intellectual comparisons that increasingly threaten the distinctiveness of humans (Cha *et al.,* 2020); robotic devices for older adults with an emphasis on supporting the positive aspects of aging (Deutsch *et al.*, 2019); the interactions with AI agents (Shank *et al.*, 2019); AI in team collaboration (Seeber *et al.*, 2019); the use of artificial intelligence in-home voice assistants (McLean and Osei-Frimpong, 2019); AI-guided chatbots (Androutsopoulou *et al.*, 2019). Chen et al. (2019) apply statistics tests and machine learning algorithms to investigate whether investor personality predicts investment performance. Lee *et al.* (2019) consider four factors that trigger users' willingness to help an imperfect AI system. Wesche and Sonderegger (2019) develop a theoretical model depicting how humans come to accept and follow a computer leader. Lima and Delen (2019) suggest using machine learning to predict and explain corruption. As such, AI literature is emerging and developing as AI technology evolves.

The following subsection provides the concept of AI in section 2.2.1 and different forms of AI systems in section 2.2.2. Then, section 2.2.3 explicates the current AI applications. Following on from that, section 2.2.4 explains the current research on AI applications in corporate governance to augment board decisions through intelligent analysis.

2.2.1 Concept of AI

AI has a very long history. The term Artificial Intelligence was introduced by John McCarthy at the 1956 Dartmouth conference, which was considered the birth of AI. The development of AI research has been characterized by ups and downs (Sun and

Medaglia, 2019). It progressed steadily from 1956 onwards, and there were various points in history punctuated by breakthroughs and lows. There was always tremendous excitement and great hype about what was to come. After the Second World War, the world was generally quite hopeful and optimistic, but then you have those crashes with nothing seemed to progress and the early promises seemed to lead to nowhere and hopes were dashed. Those periods when AI hype gave way to AI negativity and pessimism. Those periods of pessimism are often referred to as AI winters. The recent development in AI is facilitated and accelerated by the availability of big data and cheap computing power. The latest development is in relation to a very specific area of artificial intelligence, known as machine learning, where you feed the system as much information that you have relevant to a particular task, and the system learns its own way through that information.

Despite the term introduced in 1956, so far, there is no widely accepted definition of artificial intelligence (HouseOfLords, 2018). In recent years, academic studies such as Androutsopoulou *et al.* (2019), and Moll and Yigitbasioglu (2019) refer AI as a set of computational techniques used to solve problems and support and enhance the quality of decision-making. This study adopts the definition of artificial intelligence and machine learning from the UK Government industrial strategy white paper, which defines artificial intelligence as "*technologies with the ability to perform tasks that would otherwise require human intelligence, such as visual perception, speech recognition, and language translation*", machine learning as "*a type of AI that allows computers to learn rapidly from large datasets without being explicitly programmed*" (HMGovernment, 2017:37). AI and machine learning have already started to transform the global economy as general-purpose technologies.

According to IBM Cloud Education, both deep learning and machine learning are subfields of artificial intelligence. Deep learning is comprised of neural networks. It is a sub-field of machine learning. A deep neural network is comprised of an input layer, multiple hidden layers, and an output layer that can process both structured and unstructured data. Deep learning eliminates some of the manual human intervention, automates the process, and enables scalable machine learning. Machine learning is more dependent on human intervention to learn and requires more structured data to learn (IBM, 2020) (see figure 4 below).

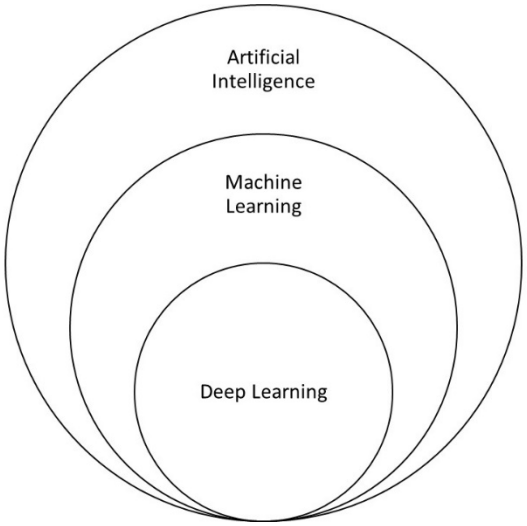


Figure 4 Relationships between AI, machine learning, deep learning (Source: IBM, 2020)

There are various forms of machine learning, like supervised machine learning and unsupervised machine learning. The idea of learning input to output mapping has been around for many decades. But this has started working incredibly well just in the last few years thanks to the rise of deep learning or neural networks. Deep learning as a further sub-branches of machine learning, is causing all the rage recently. This is because it looks like AI winters are gone. It looks likely deep learning now is the way forward in getting systems to produce genuinely interesting behaviour that does seem to reproduce some aspects of human intelligence. However, it does not mean that these systems can do anything the way humans do, but they are certainly reproducing certain kinds of human behaviors that would be considered intelligence. Currently, there is tremendous hype about machine learning, deep learning, and neural networks. What we're seeing is that, in a lot of industries, when you find the right business uses cases, you're now able to build these input/output mappings much more accurately than what was just a few years ago. For the right business use cases, this means it can be valuable in a way that wasn't possible before.

2.2.2 Typology of AI

Fundamentally, there are two major forms of AI, strong AI, and weak AI (see figure 5 below).

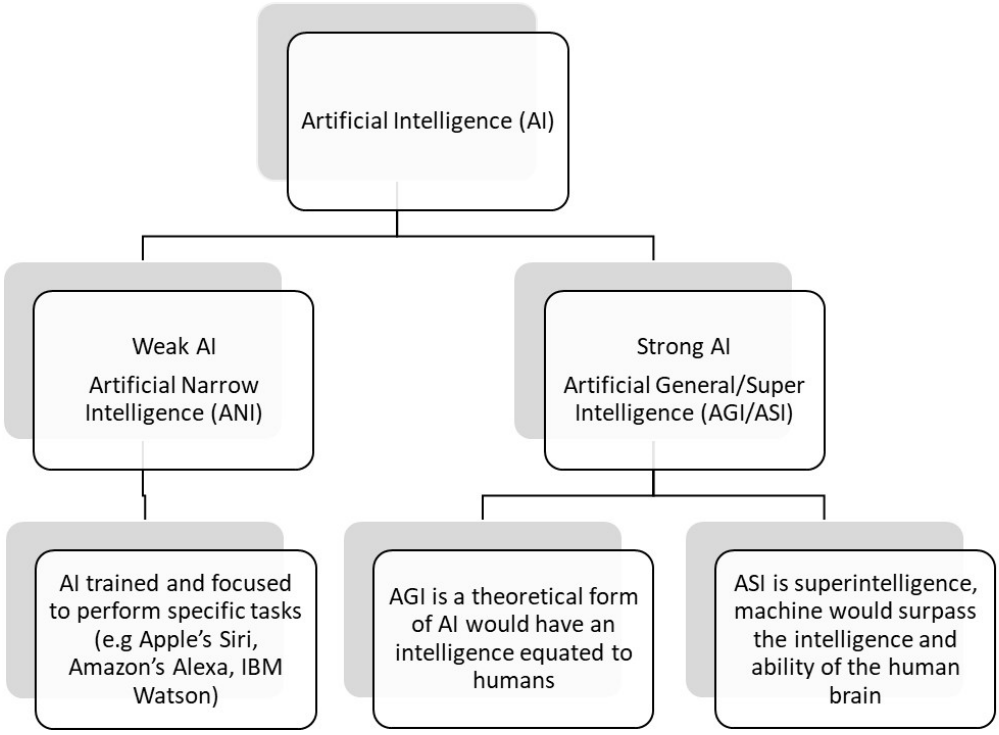


Figure 5 Two major forms of AI (Weak AI and Strong AI) (Source: IBM, 2020)

According to Russell and Norvig (2016), strong AI systems are still considered an area of speculation and science fiction. It is believed that AGI, comparable to humans, is far away in the future, if at all possible. Some tasks performed by human intelligence will never be reached by AI, particularly those related to creativity, self-awareness, conscience, and free will. Therefore, currently, only the weak form of AI is of interest for real-world applications (Wooldridge, 2017; Wirtz et al. 2018). Wooldridge (2017) explains general AI (strong AI) is the long-term dream of AI researchers to build a machine that is conscious, self-aware, and intelligent to perform tasks the same way that human does. Narrow AI (weak AI) is getting machines to solve specific tasks which currently require brains. Davenport and Ronanki (2018) suggest that it is useful for companies to look at AI through the lens of business capabilities to meet three important business needs: automating business processes, gaining insight through data analysis, and engaging with customers and employees. Seeber et al. (2019:3) introduced the concept of machine teammate, they state "*machine teammate is an autonomous, pro-active, and sophisticated technology that draws inferences from information, derives new insights from information, learns from past experiences, finds and provides relevant information to test assumptions, helps evaluate the consequences of potential solutions, debates the validity of proposed positions offering evidence and arguments, proposes solutions and provides predictions to*

unstructured problems, plus participates in cognitive decision making with human actors. Such a machine teammate may be an important technology to deal with in current designs and investigations of team collaboration". Winter and Davidson (2019) suggest the novel use of AI enables values to be encoded into an algorithm and translated into machine judgment.

Further, the recent study by Munoko et al.(2020:p211) has mentioned three types of AI artifacts. The first type is Assisted AI systems, which exhibit mechanical intelligence and enables AI to perform routine, repetitive tasks. The second type is Augmented AI systems, which increasingly learn from human and environmental interactions to supplement human decision-making. The third type is Autonomous AI systems, which can adapt to different situations and act independently without human assistance, exhibiting both intuitive and empathetic intelligence. The cost savings of AI systems will become more apparent as AI technology progresses. However, when AI systems outperform humans, AI will challenge our social norms. Companies need to deal with new social and ethical issues of using advanced AI systems, which is what this study intends to corroborate with an empirical investigation to generate more insights for this inquiry.

2.2.3 AI Applications

In recent years, AI is continuously evolving with more powerful functions. AI has the potential to transform business models across many sectors due to the availability of a vast amount of data and advanced computing power. Many of us might not even realize that our smartphone apps, google maps, and online recommendation systems, are all powered by AI systems (see some common real-life AI applications in table 6 below).

Real-world AI applications		
Most Common Applications	**AI systems**	**Real-world use case**
Speech Recognition (Automatic speech recognition - ASR)	Natural Language Processing (NLP) processes human speech into a written format	Mobile device (Siri)
Customer Service	Virtual assistants and Voice assistants	Online chatbots
Computer Vision	Image recognition powered by convolutional neural networks	Photo tagging in social media radiology imaging in healthcare self-driving cars within the automotive industry Google maps

Recommendation Engines	Prediction	Add-on recommendations to customers during the checkout process for online retailers, e.g Amazon's recommendation systems
Automated stock trading	Automation	AI-driven high-frequency trading platforms

Table 6 Common real-world AI applications (Source: IBM, 2020)

The latest trends in AI applications are evolving. For example, explainable AI, Digital Twins, Automated Machine Learning, Hybrid Learning Models, and Lean and Augmented Data Learning (Salah *et al.*, 2019). In the business world, AI is believed to have the ability to enhance and support problem-solving and decision-making (Androutsopoulou *et al.*, 2019). Its applications are evolving into different areas of business, such as accounting, auditing, finance, supply chain, medical records, stock exchange, etc. In accounting and auditing, the profession embraced a simpler version of AI such as expert systems which rely on experts' rich knowledge base of rules and facts in the early 1980s. Today, big accounting firms are increasingly using AI as an effective tool in their advisory and assurance practice to perform auditing procedures. More use cases of AI in accounting and auditing are witnessed in general ledgers review, tax compliance, audit work papers, data analytics, fraud detection, and decision making (Munoko et al.,2020:210). For example, Deloitte's LeasePoint (partnered with IBM Watson); PwC's GL.ai (collaboration with H2O.ai); KPMG ignite are all the AI-enabled systems adopted by leading accountancy firms to analyze documents and prepare reports (Faggella, 2020) to improve efficiency.

2.2.4 AI in corporate governance

As AI applications evolve in different domains, their application in corporate governance to augment board decision-making is inspiring and has attracted many boards' attention. The basic motives for companies around the world to use AI as a technological tool are to ease work processes and increase efficiency and productivity. Over the years, AI has developed to be a highly smart technology that has evolved a lot and undergone many changes. After decades of talks, research and development, a new AI era is finally arriving to transform businesses (Falk, 2019). AI experts have predicted AI could potentially run corporations in 20-30 years with highly advanced machine intelligence (Petrin, 2019). Lord Clement-Jones (2020) addresses AI will have a significant impact on and implications for corporate governance. A recent

McKinsey report indicates the old business model built on uniformity and bureaucracy cannot fit the purpose in today's business environment (De Smet et al., 2021). Companies need to think seriously about their corporate governance practices. The bar on organizational innovation will rise. The challenges are only beginning for boards who govern the corporations to decide how to leverage new AI capabilities for their businesses (Sands, 2019). Australian boards start to think about using AI and machine learning to improve the quality of their decision-making (Fox et al., 2019). VITAL is an AI system appointed to the board by Deep Knowledge Ventures and has saved the firm from multiple bad investments (Sands, 2019). Salesforce has introduced Einstein AI as a smart assistant to increase productivity. Board could use AI tools for risk management and internal control oversight to better comply with directors' duty of care under section 174 of the company Act 2006 (Fu, 2018). Directors, shareholders, investors, and auditors can use AI tools to enhance their fiduciary roles in corporate control and monitoring, investment, risk, and management decisions.

The shift to a digital age requires a fundamental transformation of organizations and their operations (Fenwick et al., 2019). It is predicted regular management reporting will be automated, virtual assistants will manage personalized travel itineraries, and the machine will learn your habits and prioritize your work. The changes facilitated by the AI system will reshape the purpose and function of boards when they expand their roles into technology and organizational development (Ganu and Kuk, 2019). However, current scholarly studies suggest "machine teammate" or "human in the loop" to ensure the use of AI systems to analyze data, evaluate consequences, predict a trend, and recommend products and services in corporate governance to augment board intelligence rather than automating leadership and governance (Seeber *et al.*, 2019). Sun and Medaglia (2019) suggest organizations can adopt a decentralized bottom-up decision-making strategy to incorporate stakeholders' views on forming AI policies to achieve both cooperation and coordination (Gulati et al., 2012).

However, the current machine learning and deep learning methods of AI are centralized, which may lead to the possibility of data tampering that adversely impacts AI decision outcomes. As such, the concept of decentralized AI was introduced, which is the combination of AI and blockchain (Montes and Goertzel, 2019; Salah *et al.*, 2019). The next session introduces the emerging literature on the blockchain.

2.3 Blockchain

This section starts to elucidate the emerging literature on blockchain technology and explicates blockchain applications in the domain of corporate governance. Blockchain was first introduced by Satoshi Nakamoto in a white paper- Bitcoin: a peer-to-peer electronic cash payment system (Nakamoto, 2008), as a method of validating ownership of Bitcoin cryptocurrency without any intermediaries (Yermack, 2017). Current research highlights blockchain technology has gained mainstream attention in 2017, trending in the press and on social media (Magnier and Barban, 2018; Murray, 2018). Swan (2015) remarks blockchain has the potential to transfer anything of value such as finance, votes, intellectual property, health data, and ideas.

It is expected to be as revolutionary as the Internet (Tapscott and Tapscott, 2017). It could become the “foundational technology” (Iansiti and Lakhani, 2017) and the “next-generation Internet” (Shermin, 2017). Blockchain has the potential to reshape our society. For the first time in human history, people from everywhere can trust each other and transact peer to peer. Trust is established through technology by cryptography and by collaboration (Tapscott and Tapscott, 2016). Its functionality has evolved into different applications in banking, financial markets, insurance, voting systems as well as government services (Dai and Vasarhelyi, 2017).

Blockchain is a pragmatic yet revolutionary technology. The technology offers a new way of collaboration between individuals and organizations (Lumineau et al., 2021). So far, scholarly literature reveals two streams of research related to the notion of blockchain technology: blockchain mechanisms and real-world applications (Cong and He, 2019). The stream of blockchain mechanisms literature focuses on the new opportunities and capabilities enabled by blockchain technology. The stream of real-world applications focuses on the use cases of blockchain technology. The extant literature indicates blockchain has not been widely adopted yet. Many remain at the proof-of-concept stage and face technical, organizational, and legal challenges (Buterin, 2014; Gilbert, 2016; Boillet, 2017; Coyne and McMickle, 2017; Kokina et al., 2017; Bertino et al., 2019). However, despite the challenges, according to Deloitte’s 2020 global blockchain survey, organizations are more committed than ever to implementing blockchain in their business (Deloitte, 2020a). Many scholars are increasingly exploring new use cases for using this nascent technology. Blockchain

will revolutionize business and redefine companies and economies, intermediaries like lawyers, brokers, and bankers might no longer be needed (Iansiti and Lakhani, 2017). The latest forecast by Garner estimates worldwide IT spending is expected to reach $3.9 trillion in 2020 (Costello and Rimol, 2020). Trade and receivables finance with blockchain technology will increase global trade volumes by $1.1 trillion (Consortia, 2019). The recent trend indicates a growing number of financial institutions are embracing partnership and collaboration with tech giants (Ruddenklau, 2018) to continuously explore novel ways of using blockchain technology for fast and secure transactions (Deloitte, 2017). Experts suggest blockchain could provide a digital record of transactions by 2050 (Fletcher, 2019). As such, currently, blockchain literature is emerging and developing as the technology evolves to improve trust through collaboration.

The following subsection provides the concept of blockchain in section 2.3.1 and the main characteristics of the technology in section 2.3.2. Then, section 2.3.3 explicates different forms of the technology. Following on from that, section 2.3.4 illuminates the current blockchain applications and illustrates the emerging literature on blockchain application in the domain of corporate governance for revised power and control in a decentralized manner to foster more close collaborations.

2.3.1 Concept of blockchain

There are many different definitions of blockchain. Most of the studies define blockchain from the perspective of blockchain characteristics and potential benefits (see table 7). Terminologies on blockchain and distributed ledger technology (DLT) are evolving. Generally, DLT refers to broad technologies, while blockchain refers to specific types of DLT (Christie, 2018).

Studies	Journal	Blockchain Definition
(Du *et al.*, 2019)	Journal of Strategic Information System	Chain of data blocks each of which is created to record a transaction An emerging financial technology (FinTech) IT artifacts of blockchain (distributed ledgers; consensus mechanism; encryption mechanism; Smart contract; immutable audit trail)
(Ølnes et al., 2017)	Government Information Quarterly	Time-stamped transactions The integrity of the data Control, data ownership, privacy, and access are the key design decisions
(Yermack, 2017)	Review of finance	Sequential database (enhance traceability)

		Cryptographic proof (improve security) Validating ownership (improve transparency) Peer to peer transactions with no intermediaries (Increase efficiency)
(Hinings et al., 2018)	Information and Organisation	Giant spreadsheet or database Peer-to-peer network (distributed) Data integrity and security Platform governance Transparency Database maintenance Smart contracts
(Iansiti and Lakhani, 2017)	Harvard Business Review	Distributed databases Peer to peer transmission Transparency with pseudonymise, Irreversibility of records (immutability) Computational logic

Table 7 Definitions of blockchain

Yermack (2017) and Hinings et al.(2018) view blockchain as a sequential database or a giant spreadsheet as an alternative to the classical financial ledger that records transactional information, secured by cryptography, and governed by a consensus mechanism. Underwood (2016:15) describes how blockchain works, “when a user wants to add a transaction to the ledger, the transaction data is encrypted and verified by other computers on the network using cryptographic algorithms. If there is consensus among the majority of computers that the transaction is valid, a new block of data is added to the chain and shared by all on the network. Transactions are secure, trusted, auditable, and immutable”. It is a digital, immutable, distributed ledger that chronologically records transactions in real-time (Deloitte, 2017).

“Smart contract may be the most transformative blockchain application at the moment”, “The implications are fascinating. Firms are built on contracts, from incorporation to buyer-supplier relationships to employee relations. If contracts are automated, then what will happen to traditional firm structures, processes, and intermediaries like lawyers and accountants? And what about managers? Their roles would all radically change” (Iansiti and Lakhani, 2017:126). Smart contracts define the terms of a contract between parties using technical computer code, which is transparent to all the participants within the network, lowering the costs of contracting between parties (Moll and Yigitbasioglu, 2019). Cong and He (2019:11) define “smart contracts are digital contracts allowing terms contingent on the decentralized consensus that are self-enforcing and tamper-proof through automated execution”. Blockchain enables machine-based automation to execute collaborations (Lumineau et al., 2021).

This study views blockchain as a digital innovation (Nambisan *et al.*, 2017) that fundamentally changes how financial records are created, kept, updated, and shared (ICAEW, 2018) to enhance transparency and improve and rebuild trust. The technology disrupts and transforms structures, practices, values, and beliefs of existing business practices (Hinings et al., 2018) that require new technical competencies and new business models (Gomber *et al.*, 2018; Kumaraswamy et al., 2018; Brennan et al., 2019).

2.3.2 Main characteristics of blockchain

The main characteristics of blockchain technology identified by various studies are transparency, decentralized, immutability, distributed databases, peer-to-peer transaction, tamper resistance, strong authentication, and synchronization across the network under a consensus mechanism (Murck, 2017; Pattison, 2017; Tapscott and Tapscott, 2017). It offers great benefits such as increased transparency, enhanced security, improved trust, increased efficiency and speed, improved traceability, and reduced costs (Yermack, 2017) (see table 8 below). Blockchain technology has the potential to transfer anything of value, not just finance, but also assets like intellectual property, health data, votes, and ideas (Swan, 2015; Tapscott and Tapscott, 2016).

Main blockchain characteristics	Description	Illustrated studies
Distributed database/ledgers (P2P transactions)	Differs from a centralized database. Data are stored in distributed networks and shared among network participants, access to the blockchain depends on the types of blockchain adopted	(Swan, 2015; Christie, 2018)(Iansiti and Lakhani, 2017; Yermack, 2017)
Immutability/irreversibility of records	Provides a permanent record of transactions available for all the participants to access and view, once records are entered, the leger cannot be altered providing an immutable audit trail, increase transparency and data can be trusted	(Ølnes et al., 2017; Du *et al.*, 2019; Moll and Yigitbasioglu, 2019)
Computational logic/Smart contract	A blockchain ledger creates a digital trail of records that enables the use of algorithms and rules to automatically trigger transactions between participants. Smart contracts may be the most transformative blockchain application that automatically executes contracts when pre-agreed conditions are met.	(Zachariadis et al., 2019) (Gomber *et al.*, 2018; Goldstein, et al., 2019) (Yermack, 2017)
Secure mechanisms	Consensus mechanism: Transactions recorded and updated in blockchain represent the view and agreement by the majority of the network participants, deem the validity of the data which can be trusted Cryptography: use of a hash function to link public and private keys. A private key is unique, like a	(Swan, 2015; Murck, 2017; Pattison, 2017; Tapscott and Tapscott, 2017; Murray, 2018)

	digital signature. A public key is the derivation of a private key	

Table 8 Main blockchain characteristics

The adoption of blockchain on a large scale will take many years to come due to technical, organizational, and legal constraints (Boillet, 2017; Coyne and McMickle, 2017; O'Leary, 2017; Christie, 2018; Yu et al., 2018; Bertino et al., 2019; Clohessy and Acton, 2019; Hughes *et al.*, 2019). However, more use cases are emerging. Organizations are more committed than ever to implementing blockchain in their business (Deloitte, 2020). When information is shared across a network, information is controlled by more than one party. Consensus governs the true state of the information among the collaborating parties (Lumineau et al., 2021), which enhances transparency, reduces information asymmetry, and encourages close collaboration among different stakeholders (Constantinides et al., 2018).

This study emphasizes the integration of blockchain technology in financial systems and companies' accounting systems help to provide real-time financial information to fundamentally improve transparency and trust for better decision-making in corporate governance ecosystems.

2.3.3 Typology of blockchain

Historically, any technological development evolves through different development stages and the technologies can be designed in different forms to conform to different business needs. The same applies to blockchain technology. Currently, the technology is developing, evolving, and improving. The extant scholarly literature indicates the emergence of blockchain technology has evolved progressively through different phases: blockchain 1.0 (cryptocurrency transactions), blockchain 2.0 (smart contracts), blockchain 3.0 (applications in the area beyond currency and finance) blockchain 4.0 (combination of blockchain and artificial intelligence).

Blockchain 1.0 was associated with virtual currencies. Bitcoin was the most widely known cryptocurrency (Mainelli and Smith, 2015). Blockchain has been used as a method of validating ownership of bitcoin without intermediaries (Yermack, 2017). This generation of blockchain is used for payment transactions, foreign exchange, etc. (Swan, 2015). The use of smart contracts (programmed contract language embedded into blockchain technology to self-execute contracts once conditions are met), is the

biggest contribution of blockchain 2.0 (Swan, 2015; Magnier and Barban, 2018). For example, smart contracts built on blockchain systems such as Ethereum, Codius, and Hyperledger, are mainly used in banking instruments, securities trading, supply chain finance, anti-counterfeiting, and payment clearing (Xu et al., 2019). Blockchain 3.0 is evolving into wider applications in health, government, science, arts, and culture (Swan, 2015; Zhao *et al.*, 2017; Pieroni *et al.*, 2018) to scale the technology extensively. Blockchain 4.0 is just emerging, the combination of blockchain with artificial intelligence (Rahul, 2016; Angelis and Ribeiro da Silva, 2019; Bertino et al., 2019).

Further, depending on the applications, blockchain technology can be set up differently so that different users are given different rights to access and update records. Some are public and can be viewed and updated by anyone. Some are private, only people who have authorization can access and view the record. Some are a consortium, which is a group of organizations collaborating on blockchain to form a system to solve a particular problem (O'Leary, 2017).

Public blockchain

A public blockchain is sometimes also known as a permissionless blockchain, it has no owner controlling access. Everyone can join the network, and view and update the records. Transactions are transparent, secure, time-stamped, and can't be changed once added to the block. The proof of work is regarded as costly to reach the consensus, as the network is so enormous, and it costs lots of electricity.

Private blockchain

A private blockchain is also known as a permissioned blockchain. It restricts access to the blockchain. It requires users to have permission or authorization to record, update and validate transactions. According to Yermack (2017), it is more likely that businesses will adopt private blockchains rather than public blockchains, to mitigate information asymmetries about transactions. Within the private blockchain, consortium blockchains are emerging, where a group of organizations uses a private blockchain design to form a system to solve a particular problem such as confidentiality (O'Leary, 2017).

Consortium blockchain

The emergence of blockchain consortia offers a novel way of collaborating on blockchain technology. Financial services, life sciences and health care, energy and resources, technology, media and telecom communications, and the public sector, have formed their own blockchain consortia (Gratzke et al., 2017).

The different types of blockchain vary significantly in the degree of accessibility, it requires different governance (Lumineau et al., 2021). This study acknowledges the value of permissioned blockchain technology for enterprise businesses to improve transparency between transacting parties but maintain a certain level of confidentiality by restricting access. Companies can unlock new business opportunities through the network on the blockchain platform to transact value in real-time. From an IT governance perspective, companies need to pay attention to decision rights (who has the authority and responsibility to do what on the platform), control mechanism (ensure good behaviours of users), and incentive structures (influence and align the interests of different stakeholder to create more value) (Zachariadis et al., 2019).

2.3.4 Blockchain Applications

The unique features of blockchain technology are to improve transparency and enhance trust through collaboration on the distributed blockchain networks. Its applications are evolving and the technology is disrupting businesses and governments globally. It is changing in every industry worldwide, from physical asset traceability, clinical supply chain, global trade finance, cross-border payment, post-trade processing, voting, and digital identity (Deloitte, 2019). Blockchain technology could serve as a potentially transformative information technology expected to be as revolutionary as the Internet, and a better technological future for us all. Its functionality has evolved into a large number of applications, such as banking, financial markets, insurance, voting systems, leasing contracts, and government service (Collomb & Sok, 2006; Dai and Vasarhelyi, 2017). Some examples of applications studied by scholars such as custody for renewable energy credits and carbon credits (Ashley and Johnson, 2018), e-health systems (Casado-Vara and Corchado, 2019), RoboJudge (Castell, 2018), smart contracts (de Graaf, 2019), supply chain (Rejeb et al., 2019), preventing corruption (Rien Agustin and Susilowati,

2019), cyber security (Taylor *et al.*, 2020), MeDShare for medical data (Xia *et al.*, 2017), corporate governance (Yermack, 2017; Brennan et al., 2019), financial services (Fanning and Centers, 2016), smart auditing and real-time audit reporting (Rozario and Vasarhelyi, 2018).

Blockchain enables traceability systems to combat illegal practices and improve sustainability performance, increase operational efficiency, and enhance supply chain coordination in areas such as cobalt, pharmaceuticals sector, and diamond trading (Hastig and Sodhi, 2020). The financial service industry is at forefront of adopting blockchain technology, which shifts the nature of financial records being created, kept, updated, verified, and shared (EY, 2018; ICAEW, 2018). For example, blockchain applications in businesses especially in the accounting mechanism of corporate governance are promising. Due to new ways of recording, validating, and sharing timely transaction information, blockchain can offer many benefits. For example, the technology can help businesses improve operational efficiency, simplify processes, reduce transaction settlement time and counterpart risk, minimize fraud activities, and improve regulatory efficiency and market liquidity (see table 9 below).

Current business Challenges	**Value driver**	**Blockchain benefits**
Manual documents	Operational simplification/efficiency	Automated documents, increase efficiency, reduce costs, reduce human error, automate reconciliation
Time-consuming process	Transaction settlement time reduction	Blockchain smart contract enables execute contracts automatically once pre-set conditions are met, and provides real-time transaction, e.g. vendor financing normally takes 3-4 days to execute the transaction, with blockchain the process only takes a few hours
Lack of mechanism to track transactions from different ledgers	Counterpart risk reduction	Agreements are codified and executed in a shared, immutable environment
Prone to fraud	Fraud minimization	Blockchain provides transparency, visibility, provenance, immutable records, any suspicious fund transfer will be detected in real-time, enhanced security
Regulatory complexity, costly to organizations	Regulatory efficiency improvement	Provides faster and more accurate reporting by automating compliance processes through a smart contract. Real-time monitory between regulators and regulated entities

Intermediaries involved in many processes	Liquidity and capital improvement	Eliminates imbalance of information among market participants, increases transparency

Table 9 Blockchain benefits (Sources: McWaters et al., 2016; Deloitte, 2017; Han et al., 2022)

2.3.5 Blockchain in Corporate governance

As indicated above, blockchain use cases are developing in different aspects of businesses. Businesses around the globe are seeking new ways to expand their business to add more value to their value chains. In recent years, digital transformation is on every board's agenda. Academically, there is growing scholarly interest in studying blockchain in the domain of corporate governance (Yermack, 2017; Mergel et al., 2018; Bindu et al, 2019; Brennan et al.,2019; Zachariadis et al., 2019; Lumineau et al., 2021). Yermack (2017) predicts blockchain innovations will potentially change corporate governance far more profoundly compared to the 1933 and 1934 Securities Acts in the USA. Smart contract automates some processes that can mitigate moral hazards. Zachariadis et al.(2019) use IT governance literature to suggest the governance of blockchain in financial services to address decision rights, control, and incentive structure to ensure collaboration. Moll and Yigitbasioglu (2019) express concerns about the profession's legitimacy in the digital era with new technologies. Fenwick et al. (2019) suggest businesses need platform governance to leverage digital technologies to create more community-driven forms of organizations to build an open and accessible platform culture. Daniels (2018) explains some legitimacy of corporate governance would be restored using blockchain as the technology provides new tools and offers networks to eliminate structural obstacles and encourage shareholder involvement in corporate governance. Lumineau et al. (2021) portray blockchain as a new form of infrastructure to facilitate collaborations.

According to Yermack (2017), blockchain enables companies to trace ownership information, reduce the use of auditing firms, encourage shareholder involvement (corporate voting and AGM), streamline liquidity, facilitate real-time accounting, and reduce fraud. Blockchain can fundamentally improve transparency as information is shared across the network of participants who have decision rights in real-time. It reflects collective decision-making based on the consensus of the parties involved. Brennan et al. (2019) identify four emerging models of governance: agile and

collaborative governance address organizational capabilities dealing with agility, adaptiveness, and cooperation to deal with uncertainty and rapid market transformations, and decentralized and distributed governance to deal with authority, power, and decision-sharing dimension.

Based on the salient and strategic relevance of blockchain technology in facilitating new ways of recording, validating, and sharing information, this study suggests blockchain technology can be an effective technological tool as a new corporate governance mechanism to fundamentally improve transparency and trust that drive the ethical decision-making of top management to mitigate opportunistic behaviour and moral hazards, facilitate and empower collaboration to the inclusion of diverse stakeholders.

2.4 Integration of AI and Blockchain

As the study reviews the emerging literature on AI and blockchain, there is a growing trend suggesting these two technologies can be complementary to each other to enhance decision-making and improve trust. The combination of AI and blockchain can improve data security, enhance accurate AI decisions, improve trustworthiness and efficiency, and facilitate decentralized intelligence. In recent years, AI and blockchain are increasingly embedded in new products and service offerings. The insurance sector is starting to think of auto insurance claims and approval on autonomous vehicles. The retail sector is beginning to offer personalized products based on AI predictive capabilities to transform customer acquisition and retention. The financial industries are transforming to branchless banking with transactions, credit monitoring, credit scoring, and approval, cross-border payments, global remittances, and foreign exchange are all real-time with fewer intermediates (Gomber *et al.*, 2018). It is predicted that the two technologies can pose the most transformative value for the future of businesses. Currently, most scholarly works on AI and blockchain are conceptual or descriptive, the empirical research is slight (Du *et al.*, 2019; Yin *et al.*, 2019), which is understandable and common for research done at the early stages of technology development (Toufaily et al., 2021). AI is based on probabilistic theory to express uncertainty. The algorithms are projected to make assumptions about reality. Blockchain uses a determinist hashing algorithm and cryptography to record reality. These two technologies can benefit and complement

each other (Banafa, 2019). This statement can be supported by a Whitepaper published by Accubits Technologies, which states "*while blockchain technology is in itself a transformative step, the integration of AI with it opens a plethora of never before seen opportunities that can be tapped into by public and private sector stakeholders",* it further exemplifies the benefits of integrating blockchain and AI *"can lead towards a more secure ecosystem for transactions and data exchange. Improved business data models, newer insights and discovery, intelligent predictions, digital intellectual property rights, autonomous organizations*" (Rahul, 2016:7). Based on the extensive literature review, the study has summarized the advantages and challenges of AI and blockchain (see table 10 below), which have great implications for corporate governance practice in general and ethics in particular.

Technologies	Opportunities	Challenges
Blockchain	Decentralized Transparency Traceability Data integrity Resilience Trust protocol Visibility Immutability	Privacy Scalability Interoperability Standardization
Artificial Intelligence (AI)	Cost-saving Enhance analytical capabilities Improve, scaling existing process Problem-solving Augment decision making	Centralized architecture Security Privacy Lack of training data Lack of transparency of AI algorithms Fairness Interpretability Explainability Responsibility and accountability
Blockchain and AI	Improved data security Enhanced accurate AI decisions Decentralized Intelligence Improved efficiency Trustworthy	Regulatory compliance Cybersecurity Privacy

Table 10 Opportunities and challenges of AI and blockchain

The integration of AI and blockchain is still a largely undiscovered area (Banafa, 2019; Foote, 2019) for future trends. Blockchain has the potential to become the foundation technology of the future (Iansiti and Lakhani, 2017) and provide a digital trail of data to enhance AI decisions to improve business prospects. Blockchain is a distributed, decentralized, immutable ledger used to provide security and AI is the engine of the brain that enables analytics and decision-making from the data collected (Banafa, 2019). By combining the two technologies, organizations can organize large

databases, strengthen cybersecurity, enhance decision-making issues and perform tasks far more quickly (Foote, 2019). Angelis and da Silva (2019) regard the combination of AI and blockchain as blockchain 4.0. Salah *et al.* (2019:10127) conceptualize the integration of AI and blockchain technology as "Decentralised AI" to "enable AI to process and perform analytics or decision making using trusted, digitally signed, and secure data that has been transacted and stored on the blockchain". Montes and Goertzel (2019) use SingularityNET as a case example to describe the features and ethical advantages of the integration of AI and blockchain. AI systems can draw support from the main benefits of trust, provenance, and reliability from the blockchain (Salah *et al.*, 2019).

2.5 AI and blockchain ethics

Generally speaking, technology is neutral but how people use it can be good and bad based on the intention and implementation. Therefore, this section further explicates the ethics of AI and blockchain. From a technology ethics perspective, subsection 2.5.1 first illuminates AI ethics. The next subsection 2.5.2 elucidates blockchain ethics.

As indicated in the previous sections, technological changes can be a blessing for social wealth creation and a curse of mass unemployment (Clemons et al., 2017; Fleming, 2019; Gomber et al., 2018). Our social norms will get challenged when the advancement in technology gets ahead of society (Khanna, 2018). For example, personal harm could occur from the unethical use of technology (Mason, 1986). Due to the emerging nature of AI and blockchain technology, scholars are not only exploring new opportunities and capabilities of these technologies but also addressing concerns about the ethical and social considerations of using these technologies.

As such, organizations need to understand and address ethical dilemmas, which are the situations in which a decision results in unpleasant consequences in which someone always losses (Conger et al., 1995). The way information is assessed and used, are generating fundamental information ethics and moral considerations (Gasmelseid, 2009). Smart contracts powered by blockchain technology enable greater information distribution which may encourage collusive behaviour which hurts competition (Cong and He, 2019). AI assists in human decision-making or blockchain smart contracts execute contracts autonomously are subject to moral norms and ethical considerations (Lobschat *et al.*, 2021). Many studies have suggested the

ethical issues relating to the uses of digital technologies (Dierksmeier and Seele, 2018; Kumaraswamy et al., 2018; Lima and Delen, 2019; Mansell *et al.*, 2019; Sousa *et al.*, 2019; Ullah *et al.*, 2019). The great concern is job losses due to automation or self-execution smart contacts (Butterworth, 2018). AI might be used to endanger the safety of humans (Ransbotham *et al.*, 2017).

It is important to assess the desirability of new and emerging technologies early in their development (Lucivero et al., 2011). The report from HouseOfLords (2018) also suggests we humans must design the systems carefully from the beginning. This principle needs to be applied to the recent development of AI and blockchain technology as these technologies are increasingly changing all aspects of our life. This stream of technology ethics has attracted growing attention from scholars, scientists, and policymakers to investigate the ethical and moral issues associated with the development and application of technologies in different realms (Fisher et al., 2006; Gasmelseid, 2009; Lucivero et al., 2011; Pellin and Engelmann, 2017). Pellin and Engelmann (2017) suggest the need to incorporate business ethics in corporate governance for efficient and responsible management of nanotechnology. Fisher et al.(2006) suggest a governance approach to technology to integrate technical and societal elements to address societal and ethical concerns on environments, quality of life, and human dignity. Lucivero et al.(2011) suggest careful and well-directed use of both skepticism and imagination to form expectations on technological feasibility, societal usability, and desirability of the expected technology.

2.5.1 AI ethics

Recently, ethics in AI or AI ethics has attracted broad attention in public debate. The advancement in AI technology has dramatically improved all aspects of our life from financial services, healthcare, education, transportation, food supply, etc. The benefits and cost savings of such AI systems become more apparent. However, new ethical and social risks come to play as AI artifacts progress from assisted AI to autonomous AI with minimal or no human supervision (Munoko et al.,2020). The 2019 AI index report published by Standford University's human-centered Artificial Intelligence Institute (HAI) indicates the societal considerations of AI lie in its fairness, interpretability and explainability, ethical use, data privacy, the use of face recognition, algorithm bias, and sustainable development at scale (Perrault *et al.*, 2019). AI relies

on a large amount of training data. If training data is biased, the decision made using the AI system is biased. For example, research in AI systems continues to reflect biases issues using historical data. It is interesting to note that “the accuracy rates for speech recognition are not dependent on the volume of your voice or how close you are to the microphone-they’re dependent on your gender and the colour of your skin” (Pagliaccio, 2020). Google’s algorithm shows prestigious job ads to men, not to women (Carpenter, 2015). Amazon.com Inc's AMZN.O machine-learning specialists uncovered a big problem: their new recruiting engine did not like women (Dastin, 2018). As such, the quality of data used for training and classification in AI systems is critical to ensure fair and trustworthy AI (Bertino et al., 2019). AI ethics has attracted growing attention from policymakers, scientists, and scholars (Perrault *et al.*, 2019). Winter and Davidson (2019) suggest proper values need to be encoded into algorithms and translated into machine judgments.

AI ethics is “a set of values, principles, and techniques that employ widely accepted standards to guide moral conduct in the development and use of AI systems” (Gov.UK, 2019; Leslie, 2019). According to the UK government guidance on AI ethics and safety, the main ways AI systems can cause involuntary harms are:

1. Misuse - systems are used for purposes other than those for which they were designed and intended.
2. Questionable design - creators have not thoroughly considered technical issues related to algorithmic bias and safety risks.
3. Unintended negative consequences - creators have not thoroughly considered the potential negative impacts their systems may have on the individuals and communities they affect (Gov.UK, 2019).

The UK government and The Alan Turing Institute have guided in establishing a governance architecture consisting of a framework of ethical values, a set of actionable principles, and a process-based governance framework (see figure 6 below).

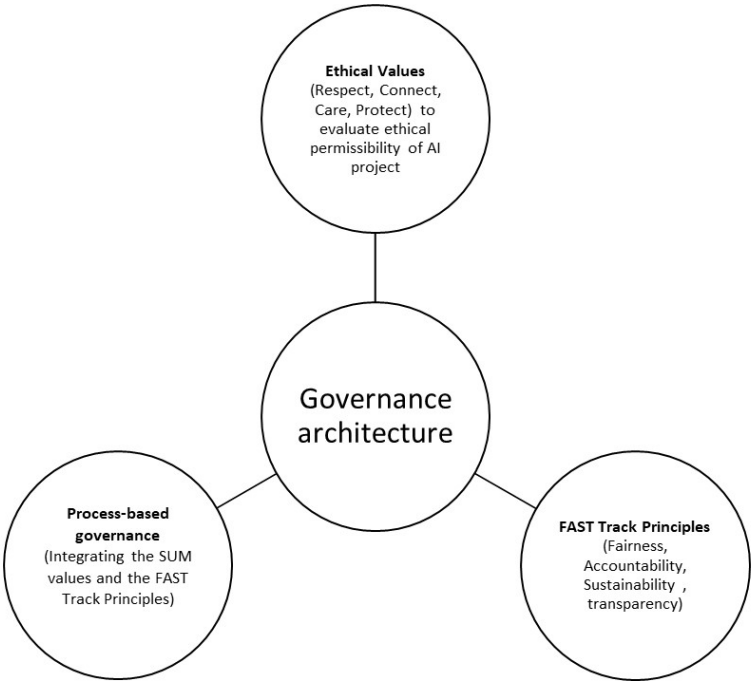


Figure 6 Ethical building blocks needed for the responsible delivery of an AI project (Source: Gov.UK, 2019; Leslie, 2019).

As indicated in figure 6, the ethical values are respect, connection, care, and protection, which can be used to evaluate the ethical permissibility of AI projects. The process-based governance is to integrate ethical values and the fairness, accountability, sustainability, and transparency (FAST) tract principles to form a governance architecture (Gov.UK, 2019). Following the ethical building blocks, this study provides a detailed explanation of fairness, accountability, sustainability, and transparency, drawn from UK government guidance (see table 11 below).

Principles	**Explanations**
Fairness	Use only fair and equitable datasets (Data Fairness) Include reasonable features, processes, and analytical structures in your model architecture (Design fairness) Prevent the system from having any discriminatory impact (Outcome fairness) Implement the system in an unbiased way (Implementation fairness)
Accountability	Establish a continuous chain of responsibility for all roles involved in the design and implementation lifecycle of the project Implement activity monitoring to allow for oversight and review throughout the entire project
Sustainability	Accuracy, reliability, security, and robustness (AI safety)
Transparency	Designers and implementers of AI systems should be able to: explain to affected stakeholders how and why a model performed the way it did in a specific context Justify the ethical permissibility, the discriminatory non-harm, the public trustworthiness of its outcome, and the processes behind its design and use

Table 11 Explanation of FAST track principles (Source: Gov.UK.2019)

Further, similar to the guidance from the UK government and The Alan Institute, Martin (2018:845) suggests 1) algorithms should be designed understanding the delegation of roles and responsibilities of the decision system, 2) algorithms should be designed and implemented toward the appropriate level of accountability within the decision, 3) the ethical implications of algorithms are not necessarily hard-coded in the design and firms developing algorithms would need to be mindful of indirect biases.

This study argues data transparency is critical for ethics in AI systems to help "determine what are the training datasets, how the training was carried out, what are the sources of training and other metrics related to machine learning, and whether ethics requirements are supported" (Bertino et al., 2019:16:2). Data transparency can enable quality data feed for AI systems to enhance the trustworthiness of AI. Blockchain technology is perfect for AI systems to ensure data integrity based on a consensus mechanism (Salah *et al.*, 2019).

2.5.2 Blockchain Ethics

Despite the unique and salient benefits of blockchain technology, as mentioned before, this technology is developing but can be very disruptive. The technology poses ethical implications for individuals and organizations. The decentralized protocols powered by blockchain technology are redefining traditional business models, and companies need to think about how to survive as artificial intelligence and automation are advancing every year (Kuebler, 2018). Professionals need to think about reskilling to enhance competency to stay relevant. The following statement published in Harvard Business Review explains the truth about blockchain and its impact on individuals and our society.

> "*With blockchain, we can imagine a world in which contracts are embedded in digital code and stored in transparent, shared databases, where they are protected from deletion, tampering, and revision. In this world, every agreement, every process, every task, and every payment would have a digital record and signature that could be identified, validated, stored, and shared. Intermediaries like lawyers, brokers, and bankers might no longer be necessary. Individuals, organizations, machines, and algorithms would freely transact and interact with one another with little friction. This is the immense potential of blockchain"*
>
> (Iansiti and Lakhani, 2017:120)

The truth about blockchain is that blockchain will transform business and become a foundational technology for the future, but the process of adoption will be gradual and it will take decades for blockchain to seep into our economic and social systems (Iansiti and Lakhani, 2017). Davenport and Ronanki's (2018) recent survey indicates most managers who reflect on the issue of job loss are committed to an augmentation strategy rather than replacing humans entirely. The study of Dierksmeier and Seele (2018) has adopted "information ethics" proposed by Floridi (1999, 2013, 2018) to address the ethical assessment of blockchain technology on human life and society. Their study suggests the transparency enhanced by blockchain can support a more open digital environment and boost forms of responsible digitalization. Blockchain technology enables automated transaction systems with the great disruptive potential to provide cheaper access to products or services and better-aligned incentives for all stakeholders on a network (Kuebler, 2018). The study of Dierksmeier and Seele (2018) has listed three types of blockchain applications associated with ethics, namely ethically unfavourable applications, ethically favourable applications, and ethically ambivalent applications. The ethically unfavourable and ambivalent applications can be mitigated by proper governance and policing that foster transparency of data and algorithmic judgments which could further boost and regain trust to reduce ambivalences.

Therefore, this study focuses on the transparency feature of blockchain technology, which can facilitate ethically favourable applications such as traceability in the supply chain (Hastig and Sodhi, 2020), and real-time transaction records (Yermack, 2017). Further, transparency is a regime value linked with ethics and it is also a part of a larger system of values associated with governance (Piotrowski, 2014). Transparency is a big principle in contemporary management and corporate governance literature. It is assumed that greater transparency will lead to higher standards of ethical behaviour and accountability by corporations (Janning et al.,2020). Transparency will reduce information asymmetry, and increase truthful disclosure (Ølnes et al., 2017; Du *et al.*, 2019). It is practically impossible to falsify or destroy transaction entries to conceal activities (Deloitte, 2016). A recent study by Lumineau et al.(2021) has suggested blockchain constitutes a governance mechanism to facilitate cooperation and coordination.

In the light of the above, AI and blockchain will transform the future of business and society. AI and blockchain should be designed to “create the kind of world in which we wish to live” and to “enhance the dignity of mankind” Mason (1986:11-12). Ethics in AI systems is closely related to data transparency which blockchain technology can enable transparency and data integrity (Bertino et al.,2019). Blockchain can help improve data quality to enhance accurate AI decisions to enhance efficiency and trustworthiness (Banafa, 2019). “With blockchain, for the first time in human history, people and organizations can trust each other directly, without intermediaries” (Tapscott and Euchner, 2019:13). AI enables organizations to improve strategic decision-making by tracking capital allocation patterns, highlighting concerns, analyzing internal communications to assess employee morale, and predicting concerns (Libert et al., 2017). AI adds value to teams and organizations that may leap ahead of current technological team support (Wilson and Daugherty, 2018). Khanna (2018) highlights when technology gets ahead of society will challenge existing business models and social norms, and how organizations are designed (Moore, 2019). Lobschat *et al.* (2021) suggest organizations develop a comprehensive, coherent set of norms, embedded in their organizational culture, to govern the development and deployment of digital technology and data. Mason (1986) states that information technology should be designed to “create the kind of world in which we wish to live” to “enhance the dignity of mankind”. He suggested that a new social contract needs to be formulated to fulfill human potential.

As such, based on the extensive literature review for the purpose of this specific investigation, this study situates the investigation in the domain of corporate governance. From the theoretical orientation of corporate governance, this research further develops a multi-theoretical framework from the agency, stewardship, stakeholder, and institutional theory perspectives to guide this inquiry and further explicate results through these theoretical lenses so that the impact of AI and blockchain adoption in corporate governance from ethical perspectives can be better understood.

2.6 Theoretical framework

As indicated in the previous sections, the extant literature on blockchain and artificial intelligence has focused on the opportunities and challenges of those technologies for

businesses, changing the way organizations capture value. This study argues that AI and blockchain are the new technological tools that can be adopted to foster effective corporate governance to enhance firm performance and build resilience for future disruption. As such, this study applies a multi-theoretical approach (Dalton *et al.*, 1998; Daily et al., 2003; Hillman and Dalziel, 2003; Lynall et al., 2003; Christopher, 2010; Elsayed, 2010) from the perspectives of agency theory, stewardship theory, stakeholder theory, and institutional theory to guide the study of the impact of AI and blockchain on ethics in corporate governance and further explicate results through these theoretical lenses to help better understand the ethical issues of using AI and blockchain in corporate governance under this investigation.

The research in corporate governance has existed for many decades, and these four theories have been widely applied in extant scholarly studies. Although each theory has its own limitations, the different theories complement each other to provide a better understanding of the corporate governance phenomenon from multidisciplinary studies across different countries and have helped developed corporate governance codes in different jurisdictions.

Agency theory has been used to study ownership structure and firm performance, CEO's external advice network, board control, and CEO tendencies, compensation plans, determinants of audit committee meeting frequency, board composition, audit quality, shareholder activism, board independence, managerial ownership, institutional investors, capital structures, etc (O'Sullivan, 2000; Gedajlovic and Shapiro, 2002; Brandes et al., 2008; McDonald et al., 2008; Perrini et al., 2008; Sharma et al., 2009; Janakiraman et al., 2010; Marler and Faugère, 2010; McDonald and Westphal, 2010; Grove *et al.*, 2011; Jiraporn et al. 2012; Shen et al., 2016; Dixon et al., 2017; Benton and You, 2019; Chari *et al.*, 2019; Lel, 2019). Stewardship theory has been used to study trust, ethics, intrinsic incentives, honesty, and loyalty (Nowak and McCabe, 2003; Caldwell and Karri, 2005; Anderson et al., 2007; Christopher, 2010; Elsayed, 2010; Cuevas-Rodríguez et al, 2012; Till and Yount, 2019). Stakeholder theory has been used to study wider influencing forces impacting organizations, and incentive alignments (Ryan and Schneider, 2003; Christopher, 2010; Kovermann and Velte, 2019). Institutional theory has been used to study the interrelationship between the firm's corporate governance, responsible leadership, and corporate social responsibility in a different institutional context, corporate

governance deviance, institutional logic, government integrity and culture on corporate leadership, institutional approach to corporate social responsibility (CSR) adoption (Filatotchev and Nakajima, 2014; Johed and Catasús, 2015; Jackson and Rathert, 2017; Aguilera et al., 2018; Filatotchev et al., 2018; Nakpodia and Adegbite, 2018; Chizema and Pogrebna, 2019).

Practically, many extant scholarly studies (Brandes et al., 2006; Haveman and Wang, 2013; Wilkin et al.,2013; Zeyen et al., 2016; García-Meca et al., 2017; Malen and Vaaler, 2017; Shi et al., 2017; Till and Yount, 2019; Zhu et al., 2019) have applied different theories in their corporate governance studies to support their arguments to provide a comprehensive understanding of their inquiry in the domain of corporate governance. The extant studies have contributed to the contemporary global governance practice, in which information plays a crucial role (Zachariadis et al., 2019). Based on the theoretical lenses, this study has developed a theoretical framework to guide the study so that the phenomenon under this investigation can be better understood (see figure 7 below).

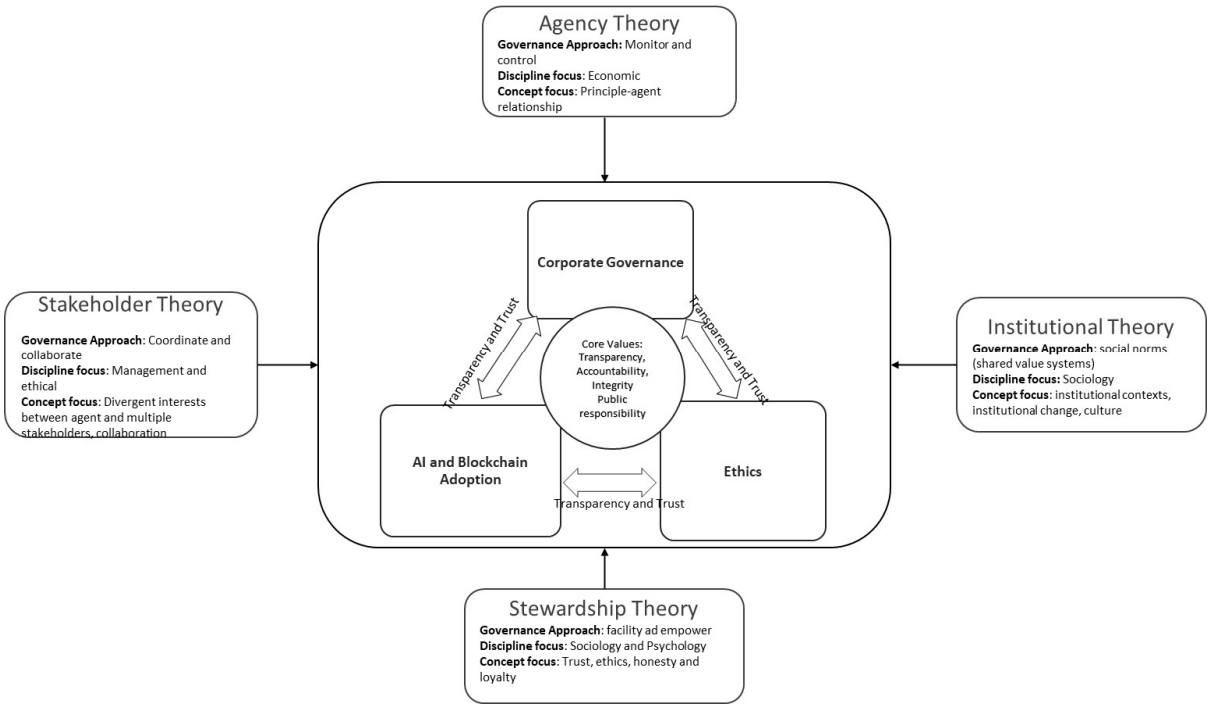


Figure 7 Theoretical framework

From an agency theory perspective, technological automation facilitated by AI and blockchain technology will streamline and simplify business processes. The decentralized protocol powered by blockchain technology and analyzed by AI technology can detect fraudulent activities in real-time, hence the technology will make

manipulation activities very hard to conceal. As such, the technologies will reduce the opportunities for wrongdoing and unethical behaviour and reduce moral hazards as enhanced transparency reduces information asymmetry (Yermack, 2017). From the stewardship theory perspective, the enhanced transparency enabled by the advancement in technologies will facilitate and empower the board to work more collaborative with management, which is ethically consistent with the needs of today's organizations to restore and rebuild public trust (Caldwell and Karri, 2005), leading towards a more humanistic pedagogy of management (Dierksmeier, 2019), emphasizing on intrinsic incentives, satisfaction, recognition from peers and bosses (Cuevas-Rodríguez et al., 2012). Trust is established through technology by cryptography and by collaboration. From a stakeholder theory perspective, the adoption of AI and blockchain will flatten existing business structures, change the way we share information, and capture value through collective commitments and horizontal interaction between all stakeholders on platforms (Fenwick et al., 2017; Fenwick et al., 2019). The stakeholder theory acknowledges that firms or organizations are part of a greater social system, and decisions cannot be made in isolation. The decentralized protocol powered by blockchain technology will enable the inclusion of all stakeholders and better address their diverse interests. From an institutional perspective, the adoption of AI and blockchain will change business models and processes, challenging our social norms in different institutional contexts. The new technological tools will facilitate new ways of recording, updating, sharing information, and collaborations, which will upend our existing social reality guided by institutional values, beliefs, and rules. Companies need to respond to these technological pressures and establish the right organizational culture to govern the development and deployment of digital technology and data (Lobschat *et al.*, 2021) to balance human and technical demands created by rapidly shifting waves of technology and societal needs (Brennan et al., 2019).

The adoption of AI and blockchain technology provide more advanced technological tools for corporate governance to deal with information asymmetry, lack of transparency, and lack of trust issues faced by contemporary governance practices. Ultimately, business models and the process will be changed in response to the advanced in technology that requires increasing technical competence and more close collaborations from future workers. Business platforms expand business networks to

unlock new opportunities and reach new customers and allow values to be transacted in real-time and speed up transactions. Therefore, agency theory, stewardship theory, stakeholder theory, and institutional theory are deemed appropriate and relevant theoretical lenses to guide the study. The next four subsections provide a detailed explanation of each of the theories and its relevance as the theoretical lens to guide this investigation. Subsection 2.6.1 explicates the agency theory, followed by the explanation of stewardship theory in section 2.6.2. Then subsection 2.6.3 illuminates the stakeholder theory. Following on from that, subsection 2.6.4 elucidates the institutional theory.

2.6.1 Agency theory

Agency theory is the dominant theory used for the study of corporate governance (Kumar and Zattoni, 2019), and has become “a cornerstone of the corporate governance field” (Lan and Heracleous, 2010:294). The fundamental concern for a corporation is the relations between managers and owners, derived as early as 1932 from Berle and Means’ work on the separation of ownership and control of large U.S corporations (Berle and Means, 1932). It has been a central issue in corporate governance studies to find the most effective ways to govern organizations with dispersed ownership structures (Fama, 1980; Fama and Jensen, 1983).

Then Jensen and Meckling (1976) extended Berle and Means’ (1932) work and conceptualized the relationship between managers and owners as an agency relationship, which they define as “a contract under which one or more persons (the principal(s)) engage another person (the agent) to perform some service on their behalf which involves delegating some decision-making authority to the agent. If both parties to the relationship are utility maximizers, there is good reason to believe that the agent will not always act in the best interests of the principle. The principle can limit divergences from his interest by establishing appropriate incentives for the agent and by incurring monitoring costs designed to limit the aberrant activities of the agent” (Jensen and Meckling, 1976:308). Jensen and Meckling are often referred to as the founders of agency theory: a theory of the ownership structure of the firm that integrates elements from the theory of agency, the theory of property rights, and the theory of finance. The central assumption of agency theory is that managers act as the agents of shareholders (the principals) and may engage in self-serving behaviour,

acting opportunistically at the expense of shareholders' wealth (Fama, 1980; Fama and Jensen, 1983; Eisenhardt, 1989).

The extant scholarly studies have applied agency theory to develop monitoring and control corporate governance mechanisms to align the conflicts of interest between agents and principles (Coles et al., 2001). Earlier studies have revealed a diverse range of internal corporate governance monitoring and control mechanisms (Eisenhardt, 1989; Dalton *et al.*, 1998), such as monitoring by the board of directors (Fama, 1980; Fama and Jensen, 1983), ownership structure (Demsetz and Lehn, 1985), equity-based managerial incentives (Murphy, 1985, 1997; Jensen and Murphy, 1990). Further, scholars have devoted important attention to external corporate governance mechanisms (Coffee, 2006; Aguilera *et al.*, 2015; Shi et al., 2017), such as shareholder activism and investors (Bebchuk, 2005; Aguilera *et al.*, 2015), external auditors (Liu and Lai, 2012; La Rosa et al., 2019), new regulations and legislations after financial scandal to promote transparency and accuracy of financial reporting. For example, the Sarbanes-Oxley Act 2002 post-Enron scandal in America (Bhabra and Rooney, 2019). More internal and external monitoring and controlling mechanisms are studied to lessen divergence in interests between management and shareholders, focusing on board of directors, such as board size, composition, structure and behaviour (Elsayed, 2010), CEO compensation, CEO tenure, board composition, leadership structure, ownership structure, blockholders, industry performance, and firm size (Coles et al., 2001), board independence (Elbadry et al., 2015), CEO duality (Grove *et al.*, 2011), inventive alignment between management and shareholders (Kovermann and Velte, 2019), CEO's external advice network (McDonald et al., 2008), DATA Act governmental reporting (Errichetti and Roohani, 2018), and corporate social responsibility leadership (Filatotchev and Nakajima, 2014), etc.

However, Eisenhardt's (1989) findings suggest the monitoring and control functions of boards did not always adequately align the interests of managers and shareholders. Shi et al. (2017:1268) find "external pressure from activist owners, the market for corporate control, and securities analysts increase managers' likelihood of financial fraud" and engage in financial misbehaviour. Their study suggests external controls rob managers' intrinsic motivation for behaving appropriately, leading to the opposite of the intended effect. The financial scandals have triggered a debate on whether firms are properly governed with the implementation of new rules and procedures

(Chhaochharia and Laeven, 2009) and more control to managers (Knapp et al.,2011). The surge in corporate governance research rise in demand for transparency (Kumar and Zattoni, 2014; OECD, 2015), accountability, and responsibility from the board and senior manager (Christopher, 2010). Extant scholars have found the invisible barriers in modern companies, such as information asymmetry, lack of transparency, and lack of trust (Arrow, 1985; Caldwell and Karri, 2005; Jiraporn et al., 2012).

Information asymmetry is referred to as information held privately or withheld or revealed strategically to influence the outcome of a transaction or decision (Williamson,1979). Internal managers are in the position of holding more information that can be manipulated to maximize their own interests at the expense of the principle (Godfrey et al., 2003). This creates a potential for moral hazard, for example, managers take actions that generate lower returns and higher risk for shareholders to enhance their career prospects (Chari *et al.*, 2019). As such information can serve as a system for control by shareholders and other stakeholders over manager activities (Jensen and Meckling, 1976). The Analysts serve as information intermediaries and represent an external governance mechanism that provides additional oversight over management to reduce information asymmetry and mitigate agency conflicts (Jiraporn et al., 2012).

Eisenhardt (1989) suggests two lines of agency theory: positivist agency theory and principle-agent. The positivist agency focuses on identifying principle-agent relationships and considering appropriate governance mechanisms to mitigate the agent's self-serving activities. While the principal-agent line of agency theory serves as a general theory for a wide variety of circumstances. Errichetti and Roohani's (2018) study focuses on positivist agent theory. Positivist agency theory has identified two governance mechanisms: outcome-based contracts (align the interests of the agents and principles) and information systems (inform the principle of the agent's activities and discourage agent opportunism because the agent realizes that it will not be able to deceive the principle (Eisenhardt, 1989; Errichetti and Roohani, 2018). Reducing the impact of asymmetric information will lead to an improvement in the market for the firm's share (Elbadry et al., 2015).

Agency theory is subject to several criticisms from corporate governance research. The theory did not recognize the wider environmental influencing forces impacting

organizations (Christopher, 2010). It simply assumes all managers are self-serving, ignoring managers' intrinsic motivations for achievement, responsibility, recognition, and working (Lubatkin, 2005; Segrestin and Hatchuel, 2011). The agency theory is excessively narrow and only presents a partial view of organizational complexities (Eisenhardt, 1989; Clarke, 2005). Despite the criticisms of agency theory, Lange (2005); Segrestin and Hatchuel (2011) believe this theory has much to offer and has helped scholars understand the complexities of organizations. The principle-agent model has a profound influence on organizational scholars, having informed research about CEO compensation, firm performance, firm risk, and strategic decisions on diversification and mergers (Lubatkin, 2005). Today, the advancement in technologies offers new capabilities for businesses to improve transparency and trust through collaborations. The new technological tools powered by AI technology and blockchain technology can help organizations to automate and streamline the process, reduce information asymmetry, enhance transparency, and reduce moral hazards (Yermack, 2017). As such, this investigation argues that AI and blockchain technologies can be new governance mechanisms to mitigate agency problems by enhanced transparency and intelligent detection of suspicious activities.

2.6.2 Stewardship theory

Stewardship theory as opposed to agency theory focuses on the intrinsic motivations of managers who wish to perform their jobs in the best interest of the shareholders for achievement, recognition, and acting as good stewards rather than self-serving agents (Davis et al.,1997). Stewardship theory rooted in psychology and sociology focuses on empowerment rather than monitoring and control (Christopher, 2010). This theory suggests that directors and management have interests that are consistent with the interests of shareholders. They are ethical and can be trusted. Managers and directors are motivated by the need to achieve, provide high-level commitment and gain intrinsic satisfaction by performing challenging work and exercising responsibility and authority to gain recognition from peers and bosses (Davis et al.,1997). Intrinsic motivation is inherent in stewardship theory, while extrinsic motivation is inherent in agency theory. Stewardship theory promotes collaborations between directors and managers, offers additional perspectives to overcome the partiality of agency theory, and captures the complexity of managerial behaviour of self-actualization (Eisenhardt, 1989; Coles et al.,2001; Till and Yount, 2019). Hail et al. (2014) have found the board is evolving

towards a more collaborative role with management. Intrinsic incentives such as honesty, ethics, loyalty, and trust can provide stronger restraints on agent opportunism (Cuevas-Rodríguez et al., 2012). Caldwell and Karri (2005) suggest governance mechanisms using a covenantal approach are more effective in building trust in an organization.

The trust and transparency in the governance can promote the collaborative behaviour of managers as good stewards rather than self-serving agents. Therefore, this study argues the decentralized protocol powered by blockchain technology and intelligence analysis of AI technology will facilitate and empower managers and promote collaborative behaviours to the commitment to a society based on ethics and trust facilitated by the enhanced transparency.

2.6.3 Stakeholder theory

Stakeholder theory was introduced by Freeman (1984, 1994), he defines stakeholders as “any group or individuals who can affect or is affected by the achievement of the organization’s objectives”. Donaldson and Preston (1995) extended the concept of stakeholders to include all persons or groups with legitimate interests in an organization with no one having priority over another, they suggest that governance mechanisms and processes should recognize the wider influence of multiple stakeholders through a structure that considers the full range of stakeholders who seek multiple and sometimes divergent goals. They suggest stakeholder theory includes descriptive (i.e., reasoning about how corporations consider stakeholder interests), instrumental (i.e., reasoning about whether it is beneficial for firms to consider stakeholder claims), as well as normative (i.e., reasoning about why corporations should consider stakeholder claims) elements. The governance approach to stakeholder theory is to coordinate and collaborate between multiple stakeholders. The theory focuses on the utilitarian needed of all stakeholders with ethics of balance (Caldwell and Karri, 2005). It is one stream of normative theories of ethics used by managers to make ethically accepted decisions in the changing business environment (Hasnas, 1998; Bose, 2012). Therefore, there are two strands of stakeholder theory, one is based on ethical theory which is normative and promotes ethical values and states firms should address the needs of all stakeholders. The other strand is based on managerial theory which is positivist and states that firms will move

to address the needs of their most powerful stakeholders. However, both strands of stakeholder theory recognize that firms or organizations are a part of greater social systems and decisions cannot be made in isolation.

The concept of stakeholders extended the central idea of agency theory's divergent interests between agent and shareholders to a consideration of divergent interests between the agent and multiple stakeholders (Christopher, 2010; Till and Yount, 2019). Shareholders, employees, suppliers, clients, local authorities, etc, need to be given guarantees before the firm can create value (Blair and Stout, 1999; Charreaux and Desbrie` res, 2001). For companies to achieve the common good and meet and safeguard the needs and rights of various stakeholders, people must come together and cooperate based on values, interests, and social choice. (Bass and Steidlmeier, 1999). They suggest the extent to which the organization satisfies all of its stakeholders impacts its ultimate criterion of worth. Companies can achieve good performance with the support of stakeholders.

The challenges in the use of stakeholder theory involve the accurate identification of stakeholders and balancing the conflict interests of all stakeholders (Bose, 2012). "In true consensus, the interests of all are fully considered, but the final decision reached may fail to please everyone completely. The decision is accepted as the best under the circumstances even if it means some individual members' interests may have to be sacrificed" (Bass and Steidlmeier, 1999:27).

As such, this investigation also argues that blockchain technology will enable information and data to be shared in a decentralized manner with all stakeholders who participate in the network, and then they can use AI systems to analyze the quality data from blockchain technology to enhance their decision-making.

2.6.4 Institutional theory

Institutional theory is a sociology strand of theory. It focuses on institutional context (contextualization of agency conflicts focusing on moderating effects of institutions). Early management theorists have viewed organizations as rational systems of social machines designed for the efficient transformation of material inputs into material outputs (Scott, 1987; Suchman, 1995). Institutions are the core of the institutional theory. Institutions are blocks of society, interacting with the surrounding social

systems (Scott, 1995; Thornton and Ocasio, 1998). There is no single and universally agreed definition of an “institution” in the institutional school of thought (Scott, 1987). Scott further highlights institutions in his later work, he asserts

> *“Institutions are composed of cultural-cognitive, normative, and regulative elements that, together with associated activities and resources, provide stability and meaning to social life. Institutions are transmitted by various types of carriers, including symbolic systems, relational systems, routines, and artifacts. Institutions operate at different levels of jurisdiction, from the world system to localized interpersonal relationships. Institutions by definition connote stability but are subject to change processes, both incremental and discontinuous*” (Scott, 1995:33).

Scott’s description of an institution is comprised of three pillars: 1) regulative pillar deals with rules, laws, and their associated sanctions; 2) normative pillar are the norms and values within the institutions and give it its ethics, its individuality, and its personality; 3) cultural-cognitive pillar acknowledges an institution sits easily in a society when it has absorbed the society’s cultural and ways of doing things (Scott, 1995). Companies are influenced by other organizations or institutions. Institutional theory can be used to examine how companies respond to the external institutional environment, which is often pluralistic. Organizations incorporate all sorts of incompatible structural elements to search for external support and stability (Meyer and Rowan, 1977) to provide meaning to their social reality (Thornton and Ocasio, 1998). The dynamics of the organizational environment stem from historical patterns of material practices, assumptions, values, beliefs, and rules by which individuals produce and reproduce their material subsistence (Meyer and Rowan, 1977; Thornton and Ocasio, 1998).

A central concept of institutional theory is “isomorphism”-organizations come to look more and more like each other due to the strength of legitimacy and social-cultural pressures (Meyerand Rowan, 1977; DiMaggio and Powell, 1983). DiMaggio and Powell (1983) suggest organizations compete for customers and resources, as well as institutional legitimacy and political power. They list three mechanisms of institutional isomorphic change: coercive, mimetic, and normative isomorphism processes as a useful tool for understanding organizations not just compete but collaborate to form a recognized area of institutional standards that produce similar products or services, with collective institutional power in influencing the regulatory environment. Coercive isomorphism stems from political influence and the problem of

legitimacy; mimetic isomorphism stems from standard responses to uncertainty, and normative isomorphism is associated with professionalization.

There are large overlaps between institutional theory, legitimacy theory, and stakeholder theory. Institutions form their own social expectations of the shared value systems that prescribe legitimate behaviour (Hinings et al., 2018). Suchman (1995:574) has conceptualized legitimacy as “a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions.” For example, accounting scholars consider institutional theory because of its ability to track accounting decisions concerning the institutions’ need for social acceptance. Conformity and institutional change are large aspects of accounting decision-making under institutional theory. The institutionalization process is not automatic (Zilber, 2002; Zeyen et al., 2016). The process starts with early adoption by some actors and then needs to diffuse and be widely accepted to become proper institutions (Leblebic *et al.*, 1991; Strang and Meyer, 1993; Zeyen et al., 2016). The limitation of institutional isomorphism cannot explain why different organizations respond to institutional pressure differently. Therefore, institutional logic was introduced as one construct of institutional theory to help us understand the variations and different responses in organizations. Many stakeholders have various interests, they compete to influence different logic. Some extant scholars have found that the coexistence of a plurality of institutional logic simultaneously constrains organizational and individual behaviour (Greenwood *et al.*, 2011; Martin *et al.*, 2015, 2017).

The study of Hinings et al. (2018:52) indicates that the adoption of blockchain technology will lead to “ novel actors, structures, practices, values, and beliefs that change, threaten, replace or complement existing rules of the game within organizations, ecosystems, industries or fields.” This study further argues that AI technology and blockchain technology will automate some business processes, leading to changes in business models, and requiring new technical competencies to deal with digital technologies, which will fundamentally change the way we work and live.

In the light of the above, these four theories provide an appropriate and relevant theoretical foundation for this investigation to study the impact of AI and blockchain on

corporate governance from ethical perspectives. The adoption of blockchain and AI can align the divergent interests between principle and agents, and potentially mitigate agency problems by providing transparency to reduce information asymmetry and increase trust. The process will be enhanced by using a blockchain-based smart contract when all the contractual conditions are pre-agreed and encoded into technical code. The contract will execute by itself when all the conditions are met. A blockchain-based smart contract allows more automation and less human intervention. Thus, the process will reduce manipulation and opportunistic behaviour. Blockchain is a distributed ledger system and trust is built in the system. The adoption of blockchain and AI can enhance the coordinated and collaborative approach to governance. Information will be shared in a decentralized manner with all stakeholders who participate in the network. These technologies help address the limitation of stakeholder theory. Blockchain allows greater transparency of ownership so that majority of the stakeholders can be easily identified. The blockchain consensus mechanisms allow the stakeholders with access rights to actively engage in collaborative decision-making. For example, investors, and creditors would be able to access real-time financial information to make the decision and do not have to wait for the quarterly or yearly financial statements, which increases the collaboration and coordination among diverse stakeholders. Additionally, the governance system seeks to balance trust and accountability. Blockchain increases trust. “Trust is in the process by increased control due to immutable recordkeeping and by verification of data by multiple nodes” in blockchain (Ølnes et al.,2017:359). Managerial self-serving behaviour will be reduced under a transparent blockchain system. The technology will encourage collaborations between directors, managers, accountants, etc. The trust can be explained by stewardship theory to capture the complexity of managerial behaviour of self-actualization and intrinsic motivations. Furthermore, the adoption of blockchain and AI will change the way people work and interact with each other. The institutional theory has the potential to help understand the institutionalization process of AI and blockchain adoption to become legitimated within institutions. Based on these understandings, this study situates this inquiry within the domain of corporate governance to examine the impact of adopting AI and blockchain in corporate governance in general and particularly from the ethical perspectives. The next chapter outline the research methodology purposefully designed for this empirical investigation.

Chapter 3 Methodology

This chapter explains the research methodology adopted by this research. It frames and guides the investigation of the ethical impact of AI and blockchain adoption on corporate governance. The research strategy is to ensure that 1) any data collected are relevant to the research questions and theoretical considerations and 2) would contribute to the findings to enhance the body of knowledge in AI and blockchain adoption in corporate governance from ethical perspectives.

This study applies specific techniques and a pragmatic, step-by-step netnography approach to investigate online traces, and extends these online explorations with online semi-structured interviews. The data collection and analysis are iterative processes until theoretical saturation is achieved. The researcher has spent 10 months collecting and analyzing data, immersing in social media research sites such as LinkedIn, YouTube, Ted Talks and Financial Times, and interviewing informants from different industry sectors regarding their experiences and practices affected by blockchain and AI advancements. Therefore, this study collects an abundance of textual, video, and audio data using netnography and Semi-Structured Interviews. Data collected from netnography consists of 5 datasets: 1) 34 LinkedIn Posts with Comments; 2) 12 Webinars; 3) 22 YouTube Videos; 4) 19 Videos; 5) 10 Podcasts. Simultaneously, this study has also conducted 17 semi-structured interviews using online platforms of MS Team, Zoom, and Google Meet. The video, audio, and interview data have been transcribed into textual data creating a total of 453,065 words for thematical analysis using NVivo software.

This chapter starts with the articulation of the philosophical orientation of the study in section 3.1. Following on from this, section 3.2 explains the research design of the study. The subsequent section 3.3 elucidates the different methods (netnography and semi-structured interviews) adopted for data collection. Then, section 3.4 illuminates the thematic analysis of the data. Finally, section 3.5 evaluates the research quality.

3.1 Philosophical orientation of this study

The philosophical orientation of this study is interpretivism epistemology philosophy. Epistemology is the theory of knowledge and follows logically from ontology (Delanty and Strydom, 2003). Interpretivism emphasizes the understanding of the social world

through an examination of the interpretation of what world by its social actors like people and their institutions. The intellectual heritage of interpretivism includes "*Weber's notion of Verstehen, the hermeneutic-phenomenological traditions, and symbolic interactionism",* and this approach *"is underpinned by a social constructionist ontology, which holds that reality is constituted by human action and meaning-making, rather than existing objectively and externally*" (Bell et al., 2019:31).

Specifically, technogenesis (Kozinets, 2020) is the ontological foundation for interpretivism in this research. It originates in the philosophy of Bernard Stiegler, who was a philosopher of technology. Stiegler focuses on the idea that human beings and our technologies coevolve, i.e we cannot separate human beings from technology (Stiegler, 1994). His term, *Technics*, from the Greek *tekhnē*, to make or to construct, referring to the essentially dual nature of technology to help answer Heideggers' famous question of "what is technology in relation to humanity" (Bluemink, 2020).

"*Stiegler argued that Technics was a Pharmakon- a Greek word meaning both poison and cure. It was both the poison that affected contemporary society and also the cure through which it could be saved. It was both an external form into which we pass our knowledge, and an internal condition which makes us human*"

(Bluemink, 2020:para.1)

"Stiegler suggests a contemporary malaise or disenchantment to be the product of a neoliberal, capitalist model of consumption which has increasingly been driven by the disruptive power of the technologies of "progress." At the same time… might be re-enchanted through a more positive "noetic" life, that is, a life in which an intergenerational transmission and translation of knowledge provides a profound foundation for social and individual well-being"

(Dawson, 2021:652)

Today, our world is in the age of disruption that changes the social reality and the psychic, opening up a new age of deliberation for a new public thing (Stiegler, 2019). This study argues that the disruption will be more profound with the advancement in AI, blockchain, and other digital technologies. Every institution and every organization needs to empower a thoughtful, careful consideration of the implications of that disruption (Dawson, 2021). Science and Technics form a powerful "technoscientific" dynamic driven by increasingly digital networked innovation (Bishop and Ross, 2021;

Dawson, 2021). The new stage of technological developments or advancements sets the condition for disruption or transformation and creates a new epoch for new ways of thinking, living, organizing, and caring (Bishop and Ross, 2021; Reader, 2021).

"*The formation of a new epoch thus occurs in two stages: the first is the disruptive change of a technical system that has the effect of overturning all kinds of social understandings and forms of knowledge, which find themselves obsolete; the second is the transindividuation of new knowledge on the basis of this suspension, generating new knowledge and new ways of adjusting psychosocial life to the new technical system"*

(Bishop and Ross, 2021:p123).

AI, blockchain, and other digital technology systems are rapidly altered by the contemporary environment with excessive computer powers and large databases. Simultaneously, humans rapidly change social and physical environments using digital devices like smartphones, facial recognition cameras, assistant robots, virtual reality (VR), etc. The technological environment forces us to understand the predictive models, algorithmic decision making, smart contracts, and the relationships between the human and the non-human. The new economic arrangements support the sharing and collective generation of intergenerational knowledge to understand a globalized culture mediated through digital technology (Bishop and Ross, 2021). Humans need to understand and develop the reasoning ability to discern the differences between reasonable and unreasonable judgments and act accordingly to mitigate the negative impacts of a digitized economy (Reader, 2021).

Therefore, interpretivism epistemology underpinned by a social constructionist ontology is the philosophical orientation for this research. This approach studies the technogenetic notions of coevolving human-technology transformation and adaptation, to understand human experience and cultural understanding in response to technological disruption in various calculative, social control, economic, and algorithmic functions and features (Kozinets, 2020).

3.2 Research design

The above philosophical assumptions inform the development of a qualitative research strategy using both netnography and semi-structured interviews for this study. These

two approaches are prevailing in the use of interpretive or constructivist paradigms to gain knowledge through immersing in social media and interviewing social actors to understand how they shape, understand, and interpret the digital world. Netnography values an empathic sense of verstehen and focuses on human experience and cultural understanding which associate netnography with epistemology (Kozinets, 2020).

The research design of this study provides a framework for the data collection and analysis to ensure the methods and techniques used for this investigation are most suitable to address the research questions regarding the ethical benefits of using AI and blockchain, the ethical concerns about using these technologies, and how companies can ethically govern the use of these technologies. Special attention was paid to the feasibility of data collection within the research design to ensure relevant data is accessible and can be collected online using netnography methodological approach and semi-structured interviews (see figure 8 for the research design).

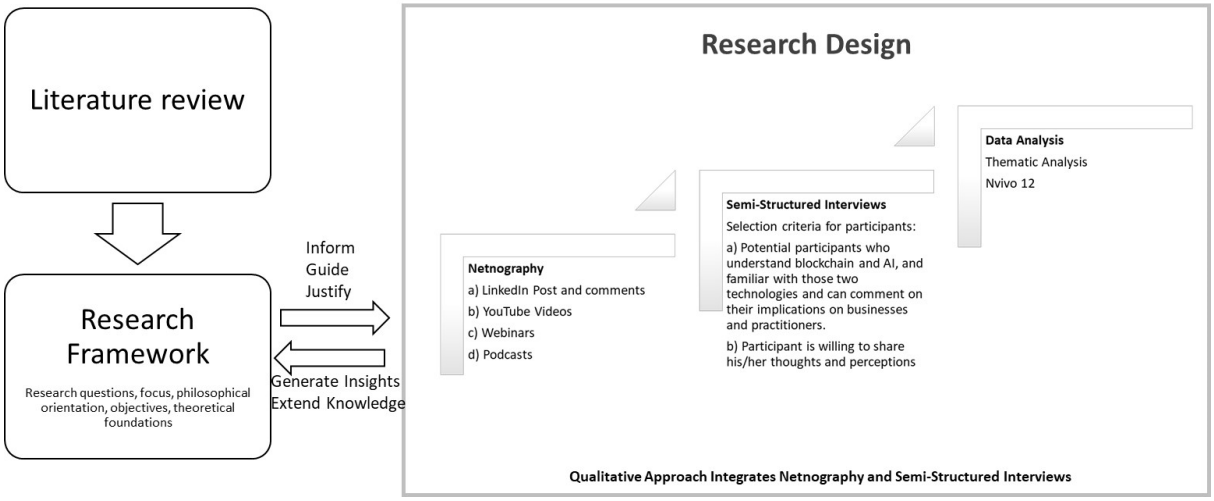


Figure 8 Research design of this study

This research design follows Bell et al.'s (2019) five steps in qualitative research. First, review the relevant literature in corporate governance, blockchain, AI, and ethics in corporate governance, AI ethics, and blockchain ethics. The literature review has helped the researcher develop a multi-theoretical research framework to address the theoretical relevance of the extant corporate governance theories to help understand the impact of AI and blockchain adoption on corporate governance from ethical perspectives. At this stage, the literature review informs and directs this investigation toward the development of the research goals, focusing on examining the ethical benefit of using AI and blockchain, as well as the ethical concerns related to the use

of these technologies and how companies can ethically govern the use of these technologies to mitigate misuse and unwanted consequences. Second, select relevant social media sites for netnography inquiry, and select interviewees who are competent to comment on the implications of blockchain and AI applications from an ethical perspective in the context of corporate governance. Third, collect the relevant textual, video, and audio data from social media sites like LinkedIn Posts and Comments, YouTube videos, Webinars, Ted Talks videos, and Podcasts, as well as semi-structured interviews. The abundant data collected from different sources can enable triangulation to maximize the trustworthiness of the research. Fourth, use Nvivo 12 for thematic analysis to analyze and interpret data. This is an iterative process until the point of theoretical saturation is reached (Glaser and Strauss, 1967; Eisenhardt, 1989; Pan and Tan, 2011). Finally, present a thematic framework to expand knowledge about the ethical benefits, and ethical concerns of adopting AI and blockchain and further explicates how companies can govern the ethical use of AI and blockchain technologies for the good of society to foster sustainability. Throughout all the steps of this qualitative inquiry, the investigator is committed to incorporating relevance and rigor in designing, conducting, and reporting the research, which would enable better knowledge accumulation (Maula and Stam, 2019).

Further, this research design is informed by two aspects of compelling justifications. First, the accessibility and feasibility of data collection enabled by digital mediated communication. New technologies often lead to advances in scientific research (LeBaron *et al.*, 2018), allowing the study of online traces and online interviews. Specifically, social media platforms facilitate new ways for social actors to participate and engage in digital communications. Every time we post something online, we leave a digital trail. Thus, abundant data is available on social media platforms and can be accessed easily online. The data can be photographs, videos, images people draw, texts, or even stories (Kozinets, 2020), which can be very meaningful and revealing. Each of the postings can offer invaluable and very detailed descriptive opinions and viewpoints from a global scale (Jeacle, 2021). For example, LeBaron *et al.*(2018) suggest video data can bring actors to life through multimodality, embodiment, materiality, and sequence to make retrospective and remote accounts more vivid, to help analyze human behaviour and organizational activities. The rich data online provides exciting opportunities for scholars using the netnography technique across

all disciplines to seek a deeper sense of meanings that are continually being accomplished by social actors penetrating online communications (Bialecki et al., 2017; Costello et al., 2017; Jeacle, 2017, 2021; Aleksandrov et al., 2018; Guo, 2018; Kozinets et al., 2018; Thanh and Kirov, 2018; Wang, 2019). According to Statista (2022), in 2020, over 3.6 billion people were using social media worldwide, and the number is projected to increase to almost 4.41 billion in 2025. Netnography is rooted in traditional ethnography in participants' observation (Zeng et al., 2019), using the information from social media or online communities to study the online traces, interactions, and socialites to understand the norms of behaviour change as technology changes.

Second, is the nature of the emergent research topic. The overall business environment is experiencing unprecedented changes with advancements in technological innovation. The disruption of corporate governance by networks and platforms is still at a nascent stage (Fenwick et al., 2017). The shift to a digital age requires a fundamental transformation of organizations and their operations (Fenwick et al., 2019). Blockchain-based technologies are still considered as an emergent phenomenon (Yin *et al.*, 2019). Extant scholarly literature on blockchain technology is mainly based on conceptual description rather than empirical evidence (Du et al. 2019, Toufaily et al.,2021). The development of today's AI largely depends on scientific developments, the availability of big data, and cheap computer processing power. It is a new technology (Wooldridge, 2017). The diffusion of AI in the public sector is in its nascent stage, and so is the body of research on the phenomenon (Sun and Medaglia, 2019). Furthermore, the integration of AI and blockchain is a fairly new concept and still a largely undiscovered area (Banafa, 2019; Foote, 2019). It is still elusive for many organizations to adopt AI or blockchain technologies due to technical, organizational, and legal challenges (McKinsey, 2020). Organizations need to have the right culture and corporate values to govern the development and deployment of digital technologies (Lobschat *et al.*, 2021) to ensure the ethical use of these technologies (Brennan et al., 2019; Gomber et al. 2018) as machines are unable to make moral judgments (Montagnon, 2019; Clement-Jones, 2020). Additionally, it is acknowledged that AI and blockchain can create salient values for individuals and businesses. They can redefine the nature and scope of our work and social life. Academics, industries, and governments are increasingly interested in exploring the

opportunities and challenges of using AI and blockchain as new technological tools to help organizations to build resilience for the future. Increasingly, social media brings a global community of diverse people who are interested in AI and blockchain. People who come together online can share and exchange their views and ideas on AI technologies or blockchain technologies. Many webinars, panel discussions, and YouTube videos are hosted and posted online as new forms of sharing information on a specific topic relevant to AI or blockchain. These rich online data sources have provided great opportunities for this study to collect relevant online data to gain a deeper understanding of AI and blockchain's impacts on corporate governance in general and the ethical benefits and ethical concerns in particular.

3.3 Data collection

This study integrates netnography and semi-structured interviews to collect relevant data to investigate the ethical benefits of AI and blockchain as well as the ethical dilemmas of using these technologies to further explicates how companies can govern the ethical use of these technologies. The research intends to interact with social actors who have knowledge and experience of AI and blockchain to understand those ethical issues and enhance knowledge accumulation on how companies can govern the use of these disruptive technologies to add value and mitigate misuses and unwanted consequences.

The contemporary communication networks record a significant amount of data that originates in and manifests through the digital traces of naturally occurring public conversations. These conversations can be sound files and audio-visual presentations, videos, texts, or even stories (Jeacle, 2021). Netnography uses these conversations as data (Kozinets, 2020). It is defined as:

> *"Netnography, or ethnography on the Internet, is a new qualitative research methodology that adapts ethnographic research techniques to study the cultures and communities that are emerging through computer-mediated communications"*
>
> (Kozinets, 2002:62)

Compared to traditional ethnography study, netnography is faster, simpler, less expensive and more naturalistic, objective, and unobtrusive (Kozinets, 2002, 2020;

Thanh and Kirov, 2018; Jeacle, 2021). This study extends these online Netnography explorations with online semi-structured interviews to generate deeper insights and understanding.

This research carefully designs and executes the study to rigorously structure the investigation and scientific presentation following a pragmatic, step-by-step netnography and semi-structured interview procedures and guidelines. This study collects abundant video, audio, and textual data from online communications. Five datasets were collected using netnography: 1) 34 LinkedIn Posts with Comments; 2) 12 Webinars; 3) 22 YouTube Videos; 4) 19 Videos; 5) 10 Podcasts. Additionally, 17 semi-structured interviews were conducted using the online platforms of MS Team, Zoom, and Google Meet.

The sub-section 3.3.1 explains the Netnographay approach for data collection for this study. Following on from that, section 3.3.2 illuminates the semi-structured interview approach.

3.3.1 Netnography

This section elaborates on the sampling strategy and pragmatic step-by-step procedures of the netnography approach.

3.3.1.1 Sampling strategy

This study adopts a non-probability purposeful sampling strategy. Non-probability samples are chosen due to three main reasons: 1) the adoption of AI and blockchain is at an early stage with the financial industry at forefront of using the technologies; 2) the opportunity to study a certain group who has the knowledge or experience of investigating or using AI and blockchain technology represents too good an opportunity to miss; 3) it is impossible and extremely difficult to obtain probability sample due to time and costs involved in securing a probability sample is too great relative to the level of resources available. Therefore, purposeful sampling is adapted. Purposeful sampling is that "*sampling is conducted with reference to the goals of the research so that units of analysis are selected in terms of criteria that will allow the research questions to be answered*" (Bell et al., 2019: 391). Sampling in this research is an evolving process with a sequential approach by gradually adding to the sample if it helps the research questions. The unit of analysis in this netnography study is not

the person but the behaviour or the act of posting information on computer-mediated communication channels (Mead, 1938; Kozinets, 2002). Mead (1934) calls the behaviour, the speech act as the “Utterance”. Pragmatically, it means the research focuses on what is said on social media rather than who is saying it. According to Kozinets (2020:203), netnography is all about Utterance, “each photograph, each video, each tag, each comment, each posting of text is an utterance”.

3.3.1.2 Step-by-step procedures of netnography

This study applies Kozinet’s method-embedded research communication triangle, and six step-by-step procedural movements of netgnography to investigate online traces to social media data (see figure 9 below). The specific techniques and the pragmatic step-by-step approach adopted aim to achieve methodological rigour and trustworthiness of the study.

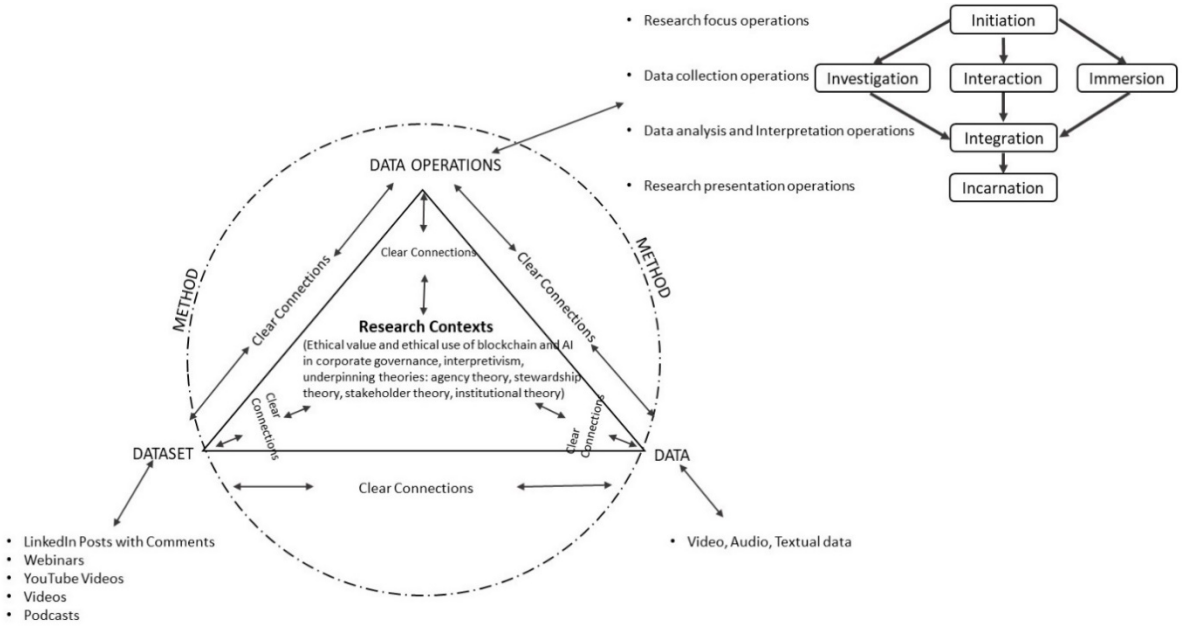


Figure 9 Netnography communication triangle and step-by-step procedural movements (Source: Kozinets, 2020:139, 387)

Kozinets (2020) illustrates four key elements that guide the best practices for approaching contextual and methodological appropriate communication. First, the method of netnography, incorporates a range of culturally and technologically based techniques to gather, create, co-create, and analyse online traces. This approach shares the inductive and iterative aspects of the traditional ethnography approach but distinguishes the traditional approach in terms of cultural focus, the use of social media

data, appropriate engagement, and specification of procedures. Second, netnographic data operations, encompass and justify the procedures used for research focus operations, data collection operations, data analysis and interpretation operations, and research presentation operations. Third: netnographic dataset, which overviews, describes, and justifies the data collected in the project. Fourth, the data, which provides excerpts from data in the context of the overall research presentation.

Pragmatically, this study follows Kozinets' (2020) six procedural steps of netnography operations for data collection, analysis, and presentation to enhance rigour and trustworthiness.

Step 1: Initiation

The initiation stage involves brainstorming many possible topics and approaches, reading, analyzing, and evaluating much extant literature on corporate governance, blockchain, and artificial intelligence. Then it is acknowledged from existing literature that corporate governance will change in many ways with the adoption of AI and blockchain technologies because organizations with current hierarchies or matrix governance structures are no longer fit for today's business environment (De Smet et al., 2021). It is harder for the board to exercise controls and manage new risks without intelligent tools due to the large amount of data generated. Ethics matters when every organization is increasingly becoming a technology organization (Bannister et al., 2020; Sniderman, 2020). Our social norms come to be challenged when technology gets ahead of society (Khanna, 2018). Ethics are particularly important because machines are unable to make moral judgments (Clement-Jones, 2020). Board members must understand how to govern the use of AI and blockchain in an ethical and socially responsible way. This falls into board responsibility for risk oversight on digital transformation. Therefore, this study crafts and hones the research questions on ethical benefits and ethical dilemmas of blockchain and AI use in corporate governance and further explicates how companies can govern the ethical use of AI and blockchain technologies.

The research questions emphasize the focus of this investigation, guided by epistemology philosophy to understand the social world with digital transformation and interpret the social world through human action and meaning-making by its social actors. The advancement in digital technologies such as AI, and blockchain, sets the

condition for disruption or transformation. The world is in the age of disruption that changes the social reality and the psychic (Stiegler, 2019), creating a new epoch for new ways of thinking, living, organizing, and caring (Bishop and Ross, 2021; Reader, 2021). Every organization must empower a thoughtful, careful consideration of the implications of the disruption (Dawson, 2021). This understanding leads the research design to include netnographic inquiry to focus on human experience and cultural understanding of AI and blockchain adoption within an organization.

In addition, at this initial stage, this study pays special attention to the research ethics about ethical considerations and relevant research ethics procedures. First, the researcher has completed University's research integrity courses and is fully aware of research integrity and research ethics. Second, this study has obtained ethics approval from Brunel CBASS Research Ethics Committee (see Appendix 1 for ethics approval). Approval is given for remote research activity only for this study to be carried out between 26/03/2021 and 30/09/2022. This research ensures ethics is embedded throughout the research project.

According to Jeacle (2021), an ethically appropriate procedure for netnography has not emerged. This study follows Langer and Beckman's (2005) view on ethical consideration in netnography. They suggest consent is implicit in the act of posting on a public site. From this perspective, Jeacle (2021:93) suggests "*there is, therefore, no need to gain the explicit consent of online members when using their posts, just provide anonymity to those you quote according to common research practice*". Therefore, this study follows the current consequentialist ethics that govern academic research to weigh the potential for public benefits and the advancement of social and scientific knowledge into ethical decisions and protocols (Kozinets, 2020). In addition, this study also uses deontological ethics to guide the netnography approach. For example, the researcher provides a clear disclosure of research activity on social media along with a profile picture on LinkedIn. This research provides anonymity to informants and properly mentions and references the sources where possible to consider the ownership of data. In addition, all information that is collected will be kept strictly confidential. The data will be kept and stored in the secure password-protected Brunel network drive.

Step 2: Investigation

This stage of investigation identifies the online sites most relevant to study through simplifying, searching, scouting, selecting, and saving processes. Simplifying translates the research questions into searchable terms or keywords, such as “artificial intelligence”, “blockchain”, “corporate governance digital transformation”, and “ethics”, which can be put into search engines. Then the scouting operations involve identifying and making choices about which sites the research will focus on. After spending some time on different social media sites researching AI and blockchain ethical use in organizations, this study decides to focus on LinkedIn, YouTube, and Ted Talks sites, as well as some industry-organized webinars and podcasts for netnography inquiry.

The choices of the above data sites are informed by Kozinets (2002)’s five selection criteria: 1) relevant to the research question; 2) higher traffic of postings; 3) larger numbers of discrete message posters, 4) more detailed or descriptively rich data; and 5) member interactions. In simple words, the five selection criteria are relevance, activity, interactivity, diversity, and richness. Kozinets (2002) suggests for most purposes, the research does not need a massive number of posts, but focuses on quality over quantity, and seeks good reflection of the sort of multi-perspectival and public type of opinion.

LinkedIn is a public platform for professionals. The site facilitates professional networking. There are many professionals like CEOs, legal tech specialists, board & governance advisors, board members, chief operating offers, public policy leaders, AI ethics and regulatory leaders, non-executive directors, etc. This site allows the researcher to follow professionals who regularly post blockchain or AI topics. The influential tech visionary ones have around 775K to 1.4M followers on LinkedIn, who reacts to the posts and comments on them.

Ted Talks is a public site providing influential videos from expert speakers on business, science, tech, and creativity, inspiring conversations with a global community. There are many videos presented by expert speakers such as data and research experts, digital strategists, blockchain entrepreneurs, AI technologists, techno-sociologist, AI experts, data scientists, ethicists, philosophers, etc. Many relevant videos to this study achieve between 1.2M to 5.9M views.

YouTube is another great public site. It is rated the No.1 social media site in America in 2018. It generates 432,000 new hours of utterance and social act-filled video every day, which is 300 new hours of video-utterance every minute (Kozinets, 2020). YouTube contributes to the availability of a large number of videos covering an ever-evolving set of new topics on AI, blockchain, and ethics, in organizations and society. The videos are available for public viewing by anyone, free of charge. Some videos are highly influential as published by some YouTube Influencer who has substantial subscribers.

The relevant posts and comments are copied and pasted into word documents as textual data and saved in the secure password-protected Brunel network drive. The relevant videos details are recorded in an excel document with URL links. Each video is transcribed line by line to textual data, saved in word documents, and stored in the secure password-protected Brunel network drive too.

This investigative data collection is an iterative process until theoretical saturation is met. It is flexible and adaptable to research needs and context.

Step 3: Immersion

The investigative stage results in the research immersion, directed by the research focus on ethical benefits and ethical concerns of using AI and blockchain in corporate governance, to seek quality deep data. Thus, the researcher of this study has deliberately joined some groups or communities such as corporate governance, compliance and ethics professionals; corporate governance-best practice; blockchain in Europe, Artificial Intelligence and business analytics; Information Technology, Fintech, Blockchain, and Bitcoin innovation; blockchain executive, etc, on LinkedIn. Some LinkedIn influential professionals have their own YouTube channels or Ted Talk videos. This immersion expands when professionals on LinkedIn introduce a new webinar event or podcast they are attending. The expanded networks enable the researcher to selectively join webinar events, listen to the podcast, and view any posts, comments, and videos based on the research focus. The Immersion stage is data-centric and enacts data collection and indexing strategies. Therefore, large amounts of textual, and audiovisual data are being examined and noted, selected, and recorded in immersion journals similar to research notes for analysis and reflection. The Immerse journals records 5 datasets: 1) 34 LinkedIn Posts with Comments; 2) 12

Webinars; 3) 22 YouTube Videos; 4) 19 Videos; 5) 10 Podcasts (see table 12 below). These datasets sources are recorded in an Excel document (see Appendix 2 for netnography inquiry datasets source record).

	Datasets	No.	Codes
1	Posts and Comments	34	Post1, Post2, Post3,Post4, Post5…....Post34
2	YouTube Videos	22	YT-V1, YT-V2, YT-V3, YT-V4, YT-V5…...YT-V22
3	Video	19	V-P1, V-P2, V-P3, V-P4, V-P5…...V-P19
4	Webinars	12	Webinar1, Webinar2, Webinar3…....Webinar12
5	Podcasts	10	PODCAST1, PODCAST2,PODCAST3…..PODCAST10

Table 12 Netnography datasets

Step 4: Interaction

The previous immersion stage is largely unobtrusive and non-invasive, but immersion is already a type of interaction. The immersion stage interacts with different social media sites such as LinkedIn, YouTube, Ted Talks, and some industry-organized Webinars and Podcasts. This study then extends the unobtrusive immersion interaction to more obtrusive forms of data collection by commenting on a post, liking a post, or contacting online participants for semi-structured interviews (see more details on online interviewing in section 3.3.2).

Step 5: Integration

"*The lines between data collection, interpretation, and analysis are amorphous in ethnography and netnography. Data is being interpreted, analyzed, and collected almost from the initiatory moment when you decide on sites or topics. That analytical and interpretive activity intensifies as you begin to investigate which sites to research and continues through the various choices, interactions, and immersions of your netnogrpahy*"

(Kozinets, 2020:142)

Therefore, integration is an ongoing process of analyzing and interpreting the data between parts and wholes. The analysis (coding breaks down data into chunks and assigns meaningful labels to it) and interpretation (connecting or combining conceptually related codes to form pattern code) are often iterative and require the researcher to revisit the sites and the literature to collect more data to sharpen the understanding of AI and blockchain ethical impact on corporate governance.

Step 6: Incarnation

The incarnation stage is about communication. It is a process of making sense of and discovering meaning, using evidence from analysis to tell a holistic story to contribute to a deeper level of understanding. Based on the rigorous method of netnography, the netnographic data operations, the netnographic datasets, and representation of the data, the results of the research can be trusted to inform important decisions, inspire further work, and enhance understanding of the ethical benefits and ethical use of AI and blockchain in corporate governance.

This study follows these six procedural steps to ensure methodological rigour in netnography inquiry. Further, this study extends these online explorations with more obtrusive forms of data collection by interviewing online participants.

3.3.2 Semi-structured interviews

Simultaneously, this study also conducts 17 semi-structured interviews with different informants from various sectors to provide as wide a scope as possible for the data collection. Interviews are conducted online using platforms such as MsTeams, Zooms, and Google Meet. These interviews last around 45-90minutes. Majority of them last at least 60 minutes. They are semi-structured with a predefined schedule of nine questions to guide, not dictate, the progress of the interview. Thus, this form of data collection is very flexible, questions can be asked in a different order, and can be dropped or added. The terms generated or issues raised by previous informants are used to frame questions in the later interviews. This allows the researcher to pursue her own agenda whilst being responsive to the participant’s concerns.

This section explains the sampling strategy and procedures for the semi-structured interview approach.

3.3.2.1 Sampling strategy

The sampling strategy of the semi-structured interviews for this study is purposeful sampling. This research follows Lincoln and Guba's (1985) guidelines for strategic and purposive sampling in choosing informants who might most effectively and meaningfully answer the research questions. This study uses informants or participants or interviewees interchangeably. The potential participants are chosen

based on two selection criteria: 1) participant who understands and works with AI and blockchain technologies, are familiar with those two technologies, and can comment on their ethical implications on businesses and people; 2) participant is willing to share their experience, thoughts on how to use these technologies in a socially responsible way to mitigate misuse and unwanted consequences. The initial informants are identified when the researcher is immersed in online investigations. Then this study applies a snowball or chain referral technique recommended by Biernacki and Waldorf (1981), asking each participant for recommendations from his or her network to identify participant who is knowledgeable on the topic and could best explicate the research questions. This approach results in an evolving sample of informants (participants) and increasing focused data relevant to the research questions until this investigation reaches theoretical saturation (Glaser and Strauss, 1967), which means further data collection and analysis yielded no further explication of a given category or theme (Corley and Gioia, 2004).

3.3.2.2 Semi-structured interview procedures

This study designs and conducts interviews online through ten procedure movements under four categories of arranging, scheduling, closing, and transcribing interviews (see figure 10 below). The interviews are semi-structured, and flexible, to learn deep insights from informants by asking them to reflect on their experiences, their thoughts on the ethical benefits and ethical concerns of using AI and blockchain technologies, and how companies can govern the ethical use of these technologies to the benefits of our society.

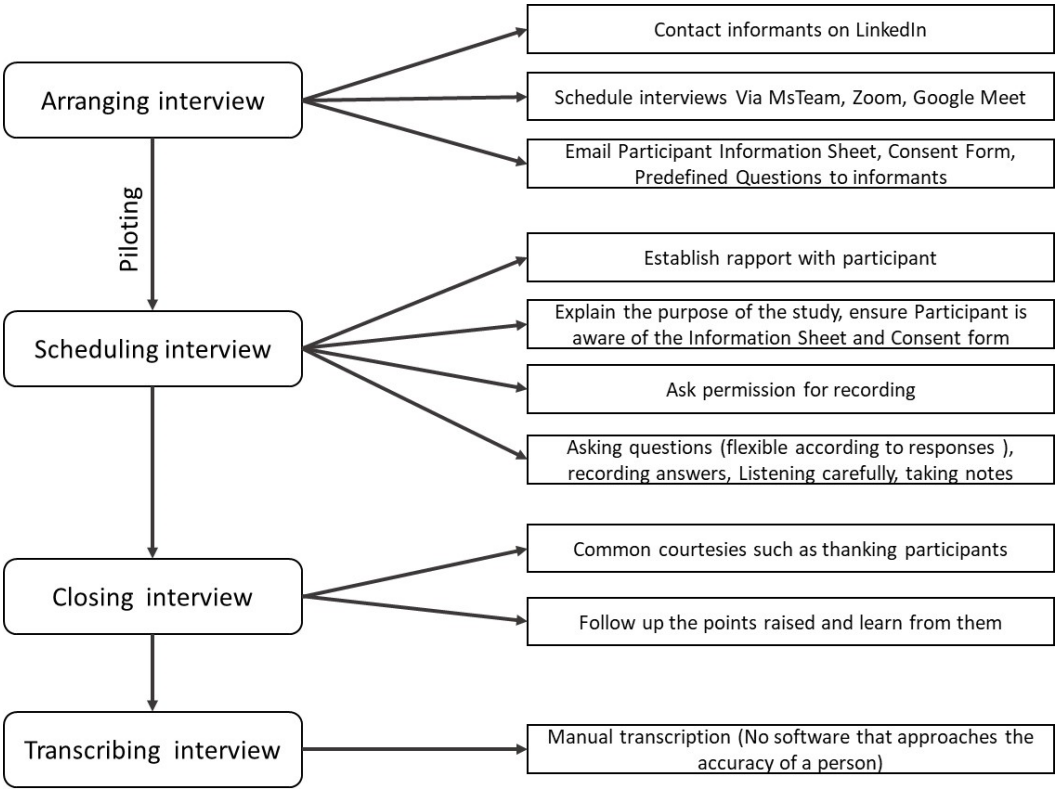


Figure 10 Semi-structured Interview procedures

Before the interview, this study obtained ethics approval from Brunel CBASS Research Ethics Committee to ensure ethics is embedded throughout the research project. In addition, this researcher is fully aware of the research ethics risk assessment (see Appendix 3 for more details on research risk assessment for this investigation). The participant information sheet covers a list of information. For example, what is the purpose of the study? Why have I been invited to participate? Do I have to take part? What will happen to me if I take part? Are there any lifestyle restrictions? What are the possible disadvantages and risks of taking part? What are the possible benefits of taking part? What if something goes wrong? Will my taking part in this study be kept confidential? Will I be recorded, and how will the recording be used? What will happen to the results of the research study? Who is organizing and funding the research? etc. (see Appendix 4 for participant information sheet for detailed information on these questions). In addition, this study designs the Consent Form that outlines the informed consent of an interviewee for participating in this PhD study (see Appendix 5 for the consent form). Furthermore, the interviews are semi-structured with nine predefined questions (see Appendix 6 for guided interview questions). All these documents are prepared in compliance with university research ethics guidelines.

The initial informants are identified when the researcher is immersed in online investigations. Then this study uses a professional network platform- LinkedIn, to make a connection with those potential informants, clearly state research purposes, and ask if they would be interested in participating in a semi-structured interview for this PhD study. Therefore, this study makes the initial contact on LinkedIn. Once the informant agrees to be interviewed, emailed contacts are exchanged, and the interview date and time are scheduled. Meeting invitations are sent via MsTeam, Zoom, or Google Meet depending on the informant's preference. Then participant information sheet along with the consent form and predefined interview questions are emailed to the participant as soon as the meeting invitation is sent. Anonymized data will be analyzed and used in this investigation (see table 13 below for the list of interviewees).

Informants	Gender	Expertise	LinkedIn	Country	Meetings
IntvP1	M	Corporate Law, legal Tech	500+connections	Belgium	Zoom
IntvP2	M	C-level Executives	500+connections	Germany	Zoom
IntvP3	F	Regulatory	500+connections	Belgium	Zoom
IntvP4	F	Banking, Financial, AI, Board	8,323 followers	UK	Zoom
IntvP5	M	Technology	3,408 followers	UK	GoogleMeet
IntvP6	M	Blockchain	5,625 followers	UK	Zoom
IntvP7	M	IT governance, Account Tech	500+connections	USA	Zoom
IntvP8	M	Corporate governance, digital, policy	4,245 followers	London	MsTeam
IntvP9	M	Policy and governance of Algorithmic systems	8,778 followers	London	MsTeam
IntvP10	M	Account Tech, FinTech, Innovation	5,704 followers	Netherlands	MsTeam
IntvP11	M	AI ethics, governance, trust	2,152 followers	USA	Zoom
IntvP12	M	AI ethics, leadership	9,199 followers	USA	MsTeam
IntvP13	M	Blockchain, social media	500+connections	Netherlands	MsTeam
IntvP14	M	Ethics, AI ethics, responsible AI, machine learning	14,104 followers	New York	Zoom
IntvP15	F	Blockchain, DeFi, Board advisory	24,022 followers	Australia	MsTeam
IntvP16	F	Cybersecurity, AI risks, governance	13,775 followers	New York	MsTeam
IntvP17	M	Ethical social-technical systems	500+connections	UK	MsTeam

Table 13 Interview participants' information

The selected multiple informants are uniquely qualified to answer the research questions about the issues under investigation. 13 of them are male and 4 of them are female. 64.72% of them have 20-30 years of work experience and currently are involved in dealing with the use of disruptive technologies such as AI and blockchain technologies in organizations. 11.76% of them have 30-40 years of work experience of work. 5.88% of them have more than 40 years of work experience (see figure 11 below). Most of them have worked as or are involved in working with executive board members. This study uses their length of work experience, current knowledge, and expertise as the specific measures of their competency.

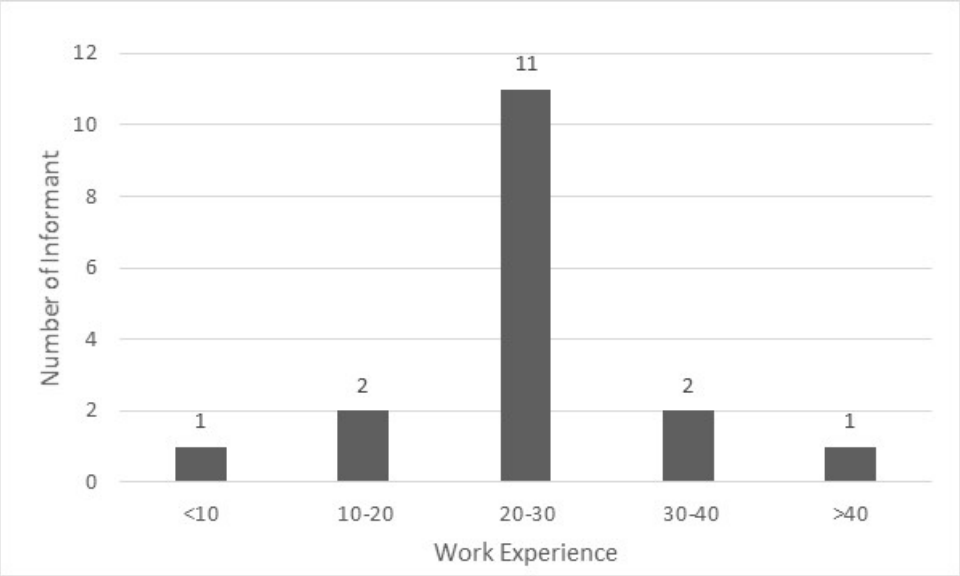


Figure 11 Informants' length of work experience

Before the actual interviews, the investigator pilots interview schedules with alternative participants like colleagues and friends, to practice interview techniques and adjust. Every interview begins with informal conversations to establish rapport with the participant. Then the investigator briefly explains the purpose of the study and ensures the participant is fully aware of the participant informant sheet, consent form, and predefined questions.

Before asking any questions related to this study, the investigator seeks permission from the participant to record the interview for analysis and interpretation of this study. The questions asked are very flexible in different order. Notes are taken during the interviews (see Appendix 7). Questions are dropped or added in response to the flow of the conversation. This allows the investigator to pursue her own agenda whilst being responsive to the participant's insights. The researcher listens to the informant carefully and offers greater freedom of movement in response. The emphasis is on how the informant frames and understands the ethical benefits and ethical concerns of using AI and blockchain technologies in organizations, to help explain and understand patterns and forms of behaviours that are important to govern the use of these disruptive technologies.

When the interview finishes, the investigator thanked the informant again for participating in the study. Any points raised by the previous participant are used to form the questions for the next participant to ask his or her opinions on that. After the

interview finishes, the researcher spends substantial time transcribing the video interviews into textual data. This study uses manual transcription because no software approaches the accuracy of a person (Bell et al. 2019). Thus, sometimes, the manual transcribing interview takes longer than the suggested 5-6 hours for every hour of speech. However, transcribing interviews verbatim enhances the validity and trustworthiness of this study. The entire procedure involved an iterative process of simultaneously collecting data, analyzing the data, and seeking new informants based on information deemed important by prior informants until further interviews yield no further explication of a given category or themes.

In the light of the above, this study collects various textual, video, and audio data from netnography and semi-structured interviews. This research follows pragmatic, step-by-step procedures for data collection to ensure rigor in the investigation to enhance the trustworthiness of this study. The following section illustrates the thematic data analysis of the data collected.

3.4 Data analysis

The data collected through netnography and semi-structured interviews are concurrent with data analysis and interpretation to reveal the rich insights from the data. The entire procedure involves an iterative process of simultaneously collecting data, and analyzing the data until theoretical saturation is achieved. This study collects 34 Posts & Comments, 12 webinars, 22 YouTube videos, 19 videos, 10 Podcasts, and 17 Interviews (see figure 12 below). This research follows Corley and Gioia's (2004) study, inductively analyzing the data once it is collected, adhering closely to the guidelines specified for methods of naturalistic inquiry and constant comparison techniques (Glaser and Strauss, 1967; Lincoln and Guba, 1985). These approaches provide the basis for rigorous data collection and analysis to determine if more data needs to be collected (Corley and Gioia, 2004). These techniques used for data analysis were not a linear process due to the large corpus of textual, and audio-visual data. Instead, it is a recursive process (Locke, 1996), where analysis is back and forth throughout the data collection and analysis phases (Braun and Clarke, 2006).

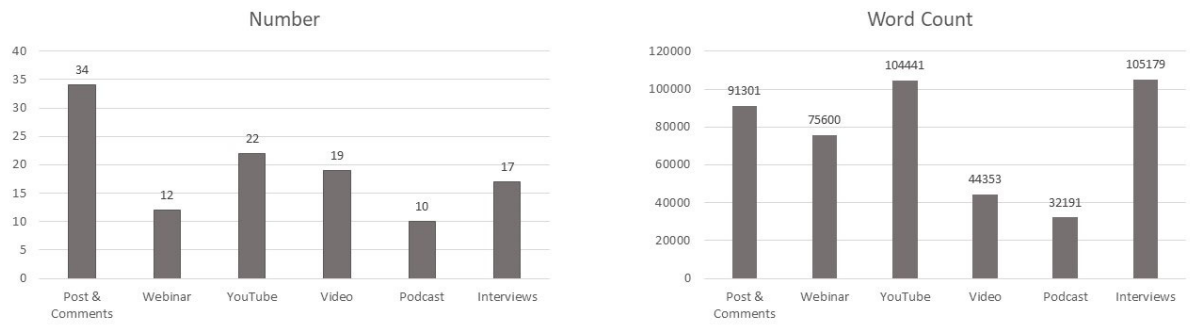


Figure 12 Final datasets

Among them, the audio-visual data account for 50.45 hours of recordings, which have been manually transcribed into textual data as soon as they have been collected. Together with other textual data, this study analyses 453,065 words in total. These data are analyzed using Nvivo 12, a qualitative data analysis application for organizing, analyzing, and visualizing data to code sources and capture ideas for thematic analysis in this study.

Nvivo is the most common qualitative data analysis software (Whalen, 2018). Thematic analysis is one of the two most used strategies for qualitative data analysis (Bell et al., 2019). In addition, Whalen (2018) finds a variety of broadly constructed data analysis techniques such as content analysis, discourse analysis, textual analysis, mapping, and grounded theory, but she finds thematic analysis dominant among them at 46% of publications in the field. Thematic analysis is a useful and flexible method for analyzing qualitative data (Braun and Clarke, 2006) that is an appropriate approach for this study to analyse large or small qualitative data collected from netnography and online semi-structured interviews.

Subsection 3.4.1 below briefly explains the thematic analysis approach. Following on from this, section 3.4.2 describes the thematic analysis procedures followed by this study to enhance qualitative rigor.

3.4.1 Thematic analysis

Thematic analysis is "*a method for identifying, analyzing and reporting patterns (themes) within data*" (Braun and Clarke, 2006:79). This approach offers a useful and flexible method for analyzing qualitative data and involves searching across datasets to find repeated patterns of meaning. The method can be used to reflect reality to understand and interpret reality. It encompasses many of the operations of data

analysis and fits well with the interpretation of qualitative social media data, to quest for unifying ideas to guide the discussion (Kozinets, 2020). The thematic analysis follows the general coding and categorizing principles of open coding, and axial coding, and searches for relationships between and among these categories to assemble them into higher-order themes, then gather similar themes into overarching dimensions to form the basis of an emergent framework (Corley and Gioia, 2004). The endpoint is the reporting of the content and meaning of patterns (themes) in the data (Braun and Clarke, 2006). This is done to illustrate a progression, as analysis advances, to more thematic ideas (Gibbs, 2021) emerging from data to help understand and interpret ethical benefits and ethical concerns of using AI and blockchain within an organization, and how companies can govern the use of these technologies in an ethical and socially responsible way. The following section illuminates the thematic analysis procedures followed by this study.

3.4.2 Thematic analysis procedures

This study follows Saunders et al.' (2019) four procedures for thematic analysis throughout the iterative data collection and analysis phases (see figure 13 below), to ensure data analysis is conducted more deliberately and rigorously that is theoretically and methodologically sound (Braun and Clarke, 2006).

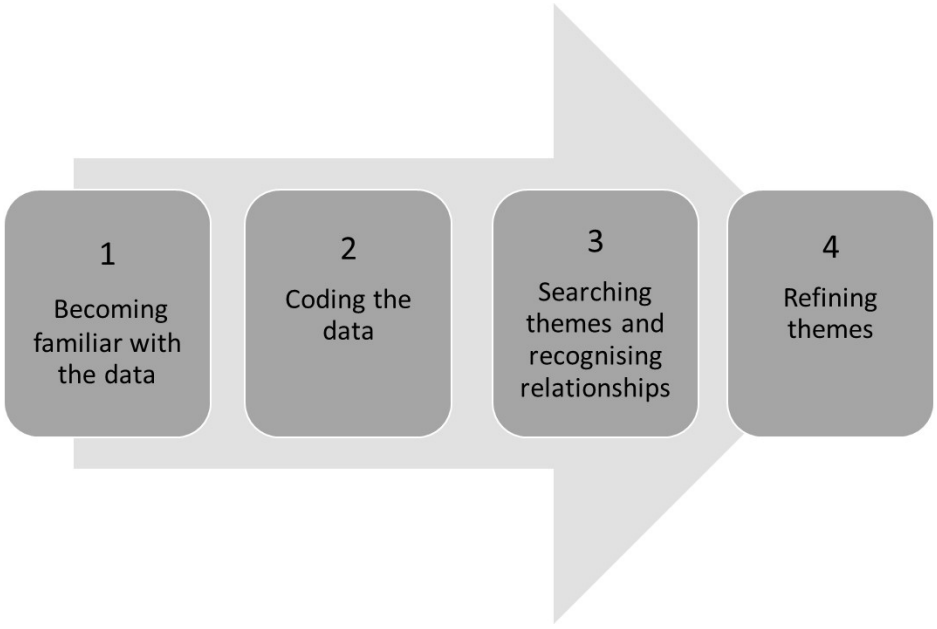


Figure 13 Thematic analysis procedures (Sources: Saunders et al.2019:652)

The whole analysis is not a linear process of simply moving from one phase to the next (Braun and Clarke, 2006). It is a recursive process, that moves back and forth throughout the iterative data collection and analysis phases. This study follows the studies of Corley and Gioia (2004); Gioia, et al.(2013), and organizes the data into 1st and 2nd order categories to facilitate their later assembly into a more structured form. The identification of a theme is a stage or two further on from coding data in terms of initial open codes (Braun and Clarke, 2006).

Step 1: Becoming familiar with data

This step starts with the process of collating the data and getting it into a form that can be coded. This study prepares and saves all the data in textual format in Word documents so that the data can be easily read and coded (see Appendix 8 for data files imported in NVivo). This study imports all the word documents in Nvivo to code. Coding is accomplished through nodes in Nvivo. Then, the investigator reads and re-reads the data several times to become familiar with the data. The researcher reads the data as a whole first to seek what views the data tell. Later, the researcher reads the data again and codes the data to sharpen the understanding of the data (see Appendix 9 for evidence of an example of coding visualized in coding stripes). The process is iterative and continues throughout the research project to enable the researcher, to become familiar with data, and to look for meanings, and recurring patterns in the data for analysis and interpretation.

Step 2: Coding the data

Coding lies at the heart of the thematic analysis. It is a way to reflect and discover meanings to identify patterns across the various elements of the datasets (Kozinets, 2020). It enables the researcher to retrieve the combined texts being coded under the same-named category nodes, to analyze and compare the data in a structured way (Gibbs, 2021).

This study starts with an open coding process (Strauss and Corbin, 1998) in this 1st-order analysis (Corley and Gioia, 2004). In this stage, the researcher manually codes the texts line-by-line and tries to adhere faithfully to informant terms (Gioia et al., 2013). This is one of the advantages of line-by-line coding. It forces the investigator to pay close attention to what the respondent is actually saying and to construct codes that reflect their experience of the world. The idea is to impose analytic thinking whilst

keeping close to the data (Gibbs, 2021). This practice enables constant comparison (Glaser and Strauss, 1967) between nodes coded to help understand the distinctive and significant meanings behind the surface text.

At this stage, little attempt is made to distill category nodes. The researcher identifies chunks of text which can be phrases, sentences, several sentences, or even paragraphs to which code applies, and groups the text that explains, implies, or exemplifies the same thing to the same-named node (fragmenting original data). Therefore, the initial opening coding of the total of 453,065 textual words from 6 datasets, has generated 742 Nodes (see Appendix 10 for evidence of initial codes). It is pretty normal that the sheer number of nodes (categories) initially becomes overwhelmingly emerging from the data (Gioia, 2004; Bell et al., 2019).

After this initial line-by-line coding, this study refines the actual nodes and rearranges them into 35 1st-order concepts relevant to research questions. Refining makes initially descriptive nodes more analytic because passages coded may overlap and be given different nodes. After refining the nodes, this study reviews the nodes and eliminates repetition and similar nodes to group them (regrouping data with similar meanings, see Appendix 11 for evidence of regrouping codes).

Step 3: Searching themes and recognizing relationships

As the research progresses, this study starts searching for similarities and differences (relationships between and among these categories) to combine conceptually related nodes to form new, higher-order elements in this 2nd -order analysis (see the results chapter 4 for more details). This is similar to Strauss and Corbin's (1998) notion of “axial coding”. That is a type of second-order coding that reveals more abstract structures and patterns that reduces the categories (nodes) to a more manageable number of 12 2nd-order themes. In deriving these higher-order pattern codes (themes), the development process is not linear but, instead, forms a “recursive, process-oriented, analytic procedure” (Locke, 1996:240). It is guided by the notion of “theoretical saturation” (Glaser and Strauss, 1967; Eisenhardt, 1989; Pan and Tan, 2011), when researchers “gather data to the point of diminishing returns, when nothing new is being added” (Bowen, 2008:140). In this 2nd order analysis, this study follows the advice from Gioia et al. (2013) to focus particular attention on nascent concepts, or existing concepts that leap out because of their relevance to a new domain.

Step 4: Refining themes

As the analysis progresses, this study continues to examine the codes, and themes, to develop a well-structured analytical framework consisting of several overarching dimensions. This process involves refining the themes to form a coherent set of relationships to guide the analytical process. This study follows the study of Corley and Gioia (2004) and groups the emergent 2nd-order themes even further into 2nd-order "aggregate dimensions". Then this research builds a data structure consisting of 1st-order concepts, 2nd-order themes, and aggregate dimensions (see results chapter). This data structure provides a graphic representation of how this study progresses from raw data to concepts and themes in analysis to demonstrate rigor in research. The final data structure summarizes and marshals the 2nd order themes on which this study built the thematic framework for the corporate governance transformation with the ethical use of AI and blockchain technologies (see results chapter).

3.5 Research quality

This study applies Lincoln and Guba's (1985) quality criteria in this qualitative research to ensure this investigation is trustworthy in terms of credibility, transferability, dependability, and confirmability.

- ***Credibility*** *parallels internal* ***validity****- i.e. how believable are the findings?*
- ***Transferability*** *parallels external* ***validity*** *– i.e. do the findings apply to other context?*
- ***Dependability*** *parallels* ***reliability****-i.e. are the findings likely to apply at other times?*
- ***Confirmability*** *is concerned with* ***objectivity****- i.e. has the investigator allowed his or her values to intrude to a high degree?*

(Bell et al., 2019:48)

Following Lincoln and Guba's (1985) quality criteria, this study took several steps to ensure the trustworthiness of our data.

The first is about the researcher. The investigator is committed to incorporating relevance and rigor in designing, conducting, and reporting the research, which would enable better knowledge accumulation.

The second is about the rigorous data collection process. This research follows pragmatic, step-by-step procedures for data collection through netnography and semi-structured interviews to ensure rigor in the investigation to enhance the trustworthiness

of this study. Based on the rigorous method of netnography, the netnographic data operations, the netnographic datasets, and representation of the data, the results of the research can be trusted to inform important decisions, inspire further work, and enhance understanding of ethical benefits and ethical use of AI and blockchain in corporate governance. This study ensures complete records of netnography datasets are kept throughout the research process. Additionally, this study selected multiple informants based on their knowledge and expertise, and work experience relevant to the issues under investigation and they are willing to communicate about them. The researcher meticulously managed the data, including contact records, interview transcripts, field notes, and documents, as they were collected.

The third is about good thematic analysis to ensure rigor. This study follows Braun and Clarke's (2006:96) checklist of criteria for good thematic analysis to ensure the trustworthiness of the study, and to ensure the concepts used in the report are consistent with the epistemological position of the analysis. This study ensures the data have been thoroughly managed, saved, and recorded. The visual-audio or video data (collected through both netnography and online interviews) have been manually transcribed verbatim to ensure an appropriate level of high accuracy. Each data item has been given equal attention in the line-by-line coding process. The coding process has been thorough, inclusive and comprehensive. All relevant extracts from 1st-order concepts have been collated to each 2nd-order theme. Themes are internally coherent, consistent and distinctive, have been checked against each other and back to the original data set (see Appendix 12 for evidence of an example of original data extracted from the NVivo node). Data have been analyzed and interpreted to make sense of meanings rather than just paraphrased or described, to tell a convincing and well-organized story about the data and topic, and to ensure a good balance between analytic narrative and illustrative extracts. Overall, this study follows step-by-step procedures that are methodologically sound. Enough time has been allocated to the iterative process of data collection and data analysis. The analysis moves back and forth to the point when theoretical saturation is achieved. The data structure extracts from data in this study illustrate the analytic claims that match the analysis and data together, to ensure a good fit between described method and reported analysis are consistent.

Finally, this study uses peer debriefing suggested by Corley and Gioia (2004), which entails the field researcher vetting the ideas through other researchers such as supervisors and other doctoral researchers to gain an outsider's perspective to assess whether the results were plausible.

Chapter 4 Data analysis and findings

This chapter details the findings and collates similar themes identified from the data into several overarching dimensions that make up the basis of an emergent thematic framework. The narrative of the findings is constructed from the data collected purposefully for this study from a combination of netnography inquiry and semi-structured interviews. The results that emerged are from the empirical and analytical procedures outlined in the previous chapter. The thematic framework of the corporate governance transformation with the ethical use of AI and blockchain technologies developed signifies the substantiation of the main findings as a result of this study. The findings empirically explicate the ethical benefits, ethical concerns of AI and blockchain use in corporate governance, and how companies can govern the use of these technologies in an ethical and socially responsible way, to mitigate bias, misuse, and unwanted consequences.

As outlined in the previous chapter, the data collected through netnography and semi-structured interviews are concurrent with data analysis and interpretation to reveal the rich insights from the data. The entire procedure involves an iterative process of simultaneously collecting data, and analyzing the data until theoretical saturation is achieved. This study collects 34 Posts & Comments, 12 webinars, 22 YouTube videos, 19 videos, 10 Podcasts, and 17 Interviews. The audio-visual data account for 50.45 hours of recordings, which have been manually transcribed into textual data as soon as they have been collected. Together with other textual data, this study analyses 453,065 words in total. These data are imported into and analyzed using Nvivo 12. This study conducts a word search once further data collection and analysis yielded no further explication of a given category or themes (see figure 14 below).

Figure 14 Word frequency query result

The word search result indicates the most frequently talked words in our datasets such as “data”, “technology”, “people”, “company”, “ethics”, “systems”, “humans” etc, which are very relevant for this inquiry to understand the technological impact in organizations as they transform digitally, especially the ethical considerations of using these technologies that affect people’s jobs and the way of doing things.

In this findings presentation, this study integrates and marshals four data displays: a) the findings narrative itself throughout this chapter, b) the supporting data with representative quotations to each theme in table 14; c) the progressive data structure (1st order concepts, 2nd order themes, aggregate dimensions) in figure 15, and d) the emergent thematic model in figure 16. This chapter clearly articulates each theme identified from the data and progressively collates similar themes into several overarching dimensions that make up the basis of an emergent thematic framework as a result of this inquiry. This way of reporting findings makes it easier for the interested reader to discern the evidence of the findings

Therefore, this chapter is divided into two main parts. Section 4.1 outlines the themes identified from the thematic analysis of the data collected purposefully for this inquiry. This section is then organized into sub-sections to analyze and interpret each theme with supporting evidence of representative quotations from the informants, and further,

this study builds a data structure to make a meaningful and insightful understanding of the data. Following on from this, section 4.2 explicates the thematic framework developed from the data as the main findings of this investigation. The thematic framework of the corporate governance transformation with the ethical use of AI and blockchain technologies explicates the ethical benefits, the ethical concerns of using AI and blockchain, and how companies can ethically govern the use of AI and blockchain to drive growth and sustain their businesses.

4.1 Thematic analysis: themes identified

Following the step-by-step thematic analysis procedures outlined in the previous chapter, this study refines the data codes and identifies 12 themes that are relevant and appropriate to provide a holistic understanding of the research questions under this investigation. Further, this study refines the themes into three dimensions, which form three sub-sections to present the analytical results from the data. Sub-section 4.1.1 explains the triggers of corporate governance change. Sub-section 4.1.2 illustrates the corporate governance change context with the use of AI and blockchain technologies. Sub-section 4.1.3 elucidates the imperative corporate governance response to the ethical use of AI and blockchain technologies. Each dimension contains relevant themes that are individually explained in each sub-section. The supporting data with representative quotations to each theme are summarized, and further, this study builds a data structure to make a meaningful and insightful understanding of the data at the end of this section.

4.1.1 Triggers of corporate governance change

Three specific themes related to the triggers of corporate governance change according to informants' views and experiences: 1) change in social reality, 2) current business problems, and 3) blockchain and AI for fraud detection.

4.1.1.1 Change in social reality

Today, we live in a digitally connected world. There is no better alternative, digitalization is in public discourse. We have to live with digitalization, which means we have to understand it and have an ethical reading of this process and our

responsibilities. Digitalization has created a virtual world based on data, graphs, and all kinds of the matrix. This world is a selective reflection of reality (Webinar1). Now, we live alongside non-human systems, surrounded by technology that is on all the time (YT-V7). We have increasingly sophisticated analytic technologies and methods to turn our data into business value (POST13). Most people don't realize that AI is already part of our life, in Gmail, Facebook, Netflix, Navigation, etc. (IntvP7). The technology is so convincing some people get emotionally connected to their Robo dogs (POST2). Many artificial intelligent entities such as chatbots, and digital assistants can emulate certain human abilities (POST17). AI is currently used in transaction monitoring, risk assessment, and credit-based decisions. It is going to be embedded in every digital product and service on a go-forward basis to be readily accessible to everyone (Webinar8). We now have an Internet of value enabled by blockchain that gives us another opportunity to exchange any asset that is of value, rewrites the economic power grid and the old social order, decentralizes control and removes information asymmetries (POST9). We see gamification in the financial markets, young people enter the investment market, they use apps, social media, and financial influencers, they join on platforms, and they could drive the market differently from what the regulations applied for (Webinar4). Nowadays, if you have a good idea and you can get followers on the Internet, you can be as powerful as anyone, like social media has really changed who we listen to (IntvP15). The young generation takes up the virtual economy (IntvP10). Slickness, speed, and automation are changing the human experience. The change will be huge. It involves cultural change, process change, and workflow change (Webinar7). Boards today are using several types of technologies in their work, some of the pieces of technologies are focused specifically on the mechanics of board meetings, using secure board communication platforms, that allow directors to communicate with each other securely online, allow them to accurately archive minutes by company secretary to ensure everything they need to comply with (Webinar2). The required changes will not only significantly transform the entire business, but also these support functions. For example, the job roles of accountants, auditors, and financial experts of old will need to change, which means different hiring strategies, and business schools would have to prepare people for the market differently (IntvP2).

We should start thinking about how our social structures and economic structures are going to adjust to the new realities (V-P12) in the changing human experience, digital platform business models, new future of work, and sustainability (YT-V15). Companies are imperative to respond to these changes. They should have the right ethics, values, and cultures to guide the digital transformation to enhance ethical practice and mitigate any misuse and unwanted consequences. Companies need to assess, evaluate and adopt the right technological tools, that are ethically designed for the right intent for the ultimate use, through rigid implementation with appropriate checks and balances, and safeguards in place, to have a sustainable impact that is good for society.

4.1.1.2 Current business problems

Today businesses are going through very manual and burdensome processes that are prone to human errors in recording, validating, and verifying transactions, especially those large corporations that trade across multiple jurisdictions (Webinar8). In many companies, they have to manage all of the different vendors across global value chains. All of these vendors. They don't have the same database. They use different infrastructures. Thus, it becomes really hard to see transparency as a product like a smartphone evolves (V-P6). Many businesses are reliant on physical record-keeping, note-taking, filling out paper forms, or ticking checkboxes on hard copy documents that are then filed away and forgotten about. Business processes often involve creating or capturing data in a way that is siloed and difficult to access, analyze or act on outside of the process for which it was created (POST14). These opaque processes have created opportunities for management to manipulate financial statements, asset misappropriation, and conduct unethical behaviours and wrongdoings. In addition, "*the more centralized control, the greater the potential for unethical behavior. Because you have a few people who become those actors who have more access to run the system, they can act without checks and balances*" (IntvP17).

Using the accounting and auditing function as an example, there are lots of pain points, such as manual work, human error, and the need for reconciliation, checking, and validating information (IntvP7). If you look at the way an audit comes together today, it hasn't changed in 25 years. Firms have added technologies and replicated their

paper process. Financial users are using historical financial statements for decision-making. And it took a long time to have an auditor's opinion after the financial year-end (PODCAST9-1). The problem with auditing: 1) too much focus is on transactional testing which is picked at random, the actual subjective parts are never really challenged. 2) The Tick-box sampling methods were tedious and invariably found nothing. 3) Samples will often be re-picked when issues arise. 4) Large accounting firms like the Big 4 are hugely influential in standard-setting and regulation, they often earn 2/3 of their fees from non-audit work. 5) No audit firm can ever get close enough to its client to be confident that it will discover things that management or others within the company want to hide (POST24). It is difficult for auditors because the people who pay the auditors are the people auditors are in theory trying to catch (IntvP5). In addition, directors can manipulate accounts by using aggressive and questionable accounting policies without consequences. Transactions are recorded in different ledgers, it is difficult for auditors to detect material fraud due to opaque processes. "*I think partly this is because of the ethical challenges around Greed*" (IntvP5). Furthermore, in this digital world, no one, no business, is completely safe from the new wave of fraud. Criminals are exploiting the convergence of social media, technology, and social engineering to create more potent and widespread scams (PODCAST7).

To stay relevant in this digital transformation, companies are increasingly seeking new ways to record, check and validate information immediately, and gain a sense of anomaly activities using technologies such as blockchain and AI, to reduce information asymmetry and enhance transparency. Audit evidence standards must be modernized to move down the path to real-time auditing and monitoring and focus on accuracy, completeness, susceptibility to bias, authenticity, all those types of things, to detect material fraud as an audit requirement (PODCAST2).

4.1.1.3 Blockchain and AI for fraud detection

In today's world, "*transactions that are recorded this morning can spit out if there's an anomaly associated with it for quick review this afternoon….we're getting into a stage where a continuous assurance can actually be given and spit out onto a website or to a very, very tight blockchain supply channel so that they can rely on what's really*

happening today, not just within the company, but with the third parties that are working with the company as well" (PODCAST6).

Blockchain and AI technologies can offer some technical solutions to address these issues that businesses are currently facing. As we all know, financial fraud, like the WireCard type of fraud, where the management takes a deliberation on ethical and dishonest position and makes decisions to increase the value of the company based on fraud, is damaging the company and harming the economy and job security. Now, technological tools such as AI and blockchain can make management wrongdoings hard to hide so they would have to think carefully about their unethical behaviours.

AI can be used to analyze a large amount of data, identify patterns, and detect anomalies. "*Machine learning can be helpful to highlight outliers that could be a sign that something odd is going on, as it's able to correlate many different factors and draw up a more accurate picture of which activity is simply unusual and what might constitute a serious threat that requires remedy*" (POST30). When you use AI for everything, you create a trail of activities, which makes you more transparent and the activities become more transparent and can be easily scrutinized. "*AI technology has enabled us to put a mirror in front of us…can protect the companies from managerial fraudulent activities…lying in the age of AI as a corporate or as a startup, that is a short living environment*" (IntvP4). "*We definitely done some fraud detection work within financial services organizations, definitely done some pattern analysis, work with security organizations looking for unusual communication signals*" (IntvP5). If we do it right, there is such immense value for everyone (IntvP16). If AI is used with the right intention and has a range of checks and safeguards in place, there are opportunities for ethical improvement (IntvP14). If AI works properly, it has the potential to make decisions, or make calculations more consistent than humans. "*It could result in fair and more ethical decisions, certainly ethically consistent decision, provided you have the confidence around how it is designed and operated in the first place…some of my friends seen AI is beginning to be used to spot patterns of transactions that sort of things, which can also slush out frauds*" (IntvP8).

Blockchain can help to check and validate the information immediately or give you a sense of anomaly activities (IntvP7). In theory, any suspicious fund transfer will be

detected in real-time on the blockchain. Further, a blockchain-based repository for financial statements, part of the functional blockchain repository is that auditors can stamp and provide their assurance there. People with different needs can go back to the blockchain to retrieve the statements and view the actual transactions. This could increase the trust level of an audit report that is published because you can track the records in real-time, whether or not, the auditor's sign-off is actually valid. The interested third parties such as lenders or banks can access and get the information from the blockchain repository instead of getting it from business owners. Blockchain has the potential to create ethical value for instance by creating more visibility and traceability of transactional data (PODCAST10). Blockchain can automate some of the tasks using smart contracts. It can provide an audit trail, which will make the auditors' job much easier so that they can perform their fiduciary role more objectively. Because blockchain makes it hard to alter and manipulate ledger entries (IntvP8).

Blockchain resonates very well with the concept of trust (Webinar12). The trust is huge with a decentralized consensus mechanism enabled by blockchain technology. This is a new phenomenon where AI will assist with new transparency and push back against the activities that aren't very good that have been hidden in a human-centric system previously. It will now be exposed in the human-machine systems. "*The use of the technology will enhance a bit of ethical practice of corporate leadership and the top management…as the distributed control of the new form of organization will give a different degree of checks on each other* " (IntvP12). "In theory, the technologies could reduce the sort of financial fraud" (IntvP8). It can be used as a "surveillance" for the board to oversee the ethical behaviour of those C-Suit directors and management. The advantage of blockchain or decentralized autonomous organization (DAO) powered by blockchain, is that you know the activities are managed through effective smart contracts. So that you can't just as an individual pay yourself loads of money. "Should technology reduce the fraud, that's the theory behind it" (IntvpP17). The trust is provided by mathematical algorithms, and by real proof (Webinar12). Blockchain provides a new way of increasing transparency and reducing information asymmetry (IntvP1).

However, "*All transparent systems are at the mercy of bad actor*s" (IntvP11). "*I think partly this is because of the ethical challenges around greed*" (IntvP5). "*I think it will*

be harder but I always think as a kind of if someone will do that type of staff will always find a way to do that stuff" (IntvP7).

"*The problem with fraudsters, they are incredibly clever, they will find the way. It will just push fraudsters somewhere else inevitably. But it just becomes just sort of arms race of whose detection of prevention measures can develop faster than fraudster's ability to create schemes of ways of extracting value*" (IntvP8). "*These technologies will push organizations to adopt more decentralized systems and ways of operating, I hope, bring about with it more transparency, and create less opportunity for the kinds of unethical behaviour we're seeing at the moment*" (IntvP17).

"*Let's say by the increased transparency by using these technologies, this could enforce more ethical behaviour, On the other hand, it could, if people want to behave unethically, they will. And human nature and human beings have the tendency to be weak. Technology is uncovering unethical behaviour, like security cameras. There will be intelligence criminals who will try to circumvent this with other technology. There could be short term benefit until the ethics find the ways around the algorithms and know how to play with them*" (IntvP2). It sounds tempting that a decentralized protocol powered by blockchain technology that enhances transparency would foster ethical practice in financial reporting and disclosure and restore trust in the public. In reality, companies need to be cautious and bear in mind that any system is only as good or strong as it is. It could be seen as strong, but as we know, the password can be hacked, and two-way identification can be hacked. It is worth not relying on it blindly.

The next section illuminates corporate governance change context with the use of blockchain and AI.

4.1.2 Corporate governance change context

Four specific themes related to corporate governance change context according to informants' views and experiences: 1) structural change, 2) new capabilities, 3) ethical concerns of automated systems, and 4) adoption challenges.

4.1.2.1 Structural change

The old way of companies building their own systems with very high transaction costs and friction and inertia between companies just doesn't work for a lot of the problems. The hierarchical structure that we designed years ago is no longer fit for today's organization. We need to solve and look at distributed ledgers and other technologies that reduce the transaction costs for cross-company connections (YT-V15). "*Many companies have been trying to become less bureaucratic, to have fewer central rules and procedures, more autonomy for their local teams to be more agile*" (V-P4). "*The change will be much bigger than the changes come out of the implementation of ERP systems 20 years ago, which they just replicated the brick and mortar, now with blockchain, there is no central data repository, everything is decentralized, so the entire structure of a company will be totally new*" (IntvP2). What we are going to start to see is organizations coming to grips with the fact that AI and blockchain will automatically negotiate contracts, automate business processes, and provide insights for new products and services. Therefore, there is a whole governance change around how organizations work around that (IntvP12).

"*I believe that AI and blockchain are causing the structure of organizations to change. So both of these are network technologies. They work decentralized. They work best when used by organizations that are not rigid, hierarchies of command and control. So the technologies themselves are forcing organizations to adapt to their culture and their structure… I hope, will naturally become more open to diversity, more open to different opinions…if I was in an optimistic mood, I would say that we should see organizations that become more decentralized and begin to outperform old centralized organizations…we can monitor the decision flows and processes of thousands of semi-autonomous entities that are operating in hundreds of jurisdictions, not just the actions of a few leaders within one big organization* " (IntvP17)

Technology cannot deliver solutions without an overhaul of business practice, which requires a business process re-engineering across the organization. It is "highly advisable to start by impending a data governance framework, that ensures that silos are torn, data assets are identified and there is a single source of truth for each data set" (POST14). Decentralized autonomous organizations (DAO) are in an

experimental phase, running an organization by code, and different people are building these DAOs in different ways (IntvP15). For example, Siemens has tried to create a DAO, where there are a lot of decisions were done by virtual directors. The protocol is already there. But there is high resistance from everybody involved. Because it will affect the whole ecosystem, not just one party (IntvP2).

Further, "*every time a machine gets smarter, we get smarter*" (V-P13). "*Human plus AI is our only option to bring the benefits of AI to the real world. And in the end, winning organizations will invest in human knowledge, not just AI and data. Recruiting, training, and rewarding human experts. Data is said to be the new oil, but believe me, human knowledge will make the difference*" (V-P4). Progressively, organizations will change their structures to be less hierarchical, and more collaborative to be agile to the changing business environment as they transform digitally.

4.1.2.2 New capabilities

Both AI and blockchain technologies can provide new capabilities for companies to do things much better, simpler, and cheaper. Companies can embrace the new capabilities of these technologies to innovate their products and services in this digital world. Further, they can "*save business owners time, energy and improve their process efficiency so that they can generate more revenue*" (POST1), and have the potential for improving efficiency (POST13). For example, the global manufacturer Stanley Black and Decker has reduced the time it takes to complete a tax journal process from 7 days down to 15 minutes using analytics process automation (APA) (POST11).

"*The benefits will surely speed up things because if you look at the entire, not only financial aspects of change if you can automate things, you can avoid manual, not only processes, you can use AI to analysis it, to have opinions on things, so speed, accuracy, precisions, trustworthiness, I see lots of benefits in the financial part of the business, but also in others*" (IntvP2).

Blockchain is a coordination technology, that can coordinate not just people, but also legal fiction. It can permit more of a decentralized corporate culture, and we will see

more decentralization of corporate organizations. Intermediaries such as payment companies won't be needed anymore (Webinar12). Blockchain offers a new way to record, store, share, and search information. "*It is a network of value or a network of trust*" (PODCAST9-1). The technology gives us the "*technological capabilities of creating a record of human exchange, of exchange of currency, of all kinds of digital and physical assets, even of own personal attributes, in a totally new way*" (V-P6). People would be able to control their own data (intvP6).

AI is capable of processing large volumes and a variety of information with speed, precision, and accuracy (POST8). It can provide "*massive opportunities to improve the decision-making process, governance, contracts, by making use of big data analysis, recognize certain patterns, assessing the impact of decisions in a short, medium and long terms*" (IntvP1). AI is also used to "*create new and smarter products and services and generate growth. It's also being used to tackle some of the biggest global challenges, such as monitoring and reducing the impact of climate change, and of course, tracking pandemics and developing vaccines*" (POST5). "*Artificial intelligence is the greatest, newly developing technology, capable of profounding, enhancing human opportunity and experience*" (YT-V13). "*The technology can free up the most valuable human assets, the time. This time can be turned into more creative tasks and the human being should find where can join with her/his creativity in AI-supported processes*" (POST6). "*I think we are getting into the golden ages of AI as a tool that supplements and helps people to do their job better*" (Webinar8). Now we are in the stage where new technologies provide new capabilities for companies to improve and innovate. Simultaneously, companies will encounter new problems like ethical concerns with the use of these technologies.

4.1.2.3 Ethical concerns of automated systems

Either AI or blockchain, the technology enables automated processes in organizations, powered by algorithms. These automated systems give rise to ethical issues because their small decisions can have massive social consequences. The Cambridge Analytica scandal has caused many concerns over Facebook's unethical use of data (YT-V12). For blockchain technology, we need to consider "*system vulnerabilities, the environmental impact associated with the enormous amount of computing power*

needed for transparency and privacy challenges" (PODCAST10). For AI, we need to think about "*issues to do with bias of datasets, algorithms, and so on*" (YT-V21). "So, without the organizational structure, governance, and cultural evolution, on its own, their technologies have serious problems. Blockchain on its own is dangerous. AI on its own accelerates all the biases and poor ethics. It's dangerous. It is causing massive social upheaval. It's removing people, their jobs…" (IntvP17).

The findings of this study focus on reporting the three most frequently talked about ethical concerns: a) job transformation and replacement, b) problems with algorithms (bias, flaws, distortions, inaccessible algorithmic secrecy), and c) surveillance and privacy issues.

Job transformation and replacement

Two arguments lead to the debate around jobs with automation. The first one is job loss, the second one is new jobs will be created. "*You will have lots of jobs will be redundant due to automation, but it also creates space for new jobs*" (IntvP1). It is evident from the previous industrial revolution, that lots of people have been put out of work but it also creates a whole bunch of new jobs (YT-V14). See figure 17 blow about a poll that has run on Linkedin to poll people's views on the impact of AI and automation on employment, 1,546 people have voted. The result shows that 13% voted for causing great unemployment. Compared to the 39% who voted for creating more jobs than destroying. 36% think AI and automation will be disruptive to employment.

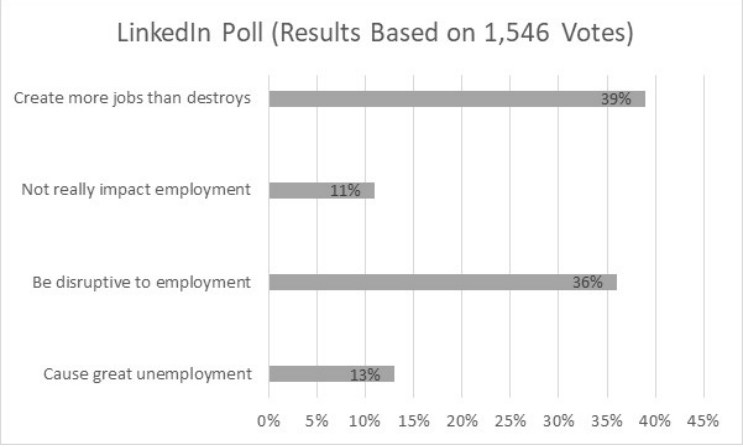


Figure 15 LinkedIn votes on the impact of AI and automation on employment

It is predicted that most duties in a typical corporate will be automated within 5 to 10 years (POST8). Most repetitive jobs will be replaced by automation or by robots in the future (POST2, POST21). "*So we got an issue, we can talk about the ethical issue of implementation of new technology, each time you got new technology coming, you are going to have a lot of people, they will lose their jobs, Okay. Because it is a substitute machine, and the machine is going to substitute a lot of things…For example, from a business perspective, when you integrate a blockchain in your business, you know that first of all the positive aspect would be disintermediation, in which you are going to need fewer people*" (IntvP6). For example, "*automatic doors fired the doorman... self-checkout fired a clerk... self-driving cars will fire taxi drivers... Keep it up and we will all be out of a job*" (POST16).

However, simply saying job loss is a misguided assumption (IntvP4). A job category is comprised of job tasks, some tasks will be automated but that doesn't mean the whole job category is going to go. "*Rather than talking about an entire profession, maybe we can look at specific tasks/specializations that are more feasible to be completed by AI*" (POST17). On one hand, we will see we're displacing, disrupting, and replacing the traditional professional model with emerging technologies, and on the other hand, these new technologies can improve, support and enhance what the professionals do today (YT-V5). Surely the jobs will be different, "*if you think about the function of the bank teller back in 1980, and you compare the function of the bank teller now, they are different. The jobs are different. you don't often really go to the bank teller to get a withdrawal of cash anymore, you would do that using the cash machine. so that aspect of the job you could say was automated, but it doesn't mean there are no more bank tellers*" (YT-V11). This is something that society can adjust to but you have to get it right in terms of reskilling (YT-V18). "*At the moment, I just don't feel we're moving nearly fast enough. We're going to wake up with a dreadful hangover (if we're not careful) with people without the right skills*" (IntvP17). Machines can't make judgemental or ethical decisions, how can we ensure the responsibility with automated systems, but humans can. Therefore, to keep the automated systems responsible, we need to have a human in the loop to make sure accountability in decision-making (YT-V6). In this digital space, we will need different types of roles that have never existed before, like, algorithm forensic experts, digital ethicists, AI ethicists, computer

scientists, data scientists, big data engineers, and many other roles, which are being created as we move into the space (IntvP4).

As going forward with automation, how do we make sure people can maintain the right level of skills at the job? As we automate too much, people no longer have enough knowledge and skills in that space to be able to fill that gap when the automated systems can't do it. It is like pilots complain about the autopilots that doing so much of the flying, they are not getting enough training in flying. Demanding that human in the loop is going to be able to jump in and take over for those cases when the automated systems couldn't handle it. But you don't give the human enough cases, because that would be once every 10 months that human is asked to interfere, the need to take over, human is not going to be able to pay attention through all those times, yes the system is operating ok, and I don't need to do anything, then suddenly oh I do. Therefore, the way we built the accountability has to be realistic and avoid the human being in an ethical crumple zone (IntvP9). If the human judgment is not kept in the loop, AI will bring a terrifying form of new bureaucracy (V-P4).

Problems with algorithms

Algorithms are used in both blockchain and AI technologies to automate tasks and deal with smart contracts. The ethical angle around the use of these technologies is the bias issue. For example, Amazon scraps its experimental hiring algorithm that showed bias against women, the Stanford vaccine algorithm that excluded frontline doctors, faulty facial recognition led Michael Oliver the 2nd Blackman found to be wrongfully arrested by Detroit police (IntvP16). These are algorithmic flaws or distortions, where computers inadvertently propagate bias through unfair or corrupt data input (POST15). If certain minority groups are not represented in certain facial recognition algorithms when the machine was being trained, it can't recognize them, which is not right and is not fair (YT-V19).

"*Well, an algorithm is a set of rules for computers to follow. The bias can be there because that set of rules has to be written by humans (or by software designed by humans). Humans have biases - some intentional and some unintentional*"(POST19). Some problematic algorithms are being deployed without oversight or transparency in

recruitment, education, insurance, and social media (POST15). For example, it isn't quite clear what effect these machine learning algorithms are having on our democracies, in the form of micro-targeting political ads (YT-V11). If AI is trained on data sets that reflect bias, or it is implemented in a biased way, then the outcome will be biased (POST19, YT-V16). The same applies to blockchain technology, the smart contract has the same issues of having people involved in designing it, which could inherit some human bias if not used with the right intention. Therefore, the smart contract needs to be audited.

In addition, there is currently no external pressure from regulation or law to require companies to disclose how their algorithms work. Algorithms are often inaccessible and not transparent. "*Algorithms animating our social media news feeds are often protected as trade secrets, and not found on a publicly accessible registry such as the US or UK Patent Office…Trade secrets… keep the knowhow of formulas and technical developments confidential….The main reason why algorithms aren't transparent is that bad actors will take advantage*" (POST22). They're very complicated, they are very difficult to unravel, and how an input transforms itself along the path to becoming output is not easy to figure out, which is in contrast to more traditional forms of Machine learning. So this is a problem (YT-V11).

"*Unfortunately, these technologies won't address all of the issues. So if we think about things like bias in algorithm systems, whether or not the data is updated or not is only one element, of where it comes from. Often more important elements when it comes to bias are we even looking at the right parameters, are we tracking the right input datasets, or should we be looking at something else? Because these particular input data end up being unjustifiably favorable toward certain people or organizations, as opposite to others, that would be introducing a bias. There is also a question about are we formulate the requirements of the problem in the right way that could be the way bias is being introduced. The bias question is broader than whether or not the data is up to date. So those other elements won't address by it. But that does not mean making your data up to date isn't also an important element. It needs to be part of the big picture. And in that sense, blockchain may be useful*" (IntvP8).

Surveillance and privacy issues

Apart from the bias issues, the other ethical concerns are surveillance and privacy issues. "*The fact that we're fundamentally under surveillance to one degree or another by the very nature of the motions we take through the day whether it's closed-circuit TV cameras, what we click on Amazon, or what we look at as our daily newsfeed. That is being tracked*" (YT-V19). "*Many people are precariously employed and work in conditions of really we'd have to say is quite extreme surveillance and monitoring. things like keystroke and heart rate and how quickly they walked to the next shelf to get an item in a fulfillment warehouse, an Amazon fulfillment warehouse, how many times they go to the toilet, I mean that's a level of intrusion into your personal ambient space and your interior life that is quite unprecedented*" (YT-V11). These are increasingly controlled by large private tech companies (POST15), the mega-corporations such as Microsoft, Amazon, Google, and Facebook, who have bigger economies than every country in the world except US and China (IntvP15). They are increasing their corporate influence (POST19, YT-V8). For example, now many kids are using Google Classroom. We often think about how good and how convenient for learning, but on the other hand, Google can monitor the kids' online learning behavior, these can be very valuable data that can be used later. "*These big companies usually make money because they suck your data from you and they put with AI and big data, they can see who you are, what you will consume in the future*" (IntvP6). Big data means big business and big values (Webniar10). Therefore, we need to establish ethical guidelines before technology catches up with us (POST17).

Surveillance breaches privacy, there are disadvantages for those being monitored, like workers. However, for a business that controls the system, "*the advantage there is that when you are recognized as a unique individual to the pattern that you develop through life, a data pattern, an associated pattern, you can understand things better than you ever have before*," (YT-19). For example, in education, these patterns would enable education providers to tailor the teaching approach that is most beneficial to a particular student to achieve his/her potential.

In the future, those who control and own the most powerful digital systems will have a great deal of control over the rest of us (YT-V7). "*Profit and ethics sleep uncomfortably*

together" (POST19). But if you got a blockchain, you may be able to take ownership of your data (IntvP6). We need to ensure blockchain is designed and deployed in a responsible manner that captures the full range of ethical questions that may arise (Webinar12).

4.1.2.4 Challenges of AI and blockchain adoption

AI and blockchain phenomena are currently overwhelming in public discourse (IntvP12). For blockchain, "*now, I don't want you to get the impression that the blockchain is the solution to everything, even though the media has said that it's going to end world poverty, it's also going to solve the counterfeit drug problem and potentially save the rainforest. The truth is, this technology is in its infancy, and we're going to need to see a lot of experiments take place and probably fail before we truly understand all of the use cases for our economy. But there are tons of people working on this, from financial institutions to technology companies, start-ups and universities*" (V-P6). "*I think blockchain is 20 years thing*" (IntvP6). Today's AI, "*is nowhere near 'general AI' from movies as it is being hyped*" (POST12). "*There's a lot of hype, a lot of excitement, a lot of promise but sometimes overpromises about AI*" (YT-V20). "AI is over-hyped and is software/systems doing what they've been developed/designed to do" (POST2). And "*things aren't always so simple – plenty of AI initiatives fail, and there are many hurdles along the road to successfully evolving into an AI-powered, data-driven enterprise*" (POST13).

As blockchain and AI are at their early stages. There are many challenges faced by companies to adopt the technologies in the context of corporate governance. This study mainly focuses on four challenges frequently mentioned by informants: a) culture, leadership, and skills challenges, b) data challenges, c) AI and blockchain ethical challenges, and d) regulation challenges.

Culture, leadership, skills challenges

The pace of technology advancement is accelerating that has massive implications. There is a realization that many companies are becoming digital businesses. "*For many companies, these challenges around culture, leadership, and skills are the biggest factors in determining success or failure – not the technology itself…there's*

the issue of culture and buy-in across organizations that may be set in their ways and leadership teams that might not immediately see the appeal of delegating their decision making to machines" (POST13). We often interpret great capability onto the systems than what the systems actually have. "Yes, AI does machine learning, adapts based on patterns, but only adapts within the space what we have anticipated and optimized for" (IntvP9). "*As we automate too much, people no longer have enough knowledge and skills in that space to be able to fill that gap when the automated systems can't do it. This is part of the automation problem that people are already facing in some domains*" (IntvP8).

In this very virtual world, the boards of the companies suddenly find themselves in a situation where they don't understand what this whole automation process is, what the issues, and consequences might be. Then we have all these changes with AI with blockchain, with big data, the companies have to manage the responsibilities, but they are not ready for it (IntvP3). "*The fundamental problem is that directors and senior management do not know enough detail about what is going on, and they make external auditors, with no real experience and even less understanding provide them with any comfort. No easy answers, unfortunately*" (POST32). There are two obvious challenges for any incumbent organization. First, is the legacy debt, and the legacy that companies are dealing with. Second, governance becomes really important, companies are looking to roll out digitally transformative initiatives becomes a C-suite level issue to drive it strategically, you need the whole C-suite engaged and supportive and aligned on what the right decisions mean and are continually taken (YT-V15) and you need people with the right skillset (POST11). We haven't moved fast enough on education and digital understanding (YT-V18). "*There is lack of adoption because there is lack of education. You know, people don't know it. Because we are at early days*" (IntvP6).

One reason why senior leaders find it so difficult to solve the problem of AI ethics in the first place is that they don't understand the nuances of their problem. If they take time to understand their business problem, then the technological solution will become clear (POST32). "*But without a full understanding of trustworthy computing, and without understanding what attackers can do and the security risks from the beginning, there's a lot of danger in this*" (V-P19). "*Qualities that are essential for leaders today*

include curiosity about what AI in the cloud can and can't do, anxiety over what competitors might do if they do nothing, and a willingness to try new things. Leaders with these qualities are well-positioned to steer their industries toward the brave new world that lies ahead of us" (POST13).

"*Probably the larger challenge is to get sustained support for creating an AI and data culture. Good data doesn't come cheap or fast and most certainly never stays that way without change in an organization's culture. However, that is more of a reason for business and technical leaders to come together and work on this culture change as a team*" (POST25). The challenge remains around how the right conduct and culture in organizations innovating with algorithms (POST28). The technology change needs to be supported by cultural change and technology competent leaders to facilitate training for its people to have the right skills for their digital transformation.

Data challenges

Data is the fuel of the digital economy. It will add incredible value to businesses and society if we can get it right. It is predicted by PwC analysts that AI will contribute as much as $15.7 trillion to the world economy by 2030. World Economic Forum estimates that 10% of global GDP will be stored on blockchain by 2027. If data do not become more trustworthy, then this prediction or estimation simply won't happen (POST5). If people do not feel safe sharing their data, then fewer data on to base automated decisions and predictions which means less accurate results and less value. If you have data, but your data is siloed in your organization, and hard to access, that is a constraint for new systems that require a large amount of data.

"*So the question is really how big is the model? how much data do you need? And then you need to be able to provide that data*"(YT-V3). Often, projects fail when they are asked to provide data, which they can't easily provide. Because data are recorded in their current legacy systems, siloed within organizations. "*Most of the traditional industries have a tremendous amount of physical data sheet available but those are dark data as they could not digitalize or analyze for future development. Most content sits in legacy systems where it can't be accessed by those solutions*" (POST14).

"*The legacy debt is a big issue for organizations…especially in big companies, their legacy systems like mainframe-based technology that were developed 30 years ago, in that environment how do you fast forward yourself to the future, so that's one key constraint*" (YT-V15). In one of the webinars, they run a poll. Based on the 44 responses, 30% say their legacy system is 21-30 years. 25% say their legacy system is 6-10 years. 20% say 11-20 years, 7% say their legacy system is more than 30 years, with only 18% have their legacy system less than 5 years (Webinar5). Many business processes are reliant on physical record-keeping – note-taking, filling out paper forms, or ticking checkboxes on hard copy documents that are then filed away and forgotten about (POST14).

"*If you want to do this properly in an AI model, you really need to provide the data, because it really consumes a lot of data. You need to think about how you get the data as close as you can, and as fast as you can, to your AI training model machine technology*" (YT-V3). Companies need to fit two main components. You can have a supercomputer and low latency storage and it's not going to work. And you can have super storage and the wrong computer, and you still miss out (YT-V3). Thus, companies need to be creative to build data access first, and have the right computer power and storage.

AI and blockchain ethical challenges

As discussed in the previous section 4.2.2.3, there are many ethical concerns about using AI and blockchain technologies in the domain of corporate governance to manage and direct the companies' decisions in terms of job replacement, algorithms bias, surveillance, and privacy issues. The technology itself like blockchain or AI is neutral. They are designed by humans for specific purposes. If you have humans involved in designing and implementing the systems, you have possible corruption or bias creeping into the system that will have profound social consequences if it is not used or governed properly, some are intentional and some are not intentional (IntvP6). "*It is not AI that needs to be trustworthy but the human behind it, both creator and customer..every AI system has its limits or constraints which are planned, designed, and encoded by humans, so any ethical, technological, decision-making, fuzzy logic problems must be addressed and solved by humans* " (POST5).

"*When we're thinking about ethics associated with machine learning, with artificial intelligence, with giving either semi-autonomy or autonomy to machines, it's a question of both can we trust that how the machine was designed lends itself to being more used as a force for good versus the alternative. Then, two, if the machine is given semi-autonomy or, eventually, autonomy, can we trust that it will make choices consistent with the ethical values we have for different societies. As Eric said, we've had more than 3,000 years of human philosophy. We still haven't been able to find a common thread across human cultures that everyone can agree upon. Can we find a way to do that in the next few years for AI that's going to be codified increasingly into systems around the world*?" (YT-V19).

Same concern to the blockchain, people who want control would not choose to adopt public blockchain, which is decentralized with no intermediaries. Data recorded in a public blockchain is hard to tamper with. It is immutable, and shared across networks. Instead, they will choose private blockchain. The problem with private blockchain is that the person who has the authority or control power if he/she wants to behave unethically, it is possible to rewrite data on that private blockchain. "*I can certainly see blockchain where the data is less crappy… I don't think putting on a blockchain can necessarily mean that the data will be high quality… it might still be relatively dirty data*" (IntvP14). For example, it is still possible for Walmart to manipulate the raw data when they record on blockchains if they want to be dishonest because Walmart has the central authorization to decide what to record on the blockchain (IntvP6).

Thus, it depends on people's intention on how we are going to use these technologies to help us improve. We need to have the right organizational structure, governance, and cultural evolution to guide and support the design, development, and deployment of these technologies in an ethical and socially responsible way. "*People sit at the very top end creating through artificial intelligence, through using blockchain, or other FinTech measures, needs to keep that responsibility, and this is the challenge we face in this world* " (IntvP3).

In addition, the cost of the proposed change or reform is too high as it endangers the previous accomplishment (POST24). The change will affect the whole ecosystem, not

just one party (IntvP2). If you are an old company, the cost of this will be that you've got the legacy systems, the system is not working with blockchain, how are you going to connect these legacy systems with blockchain (Interoperability). This costs a lot of money because it is multi-point computing (IntvP6, IntvP7). Things aren't always so simple – plenty of AI initiatives fail, and there are many hurdles along the road to successfully evolving into an AI-powered, data-driven enterprise (POST13).

Regulation challenges

Corporate governance is about compliance to the legal requirements. Now with new technologies, it is very complicated. "*The architecture of our global governance doesn't work for the digital future in my view*" (IntvP15). Blockchain and AI are developing so fast, "*I don't think the regulators have reached the level of understanding yet…They really don't understand the ethical risks around them. They don't understand the risk mitigation techniques, and how they might be complemented with existing laws and regulations. They just have a fairly flat flooded understanding of what's going on*" (IntvP14). "*I was there two years ago and now technologies really change already and they're still on this area of two years ago, making ethical rules on how to use technology*" (IntvP10).

For example, cryptocurrencies, "*it's held the industry back because all the regulators are very worried about the crypto and so you know they're coming down hard. But also they're not exactly sure how to regulate it because it's not the same as money. There's also yeah so, so I think that whole regulatory side of things as a bit of a problem" (IntvP15).* And the informant further commented that *"the problem I think we have in Western democracies is they have a 3 to five-year time horizon, so they're not interested in the 50 years because they won't be in power, they're just trying to make very small short term decisions, and I think I think that's fundamentally a problem that we have in the western democracies because politicians are very short-sighted. Even if they knew, they have a very short term time horizon*" (IntvP15). Many areas are not covered by regulation like algorithmic decision-making and risks, and informed consent with digital data (YT-V18), given the limitations of national rules when dealing with digital companies that span across many jurisdictions (POST15).

"*I very much agree and at the moment in the absence of meaningful regulation we are seeing that companies like the big tech companies are getting together in AI alliances, to come up with a Code of practice, we see the emergence of ethical panels within companies to improve the diversity and reduced biases and improved transparency*" (YT-V11).

There are currently many international efforts in the landscape of regulations that are tackling the use of blockchain or AI technologies. Countries are making progress on their regulations. However, some of them are "*so high level and nobody knows how to put in practice. Accountability is not even a thing you put into an AI system, right, accountability is holding a certain kind of person accountable, ideally, holding organizations responsible, and accountable. So, accountability is about people not about the system itself. Transparency seems about the system, but not about the technology itself, unless you talking about transparency as the explainability of the model or model outputs. But again what constitutes the explainability, what's the sufficient explanation, to whom you are explaining, why you need explanation, that stuff is underexplored*" (IntvP4). "*We have all of these ethical principles… But what does that mean? How do we actually implement it? Then, now, we get into how can translate these into something like regulations*" (IntvP9). We need to have a dialogue, have everyone in the community or ecosystem come, be involved, and contribute to the mindset of what we can include within the regulatory sector, to help formulate a regulation that is quite inclusive but practical, and be able to implement.

4.1.3 Corporate governance imperative response to the ethical use of blockchain and AI

Five specific themes related to corporate governance imperative response to the ethical use of blockchain and AI according to informants' views and experiences: 1) ethical design fit for purpose, 2) ethical use of data, 3) leadership (board support), 4) People, and 5) culture.

Ethics and governance around adopting and implementing disruptive technologies such as blockchain and AI "*are not just about addressing technology-related matters.*

They are very much also about people and processes, bound by the right mindset and behaviours across the organization (culture) starting from their leadership down to everyone who is tasked with innovating responsibly" (POST28). "*There has to be a will to implement that kind of a system Somehow creating the moral pressure on organizations to demonstrate, like a golden tick of ethics or something, but there are no globally accepted standards of ethics for corporations with technology, and so that's one of the things that really needs to be developed somehow*" (IntvP15).

The five specific themes derived from the data of this empirical study offer some ideas for companies to govern the use of these technologies to drive success.

4.1.3.1 Ethical design fit for the purpose

There are different types of blockchains (public or private, consortium, smart contracts). And there are different types of AI (Machine learning, deep learning, machine vision, neural networks, supervised learning, unsupervised learning, deep fake technology, etc). Companies need to understand their business problem in-depth, then look at all the available technologies, then work out which one is the best solution (POST22). For example, "*all cognitive technologies, such as AI, cannot be treated as 'neutral', due to their design that involves ethical decisions, which are hidden in the background and embedded in the 'tools' by the manufacturers mostly as BlackBox*" (POST27). In practice, values are implemented through a range of design, development, and deployment choices, for example, an aircraft autopilot does not explicitly represent saving the lives of passengers, instead, this value is implemented through its design features and pilot controls (IntvP11). This is the same as the trolley problems we have when designing autonomous vehicles. The ethical use of this highly automated system is assurance that the system will perform in ways that accord with the users' values (IntvP11). "*The problem is like the ethical angle of who's designing it, humans always seem to want to give themselves advantages over somebody else*"(IntvP5).

"*I believe the ethics need to be embedded within the design of the organization. So the organization and its leadership, its processes, and its culture need to make space for people to pause and evaluate the consequences of their work*" (IntvP17). The findings of this study reveal three areas to consider for the ethical design of automated

systems: a) a voting system for consensus on AI algorithms, b) A system of checks and balances, and c) avoiding ethical crumple zone.

A voting system for consensus on AI algorithms

"*Algorithmic advances have spurred quantum leaps in myriad human endeavors — including medical devices, models for climate change, financial trading systems, GPS mapping, even online dating. Algorithms are driving our social media platforms, feeding us daily news, family updates, and friend suggestions. Algorithms have held us rapt for some time*" (POST22). Companies have the choices to build the system in-house or outsource from partners. The values and ethics of the companies and their partners need to be aligned and embedded in the design of the systems (IntvP12). "*Investors are drawn to good people as much as they invest in a good business, and building a partnership founded on transparency and flexibility can realize value over many years*" (Webinar8).

Importantly, companies need to "*think about the business continuity strategy and ensure that you are using the best tools available, and you are using the tools that are really built for the purpose that you are using them... So, it is kind to select the right tool for the right job. But again, it does not give you 100% security*" (Webinar2).

"*Biases in data classification happen all the time. Therefore, quality assurance and focus groups are essential to catching and correcting any discriminative behavior*" (POST27), to ensure the system designed will perform in ways that accord with the users' values (IntvP11). For example, "*the types of models that we make in credit risk, we have to be very, very certain around how we develop those models. We have to have a set of corporately defined standards for how we develop the models and enforce that. One of the things that we like to focus on there is emphasizing that these types of models that are impacting customers should not be left to data scientists' artistry but rather, follow a prescribed and responsible AI framework*" (YT-V17).

"*In the future, I can envision a voting system for consensus on AI algorithms before they're implemented on mass/global scales. Because the AI biases we are trying to prevent, or leverage, will have large-scale effects on economies, health, and wealth*

distribution globally. Much like the science of nuclear power, it can be used for good and bad. Will AI algorithms eventually be patented or licensed? and granted use, depending on the application, or who it will be used by? Can we establish a global system of governance similar to how information is published in Wikipedia and controls like Blockchain" (POST5)?

In addition to automation, blockchain supports other technologies like AI (PODCAST9-1). "*Blockchain, under specific circumstances, could be seen as a means to safeguard that AI is deployed in an ethically sound manner…Blockchain's traceability and data integrity together with its capacity to operate in a decentralized manner could be crucial in ensuring that the data used in artificial intelligence systems are reliable and of high quality… As blockchain technologies offer users a detailed view of how data are being used. The detailed view of how data are being used the introduction of these properties into the artificial intelligence context could help developers to design more human-centric fair and responsible algorithms*" (PODCAST10). Proper governance protocols need to be in place to ensure appropriate levels of data quality for AI systems to mitigate algorithm bias. Companies should have a set of values, principles, and techniques that employ widely accepted standards to guide moral conduct in the development and use of AI systems. "*What are the standard ways that we're going to tackle biased algorithms and explainability and privacy violations*" (YT-V14). You have a kind of simple checklist that make sure you're not implementing something which will make life harder for your customers (YT-V11).

A system of checks and balances

Proper governance procedures need to be in place to enable people to work on constant feedback loops and have controls, checks and balances, and safeguards to ensure the ethical use of any automated system. "*I think they need to work on the constant feedback loops. If they try to experiment with AI, blockchain, etc., They need to go through the entire process of building it, testing it, and gathering feedback to improve it. So I think it is very important for companies from the top down to be involved in all of the phases of the tech process. Lastly, I think it is valuable to exchange experiences, to get people from outside to involve to assist with this and leverage on these types of experiences*" (IntvP1).

"*We have a corporate defined model development governance process, which is adhered to with respect to the scientists where we have the checks and balances, where we monitor that and we record progress along those lines. So, we can demonstrate not only that we want to be responsible, but we are because we followed this process. We can enhance that process over time, so it's a huge focus for our firm. I think it's going to be a huge focus for every firm that is going to be applying AI and machine learning technologies in the digital world in the coming years…One of the things that we will routinely do is reassess. If we say, 'these are the technologies that are not allowed' as new things develop, we're more than open to going and changing or revising our decision around a particular algorithm. And so, we have diversity in terms of ensuring there's flexibility in the corporate model development governance standards that we use, but also ensure that every scientist has a voice*" (YT-V17).

"*We go through all the checks and the privacy elements and the security teams, we work with cyber as well to make sure that the solution we put in is as secure as absolutely possible, and so that's fundamental to any solution. Customer experience, yes, but also safeguarding the privacy and adhering to risk and reg, those are all factors we take into account*" (Webinar7). The organization's risk governance function needs to monitor and evaluate the risk from the AI, algorithmic and autonomous systems (POST29). In terms of cybersecurity, "*the cyber risk is exploding, everything is open to attack now in this digital world*" (IntvP16). Cybersecurity is no longer an IT problem anymore, it is a business problem (POST30). "*You need to have the governance procedures in place, on top of the board's agenda, you don't have to have the technical knowledge, but it needs to be paid attention to what companies can do before the attack, during the attack, and after the attack… it is really costly. So, all and every board member should be aware that cyber security is another additional responsibility. because it is part of the business. And it is dangerous and it is material. And it is reputational, and it is related to any of other risks*" (Webinar2).

"*I think it is a good practice to have a committee that is going to be doing assessment around whether the use of these technologies is going to be responsible or going to be ethical*" (IntvP9).

Avoid ethical crumple zone for accountability

We are now trying to automate things we previously couldn't using either AI or blockchain. In a sense, it has lots of potential, but it also brings with it certain new risks if we apply it without putting in place the right kind of safeguards (IntvP9). We need a system that is built around this newly automated task, for example, "*when you inject an AI component into a workflow, what are the inputs and who is supposed to look at the AI systems decisions and do something about it? That's change management… When an AI flags a defective smartphone, what happens next? Do you get a human inspector to reinspect it? Do you send it for reworking? Did you discard it right away?*" (YT-V20).

"Demanding that human in the loop is going to be able to jump in and take over for those cases when the automated systems couldn't handle it. But you actually don't give the human enough cases" (IntvP9). For example, in autonomous vehicle testing, the car and the human. The human safety driver has the same problem because the car is being driving perfectly fine with the autopilot for the last hour. Am I supposed to be continuously paying attention to take over in case of an accident? That is not going to work. So this refers to the ethical crumple zone, what is responsible, the human safety driver or the car?

And "*it is a complicated question, the question of accountability is almost philosophical, and it will probably, the entire debate about AI and board room, and accountability would relate to different cultures. Because in different cultures, things are seen differently*" (IntvP2). "*So as we use humans in the loop, we need to make sure we use them in a way that is actually reasonable for a human have to do this kind of things… the way we built in the accountability has to be realistic.*" (IntvP9). Companies can consider establishing an ethical review committee to assess the feasibility, societal usability and desirability of AI and blockchain use in their organizations.

4.1.3.2 Ethical use of data

Typically, lots of organizations around the world that are using analytics and data to drive value for their organizations to get closer to their customers, reimagine the efficiency of business processes driven by data, to expand business opportunities by

using data to deliver new services to customers, and to address the balance between risk and reward across the ecosystems (YT-V12).

There is no doubt about it, big data means big business and big values attached to that. We are getting to the point where we need to choose the level of privacy that we are happy to live with for the services we want (Webinar10). In the next five years, how well companies use their data is one of the key factors in determining whether companies will thrive or fail (POST14). Data becomes a big issue for many companies. It is about data quality, and it is about getting the right access to data (YT-V15). Companies need to have a clear data strategy in place to support, govern and enable AI, and safeguard people's data and privacy. They can use blockchain to improve data quality to enhance accurate AI decisions. "*Blockchain started as a distributed ledger for bitcoin. It gets its name because it processes the transactions in a group known as the block, and it adds each new block to the end of the ledger — or at the end of the chain. It was really attractive for use because it was transparent, resilient, and immutable — all without a third party. It actually achieves all these traits using techniques and technologies that have been around for quite some time. It uses cryptography to be transparent. It uses public/private keys to allow access to specific data by specific people who have those proper keys*" (PODCAST9-1)

To help companies move forward, the findings of this study suggest six factors to guide the ethical use of data: a) accessibility, b) security, c) privacy, d) property, e) accuracy, and f) transparency.

Accessibility

Conventional "*business processes often involve creating or capturing data in a way that is siloed and difficult to access, analyze, or act on outside of the process for which it was created. Even today, many business processes are reliant on physical record-keeping – note-taking, filling out paper forms or ticking checkboxes on hard copy documents that are then filed away and forgotten about*" (POST14). The data is either sitting in legacy systems or siloed within organizations. They are not accessible. For example, "*real-time audit and monitoring have been talked about for years, and the reality of it happening may finally be here. The issue has always been getting access to the data to analyze it and interpret it*" (PODCAST9-1). Companies in the oil and gas

industry "*may have very valuable data assets that are hard to gain insights from, due to changing standards of recording and storage over the years*" (POST14).

"*If you want to do this properly in AI model, you really need to provide the data, and again the compute system that you have on the cloud or on-premise, need very fast access to the data, You need fast access and in a transactional system because it consumes a lot of data. so you need to think about how you get the data as close as you can, and as fast as you can, to your AI training model machine technology…The more data sets you have, the better the model is. More data sets mean larger volumes of data, that need to be fast accessible. This is kind of economic breakpoint if you need to upload all those data first into a public cloud environment, you may end up spending a lot of money*" (YT-V3).

Therefore, "*firms should focus on the access to data, the analytics, and understanding what that data means because there is so much knowledge in the data*" (PODCAST9-1). Much of the business value will "*depend on the ability of businesses to access and analyze the data, technology, and skills that will make it possible*" (POST13). You need to build those data access first. "*There's been a strong trend towards creating simplified processes, as well as widening access to these processes among employees who may never have worked with data before, for AI to achieve its truly transformative potential, it has to be possible for anyone to use it, and not just a highly educated elite*" (POST11). "*Even if all a business's procedural documents and record-keeping are digital, the information is of little value unless careful thought is given to the data structure, format, and storage media that will be used. If it isn't, the potential for it to be used across the enterprise to unlock value and drive efficiency becomes severely limited*" (POST14). So we need to compute power to run the AI, and we need fast big accessible data storage. "*You can have a super compute and low latency storage and it's not going to work. You can have super storage and the wrong computer, and you still miss out*" (YT-V3). "*If you integrate a blockchain in your business… you're going to have clearer data storage, you will be able to access your data better, faster*" (IntvP6),

Security

Security is fundamental to any solution. "*We saw a rapid acceleration of digitization across industries… but with that came risk. You have a lot less visibility into your security ecosystem, less control over access points and you're relying heavily on third parties and external service providers to support you. All these factors create more surface area and more risk for security breaches*" (POST30). "*Directors need to be constantly vigilant of any cybersecurity, which has become such a huge area. It is not just an area of a simple company, or even a single board to oversee. It is becoming a massive global phenomenon. I heard latest is that it is a 6 trillion-dollar industry*" (Webinar2). If a cyberattack happens, it is costly, disrupts business, and erodes consumer trust.

Therefore, security should be at the forefront of the way corporations do things. Empowering your chief security officers, holding people accountable for matrix: speed to recover with minimal disruption, and improve to be more secure. That should be part of everyone's role, not just the particular role of IT. So all and every board member should be aware that cybersecurity is another additional responsibility because it is part of the business. And it is increasingly important for businesses to choose the most secure platform to get their hands on (Webinar2). Companies need to go through all the checks, privacy elements, security teams, and safeguards, and adhere to risks and regulations to ensure the solutions they put in are as secure as possible (Webniar7).

Privacy

Privacy refers to "*a program code which accesses password should not be allowed to perform any analytical function, otherwise, it might be vulnerable to hacking or being used for any unethical purpose*" (POST14), which means the insights derived from data should not be disclosed to or shared with any third party without the given explicit permission from the user. "*This is closely linked to challenges posed by accountability as well as explainability, as we need to be able to explain who it is shared with (and why), and we need to be compliant with regulations and other principles of accountability, for trust in privacy to work*" (POST5).

Our privacy is getting breached from every end as technology constantly evolves (POST14). We are experiencing wealth creation, growing social inequality (V-P5), the excessive concentration of corporate power, and erosion of privacy (POST19). It is important to respect privacy while we use data to gain valuable insights to provide better products or services (Webinar7). A lot of efforts are needed on the issues of privacy and trustworthiness (POST5). In addition, consumers are increasingly aware of their rights and would like the companies to be open and transparent about how they are using their data. Further, taking inspiration from the GDPR, many countries are having new data protection laws and regulations that companies have to comply with.

So what does that mean for companies? “First of all, it absolutely means that companies could no longer treat data protection as some back-office compliance issue. It is a board-level and C-level strategic issue for companies. Companies that have not already done so really need to have proactive strategies and programs, which over time will raise customer trust levels by enhancing customer engagement…. companies now that are taking privacy importantly and strategically, and perhaps are seeing it as a competitive differentiator that sets themselves apart” (Webinar10).

Companies should look at enhancing their privacy capabilities deep into their organizations and should look at embracing technology solutions that will better enable them to manage the vast amount of data that flows through their organization. They need to establish clearer rules on the use of sensitive data and ensure safeguards are in place to deal with them ethically. They need to proactively demonstrate to their consumers that they are acting not just within the letter of the law, but are acting within the spirit of the law and the spirit of data protection regulation, to protect individuals and give them rights. For example, Trūata based in Dublin was founded in early 2018 by Mastercard and IBM to deliver next-generation data protection and analytics to the marketplace. The company sits at the intersection of big data analytics and privacy. They wish to unlock insights from data but to do so in a privacy-responsible way. One example of this would be anonymization, Trūata transforms the personal data into non-personal data and carries out analytics on that data, and gives back to the customer with rich aggregate insights (Webinar10).

However, there is a lot of information asymmetry between what the company actually knows and what individuals can know and expect individuals to try and figure it all out. "*We get to the point where almost our data becomes a currency. So we choose the level of privacy that we are happy to live with for the services we want*" (Webinar10).

Property

Property means the ownership of the data. As we are increasingly aware of the value of our data and our privacy, "*I believe that everything has to start with 'data ownership'. Companies need to be accountable not only for the algorithms and outputs but also for the inputs and how the data is acquired*" (POST5).

"*In the digital world, you can't give meaningful informed consent because you don't know how that data will be used… it might so happen that you give away data that you think is perfectly innocuous, your primary data, your keystroke, your heart rate, whatever it is that you gave or is collected but that information doesn't just put up in the jar and sealed off. It's used to draw inferences about people like you. So if they infer all of these things about someone like you, is that still, your data, or is that no longer your data? Because if that still is your data which is inferred about you. Then there's a good case to be made that it should be protected in the same way that your primary data is protected*" (YT-V11).

As technology evolves and people's understanding of data protection laws surges, customers would want more control over their data. For example, "*Increasingly businesses are looking toward multi-cloud or hybrid-cloud approaches – allowing them to take more direct control over where their data is stored and how it is guarded. Hybrid models such as "cloud-on-premises" involve public cloud providers deploying containerized micro-clouds at client premises that benefit from the connective and feature-rich environment that the public cloud provides, so the client never has to let the data out of their sight or direct control*" (POST13). Further, the emergence of blockchain technology provides a lot of opportunities to confirm the authenticity of data, providing provenance and ownership of data in governance terms (IntvP8). With blockchain, people will be able to control their data, so that they can sell their data to whom they want, in other words, they may take ownership of data (IntvP6).

Accuracy

"*You know the problem is that people will see lots of information. .. It's like prospectuses of 2000 pages, the more information you see, the less you understand. So that in itself is not going to help people…We see it with ESG, we have so much information that's been asked, AI certainly can help, you know, the structure of that. But the wealth of information, do investors really understand it? I don't think so….so information in itself and vast amounts of information depends on the information being put in is good, who is checking that, and at the other end, is all that information that is available, does the ultimate reader of this information understand it…. Let's say the pipeline if you put bad things into the pipeline, bad things come out*" (IntvP3).

In addition, the way we collect data is changing. The way we need to create tools to manage these data is also changing. We will continue to do so reliant on AI technology to enable us to manage the ever-growing volume of data. We need to manage anything from structured, to unstructured data such as financial personal data, how we do things concerning money, how we save money, how we spend money, and how we invest money (IntvP4).

"*Hopefully blockchain will contribute to the accuracy, and trustworthiness of data communication*" (IntvP2). "*I think blockchain will play a very important role, blockchain enables 100% verification of transactions, which is different from the current ways of financial records are kept…If you use blockchain technology in your business processes, this enables complete verification of transactions and complete register, complete record of all the transactions. So that is completely transparent, immutable so that obviously will have a big impact… but still, you will also need to control the mechanisms of the blockchain itself need to be audited because we can't simply accept that transactions happen or use of blockchain technology are correct, we have to audit the mechanisms of blockchain technology…I think AI will play an important role in analysis, because, obviously, you can have all types of algorithms, or self-learning algorithms, analyze the information, and hopefully, the information due to blockchain will be better in quality… If you have bad input, you will have bad output,*

Now I think if you have good information based on blockchain technology, you can perform better analysis" (IntvP1).

Therefore, investing in data quality and accuracy is essential to making AI decisions more trustworthy (V-P3). Further, well-labeled data will also work better with AI/ML algorithms and improve accuracy (POST25). Data accuracy is fundamental to making AI possible and driving more adoption and benefiting everyone in society.

Transparency

As mentioned earlier, businesses are facing challenges such as lack of transparency, bias in algorithms, issues of misuse of data on the risk side, non-inclusion, and so on (YT-V21). We have witnessed problematic algorithms being deployed without oversight or transparency (POST15). "*Many of us still do not understand how algorithm and data work, and this is mainly vested in the concepts of disclosure and secrecy of such information*" (POST22). Information asymmetry has provided opportunities for managers to manipulate data and commit wrongdoings. Financial fraud is costly, eroding public trust. Over the past decades, we have seen increasing reporting requirements to include not only financial information, but also information on the environment, sustainability, and governance (ESG) in annual reports, to embrace transparency and rebuild trust (IntvP1).

It is quickly becoming clear that "*trust is a business principle as well as an ethical one.. .we should all want to be transparent, accountable, unbiased and secure and respectful of our customers' privacy…failing to do so could do serious damage to businesses*" (POST5). Further, "*we used to place our trust in institutions like governments and banks, today we increasingly rely on others, often strangers, on platforms like Airbnb and Uber and through technologies like the blockchain. This new era of trust could bring with it a more transparent, inclusive and accountable society -- if we get it right*" (V-P14). "*We will see more mass personalization I think. But for me, this has to be earned by trust and transparency. Giving consumers the choice to delete their data, control their data*" (Webinar10).

Blockchain has "*the potential to increase transparency*" (IntvP6). It "*can lower our*

uncertainties about identity and how they change what we mean about transparency in long distances and complex trades, like in supply chain" (V-P6). Theoretically, this type of technology could be very useful in a lot of areas. "*Blockchain technology is really referring to the use of the public ledger where anybody and everybody can view the transactions, resulting in true transparency*" (PODCAST8). Blockchain creates a new phenomenon of enhanced transparency, to support AI to become more trustworthy (IntvP12). In addition, IBM has designed the AI Explainability Toolkit and AI Fairness Toolkit. The Explainability Toolkit "*provides algorithms and metrics that can be used to evaluate how explainable machine learning processes are. It has also developed an AI "fact sheet" that it recommends is completed for all AI projects, providing transparency on how it works, how it was trained, and how it has been audited for bias and security issues*" (POST5). There is no doubt that digging into the transparency of algorithms is the right way to go (POST22). The AI Fairness Toolkit "*is used to examine algorithms and models for bias – and also counter them with its own bias-mitigation algorithms when required*" (POST5).

4.1.3.3 Leadership

Companies needed a form of leadership to lead organizations to anticipate digital changes and support their teams to adopt these technologies. Ethics and governance are very much about people and processes, bonded by the right mindset and behaviors starting from their leadership down to everyone who is tasked with innovating responsibilities (POST28). We need all sorts of things, not just technology but also business models, to drive the digital experience (YT-V16). The form of leadership to make this possible is the one that enables the technical discussion to help with the social discussion with the creative discussion. In other words, "*we need to have leaders who can say I don't know. And only once your leaders accept that they don't know because there is no way you could know enough about AI, there's no way you can know enough about blockchain, and there's no way you can know enough like both of them to be able to make effective decisions on your own. So the form of leadership we need is the leaders who work to support diverse distributed thinking and processing. So the leadership challenge is not, can they know more about AI? Can they know more about blockchain? We need the leaders can have the self-confidence to trust their own employees, can build a culture within their organization where people*

can listen to each other, and develop more collaborative, more open ways of working that allow for diversity, that allows for the software developers to work with the social scientists, etc…. It really comes under self-esteem and collaboration and openness and the ability to say I don't know" (IntvP17).

The findings of the study focus on two aspects in terms of leadership that drive success in digital transformation, a) change management is needed, and b) the ability to ask smart and right questions.

Change management is needed

"*Increasingly, the digital and technology really come together because you need the technology and the mastery of technology to create the leading digital experiences*" (YT-V16). A lot of companies underestimate the change management aspects of how to roll out these very disruptive technologies (YT-V20). When we automate some tasks using these technologies, on one hand, it could help that person become much more productive. On the other hand, it could also make them feel threatened about their job security. "*I think a lot of companies underestimate the change management aspects*" (YT-V20). AI and blockchain technologies are disruptive. The changes will affect the whole ecosystem, not just one party (IntvP2). As we are aware that most companies have legacy systems that have been built for many years, which identifies who they are. However, companies must be able to have the conversation to help them understand how they can continue and be relevant in the future and what can they do in the digital context to do the change management (YT-V20). We need the right form of leadership to steer learning from successful use cases to enable new industries to continue to grow, evolve, and improve (Webinar10). For example, the leadership teams might see the appeal of delegating their decision-making to machines (POST13).

"*So it's a digital buddy for the sales force, for the innovation force, for the decision making in the middle management, in C-suit. You know, we look at the whole change here on how to align intelligent systems*" (IntvP12). "*We need to have leadership in the industry to make sure that, for instance, if companies are deciding to invest in AI or other autonomous technologies, they really look at the implications, the ethical implications, the job implications, the reskilling implications, so this becomes second*

nature. It becomes a set of procedures that they know they've got to do to have public acceptance. I think that that will require quite some leadership because a lot of our leaders will not really understand fully what the implications of AI are and what the benefits will be, as well as, of course, the risks that they need to mitigate" (YT-V21). Leaders need to ensure their Chief Information Officer (CIO) or Chief Technology Officer (CTO) can bring along the rest of the organizations and make sure they understand the technology. Any strategies formed at the board level such as data strategy or digital platform strategy need to be the same as the overall business strategy. "*Digital platforms often mean a fundamental change to business models and strategy, which means you'll have to think carefully about how best to leverage the platform model to drive success*" (POST10).

Successful leaders need to focus on three steps for change management for the digital transformation: first, strategy. Second, cultural transformation. Third, ethical implications (YT-V6). So firstly, think about what is your end goal, think about where you want your company to be in five to ten years by using AI or blockchain to transform the business in the short, medium, and long term adapted to the skills and data that you have in your organization and build the learning process. Secondly, AI or blockchain is not something that you can just put on the table of your scientists and leave. Rather, it requires everyone in the organization to be part of the digital transformation that involves a cultural transformation. You need an empowered organization where everybody is part of the process of thinking what are the use case, what are the business problems they want to solve with AI or blockchain. Thirdly, you need to think about the ethical implications of using these technologies. So as you are embracing AI or blockchain, you need to think about the challenges, and ethical implications these technologies are going to bring to your organization, as well as the system limitations of these technologies (YT-V6). The governance needs to be carefully thought out so that the investment leads to the right outcome you want (YT-V15).

The ability to ask smart and right questions

As mentioned above, "*there is no way you could know enough about AI, there's no way you can know enough about blockchain, and there's no way you can know enough like both of them to be able to make effective decisions on your own*" (IntvP17). What

we really need is curious board members who can ask the right questions, do the research, become prepared, and empower people (Webinar2). There is no doubt that business that has transformed their business from traditional method to digital is doing exceptionally well (POST10).

"*We believe you need to go beyond the traditional approach of problem-solving, to the more complicated one of question-asking and question-framing. Because in so doing, you open up all kinds of new possibilities and new challenges… They point us in the right direction and help us on a path to establish a new branch of engineering. But critical questions aren't enough. You also need a way of holding all those questions together*" (V-P2). Leaders can frame the questions around autonomy, agency, assurance, indicators, interfaces, and intentionality. For example, "*Is the system autonomous? does this system have agency? Does this system have controls and limits that live somewhere that prevent it from doing certain kinds of things under certain conditions? how do we think about assurance. How do we think about all of its pieces: safety, security, trust, risk, liability, manageability, explicability, ethics, public policy, law, and regulation? And how would we tell you that the system was safe and functioning? what would be our interfaces with these AI-driven systems. Will we talk to them? Will they talk to us, will they talk to each other? What will the indicators be to show that they're working well?* (V-P2).

Further, if companies decide to incorporate a platform strategy, it is far from an easy, overnight transition. Leaders need to ask questions around: "*Where's the value? Do we have the necessary platform skills? How will we attract people to your platform? How will our platform encourage and support user interactions? How will our platform integrate future technologies?..... The good news is that if you're moving into platforms now, you have the opportunity to leapfrog existing platforms and harness new technologies like blockchain to your advantage at the outset. Ask yourself, is there an opportunity to use blockchain to create a new, more decentralized way of doing business in your industry?*" (POST10). Leaders with qualities that include curiosity about what AI or blockchain can and can't do, anxiety over what competitors might do if they do nothing, and a willingness to try new things, are well-positioned to steer their companies toward the brave new world that lies ahead of us (POST13).

4.1.3.4 People

Organizations need people with a particular skill set to help roll out digitally transformative initiatives that generally require numerous technologies and platforms to be deployed simultaneously (POST11). "We need people who can solve problems… we need people who can tell us what are the real issues that need fixing and help us find ways that technology can fix it. Because, when people from diverse backgrounds come together, when we build things in the right way, the possibilities are limitless" (V-P7). People are the biggest success factor to make all the processes, procedures, discipline, and tools work all together seamlessly to fine-tune to the point where businesses can deliver value (Webinar8). This study finds that organizations can look at three areas to ensure their people are educated and understand the technologies to drive the changing progress. First, Continuous training and education of your workforce. Second, ethical awareness of digital hardness. Third, hire an ethicist or form an ethical review panel.

Continuous training and education of your workforce

Training and education must be key elements of any organization's plan (POST30). "*The important reason is we're rewriting the future with technology. It's not just about applying technology and doing things to automate business and such. We're enabling the experiences of the future across every business and every sector of the economy…Talent is really pivotal and critical. If you think about this moment of truth and building the future, you need the right talent and you need an inclusive and diverse set of talent*" (YT-V16).

"*I think first of all people need to get acquainted with the technologies. we still have a lot of boards in companies that are really old-fashioned, and they are not looking enough into the future, often driven by short-term gains. Not really paying attention to what is going and will be going on in five to 10 years*" (IntvP1). As the companies become more and more digital, "*there is enough pressure now for an organization to be a learning organization and incorporate all these changes*" (YT-V19). For example, education for the C suites is fundamental and really important for the adoption of these disruptive technologies (IntvP12). "*You need some sorts of training programs and awareness programs that are formalized for boards and CEOs to go through*" (IntvP15),

to help them get acquainted with the technologies which means listening to the people that know the interesting things about these technologies, both from within the company and externally (IntvP1). Further, "*we need to get more leaders and companies to ensure they are thinking about reskilling of their own people. And we need to engage in our communities to make sure we are doing this to provide equal access to technology*" (YT-V15).

Therefore, "*the first thing is training company boards and managers but everybody throughout the company to understand this new responsibility to use automation in the correct way*" (IntvP3). "*Companies need to have either in-house or they need to bring it in at the time when they do their procurement of AI or blockchain systems. They need to have people on their side of the procurement discussion, who know enough about the technologies, so that can ask the right kind of questions, to prove does it addresses the issues that need addressing? Is it going to do in a way actually make sense?*" (IntvP9). "*I hope that the general public will be more educated about these different choices in the trade-offs and maybe a bit more tech-savvy to have to trust the expert less and do some of their own due diligence for themselves*" (Webinar12).

Further, "*people have to besides your normal CV, you need an ethical CV. So everybody in this world needs an ethical CV that shows your ethical behaviour, what you've done wrong what you've done right. That is a challenge because of course at the moment and especially with the big CEOs they can leave a company in a disaster state and still get a fantastic job elsewhere with bonuses and whatever. That's not what should be happening*" (IntvP3).

In this ever-fast-changing environment, the professional world is transforming, and those who can adapt and update themselves in terms of skills like creativity, curiosity, collaboration, critical thinking, digital literacy, empathy, engineering mindset, and resilience, can survive in today's volatile business environment (POST3, Webinar 5 & 6, YT-V15, POST24).

Ethical awareness of digital hardness

There is a strong ethical watchpoint around how you do anything with machine learning, AI, and blockchain technologies. We are capable of doing large-scale machine learning and automation. However, we've gotten not very good yet at where is that training data come from? who creates it? how do they create it? How do we recognize biases that are inherent in those data? It's going to be equitable, and fair across the whole population rather than just a subset of it. Generally, we are very excited about machine learning and distributed networks powered by blockchain technology. There are lots of good possibilities there as long as people approach it sensibly and ethically. "*The problem is like the ethical angle of who's designing it, humans always seem to want to give themselves advantages over somebody else… The ethical angle I think is the piece around bias is the big problem, along with who is using the technology and what they are using it for*" (IntvP5).

"*The first ethical concerns that we need to share and to develop as being the first step toward better ethical awareness of digital hardness*", the ethical concern in finance and everywhere we deal with digitalization is not to lose contact with reality. "*The second point I would like to address is the fact that artificial intelligence, big data, and machine learning are all tools widely used …they provided users with automated ways for decision-making… But the decision to use such a tool to go for automation has to be a prudence decision, a conscious decision with required due diligence and ethical considerations… What is the scope of delegation? What are the terms of the delegation? What are the monitoring tools? how would then we trust errors? What are the effects if we delegate the power to the machine?*" The ethical dimensions have to be presented in these places where we use AI and blockchain technologies. "*The third point is digitalization breeds complexity. And complexity tends to blur the sense of responsibility…what I call Moral Distance-No, it is not me, it is the system, it's the procedure, is the routine, is the batch is something outside of my reach…The moral distance has to be not only acknowledged but has to be addressed because if we do not monitor if we do not harness this moral distance, we enter slowly into the field of irresponsibility, nobody is in charge… So to compensate for moral distance, and to avoid more regulation, we need to build the awareness of ethical issues in times of digitalization*" (Webinar1).

As technology evolves so fast, there is so much to be done. Organizations need to increase the awareness and urgency to pay attention to the practice of responsible business (Webinar1). For most of us, we need to have cultural awareness and almost human awareness of what automation and decentralization actually mean to us. "*Multiple times in our lives because things are outdated over time. How do we stay creative? How do we stay optimistic? How do you manage our mental health? Those are the real challenges that technology challenges are there happening. The challenge we have to face now is more mental health and social fabric that's being ripped apart by these changes*" (IntvP17). We need to be aware of the fact that these technologies can pose potential ethical issues and we need to look into them. Raising awareness is a crucial first step to performing risk analysis and due diligence with automated systems (POST29).

Hire an ethicist or form an ethical review panel

As previously discussed, we see new jobs such as algorithms forensic experts, digital ethicists, AI ethicists, computer scientists, data scientists, and big data engineers (IntvP4). For example, "AI ethicist, he said no way, not a job. That's not a lucrative career field to go into. You never tell your child to do that. Yet here we are, seems like a pretty cool career field to me right now" (YT-V13).

"*A designer says, "This is going to be great!" And off the philosopher is impelled to go, searching for all the scenarios in which it isn't great…. This is one reason I tell clients to hire an ethicist. They've been developing their muscle of moral imagination and so they see things others don't. They also see them quite fast*" (POST31). Many companies now actually employ ethicists and create ethical review panels for AI projects (YT-V11).

"*It is a good strategy to have an ethical committee or review panel. But with many strategies made off broken by the implementation. So, this should be pushed, and pushed by whom. Ideally the chair, and the risk committee at least should push this. Ethics committee influence company is almost like a cross-sectional topic, It is really about something sponsorship, who would push this…the drive for this transformation is likely not to come from inside the corporation, but in public companies, I believe that*

big investors, proxy advisors, they will push this and they have the power to enforce it. They have different interests because they are part owners of the company. Where CEO or chairman, has different positioning in that" (IntvP2).

"*My general answer to that one is that I think it is a good practice to have a committee that is going to be doing assessment around whether the use of these technologies is going to be responsible or going to be ethical. I think it is also good practice to have that kind of committee for all of the other things you do in your company, not just for the question about how you going to use emerging technologies*" (InvtP9)

"*My thoughts are that some older data might still benefit from going through an ethics review before releasing it to an external AI system. And anyone who wants to use data to their advantage has to first ask the questions they want to be answered, so they know what to look for*" (POST14).

"*Well, first of all, who's on the review panel? Right, so I believe we're going to see philosophers, social scientists, and sociologists, on the review panel… So I think with review panel makes sense, but who's on the review board. That's an important question*" (IntvP12).

4.1.3.5 Culture and Value

As more businesses venture into the realm of digital technologies, *"... conduct and culture play an integral role in determining the outcomes of the decisions around how algorithmic, AI and autonomous systems are deployed in society…Yet most executives fall short of fully understanding the culture of their operation or how to manage it. Without suitable regulations, it's a free-for-all fiasco with potentially devastating results for certain individuals and demographics*" (POST28). Companies need to have a proper digital culture to respond to changes. A bad culture will produce bad AI, especially when people don't openly collaborate. "*It is critical when we go beyond business conduct to include ethics and culture*" (Webinar4).

The issue with AI is it's automated, and it can affect hundreds, thousands, or millions of people you know with one kind of wrong decision, so the consequences are huge

(IntvP15). “The risk is so great, and their consequences are so severe that you've gotta make sure that the culture of the organization encourages trust, psychological safety, listening, reflection, and ethical standing throughout the entire system” (IntvP17). The findings of this study report three areas companies can look into to foster a digital culture to move forward with transformation: 1) tone at the top, 2) ethics embedded in the design of an organization to value ethics first, and 3) people open to call out unethical behaviour.

Tone at the top

As mentioned earlier, people are a critical success factor to help companies move forward in the digital journey. If companies don’t have adequate competent, honest people with the right ethical behaviour, especially those people who set the tone for the entire organization, then sooner or later, the company will run into trouble. So companies need robust, strong internal control function in risk management, compliance, internal auditor, as well as the tone on the top to give the voice to the value (Webinar4). We need some kind of ethical framework to guide developers to incorporate ethics into their design. “*This should be at the highest levels of corporate governance. This is a CEO and a board decision, not somewhere down the line*” (IntvP15). “Ethics should be in our core of our DNA for the good of our society, long term sustainability” (Webinar4).

“*Tone on the top set the direction where we want to be, how you want to operate as a company, it has to come from CEO through to our field, to the teams in the back office, certainly to the function in technology… The tone on the top expands to communities…Tone on the top empowers everyone to use data analytics, hearing from senior executives, a bunch of characteristics keeps coming up, data as fuel to build up, focusing together, normalizing the use of analytical thoughts in organizations. Learn along the way, it is about agility*” (Webinar5).

Ethics embedded in the design of an organization

“AI is being increasingly deployed right across everything, and people aren't necessarily thinking about the ethical issues…. Often people who are currently designing the algorithms don’t have an ethical framework or something that they can

work from … people are far away from the algorithms and don't really know what's in them… So we need to think about ethics by design… think about what are the ethical issues, questions, risks, and consequences… these need to be elevated onto blockchain too. Because there are also ethical issues around the kind of social and moral consequences of disrupting intermediaries" (IntvP15).

"*So, yes, ethical committees are important, but audibility and verifiability throughout the entire system are important because AI and blockchain I think are completely intermeshed in the future. How do we achieve this?..... I believe ethics need to be embedded within the design of the organization. So the organization and its leadership, its processes, and its culture need to make space for people to pause and evaluate the consequences of their work…. So, each person along the way must be encouraged to take ownership of the ethical choice and the ethical responsibility. It can't just be a committee, but you also have to know that every step of the way it should be auditable. You must be able to prove, let's say, you must have approved your ethical choice in perhaps blockchain log so that someone else can check it*" (IntvP17). So, the culture itself within corporations has to change when humans and machines now can work together to take the organization forward with new innovative new products and services (IntvP12). "*Good data doesn't come cheap or fast and most certainly never stays that way without change in an organization's culture*" (POST25). "*Organizations need to drive more cultural change to leverage technology in the right way to make people smarter, to reduce some of the manual drudgeries to automate certain elements of it, so people have time to really have time to interpret and understand data*" (YT-V12). Importantly, organizations need to ensure that our cultural and diversity, and ethical values are honored by AI and autonomous systems to help us advance into the future (IntvP12).

People open to call out unethical behaviour

If you realize or identify that one of the founders of one of the investors was just unethical in your due diligence, then you have to decide do you want to jump in or not? "*Often there may not be an effective whistleblower avenue or avenues in an organization. So, if employees, in particular, don't know where to go, they might either not report something that's a suspicion or a concern*" (PODCAST7).

"*My decision was I don't want to deal with these people because these people are liabilities. They will sooner or later break their necks because lying in the age of AI as a corporate or as a startup, that's a short living environment*" (IntvP4). "*I have on two occasions in my life seen unethical behaviour and, in both instances, I called it out. I was tried but I was put on the sideline. I was proven right in both cases, you know, very unethical behaviour and wrong ultimately for the business in the long term…, I wasn't afraid, but someone more afraid for their careers would not have called it out. With AI, this is going to be even more, because the changes are going to be more automated, so you don't know who's behind it, so you don't know who to talk to,*" (IntvP3).

"*One of the other things I believe is, if you are in a regulated business if you don't have a culture of openness, and inclusion, it is just a matter of time until you are going to have a regulatory problem because your people have got to feel as if they are safe and that they are expected to raise issues that they see. If they do not feel that they are in an inclusive environment where they can do that, where they have that freedom and an obligation to raise their hand when something is wrong, then you are going to end up with a regulatory problem at some point in time*" (Webinar9). There is also key that firms provide an environment that does not punish speaking out when people are facing a situation when wrongdoing is being carried out. If the firm does not see the value in reporting the ethical wrongdoing and practices that break the law, it is creating a toxic environment (Webinar4).

In the light of the above, table 14 below summarizes the themes explicated above with representative quotations from the data collected for this study.

Table 14 Data supporting interpretation with representative quotations for themes

Data supporting Interpretation with representative quotations for each theme	
Theme	**Representative Quotations**
Triggers of change	
Change in Social Reality	"What's new about today's most powerful platform businesses is that the connections they facilitate take place online. In other words, digital platforms draw upon related technology trends, such as mobile devices, artificial intelligence, blockchain, big data, cloud computing, and automation. All these tech trends have combined to create a perfect storm, giving rise to a new wave of highly successful digital platform businesses" (POST10) "There are four things that I talk about in the shaping new realities, the first is a new reality in human experience…the second is the technology that just the realization and the new reality that every business is a technology business… the third new reality is around new future of work … the 4th reality is surprised some people but it's sustainability" (YT-V15) "First of all, the two biggest macro trends hitting business and society accelerated by the pandemic, and on one hand the digitalization and data transformation of business and society. And at the same time increase the awareness and urgency to pay attention to the practice of responsible business" (Webinar1) "So for some industries, it's necessary to start looking into different technologies to improve, and I think what we've been seeing in the last year is that a lot of companies looked into blockchain or AI because it's a buzzword and so they can go along. For the next couple of years, you will see this shift of companies who are successfully transferring into something new into this new world thing, and other companies will bleed to death because they're unwilling or unable to change their company policy" (IntvP13) "Because if you think about what's changing. So first of all, you have these megacorporations, Microsoft, Amazon, Google, and Facebook who have bigger economies than every country in the world except China and the US, so they're more powerful than all the countries in the world, and they have this consumer base that they can sell products to that they can communicate with. So how is that governed? And then, similarly, we now have, you know, with blockchain, these decentralized organizations. They don't live anywhere. They're kind of like digital organizations that aren't necessarily in any one sovereign state. So how do you regulate those? Or how do you say you almost have organizations that don't exist in grounded geography" (IntvP15) "The Machine Learning Revolution is going to be very different from the Industrial Revolution, because the Machine Learning Revolution, never settles down. The better computers get at intellectual activities, the more they can build better computers to be better at intellectual capabilities, so this is going to be a kind of change that the world has never experienced before, so your previous understanding of what's possible is different" (V-P12) "I think people don't realize that this isn't just a career thing, the way the world is shifting, this fourth industrial revolution, the digital revolution is a life-altering thing, and the way jobs are changing, you need these fundamental skills" (YT-V4)

	"And those young people are different, they use apps, they go to social media, financial influencers, different from what the regulatory applied for, so we need to reconsider that" (Webinar4) "Changes in Fintech alters mentality of people who are approaching the financial sector" (Webinar1)
Current Business Problems (fraud, moral hazards)	"And I have worked in my earlier career, I worked in one of the big 4 accounting firms, at that time, is still very labour-intensive, people-intensive business. We are relying on lots of young graduates, educating them, and after 2 years, they left. I think that kind of business would change, and shift towards technology-enabled business" (IntvP2) "Everything from cost pressures to changing customer expectations" (Webinar7) "Business processes often involve creating or capturing data in a way that is siloed and difficult to access, analyze or act on outside of the process for which it was created. Even today, many business processes are reliant on physical record-keeping – note-taking, filling out paper forms or ticking checkboxes on hard copy documents that are then filed away and forgotten about" (POST14) "This is what we have already seen since the last financial crisis, that is the erosion of trust. In the last financial crisis, there was a trust survey, financial services would appear below politicians, below media. So we all know nobody trusts politicians, but even below that was financial services. So in the 11 years since the crisis, things have moved a little bit but it's still very much at the bottom" (IntvP3) "We have lots of pain points in accounting, for example, manual work, human error, the need for reconciliation, checking or validating information" (IntvP7) "We face uncertainties like not knowing who we're dealing with, not having visibility into a transaction and not having recourse if things go wrong" (V-P6) "What undermines confidence is when a reputable audit partner signs accounts which purport to show that all is well months or weeks or even days before the business fails….The internal audit people in big firms already do most of the work. The externals ask questions about the justification for the internal treatment of various things. That's a big part of the reason why these scandals keep happening…. It's the same problem with rating agencies: whoever pays the piper calls the tune" (POST24) "Fraud is on the rise across the globe. Criminals are exploiting the convergence of social media, technology, and social engineering to create more potent and widespread scams. No one, and no business, is completely safe from this new wave of fraud" (PODCAST7) "Greed is definitely a problematic issue around crypto of blockchain from ethics perspective" (IntvP5)

	“The job of a modern auditor is complicated. Businesses today are complex, and how you validate the information is a difficult business. And there is also a massive conflict of interests there because the people who pay the auditors are the people auditors are in theory are trying to catch, which is a wired place to be” (IntvP5) “Independent Audit of AI Systems will not provide ultimate security: all transparent systems are at the mercy of bad actors” (IntvP11) “Then you also have a lot of bad actors who are trying very hard to steal money so you know, especially in decentralized finance” (IntvP15) “Even you want to do the right thing, it gets all shadow by people who may not have the right intend” (IntvP16) “Business processes often involve creating or capturing data in a way that is siloed and difficult to access, analyze or act on outside of the process for which it was created. Even today, many business processes are reliant on physical record-keeping – note-taking, filling out paper forms or ticking checkboxes on hard copy documents that are then filed away and forgotten about” (POST14)
Blockchain and AI for fraud detection	“While with blockchain, it will help to check and validate the information immediately or give you a sense of anomaly activities” (IntvP7) “I think blockchain perfectly fits into that idea of a new way of increasing transparency and reducing information asymmetry. If you use the technology in a good way, from the societal point of view, that is very relevant, that will increase public trust in that specific company” (IntvP1) “The whole purpose of blockchain is transparency, so you would be able to see who did this, where it was, and at what point. It is good for transparency and trust in AI, so if you would put that all together, the objective is to create trust in AI ” (IntvP16) “Blockchain has in itself the potential to create ethical value for instance by creating more transparent and traceable food supply chains to ensure that the food we eat has not been produced with forced labour or against environmental standards” (PODCAST10) “We believe blockchain resonates very well with the concept of trust and we want to provide trust which is not provided by the third party. We want to offer trust which is provided by mathematical algorithms, and by real proof” (Webinar12) “Activities that aren't very good that have been hidden in a human-centric system will now be exposed in the human-machine systems” (IntvP12) “Decentralized form of organization will give a different degree of checks on each other. So it makes these criminal activities hard to hide to a degree…. I mean the advantage of blockchain and the DAO models is that you know the activities are managed through effective smart contracts. So you can't just as an individual pay yourself loads of money” (IntvP17)

	"What they didn't realize is that when you use AI for everything you do, you create a trail of activity, which becomes, which makes your activity becomes more transparent and can be detected very quickly" (IntvP4) "The transparency aspect and there are also the aspects around if you can have a system that proves something like blockchain potentially means you are continuously connected to real-time status of the data, as opposed to a certain amount of data you collected some point in time that maybe end up becoming outdated. You are making sure any kind of influence that the AI systems are making is based on the current state of that particular thing. Those are important elements that can help to address some of the ethical issues" (IntvP9) "I suppose in principle, sure. AI and blockchain can enhance the ethical behaviour of top management, particularly in the context of fraud detection" (IntvP14) "If we do it right, there is such immense value for everyone…but only if we are very confident that these systems have the right intention and are not ethically compromised" (IntvP16) "It has the potential to make decisions or calculations more consistent than humans. It could result in fair and more ethical decisions, certainly, ethically consistent decisions, provided you have that confidence around how it is designed in the first place, operating in the first place…Yes, in theory, it can dissuade catch, prevent frauds" (IntvP8) "Machine learning can be helpful here, as it's able to correlate many different factors and draw up a more accurate picture of which activity is simply unusual and what might constitute a serious threat that requires remedy. And, of course, data is the fuel of machine learning - the more that algorithms know, the more accurate they will be at understanding and classifying behavior"(POST30)
Change Context	
Structural Change	"So what we're going to start to see is organizations coming to grips with the fact that AI will automatically negotiate contracts on their behalf for their business and services and products, and that means a delegation of authority. And also we lots of other things as well to that that automatically negotiations by smart contracts. So there's a whole governance change around how organizations work around that" (IntvP12) "There is no doubt that business that has transformed their business from traditional method to digital platform business is doing exceptionally good" (POST10) "You know, with blockchain, these decentralized organizations. They don't live anywhere. They're kind of like digital organizations that aren't necessarily in any one sovereign state" (IntvP15) "I also believe that these technologies themselves are causing the structure of organizations to change. So both of these are network technologies. They work decentralized, they work best when used by organizations that are not rigid, hierarchies of command and control. So the technologies themselves are forcing organizations to adapt to their culture and their structure, and so

	in the long run, the organizations that welcome that and allow that transformation to happen and make the best use of these technologies, I hope, will naturally become more open to diversity, more open to different opinions. The potential is technology should drive transparency, and ethics is high" (IntvP17) "Tech-enabled are the businesses that now seem to be the structural winners here" (Webinar8) "Based on the discussions, first you see an increased level of automation of legitimization and digitalization, and going much more in the direction of self-serve, self-service" (Webinar1) "Human plus AI" is our only option to bring the benefits of AI to the real world. And in the end, winning organizations will invest in human knowledge, not just AI and data. Recruiting, training, and rewarding human experts. Data is said to be the new oil, but believe me, human knowledge will make the difference" (V-P4) "Before any organization aims at digital transformation or leveraging data for AI-ML purposes, it is highly advisable to start by implementing a data governance framework, that ensures that silos are torn, data assets are identified and there is a single source of truth for each data set. This process requires a business process re-engineering across the organization" (POST14) "The key unifiers are the enablement of multi-level governance, the decentralized management of data, and the distributed nature of the technologies. They will challenge the existing more centralized economic and data management model of today's Internet and will provide self-determination to citizens in the management of their data and transactions" (POST26) "I specifically focus on the smart contract on governance type of framework, and more specifically on decentralized autonomous organizations (DAOs)" (IntvP1). "What we're going to do is we're going to push the whole company in the later stages towards a DAO company…So what I'm thinking at this specific moment, obviously we will learn in time whether this decentralized application will work or it needs to be a little bit more centralized at some point" (IntvP13)
New capabilities	"Just talk from an engineering point of view, blockchain is a coordination technology, and pacifically, the ability to coordinate not just people, but also legal fictions…... I see blockchain also permitting more of a decentralized corporate culture." (Webinar12) "I think the main benefits of using blockchain technology is to enable more transparent governance and provide opportunities to engage more stakeholders… the main benefit of AI for companies is that more efficient decision-making. Combining AI with blockchain can facilitate decentralized autonomous organizations, which could play a very important role in the economic life, depending on how you fill in the concept of autonomous organizations" (InvtP1) "So the benefits will surely speed up things, because if you look at the entire, not only financial aspects of changes. If you can automate things, you can avoid manual, not only processes, you can use AI to analyze it, to perform opinions on things, so speed, accuracy, precisions, trustworthiness, I see lots of benefits in the financial part of the business, but also in others" (IntvP2)

	“Save business owners time, energy and improve their process efficiency so that they can generate more revenue” (POST1) “We see more companies looking to harness AI for a range of tasks and I believe this is going to continue as we see more innovations in the coming years that will further the usability and ultimately efficiencies for the industries…. It also gives us the ability to monetize our data and turn it into a tradeable asset” (POST13) “artificial intelligence provides massive opportunities to improve the decision-making process, governance, contracts, by making use of big data analysis, recognize certain patterns, assessing the impact of decisions in a short, medium and long term” (IntvP1) “Efficiencies will generally come from time-saving and reduction of waste, as routine processes are taken care of by machines, leaving human workers free to apply their knowledge and expertise in areas where it can make a real difference” (POST11) “If you integrate a blockchain in your business, you know that first of all the positive aspect would be disintermediation, in which you are going to need fewer people. You are going to gain money. because you spend less, and you're going to have kind of clearer data storage, you will be able to access your data better, faster” (IntvP6) “The organizations can leverage the new capabilities from these two technologies to build, you know, like to streamline their business process that improves the efficiency and kind of try to build a robust for their future” (IntvP12) “Blockchains give us the technological capability of creating a record of human exchange, of exchange of currency, of all kinds of digital and physical assets, even of our own personal attributes, in a totally new way” (V-P6)
Ethical concerns with automated systems	“but without the care and control, it can unintentionally or purposely infiltrate our privacies and even replicate or exasperate our worst inequities, bias, and abuse” (YT-V13) “So you got an issue, we can talk about the ethical issue of implementation of new technology, each time you got new technology coming, you are going to have a lot of people, they will lose their jobs, Okay. Because it is a substitute machine, and the machine is going to substitute a lot of things” (IntvP6) “It is causing massive social upheaval. It's removing people, their jobs” (IntvP17) “We can tell that the automation, repetitive jobs are mostly replaced by robots” (POST2) “Most duties in a typical corporation will be automated within five to 10 years” (POST8) “Automatic doors fired the doorman... self-checkout fired a clerk... Self-driving cars will fire taxi drivers... Keep it up and we will all be out of a job” (POST16)

	"On the other, we saw emerging technologies but frankly we're displacing, disrupting, replacing the traditional professional model" (YT-V5) "Now, for the long term, we have to think the skills that would be needed in the people, employees, to have that collaboration between human and AI. Just like any technology revolution, it would need new skills" (YT-V6) "I think that's part of the frustration we see right now is people trying to figure out, one, what is the future of work. Is it a future of abundance? Is there going to be a massive series of job losses and displacements? There are all these different scenarios" (YT-V19) "You will have lots of jobs will be redundant due to automation, but it also creates space for new jobs.. we have to be optimistic. Machines will not all replace us, hopefully" (IntvP1) "Technology is poised to transform the accounting profession. Artificial intelligence, robotics, and blockchain are on the verge of automating many traditional core CPA tasks. The profession is at a critical moment, one from which it will emerge in a far different form" (PODCAST8) "So from the ethical point of view, there is another issue here is like the control of the workers, it is going to be more terrible. Because you know who did what at what time, you know the name, how they did it, you know everything. From a business point of view, it is good, because you got control, but not good if you are a worker " (IntvP6) "So I am a big believer that the ethics watchpoint around ML AI, tends to be more about natural human bias. Add whether things that people realize or not, more often is not intentional, but groups of researchers who are all perhaps they are all white men or the training data is all white man and as a result, people struggle with it… The ethical angle I think is the piece around bias is the big problem, along with who is using the technology and what they are using it for." (IntvP5) "AI will take more and more critical decisions by the rules outside of any human control. Is there a real risk? Yes" (V-P4) "Well, an algorithm is a set of rules to be followed. The bias, as I see it, can be there because that set of rules has to be written by humans (or by software designed by humans). Humans have biases - some intentional and some unintentional" (POST19) "Unfortunately, they won't address all of the issues. So if we think about things like bias in algorithm systems, whether or not the data is updated or not is only one element, of where it comes from. Often, a more important element when it comes to bias, are we even looking at the right parameters? are we tracking the right input datasets? or should we look at something else. Because these particular input data says, actually end up being unjustifiably favorable toward certain people or organizations, as opposed to others, that would be introducing a bias. There is also the question about are we formulate the requirements of the problem in the right way that could be the way bias is being introduced" (IntvP9)

	“Some have also been attacked for the algorithmic flaws or distortions in their programs, where computers inadvertently propagate bias through unfair or corrupt data inputs — such as Amazon’s experimental hiring algorithm that penalized female applicants. The company has since scrapped it” (POST15) “Fairness is critical because AI isn't biased. AI is a very neutral technology, like every technology. Technology is neutral, but AI can be trained on data sets that reflect bias and AI can be implemented in a biased way” (YT-V16) “Millions of people, in some cases, billions of people’s lives can be affected by choices you make in your algorithms like which web pages should be promoted on the Google search engine” (YT-V8)
Adoption challenges	“The prototype is already there. But there is high resistance from everybody involved. Because these changes are disruptive. It will affect the whole ecosystem, not just one party. How do you put a virtual director in jail? How do you find the virtual board director, who is that person directly accountable? It is a very complicated question, probably there are lots of similarities of lessons learned from the whole autonomous driving sector” (IntvP2) “What's missing for most of us is actually the cultural awareness and almost the human awareness. What does decentralization actually mean? I don't know how to be decentralized. I've never been taught how to do that. So we don't have the human capabilities to work in a decentralized way. And that's actually for me the bigger danger” (IntvP17) “Because you have to remember that Bitcoin blockchain, were invented against the bank. they wanted to make redundant the banking system and the financial systems. Ok, so, from the DNA of the bank, they profoundly hate Bitcoin, profoundly hate blockchain, because blockchain is transparency” (IntvP6) “They don’t understand the technology. They really don’t understand the ethical risks around them. They don’t understand the risk mitigation techniques, and how they might be complemented with existing laws and regulations. They just have a fairly flat flooded understanding of what’s going on….. It is complicated, and I don’t think the regulators have reached the level of understanding yet. ” (IntvP14) “On the other side because of the cryptocurrencies, and I think this is both got people involved, but it's held the industry back because all the regulators are very worried about the crypto and so you know they're coming down hard. But also they're not exactly sure how to regulate it because it's not the same as money. So I think that whole regulatory side of things as a bit of a problem” (IntvP15) “Hard to regulate, bearing in the mind, in the digital age, it is very hard for regulators to keep up” (Webinar1) “The regulators will never be strategic because they are physiologically reacting to something” (Webinar10)

	“He was giving an example of cameras that they were using in schools were doing behaviour recognition of children who won’t pay attention, the teachers were using that scoring the children, and it was being used to stare their behaviour. The first time I saw it, I thought wow, that's terrible. To me, it feels like a really strange thing to do. But actually, by talking to other people that coming from all over different parts of the world, this is great, this is amazing. if I could have this done in my child's class, this would be brilliant. So part of the reason is complicated, not everybody has the same view on what could or should work or should happen” (IntvP5) “Some challenges that AI poses must be overcome. Bias, transparency, security, accountability, and privacy are all big issues, and ultimately, they can be summed up by the principle of trust… It's interesting to consider that these are all essentially human problems” (POST5) “There's the problem of AI solutions becoming "siloed" within organizations, each unit is deploying its own AI solutions … you lose control very quickly. Then at some point, CIOs have to pull back and centralize a lot of their AI solutions, but that means they have to have diverse solutions…. For many companies, these challenges around culture, leadership, and skills are the biggest factors in determining success or failure – not the technology itself” (POST13) “Challenges around culture, leadership, and skills, existing business models, Lack of skills” (IntvP3) “The challenge remains around how the right conduct and culture in organizations innovating with algorithmic” (POST28) “The other comes from the technology itself and the fact that so much of the information is held in legacy systems where it can't be accessed by those solutions” (POST14) “So they’re either in legacy systems, they are distributed, they are not accessible” (YT-V3) “can’t be an agile and digital company if your system is older than you” (Webinar5) “But if you are an old company, the cost of this will be that you’ve got the legacy systems, the system is not working with blockchain, how are you going to connect these legacy systems with blockchain, this cost a lot of money… And there is a lack of adoption because there is a lack of education. You know, people don’t know it” (IntvP6) “To me, the biggest challenge for blockchain adoption now is simply the cost. It costs a lot because it is multi-point computing” (IntvP7) “Sitting at the very top end creating through artificial intelligence, through using blockchain, or other FinTech measures, needs to keep that responsibility, and this is the challenge we face in this world” (IntvP3) “The board I talked to generally they care about cyber, but they feel like bottoms up the money pig. Keep throwing money into it, but did not see the outcomes” (Webinar5)

Imperative Response to Ethical Use of Blockchain and AI	
Ethical design fit for purpose	“You can’t choose the right solution - the right processes, policies, practices, etc. - if you don’t understand the nuances of your problem. That’s one reason why senior leaders find it so difficult to solve the problem of AI ethics in the first place.” (POST32) “I agree with this! Leaders have to understand the problem they are trying to tackle before making large decisions” (POST22) “In the future, I can envision a voting system for consensus on AI algorithms before they're implemented on mass/global scales… Can we establish a global system of governance similar to how information controls like Blockchain?” (POST5) “All cognitive technologies, such as AI, cannot be treated as "neutral", due to their design that involves ethical decisions, which are hidden in the background and embedded in the "tools" by the manufacturers mostly as BlackBox” (POST27) “For example, an aircraft autopilot does not explicitly represent save the lives of passengers but instead implements that value through its design features and pilot controls” (IntvP11) “I believe the ethics need to be embedded within the design of the organization. So the organization and its leadership, its processes, and its culture, need to make space for people to pause and evaluate the consequences of their work” (IntvP17) “We go through all the checks and the privacy elements and the security teams, we work with cyber as well to make sure that the solution we put in is as secure as absolutely possible” (Webinar7) “I think they need to work on the constant feedback loops. If they try to experiment with AI, blockchain, etc., They need to go through the entire process of building, it, testing it, and gathering feedback to improve it. So I think it is very important for companies from the top down to be involved in all of the phases of tech process” (IntvP1) “Often ethics isn't considered in the design of the AI, so the people who are designing the algorithms don't have an ethical framework or something that they can work from, and so they're not necessarily thinking about the ethical consequences of the algorithm. And I don't think yet it's incorporated into corporate governance… this goes back to ethics by design. If that is the intent of the corporation that can be programmed into all of the technology, and that is possible” (IntvP15)
Ethical use of data	“If a business is just starting along the road to becoming data-driven, they create opportunities to ensure the framework and infrastructure are in place – from technology to skills, data governance, and compliance” (POST11) “it is a good strategy to have an ethics review committee. So this should be pushed, and pushed by whom. Ideally is the chair, the risk committee at least should push this… the drive for this transformation is likely not to come from inside the corporation, but in public companies, my belief is that big investors, proxy advisors, they will push this” (IntvP2)

	"My general answer to that one is that I think it is a good practice to have a committee that is going to be doing assessment around whether the use of these technologies is going to be responsible or going to be ethical. I think it is also good practice to have that kind of committee for all of the other things you do in your company, not just for the question about how you going to use emerging technologies" (IntvP9) "My thoughts are that some older data might still benefit from going through an ethics review before releasing it to an external AI system. And anyone who wants to use data to their advantage has to first ask the questions they want to answer, so they know what to look for" (POST14) "Well, first of all, who's on the review panel? That's an important question. I think we're going to see philosophers, social scientists, sociologists, on the review panel" (IntvP12) "This data is essential for businesses and society. Our once-in-a-lifetime opportunity to reduce human bias in AI starts with the data. Instead of racing to build new algorithms, my mission is to build a better data infrastructure that makes ethical AI possible" (V-P3) "you want to look for three criteria, 1) we want high volumes of data, so think of a ton of excel files, you want 2) high velocity of data, so think of the requirement that decisions be made quickly, the last piece is 3) highly accurate data. This is a twist that I don't think we're talking about enough. The third one is where most people are failing" (YT-V13) "A program code which accesses password should not be allowed to perform any analytical function, otherwise it might be vulnerable to hacking or being used for any unethical purpose" (POST14) "So it still comes to the control and proper use of the data. And making sure we put controls in place to minimize the bias in data" (IntvP7) "We need to stop the data, or the biased data that we already have, and focus on three things: data infrastructure, data quality, and data literacy" (V-P3) "Here is no doubt that digging into the transparency of algorithms is the right way to go, whether on social media or other Internet platforms. But the biggest obstacle is how to balance the interests of the Internet users and the platform operators" (POST22) "However, I believe that everything has to start with data ownership. Companies need to be accountable not only for the algorithms and outputs but also for the inputs and how the data is acquired" (POST5) "Even if all a business's procedural documents and record-keeping is digital, the information is of little value unless careful thought is given to the data structure, format, and storage media that will be used" (POST14) "Use the most secure platform to get your hands on" (Webinar2)

	“So think about privacy, transparency as well as we discussed before, think about bias, think about reliability, think about the system imitations of the technology” (YT-V6) “For AI systems to be more effective, data will have to be labeled at creation so that it can be consumed by AI models downstream” (POST25) “We had better be quite sure that the purpose put into the machine is the purpose which we really desire. This was said by Norbert Wiener in 1960” (V-P9) “We need to put the governance framework in place that creates an industry and society where we can be bought trust in what we are doing with data” (YT-V12) “Security is an essential aspect of any data strategy” (POST30)
Leadership (Board support)	“To your point on digital leadership, it's those characteristics around the talent, the technology, the governance, the change” (YT-V16) “So the form of leadership we need is the kind of formal leadership that's natural to these technologies, which is leaders who work to support diverse distributed thinking and processing, so the leadership Challenge is not, can they know more about AI or more about blockchain? It is: they have the self-confidence to trust their own employees within their organization. They can build a culture where people can listen to each other and develop more collaborative, more open ways of being and working that allows different allows for diversity” (IntvP17) “So when it comes to culture and ethics, we're looking at a whole transformation for organizations to codify and to build their constitution, and to start to actually incorporate this change within their organizations. And this is the big thing. AI is now the new digital employee, and so how do we bring that into play?.... to empower organizations to give them a baseline of how to ask the right questions and qualify ethical AI” (IntvP12) “AI is equally disruptive. In all of these industries from manufacturing to retail to agriculture to healthcare to many others, it will change the core of what it means to be a leading company in all of these industry verticals. I think now is the time for a CEO or an executive team to figure this out” (YT-V20) “First of all, it absolutely means that companies could no longer treat data protection as some back-office compliance issue and that really it is a board-level and C level strategic issue for companies” (Webinar10) “A lot of companies underestimate the change management aspects of how to roll out this very disruptive technology” (YT-V20)

	"It like diversity, inclusion becoming more and more open, yes, increasing awareness and debate like what we are doing is certainly contributing to that" (Webinar1) "AI Ethics and Governance is very much also about people and process, bonded by the right mindset and behaviours across the organization (culture) starting from their leadership down to everyone who is tasked with innovating responsibly" (POST28) "it primarily drives changes at the leadership level, educates leaders, board of directors that's my main target" (IntvP4) "The most important is actually not technical, empowering your Chief security officers (CSO)…bring them into board meetings when you decide to move your infrastructure into the cloud, make sure the CSO is there from day 1, express their opinions and provide you with guidance and things need to be done to make sure this happens securely. Don't finish the project and then go see the CSO and say that is your job to secure it. It is an impossible job" (Webinar5) "And getting up to very strategic and very material, where might say the acquisition of the technology, where the board might involve because it is a multi-billion dollar investment" (IntvP8)
People	"Some of us are aware that digital transformation is not just about technology, but more about people and the organizational culture" (POST28) "We are talking about jobs that might not exist in quite the same way right now. I think that instead of worrying about it the day that they get displaced. I think the next step is we start building pathways forward before the displacement happens. I think people are doing that" (YT-V13) "What will happen, and is happening that we should address, is making training and reassignment of employees to new positions smoother and better-planned, not only to help the people affected by technology changes but also help the businesses take full advantage of their talents and skills in new roles" (POST21) "It is about improving people and the quality of the people that you hire along the way because good people make good things happen" (Webinar8) "So getting acquainted with the technologies that mean listening to the people that know the interesting things about these technologies, both from within the company and externally" (IntvP1) "The education for the C-suites is really important. It's fundamentally" (IntvP12) "You need some sorts of like training programs and awareness programs that are formalized for boards and CEOs to go through because at the moment you know again the technology is moving so far. It's very hard for people to keep up with what they should be knowing about, so I think that's a challenge as well" (IntvP15)

	“So the first thing is training company boards and managers but everybody throughout the company to understand this new democratic responsibility” (IntvP3) “Collaboration and communication are key but the ability to adapt is also super important in our ever fast-changing environment. People need to be able to change directions fast and with little effort” (POST3) “You think about data literacy, it’s the empowerment of people and the empowerment of organizations, the culture, and people, to use data effectively. It's not about tools. It's about the human element of it” (YT-V4) “The ability to question data is a key part of establishing trust as well” (YT-V12) “I think the CIO has to play a role around the inspiration and the evangelism of technology and the education of the rest of the organization. The education of technology, certainly, but the education of the rest of the organization” (YT-V16) “He said that people have to besides your normal CV, you need an ethical CV, so everybody in this world needs an ethical CV, that shows your ethical behaviour, what you've done wrong what you've done right. and that is a challenge because of course at the moment and especially with the big CEOs they can leave at a company at a disaster state and still get a fantastic job elsewhere with bonuses and whatever” (IntvP3) “So I think it is very important to help as many boards of directors as possible, to become technology-competent. Why? the more they become competent, the better they become running those companies, we want to see more companies strive and succeed because that means jobs for people, that means security, economic flow, stability” (IntvP4) “I think is the first ethical concerns that we need to share and to develop as being the first step toward better ethical awareness of digital hardness awareness” (Webinar1)
Culture	“so it is a very complicated question, the question of accountability is almost philosophical, and it will probably, the entire debate about AI and board room, and accountability would relate to different cultures. Because in different cultures, things are seen differently” (IntvP2) “As you know, a bad culture will produce bad AI, especially when people don’t openly collaborate” (POST28) “The risk is so great and their consequences are so severe that You've got to make sure that the culture of the organization encourages trust, psychological safety, listening, reflection, and ethical standing throughout the entire system because that developer working on that one piece up there” (IntvP17)

	“If that AI is being used with the employees or with their customers, they absolutely need to ensure the quality aligns with their values, their cultures, their beliefs, and their ethics and so. This is why we need a certification and maturity model for ethical AI because otherwise, our world is heading into chaos… so culture itself within corporations has to change” (IntvP12) “Thinking about how you drive more cultural change in your organization to increase levels of data literacy that brings this kind of Tribeca of elements together around the rules the technology and the people which really can help you live with data” (YT-V12) “Probably the larger challenge is to get sustained support for creating an AI and data culture. Good data doesn't come cheap or fast and most certainly never stays that way without change in an organization's culture. However, that is more of a reason for business and technical leaders to come together and work on this culture change as a team!” (POST25) “We urgently encourage ethics, will lead to less enforcement and less legislation issues faced with supervision, it should be in our core of our DNA for the good of our society, long term sustainability” (Webinar4) “Tone on the top set the direction where we want to be, how you want to operate as a company, it has to come from CEO through to our field, to our teams in the back office, certainly to function in technology” (Webinar5) “One of the other things I believe is, if you are in a regulated business if you don’t have a culture of openness, and inclusion, it is just a matter of time until you are going to have a regulatory problem because your people have got to feel as if they are safe and that they are expected to raise issues that they see. If they do not feel that they are in an inclusive environment where they can do that, where they have that freedom and an obligation to raise their hand when something is wrong, then you are going to end up with a regulatory problem at some point in time” (Webinar9) “It is critical when we go beyond business conduct to include ethics and culture… If the firm does not see the value in reporting the ethical wrongdoing and practices that breaking the law, it is creating a toxic environment” (Webinar4)

Further, guided by Gioia et al's (2013) mantra of "no data structure; know nothing" (p21), this study follows the study of Corley and Gioia (2004) and builds a data structure from the data analysis processes (see figure 15 below). The data structure consists of the 1st order concepts, 2nd order themes, and aggregate dimensions. It demonstrates how this study progresses from raw data to concepts and themes in the data analysis. The 1st order concepts indicate what the respondents are saying, and the concept codes are constructed to reflect respondents' views and experiences of the world. As the research progresses, this study starts searching for similarities and differences (relationships between and among these categories) to combine conceptually related nodes to form new, higher-order elements in the 2nd -order analysis to form themes. Following on from this stage, this study further refines the 2nd order themes and groups them into aggregate dimensions. The data structure provides a graphic representation of configuring data into a sensible visual aid to enhance the rigor of this study.

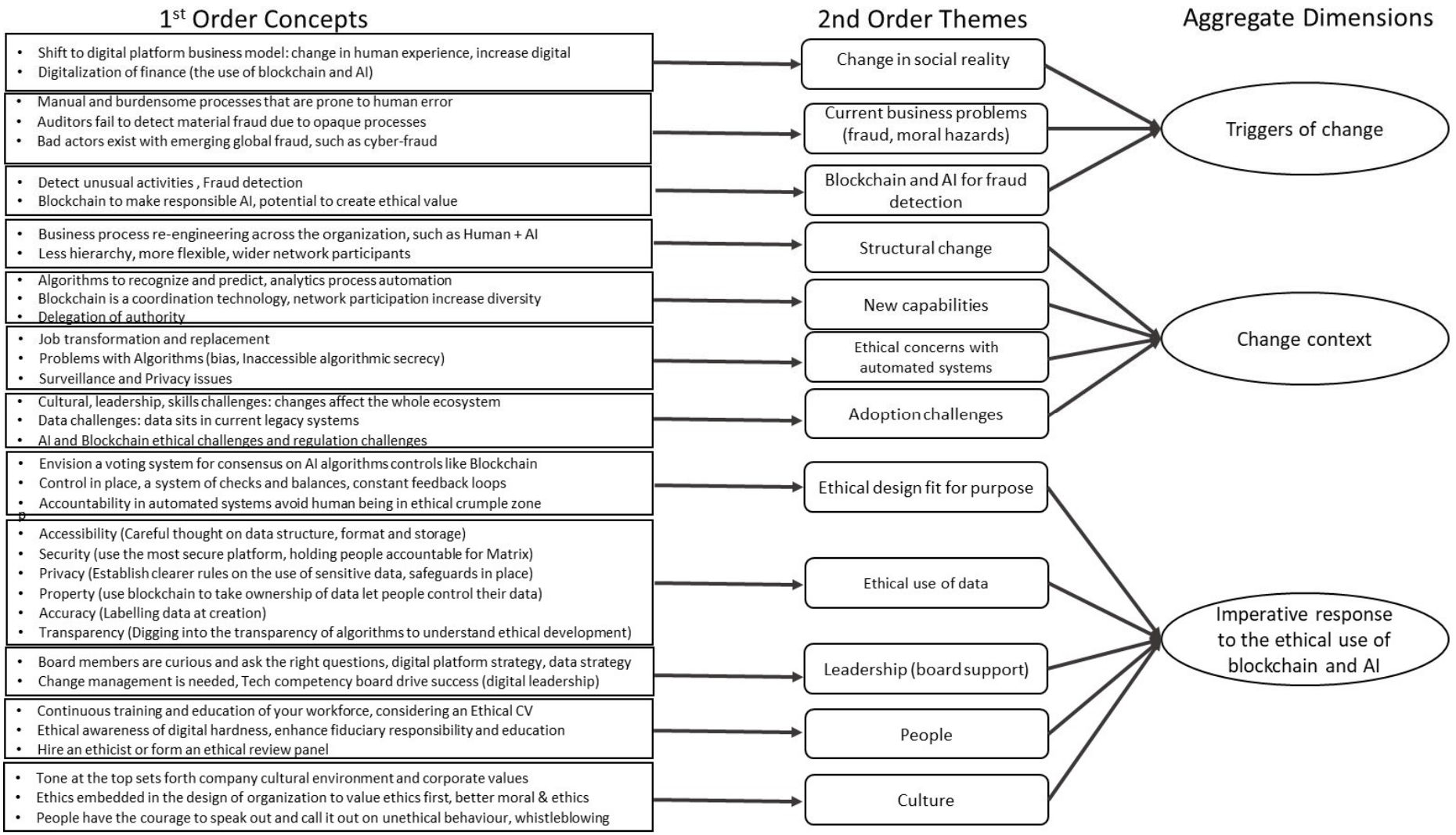


Figure 16 Data structure of this study

4.2 Thematic framework: substantiation of main findings

Based on the progressive data structure derived from the data analysis and interpretation shown in figure 15 above, this study develops a thematic framework that constitutes the corporate governance transformation with the ethical use of AI and blockchain technologies in figure 16 (see below). This framework provides a holistic understanding of why corporate governance needs to change, especially with the emergence of blockchain and AI technologies, what changes will corporate governance encounter with the use of blockchain and AI technologies, and how corporate governance can imperatively respond to the intent, implementation, and impact of using these technologies. Particularly, this framework explains the ethical benefits of AI and blockchain technology for fraud detection, and the ethical concerns with these automated systems such as job transformation and replacement, algorithms bias, surveillance, and privacy issues, and further articulates technology competency board in corporate governance drives success in digital transformation by fostering right strategies, embedding ethical design in systems that fit for purpose, creating an organizational culture values ethics first, and continuous training and educating workforces to enhance ethical awareness. As illustrated in figure 16 below and explicated in section 4.1 above, there are three main dimensions to the thematic framework of the corporate governance transformation with the ethical use of AI and blockchain technologies that emerged from multiple informants' experiences: 1) triggers of change in corporate governance; 2) corporate governance change context with the use of AI and blockchain technologies, and 3) the imperative corporate governance response to the ethical use of blockchain and AI.

To understand why each of these aggregated dimensions and their constitutive themes emerged, it is important to gain an overview of digitalization that facilitates and accelerates the changes.

As previously outlined in the introduction chapter, technology has been embedded in our lives and organizations for many decades. It has accumulated through human history. It drives the most fascinating social changes. Today, the abundance of data, advanced computing power, the emergence of pattern recognition, machine learning, digital sensing tools, and integration systems are the embodiment of the new industrial revolution. Our lives have been transformed by digital technologies such as laptops,

tablets, smartphones, biometric devices, social media, video conferencing, network sensors, machine learnings, and autonomous vehicles. The most valued businesses today like Google, Amazon, and Facebook, are highly successful digital platform businesses that embrace new technologies such as artificial intelligence, blockchain, big data, cloud computing, and the Internet of things. IBM already has AI as a service module and blockchain as a service module.

Corporate governance regulates the relationship between the board and management, the board in and of itself, and the board and the shareholders. It is acknowledged that good corporate governance promotes effective management and corporate results that benefit all the participants such as shareholders, investors, employees, customers, suppliers, etc., within the corporate ecosystems (PODCAST4). As technology advances in the 4th industrial revolution, it is believed the economy is not going to be built by millions of factories or billions of people, but by computers and algorithms (V-P3). Importantly, we all come to realize AI is already here. It is already embedded in our smartphones, in Google Homes, Echo Dot, so on and so forth (YT-V21). "*Often it works in the background, in the back offices of hospitals, where it's used to diagnose X-rays better than a human doctor. It's in legal offices, where it's used to go through legal evidence better than a human lawyer. It's used to fly the plane that you came here with, human pilots only flew it for seven to eight minutes, the rest of the time the AI was driving. And of course, in Netflix and Amazon, it's in the background, making those recommendations. That's what we have today*" (V-P16). In businesses, it becomes very difficult and challenging for C-suite to make decisions without the help of intelligent systems due to the enormity of data available. In addition, businesses are seeking new technological solutions to solve their current business problems, such as a) manual and burdensome processes that are prone to human error, and 2) auditors fail to detect material fraud due to opaque processes. "*We have problems that we desperately need to solve…The train is already out of the station, and there's no brake to pull*" (V-P10).

This study finds that artificial intelligence and blockchain technologies are evolving faster than ever, transforming business models and processes, and disrupting the way we work and live. To some extent, these two technologies can help organizations combat their current challenges, based on the right intent, implementation, and impact. Companies and individuals that don't keep up with some of the major technology

trends run the risk of being left behind (POST1). Blockchain-enabled network coordination and AI-enabled data intelligence create new capabilities for businesses to create value. Corporate governance will change in many ways with the arrival of AI and blockchain technology. Every institution and organization needs to empower a thoughtful, careful consideration of the implications of technological disruption, to stay relevant and build resilience in the digital era.

"*In general, artificial intelligence provides massive opportunities to improve the decision-making process, governance, and contracts, by making use of big data analysis, recognizing certain patterns, and assessing the impact of decisions in the short, medium, and long term. Those things can be facilitated by the use of artificial intelligence tools. And on blockchain technology, like I just mentioned is a very interesting technology, which enables new ways of decentralized governance*" (IntvP1).

Based on the philosophical orientation of this study, the researcher is inspired by the philosophy of Stiegler, who suggests human beings and our technology coevolve. The findings of this study reflect this philosophical view.

"*Some of us are aware that digital transformation is not just about technology, but more about people and the organization culture*" (POST28).

"*The next stage is going to be, how do you marry the very best in technology, the very best in digital experience, together with the brilliance of your people, because what customers are looking for, ultimately is choice, but they're also looking for advice. That combination of brilliance in terms of technology, choice, and flexibility, together with warmth, the empathy, and the expertise of our people, absolutely that's going to be the next stage in terms of evolution*" (Webinar6).

"*The first thing is, you got to make sure you have the right foundation in terms of a company. For that I mean the company and your team have got to be clear and unified in terms of what is the purpose of the company, why you guys exist, and why have you brought it together. First of all, what's the purpose of what you are doing. Secondly, what's your vision in terms of where you want to take the company; when you look at it in 3 or 5, or 10 years, what do you envision that company to be? The third thing is what are the values you have around the company, what are you telling your people*" (Webinar9).

"*Compared with normal ethical questions, I think the issue about digital is, you know if you and I are discussing an ethical problem in traditional life if you like. It's an issue perhaps to one person or one small group of people. The issue with AI is it's automated, and it can affect hundreds, thousands, or millions of people you know with one kind of wrong decisions, so the consequences are huge and I think the challenge is that*" (IntvP15).

Thus, this study finds the use of technology is a double sword depending on the intent and implementation. "*In a sense, it has lots of potential but brings with it certain new risks if you apply it without putting in place the right kind of safeguards*" (IntvP8, IntvP9). To some extent, the use of blockchain and AI technologies can enhance ethical benefits by detecting anomalies and making it harder to tamper with the data. Financial fraud will thus be harder to hide. In theory, suspicious fund transfers can also be detected in real-time. However, at the same time, the use of blockchain and AI technologies will encounter new problems, some of which are ethical concerns, such as job losses, algorithm bias, and surveillance, which will have a profound impact on people. Based on the views and experience of the multiple informants, this study also finds fundamentally the human who designs, uses, and advances all these technologies. We not only advance AI, blockchain, and big data but are also transformed by these technologies. As mentioned by the informants: "*of course, we can reach into the autonomous parts of the world, but how do you hang on to feel responsible. A machine doesn't feel responsible. That person does*" (IntvP3). "*AI is not going to help us make more ethical decisions If we don't have the organizations that value the ethics first*" (IntvP17). These views can help organizations to understand how to govern the use of these technologies and enhance organizational awareness of digital transformation is not just about technology, but more about leadership, people, and organizational culture.

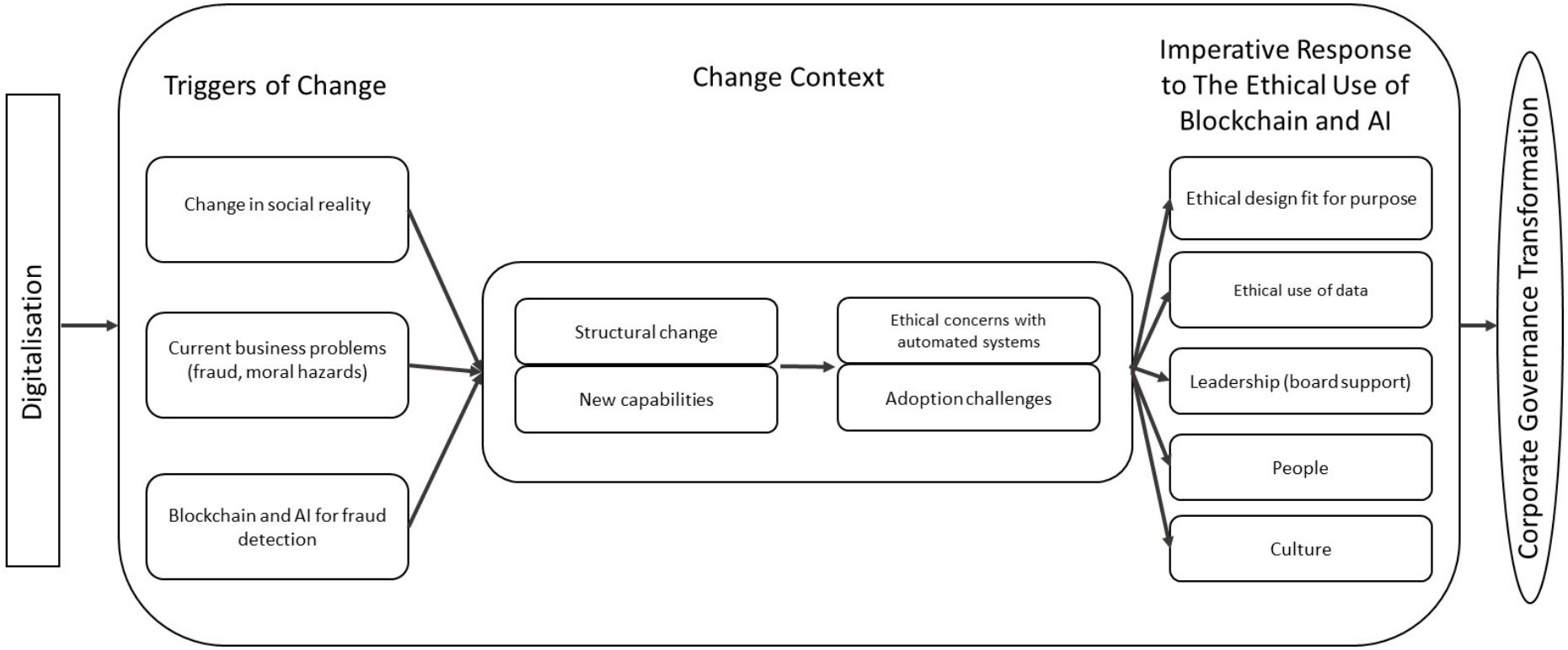


Figure 17 Corporate governance transformation with the ethical use of AI and Blockchain technology

In the light of the above, this chapter reports the findings of this study with a detailed analysis and interpretation utilizing the supporting quotations from the data collected. The data purposefully collected through netnography and semi-structured interviews provide rich insights for this study. The developed thematic framework of the corporate governance transformation with the ethical use of AI and blockchain technologies signifies the substantiation of the main findings as a result of this study. The analytical results provide a holistic understanding of why corporate governance practice needs to change to improve transparency and trust, how corporate governance will change by leveraging the new capabilities of AI and blockchain technologies, and what can companies do to imperatively respond to the governance of the ethical use of blockchain and AI. Specifically, the findings empirically explicate the ethical benefits, ethical concerns of AI and blockchain use in corporate governance, and how companies can govern the use of these technologies in an ethical and socially responsible way, to mitigate bias, misuse, and unwanted consequences. The next chapter discusses the impact and the contributions of the empirical results of this study.

Chapter 5 Discussion

This chapter evaluates the empirical results by demonstrating their impact and contribution relative to the appropriate theoretical literature and assessing the strengths and limitations of the methods and results.

This study sets out to explore and elaborate the nascent notion of corporate governance change with the adoption of artificial intelligence and blockchain technologies, to understand the ethical values of using AI and blockchain for fraud detection, and the ethical concerns of using these technologies, as well as how companies can govern the use of these technologies in an ethical, socially responsible ways to mitigate misuses, and unwanted consequences of adopting these technologies. As such, the findings of this study empirically explain the ethical values, ethical concerns of AI and blockchain use in corporate governance, and how businesses can leverage the new capabilities of AI and blockchain for the good of the business to ensure the ethical use of these technologies.

In reviewing the literature it was established that the overall business environment is experiencing unprecedented changes with the advancement in technological innovation. Organizations with traditional hierarchies or matrix structures are no longer fit for today's business environment (De Smet et al. 2021). The hierarchies and bureaucratic structure in modern companies have created some invisible barriers, such as information asymmetry, lack of transparency, and lack of trust (Arrow, 1985; Nowak and McCabe, 2003; Caldwell and Karri, 2005; Wiseman et al., 2012). Many of us are familiar with stories about top managers cooking the books in one way and another and financial professionals like accountants, auditors, bankers, and financial advisors can fail to detect managerial suspicious actions (Dong et al. 2018). As such, corporate governance has been an area of research for many decades to enhance the responsibility and accountability of the board and senior management. The financial and societal implications of financial scandals have surged call for the re-examination of corporate governance (Ndofor et al. 2015). However, the enhanced regulations and additional monitoring and incentive mechanisms have not stopped the financial scandals that resulted from unethical behaviour or wrongdoings (Minkes et al. 1999; Palazzo and Scherer, 2006; Claessens and Yurtoglu, 2013). Some scholars have suggested that ethics in corporate governance can help address the issues that rules

and regulations can't reach (Shamir, 2008; Adam and Schwartz, 2009). Ethics can enhance trust in the capital market (Anderson et al. 2007). This of course depends on companies' self-regulating. Bonn and Fisher (2005) indicate the bureaucratic and formalized business structure, and lack of implementation that challenges the integration of ethics into corporate governance.

In addition, organizations and their operations are undergone a fundamental transformation in the digital era to reach a wider acceptance of more decentralized corporate governance structures and practices facilitated by artificial intelligence and blockchain technology (Fenwick et al. 2019). Today, the most successful and valuable businesses adopt smart business models to leverage new capabilities in network coordination and data intelligence (Zeng, 2018). It is predicted that only 20% of the heritage financial service firms will have survived by 2030. Everyday banking experience could be entirely virtual with money-changing hands virtually in real-time. The financial service firms will be facilitated by digital banks on digital platforms, fuelled by data stored and shared on the cloud, and made faster and safer by blockchain technology (Santander, 2020). Many scholars are exploring the opportunities and new capabilities of new emerging technologies like artificial intelligence and blockchain.

As such, in recent years, the literature on artificial intelligence and blockchain are emerging and developing (Davenport and Ronanki, 2018; Hinings et al. 2018; Martin, 2018; Biais et al., 2019; Brennan et al. 2019; Moll and Yigitbasioglu, 2019; Seeber et al., 2019; Sun and Medaglia, 2019). Most of the literature on these two technologies is currently conceptual or descriptive (Du et al., 2019), which is understandable and common for research done at the early stages of technology development (Toufaily et al. 2021). Leaders from different industries are starting to envision a future shaped by these technologies, which post the most transformative value for the future of the business (Cong and He, 2019). Blockchain can offer a solution to enhance transparency to improve trust (Yermack, 2017; Zachariadis et al. 2019). AI can effectively detect any anomalies by analyzing patterns and predicting trends (Davenport and Ronanki, 2018). Simultaneously, many scholars have also addressed the ethical and social considerations of using these technologies (Dierksmeier and Seele, 2018; Kumaraswamy et al. 2018; Martin, 2018; Moore, 2019; Ullah et al., 2019; Wesche and Sonderegger, 2019). Companies need to think seriously about their corporate governance practice with new technological tools used like AI and

blockchain that will facilitate flatter structures, autonomous processes, transparent ownership, real-time accounting information, and fraud detection. If contracts are automated, then what will happen to intermediaries like lawyers, accountants, auditors, banks (Iansiti and Lakhani, 2017). Autonomous processes enabled by these technologies are subject to ethical considerations such as job replacement, problems with algorithms. “As society becomes increasingly entrenched in the digital information era, ethics in computing continues to be an important and widely discussed issue in both academia and practice” (HouseOfLords, 2018:21). Ethics matters when every organization is becoming a technology organization (Sniderman, 2020). Therefore, this study investigates the impact of AI and blockchain adoption on corporate governance from ethical perspectives to understand the ethical values and ethical concerns of using those technologies, to help organizations to draw plans on how to govern these technologies to capture value in new ways. As such, this study has identified ethics as the unique, relevant research focus for this study to inquire about the impact of AI and blockchain adoption in corporate governance. Based on the literature review, this study has developed a multi-theoretical framework drawn from theories of corporate governance (i.e. agency theory, stewardship theory, stakeholder theory, and institutional theory) to guide the study to better address the research questions.

In the light of the above, the research design of the study was developed based on an explication of interpretivism epistemology underpinned by a social constructionist ontology relevant for the study. The purpose of this inquiry is to provide the theoretical and instrumental understanding of the impact of AI and blockchain adoption on corporate governance, and how companies can use these technologies to enhance ethical values and mitigate ethical dilemmas. Companies need to help their people understand and develop the reasoning ability to discern the differences between reasonable and unreasonable judgments and act accordingly to mitigate the negative impacts of a digitized economy (Reader, 2021). The philosophical orientation of this study informs the development of a qualitative research strategy using both netnography and semi-structured interview, which are prevailing to the use of interpretive or constructivist paradigms to gain knowledge through immersing in social media and interviewing social actors to understand how people shape, understand and interpret the digital world with the use of AI and blockchain technologies. The

research design follows Bell et al.'s (2019) five steps in qualitative research to incorporate relevance and rigor in designing, conducting, and reporting the research to enable better knowledge accumulation. Special attention was paid to the feasibility of data collection within the research design to ensure relevant data is accessible and can be collected online using netnography methodological approach and semi-structured interviews, which would be best to address the research questions in light of the assumed nature of the empirical phenomenon to be scrutinized, the nascent stated of this field in AI and blockchain development in corporate governance, and the paradigmatic convictions guiding the inquiry. As such, the research approach, research strategy, and research methodology adopted for this study were discussed and justified, and the study's general quality assurance principles and strategies were introduced. The empirical context of the study was outlined, and the relevance of the inquiry was established, the specific techniques and pragmatic, step-by-step research process was described in detail, and the approach to data analysis and synthesis was outlined in detail to provide empirical and procedural transparency.

The findings of this study were detailed and empirically substantiated and a thematic framework was developed that constitutes the corporate governance transformation with the ethical use of AI and blockchain technologies. This study reports the empirical findings in four data displays: the progressive data structure, the emergent thematical model, supporting data with representative quotations, and the findings narrative itself, to make it easier for the interested parties to discern the evidence of the findings. The analytical results provide a holistic understanding of the ethical values, ethical concerns, changes in social reality, challenges faced, and the imperative response from the corporate governance level to support the ethical use of AI and blockchain technologies to capture value.

Three dimensions constitute the thematic framework that emerged from multiple social actors' understanding and experiences: 1) triggers of change in corporate governance. 2) corporate governance change context with the use of AI and blockchain technologies, and 3) corporate governance imperative response to the ethical use of blockchain and AI. This framework provides a holistic understanding of why corporate governance needs to change, especially with the emergence of blockchain and AI technologies, what changes will corporate governance encounter, and how corporate governance can imperatively respond to the intent, implementation, and impact of

using these technologies. Particularly, this framework explains the ethical values of AI and blockchain technology for fraud detection, and the ethical concerns with these automated systems such as job transformation and replacement, algorithms bias, surveillance, and privacy issues, and further articulates technology competency board in corporate governance drives success in digital transformation by fostering right strategies, embedding ethical design in systems that fit for purpose, creating an organizational culture values ethics first, and continuous training and educating workforces to enhance ethical awareness.

In this chapter, the results of this study and the resulting thematic framework as the main findings of this research are first discussed in Section 5.1 in the context of extant scholarships in corporate governance, blockchain, AI, and ethics to evaluate the impact of AI and blockchain adoption in corporate governance from ethical perspectives. Further, the contributions of this study in theoretical and practical terms are explicated in Section 5.2. Finally, the methodological, empirical, and practical limitations of this study are outlined in Section 5.3.

5.1 The findings in the context of extant scholarship

5.1.1 Corporate governance scholarship

Over the past decades, the major surge in corporate governance research was accelerated by the increased call for greater accountability and responsibility from the board and senior management of corporations after many worldwide financial scandals (Christopher, 2010), to seek the most effective corporate governance model. The extant studies on corporate governance have focused on internal and external monitoring and control mechanisms to align the diverse interests of those involved in corporate governance (Daily et al., 2003; Anderson et al., 2007; Clarysse et al., 2007; Elsayed, 2010; Horner, 2010; Grove et al., 2011; Filatotchev et al., 2013; Coles et al., 2001; Brandes et al.,2006; van Essen et al., 2015; Kovermann and Velte, 2019; Till and Yount, 2019; Ryan and Schneider, 2003; McDonald et al., 2008; Grove et al., 2011; Cuomo et al., 2016). So far, the extant studies on corporate governance have not covered much about digital transformation accelerated by AI and blockchain (Scott et al. 2017, Fenwick et al. 2017). It is suggested that theoretical development is needed to help businesses understand how corporate governance can help

businesses to transform their business models to make the needed change accelerated by AI and blockchain (Brennan et al., 2019). Further, ethics matters when every organization is increasingly becoming a technology organization (Sniderman, 2020). This study, in building on these contributions, provides conceptual and empirical support for corporate governance change with the ethical use of AI and blockchain framework.

In general terms, the findings of this study support the notion of corporate governance change to transform business models and processes (Gomber et al. 2018) to leverage the new capabilities of AI and blockchain technologies (Androutsopoulou et al. 2019; Cong and He, 2019; Goldstein et al. 2019; Sun and Medaglia, 2019), to priories creativity, speed, and accountability, to replace the old business model (De Smet et al. 2021), to foster agile or collaborative governance to deal with uncertainty, agility, adaptiveness, and cooperation in the digital world (Brennan et al. 2019). The findings of this study also support the transition of corporate governance from a centralized, vertical hierarchy to a decentralized, horizontal, unmediated organization, initiated and accelerated by rapid technological changes (Fenwick et al. 2017; Fenwick et al. 2019) to foster a network and platform strategies to drive success (Scott et al. 2017).

This study goes beyond the extant corporate governance scholarship to assess the technological impact to capture values for companies in ethical ways to sustain future growth. As informed by literature, First, the modern world is largely defined and constructed by the scientific and industrial revolutions since the 17th and 18th centuries, reflecting the external influences over science and technology (Mitcham, 1999) that revolutionize every aspect of our lives and work (Fisher et al. 2006). In the mid-20th century, academic scholars have started to develop technology assessments to address the societal, ethical, and moral concerns of technological changes (Shrader-Frechette, 1995; Schot and Rip, 1997; Guston, 2002). Second, many business and management scholars have identified the invisible barriers in modern companies, such as information asymmetry, lack of transparency, and lack of trust (Arrow, 1985; Nowak and McCabe, 2003; Caldwell and Karri, 2005; Cuevas-Rodríguez et al. 2012; Liu and Lai, 2012). Ndofor et al. (2015) have found that industry-level complexities of information asymmetry increase the likelihood of wrongdoing (financial scandals). Third, today, the abundance of data, advanced computing power, the emergence of pattern recognition, machine learning, digital sensing tools, and

integration systems are leading to prominent changes in individuals and organizations (Benlian et al. 2018). Our lives have been transformed by those remarkable technological innovations (Pancake, 2018). For businesses, technologies are transforming business models and processes (Gomber et al. 2018). Thus, this study contributes to providing empirical insights into the triggers of corporate governance change in general, and specifically elucidating the potential ethical values of using AI and blockchain to solve surrent business problems especially fraud dection and moral hazards mitigation.

The findings of this study support the recent ideal corporate governance model proposed by Errichetti and Roohani (2018), based on the corporate and governmental information flows. Their study suggests “increased data timeliness and usability will enhance transparency, while improvements in automation, data transfer, and data analytics will improve monitoring” (p107). However, their model has not considered using AI and blockchain technologies to streamline and automate the processes, detect anomaly transactions to fundamentally enhance transparency and monitoring in a timely and continuous manner, as well as the ethical concerns of using automated systems to streamline information flows.

Thus, the notion of corporate governance is further specified and significantly expanded by this study to assess the adoption of AI and blockchain as new corporate governance tools or mechanisms, to enhance ethical values when used properly, and mitigate ethical dilemmas with proper checks and balances, safeguards in place, to help organizations stay relevant in this digital transformation and be ethical and sustainable.

First, this study supports the notion that companies that have transformed their business from traditional methods to digital are doing exceptionally well (POST10). Digital transformation should be about helping businesses spark new growth, relevance, and viability into the future (POST1). Increasingly, directors need to keep an eye on what is important for their company in the long-term view, such as the volatility in the markets, disruption in their normal business operations, workforce changes, etc., and how these really impact the lives of stakeholders in large, not just financial returns for shareholders, but long-term sustainability. It just becomes progressively harder for directors to do their jobs without intelligence systems due to

massive data generated both inside and outside the organizations. It is a wake-up call for a lot of companies' secretaries and senior management teams as directors or board members are increasingly taking an outside-in approach to assessing what is happening to the company and the industry using governance analytics tools fuelled by AI to mine public accessible data, to help them understand the trends and the things that really impact the strategy of the business. Progressively, board members conduct their own research prior to board meetings, they look at the analytics about the industry, speak with other colleagues and call other directors to ask whether they have encountered any other particular problem before. They spend a lot of time reading the information coming from the management. They need not only financial information but also non-financial information like environmental, social, and governance (ESG), culture. Companies need to gather and report on the relevant information to allow the board to make the decisions from the strategic level, to ensure their shareholders that the company is on board with what the company is committed to (Webinar2). Technological tools like AI for analysis and blockchain for visibility and traceability, are going to be much more critical moving forward to provide that insight and oversight for board members.

Second, the findings of this study support and expand the notion of imperative changes required in corporate governance, to rethink how companies will be directed and controlled in response to the digital transformation in terms of who we are in terms of values, cultures, how we operate in terms of structure, talent, and how we grow in terms of ecosystem, platform, data-centric approach, and organizational learning (De Smet et al. 2021). Look forward, we are creating a new future (YT-V16). Every company is going to be a technology company to survive and thrive (IntvP4). Successful leaders need to focus on three steps for change management for the digital transformation: 1) strategy, 2) cultural transformation, and 3) ethical implications (YT-V6). Companies need to prioritize their strategies, consolidate systems, manage core platforms for change processes, have a discipline that forces decision-makers to make tough choices (Webinar5). Companies need to work on their strategic business model, as well as the unique cultural proposition that ties back to the strategy to ensure they have in place the best people and best practices in terms of robust continuous feedback, policies, processes, controls, and safeguards, to enable people to work together and actually innovate and move businesses forward towards the place they

really want with the help of digital technologies (Webinar9). Ethics and governance are very much about people and processes, bonded by the right mindset and behaviors starting from their leadership down to everyone who is tasked with innovating responsibilities (POST28). Companies need all sorts of things, not just technology but also business models, to drive the digital experience (YT-V16)

Third, the findings of this study expand the existing corporate governance mechanisms to include technological mechanisms of using AI or blockchain to facilitate cooperation and coordination, and fundamentally improve trust through a consensus mechanism. “Decentralized form of organization will give a different degree of checks on each other. So it makes these criminal activities hard to hide to a degree” (IntvP17). “I suppose in principle, sure. AI and blockchain can enhance the ethical behaviour of top management, particularly in the context of fraud detection” (IntvP14). “Yes, in theory, it can dissuade catch, prevent frauds” (IntvP8). This finding is consistent with the study of Munoko et al. (2020) which explicates augmented AI systems that increasingly learn from human and environmental interactions to supplement human decision-making by analyzing data, identifying patterns, detecting anomalies, and recommending solutions. This finding is also consistent with the recent study by Lumineau et al. (2021) that suggests using blockchain as a new way to organize collaboration and reduce moral hazards (Yermack, 2017).

Last, the findings of this study support boards, and senior management need to have a real understanding and genuine engagement (Falk, 2019; Sands, 2019) to leverage the immense capability of AI and blockchain to support ethical practice to enhance transparency and accountability in corporate governance. Managing the ethical use of AI, blockchain or other digital technologies are additional responsibility of the board members. What companies really need is curious board members who can ask the right questions, do the research, become prepared, and empower people to innovate with new technological tools in response to the digital transformation (Webinar2). Simultaneously, the findings of this study also support that ethics is critically important as technology cannot make moral judgments (Lobschat et al., 2019; Sands, 2019). “We're going to start to see is organizations coming to grips with the fact that AI will automatically negotiate contracts on their behalf for their business and services and products, and that means a delegation of authority. So, there's a whole governance change around how organizations work around that” (IntvP12). It is advised to have

stakeholder feedback input into automated system assessments to improve the perceived transparency of the governance process (IntvP11). This study found companies need to have a human in the loop to make sure accountability in decision-making to keep the automated systems responsible (YT-V6). If human judgment is not kept in the loop, AI or any automated systems will bring a terrifying form of new bureaucracy (V-P4). However, the way companies build accountability has to be realistic and avoid the human being in an ethical crumple zone (IntvP9). When we automate some tasks using these technologies, on one hand, it could help that person become much more productive. On the other hand, it could also make them feel threatened about their job security. This is something that society needs to adjust and gets right in terms of reskilling (YT-V18). And always remember that there is a human element around change management (IntvP5). To reiterate, this study broadly confirms previous contributions in regard to the extant corporate governance scholarship but goes beyond existing discussion by providing empirical evidence of corporate governance change in the context of digital transformation in general, and specifically explicating ethical values and ethical concerns of using AI and blockchain, and how companies can govern the use of those technologies in an ethical way to drive growth and sustainability.

5.1.2 Blockchain Scholarship

Since Nakamoto (2008) set the groundwork for what would become blockchain technology in 2008, the banking, financial, insurance, education, health care, logistics, and government sectors (Collomb & Sok, 2006; Dai and Vasarhelyi, 2017) have been exploring blockchain use cases such as custody for renewable energy credits and carbon credits, e-health system, RoboJudge, smart contracts, supply chain, preventing corruption, cyber security, MeDShare for medical data, financial services, smart auditing and real-time audit reporting (Ashley and Johnson, 2018; Casado-Vara and Corchado, 2019; Castell, 2018; de Graaf, 2019; Rejeb et al., 2019; Agustin and Susilowati, 2019; Taylor et al., 2019; Xia et al., 2017; Fanning and Centers, 2016; Rozario and Vasarhelyi, 2018), to improve transparency, trust, and efficiency. Academically, the literature on blockchain technology is booming since it gained mainstream attention in 2017 (Murray, 2018). However, most scholarly works on blockchain technology are currently conceptual or descriptive, the empirical research

is slight (Toufaily, et al., 2021, Du et al., 2019; Yin et al., 2019), which is expected and understandable as blockchain research is still in an early stage (Toufaily et al.,2021).

Thus, this study extends the existing blockchain literature and provides empirical evidence. This study empirically supports the two streams of research on blockchain technology: blockchain mechanisms and real-world applications (Cong and He, 2019). In general terms, the findings of this study support the salient benefits of using blockchain to leverage new opportunities and capabilities to enable real-world applications to explore new use cases, to help businesses improve and thrive for future success.

First, the notion of blockchain technology is further specified and significantly expanded by this study. This study expands the extant blockchain technology literature in the context of corporate governance in general and ethics in particular by showing its relevance in the context of solving current business problems faced in corporate governance, especially in fraud detection and moral hazard mitigation by enhanced transparency. The findings of this study support the notion of some legitimacy of corporate governance would be restored using blockchain as the technology provides new tools and offers networks to eliminate structural obstacles, encourage shareholder involvement in corporate governance (Daniels, 2018). This study has collected an abundance of data from social media through netnography, and from interviewing many informants. In doing so this study adds depth and specificity by identifying and articulating the multi-dimensional and interlinked nature of blockchain networks.

In general terms, in the context of corporate governance, the findings of this study support the notion of blockchain could help organizations to better comply with legal requirements (e.g. the EU Directive 2007/36/EC- has been amended to EU Directive 2017/828, and UK corporate governance code 2018, have all required listed companies to identify their shareholders and encourage long term shareholder engagement) and enable better shareholder engagement (FU,2018). The results also support the notion of blockchain can be used to record stock ownership, which could solve many longstanding problems related to companies' inability to keep accurate and timely records of ownership (Kahan and Rock, 2008; Brennan et al., 2019; Yin et al., 2019; Zachariadis et al., 2019; Yermack, 2017). "Blockchain technology, certainly,

in governance terms, provides a lot of opportunism to confirm the authenticity of whatever it is you are that is attached to. That is the sort of procedures and controls go around, currently proving provenance, or ownership are quite cumbersome, relatively what blockchain can do" (IntvP8).

Further, in providing instrumental insights and normative guidelines in terms of the uniqueness of blockchain for visibility, traceability, immutability, this study substantiates claims in regard to the efficacy of the smart contract powered by blockchain, and the consensus mechanism governed by blockchain, in theory, the use of blockchain technology can mitigate moral hazards, reduce the incentive and opportunities for manipulation and fraud (Yermack, 2017; Tan and Low, 2019). "I think blockchain perfectly fits into that idea of a new way of increasing transparency and reducing information asymmetry. If you use the technology in a good way, from the societal point of view, that is very relevant, that will increase public trust in that specific company" (IntvP1). "While with blockchain, it will help to check and validate the information immediately or give you a sense of anomaly activities" (IntvP7). "We believe blockchain resonates very well with the concept of trust and we want to provide trust which is not provided by the third party. We want to offer trust, which is provided by mathematical algorithms, and by real proof" (Webinar12). Blockchain will provide a different degree of checks on each other, so it makes these criminal activities hard to hide to a degree (IntvP17).

Second, the findings of this study support the notion of blockchain is a pragmatic yet revolutionary technology that offers a new way of collaboration between individuals and organizations (Lumineau et al., 2021). "I think decentralized governance, using blockchain technology, provides lots of opportunities, to engage more people, in a decentralized way in governance, in decision making. It can do so…If you use the technology in a good way, yes it shows that you are willing to listen to people, and you not only listen to people but also people's actual voice, or even actual power, to make certain decisions. From a societal point of view, that is very relevant, that will increase public trust in that specific company" (IntvP1). For example, in a blockchain-based repository for financial statements, part of the functional blockchain repository is that auditors can stamp and provide their assurance there. People with different needs can go back to the blockchain to retrieve the statements and view the actual transactions. This could increase the trust level of an audit report that is published because you can

track the records in real-time, whether or not, the auditor's sign-off is actually valid. The interested third parties such as lenders or banks can access and get the information from the blockchain repository instead of getting it from business owners. Further, different stakeholders can easily interact with each other in a blockchain ecosystem that provides a network, connectivity, and a single source of truth. "The very thing that keeps the blockchain secure and verified, is our mutual distrust. So rather than all of our uncertainties slowing us down and requiring institutions like banks, our governments, our corporations, we can actually harness all of that collective uncertainty and use it to collaborate and exchange more faster and more open" (V-P6).

Third, this study supports the notion of blockchain is emerging (O'Leary, 2017; Brennan et al. 2019). The findings of this study support the notion of the truth about blockchain is that blockchain will transform business and become a foundational technology for the future, but the process of adoption will be gradual, and it will take decades for blockchain to seep into our economic and social systems (Iansiti and Lakhani, 2017). This study further corroborates with empirical support from social actors' experiences and views. "Its application to corporate governance and board room purpose is relatively new. And I would say the use case is still to be found" (IntvP2). "I think blockchain is a 20-year thing. this is very little, if we talk about revolution, it will embark everything in the economy. I don't think blockchain will change the world as the changes made by the Internet, for the time being, you know. If it stays b2b, it is not going to change anything. It has to be b2c at one point, and this b2c, people need to see that is better. For the moment, they don't see it" (IntvP6). "Now, I don't want you to get the impression that the blockchain is the solution to everything, even though the media has said that it's going to end world poverty, it's also going to solve the counterfeit drug problem and potentially save the rainforest. The truth is, this technology is in its infancy, and we're going to need to see a lot of experiments take place and probably fail before we truly understand all of the use cases for our economy. But there are tons of people working on this, from financial institutions to technology companies, start-ups, and universities. And one of the reasons is that it's not just an economic evolution. It's also an innovation in computer science…. right now, so it's better suited for either really early adopters who kind of get it and can tinker around or for finding those best use cases like identity or asset

tracking or smart contracts that can be used at that level of an enterprise or government" (V-P6). "I think there is huge opportunism around the use of blockchain" (IntvP8).

Fourth, equally important, this study further contributes to providing empirical evidence of the challenges and points of caution faced by the organization in adoption. This study finds that "in reality, I guess it related to my previous statement, the system is only as good or strong as it is, it could be seen as strong, but as we know, the password can be hacked, two-way identification can be hacked, I am sure there are ways how to mess up a blockchain repository of data, so it sounds tempting, but I think it worth not to rely on it blindly… It has to be carefully used for what you wanted for blockchain. you need to understand the system vulnerability" (IntvP2). "We have to be a bit careful because not all decisions need to be taken in a decentralized way. And from an efficiency perspective, you often see issues that decentralized organizations or protocols, that decision making is not actually done in an effective way. Sometimes you need to allocate certain powers to pacific people, or a group of people, in order to make the organizations run smoothly" (IntvP1).

In addition, this study further finds that the choice between public and private blockchains will have different implications. A public blockchain is costly and takes time to reach a consensus because of the large, distributed network. A private blockchain is comparatively faster and more cost-effective due to identities being known. The findings of this study support the notion that blockchain can be quite situation-specific and is not one-size-fits-all solutions to all the business problems. The use of the technology needs to align with the organizational purpose. Not all the data might reside on a blockchain. Companies that want to maintain control and trade secrets will adopt private blockchains (IntvP13) to protect the privacy and confidentiality of business data. "Blockchain is a new way of storing, and sharing data, and making a certain type of record available, it does not entail it is going to be more accurate. So, take for instance, within a blockchain, there is always a first blockchain in the chain, the genesis block, and you may have a bunch of false information on the genesis block. Then it is just get promulgated throughout the blockchain" (IntvP14). "So, if Walmart doesn't say things at the very beginning that your pork has that kind of antibiotics, you know, we don't know it. Nobody knows it… for instance, Walmart has the best supply chain in the world…. So if I were Walmart, and I really want to be

honest, I will ask an institution to test my pork, say this thing which is going to be entered by Walmart in the blockchain is guaranteed" (IntvP6). Thus, in articulating the different implementation modes or choices of blockchains, this study helps to further illuminate the human element involved (IntvP5) in designing and using blockchain systems, there is a need to balance profit and ethics. Companies need to have safeguarding and ethical guidelines in place, to help people increase ethical awareness in designing and implementing the system to mitigate unwanted consequences. The findings of this study provide insights into how companies can govern the use of blockchain ethically by having the right intention, with the right implementation to have the impact that companies expected. "You can't choose the right solution - the right processes, policies, practices, etc. if you don't understand the nuances of your business problem" (POST32). This study further reveals that it is going to be different chains with different protocols that people will use for different reasons (Webinar12).

5.1.3 AI scholarship

Artificial intelligence has a very long history, and it progressed steadily from 1956 onwards. There were various points in history punctuated by breakthroughs and lows. There was always tremendous excitement and great hype about what was to come. After the Second World War, the world generally was quite hopeful and optimistic, but then you have those crashes with nothing seemed to progress and the early promises seemed to lead to nowhere and hopes were dashed. Those periods when AI hype gave way to AI negativity and pessimism, those periods of pessimism are often referred to as AI winters. So that's the period where nothing really happens and where the promises of the earlier generation seem to amount to nothing (YT-V11). The development of AI research has been characterized by ups and downs (Sun and Medaglia, 2019). The recent advance in artificial intelligence is accelerated by a string of scientific developments, the availability of big data, and cheap computer processing power. It is a new technology (Wooldridge, 2017). "Its industrial adaptation until the past decade was limited to quantitative trading and credit risk modeling. Now other industries are catching up and every now and then we get to know about additional use cases" (POST13). The diffusion of AI in the public sector is in its nascent stage, so the body of research on the phenomenon is evolving (Sun and Medaglia, 2019). Furthermore, the integration of AI and blockchain is a fairly new concept and still a

largely undiscovered area (Banafa, 2019; Foote, 2019). It is still elusive for many organizations to adopt AI or blockchain technologies due to technical, organizational, and legal challenges (McKinsey, 2020). This study, in building on these contributions, provides conceptual and empirical support for the ethical use of AI in corporate governance to mitigate misuse and unwanted consequences. Thus, the notion of AI is further specified and significantly expanded by this study.

First, this study expands the extant AI literature in the context of corporate governance in general and ethics in particular by showing its relevance in the context of solving current business problems faced in corporate governance, especially in fraud detection and moral hazard mitigation by automating processes, analyzing patterns and predicting trends. The findings of this study support the notion of organizations are increasingly using AI to augment decision-making and improve business operational efficiency. AI has been used to reduce fraud in payment transactions, diagnose and treat patients, manage health care, etc. (Sharron and Serwin, 2018). This study supports the notion of AI as a tool to deliver growth (IntvP4). Today, AI is really around machine learning in the business context (V-P11, IntvP14). Machine learning is used in recommendation systems, in search engines, voice assistants, drug discovery, image recognition (POST12). Machine learning doesn't operate in a way that other forms of artificial intelligence operate, but where you feed the system as much information that you have that's relevant to a particular task and you essentially get the system to learn its own way through that information. It looks like AI winters are gone, but there is there's tremendous hype about machine learning (YT-V11). Companies like Google use machine learning to look for patterns and trends and do something clever with that large volume of data (IntvP5). Machine learning is important because it introduced new ways of addressing challenges around how to handle questions. Effectively, you looking to use machine learning, especially in the domains where you cannot easily identify what the rules are, by which you would prescribe as decision-making. So, if it's possible to clearly identify if A then B, then you can use a rule-based system, that would be easily conveyable. But if you have a case where there are lots of factors, that go into it. And you know other factors are supposed to be sort of good output for that, but it is very difficult to pinpoint which of those are relevant things to what extent. You can use machine learning trying to find patterns within this and recreate this kind of mapping, input and output mappings. So that is how

introduces a lot of potential for being able to automate things previously won't be automatable. And on the other hand, that is also one of the other reasons why it is very difficult to get explanations why the AI is producing these particular outputs. And not having the explanation for why you are getting these outputs, means you also don't have the guarantee that it is always going to work the way you think is going to work (IntvP9). Thus, ethics should be embedded in machine learning design and ethical use of data is critical for trusted AI systems.

Second, this study empirically supports that weak or narrow AI is the one that classifies data and finds patterns (POST2), that are of interest to assist decision-making and for real-world applications (Wooldridge, 2017; Wirtz et al. 2018). Companies can leverage new capabilities from AI to automate business processes, gain insights from data, and engage with customers and employees (Davenport and Ronanki, 2018), Overtime, AI has evolved a lot into highly smart technology and undergone many changes in terms of its research and development. "Now, many companies have started using AI as a means to collect highly sensitive data of all the internet users around the world for their own benefit and put people's personal and private information at risk" (POST8). It's abundantly clear that narrow AI presents enough actual and immediate concerns to warrant our full attention (YT-V13). There are certain kinds of ethical issues that raise with narrow AI, especially machine learning (YT-V14). This study reveals the most ethical concerns with machine learning are job loss, algorithmic bias, surveillance, and privacy issues, that are worrying people and causing concerns. Further, to create general artificial intelligence, it will be essential to comprehensively understand the human brain, but science still had very little understanding of how the brain processes information, we are still relatively clueless about general AI that machines have the cognitive abilities that humans have without any human intervention (POST2). "I don't think we will ever get AGI that is equivalent to humans. I'm sure we will get AI that will be able of doing many of the things humans can do much better. But it will lag consciousness and individuality" (POST8). "It was very easy and fast to get "AI" to 80%, but to master the remaining 20% (not just technologically, but ethically, logistically, socially, etc.). It is going to take a long time" (POST20). All companies can benefit from AI to mitigate risks, depending on different levels of depth, and the way they use AI within the company, which can be used in a good way or bad way (IntvP1).

Therefore, we need to develop scalable AI control methods, think hard about ethics and governance to proceed forward (YT-V8).

Third, the findings of this study support the notion of “machine teammate” or “human in the loop” to ensure the use of AI systems to analyze data, evaluate consequences, predict trends, recommend products and services in corporate governance to augment board intelligence rather than automating leadership and governance (Seeber et al., 2019). To keep the automated systems responsible, we need to have a human in the loop to make sure accountability in decision-making (YT-V6). Further, the findings extend to suggest the way we built-in accountability in automated systems has to be realistic and avoid the human being in an ethical crumple zone (IntvP9).

5.1.4 Ethics Scholarship

In general terms, the findings of this study support the notion of ethics can be an alternative or rather more positive approach to empowering the board of directors, guided by ethical values and norms, by accurately reviewing corporate activities and financial reports to prevent financial damage (Adam and Schwartz, 2009). The rise of ethics in corporate governance gives hope to restoring trust in business and helping address issues that rules and regulations cannot reach (Caldwell and Karri, 2005; Cuevas-Rodríguez et al., 2012; Shamir, 2008). The stream of technology ethics has attracted growing attention from scholars, scientists, and policymakers to investigate the ethical and moral issues associated with the development and application of technologies in different realms (Fisher et al., 2006; Gasmelseid, 2009; Lucivero et al., 2011; Pellin and Engelmann, 2017). Thus, the notion of ethics is further specified and significantly expanded by this study to examine how AI and blockchain can enhance ethical practice and what ethical dilemmas organizations will encounter when using AI and blockchain technology, and how should businesses govern the use of these technologies ethically.

First, this study empirically corroborates that in theory, the use of blockchain and AI can enhance ethical practice by detecting fraud and anomaly activities, due to the unique capabilities of blockchain and AI technologies as suggested from the extant literature. “The whole purpose of blockchain is transparency, so you would be able to see who did this, where it was, at what point. It is good for transparency and trust in AI, so if you would put that all together, the objective is to create trust in AI” (IntvP16).

“It has the potential to make decisions or calculations more consistent than humans. It could result in fair and more ethical decisions, certainly, ethically consistent decisions, provided you have that confidence around how it is designed in the first place, operating in the first place…Yes, in theory, it can dissuade catch, prevent frauds” (IntvP8). “I suppose in principle, sure. AI and blockchain can enhance the ethical behaviour of top management, particularly in the context of fraud detection” (IntvP14). Therefore, if we do it right, there is such immense value for everyone…but only if we are very confident that these systems have the right intention and are not ethically compromised” (IntvP16). Additionally, the findings of this study further indicate that “in theory, it sounds tempting. In reality, a system is only as good or strong as it is, it could be seen as strong, but as we know, the password can be hacked, two-way identification can be hacked, I am sure there are ways how to mess up a blockchain repository of data, so it sounds tempting, but I think it worth not to rely on it blindly” (IntvP2).

Second, this study adds depth and specificity by identifying the ethical concerns of using blockchain and AI in corporate governance. The study empirically supports the ethical issues of privacy, unethical use of data, job loss, and algorithm bias outlined in the existing literature (Dierksmeier and Seele, 2018; Kumaraswamy et al., 2018; Lima and Delen, 2019; Mansell et al., 2019; Sousa et al., 2019; Ullah et al., 2019). In terms of job loss that frustrates most people, surely, we will see in future lots of jobs like repetitive jobs will be redundant due to automation, but it will also create spaces for new jobs, we have to be optimistic, and that is what the society has to adjust and get it right in terms of reskilling moving forward with digital transformation.

Third, in providing instrumental insights and normative guidelines in terms of how AI and blockchain can enhance ethical practice and what ethical concerns will organizations encounter when using these technologies, the findings of this study further explicate and articulate how companies can govern the use of these technologies ethically. This study supports the notion of humans must design the systems carefully from the beginning (HouseOfLords, 2018), and it is important to assess the desirability of emerging technologies early in their development (Lucivero et al., 2011). Companies need to ensure the ethical design of any automated systems fit for purpose and create opportunities to ensure the framework and infrastructure are in place – from technology to skills, data governance, and compliance. Companies

could no longer treat data protection as some back-office compliance issue and that really it is a board-level and C-suite strategic issue for companies. It is critical when companies go beyond business conduct to include ethics and culture. If the firm does not see the value in reporting the ethical wrongdoing and practices that break the law, it is creating a toxic environment. “We urgently encourage ethics, will lead to less enforcement and less legislation issues faced with supervision, it should be in our core of our DNA for the good of our society, long term sustainability” (Webinar4). Digital transformation is not just about technology, but more about people and the organizational culture.

Having discussed the findings of this study in the light of corporate governance, blockchain, AI, and ethics literature in general, the next section will articulate the main contribution of this thesis and its various implications.

5.2 Contribution of the study

This study explicates the contribution of this study in two parts. This study first illuminates the theoretical contribution in section 5.2.1. Followed on from that, this study further elucidates the practical contribution in section 5.2.2.

5.2.1 Theoretical contribution

Guided by a multi-theoretical approach to studying the phenomenon of the impact of AI and blockchain adoption in corporate governance from ethical perspectives under this investigation, this section explicates the empirical contribution of the development of a new thematical framework as a result of this study in subsection 5.2.1.1, followed by explicating the results from the perspectives of the agency theory, stewardship theory, stakeholder theory and institutional theory to provide a better understanding of the phenomenon under this investigation. In doing so, the results will be better understood to inform future studies.

5.2.1.1 New thematical framework—empirical contribution

This study contributes to the development of a thematic framework of corporate governance transformation with the ethical use of AI and blockchain technologies that signifies the substantiation of the main findings as a result of this study. The emergent framework is constructed from the empirical and analytical procedures specifically and

purposely designed for this study. This study, in building on existing scholarly contributions that provide conceptual relevance to AI and blockchain use in the context of corporate governance, provides further empirical support for the constructs of corporate governance change with the use of AI and blockchain in general, and ethics is further specified and significantly expanded by this study. In doing so, this study substantiates claims regarding fraudulent activities, in theory, the use of AI and blockchain can detect these activities in real-time. AI and blockchain provide new technological tools to dissuade catch and further prevent fraud. On the other hand, this study adds depth and specificity by identifying and articulating the ethical concerns of using these technologies based on informants' views and experiences. The findings of this study focus on reporting the three most frequently talked about ethical concerns: a) job transformation and replacement, b) problems with algorithms (bias, flaws, distortions, inaccessible algorithmic secrecy), and c) surveillance and privacy issues.

Further to previous discussions, the thematic framework developed in this thesis provides a holistic understanding of why corporate governance needs to change, especially with the emergence of blockchain and AI technologies, what changes will corporate governance encounter, and how corporate governance can imperatively respond to the intent, implementation, and impact of using these technologies ethically. Further, the results of this study show the aggregate dimensions' utility and applicability in a business context by illuminating the 1) triggers of change in corporate governance. 2) corporate governance changes context with the use of AI and blockchain technologies, and 3) corporate governance imperative response to the ethical use of blockchain and AI.

Then, this study reports the three dimensions with detailed themes according to informants' views and experiences. First, three specific themes related to the triggers of corporate governance change: 1) change in social reality, 2) current business problems, and 3) blockchain and AI for fraud detection. Second, four specific themes related to corporate governance change context: 1) structural change, 2) New capabilities, 3) ethical concerns with automated systems, and 4) adoption challenges. Third, five specific themes related to corporate governance imperative response to the ethical use of blockchain and AI: 1) ethical design fit for purpose, 2) ethical use of data, 3) leadership (board support), 4) People, and 5) culture.

Further, this study extended beyond the original domain of technologies by showing its relevance in the context of corporate governance to empower a thoughtful, careful consideration of the implications of technological disruption, to stay relevant and build resilience in the digital era. The results indicate that blockchain-enabled network coordination and AI-enabled data intelligence create new capabilities for businesses to create value if companies use them properly, based on the condition that only if companies are very confident that these systems have the right intention and are not ethically compromised. Further, this study articulates technology competency board in corporate governance drives success in digital transformation by fostering the right strategies, embedding ethical design in systems that fit for purpose, creating an organizational culture values ethics first, and continuously training and educating the workforce to enhance ethical awareness, and having right policies and processes, controls, safeguarding in place, and working on robust constant feedback loops. Our findings indicate that if companies try to experiment with AI or blockchain, they need to go through the entire process of building it, testing it, and gathering feedback to improve it. Companies from the top-down need to be involved in all of the phases of the tech process. Further, the results of this study reveal that it is valuable to exchange experiences, to get people from outside involved to assist with this and to leverage these types of experiences.

5.2.1.2 The Agency theory perspective

Agency theory has been used to study ownership structure and firm performance, CEO's external advice network, board control, CEO tendencies, compensation plans, determinants of audit committee meeting frequency, board composition, ownership of audit quality, shareholder activism, board independence, managerial ownership, institutional investors, capital structures, etc (O'Sullivan, 2000; Gedajlovic and Shapiro, 2002; Brandes et al., 2008; McDonald et al., 2008; Perrini et al., 2008; Sharma et al., 2009; Janakiraman et al., 2010; Marler and Faugère, 2010; McDonald and Westphal, 2010; Grove et al., 2011a; Jiraporn et al. 2012; Shen et al., 2016; Dixon et al., 2017; Benton and You, 2019; Chari et al., 2019; Lel, 2019).

The results of this study extend the agency theory to study the new technological capabilities of blockchain and AI to mitigate agency problems by streamlining, simplifying, and automating business processes. For example, contracts will be

executed automatically using blockchain-enabled smart contracts. Data can be further analyzed using AI-enabled machine learning to find patterns, detect anomalies and predict trends. The findings of this study support the notion of using blockchain and AI with the right intention could reduce the opportunities for wrongdoing and unethical behaviour, and reduce moral hazards (Yermack, 2017) because blockchain can enhance transparency to reduce information asymmetry, and AI can detect fraudulent activities by screening anomalies. Therefore, blockchain technology will increase the difficulty for managers to manipulate accounting data because it provides smart contracts and records data precisely, which is further analyzed by AI for patterns and anomalies. These technologies will make it easier for organizations to control and monitor information flow, including all financial transactions. Further, the multi-party consensus on validating data recorded on blockchain makes it harder to tamper with the data. Financial fraud will thus be harder to hide when used together with AI to detect anomalies. In theory, suspicious fund transfers can also be detected in real-time. “I suppose in principle, sure. AI and blockchain can enhance the ethical behaviour of top management, particularly in the context of fraud detection” (IntvP14). “Yes, in theory, it can dissuade catch, prevent frauds” (IntvP8). “If we do it right, there is such immense value for everyone” (IntvP16)

As such, blockchain and AI can be used as new technological mechanisms for corporate governance to enhance transparency, detect fraudulent activities, and reduce agency problems, but only if we are very confident about how it is designed and operated in the first place, and these systems have the right intention and are not ethically compromised.

Further, the findings of this study extend the notion of increased transparency by using these technologies, this could enforce more ethical behavior. Because transparency is a regime value linked with ethics (Piotrowski, 2014), and can be used as an effective tool to reduce corruption and increase ethical behaviour (Roberts, 2009; Halter et al., 2009). However, on the other hand, “all transparent systems are at the mercy of bad actors…no system is foolproof” (IntvP11). For example, it is like lots of cyber criminals we see today, as much as our cyber security technology moves forwards, the cybercriminals still figure out the way around it (IntvP7). “The problem with the fraudster, they are incredibly clever, they will find the way. It will just push the fraudster somewhere else inevitably. But it just becomes just sort of arms races of whose

detection of prevention measures can develop faster than fraudster's ability to create schemes of ways of extracting value" (IntvP8). "It could, if people want to behave unethically, they will. Human nature and human beings tend to be weak. Technology is uncovering unethical behaviour, like security cameras, there will be intelligence criminals who will try to circumvent this with other technology. There could be short-term benefits until the ethics find the ways around the algorithms and know how to play with them" (IntvP2).

Therefore, it does not mean that the use of blockchain and AI can stop fraud but certainly will make it hard to conceal. The assertion of mitigating agency problems by reducing information asymmetry assumes that people are not manipulating the source or raw data recorded in blockchains in the first place and then analyzed by AI. As such, ethics and ethical guidances/framework are vital to ensure the right values feed through these systems with proper checks and balances, and safeguards in place to push back against fraudulent transactions.

5.2.1.3 The stewardship theory perspective

Stewardship theory has been used to study trust, ethics, intrinsic incentives, honesty, loyalty (Nowak and McCabe, 2003; Caldwell and Karri, 2005; Anderson et al., 2007; Christopher, 2010; Elsayed, 2010; Cuevas-Rodríguez et al., 2012; Till and Yount, 2019). The findings of this study extend stewardship theory to embrace new technological capabilities to foster ethics and enhance trust to gain a competitive advantage in digital transformation.

First, in terms of ethics, the findings of this study support the notion that we need less regulation and better morals & ethics to empower everyone who is involved in the innovative projects to drive digital transformation with blockchain and AI in organizations. The findings of this study suggest in theory these technologies have the potential to make decisions or calculations more consistent than humans, which could result in fair and more ethical decisions, provided you have the confidence in how the systems are designed and not ethically compromised (IntvP8, IntvP16). Further, Digital transformation is not just about technology, but more about people and the organizational culture. Ethics should be at the core of our DNA for the good of our society and long-term sustainability. It is critical to go beyond business conduct to include ethics (Webinar4). Ethics need to be embedded within the design of the

organizations to allow people to pause and evaluate the consequences of their work (IntvP17). “If you don’t have adequately competent honest ethical people at the helm of the firm, well, of course, translate into behaviour, you will sooner or later be running into trouble” (Webinar4). Therefore, companies need to have a competent board that understands AI or blockchain technologies and knows how to use the technologies to deliver their governance responsibilities, empower people to ask the right questions, and create an inclusive, open working environment that allows for diversity. Further, the point of recruiting a CEO or anybody in the C-suite there should be an additional component in the assessment process that looks closely at the ethical side of that person.

Second, in terms of the trust, the findings of this study extend stewardship theory to embrace the new capabilities of blockchain to enhance transparency and add trust in AI systems to facilitate and empower the board to work more collaborative with management, which is ethically consistent with the needs of today’s organizations to restore and rebuild public trust (Caldwell and Karri, 2005). Further, the findings of this study indicate that the way trust flows through society is changing. It is creating this big shift away from institutional trust toward distributed trust. This new era of trust could bring with it a more transparent, inclusive, and accountable society if we get it right. Trust is no longer top-down. It is being unbundled. No longer opaque and linear. The emerging trust is distributed among people and is accountability-based. Blockchain will revolutionize trust on a global scale(V-P14), where the trustworthiness of a ledger derives from trust in the systems that drives the recordkeeping. Blockchain can provide shared, verified, and agreed-upon auditable data. Trust is not provided by the third party, but rather by mathematical algorithms and by real proof (Webinar12). “The whole purpose of blockchain is transparency, so you would be able to see who did this, where it was, and at what point. It is good for transparency and trust in AI, so if you would put that all together, the objective is to create trust in AI” (IntvP16). Artificial intelligence will assist and augment boards to make better decisions using the trusted information from blockchain technology.

5.2.1.4 The stakeholder theory perspective

Stakeholder theory has been used to study wider influencing forces impacting organizations, and incentive alignments (Ryan and Schneider, 2003; Christopher, 2010; Kovermann and Velte, 2019).

The findings of this study extend stakeholder theory in three aspects. First, blockchain and AI can be the new technological mechanisms in corporate governance to coordinate and collaborate between multiple stakeholders. “From an engineering point of view, blockchain is a coordination technology, and pacifically, the ability to coordinate not just people, but also legal fictions…...blockchain also permits more of a decentralized corporate culture” (Webinar12). The main benefit of using blockchain technology is to enable more transparent governance and provide opportunities to engage more stakeholders. The technology enables new ways of interacting by using for instance tokens in their service offerings to encourage multiple stakeholders to participate in certain processes and vote on certain decisions. When combined with AI, companies can make more efficient decisions that are trustworthy based on the shared, verified, consensus-agreed blockchain data.

Second, the findings support the notion of blockchain, and AI will change the way we share and analyze information, thus capturing value through collective commitments and horizontal interaction between all stakeholders on platforms (Fenwick et al., 2017; Fenwick et al., 2019). People can now participate remotely, which enables easier participation in meetings and supports diversity. Organizations can promote stakeholder inclusion and expand business opportunities in blockchain networks. The decentralized protocol powered by blockchain technology will enable the inclusion of all stakeholders and better address their diverse interests. Blockchain allows greater transparency of ownership so that majority of the stakeholders can be easily identified. The blockchain consensus mechanisms allow the stakeholders with access rights to actively engage in collaborative decision-making. For example, interested parties like managers, accountants, auditors, business partners, investors, policymakers, etc., can join and collaborate in blockchain ecosystems to view, update, or validate transactions based on their access rights. Further, stakeholders can use AI to analyze patterns and predict trends to improve their decision-making.

Third, the findings of this study support both strands of stakeholder theory (the ethical branch and the managerial branch), to recognize that organizations are a part of greater social systems, and decisions cannot be made in isolation. Especially in the digital world, people must come together and cooperate to safeguard the needs and rights of various stakeholders, to embed ethics in the design of any automated systems that benefit the whole of the society to drive sustainability.

However, it is critical to balance stakeholders' conflicts of interest. Companies need to ensure the design of the blockchain ecosystem maximizes its capacities to facilitate collaboration, and ensure ethics embedded in the design of AI and blockchain systems are fit for the purpose and not ethically compromised.

5.2.1.5 The Institutional theory perspective

Institutional theory has been used to study the interrelationship between the firm's corporate governance, responsible leadership, and corporate social responsibility in the different institutional contexts, corporate governance deviance, institutional logic, government integrity and culture on corporate leadership, institutional approach to CSR adoption (Filatotchev and Nakajima, 2014; Johed and Catasús, 2015; Jackson and Rathert, 2017; Aguilera et al., 2018; Filatotchev et al. 2018; Nakpodia and Adegbite, 2018; Chizema and Pogrebna, 2019).

The findings of this study extend the institutional theory to explicate the digital transformation that drives the most fascinating social changes, especially the emerging blockchain and AI technologies, which are evolving faster than ever, transforming business models and processes, disrupting the way we work and live. Our world is now entering a further and radical evolution of how we interact and trade. For the first time, we can lower uncertainty not just with political and economic institutions like banks, corporations, and government, but we can do it with technology alone (V-P6). Blockchain-enabled network coordination and AI-enabled data intelligence create new capabilities for businesses to create value. The new technological tools will facilitate new ways of recording, updating, sharing information, and collaborations, which will upend existing social reality guided by institutional values, beliefs, and rules. Businesses today can leverage emerging technologies to bring innovations to clients. The implications will be huge. Business models will change to tech-enabled businesses and the support functions will change too (IntvP2).

The findings of this study support Hinings et al.'s (2018:52) notion of disruptive technologies adoption will lead to "novel actors, structures, practices, values, and beliefs that change, threaten, replace or complement existing rules of the game within organizations, ecosystems, industries or fields". Every institution and organization need to empower a thoughtful, careful consideration of the implications of technological disruption, to stay relevant and build resilience in the digital era. The change is imperative. This study generates insights to help organizations to understand how to govern the use of blockchain and AI to balance human and technical demands created by rapidly shifting waves of technology and societal needs (Brennan et al., 2019). Companies need to respond to these technological pressures and establish the right organizational culture to govern the development and deployment of digital technology and data (Lobschat et al., 2019). This study reveals ethics and governance around adopting and implementing blockchain and AI are "not just about addressing technology-related matters. They are very much also about people and processes, bound by the right mindset and behaviours across the organization (culture) starting from their leadership down to everyone who is tasked with innovating responsibly" (POST28). Further, blockchain and AI are developing, the early adopters can lead the way to demonstrate successful user cases to diffuse the technologies and then scale the adoption to gain social legitimacy. Companies in the same sector should collaborate to form recognized ethical technology standards in their product and service offerings, with collective institutional power to influence the regulatory environment to promote innovations.

The next section outlines the practical contributions of this study.

5.2.2 Practical contribution

The substantial empirical findings of this study provide some practical contributions. This study reports the three main aspects. The first is the ethical use of disruptive technologies. The second is the future workforce. The third is the regulations.

5.2.2.1 Ethical use of disruptive technologies

The findings of this study provide insights on not only the new capabilities of blockchain and AI to improve efficiency and enhance decision-making but also indicate the ethical concerns of automated systems. Then, this study further reveals how companies can

govern the ethical use of blockchain and AI. The empirical evidence indicates companies need a technology competency board in corporate governance to drive and lead digital transformation by fostering the right strategies, embedding ethical design in those blockchain and AI systems that fit for purpose, creating an organizational culture values ethics first to ensure ethical use of data, and continuous training and educating workforces to enhance ethical awareness. As such, this study has revealed four important areas for companies to consider when adopting and implementing these technologies in their organizations to ensure ethical use of these technologies.

First, people need to get acquainted with these technologies, which means listening to the people who know these technologies, both from within the company and externally. Even if a business's procedural documents and record-keeping are digital, the information is of little value unless careful thought is given to the data structure, format, and storage media that will be used (POST14). Companies need to find a fit between computers and storage. If companies have a supercomputer and low latency storage or super storage with the wrong computer, it is not going to work (YT-V3). Therefore, it is very important to assess the hardware and software infrastructure to be compatible with blockchain and AI systems and identify vulnerabilities (POST30). It is critical to ensure the design of any blockchain or AI system automates processes that fit for purpose. Companies need to start thinking about what business problems they want the technologies to solve and be aware of the potential ethical issues and look into them, and ensure proper controls, and a system of checks and balances are in place. Directors need to know what questions to ask and understand the ultimate outcomes when implementing/using the technologies. If companies try to implement AI or blockchain. They need to go through the entire process of building it, testing it, and gathering feedback to improve it to work on the constant feedback loops (IntvP1). Companies from the top-down need to be involved in all of the phases of the tech process. Further, it is valuable to exchange experiences, to get from outside involved to assist with this and leverage on this type of experience and collaborate in ecosystems.

Second, it is important to ensure governance procedures are in place to guarantee the ethical use of data. We mustn't use bad data to base our decision. Because if companies don't have trustworthy input in their data systems, in their training data sets,

then people can't trust the outputs of their algorithms and if companies don't have AI capable of operations, then they can't deploy to extract value from the work that they've done (Webinar11). For example, the bias issue. If directors of a company use certain data for AI to predict whoever will become the next manager based on historical data, men would be privileged. Companies should not assess their people only based on their gender, other elements would need to be taken into account like their qualities, their performance, etc. That is something companies need to be very careful about the inclusive approach to mitigate bias issues to decide if an algorithm is problematic and know how to fix it. Technological tools will not inform us of their trustworthiness within the context of ethics, bias, privacy, and cybersecurity. For example, AI is not going to help us make more ethical decisions If we don't have the organizations that value ethics first. Further, with regards to personal data, companies need to follow the existing GDPR rules but also ensure these are monitored in a correct way. This study explicates how companies can ensure ethical use of data to cover areas of accessibility, security, privacy, property, accuracy, and transparency in the results section. Companies need to look carefully at their data governance and understand the different interpretations in different jurisdictions with different cultures. More, when organizations have highly automated systems, they still need to be able to pinpoint who they can talk to inside and outside the company. Companies need to understand accountability properly, a human is accountable for a design decision or an operating decision that made something happen (YT-V16). However, the way companies build accountability has to be realistic. So as companies use humans in the loop, they need to make sure they use them in a way that is reasonable for a human to have to certain tasks.

Third, both blockchain and AI technologies are network technologies. They work best when used by organizations that are not rigid, hierarchies of command and control (IntvP17). The technologies will have serious problems if used by organizations that are not evolving their culture, and the way they approach the world, profits, and ethics. The blockchain and AI, or a new type of nonlinear process that really needs a different culture to harness it and ethics need to be embedded within the design of the organization. Therefore, the organization and its leadership, its processes, and its culture need to make space for people to pause and evaluate the consequences of their work. Further, the technologies themselves are forcing organizations to adapt to

a new culture and novel structure. In the long run, the organizations that welcome the changes and allow that transformation to happen and make the best use of these technologies will naturally become more open to diversity, more open to different opinions. Companies need the form of leadership that trusts, trains their employees and within their organization, they can build a culture where people can listen to each other and develop more collaborative, more open ways of working that encourage trust, psychological safety, listening reflection, and ethical standing throughout the entire system, followed by simple, succinct kind of policies is essential. There is real think about simplification before you automate. Once you are automated, it has to be better, faster, and cheaper

Lastly, what companies should care about when talking about ethics is people being trustworthy creating trustworthy companies where people can trust their colleagues, show respect to each other, and consider welfare to breed trust (YT-V14). To achieve personal excellence or to contribute to the good of society has a kind of orientation in a particular meaning of ethics (Webinar1). Ethical beliefs vary across cultures. So, each person along the way must be encouraged to take ownership of the ethical choice and the ethical responsibility when they are making the ethical judgment. Companies need to balance the profit and planet. Ethics and its moral and appropriate use are in line with the values. C-Suites have a real challenge. Under a capitalist regime, the company has to make a profit to survive. C-Suites are beholden to shareholder values. However, we are now moving into people, planet, and profit (InvtP12). CEOs need to take the leap of faith and invest in community efforts to uplift people and make profits for wider stakeholders. In doing so, companies can help shape and empower people to create a better future for us all. Sustainability is a critical consideration for organizations of all sizes. Companies increasingly face pressure from external influencers and competitors around the globe. For example, the expectations of investors and customers are changing, now the commercial calculation is changing. The company as a whole needs to do more, understand the drivers and try to integrate them, and think about the innovation potential in the businesses to grab the opportunities of using blockchain or AI. If companies get right in using blockchain to provide reliable and trustworthy information and using AI to augment decision-making based on the trustworthy information recorded on the blockchain, consumers will support those companies who are doing the right thing by producing products

sustainably and ethically. Good producers and processors and retailers will get rewarded as consumers will support them every time by choosing their goods over others. Alternatively, bad actors will be forced to adjust their practices or get out of business (V-P17). Ultimately, it is about thinking differently, asking different kinds of questions, looking holistically at the world and the systems, and finding other people to work with. The way forward to the future is always doing things collectively to be responsible, safe, and ultimately, sustainable (V-P2). The board needs to satisfy the organization with serious checks and balances looking at all these issues according to their level of materiality essentially.

5.2.2.2 Future workforce

The findings of this study corroborate two different futures concerning the future workforce in the digital transformation and explicate how people can reskill and upskill to keep relevant in the digital era. The results are consistent with the previous industrial revolution like steam, machines, and electricity that disrupts things. The results of this study indicate both pessimistic and optimistic views from informants. The pessimistic view believes that lots of jobs will be redundant due to automation. The emerging technologies such as blockchain or AI are frankly displacing, disrupting, and replacing the traditional professional model. On the other hand, more optimistically, machines will not replace us all. Just like any other technology revolution, it would need new skills. The results of this study indicate that new jobs such as algorithms forensic experts, digital ethicists, AI ethicists, computer scientists, data scientists, big data engineers will be created. People believe the role of technologies like blockchain, or AI is to improve what it is professionals do today to support and help people do their job better and quicker. In the long term, people have to think about the skills that would be needed to have to collaborate between humans and AI or automated systems like smart contracts. Therefore, people must prepare themselves for the future. This study suggests people pay attention to the following two areas to anticipate the changes and prepare for the future.

First, people need to increase their awareness of changes in social reality and urgency to pay attention to the practice of responsible business. Digitalization and the availability of enormous data are the two biggest macro trends hitting business and society today. Today, the most valuable businesses are digital platform businesses

like Google, Amazon, Facebook, etc. we get to the point where almost our data becomes a currency. Tech-enabled businesses are now the structural winners. There is no doubt that business that has transformed their business from traditional method to digital platform business is doing exceptionally well. What we are going to start to see is organizations coming up to grips with the fact that lots of things like contracts will be automatically negotiated by smart contracts and AI on their behalf for their business, services, and products, transaction settlement is real-time, any suspicious fund transfer will be detected in real-time. All these changes accelerated by AI and blockchain technologies will lead to a whole governance change around how organizations work around that. Therefore, people need to understand and increase their awareness of the changes happening, not only the changes in business models but also in support functions like hiring strategies, and university prospects to enhance future employability. For example, the job roles of boards, managers, accountants, auditors, financial experts, lawyers, and investors of old will need to change. It is very important to help as many boards of directors as possible to become technology competent. The more they become competent, the better they become running those companies. Managers with boring jobs can do something more interesting. In terms of accounting and auditing, blockchain will change the traditional processes by further digitalizing contemporary paper-based validation. Accountants and auditors can focus on more valuable activities like strategy and in-depth analysis to cover assuring the authenticity of source documents and the worth of smart contracts. When used with AI technology, it would make it easier for auditors to check and validate accounting transactions using real-time data recorded on a blockchain. Blockchain and AI permit real-time monitoring between regulators and regulated entities by automating compliance processes through a smart contract. Investors can use these technologies to augment their investment decisions by using less aggregated real-time information to analyze patterns and predict trends, etc. As such, society as a whole needs to adjust to new realities and get it right in terms of upskilling and starts building pathways forward before displacement happens, to ensure the digital transformation is ethical and socially responsible.

Second, people need to anticipate changes, and continuously educate and train themselves to reskilling and upskilling. Companies can make changes where they can use AI or blockchain or other technologies to improve their operations. However,

they still need people to design and control these systems. That is impacting the way companies think about their workforces, workspaces, and how to get people together to create value. Human beings need to work together to build corporate cultures, trust, and relationships. For example, in terms of corporate meetings, companies can do a lot on how they structure and scale meetings to make sure they do not lose the richness of connection that they really all desire. The current hybrid approach is likely to be on into the future. On one hand, people don't want to lose the virtual experience entirely, considering the efficiencies people had during the pandemic. On the other hand, certain meetings just do not end well on a virtual platform. For example, when you hire a new director on board, or when you think about the strategies, that requires a lot of talk and lots of thoughts. The opportunity to build trust just doesn't do well on camera. The informal connectivity of human interactions is very difficult to replicate (Webinar2, Webinar6). It is really a human solution rather than a technology solution at this time in point. Therefore, collaborations and communications are key but the ability to adapt is also super important in the fast-changing environment. People need to be able to change directions fast and with little effort (POST3). The future lies in combining people with all the skills of collaboration, communication, creativity, curiosity, critical thinking, and adaptability that culminates in growth. The findings of this study suggest people focus on skills that machines can't do well, to focus on inclusive and diverse sets of talents, as well as emotional intelligence like empathy that make us human while at the same time really understanding the technologies and the massive wave of innovations that are happening.

5.2.2.3 Regulations

The findings of this study support the notion of the emerging AI and blockchain technologies are transformative due to a couple of reasons. First, is the nature of the scale and scalability of these technologies. Second, the ubiquitous and the pervasiveness of these technologies and how they seep into both people's professional and personal lives, and how they influence people in ways that people don't understand the algorithms behind them. Therefore, it is very challenging for regulators, they always stone between regulating too much and preventing the nice things from happening or regulating too little and having a disaster and getting blamed for not having the right regulations in place. The recent innovations in technologies

impacting regulations, on one hand, is the emergence of regulatory technology (RegTech) companies that help businesses enhance their compliance process through intelligent regulatory analysis or auto-compliance. On the other hand, is the regulatory challenges to deal with new technological innovations. This study has revealed some challenges faced by current regulators due to the nature of blockchain and AI are both network technologies.

First, national rules are limited to dealing with international companies (POST15). There are a lot of platforms operating at the global level. For example, Facebook is operating out of the US, basically running based on US legal systems, but being used all across the globe in other countries. Then people in other countries have effectively been put under the US legal umbrella of doing things. How do we cope with that? That is the big challenge coming out of these types of technologies. There is still exploration as to how far should go in these things, every government is exploring for themselves, how much should be pre-regulated, how much is post markets, how to monitor them. Different societies are approaching it from their cultural background perspective. There is no one size fits all, and there is no best way of doing it because every country has to make it to fit its cultural background (IntvP8, IntvP9). For example, even though GDPR applies supposedly uniformly across the EU, different countries have interpreted it in subtly different ways. Some are following it as law, some are using it as guidance.

Second, these technologies like AI and blockchain are becoming increasingly complicated for people to understand from their simple intuition (IntvP9). They are developing faster than regulators can regulate these practices for not being misused (POST1). This is how the world works divert understanding. The general public lack understanding of the technicalities of different algorithms, and data harvesting and analysis by different organizations. Legislation is being formulated without input from people who will potentially be victims of the negative impacts of these new technologies. (POST15). One of the challenges always of regulating new technologies is that the regulator does not anticipate how the technology will change people's lives, companies, and consumers (YT-V10). How can we balance the freedom of people to be able to choose how much they want to give up, to make their own trade-off? For instance, between privacy and convenience, those kinds of things.

Therefore, there are no specific regulations on AI or blockchain as the adoption of those technologies are still at a nascent stage. However, many countries have begun to ease their regulations to facilitate firms seeking to adopt blockchain and provide guidance on AI. For example, the UK government and regulators have taken a flexible and balanced approach to position itself as a more blockchain-friendly jurisdiction. US embraces wait and see approach, but its agencies are active on the enforcement front to address case-by-case issues arising from blockchain and its offshoots when they are perceived to violate the existing legal framework. The Dutch government and Dutch financial regulators maintain a positive attitude towards blockchain and its applications. The Swiss parliament approved DLT Act with the aim to ensure legal certainty to foster innovation for blockchain-based projects, etc.

For AI, the UK government and regulators have paid increasing attention to monitoring how existing laws such as General Data Protection Regulation (GDPR), Data Protection Act (DPA) 2018, and Equality Act (EA) 2010, etc, can be applied to AI being deployed by business and government. UK businesses must comply with these laws when developing and using any technology, but they are not specific to AI. However, the UK government has provided guidelines on how to use AI ethically. In the US, new laws came in California for the disclosure of the current use of AI. Recently EU has brought forward a new framework for AI regulation. EU wants its member states to take a more hands-on approach to regulate AI. Although it will take a substantial time before it becomes legislation, the Journey has started. They have classified certain AI systems as “high-risk” including those in education, employment and worker management, public services like credit scoring, law enforcement, and border control. These will be subject to stricter controls, including opening up the black box to trace results, assessment of data quality, and appropriate human oversight. (POST15). In addition, principles alone cannot guarantee ethical AI, that’s why there is a need to develop alongside a much more socially responsible form of corporate governance

Lastly, this study summarizes some good suggestions from this empirical investigation for regulators to consider. Firstly, to large extent, regulations should be mostly technology neutral. Regulation shouldn’t be focusing on which technology companies are using for their businesses. They should focus on what is the impact on people, and the good operations of society. Most existing rules are written in a technology-neutral way. So really what the regulator should ask: is there a way of enforcing them

up to date? Are we good enough at identifying whether a system like a blockchain or AI system is reliable or not? whether it posts safety issues or not? So, for instance, the AI regulation that was proposed in the EU is based on a product safety kind of approach to doing things. It is asking the question of is the introduction of the AI introducing a new safety risk? Where safety is being interpreted broadly, that is why it is a dual risk assessment. These kinds of things are going into there, but it is not a complete break from how we did things previously, and hopefully, we won't be facing a dramatic change in existing regulations (IntvP8 and IntvP9). Secondly, many countries have published their ethical principles to guide the use of AI to be good, not bad, these principles are more or less the same with slightly different words, and slightly different meanings in there, but roughly the same. But what does that mean? How can a business implement it? Companies are coming out with these principles not operationalizable because they are too vague. People don't know how to operationalize it. Therefore, regulators have to get away from these sorts of high-level ethics principles and get into something more concrete like role-specific responsibilities, a risk mitigation strategy, and keep it simple so that people can understand them (YT-V14). One thing suggested by the informant is to actually build a proper framework like a risk mitigation framework around ethics, or an ethical framework with less high-level principles but more concrete role-specific responsibilities and ask "what are the high-risk areas that are in operation?". Thirdly, there is a lot of thinking and conversation going on, as is the issue of quality data sets. As we know, the main achievement of the current GDPR has not only caused companies to do housekeeping on their data but also raised individual awareness of their data rights. AI introduces, in particular, machine learning introduces is that the models are dynamic, they change over time, as they are exposed to different types of datasets. So the question is how can regulation adjust these from the existing ways of asking for guarantees around the robustness of those models. Lastly, citizen engagement and education is an under-utilized approach to developing policy around new technologies (POST15). For example, there could be more focus on educating minority groups that tend to be under-represented in machine learning datasets, who will likely be disproportionately affected by inaccurate decision-making. Some boards include expert stakeholders to draft ethical guidelines for trustworthy AI, such as the EU's high-level expert group on AI includes people from the industry, academia, and civil society. They worked together with the European AI alliance providing diverse

input to help draft Ethical Guidelines for Trustworthy AI (POST15). As such, collaboration is critical to enable multi-stakeholder perspectives and international efforts to anticipate and be proactive in having a framework that, in a sense, assesses the risk, to make sure people understand what is happening out there and their radar is fully alert and be quite forensic about the use of these technologies.

After articulating the contributions of this study, the next section 5.3 elucidates the limitations of this study.

5.3 Limitations of the study

In the light of the above, this study makes theoretical contributions to knowledge and enriches the extant works of literature, and also provides practical contributions to the ethical use of disruptive technologies, future workforce, and regulations. However, the study was conducted within certain theoretical, methodological, empirical, and pragmatic conditions, which might also constitute particular limitations and constraints. The perceived severity of certain limitations does often depend on the philosophical orientation adopted by the study and is used as a basis for the evaluation of the relevance of the study. The philosophical orientation and research design outlined in Chapter 3 partially served the purpose to alleviate such paradigmatic biases and providing the justifications for this study. As such, this study transparently discusses three main limitations in terms of methodological, empirical, and practical limitations, which can help other researchers to assess the suitability of the findings for their own future work.

Methodologically, the philosophical orientation adopted in this study favors situated and particularistic knowledge based on interpretivism epistemology to understand the social world through an examination of the interpretation of what world by its social actors to understand and empower a thoughtful, careful consideration of the implications of AI and blockchain adoption that disrupts the way people work and live from ethical perspectives. Further, the research design of this study provides a framework for the data collection and analysis to ensure the methods and techniques used for this investigation are most suitable to address the research questions under investigation. Special attention was paid to the feasibility of data collection within the research design to ensure relevant data is accessible and can be collected through netnography and semi-structured interviews. Therefore, this study was limited in that

it primarily used qualitative methods to collect different data as a source for empirical materials, with online immersion in social media serving a corroborative and auxiliary purpose. The focus of this study is on accumulating knowledge within a nascent area of academic inquiry, which is not yet well specified. Blockchain is at its nascent stage, and so does AI. These technologies will automate things, but their capabilities are not there yet to operate fully autonomously. They haven't actually opened up a completely new space yet. They are actually in the next step in the automating processes in place where we are already operating, but for better, quicker, and cheaper. In addition, pragmatically, the netnogrpahy method focuses on what is said on social media rather than who is saying it. In terms of interviews, this study uses informants' length of work experience, current knowledge, and expertise in the field of AI and blockchain as the specific measures of their competency and privileges the voice of those who understand these technologies. As such, societal polyvocality such as end-users, and less tech-savvy stakeholder perspectives have not been captured by this study. However, this is consistent with the general research purpose and does not negate the relevance of the study. Moreover, the focus of this study was on generating rich insights through netnography and interviews investigation rather than scale and scope. The latter could be inquired by a more quantitative-oriented design, for instance, a survey-based inquiry into the notion of corporate governance with the advancement in AI and blockchain across different companies or industries. Other investigation methods such as case studies can also help to further contrast and differentiate the results to enrich and extend this nascent area of academic inquiry.

Empirically, this study details the findings and collates similar themes into several overarching dimensions that make up the basis of an emergent thematic framework. The empirical findings are based on qualitative data collected from 34 LinkedIn Posts with Comments,12 Webinars, 22 YouTube Videos, 19 Videos, 10 Podcasts, and 17 semi-structured interviews. Thus, statistical generalization is not possible. The findings are context and situation-specific to study the technological impact on corporate governance, with a focus on ethical issues. The research design aims to develop a thematic framework and purposefully abstract from the empirical domain to establish a substantive understanding that specifies the phenomenon constituting the primary study purpose (to understand the implications of AI and blockchain adoption in corporate governance from an ethical perspective). The substantive findings as a

result of this study serve the purpose of providing a comprehensive understanding and conceptual lense for future research rather than the establishment of the empirical reach and scope of the findings. Due to the nascent character of the concepts (AI and blockchain developments) and the exploratory objectives of this study, this limitation is permissible. As such, the findings and the relative importance of the identified dimensions may reflect contemporary economic and societal conditions and might change over time as AI and blockchain are ethically adopted as governance mechanisms to enhance transparency, accountability, and trust in the corporate governance ecosystems. More future studies need to expand the thematical framework developed from this study to integrate different empirical methods and settings to further refine, test, and compare the results to enrich the knowledge. For example, comparative case studies or other quantitative studies, or mixed methods would be appropriate approaches to overcome and complement the empirical limitations of this study based on a qualitative approach. Further, in cultural terms, the findings of this study have emphasised on the importance of cultural changes to foster ethical values in the design of automated systems. However, the empirical findings of the semi-structured interviews of this study are situated in a western context and may produce different results in other cultural environments. This limitation might have been overcome by netnography method that collects the online communications across the different cultural backgrounds but was paying more attention to what is being said online rather than who is said and which cultural background the person comes from. Thus, comparative studies across different spatial and/or cultural settings would counter the spatial and cultural limitations of this study.

Practically, this study was conducted by a single person, a novice doctoral researcher still learning the craft, therefore this study was limited in terms of budget and available time of a PhD program, and was constrained in terms of the necessary skills, and competencies of a learner researcher. However, this study has overcome the limitations of budget and available time, as well as a pandemic by conducting online research, collecting online social media communication data, and interviewing informants through MsTeam, Zoom, and GoogleMeet. In addition, the limitations of the skills are partially alleviated by the purpose of a PhD program to train future researchers to develop the necessary skills, competencies, and reflective mindset required for further independent studies. The researcher of this study has attended

all the relevant Brunel training and learning workshops organized by Brunel Graduate School and Business School to enhance the skills needed to do and disseminate research to enhance future employability and contribute to the research excellence framework.

In the light of the above, this chapter discusses the substantial empirical results by demonstrating their impact and contribution relative to the appropriate theoretical literature and assessing the strengths and limitations of the methods and results. The next chapter concludes this study and provides some recommendations, future predictions, and further research.

Chapter 6 Conclusion and further research

This final chapter first concludes this thesis and then outlines some future predictions from this empirical investigation regarding technological development in section 6.1. Following on from this, section 6.2 provides some recommendations. Finally, section 6.3 suggests areas of future research to enrich the knowledge.

To sum up, the primary aim of this research is to study the impact of AI and blockchain adoption on corporate governance from ethical perspectives. This study explores and elaborates on the nascent notion of corporate governance transformation with the adoption of artificial intelligence and blockchain technologies, to understand the ethical benefits of using AI and blockchain for fraud detection, and the ethical concerns of using these technologies, as well as how companies can govern the use of these technologies in an ethical, socially responsible ways to mitigate misuses, unwanted consequences. This investigation is important because digital technologies like AI and blockchain, are disruptive and transforming the nature and scope of our work and life, leading to a major shift in how value is captured and exchanged in society. All parties must stand ready to embrace and direct that change in shaping the future of business and society. Now businesses have disintermediation with blockchain, it is more complicated. As soon as these technologies become vital parts of a company's existence, they need to be the center of corporate governance. Technologies like AI and blockchain can support new forms of organizational structure, and act as effective tools to deliver growth. However, who is going to be responsible when companies advance with AI, transform by blockchain, and be able to reach into the autonomous parts of the world. A machine doesn’t feel responsible. It only performs what is being asked to do in a logical machine way. It can’t think outside the box. As such, ethics is very important in the digital world to help companies design the AI or blockchain systems that fit the purpose of the companies’ strategies. Therefore, the organizations, their leadership, processes, and culture need to make space for people to pause and evaluate the consequences of their work. How to behave more ethically and socially responsible way with AI and blockchain is something organizations need to put more emphasis on and have ethics embedded within the design of the organizations to strive for success and sustainability.

As such, this study applies netnography approach to investigate social media data and extends these online explorations with online semi-structured interviews. The data collection and analysis are iterative processes until theoretical saturation is achieved. Detailed justifications of why netnography and semi-structured interviews are appropriate methods for this investigation are explicated in methodology chapter 3. This investigation collects an abundance of textual, video, and audio data, which have been transcribed into textual data for thematical analysis using NVivo software. This research design follows pragmatic, step-by-step procedures for data collection through netnography and semi-structured interviews to ensure rigor in the investigation to enhance the trustworthiness of this study so that the results of the research can be trusted to inform important decisions, inspire further work, and enhance understanding of the implications of AI and blockchain adoption on corporate governance in general and ethical implications specifically. The data structure extracts from data in this study illustrate the analytic claims that match the analysis and data together, to ensure a good fit and consistency between described method and reported analysis.

The findings of this study were empirically substantiated. A thematic framework was developed as a result of this study. This thematic framework provides a holistic understanding of why corporate governance needs to change, especially with the emergence of blockchain and AI technologies, what changes will corporate governance encounter with changes in social reality, and how corporate governance can imperatively respond to the changes by using these technologies ethically. Particularly, this framework explains the ethical benefits of AI and blockchain technology for fraud detection, and the ethical concerns with these automated systems such as job transformation and replacement, algorithms bias, surveillance, and privacy issues, and further articulates technology competency board in corporate governance drives success in digital transformation by fostering right strategies, embedding ethical design in systems that fit for purpose, creating an organizational culture values ethics first, and continuous training and educating workforces to enhance ethical awareness. This study reports the empirical findings in four data displays: the progressive data structure, the emergent thematic model, supporting data with representative quotations, and the findings narrative itself, to make it easier for the interested parties to understand the evidence of the findings.

This study contributes to providing the theoretical and instrumental understanding of the implications of AI and blockchain adoption in corporate governance, and how companies can use these technologies to enhance ethical behaviour and mitigate ethical dilemmas. The results of this study and the resulting thematic framework as the main findings of this research are first discussed in Section 5.1 in the context of extant scholarships in corporate governance, blockchain, AI, and ethics to evaluate the impact of AI and blockchain adoption in corporate governance from ethical perspectives. Further, the contributions of this study in theoretical and practical terms are elucidated in Section 5.2. This study first explicates the empirical contribution of the development of a new thematic framework, followed by its theoretical understanding of the results from the perspectives of the existing agency theory, stewardship theory, stakeholder theory, and institutional theory. Further, the substantial empirical findings of this study provide some practical contributions to the ethical use of disruptive technologies, the future workforce, and the regulations. In general terms, the findings of this study support the notion of corporate governance change to transform business models and processes to leverage the new capabilities of AI and blockchain technologies, to priories creativity, speed, and accountability, to replace the old business model, to foster agile or collaborative governance to deal with uncertainty, agility, adaptiveness, and cooperation in the digital world. The findings of this study support the notion of ethics can be an alternative or rather more positive approach to empowering the board of directors, guided by ethical values and norms, by accurately reviewing corporate activities and financial reports to prevent financial damage. The rise of ethics in corporate governance offers hope for restoring trust in business and helping address issues that rules and regulations cannot reach. In Theory, this investigation empirically corroborates that the use of blockchain and AI can enhance ethical practice by detecting fraud and anomaly activities, due to the unique capabilities of blockchain and AI technologies to enhance transparency and detect anomalies. Additionally, it adds depth and specificity by identifying the ethical concerns of using blockchain and AI in corporate governance such as privacy, unethical use of data, job loss, and algorithm bias. Further, the findings of this study explicate and articulate how companies can govern the use of these technologies ethically.

As such, this study has revealed four important areas for companies to consider when adopting and implementing these technologies in their organizations to ensure ethical use of these technologies as previously mentioned in Chapter 5. First, people need to get acquainted with these technologies and know to ask the right questions. Second, it is important to ensure governance procedures are in place to guarantee and safeguard the ethical use of data to ensure data accessibility, security, privacy, property, accuracy, and transparency. Third, both blockchain and AI technologies are network technologies, which requires organizations to have less rigid, hierarchies of command and control but more collaboration. Organizations need to evolve their culture and rethink their approach to profits and ethics. The leadership team needs to trust and train their employees and build a culture where people dare to speak out and call out unethical behaviours. Companies need to develop more collaborative, more open ways of working that encourage trust, psychological safety, listening, reflection, and ethical standing throughout the corporate governance ecosystems. Finally, companies need to educate their people, increase their awareness of changes in social reality, and urgency to pay attention to the practice of responsible business, where people can trust their colleagues, show respect to each other, and consider welfare to breed trust in creating trustworthy companies. Because principles alone cannot guarantee ethical AI or ethical blockchain, there is a need to develop alongside a much more socially responsible form of corporate governance, where decisions are made taking into account not just financial returns, but also the broader impact on people and the planet.

The next section 6.1 outlines some future predictions extracted from the empirical data of this study regarding digital technologies as tools to open up new opportunities and deliver growth in the future.

6.1 Future predictions

The future: where does the digital transformation take us? At the moment, we are just at the beginning of the beginning. AI and blockchain are at a nascent stage. The most popular AI product in 20 years from now, that everybody uses, has not been invented yet (V-P16). In general terms, this study outlines some future predictions based on what the informants said. In the very short term, say over the next 10 years, the Internet of Things will become even more embedded in our environment. It will

increasingly difficult to buy appliances that are dumb. They will all be smart. For example, autonomous vehicles, cognitive enhancements, augmented reality, intelligent digital twins, and smart wearables will drive some really fantastic changes. However, a general caveat is in the first instance, a lot of these will only be available to people of means, wealthier people. Hopefully, welfare systems will be in place to ensure equality, diversity, and inclusion. In a slightly longer medium term, say 20-40 years, it will no longer just be human-to-human communication. It will be device-to-device communication. We are going to have AI look at how we can model the effects of different things, so we can't do large-scale blockchain without AI due to the scale and speed. Blockchain will facilitate decentralized autonomous organizations as this technology support new forms of organizational structure. The world will make the transition from automated work to highly automated work. Technology becomes such an extension of humans that humans can't fully participate and engage in work and life without technologies. In addition, the impact big tech companies have on our systems of government and whether they are engaging in any kind of political wrongdoings, is going to be with us for the next 20-40 years. In the longer term, beyond 2070, the prospects for artificial general intelligence may become more of a something to worry about (YT-V11). At least under any current or foreseeable technology, artificial general intelligence is not going to happen to the level set for everyone (YT-V13).

As such, the most successful companies in the future will be those that do keep these on their radar, actively engage to get to know these technologies, implement these technologies in the best way possible, and find a good balance between leveraging the technology while also keep human touch focusing on their business. The next stage in terms of evolution is going to be how companies can create the very best in the digital experience together with the brilliance of people to offer choice and advice to their customers. The combination of brilliance in terms of technology, choice, and flexibility, together with warmth, empathy, and the expertise of people, is critical moving forward (Webinar 6). It is going to be a tech solution, plus a people-centered solution advancing into the future.

The next section 6.2 provides some recommendations from this empirical investigation to help companies evaluate technological solutions that are appropriate and fit for their company strategies.

6.2 Recommendations

As indicated in the findings chapter, ultimately, any technology as we have mentioned either AI or blockchain is going to have two sides to its utilization and it comes down to the ethical principles and values of the companies to create fairer systems that mitigate bias and enhance privacy. This study identifies and provides some suggestions on how companies can refocus and rethink their approaches to digital transformation to deliver growth and sustainability.

Firstly, from the technological perspective, blockchain and AI are evolving. There are surely many benefits and new capabilities that come with these technologies if we can use them properly and the technologies are not ethically compromised. However, blockchain and AI are not widely adopted yet, they are at the early stages of development. They are still so nascent that the full implications are difficult to discern. Organizations need to be cautious about the limitations, challenges, and risks of adopting these technologies and carefully evaluate the suitability of these technologies for their business problems.

As to blockchain, it is just a matter of time, we will see companies flip fully onto a blockchain as soon as blockchain is enrolled in a good way. In the early days, we see there is a small group of nerds, then a small group of society, then a small group of companies, and now a small group of countries using it. In the end, we will see the bigger picture in 10-20 years (IntvP13). However, companies should not rush into something just to get along the hype of how good blockchain is. Companies need to understand the limitations of blockchain technology. Blockchain is not a one-size-fits-all solution to all business problems, which means not every problem where blockchain is the best solution. Blockchain can be quite contextual, designed in different forms will have different implications in terms of security, efficiency, and energy issues. Companies should have somebody who knows the technology and understands the business problem to check whether blockchain is the most suitable way to tackle the business problem. If everything goes alright, then it is good to go. Further, companies also need to decide whether to build their own blockchain or depend on a different company. The extra layer company will add extra risk for the company. For example, if companies decide to run their blockchain on Ethereum or Hyperledger networks, the

company would automatically have a problem when there are issues with those platforms. As such, companies should have proper risk management in place to ensure it shouldn't be like that the full company will be shut down if the blockchain stops.

As to AI, it is increasingly seeping into our life as a general-purpose technology. Human-centric AI system will be what companies should be looking for the future practices. It is not just what kind of AI technology we can use, but the AI technology we can use for the good of society and the future of humanity. People are not going to create an AI that is going to run the company but rather make it a part of the business process to create value and leverage the technology in the right way to make people smarter and automate certain elements of the work. Some AI projects are very likely to die because AI is a very difficult technology. People need to work with it and iterate it until the right combination is found before companies can scale it. If we can effectively deploy AI to help us, the effective deployment must be both trustworthy and ethical. First, step away from fears. The fact is that we have always adjusted to ongoing automation from previous industrial revolutions. Machines will not replace people. Second, the weak form of AI as a tool like any other technological tool that will augment decision-making and make work safer and more rewarding. It will be a net benefit if we learn to use it properly (POST21). AI is not a race to decide who are the winners or losers. We should not engage in a competition type of approach but rather reach collaboration and opportunities for all to encourage exploration of different ways of looking at it. Currently, we are emphasizing AI on data-driven approaches. If data and values are unethical then the output of artificial intelligence itself will become unethical. The lifeblood of AI is the data, if you don't get it right, it is not going to happen later on (InvtP16). However, data-driven approaches are not the solution to all our problems. Many complex problems cannot be addressed only by adding more data and more computational power to the same equation. As such, we should look at other approaches that are more amenable to responsibility, explanation, collaboration, and other types of technologies that can help address these issues (Webinar11).

Secondly, from the organizational perspective, blockchain and AI are forcing organizations to adapt to their culture and structure. As previously mentioned, blockchain and AI are network technologies, they work best when used by organizations that are not rigid, hierarchies of command and control. Currently, what

is going on with a lot of companies is that they think it is quiet, blockchain, and AI, are there, but that is not something that they have to pay much attention to. Then suddenly the storm hits and then everyone will say that we have to be looking into this five years ago (IntvP1). Therefore, companies should need more attention to technological developments that have these types of disruptive effects.

In the long run, organizations that welcome and allow that transformation to happen and make the best use of these technologies will become more open to diversity and different opinions. In principle, the potential of these technologies should drive transparency and enhance the ethical behaviour of top management in the context of fraud detection. As such, there is an opportunity for ethical improvement. Additionally, these technological tools come together and can provide an easy interface for directors to interact with. In the near future, directors will have immediate direct access to the data showing how the business is performing, and what are the main areas of risk. Directors will become more powerful at jobs, more confident, and better because the intelligent tools bring insights into potential areas of opportunity. However, as outlined in the results chapter, there are ethical concerns with blockchain and AI systems. The biggest ethical issue with technologies is having people understand them so that they understand what the risks are there.

As such, the first thing is to train company boards and managers and everyone throughout the company to understand this new responsibility to deal with ethical issues of emerging technologies. Companies need to bring people on board to help redesign the strategy. The technologies must fit into companies' purpose and strategy. Their security is not an afterthought at all, it is so much part of the strategy and road map for the company, it can not be left out with digital technologies. At the board level, companies need people who have enough business, sector, and technology knowledge to enable them to properly deploy their fiduciary responsibility to question the management to make sure the management is on top of things. Companies need board, CEOs, and managers who are intellectually curious about these technologies. They invest time to educate themselves so they know how to use the technologies as business tools for growth. The main thing there is learning things to think about trust and how to cultivate it within the corporate governance ecosystems by working on the constant feedback loops in all of the phases of the tech process. They sign the projects, they sign off cheques and investments, and they know what to expect and

they know what questions to ask. For example, companies need to have either in-house or they need to bring it in at the time when they do their procurement of AI systems. They need to have people on their side of the procurement discussion, who know enough about the technology so they can ask the right kind of questions, to prove whether it actually addresses the issues that need addressing.

The second thing is the recruitment of CEOs and executive management or anybody in the C-suite, there should be an additional component in that assessment process, which looks closely at the ethical side of that person (IntvP3, IntvP4). It is also important that you don't join a board if you think that the management is prone to be unethical. The third thing is to understand the emerging risks and know where the risks come from. It starts with companies' critical assets, knowing how and who is touching them inside and outside the company, and having the right safeguards in place. Companies need to be careful not to over-rely on technologies ability to detect or prevent fraud. In the governance context, companies need to have more purposeful open conversations about the risks of fraud. The last thing is the adoption of blockchain, or AI technologies should be at the highest levels of corporate governance. This is a CEO and a board decision, not somewhere down the line. They need to rethink and redesign the expectations and guidelines for using disruptive technologies because these technologies would require multi-million investments and change management. It is not enough to have a policy. They have to have appropriate safeguards, appropriate checks and balances, and procedures that go right. There needs to be some kind of adopted framework like risk management frameworks that corporations can comply with. However, the current risk management committee looks at the traditional forms of risks and they do not largely look at very complex interactions of technology, systems, and data (IntvP12). Companies need to assess whether the current rules and standards are appropriate for blockchain and AI, or whether new rules and standards need to be developed.

So, the big piece of all these is to try to remember that there is a human element around change management. We have to be educated and competent to embrace change and direct it into something beneficial to us all with blockchain and AI technologies that improve transparency, trust, and efficiency. We need to make training and education for employees in new positions better planned and smoother to help people who have been affected by technology changes and help businesses take

full advantage of their talents and skills in new roles (POST21). When it comes to corporate culture and ethics, we're looking at a whole transformation for organizations to codify and build their constitution and start to incorporate this change within their organizations.

6.3 Further research

This last section of this thesis elucidates and suggests the directions for future research. As explicated throughout this thesis, AI and blockchain are at nascent stages, and there is still a long way to go but the reality is there. In addition, the current study on the impact of disruptive technology adoption in corporate governance is slight (Scott et al., 2017), and extant scholarly works on corporate governance have not covered much on the transition from a centralized, vertical hierarchy to a decentralized, horizontal, unmediated organizations that initiated and accelerated by rapid technological changes (Fenwick et al, 2017). As such, almost all research avenues are still open for interested researchers across different disciplinaries in the business and management research in the diverse fields of accounting, finance, information systems, innovation, international business, marketing, operations and technology management, organizational studies, public sector and health care, social sciences, strategy, etc., using different research designs from single or multiple case studies, comparative studies, cross-sectional studies, longitudinal studies, to large scale surveys. However, this study has raised some issues that are related to the literature reviewed, the findings of the research itself, and the methodological, empirical, and practical limitations discussed in the previous chapter, which provides some guidance for further empirical scrutiny.

In general terms, this thesis reveals the applications of AI and blockchain in corporate governance, in general, are a largely unexplored area. Some authors have started to address this paucity but mostly are conceptual, for instance, corporate governance and blockchains (Yermack, 2017); corporate governance implications of disruptive technology: an overview (Brennan et al., 2019); the end of “corporate” governance (hello “platform” governance) (Fenwick et al., 2019); blockchain & shareholder voting: a hard fork for 21st-century corporate governance (Daniels, 2018); the role of internet-related technologies (cloud, big data, blockchain, and artificial intelligence) in shaping the work of accountant: new directions for accounting research (Moll and Yigitbasioglu,

2019); it is a research avenue, which warrants further empirical scrutiny. This study provides a thematic framework of different dimensions of foundational concepts of the implications of AI and blockchain adoption in corporate governance from ethical perspectives (i.e change in social reality, current business problems, blockchain and AI for fraud detection, structural change, new capabilities, ethical concerns with automated systems, adoption challenges, ethical design of automated systems, ethical use of data, leadership and board support, people and culture) that can be used hopefully as conceptual lenses for exploring different aspects of corporate governance reforms in different countries with digital technologies. Further in-depth case studies and comparative case studies would best facilitate further investigation to enrich this field of knowledge.

In specific terms, the obvious direction for future research would be the utilization of the thematic framework developed in this thesis to further refine, elaborate, and corroborate the emerging corporate governance change with the adoption of AI and blockchain technologies to strive for growth. As such, the main contribution of this thesis provides a thematic framework for future empirical inquiries utilizing qualitative, quantitative, or mixed methods to further expand and enrich this field of knowledge. Surely, this thematic framework itself is subject to change and amendment by future inquiries. Further studies could assess the implications of adopting AI and blockchain across new empirical contexts or assess corporate governance reform with the use of AI and blockchain technologies at macro-level and micro-level institutional arrangements or adopt an institutional perspective to assess the “technology logic” to enable a comparison between different approaches companies use to address their business problems using different technological tools. In this respect, future work could alter the empirical setting to investigate the implications of AI and blockchain adoption in corporate governance in specific types of companies (e.g. public or private companies; large corporations, or small-medium-sized companies); in different industries (e.g. banking, financial, insurance, education, heal care, supply chain, or government sectors); or in different countries and cultural backgrounds. As such, the thematic framework could be tested, refined, and expanded by progressing into different contexts and domains. Once stable empirical investigations emerge, larger-scale surveys could assess the scope of these dimensions across different empirical domains. Further, longitudinal studies could track changes in corporate governance

with new AI and blockchain tools and their impact on the new agency problems, stewardship trust mindset, stakeholder collaboration and novel institutional arrangements, and different implementation/positioning strategies over time (within a company or a sector, etc.). This could be facilitated by ethnographic research over a long period, qualitative interviewing on more than one occasion, or qualitative content analysis of documents relating to different time periods (Bell et al.,2019). This would facilitate the change process of corporate governance transition from a centralized, vertical hierarchy to a decentralized, horizontal, unmediated organization with less rigid, hierarchies of command and control but more collaboration. Further, multidisciplinary collaboration could offer the fruitful exchange of insights and provide a valid route for future theory development in information systems, innovation, corporate governance, strategic management, human resource management, education, and public policy domains with the use of AI or blockchain or other digital technologies to deliver a diverse, inclusive, holistic picture of how companies can ethically use advanced technological tools. As businesses shift towards technology-enabled business, the change will be huge, the entire structure of a company will be totally new. Proactively, companies will have to make significant transformation, not only the business but also how to build these support functions, which means different hiring strategies, business school would have to prepare people for the market differently, policy makers will need to create a new regulatory framework such as risk mitigation framework around ethics for emerging technologies to support firms focusing on scaling innovative technologies. Thus, future research should adopt inclusive approaches to light the path to innovation to enrich the knowledge in digital transformation to deliver growth.

References

Acharya, V. V., Myers, S. C. and Rajan, R. G. (2011) 'The internal governance of firms.', Journal of Finance, 66, pp. 689–720.

Adam, A. M. and Schwartz, M. S. (2009) 'Corporate governance, ethics, and the backdating of stock options', Journal of Business Ethics, 85(SUPPL. 1), pp. 225–237. doi: 10.1007/s10551-008-9941-7.

Aguilera, R. V., Desender, K. and Bednar, M.K. (2015) 'Connecting the dots: bringing external corporate governance into the corporate governance puzzle', Academy of Management Annals, 9(1), pp. 483–573.

Aguilera, R. V., Judge, W. Q. and Terjesen, S. A. (2018) 'Corporate governance deviance', Academy of Management Review, 43(1), pp. 87–109. doi: 10.5465/amr.2014.0394.

Akaah, I. P. (1996) 'The influence of organizational rank and role on marketing professionals' ethical judgments.', Journal of Business Ethics, 15, pp. 605–613.

Al Farooque, O., Buachoom, W. and Hoang, N. (2019) 'Interactive effects of executive compensation, firm performance and corporate governance: Evidence from an Asian market', Asia Pacific Journal of Management, 36(4), pp. 1111–1164. doi: 10.1007/s10490-018-09640-2.

Aleksandrov, E., Bourmistrov, A. and Grossi, G. (2018) 'Participatory budgeting as a form of dialogic accounting in Russia: Actors' institutional work and reflexivity trap', Accounting, Auditing & Accountability Journal, 31, pp. 1098–1123.

Altshuler, T. S. (2019) The crossroads between ethics and technology. Available at: https://techcrunch.com/2019/08/06/1846988/ (Accessed: 1 May 2020).

Anderson, D. W., Melanson, S. J. and Maly, J. (2007) 'The evolution of corporate governance: Power redistribution brings boards to life', Corporate Governance: An International Review, 15(5), pp. 780–797. doi: 10.1111/j.1467-8683.2007.00608.x.

Androutsopoulou, A. et al. (2019) 'Transforming the communication between citizens and government through AI-guided chatbots', Government Information Quarterly, 36(2), pp. 358–367. doi: 10.1016/j.giq.2018.10.001.

Angelis, J. and Ribeiro da Silva, E. (2019) 'Blockchain adoption: A value driver perspective', Business Horizons, 62(3), pp. 307–314. doi:10.1016/j.bushor.2018.12.001.

Appel, M. et al. (2020) 'The uncanny of mind in a machine: Humanoid robots as tools, agents, and experiencers', Computers in Human Behavior, pp. 274–286. doi: 10.1016/j.chb.2019.07.031.

Arntz, M., Gregory, T. and Zierahn, U. (2017) 'Revisiting the risk of automation', Economics Letters, pp. 157–160. doi: 10.1016/j.econlet.2017.07.001.

Arrow, K. J. (1985) 'Informational Structure of the Firm', American Economic Review, 75(2), pp. 303–307.

Ashley, M. J. and Johnson, M. S. (2018) 'Establishing a secure, transparent, and autonomous blockchain of custody for renewable energy credits and carbon credits', IEEE Engineering Management Review. 46(4), pp. 100–102. doi: 10.1109/EMR.2018.2874967.

Atkin, N. (1999) 'Communication and Politics: Transparency, Dialogue and Ethical Decision-Making'', Vital Speeches of the Day, 65(11), pp. 347–351.

Awolowo, I.F., Garrow, N., Clark, M.C. and Chan, D., (2018) 'Accounting Scandals: Beyond Corporate Governance', SSRN Electronic Journal, 14, pp. 399–407. doi: 10.2139/ssrn.3101057.

Banafa, A. (2019) Blockchain and AI: A Perfect Match? Available at: https://www.bbvaopenmind.com/en/technology/artificial-intelligence/blockchain-and-ai-a-perfect-match/ (Accessed: 17 December 2019).

Bannister, C., Sniderman, B. and Buckley, N. (2020) Ethical Tech. Available at: https://www2.deloitte.com/us/en/insights/topics/digital-transformation/make-ethical-technology-a-priority.html (Accessed: 1 May 2020).

Bao, S. R. and Lewellyn, K. B. (2017) 'Ownership structure and earnings management in emerging markets—An institutionalized agency perspective', International Business Review, 26(5), pp. 828–838. doi: 10.1016/j.ibusrev.2017.02.002.

Barnett, J. and Treleaven, P. (2018) 'Algorithmic Dispute Resolution-The Automation of Professional Dispute Resolution Using AI and Blockchain Technologies', Computer Journal, 61(3), pp. 399–408. doi: 10.1093/comjnl/bxx103.

Barney, J. and Hansen, M. (1994) 'Trustworthiness as a source of competitive advantage', Strategic management journal,15, pp. 175–190.

Bass, B. M. and Steidlmeier, P. (1999) 'Ethics, character, and authentic transformational leadership behavior', Leadership Quarterly, 10(2), pp. 181–217. doi: 10.1016/S1048-9843(99)00016-8.

Bebchuk, L. A. (2005) 'The case for increasing shareholder power', Harvard Law Review, 118(3), pp. 833–914.

Bell, E., Bryman, A. and Harley, B. (2019) Business Research Methods. Fifth Edit. Oxford University Press.

Benlian, A., Kettinger, W.J., Sunyaev, A., Winkler, T.J. and Guest Editors (2018) 'Special Section: The Transformative Value of Cloud Computing: A Decoupling, Platformization, and Recombination Theoretical Framework', Journal of Management Information Systems, 35(3), pp. 719–739. doi: 10.1080/07421222.2018.1481634.

Benton, R. A. and You, J. (2019) 'Governance monitors or market rebels? Heterogeneity in shareholder activism', Strategic Organization, 17(3), pp. 281–310. doi: 10.1177/1476127018776482.

Berger, A. N. and Bonaccorsi di Patti, E. (2006) 'Capital structure and firm performance: A new approach to testing agency theory and an application to the banking industry', Journal of Banking and Finance, 30(4), pp. 1065–1102. doi: 10.1016/j.jbankfin.2005.05.015.

Berle, A. and Means, C. G. (1932) 'The Modern Corporation and Private Property.', Macmillan, New York.

Bertino, E, Kundu, A. and Sura, Z. (2019) 'Data transparency with blockchain and AI ethics', Journal of Data and Information Quality, 11(4),pp. 1–8, doi: 10.1145/3312750.

Bérubé, V., Kelleher, J., Mercier, P., Mian, A. and Packer, B. (2018) AI looks North: Bridging Canada's corporate artificial intelligence gap, McKinsey & Company. Available at: https://www.mckinsey.com/featured-insights/artificial-intelligence/ai-looks-north-bridging-canadas-corporate-artificial-intelligence-gap (Accessed: 10 January 2021).

Bhabra, G. S. and Rooney, J. (2019) 'Sarbanes-Oxley, agency conflicts and the marginal value of capital expenditure', Managerial Finance, doi: 10.1108/mf-10-2018-0471.

Biais, B., Bisiere, C., Bouvard, M. and Casamatta, C. (2019) 'The Blockchain Folk Theorem', Review of Financial Studies, 32(5), pp. 1662–1715. doi: 10.1093/rfs/hhy095.

Bialecki, M., O'Leary, S. and Smith, D. (2017) 'Judgement devices and the evaluation of singularities: The use of performance ratings and narrative information to guide film viewer choice.', Management Accounting Research, 35, pp. 56–65.

Biernacki, P. and Waldorf, D. (1981) ‘Snowball sampling: Problems and techniques of chain referral sampling’, Sociological Methods and Research, 10(2), pp. 141–163.

Bindu, N., Sankar, C. P. and Kumar, K. S. (2019) ‘From conventional governance to e-democracy: Tracing the evolution of e-governance research trends using network analysis tools’, Government Information Quarterly, 36(3), pp. 385–399. doi: 10.1016/j.giq.2019.02.005.

Bishop, R. and Ross, D. (2021) ‘Technics, Time and the International: Bernard Stiegler’s Thought – A Dialogue with Daniel Ross’, Theory, Culture & Society, 38(4), pp. 111–133.

Blackman, R. (2022) Ethical Machines, Harvard Business Review Press, Boston, Massachusetts

Blair, M. M. and Stout, L. A. (1999) ‘A team production theory of corporate law?’, Journal of Corporation Law, 24, pp. 751–807.

Bluemink, M. (2020) Obituary-Bernard Stiegler (1952-2020), Philosophy Now Magazine. Available at: https://philosophynow.org/issues/140/Bernard_Stiegler_1952-2020#:~:text=Stiegler’s (Accessed: 3 February 2022).

Boillet, J. (2017) ‘Are auditors ready for blockchain? The audit profession is eyeing blockchain.’, Accounting Today, 31(9), p. 34.

Bonn, I. and Fisher, J. (2005) ‘Corporate governance and business ethics: Insights from the strategic planning experience’, Corporate Governance: An International Review, 13(6), pp. 730–738. doi: 10.1111/j.1467-8683.2005.00466.x.

Bose, U. (2012) ‘An ethical framework in information systems decision making using normative theories of business ethics’, Ethics and Information Technology, 14(1), pp. 17–26. doi: 10.1007/s10676-011-9283-5.

Bowen, G. A. (2008) ‘Naturalistic inquiry and the saturation concept: A research note’, Qualitative Research, 8, pp. 137–152.

Boyd, C. (1996) ‘Ethics and corporate governance: The issues raised by the Cadbury report in the United Kingdom’, Journal of Business Ethics, 15(2), pp. 167–182. doi: 10.1007/BF00705585.

Brandes, P., Goranova, M. and Hall, S. (2008) ‘Navigating shareholder influence: Compensation plans and the shareholder approval process’, Academy of Management Perspectives, 22(1), pp. 41–57. doi: 10.5465/AMP.2008.31217511.

Brandes, P., Hadani, M. and Goranova, M. (2006) ‘Stock options expensing: An examination of agency and institutional theory explanations’, Journal of Business Research, 59(5), pp. 595–603. doi: 10.1016/j.jbusres.2005.09.018.

Braun, V. and Clarke, V. (2006) ‘Using thematic analysis in psychology’, Qualitative research in psychology, 3(2), pp. 77-101.

Brennan, N. M., Subramaniam, N. and van Staden, C. J. (2019) ‘Corporate governance implications of disruptive technology: An overview’, British Accounting Review, 51(6). doi: 10.1016/j.bar.2019.100860.

Brown, R. G. (2018) The Corda Platform: An Introduction, R3 report. Available at: https://www.r3.com/wp-content/uploads/2019/06/corda-platform-whitepaper.pdf (Accessed: 3 July 2020).

Brown, R. G., Carlyle, J., Grigg, I. and Hearn, M. (2016) Corda: An Introduction, R3. Available at: https://docs.r3.com/en/pdf/corda-introductory-whitepaper.pdf (Accessed: 3 July 2020).

Brown-Liburd, H., Issa, H., & Lombardi, D. (2015) ‘Behavioral implications of Big Data’s impact on audit judgment and decision making and future research directions’, Accounting Horizons, 29(2), pp. 451–468.

Bughin, J., Herring, L., Mayhew, H., Seong, J. and Allas, T. (2019) Artificial intelligence in the United Kingdom: Prospects and challenges, McKinsey Global Institute. Available at: https://www.mckinsey.com/featured-insights/artificial-intelligence/artificial-intelligence-in-the-united-kingdom-prospects-and-challenges (Accessed: 8 January 2021).

Buterin, V. (2014) 'Ethereum White Paper: A Next Generation Smart Contract & Decentralized Application Platform', Etherum, (January), pp. 1–36. Available at: https://github.com/ethereum/wiki/wiki/White-Paper.

Butler, J. (2005) 'Giving an account of oneself.', New York: Fordham University Press.

Buttarelli, G. (2018) Debating Ethics in the digital age. Available at: https://edps.europa.eu/press-publications/press-news/blog/debating-ethics-digital-age_en (Accessed: 3 May 2020).

Butterworth, M. (2018) 'The ICO and artificial intelligence: The role of fairness in the GDPR framework', Computer Law and Security Review, 34(2), pp. 257–268.

Cadbury, A. (1992) 'The Financial Aspects of Corporate Governance, Report of the Committee on the Financial Aspects of Corporate Governance', Gee & Co, London.

Cai, C. W. (2019) 'Triple-entry accounting with blockchain: How far have we come?', Accounting and Finance, pp. 1–23. doi: 10.1111/acfi.12556.

Caldwell, C. and Karri, R. (2005) 'Organizational governance and ethical systems: A covenantal approach to building trust', Journal of Business Ethics, 58(1), pp. 249–259. doi: 10.1007/s10551-005-1419-2.

Carlin, T. (2019) 'Blockchain and the Journey Beyond Double Entry', Australian Accounting Review, 29(2), pp. 305–311. doi: 10.1111/auar.12273.

Carpenter, J. (2015) Google's algorithm shows prestigious job ads to men, but not to women. Here's why that should worry you., The Washington Post. Available at: https://www.washingtonpost.com/news/the-intersect/wp/2015/07/06/googles-algorithm-shows-prestigious-job-ads-to-men-but-not-to-women-heres-why-that-should-worry-you / (Accessed: 11 May 2021).

Carroll, A. B. (2004) 'Managing Ethically with Global Stakeholders: A Present and Future Challenge', The Academy of Management Executive (1993-2005), 18(2), pp. 114–120.

Carter, D. (2018) 'How real is the impact of artificial intelligence? The business information survey 2018', Business Information Review, 35(3), pp. 99–115. doi: 10.1177/0266382118790150.

Casado-Vara, R. and Corchado, J. (2019) 'Distributed e-health wide-world accounting ledger via blockchain', Journal of Intelligent and Fuzzy Systems, 36(3), pp. 2381–2386. doi: 10.3233/JIFS-169949.

Castell, S. (2018) 'The future decisions of RoboJudge HHJ Arthur Ian Blockchain: Dread, delight or derision?', Computer Law and Security Review, 34(4), pp. 739–753. doi: 10.1016/j.clsr.2018.05.011.

Cha, Y.J., Baek, S., Ahn, G., Lee, H., Lee, B., Shin, J.E. and Jang, D. (2020) 'Compensating for the loss of human distinctiveness: The use of social creativity under Human–Machine comparisons', Computers in Human Behavior, 103(September 2019), pp. 80–90. doi: 10.1016/j.chb.2019.08.027.

Chari, M.D., David, P., Duru, A. and Zhao, Y. (2019) 'Bowman's risk-return paradox: An agency theory perspective', Journal of Business Research, 95, pp. 357–375. doi: 10.1016/j.jbusres.2018.08.010.

Charreaux, G. and Desbrie` res, P. (2001) 'Corporate governance: stakeholder value versus shareholder value', Journal of Management and Governance, 5, pp. 107–128.

Chen, T. H., Ho, R. J. and Liu, Y. W. (2019) 'Investor personality predicts investment performance? A statistics and machine learning model investigation', Computers in Human Behavior, 101(September 2018), pp. 409–416. doi: 10.1016/j.chb.2018.09.027.

Chhaochharia, V. and Laeven, L. (2009) 'Corporate governance norms and practices', Journal of Financial Intermediation, 18(3), pp. 405–431. doi: 10.1016/j.jfi.2008.10.001.

Chizema, A. and Pogrebna, G. (2019) 'The impact of government integrity and culture on corporate leadership practices: Evidence from the field and the laboratory', Leadership Quarterly, 30(5), p. 101303. doi: 10.1016/j.leaqua.2019.07.001.

Choi, S. B., Park, B. Il and Hong, P. (2012) 'Does Ownership Structure Matter for Firm Technological Innovation Performance? The Case of Korean Firms', Corporate Governance: An International Review, 20(3), pp. 267–288. doi: 10.1111/j.1467-8683.2012.00911.x.

Christie, L. (2018) Distributed Ledger Technology, POSTbrief Houses of parliament. Available at: https://researchbriefings.parliament.uk/ResearchBriefing/Summary/POST-PB-0028 (Accessed: 26 November 2019).

Christopher, J. (2010) 'Corporate governance-A multi-theoretical approach to recognizing the wider influencing forces impacting on organizations', Critical Perspectives on Accounting, 21(8), pp. 683–695. doi: 10.1016/j.cpa.2010.05.002.

Cialdini, R. B., Petrova, P. K. and Goldstein, N. J. (2004) 'The hidden costs of organizational dishonesty', MIT Sloan Management Review, 45, pp. 67–73.

Claessens, S. and Yurtoglu, B. B. (2013) 'Corporate governance in emerging markets: a survey', Emerging Markets Review, 15(1), pp. 1–33.

Clarke, T. (2005) 'Accounting for Enron: shareholder value and stakeholder interests.', Corporate Governance, 13(5), pp. 598–612.

Clarysse, B., Knockaert, M. and Lockett, A. (2007) 'Outside board members in high tech start-ups', Small Business Economics, 29(3), pp. 243–259. doi: 10.1007/s11187-006-9033-y.

Clement-Jones, T. (2020) The rise of AI marks an opportunity for radical changes in corporate governance. Available at: https://tech.newstatesman.com/business/ai-corporate-governance (Accessed: 1 May 2020).

Clemons, E.K., Dewan, R.M., Kauffman, R.J. and Weber, T.A. (2017) 'Understanding the Information-Based Transformation of Strategy and Society', Journal of Management Information Systems, 34(2), pp. 425–456. doi: 10.1080/07421222.2017.1334474.

Clohessy, T. and Acton, T. (2019) 'Investigating the influence of organizational factors on blockchain adoption: An innovation theory perspective', Industrial Management and Data Systems, 119(7), pp. 1457–1491. doi: 10.1108/IMDS-08-2018-0365.

Coffee, J. C. (2006) 'Gatekeepers: The Professions and Corporate Governance.', Oxford University Press: Oxford, UK.

Cohen, B. (2017) 'The Rise of Alternative Currencies in Post-Capitalism', Journal of Management Studies, 54(5), pp. 739–746. doi: 10.1111/joms.12245.

Coles, J. W., McWilliams, V. B. and Sen, N. (2001) 'An examination of the relationship of governance mechanisms to performance', Journal of Management, 27(1), pp. 23–50. doi: 10.1016/S0149-2063(00)00085-4.

Collomb, A. & Sok, K. (2006) 'Blockchain / Distributed Ledger Technology (DLT): What Impact on the Financial Sector?', Digiworld Economic Journal, 103(3), pp. 93–111.

Cong, L. W. and He, Z. (2019) 'Blockchain Disruption and Smart Contracts', Review of Financial Studies, 32(5), pp. 1754–1797. doi: 10.1093/rfs/hhz007.

Conger, S., Loch, K. D. and Helft, B. L. (1995) ‘Ethics and information technology use: a factor analysis of attitudes to computer use’, Information Systems Journal, 5, pp. 161–184.

Consortia (2019) Consortia 2019 Blockchain for Trade and Receivables Finance, Consortia. Available at: https://bcrpub.com/events/consortia-2019 (Accessed: 3 July 2020).

Constantinides, P., Henfridsson, O. and Parker, G. (2018) ‘Introduction - Platforms and infrastructures in the digital age’, Information Systems Research, 29(2), pp. 381–400.

Corley, K. G. and Gioia, D. A. (2004) ‘Identity Ambiguity and Change in the Wake of a Corporate Spin-Off’, Administrative Science Quarterly, 49(2), pp. 173–208.

Costello, K. and Rimol, M. (2020) Gartner Says Global IT Spending to Reach $3.9 Trillion in 2020, Gartner. Available at: https://www.gartner.com/en/newsroom/press-releases/2020-01-15-gartner-says-global-it-spending-to-reach-3point9-trillion-in-2020 (Accessed: 7 July 2020).

Costello, L., McDermott, M.-L. and Wallace, R. (2017) ‘Netnography: Range of Practices, Misperceptions, and Missed Opportunities’, International Journal of Qualitative Methods, 16, pp. 1–12.

Coyne, J. G. and McMickle, P. L. (2017) ‘Can blockchains serve an accounting purpose?’, Journal of Emerging Technologies in Accounting, 14(2), pp. 101–111. doi: 10.2308/jeta-51910.

Craft, J. L. (2013) ‘A Review of the Empirical Ethical Decision-Making Literature: 2004–2011’, Journal of Business Ethics, 117(2), pp. 221–259.

Cuevas-Rodríguez, G., Gomez-Mejia, L. R. and Wiseman, R. M. (2012) ‘Has Agency Theory Run its Course?: Making the Theory more Flexible to Inform the Management of Reward Systems’, Corporate Governance: An International Review, 20(6), pp. 526–546. doi: 10.1111/corg.12004.

Cuomo, F., Mallin, C. and Zattoni, A. (2016) ‘Corporate Governance Codes: A Review and Research Agenda’, Corporate Governance: An International Review, 24(3), pp. 222–241. doi: 10.1111/corg.12148.

Dai, J. and Vasarhelyi, M. A. (2017) ‘Toward blockchain-based accounting and assurance’, Journal of Information Systems, 31(3), pp. 5–21. doi: 10.2308/isys-51804.

Daily, C., Dalton, D. R. and Cannella, A. A. (2003) ‘Corporate Governance: Decades of Dialogue and Data’, Academy of Management Review, 28(3), pp. 371–383.

Dalton, D.R., Daily, C.M., Ellstrand, A.E. and Johnson, J.L. (1998) ‘Meta-Analytic reviews of board composition, leadership structure, and financial performance.’, Strategic Management Journal, 19(3), pp. 269–290.

Daniels, A. (2018) ‘Blockchain and Shareholder Voting: A Hard Fork for 21st Century Corporate Governance’, University of Pennsylvania Journal of Business Law, 21(2), p. 405.

Dastin, J. (2018) Amazon scraps secret AI recruiting tool that showed bias against women, Reuters. Available at: https://www.reuters.com/article/us-amazon-com-jobs-automation-insight-idUSKCN1MK08G (Accessed: 11 May 2021).

Davenport, T. H. (2014) ‘How strategists use “big data” to support internal business decisions, discovery and production’, Strategy & Leadership, 42, pp. 45–50.

Davenport, T. H. and Ronanki, R. (2018) ‘Artificial Intelligence for the Real World’, Harvard Business Review, (February), pp. 108–117.

Davis, J. H., Schoorman, F. D. and Donaldson, L. (1997) ‘Toward a stewardship theory of management’, Academy of Management Review, 22, pp. 20–47.

Davis, J. L., Payne, G. T. and McMahan, G. C. (2007) ‘A few bad apples? Scandalous behavior of mutual fund managers’, Journal of Business Ethics, 76, pp. 319–334.

Dawson, M. (2021) ‘Book reviews-Bernard Stiegler’s The Age of Disruption: Technology and Madness in Computational Capitalism’, Management Learning, 52(5), pp. 652–663.

de Graaf, T. J. (2019) ‘From old to new: From internet to smart contracts and from people to smart contracts’, Computer Law and Security Review, 35(5). doi: 10.1016/j.clsr.2019.04.005.

De Smet, A., Gagnon, C. and Mygatt, E. (2021) Organizing for the future: Nine keys to becoming a future-ready company, McKinsey & Company. Available at: https://www.mckinsey.com/business-functions/organization/our-insights/organizing-for-the-future-nine-keys-to-becoming-a-future-ready-company?cid=other-eml-dre-mip-mck&hlkid=a774e1a8976d4a078406df70a8406fd5&hctky=12588941&hdpid=9fe1acd3-4d35-4780-a0df-208a (Accessed: 12 January 2021).

Delanty, G. and Strydom, P. (2003) Philosophies of Social Science: The Classic and Contemporary Readings. Maidenhead: Open University Press.

Deloitte (2016) ‘Blockchain Technology A game-changer in accounting?’, Deloitte. Available at: https://www2.deloitte.com/content/dam/Deloitte/de/Documents/Innovation/Blockchain_A game-changer in accounting.pdf (Accessed: 7 July 2020).

Deloitte (2017) Blockchain in banking While the interest is huge, challenges remain for large scale adoption, Deloitte. Available at: https://www2.deloitte.com/content/dam/Deloitte/in/Documents/strategy/in-strategy-innovation-blockchain-in-banking-noexp.pdf (Accessed: 7 July 2020).

Deloitte (2019) Deloitte’s 2019 Global Blockchain Survey Blockchain gets down to business, Deloitte Insights. Available at: https://www2.deloitte.com/content/dam/Deloitte/se/Documents/risk/DI_2019-global-blockchain-survey.pdf (Accessed: 26 November 2019).

Deloitte (2020a) Deloitte’s 2020 Global Blockchain Survey from Promise to reality, Deloitte Insights. Available at: https://www2.deloitte.com/content/dam/insights/us/articles/6608_2020-global-blockchain-survey/DI_CIR 2020 global blockchain survey.pdf (Accessed: 2 December 2020).

Deloitte (2020b) Thriving in the era of pervasive AI Deloitte’s State of AI in the Enterprise, 3rd Edition, Deloitte. Available at: https://www2.deloitte.com/content/dam/Deloitte/nl/Documents/innovatie/deloitte-nl-exec-deck-state-of-ai-in-the-enterprise-3rd-edition-final.pdf (Accessed: 19 February 2021).

Demsetz, H. and Lehn, K. (1985) ‘The structure ofcorporate ownership: Causes and consequences’, Journal of Political Economy, 93, pp. 1155–1177.

Denis, D. K. and McConnell, J. J. (2003) ‘International corporate governance’, Journal of Financial and Quantitative Analysis, 38(1), pp. 1–36.

Desai, H., Hogan, C. E. and Wilkins, M. S. (2006) ‘The reputational penalty for aggressive accounting: Earnings restatements and management turnover’, Accounting Review, 81, pp. 83–112.

Deutsch, I. et al. (2019) ‘Home robotic devices for older adults: Opportunities and concerns’, Computers in Human Behavior, 98(June 2018), pp. 122–133. doi: 10.1016/j.chb.2019.04.002.

Dierksmeier, C. (2019) ‘From Jensen to Jensen: Mechanistic Management Education or Humanistic Management Learning?’, Journal of Business Ethics. doi: 10.1007/s10551-019-04120-z.

Dierksmeier, C. and Seele, P. (2018) ‘Cryptocurrencies and Business Ethics’, Journal of Business Ethics, 152(1), pp. 1–14. doi: 10.1007/s10551-016-3298-0.

DiMaggio, P. J. and Powell, W. W. (1983) ‘The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields.’, American Sociological Review, 48, pp. 147–160.

Dionne, G., Giuliano, F. and Picard, P. (2009) ‘Optimal auditing with scoring: Theory and application to insurance fraud’, Management Science, 55, pp. 58–70.

Dixon, R., Guariglia, A. and Vijayakumaran, R. (2017) 'Managerial ownership, corporate governance and firms' exporting decisions: Evidence from Chinese listed companies', European Journal of Finance, 23(7–9), pp. 802–840. doi: 10.1080/1351847X.2015.1025990.

Donaldson, T. and Preston, L. E. (1995) 'The stakeholder theory of the corporation: concepts, evidence and implications', Academy of Management Review, 20(1), pp. 65–91.

Dong, W., Liao, S. and Zhang, Z. (2018) 'Leveraging Financial Social Media Data for Corporate Fraud Detection', Journal of Management Information Systems, 35(2), pp. 461–487.

Du, W.D., Pan, S.L., Leidner, D.E. and Ying, W. (2019) 'Affordances, experimentation and actualization of FinTech: A blockchain implementation study', Journal of Strategic Information Systems, 28(1), pp. 50–65. doi: 10.1016/j.jsis.2018.10.002.

EIF (2019) Why do we need to support blockchain and AI in Europe?, European Investment Fund. Available at: https://medium.com/@eif4smes/why-do-we-need-to-support-blockchain-and-ai-in-europe-30a122383f33 (Accessed: 23 September 2020).

Eisenhardt, K. L. (1989) 'Agency Theory: A Review and Assessment', Academy of Management Review, 14, pp. 57–74.

Elbadry, A., Gounopoulos, D. and Skinner, F. (2015) 'Governance quality and information asymmetry', Financial Markets, Institutions and Instruments, 24(2–3), pp. 127–157. doi: 10.1111/fmii.12026.

Elsayed, K. (2010) 'A multi-theory perspective of board leadership structure: What does the Egyptian corporate governance context tell us?', British Journal of Management, 21(1), pp. 80–99. doi: 10.1111/j.1467-8551.2009.00632.x.

Engin, Z. and Treleaven, P. (2019) 'Algorithmic Government: Automating Public Services and Supporting Civil Servants in using Data Science Technologies', Computer Journal, 62(3), pp. 448–460. doi: 10.1093/comjnl/bxy082.

Errichetti, J. and Roohani, S. J. (2018) 'The merit of the DATA act to enhance the governmental reporting process: A corporate governance perspective', Journal of Emerging Technologies in Accounting, 15(1), pp. 107–120. doi: 10.2308/jeta-52092.

EY (2018) How blockchain will revolutionize finance and auditing, EY Global. Available at: https://www.ey.com/en_gl/digital/blockchain-why-finance-and-auditing-will-never-be-the-same (Accessed: 26 November 2019).

Faems, D. et al. (2008) 'Toward an integrative perspective on alliance governance: Connecting contract design, trust dynamics, and contract application', Academy of Management Journal, 51(6), pp. 1053–1078.

Faggella, D. (2020) AI in the Accounting Big Four – Comparing Deloitte, PwC, KPMG, and EY. Available at: https://emerj.com/ai-sector-overviews/ai-in-the-accounting-big-four-comparing-deloitte-pwc-kpmg-and-ey/ (Accessed: 3 February 2020).

Falk, M. (2019) Artificial Intelligence in the boardroom, FCA. Available at: https://www.fca.org.uk/insight/artificial-intelligence-boardroom (Accessed: 8 January 2021).

Fama, E. F. (1980) 'Agency Problems and the Theory of the Firm', Journal of Political Economy, 88, pp. 288–307.

Fama, E. F. and Jensen, M. C. (1983) 'Separation of Owner- ship and Control', Journal of Law and Economics, 26, pp. 301–325.

Fanning, K. and Centers, D. (2016) 'Blockchain and Its Coming Impact on Financial Services', The Journal of Corporate Accounting & Finance, (July/August), pp. 53–57.

Fenwick, M, Vermeulen, EPM & Kaal, W (2017) 'The unmediated & tech-driven corporate governance of today's winning companies' U of St. Thomas (Minnesota) Legal Studies Research Paper, U of St. Thomas (Minnesota). https://doi.org/10.2139/ssrn.2922176

Fenwick, M., McCahery, J. A. and Vermeulen, E. P. M. (2019) 'The End of "Corporate" Governance: Hello "Platform" Governance', European Business Organization Law Review. Springer International Publishing, 20(1), pp. 171–199. doi: 10.1007/s40804-019-00137-z.

Ferguson, M. (2018) 'Preparing for a blockchain future', MIT Sloan Management Review, 60(1).

Filatotchev, I. and Boyd, B. K. (2009) 'Taking stock of corporate governance research while looking to the future: Guest editorial', Corporate Governance: An International Review, 17(3), pp. 257–265. doi: 10.1111/j.1467-8683.2009.00748.x.

Filatotchev, I. and Nakajima, C. (2014) 'Corporate governance, responsible managerial behavior, and corporate social responsibility: Organizational efficiency versus organizational legitimacy?', Academy of Management Perspectives, 28(3), pp. 289–306. doi: 10.5465/amp.2014.0014.

Filatotchev, I., Chahine, S. and Bruton, G. D. (2018) Board Interlocks and Initial Public Offering Performance in the United States and the United Kingdom: An Institutional Perspective, Journal of Management. doi: 10.1177/0149206315621145.

Filatotchev, I., Jackson, G. and Nakajima, C. (2013) 'Corporate governance and national institutions: A review and emerging research agenda', Asia Pacific Journal of Management, 30(4), pp. 965–986. doi: 10.1007/s10490-012-9293-9.

Fisher, E., Mahajan, R. L. and Mitcha, C. (2006) 'Midstream modulation of technology: governance from within.', Bulletin of Science, Technology & Society, 26(6), pp. 485–496.

Fleming, P. (2019) 'Robots and Organization Studies: Why Robots Might Not Want to Steal Your Job', Organization Studies, 40(1), pp. 23–38. doi: 10.1177/0170840618765568.

Fletcher, L. (2019) Forget the paper trail — blockchain set to shake up trade finance, Financial Times. Available at: https://www.ft.com/content/04a4fcde-dfb5-11e9-b8e0-026e07cbe5b4 (Accessed: 6 July 2020).

Floridi, L. (1999) 'Information ethics: On the philosophical foundation of computer ethics', Ethics and Information Technology, 1(1), pp. 33–52.

Floridi, L. (2013) 'Ethics of information', Oxford, England: Oxford University Press.

Floridi, L. (2018) 'Soft ethics and the governance of the digital', Philosophy & Technology, 31(1), pp. 1–8.

Foote, K. D. (2019) Blockchain and Artificial Intelligence: Driving the Fourth Industrial Revolution, Dataversity. Available at: https://www.dataversity.net/blockchain-and-artificial-intelligence-driving-the-fourth-industrial-revolution/ (Accessed: 2 January 2020).

Fox, J., North, J. and Dean, J. (2019) AI in the boardroom: Could robots soon be running companies?, Governance Directions. Available at: https://www.governanceinstitute.com.au/resources/governance-directions/volume-71-number-10/ai-in-the-boardroom-could-robots-soon-be-running-companies/ (Accessed: 8 January 2021).

FRC (2020) International Standard on Auditing (UK) 260 (Revised November 2019, updated January 2020): Communication with those charged with governance, Financial Reporting Council. Available at: https://www.frc.org.uk/getattachment/30230b68-9530-4cba-a6bc-03d196a767ff/ISA-(UK)-260_Revised-November-2019_Updated-January-2020_final-With-Covers.pdf (Accessed: 7 February 2021).

FRC (2021) Restoring trust in audit and corporate governance, Department for Business, Energy & Industrial Strategy. Available at: https://www.frc.org.uk/getattachment/b6ed12ee-ac7d-415f-b350-ffee2c7506db/Corporate-reporting-and-governance-webinar-slide-deck.pdf (Accessed: 9 April 2021).

Freeman, R. E. (1984) 'Strategic management: A stakeholder approach.', Boston: Pitman.

Freeman, R. E. (1994) 'Strategic management: a stakeholder approach.', Englewood Cliffs, NJ: Prentice-Hall.

Fu, J. (2018) Technology and corporate governance, ECGI. Available at: https://ecgi.global/sites/default/files/technology_and_corporate_governance_1.pdf (Accessed: 15 March 2021).

Gaa, J. C. (2009) 'Corporate governance and the responsibility of the board of directors for strategic financial reporting', Journal of Business Ethics, 90(SUPPL. 2), pp. 179–197. doi: 10.1007/s10551-010-0381-9.

Ganu, S. and Kuk, K. (2019) The future of work and its impact on corporate governance. Available at: https://www.willistowerswatson.com/en-GB/Insights/2019/08/the-future-of-work-and-its-impact-on-corporate-governance (Accessed: 1 May 2020).

García-Meca, E., López-Iturriaga, F. and Tejerina-Gaite, F. (2017) 'Institutional Investors on Boards: Does Their Behavior Influence Corporate Finance?', Journal of Business Ethics, 146(2), pp. 365–382. doi: 10.1007/s10551-015-2882-z.

Gasmelseid, T. M. (2009) '"Intelligent Collaboration" the Paradox of "Ethical Agency" and "Corporate Governance"', Journal of Electronic Commerce in Organizations, 7(1), pp. 50–58.

Gedajlovic, E. and Shapiro, D. (2002) 'Ownership Structure and Firm Profitability in Japan', Academy of Management Journal, 45(3), pp. 565–575.

Gibbs, G. R. (2021) Thematic Coding and Categorizing In: Analyzing Qualitative Data. SAGE Publications Ltd.

Gilbert, D. (2016) Bitcoin's Big Problem: Transaction Delays Renew Blockchain Debate, International Business Times. Available at: http://www.ibtimes.com/bitcoins-big-problem-transaction-delays-renew-blockchain-debate-2330143 (Accessed: 1 May 2020).

Gilbert, D. U. and Rasche, A. (2008) 'Opportunities and problems of standardized ethics initiatives - A stakeholder theory perspective', Journal of Business Ethics, 82(3), pp. 755–773. doi: 10.1007/s10551-007-9591-1.

Gilbert, D. U. and Behnam, M. (2009) 'Advancing integrative social contracts theory: A Habermasian perspective.', Journal of Business Ethics, 89, pp. 215–234.

Gill, M. (2009) Accountants' Truth: Knowledge and Ethics in the Financial World, Accountants' Truth: Knowledge and Ethics in the Financial World. Washington University in Saint Louis, United States: Oxford University Press. doi: 10.1093/acprof:oso/9780199547142.001.0001.

Gioia, D.A., 2004. A renaissance self: Prompting personal and professional revitalization. Renewing research practice, pp.97-114.

Gioia, D. A., Corley, K. G. and Hamilton, A. L. (2013) 'Seeking qualitative rigor in inductive research', Organizational Research Methods, 16(1), pp. 15–31.

Glaser, B. G. and Strauss, A. (1967) 'The discovery of grounded theory: Strategies for qualitative research', Hawthorne, NY: Aldine de Gruyter.

Godfrey, J., Hodgson, A. and Holmes, S. (2003) 'Accounting theory', 5th ed. Milton: Wiley.

Goldstein, I., Jiang, W. and Karolyi, G. A. (2019) 'To FinTech and beyond', Review of Financial Studies, 32(5), pp. 1647–1661. doi: 10.1093/rfs/hhz025.

Gomber, P. et al. (2018) ‘On the Fintech Revolution: Interpreting the Forces of Innovation, Disruption, and Transformation in Financial Services’, Journal of Management Information Systems, 35(1), pp. 220–265. doi: 10.1080/07421222.2018.1440766.

Gov.UK (2019) Understanding artificial intelligence ethics and safety, Gov.UK. Available at: https://www.gov.uk/guidance/understanding-artificial-intelligence-ethics-and-safety (Accessed: 7 September 2020).

Grant, R. M. and Visconti, M. (2006) ‘The Strategic Background to Corporate Accounting Scandals’, Long Range Planning, 39(4), pp. 361–383. doi: 10.1016/j.lrp.2006.09.003.

Gratzke, P., Schatsky, D. and Piscini, E. (2017) Banding together for blockchain Does it make sense for your company to join a consortium? Deloitte university Press Signals for Strategists. Available at: https://www2.deloitte.com/content/dam/insights/us/articles/3769_Signals-for-Strategists_Aug2017/DUP_Banding-together-for-blockchain-consortia.pdf (Accessed: 3 July 2020).

Gray, R. (1992) ‘Accounting and environmentalism: An exploration of the challenge of gently accounting for accountability, transparency and sustainability.’, Accounting, Organizations and Society, 14(5), pp. 399–425.

Greenwood, R. et al. (2011) ‘Institutional complexity and organizational responses’, Academy of Management Annals, 5(1), pp. 317–371.

Greve, H. R., Palmer, D. and Pozner, J. E. (2010) ‘Organizations gone wild: The causes, processes, and consequences of organizational misconduct’, Academy of Management Annals, 4, pp. 53–107.

Grossman, S. J. and Hart, O. D. (1988) ‘One share-one vote and the market for corporate control’, Journal of Financial Economics, 20, pp. 175–202.

Grove, H., Patelli, L., Victoravich, L.M. and Xu, P. (2011) ‘Corporate Governance and Performance in the Wake of the Financial Crisis: Evidence from US Commercial Banks’, Corporate Governance: An International Review, 19(5), pp. 418–436. doi: 10.1111/j.1467-8683.2011.00882.x.

Gulati, R., Lawrence, P. R. and Puranam, P. (2005) ‘Adaptation in vertical relationships: Beyond incentive conflict.’, Strategic Management Journal, 26(5), pp. 415–440.

Gulati, R., Wohlgezogen, F. and Zhelyazkov, P. (2012) ‘The two facets of collaboration: Cooperation and coordination in strategic alliances’, Academy of Management Annal, 6(1), pp. 531–583.

Guo, K. (2018) ‘The odyssey of becoming: Professional identity and insecurity in the Canadian accounting field’, Critical Perspectives on Accounting, 56, pp. 20–45.

Guston, D. (2002) ‘Real-time technology assessment.’, Technology in society, 24(1–2), pp. 93–109. doi: 0.1016/S0160-791X(01)00047-1.

Han, H., Shiwakoti, R., Javis, R., Mordi, C. and Botchie, D., (2022) Accounting and Auditing with Blockchain Technology and Artificial Intelligence: A Literature Review, International Journal of Accounting Information Systems, Forthcoming

Hail, L., Tahoun, A. and Wang, C. (2014) ‘Dividend Payouts and Information Shocks’, Journal of Accounting Research, 52(2), pp. 403–456. doi: 10.1111/1475-679X.12040.

Hail, L., Tahoun, A. and Wang, C. (2018) ‘Corporate Scandals and Regulation’, Journal of Accounting Research, 56(2), pp. 617–671. doi: 10.1111/1475-679X.12201.

Halbouni, Sawsan Saadi Obeid, N. and Garbou, A. (2016) ‘Corporate governance and information technology in fraud prevention and detection Evidence from the UAE’, Managerial Auditing Journal, 31(6–7), pp. 589–628.

Halter, M. V., Arruda, M. C. C. de and Halter, R. B. (2009) ‘Transparency to Reduce Corruption?’, Journal of Business Ethics, 84, pp. 373–385.

Hamel, G. and Zanini, M. (2018) The End of Bureaucracy, Harvard business review. Available at: https://hbr.org/2018/11/the-end-of-bureaucracy (Accessed: 12 January 2021).

Hampel, R. (1998) 'Committee on Corporate Governance: Final Report', Gee & Co, London.

Hart, O. (1983) 'The market mechanism as an incentive system', Bell Journal of Economics, 14, pp. 42–64.

Hartley, J. L. and Sawaya, W. J. (2019) 'Tortoise, not the hare: Digital transformation of supply chain business processes', Business Horizons, 62(6), pp. 707–715. doi: 10.1016/j.bushor.2019.07.006.

Hasnas, J. (1998) 'The Normative Theories of Business Ethics: A Guide for the Perplexed', Business Ethics Quarterly, 8(1), pp. 19–42.

Hastig, G. M. and Sodhi, M. S. (2020) 'Blockchain for Supply Chain Traceability: Business Requirements and Critical Success Factors', Production and Operations Management, 29(4), pp. 935–954.

Haveman, H. A. and Wang, Y. (2013) 'Going (More) public: Institutional isomorphism and ownership reform among Chinese firms', Management and Organization Review, 9(1), pp. 17–51. doi: 10.1111/more.12008.

Hearn, M. and Brown, R. G. (2019) Corda: A distributed ledger, R3 report. Available at: https://www.corda.net/wp-content/uploads/2019/08/corda-technical-whitepaper-August-29-2019.pdf (Accessed: 3 July 2020).

Heide, J. B. and John, G. (1992) 'Do norms matter in marketing relationships?', Journal of Marketing Research, 56(3), pp. 32–44.

Hillman, A. J. and Dalziel, T. (2003) 'Board of Directors and firm performance: integrating agency and resource dependency perspectives.', Academy of Management Review, 28(3), pp. 383–96.

Hinings, B., Gegenhuber, T. and Greenwood, R. (2018) 'Digital innovation and transformation: An institutional perspective', Information and Organization, 28(1), pp. 52–61. doi: 10.1016/j.infoandorg.2018.02.004.

HMGovernment (2017) Industrial Strategy Building a Britain fit for the future. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/664563/industrial-strategy-white-paper-web-ready-version.pdf (Accessed: 7 February 2020).

Hoffmann, C. H. and Dahlinger, A. (2019) 'How capitalism abolishes itself in the digital era in favour of robo-economic systems: socio-economic implications of decentralized autonomous self-owned businesses', Foresight. doi: 10.1108/FS-03-2019-0014.

Hogan, C. E. et al. (2008) 'Financial statement fraud: Insight from the academic literature', American Accounting Association, 27(2), pp. 231–252.

Horner, S. V (2010) 'Board power, CEO appointments and CEO duality', Academy of Strategic Management Journal, 9(2), pp. 43–58.

Hosmer, L. T. (1996) 'The Ethics of Management', (Irwin, Chicago).

HouseOfLords (2018) AI in the UK: ready, willing and able? Report of Session 2017–19, HL Paper 100, Published by the Authority of the House of Lords. Available at: https://publications.parliament.uk/pa/ld201719/ldselect/ldai/100/100.pdf (Accessed: 3 February 2020).

Hughes, A. et al. (2019) 'Beyond Bitcoin: What blockchain and distributed ledger technologies mean for firms', Business Horizons, 62(3), pp. 273–281. doi: 10.1016/j.bushor.2019.01.002.

Iansiti, M. and Lakhani, K. R. (2017) 'It will take years to transform business, but the journey begins now', Harvard Business Review, 95(1), pp. 118-128

IBE (2019) Boards must step up to the challenge of managing the ethical risks of Artificial Intelligence. Available at: https://pressat.co.uk/releases/boards-must-step-up-to-the-challenge-of-managing-the-ethical-risks-of-artificial-intelligence-cc63639cdc6cae3b57e8914bd7068e9c/ (Accessed: 2 May 2020).

IBM (2020) Artificial Intelligence, IBM Cloud Education. Available at: https://www.ibm.com/cloud/learn/what-is-artificial-intelligence?mhsrc=ibmsearch_a&mhq=Artificial%20intelligence (Accessed: 7 May 2021).

ICAEW (2018) Blockchain and the future of accountancy, ICAEW. Available at: https://www.icaew.com/technical/technology/blockchain/blockchain-articles/blockchain-and-the-accounting-perspective (Accessed: 3 December 2019).

IFC (2019) SME governance guidebook, IFC world bank group. Available at: https://www.ifc.org/wps/wcm/connect/efaff9f6-2510-4dd0-9f10-7d612367f99b/IFC+SME+FINAL+Spt+18-2019.pdf?MOD=AJPERES&CVID=mSnhciN (Accessed: 12 January 2021).

Jackling, B. and Johl, S. (2009) 'Board structure and firm performance: Evidence from India's top companies', Corporate Governance: An International Review, 17(4), pp. 492–509. doi: 10.1111/j.1467-8683.2009.00760.x.

Jackson, G. and Rathert, N. (2017) 'Private governance as regulatory substitute or complement? A comparative institutional approach to CSR adoption by multinational corporations', Research in the Sociology of Organizations, 49, pp. 445–478. doi: 10.1108/S0733-558X20160000049015.

Janakiraman, S., Radhakrishnan, S. and Tsang, A. (2010) 'Institutional investors, managerial ownership, and executive compensation', Journal of Accounting, Auditing and Finance, 25(4), pp. 673–707. doi: 10.1177/0148558X1002500409.

Janning, F., Khlif, W. and Ingley, C. (2020) The Illusion of Transparency in Corporate Governance: Does Transparency Help or Hinder True Ethical Conduct? Springer Nature. doi: 10.1007/978-3-030-35780-1.

Jeacle, I. (2017) 'Constructing audit society in the virtual world: The case of the online reviewer', Accounting, Auditing & Accountability Journal, 30, pp. 19–37.

Jeacle, I. (2021) 'Navigating netnography: A guide for the accounting researcher', Financial Accountability and Management, 37, pp. 88–101.

Jensen, M. C. and Meckling, W. F. (1976) 'Theory of the firm: Managerial behavior, agency costs, and ownership structure', Journal of Financial Economics, 3, pp. 305–360.

Jensen, M. C. and Murphy, K. J. (1990) 'Performance pay and top management incentives', Journal of Political Economy, 98, pp. 225–264.

Jiraporn, P., Chintrakarn, P. and Kim, Y. S. (2012) 'Analyst following, staggered boards, and managerial entrenchment', Journal of Banking and Finance, 36(11), pp. 3091–3100. doi: 10.1016/j.jbankfin.2012.07.013.

Johed, G. and Catasús, B. (2015) 'Institutional contradictions at and around the annual general meeting: How institutional logics influence shareholder activism', Accounting, Auditing and Accountability Journal, 28(1), pp. 102–127. doi: 10.1108/AAAJ-08-2012-01073.

Kahan, M. and Rock, E. (2008) 'The hanging chads of corporate voting', Georgetown Law Journal, 96, pp. 1227–1281.

Karajovic, M., Kim, H. M. and Laskowski, M. (2019) 'Thinking Outside the Block: Projected Phases of Blockchain Integration in the Accounting Industry', Australian Accounting Review, 29(2), pp. 319–330. doi: 10.1111/auar.12280.

Kelly, J. (2019) Blockchain: disillusionment descends on financial services, Financial Times. Available at: https://www.ft.com/content/93140eac-9cbb-11e9-9c06-a4640c9feebb (Accessed: 6 July 2020).

Khanna, T. (2018) 'When Technology Gets Ahead of Society', Harvard Business Review, (July–August), pp. 86–96.

Klitgaard, R. (1998) 'International Cooperation Against Corruption', Finance & Development, 35(1), pp. 3–6.

Knapp, J. R., Dalziel, T. and Lewis, M. W. (2011) 'Governing top managers: Board control, social categorization, and their unintended influence on discretionary behaviors', Corporate Governance: An International Review, 19(4), pp. 295–310. doi: 10.1111/j.1467-8683.2011.00845.x.

Kokina, J., Mancha, R. and Pachamanova, D. (2017) 'Blockchain: Emergent industry adoption and implications for accounting', Journal of Emerging Technologies in Accounting, 14(2), pp. 91–100. doi: 10.2308/jeta-51911.

Kovermann, J. and Velte, P. (2019) 'The impact of corporate governance on corporate tax avoidance—A literature review', Journal of International Accounting, Auditing and Taxation, 36, p. 100270. doi: 10.1016/j.intaccaudtax.2019.100270.

Kozinets, R. (2002) 'The Field Behind the Screen: Using Netnography for Marketing Research in Online Communities', Journal of Marketing Research, XXXIX(Feb), pp. 61–72.

Kozinets, R. (2020) Netnography: The Essential Guide to Qualitative Social Media Research. 3rd edition, SAGE Publications Ltd.

Kozinets, R. V., Scaraboto, D. and Marie-Agnès, P. (2018) 'Evolving netnography: how brand auto netnography, a netnographic sensibility, and more-than-human netnography can transform your research', Journal of Marketing Management, 34(3–4), pp. 231–242.

KPMG (2017) Forging the future How financial institutions are embracing fintech to evolve and grow, KPMG International. Available at: https://assets.kpmg/content/dam/kpmg/xx/pdf/2017/10/forging-the-future-global-fintech-study.pdf (Accessed: 7 July 2020).

Kuebler, E. (2018) How decentralized protocols are threating traditional business models, Bitcoin magazine. Available at: https://bitcoinmagazine.com/culture/op-ed-how-decentralized-protocols-are-threatening-traditional-business-models (Accessed: 12 May 2021).

Kumar, P. and Zattoni, A. (2014) 'Corporate governance, information, and investor confidence.', Corporate Governance: An International Review, 22, pp. 437–439.

Kumar, P. and Zattoni, A. (2019) 'Farewell editorial: Exiting editors' perspective on current and future challenges in corporate governance research', Corporate Governance: An International Review, 27(1), pp. 2–11. doi: 10.1111/corg.12268.

Kumaraswamy, A., Garud, R. and Ansari, S. (Shaz) (2018) 'Perspectives on Disruptive Innovations', Journal of Management Studies, 55(7), pp. 1025–1042. doi: 10.1111/joms.12399.

La Rosa, F., Caserio, C. and Bernini, F. (2019) 'Corporate governance of audit firms: Assessing the usefulness of transparency reports in a Europe-wide analysis', Corporate Governance: An International Review, 27(1), pp. 14–32. doi: 10.1111/corg.12235.

Lai, J. H., Chen, L. Y. and Chen, C. R. (2017) 'Agency hazard, managerial incentives, and the wealth effects of joint venture investments', International Review of Financial Analysis, 52, pp. 190–202. doi: 10.1016/j.irfa.2017.06.001.

Lan, L. L. and Heracleous, L. (2010) 'Rethinking agency theory: the view from law', Academy of Management Review, 35, pp. 294–314.

Lange, T. (2005) ‘A theory of the firm only a microeconomist could love?: A microeconomist’s reply to lubatkin’s critique of agency theory’, Journal of Management Inquiry, 14(4), pp. 404–406. doi: 10.1177/1056492605280419.

Langer, R. and Beckman, S. C. (2005) ‘Sensitive research topics: Netnography revisited’, Qualitative Market Research: An International Journal, 8, pp. 189–203.

LeBaron, C., Jarzabkowski, P., Pratt, M.G. and Fetzer, G. (2018) ‘An Introduction to Video Methods in Organizational Research’, Organizational Research Methods, 21(2), pp. 239–260. doi: 10.1177/1094428117745649.

Leblebici, H., Salancik, G.R., Copay, A. and King, T. (1991) ‘Institutional change and the transformation of interorganizational fields: An organizational history of the US radio broadcasting industry’, Administrative Science Quarterly, 36(3), pp. 333–363.

Lee, Y. et al. (2019) ‘Egoistic and altruistic motivation: How to induce users’ willingness to help for imperfect AI’, Computers in Human Behavior, 101(June), pp. 180–196. doi: 10.1016/j.chb.2019.06.009.

Lel, U. (2019) ‘The role of foreign institutional investors in restraining earnings management activities across countries’, Journal of International Business Studies, 50(6), pp. 895–922. doi: 10.1057/s41267-018-0195-z.

Leslie, D. (2019) Understanding artificial intelligence ethics and safety: A guide for the responsible design and implementation of AI systems in the public sector, The Alan Turing Institute. Available at: https://www.turing.ac.uk/sites/default/files/2019-06/understanding_artificial_intelligence_ethics_and_safety.pdf (Accessed: 11 May 2021).

Leung, A. (2016) Deloitte Sets Good Example, Installs Bitcoin ATM in Toronto Office, Cointelegraph. Available at: https://cointelegraph.com/news/deloitte-sets-good-example-installs-bitcoin-atm-in-toronto-office (Accessed: 6 November 2016).

Li, J., Nan, L. and Zhao, R. (2018) ‘Corporate governance roles of information quality and corporate takeovers’, Review of Accounting Studies, 23(3), pp. 1207–1240. doi: 10.1007/s11142-018-9449-z.

Libert, B., Beck, M. and Bonchek, M. (2017) AI in the Boardroom: The Next Realm of Corporate Governance, MIT Sloan Management Review. Available at: https://sloanreview.mit.edu/article/ai-in-the-boardroom-the-next-realm-of-corporate-governance/ (Accessed: 11 May 2020).

Lima, M. S. M. and Delen, D. (2019) ‘Predicting and explaining corruption across countries: A machine learning approach’, Government Information Quarterly, (May), p. 101407. doi: 10.1016/j.giq.2019.101407.

Lincoln, Y. and Guba, E. (1985) ‘Naturalistic inquiry’, Beverly Hills, CA: Sage.

Liu, C.-L. and Lai, S.-M. (2012) ‘Organizational Complexity and Auditor Quality’, Corporate Governance: An International Review, 20(4), pp. 352–368. doi: 10.1111/j.1467-8683.2012.00914.x.

Liu, X. K., Wright, A. M. and Wu, Y. J. (2015) ‘Managers’ unethical fraudulent financial reporting: The effect of control strength and control framing’, Journal of Business Ethics, 129, pp. 295–310.

Lobschat, L., Mueller, B., Eggers, F., Brandimarte, L., Diefenbach, S., Kroschke, M. and Wirtz, J. (2021) Corporate digital responsibility. Journal of Business Research, 122, pp.875-888.

Locke, K. (1996) ‘Rewriting the Discovery of Grounded Theory after 25 years?’, Journal of Management Inquiry, 5, pp. 239–245.

Lovell, A. (2002) ‘Ethics as a Dependent Variable in Individual and Organisational Decision Making’, Journal of Business Ethics, 37, pp. 145–163.

Lubatkin, M. H. (2005) ‘A theory of the firm only a microeconomist could love’, Journal of Management Inquiry, 14(2), pp. 213–216. doi: 10.1177/1056492605275352.

Lucivero, F., Swierstra, T. and Boenink, M. (2011) ‘Assessing Expectations: Towards a Toolbox for an Ethics of Emerging Technologies’, NanoEthics, 5, pp. 129–141.

Lumineau, F., Wang, W. and Schilke, O. (2021) ‘Blockchain Governance—A New Way of Organizing Collaborations?’, Organization Science, 32(2), pp. 500–521. doi: https://doi.org/10.1287/orsc.2020.1379.

Lynall, M. D., Golden, B. R. and Hillman, A. J. (2003) ‘Board composition from adolescence to maturity: a multitheoretic view.’, Academy of Management Review, 28, pp. 416–21.

Macneil, I. (1980) ‘The New Social Contract: An Inquiry into Modern Contractual Relations’, Yale University Press, New Haven, CT.

Magnier, V. and Barban, P. (2018) ‘the Potential Impact of Blockchains on Corporate Governance: a Survey on Shareholders’ Rights in the Digital Era’, InterEULawEast: Journal for the International and European Law, Economics and Market Integrations, 5(2), pp. 189–226. doi: 10.22598/iele.2018.5.2.7.

Maher, M. and Andersson, T. (2002) Corporate governance: effects on firm performance and economic growth. Convergence and Diversity in Corporate Governance Regimes and Capital Markets, Oxford University Press, Oxford, pp.386-420.

Mainelli, M. and Smith, M. (2015) ‘Sharing ledgers for sharing economies: an exploration of mutual distributed ledgers (aka blockchain technology)’, The Journal of Financial Perspectives, 3(3),47pages

Malen, J. and Vaaler, P. M. (2017) ‘Organizational slack, national institutions and innovation effort around the world’, Journal of World Business, 52(6), pp. 782–797. doi: 10.1016/j.jwb.2017.07.001.

Mansell, S., Ferguson, J., Gindis, D. and Pasternak, A. (2019) ‘Rethinking Corporate Agency in Business, Philosophy, and Law’, Journal of Business Ethics, 154(4), pp. 893–899. doi: 10.1007/s10551-018-3895-1.

Marler, J. H. and Faugère, C. (2010) ‘Shareholder activism and middle management equity incentives’, Corporate Governance: An International Review, 18(4), pp. 313–328. doi: 10.1111/j.1467-8683.2010.00794.x.

Martin, G.P., Armstrong, N., Aveling, E.L., Herbert, G. and Dixon-Woods, M. (2015) ‘Professionalism redundant, reshaped, or reinvigorated? Realizing the “third logic” in contemporary health care.’, Journal of Health and Social Behavior, 56, pp. 378–397.

Martin, G., Currie, G., Weaver, S., Finn, R. and McDonald, R. (2017) ‘Institutional Complexity and Individual Responses: Delineating the Boundaries of Partial Autonomy’, Organization Studies, 38(1), pp. 103–127. doi: 10.1177/0170840616663241.

Martin, K. (2018) ‘Ethical Implications and Accountability of Algorithms’, Journal of Business Ethics, 0(0), pp. 1–16. doi: 10.1007/s10551-018-3921-3.

Mason, R. O. (1986) ‘Four ethical issues of the information age’, MIS Quarterly, 10(1), pp. 5–12.

Maula, M. and Stam, W. (2019) ‘Enhancing Rigor in Quantitative Entrepreneurship Research’, Entrepreneurship: Theory and Practice, pp. 1–32. doi: 10.1177/1042258719891388.

Mayer, R. C., Davis, J. H. and Schoorman., F. D. (1995) ‘An integrative model of organizational trust’, Academy of Management Review, 20, pp. 709–734.

McAfee, A. and Brynjolfsson, E. (2012) ‘Big data: the management revolution’, Harvard Business Review, 90(10), pp. 60–68.

McCarthy, D. J. and Puffer, S. M. (2008) ‘Interpreting the ethicality of corporate governance decisions in Russia: Utilizing integrative social contracts theory to evaluate the relevance of agency theory norms’, Academy of Management Review, 33(1), pp. 11–31. doi: 10.5465/AMR.2008.27745006.

McDonald, M. L. and Westphal, J. D. (2010) ‘A little help here? Board control, CEO identification with the corporate elite, and strategic help provided to CEOs at other firms’, Academy of Management Journal, 53(2), pp. 343–370. doi: 10.5465/amj.2010.49389006.

McDonald, M. L., Khanna, P. and Westphal, J. D. (2008) ‘Getting them to think outside the circle: Corporate governance, CEOs’ external advice networks, and firm performance’, Academy of Management Journal, 51(3), pp. 453–475. doi: 10.5465/AMJ.2008.32625969.

McEvily, B., Perrone, V. and Zaheer, A. (2003) ‘Trust as an organizing principle’, Organization Science, 14(1), pp. 91–103.

McKinsey (2018) How artificial intelligence and data add value to businesses, McKinsey Global Institute. Available at: https://www.mckinsey.com/featured-insights/artificial-intelligence/how-artificial-intelligence-and-data-add-value-to-businesses (Accessed: 10 January 2021).

McKinsey (2020) Global survey: The state of AI in 2020, McKinsey Analytics. Available at: https://www.mckinsey.com/~/media/McKinsey/Business%20Functions/McKinsey%20Analytics/Our%20Insights/Global%20survey%20The%20state%20of%20AI%20in%202020/Global-survey-The-state-of-AI-in-2020.pdf (Accessed: 10 January 2021).

McLean, G. and Osei-Frimpong, K. (2019) ‘Hey Alexa … examine the variables influencing the use of artificial intelligent in-home voice assistants’, Computers in Human Behavior, 99(May), pp. 28–37. doi: 10.1016/j.chb.2019.05.009.

McWaters, R. J. et al. (2016) The future of financial infrastructure An ambitious look at how blockchain can reshape financial services, World Economy Forum. Available at: http://www3.weforum.org/docs/WEF_The_future_of_financial_infrastructure.pdf (Accessed: 7 July 2020).

Mead, G. H. (1934) Mind, Self, and Society. Chicago: University of Chicago Press.

Mead, G. H. (1938) ‘The Philosophy of the Act, Charles W. Morris, ed’, Chicago: University of Chicago Press.

Mehrpouya, A. and Salles-Djelic, M. L. (2019) ‘Seeing like the market; exploring the mutual rise of transparency and accounting in transnational economic and market governance’, Accounting, Organizations and Society, 76, pp. 12–31. doi: 10.1016/j.aos.2019.01.003.

Mergel, I., Gong, Y. and Bertot, J. (2018) ‘Agile government: Systematic literature review and future research’, Government Information Quarterly, 35(2), pp. 291–298. doi: 10.1016/j.giq.2018.04.003.

Meyer, J, and Rowan, B. (1977) ‘Institutional organisations: formal structure as myth and ceremony.’, American Journal of Sociology, 83, pp. 340–363.

Minkes, A. L., Small, M. W. and Chatterjee, S. R. (1999) ‘Leadership and business ethics: Does it matter? Implications for management’, Journal of Business Ethics, 20(4), pp. 327–335. doi: 10.1023/A:1005741524800.

Mitcham, C. (1999) ‘Why the public should participate in technical decision making. In R. von Schomberg (Ed.), Democratising technology: Theory and practice of a deliberative technology policy (pp. 39-50).

Moll, J. and Yigitbasioglu, O. (2019) ‘The role of internet-related technologies in shaping the work of accountants: New directions for accounting research’, British Accounting Review, 51(6), p. 100833. doi: 10.1016/j.bar.2019.04.002.

Montagnon, P. (2019) A tech challenge? Fear not, many AI issues boil down to ethics. Available at: https://www.ft.com/content/a7073e7c-7a95-3022-a235-035d5e8fa614 (Accessed: 18 May 2020).

Montes, G. A. and Goertzel, B. (2019) ‘Distributed, decentralized, and democratized artificial intelligence’, Technological Forecasting and Social Change, 141, pp. 354–358. doi: 10.1016/j.techfore.2018.11.010.

Moore, P. V. (2019) ‘Jerry Kaplan Artificial Intelligence: What Everyone Needs to Know’, Organization Studies, 40(3), pp. 466–470. doi: 10.1177/0170840618792173.

Munoko, I., Brown-Liburd, H. L. and Vasarhelyi, M. (2020) ‘The Ethical Implications of Using Artificial Intelligence in Auditing’, Journal of Business Ethics, 167(2), pp. 209–234. doi: 10.1007/s10551-019-04407-1.

Murck, P. (2017) ‘Who owns the Blockchain’, Harvard Business Review, April 19.

Murphy, K. J. (1985) ‘Corporate performance and managerial remuneration: An empirical analysis’, Journal of Accounting and Economics, 7, pp. 11–42.

Murphy, K. J. (1997) ‘Executive compensation and the modern industrial revolution’, International Journal of Industrial Organization, 15, pp. 413–532.

Murray, J. (2018) ‘The Coming World of Blockchain: A Primer for Accountants and Auditors’, CPA Journal, 88(6), pp. 20–27.

Musbah, A., Cowton, C. J. and Tyfa, D. (2016) ‘The Role of Individual Variables, Organizational Variables and Moral Intensity Dimensions in Libyan Management Accountants’ Ethical Decision Making’, Journal of Business Ethics, 134(3), pp. 335–358.

Nakamoto, S. (2008) Bitcoin: A Peer-to-Peer Electronic Cash System, Satoshi Nakamoto Institute.

Nakpodia, F. and Adegbite, E. (2018) ‘Corporate governance and elites’, Accounting Forum, 42(1), pp. 17–31. doi: 10.1016/j.accfor.2017.11.002.

Nambisan, S. et al. (2017) ‘Digital innovation management: Reinventing innovation management research in a digital world’, MIS Quarterly, 41, pp. 223–236.

Nasdaq (2017) Is Blockchain the Answer to E-voting? Available at: https://business.nasdaq.com/marketinsite/2017/Is-Blockchain-the-Answer-to-E-voting-Nasdaq-Believes-So.html (Accessed: 23 November 2019).

Ndofor, H. A., Wesley, C. and Priem, R. L. (2015) ‘Providing CEOs with opportunities to cheat: The effects of complexity-based information asymmetries on financial reporting fraud.’, Journal of Management, 41, pp. 1774–1797.

Ngo, M. T., Jorissen, A. and Nonneman, W. (2018) ‘Do OECD-type governance principles have economic value for Vietnamese firms at IPO?’, Corporate Governance: An International Review, 26(1), pp. 58–79. doi: 10.1111/corg.12228.

Nicholson, G. J. and Kiel, G. C. (2007) ‘Can Directors Impact Performance? A case-based test of three theories of corporate governance’, Corporate Governance: An International Review, 15(4), pp. 585–608.

Nowak, M. J. and McCabe, M. (2003) ‘Information Costs and the Role of the Independent Corporate Director’, Corporate Governance: An International Review, 11(4), pp. 300–307. doi: 10.1111/1467-8683.00328.

O’Connor, J. P. et al. (2006) ‘Do CEO stock options prevent or promote fraudulent financial reporting?’, Academy of Management Journal, 49, pp. 483–500.

O’Fallon, M. J. and Butterfield, K. D. (2005) ‘A Review of The Empirical Ethical Decision-Making Literature: 1996–2003’, Journal of Business Ethics, 59, pp. 375–413.

O'Leary, D. E. (2017) 'Configuring blockchain architectures for transaction information in blockchain consortiums: The case of accounting and supply chain systems', Intelligent Systems in Accounting, Finance and Management, 24(4), pp. 138–147. doi: 10.1002/isaf.1417.

O'Sullivan, N. (2000) 'The impact of board composition and ownership on audit quality: Evidence from large UK companies', British Accounting Review, 32(4), pp. 397–414. doi: 10.1006/bare.2000.0139.

OECD (2004) OECD principles of corporate governance, OECD. Available at: http://www.oecd.org/corporate/ca/corporategovernanceprinciples/31557724.pdf (Accessed: 4 May 2020).

OECD (2015) 'G20/OECD principles of corporate governance', Paris: OECD.

OECD (2019) OECD corporate governance factbook, OCED. Available at: http://www.oecd.org/corporate/Corporate-Governance-Factbook.pdf (Accessed: 4 May 2020).

Ølnes, S., Ubacht, J. and Janssen, M. (2017) 'Blockchain in government: Benefits and implications of distributed ledger technology for information sharing', Government Information Quarterly, 34(3), pp. 355–364. doi: 10.1016/j.giq.2017.09.007.

Pagliaccio, S. (2020) Understanding Gender and Racial Bias in AI, Part 1, UX matters. Available at: https://www.uxmatters.com/mt/archives/2020/11/understanding-gender-and-racial-bias-in-ai.php (Accessed: 11 May 2021).

Paine, L. S. and Srinivasan, S. (2019) A Guide to the Big Ideas and Debates in Corporate Governance. Available at: https://hbr.org/2019/10/a-guide-to-the-big-ideas-and-debates-in-corporate-governance (Accessed: 28 April 2020).

Palazzo, G. and Scherer, A. G. (2006) 'Corporate legitimacy as deliberation: A communicative framework', Journal of Business Ethics, 66(1), pp. 71–88. doi: 10.1007/s10551-006-9044-2.

Pan, S. L. and Tan, B. (2011) 'Demystifying case research: A structured–pragmatic– situational (SPS) approach to conducting case studies', Information and Organization, 21, pp. 161–176.

Pancake, C. M. (2018) Computing's Hippocratic oath is here. Available at: https://www.fastcompany.com/90215922/why-we-spent-two-years-rewriting-the-code-of-ethics-for-computing (Accessed: 1 May 2020).

Paterson, T. A. and Huang, L. (2019) 'Am I Expected to Be Ethical? A Role-Definition Perspective of Ethical Leadership and Unethical Behavior', Journal of Management, 45(7), pp. 2837–2860. doi: 10.1177/0149206318771166.

Pattison, I. (2017) 4 characteristics that set blockchain apart. Available at: https://www.ibm.com/blogs/cloud-computing/2017/04/11/characteristics-blockchain/ (Accessed: 23 November 2019).

PaymentsSource (2019) Morning Brief 11.25.19: EU plays catch up in blockchain, AI investment, SourceMedia. Available at: https://www.paymentssource.com/news/eu-plays-catch-up-in-blockchain-ai-investment (Accessed: 28 November 2019).

PEGA (2020) The future of work new perspectives on disruption & transformation, PEGA. Available at: https://www.pega.com/system/files/resources/2020-10/pega-future-of-work-report.pdf (Accessed: 2 December 2020).

Pellin, D. and Engelmann, W. (2017) 'The construction of NanoEthics from emancipation of corporate management by the applied governmentality', CADERNOS DE DEREITO ACTUAL, (5), pp. 107–121.

Perrault, R. et al. (2019) Artificial Intelligence Index Report 2019, Stanford University. Available at: https://hai.stanford.edu/sites/g/files/sbiybj10986/f/ai_index_2019_report.pdf (Accessed: 12 January 2020).

Perrini, F., Rossi, G. and Rovetta, B. (2008) 'Does ownership structure affect performance? Evidence from the Italian market', Corporate Governance: An International Review, 16(4), pp. 312–325. doi: 10.1111/j.1467-8683.2008.00695.x.

Petrin, M. (2019) Corporate Management in the Age of Artificial Intelligence, Business law Blog. Available at: https://www.law.ox.ac.uk/business-law-blog/blog/2019/04/corporate-management-age-artificial-intelligence (Accessed: 1 December 2019).

Pieroni, A. et al. (2018) 'Smarter City: Smart energy grid based on Blockchain technology', International Journal on Advanced Science, Engineering and Information Technology, 8(1), pp. 298–306. doi: 10.18517/ijaseit.8.1.4954.

Ping, Z. and Andy, C. (2011) 'Corporate governance: A summary review on different theory approaches', International Research Journal of Finance and Economics, 68, pp. 7–13

Piotrowski, S. J. (2014) 'Transparency: A Regime Value Linked With Ethics', Administration & Society, 46(2), pp. 181–189.

Potts, S. D. and Matuszewski, I. L. (2004) 'Ethics and Corporate Governance', Corporate Governance: An International Review, 12(2), pp. 177–179. doi: 10.1111/j.1467-8683.2004.00357.x.

Power, M. (2007) 'Organized uncertainty'. Oxford: Oxford University Press.

Purcell, T. V. (1982) 'The ethics of corporate governance', Review of Social Economy, 40(3), pp. 360–370.

PWC (2017) Sizing the Prize what's real value of AI for your business and how can you capitalise? Available at: https://www.pwc.com/gx/en/issues/analytics/assets/pwc-ai-analysis-sizing-the-prize-report.pdf (Accessed: 18 March 2021).

Rahul, A. R. (2016) AI in Blockchain Technology, The possibilities of integrating AI with Blockchain, CIO Accubits Technologies Inc. Available at: https://accubits.com/white_papers/possibilities-integrating-ai-blockchain/ (Accessed: 11 January 2020).

Ramdani, D. and van Witteloostuijn, A. (2012) 'The shareholder–manager relationship and its impact on the likelihood of firm bribery.', Journal of Business Ethics, 108, pp. 495–507.

Ransbotham, S., Kiron, D., Gerbert, P. and Reeves, M. (2017) 'Reshaping Business With Artificial Intelligence', MIT Sloan Management Review, 59(1), pp. 1–16.

Reader, J. (2021) 'Review of Bernard Stiegler (2019). The Age of Disruption: Technology and Madness in Computational Capitalism.', Postdigital Science and Education, 3, pp. 607–613.

Rejeb, A., Keogh, J. G. and Treiblmaier, H. (2019) 'Leveraging the Internet of Things and blockchain technology in Supply Chain Management', Future Internet, 11(7). doi: 10.3390/fi11070161.

Rest, J. R. (1986) 'Moral development: Advances in research and theory', New York: Praeger.

Reuer, J. J. and Ariño, A. (2007) 'Strategic alliance contracts: Dimensions and determinants of contractual complexity', Strategic Management Journal, 28(3), pp. 313–330.

Rezaee, Z. (2008) 'Corporate governance and ethics, e-book', John Wiley & Sons.

Rien Agustin, F. and Susilowati, D. (2019) 'Preventing corruption with blockchain technology (case study of Indonesian public procurement)', International Journal of Scientific and Technology Research, 8(9), pp. 2377–2383.

Roberts, J. (2009) 'No one is perfect: The limits of transparency and an ethic for "intelligent" accountability', Accounting, Organizations and Society, 34(8), pp. 957–970. doi: 10.1016/j.aos.2009.04.005.

Roman, A. (2019) The Three Pillars of Corporate Governance. Available at: https://www.azeusconvene.com/articles/three-pillars-of-corporate-governance (Accessed: 26 November 2019).

Rossouw, G. J. (2005) 'Business ethics and corporate governance in Africa', Business and Society, 44(1), pp. 94–106. doi: 10.1177/0007650305274851.

Rouse, M. (2019) technology ethics. Available at: https://searchcio.techtarget.com/definition/Technology-Ethics (Accessed: 2 May 2020).

Rousseau, D. M. et al. (1998) 'Not so different after all: A cross-discipline view of trust', Academy of Management Review, 23, pp. 393–404.

Roy, M. N. and Saha, S. S. (2018) Statutory auditors' independence in protecting stakeholders' interest: An empirical study, Springer International Publishing. doi: 10.1007/978-3-319-73727-0.

Rozario, A M and Vasarhelyi, M. A. (2018) 'Auditing with smart contracts', International Journal of Digital Accounting Research, 18, pp. 1–27. doi: 10.4192/1577-8517-v18_1.

Rozario, Andrea M. and Vasarhelyi, M. A. (2018) 'Auditing with smart contracts', International Journal of Digital Accounting Research, 18(February), pp. 1–27. doi: 10.4192/1577-8517-v18_1.

Ruddenklau, A. (2018) Tech giants in financial services Is collaboration the way forward?, KPMG. Available at: https://assets.kpmg/content/dam/kpmg/xx/pdf/2018/02/tech-giants-in-financial-services.pdf (Accessed: 7 July 2020).

Russell, S. and Norvig, P. (2016) 'Artificial intelligence: A modern approach (Global Edition)', Englewood Cliffs, NJ: Pearson Higher Ed.

Ryan, L. V. and Schneider, M. (2003) Institutional Investor Power and Heterogeneity: Implications for Agency and Stakeholder Theories, Business & Society. 42(4), pp.398-429 doi: 10.1177/0007650303260450.

Salah, K et al. (2019) 'Blockchain for AI: Review and open research challenges', IEEE Access, 7, pp. 10127–10149. doi: 10.1109/ACCESS.2018.2890507.

Sands, A. (2019) Bots in the Boardroom: The Promise of AI, Insights. Available at: https://insights.diligent.com/artificial-intelligence/bots-in-the-boardroom-the-promise-of-ai (Accessed: 8 January 2021).

Santander, B. (2020) The Future of Banking: 2030-Gaze into the crystal ball to see what retail banking will look like a decade from now, Financial Times. Available at: https://santander.ft.com/the-future-of-banking-2030?utm_source=FT&utm_medium=Native (Accessed: 7 July 2020).

Saunders, M., Lewis, P. and Thornhill, A. (2019) Research Methods for Business Students Ebook. 8th edn. Pearson Education, Limited.

Schearer, T. (2002) 'Ethics and accountability: From the for-itself to the for-the-other', Accounting, Organizations and Society, 27(6), pp. 541–573.

Schmitz, J. and Leoni, G. (2019) 'Accounting and Auditing at the Time of Blockchain Technology: A Research Agenda', Australian Accounting Review, 29(2), pp. 331–342. doi: 10.1111/auar.12286.

Schnatterly, K., Gangloff, K. A. and Tuschke, A. (2018) 'CEO Wrongdoing: A Review of Pressure, Opportunity, and Rationalization', Journal of Management, 44(6), pp. 2405–2432. doi: 10.1177/0149206318771177.

Schot, J. and Rip, A. (1997) 'The past and future of constructive technology assessment', Technological Forecasting and Social Change, 54, pp. 251–268.

Schwartz, M. S., Dunfee, T. W. and Kline, M. J. (2005) 'Tone at the top: An ethics code for directors?', Journal of Business Ethics, 58(1), pp. 79–100. doi: 10.1007/s10551-005-1390-y.

Scott, B., Loonam, J. and Kumar, V. (2017) ‘Exploring the rise of blockchain technology: Towards distributed collaborative organizations’, Strategic Change, 26(5), pp. 423–428. doi: 10.1002/jsc.2142.

Scott, W. R. (1987) ‘The Adolescence of Institutional Theory’, Administrative Science Quarterly, 32(4), pp. 493–511.

Scott, W. R. (1995) ‘Institutions and Organizations’, Sage: Thousand Oaks.

Seeber, I. et al. (2019) ‘Machines as teammates: A research agenda on AI in team collaboration’, Information and Management, 57(2), p. 103174. doi: 10.1016/j.im.2019.103174.

Segrestin, B. and Hatchuel, A. (2011) ‘Beyond agency theory, a post-crisis view of corporate law’, British Journal of Management, 22(3), pp. 484–499. doi: 10.1111/j.1467-8551.2011.00763.x.

Shamir, R. (2008) ‘The age of responsibilization: On market-embedded morality’, Economy and Society, 37(1), pp. 1–19. doi: 10.1080/03085140701760833.

Shank, D.B., Graves, C., Gott, A., Gamez, P. and Rodriguez, S. (2019) ‘Feeling our way to machine minds: People’s emotions when perceiving mind in artificial intelligence’, Computers in Human Behavior, 98(November 2018), pp. 256–266. doi: 10.1016/j.chb.2019.04.001.

Sharma, V., Naiker, V. and Lee, B. (2009) ‘Determinants of audit committee meeting frequency: Evidence from a voluntary governance system’, Accounting Horizons, 23(3), pp. 245–263. doi: 10.2308/acch.2009.23.3.245.

Sharron, S. and Serwin, A. (2018) Managing Corporate AI, Corporate Compliance Insights. Available at: https://www.corporatecomplianceinsights.com/managing-corporate-ai/ (Accessed: 10 January 2021).

Sheldon, M. D. (2019) ‘A primer for information technology general control considerations on a private and permissioned blockchain audit’, Current Issues in Auditing, 13(1), pp. A15–A29. doi: 10.2308/ciia-52356.

Shen, W., Zhou, Q. and Lau, C. M. (2016) ‘Empirical research on corporate governance in China: A review and new directions for the future’, Management and Organization Review, 12(1), pp. 41–73. doi: 10.1017/mor.2015.11.

Shermin, V. (2017) ‘Disrupting governance with Blockchains and smart contracts’, Strategic Change, 26(5), pp. 499–509.

Shi, W., Connelly, B. L. and Hoskisson, R. E. (2017) ‘External corporate governance and financial fraud: cognitive evaluation theory insights on agency theory prescriptions’, Strategic Management Journal, 38(6), pp. 1268–1286. doi: 10.1002/smj.2560.

Shrader-Frechette, K. S. (1995) ‘Technology assessment. In W. Reich (Ed.), Encyclopedia of bioethics (2nd rev. ed., Vol. 5, pp. 2484-2490)’, New York: Macmillan.

Shumsky, P. (2019) Blockchain Use Cases For Banks In 2020, Finextra. Available at: https://www.finextra.com/blogposting/17857/blockchain-use-cases-for-banks-in-2020 (Accessed: 7 July 2020).

Singh, S. K., Rathore, S. and Park, J. H. (2019) ‘BlockIoTIntelligence: A Blockchain-enabled Intelligent IoT Architecture with Artificial Intelligence’, Future Generation Computer Systems, 110, pp.721-743. doi: 10.1016/j.future.2019.09.002.

Sniderman, B. (2020) Ethical tech: Making ethics a priority in today’s digital organization. Available at: https://digitalagenda.io/insight/ethical-tech-making-ethics-a-priority/ (Accessed: 1 May 2020).

Sousa, W.G., de Melo, E.R.P., Bermejo, P.H.D.S., Farias, R.A.S. and Gomes, A.O. (2019) ‘How and where is artificial intelligence in the public sector going? A literature review and research agenda’, Government Information Quarterly, 36(4), p. 101392. doi: 10.1016/j.giq.2019.07.004.

Statista (2022) Number of social network users worldwide from 2017 to 2025(in billions), Statista. Available at: https://www.statista.com/statistics/278414/number-of-worldwide-social-network-users/ (Accessed: 7 February 2022).

Stiegler, B. (1994) Technics and Time: The Fault of Prometheus, Stanford, CA: Stanford University Press.

Stiegler, B. (2019) The Age of Disruption: Technology and Madness in Computational Capitalism (trans. D Ross). Cambridge: Polity.

Strang, D. and Meyer, J. W. (1993) 'Institutional conditions for diffusion', Theory and Society, 22(4), pp. 487–511.

Strauss, A. and Corbin, J. (1998) Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory. Thousand Oaks, CA: Sage Publications, Inc.

Suchman, M. C. (1995) 'Managing Legitimacy: Strategic and Institutional Approaches', Academy of Management, 20(3), pp. 571–610.

Sun, T. Q. and Medaglia, R. (2019) 'Mapping the challenges of Artificial Intelligence in the public sector: Evidence from public healthcare', Government Information Quarterly, 36(2), pp. 368–383. doi: 10.1016/j.giq.2018.09.008.

Swan, M. (2015) Blockchain: Blueprint for a new economy, O'Reilly Media, Inc.

Tan, B. S. and Low, K. Y. (2019) 'Blockchain as the Database Engine in the Accounting System', Australian Accounting Review, 29(2), pp. 312–318. doi: 10.1111/auar.12278.

Tapscott, D. and Euchner, J. (2019) 'Blockchain and the Internet of Value', Research Technology Management, 62(1), pp. 12–19. doi: 10.1080/08956308.2019.1541711.

Tapscott, D. and Tapscott, A. (2016) The Impact of the Blockchain Goes Beyond Financial Services, Harvard Business Review. Available at: https://hbr.org/2016/05/the-impact-of-the-blockchain-goes-beyond-financial-services (Accessed: 11 November 2019).

Tapscott, D. and Tapscott, A. (2017) 'How blockchain will change organizations', MIT Sloan Management Review, 58(2), pp. 10–13.

Taylor, P.J., Dargahi, T., Dehghantanha, A., Parizi, R.M. and Choo, K.K.R. (2020) A systematic literature review of blockchain cyber security. Digital Communications and Networks, 6(2), pp.147-156.

Thanh, T. V. and Kirov, V. (2018) 'Wine tourism experience: A netnography study', Journal of Business Research, 83, pp. 30–37.

Thomson, J. (2019) Ethics In The Digital Age: Protect Others' Data As You Would Your Own. Available at: https://www.forbes.com/sites/jeffthomson/2019/07/01/ethics-in-the-digital-age-protect-others-data-as-you-would-your-own/#18e2cca454e1 (Accessed: 1 May 2020).

Thornton, P. H. and Ocasio, W. (1998) 'Institutional logics and the historical contingency of power in organizations: Executive succession in the higher education publishing industry 1958–1990', American Journal of Sociology, 105, pp. 801–843.

Till, R. E. and Yount, M. B. (2019) 'Governance and Incentives: Is It Really All about the Money?', Journal of Business Ethics, 159(3), pp. 605–618. doi: 10.1007/s10551-018-3778-5.

Toufaily, E., Zalan, T. and Dhaou, S. Ben (2021) 'A framework of blockchain technology adoption: An investigation of challenges and expected value', Information & Management, 58(103444), pp. 1–17.

Tricker, R. I. (1984) 'Corporate Governance: History of Management Thought', Farnham, United Kingdom: Ashgate Publishing.

Trump, B.D., Florin, M.V., Matthews, H.S., Sicker, D. and Linkov, I. (2018) 'Governing the Use of Blockchain and Distributed Ledger Technologies: Not One-Size-Fits-All', IEEE Engineering Management Review, 46(3), pp. 56–62. doi: 10.1109/EMR.2018.2868305.

Ullah, S., Ahmad, S., Akbar, S. and Kodwani, D. (2019) 'International Evidence on the Determinants of Organizational Ethical Vulnerability', British Journal of Management, 30(3), pp. 668–691. doi: 10.1111/1467-8551.12289.

Underwood, S. (2016) 'Blockchain beyond Bitcoin', Communications of the ACM, 59(11), pp. 15–17.

Uyar, A., Gungormus, A. H. and Kuzey, C. (2017) 'Impact of the accounting information system on corporate governance: Evidence from Turkish non-listed companies', Australasian Accounting, Business and Finance Journal, 11(1), pp. 9–27. doi: 10.14453/aabfj.v11i1.3.

van Essen, M., Otten, J. and Carberry, E. J. (2015) 'Assessing Managerial Power Theory: A Meta-Analytic Approach to Understanding the Determinants of CEO Compensation', Journal of Management, 41(1), pp. 164–202. doi: 10.1177/0149206311429378.

Vial, G. (2019) 'Understanding digital transformation: A review and a research agenda', Journal of Strategic Information Systems, 28(2), pp. 118–144. doi: 10.1016/j.jsis.2019.01.003.

Vysay, V. N. and Kumar, A. (2019) Blockchain Adoption in Financial Services, Infosys. Available at: https://www.infosys.com/industries/consumer-package-goods/documents/blockchain-adoption-financial-services.pdf (Accessed: 10 July 2020).

Wang, Y.-S. (2019) 'User experiences in live video streaming: a netnography analysis', Internet Research, 29(4), pp. 638–658.

Wesche, J. S. and Sonderegger, A. (2019) 'When computers take the lead: The automation of leadership', Computers in Human Behavior, 101(June), pp. 197–209. doi: 10.1016/j.chb.2019.07.027.

West, S. M. (2019) 'Data Capitalism: Redefining the Logics of Surveillance and Privacy', Business and Society, 58(1), pp. 20–41. doi: 10.1177/0007650317718185.

Whalen, E. (2018) 'Understanding a shifting methodology: A content analysis of the use of netnography in hospitality and tourism research', International Journal of Contemporary Hospitality Management, 30(11), pp. 3423–41.

Whelan, G. (2019) Born Political: A Dispositive Analysis of Google and Copyright, Business and Society. doi: 10.1177/0007650317717701.

Wilkin, C. L., Campbell, J. and Moore, S. (2013) 'Creating value through governing IT deployment in a public/private-sector inter-organisational context: A human agency perspective', European Journal of Information Systems, 22(5), pp. 498–511. doi: 10.1057/ejis.2012.21.

Wilson, J. and Daugherty, P. (2018) 'Collaborative intelligence: humans and AI are joining forces', Harvard Business Review, 96(4), pp. 114–123.

Winter, J. S. and Davidson, E. (2019) 'Big data governance of personal health information and challenges to contextual integrity', Information Society, 35(1), pp. 36–51. doi: 10.1080/01972243.2018.1542648.

Wirtz, B., Weyerer, J. C. and Geyer, C. (2018) 'Artificial intelligence and the public sector – Applications and challenges', International Journal of Public Administration, 42(7), pp. 596–615.

Wiseman, R. M., Cuevas-Rodríguez, G. and Gomez-Mejia, L. R. (2012) 'Towards a social theory of agency', Journal of Management Studies, 49(1), pp. 202–222. doi: 10.1111/j.1467-6486.2011.01016.x.

Withers, M.C. and Fitza, M.A. (2017) 'Do board chairs matter? The influence of board chairs on firm performance'. Strategic Management Journal, 38(6), pp.1343-1355.

Wooldridge, M. (2017) Professor Michael Wooldridge – Written evidence (AIC0174), House of Lords HL Papaer 100. Available at: http://data.parliament.uk/writtenevidence/committeeevidence.svc/evidencedocument/artificial-intelligence-committee/artificial-intelligence/written/69686.html (Accessed: 8 February 2020).

Woolf, E. (1997) Auditing Today. sixth edit. Prentice Hall Europe.

WorldEconomicForum (2015) Deep Shift Technology Tipping Points and Societal Impact. Available at: http://www3.weforum.org/docs/WEF_GAC15_Technological_Tipping_Points_report_2015.pdf (Accessed: 4 December 2019).

WorldEconomicForum (2018) Values, Ethics and Innovation Rethinking Technological Development in the Fourth Industrial Revolution. Available at: http://www3.weforum.org/docs/WEF_WP_Values_Ethics_Innovation_2018.pdf (Accessed: 2 May 2020).

Xia, Q.I., Sifah, E.B., Asamoah, K.O., Gao, J., Du, X. and Guizani, M. (2017) 'MeDShare: Trust-Less Medical Data Sharing among Cloud Service Providers via Blockchain', IEEE Access, 5, pp. 14757–14767. doi: 10.1109/ACCESS.2017.2730843.

Xu, M., Chen, X. and Kou, G. (2019) 'A systematic review of blockchain', Financial Innovation, 5(1). doi: 10.1186/s40854-019-0147-z.

Yermack, D. (2017) 'Corporate governance and blockchains', Review of Finance, 21(1), pp. 7–31. doi: 10.1093/rof/rfw074.

Yin, H.H.S., Langenheldt, K., Harlev, M., Mukkamala, R.R. and Vatrapu, R. (2019) 'Regulating Cryptocurrencies: A Supervised Machine Learning Approach to De-Anonymizing the Bitcoin Blockchain', Journal of Management Information Systems, 36(1), pp. 37–73. doi: 10.1080/07421222.2018.1550550.

Yu, T., Lin, Z. and Tang, Q. (2018) 'Blockchain: The Introduction and Its Application in Financial Accounting', Journal of Corporate Accounting & Finance, 29(4), pp. 37–47. doi: 10.1002/jcaf.22365.

Zachariadis, M., Hileman, G. and Scott, S. V. (2019) 'Governance and control in distributed ledgers: Understanding the challenges facing blockchain technology in financial services', Information and Organization, 29(2), pp. 105–117. doi: 10.1016/j.infoandorg.2019.03.001.

Zeng, M. (2018) Alibaba and the Future of Business, Harvard business review. Available at: https://hbr.org/2018/09/alibaba-and-the-future-of-business (Accessed: 12 January 2021).

Zeng, M. A., Koller, H. and Jahn, R. (2019) 'Open radar groups: the integration of online communities into open foresight processes', Technological Forecasting and Social Change, 138, pp. 204–217.

Zeyen, A., Beckmann, M. and Wolters, S. (2016) 'Actor and Institutional Dynamics in the Development of Multi-stakeholder Initiatives', Journal of Business Ethics, 135(2), pp. 341–360. doi: 10.1007/s10551-014-2468-1.

Zhang, C., Cavusgil, S. T. and Roath, A. S. (2003) 'Manufacturer governance of foreign distributor relationships: Do relational norms enhance competitiveness in the export market?', Journal of International Business Studies, 34(6), pp. 550–556.

Zhao, H., Zhang, Y., Peng, Y. and Xu, R. (2017) 'Lightweight Backup and Efficient Recovery Scheme for Health Blockchain Keys', in Proceedings - 2017 IEEE 13th International Symposium on Autonomous Decentralized Systems, ISADS 2017, (pp. 229-234). doi: 10.1109/ISADS.2017.22.

Zhu, J.J., Caleb, H.T. and Li, X. (2019) 'Unfolding China's state-owned corporate empires and mitigating agency hazards: Effects of foreign investments and innovativeness', Journal of World Business, 54(3), pp. 191–212. doi: 10.1016/j.jwb.2019.02.001.

Zilber, T. B. (2002) ‘Institutionalization as an interplay between actions, meanings, and actors: the case of a rape crisis center in Israel’, Academy of Management Journal, 45(1), pp. 234–254.

Ziolkowski, R., Miscione, G. and Schwabe, G. (2020) ‘Decision Problems in Blockchain Governance: Old Wine in New Bottles or Walking in Someone Else’s Shoes?’, Journal of Management Information Systems, 37(2), pp. 316–348.

Appendix

Appendix 1 Ethics Approval

PHD%20Reviews/20%20month%20review/Letter%20of%20Approval-Ethical%20Approval.pdf

College of Business, Arts and Social Sciences Research Ethics Committee
Brunel University London
Kingston Lane
Uxbridge
UB8 3PH
United Kingdom

www.brunel.ac.uk

26 March 2021

LETTER OF APPROVAL

APPROVAL HAS BEEN GRANTED FOR THIS STUDY TO BE CARRIED OUT BETWEEN 26/03/2021 AND 30/09/2022

Applicant (s): Ms hongdan han

Project Title: The impact of disruptive technology adoption (AI and Blockchain) on financial aspect of corporate governance (Auditing)

Reference: 30243-LR-Mar/2021- 31981-1

Dear Ms hongdan han

The Research Ethics Committee has considered the above application recently submitted by you.

The Chair, acting under delegated authority has agreed that there is no objection on ethical grounds to the proposed study. Approval is given on the understanding that the conditions of approval set out below are followed:

- **Approval is given for remote (online/telephone) research activity only. Face-to-face activity and/or travel will require approval by way of an amendment.**
- **The agreed protocol must be followed. Any changes to the protocol will require prior approval from the Committee by way of an application for an amendment.**
- In addition to the above, please ensure that you monitor and adhere to all up-to-date local and national Government health advice for the duration of your project.

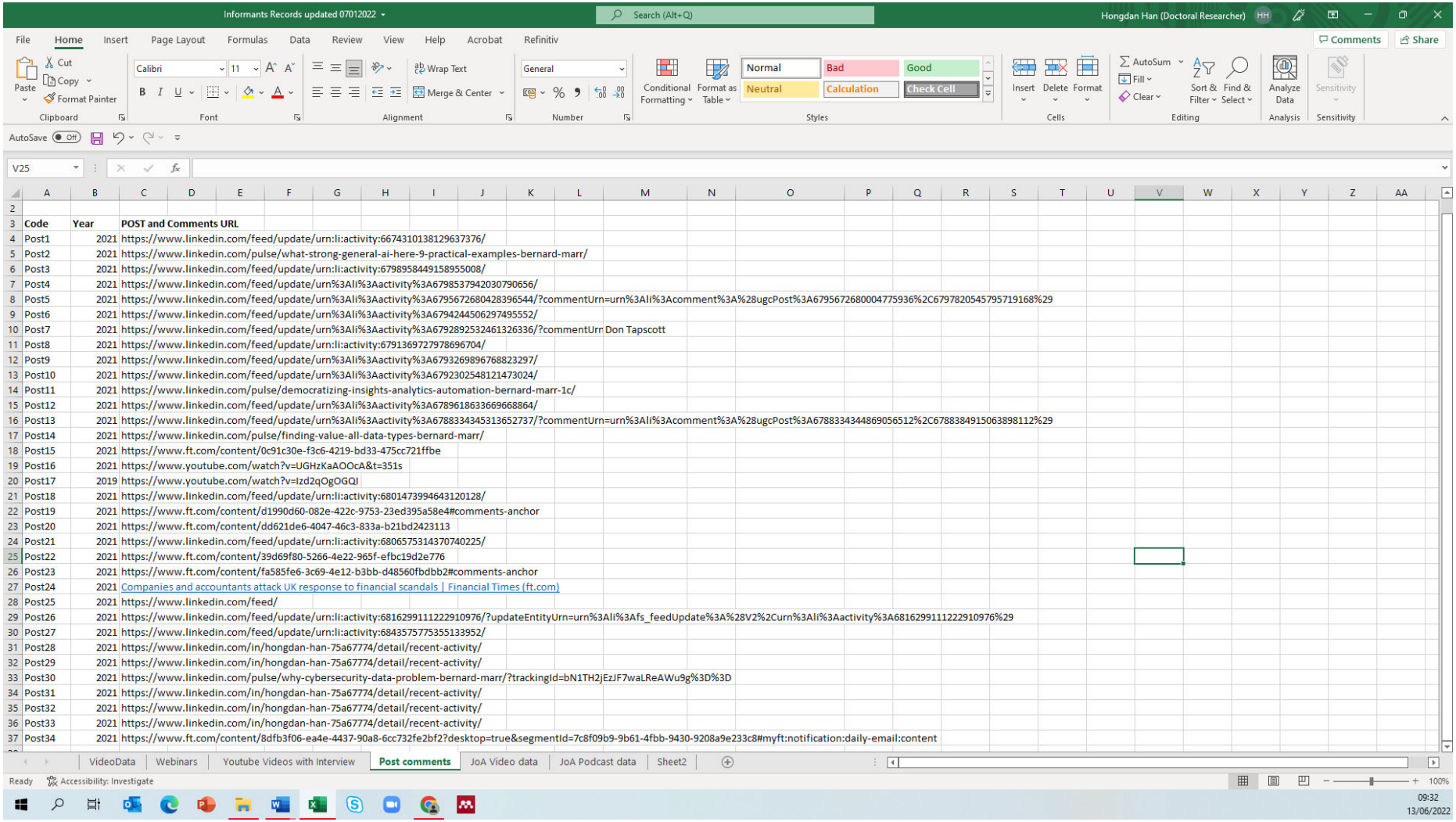
Please note that:

- Research Participant Information Sheets and (where relevant) flyers, posters, and consent forms should include a clear statement that research ethics approval has been obtained from the relevant Research Ethics Committee.
- The Research Participant Information Sheets should include a clear statement that queries should be directed, in the first instance, to the Supervisor (where relevant), or the researcher. Complaints, on the other hand, should be directed, in the first instance, to the Chair of the relevant Research Ethics Committee.
- Approval to proceed with the study is granted subject to receipt by the Committee of satisfactory responses to any conditions that may appear above, in addition to any subsequent changes to the protocol.
- The Research Ethics Committee reserves the right to sample and review documentation, including raw data, relevant to the study.
- You may not undertake any research activity if you are not a registered student of Brunel University or if you cease to become registered, including abeyance or temporary withdrawal. As a deregistered student you would not be insured to undertake research activity. Research activity includes the recruitment of participants, undertaking consent procedures and collection of data. Breach of this requirement constitutes research misconduct and is a disciplinary offence.

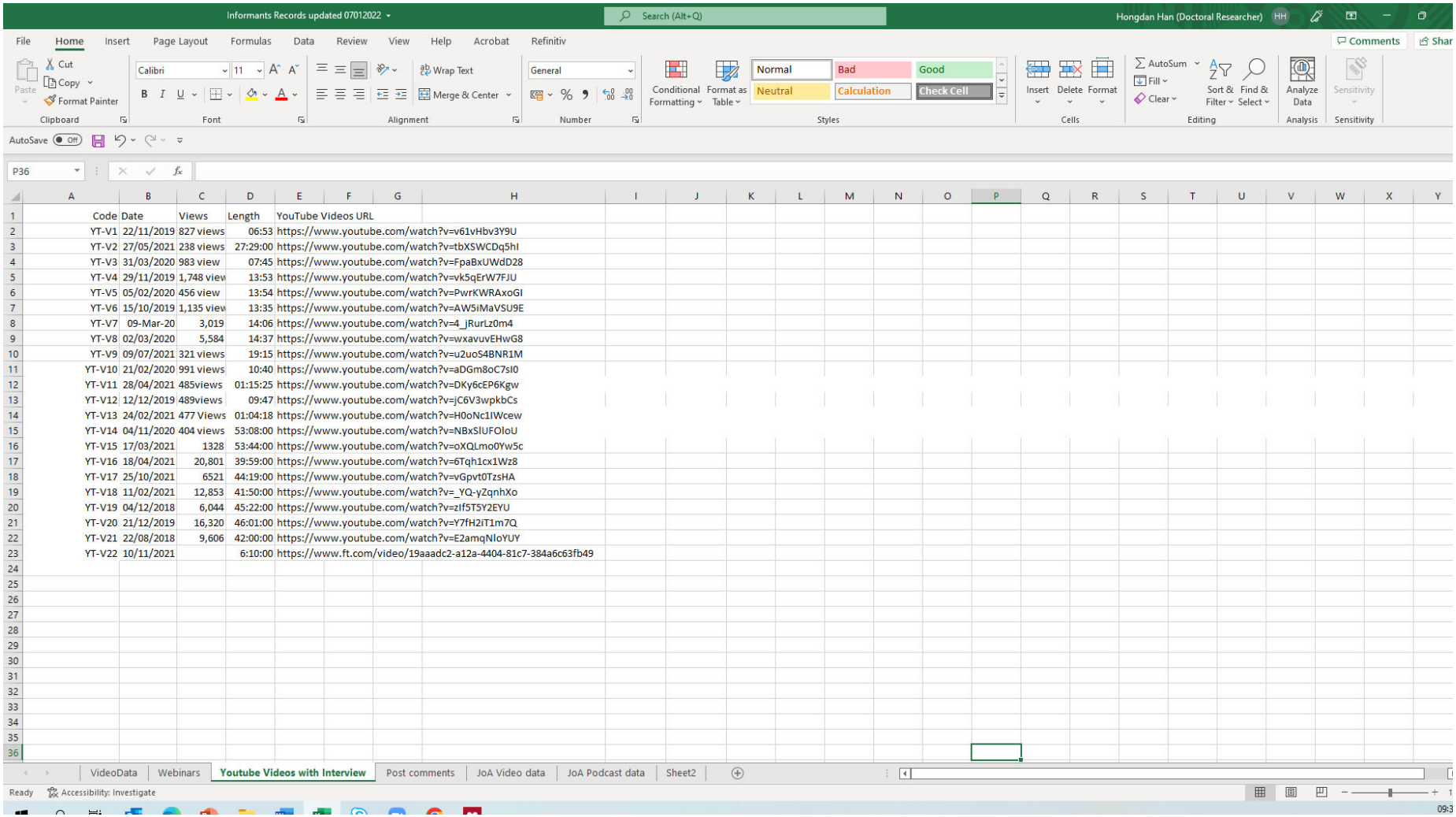
Professor David Gallear

Chair of the College of Business, Arts and Social Sciences Research Ethics Committee

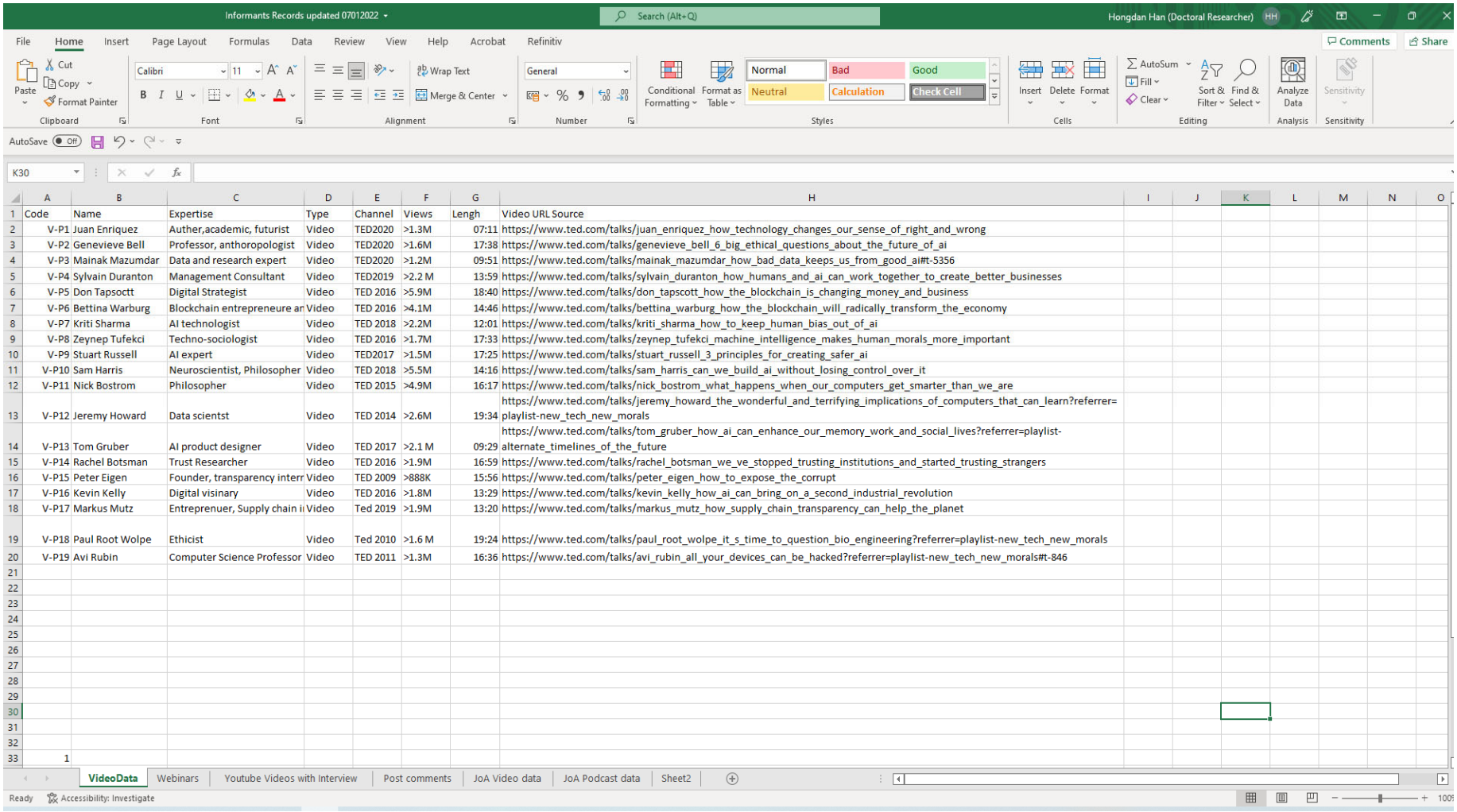
Appendix 2 Netnography Inquiry Datasets Source Record



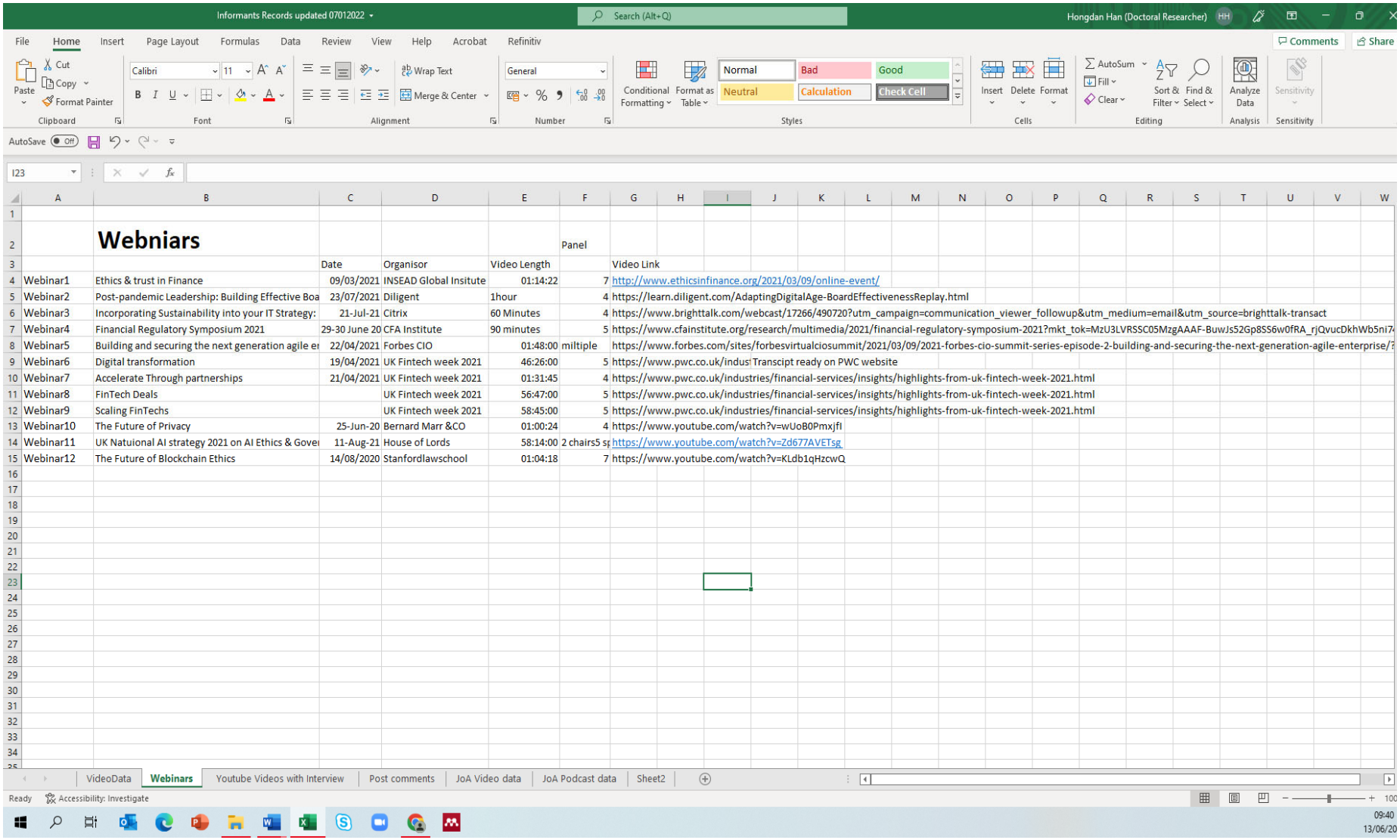
Code	Year	POST and Comments URL
Post1	2021	https://www.linkedin.com/feed/update/urn:li:activity:6674310138129637376/
Post2	2021	https://www.linkedin.com/pulse/what-strong-general-ai-here-9-practical-examples-bernard-marr/
Post3	2021	https://www.linkedin.com/feed/update/urn:li:activity:6798958449158955008/
Post4	2021	https://www.linkedin.com/feed/update/urn%3Ali%3Aactivity%3A6798537942030790656/
Post5	2021	https://www.linkedin.com/feed/update/urn%3Ali%3Aactivity%3A6795672680428396544/?commentUrn=urn%3Ali%3Acomment%3A%28ugcPost%3A6795672680004775936%2C6797820545795719168%29
Post6	2021	https://www.linkedin.com/feed/update/urn%3Ali%3Aactivity%3A6794244506297495552/
Post7	2021	https://www.linkedin.com/feed/update/urn%3Ali%3Aactivity%3A6792892532461326336/?commentUrn Don Tapscott
Post8	2021	https://www.linkedin.com/feed/update/urn:li:activity:6791369727978696704/
Post9	2021	https://www.linkedin.com/feed/update/urn%3Ali%3Aactivity%3A6793269896768823297/
Post10	2021	https://www.linkedin.com/feed/update/urn%3Ali%3Aactivity%3A6792302548121473024/
Post11	2021	https://www.linkedin.com/pulse/democratizing-insights-analytics-automation-bernard-marr-1c/
Post12	2021	https://www.linkedin.com/feed/update/urn%3Ali%3Aactivity%3A6789618633669668864/
Post13	2021	https://www.linkedin.com/feed/update/urn%3Ali%3Aactivity%3A6788334345313652737/?commentUrn=urn%3Ali%3Acomment%3A%28ugcPost%3A6788334344869056512%2C6788384915063898112%29
Post14	2021	https://www.linkedin.com/pulse/finding-value-all-data-types-bernard-marr/
Post15	2021	https://www.ft.com/content/0c91c30e-f3c6-4219-bd33-475cc721ffbe
Post16	2021	https://www.youtube.com/watch?v=UGHzKaAOOcA&t=351s
Post17	2019	https://www.youtube.com/watch?v=Izd2qOgOGQI
Post18	2021	https://www.linkedin.com/feed/update/urn:li:activity:6801473994643120128/
Post19	2021	https://www.ft.com/content/d1990d60-082e-422c-9753-23ed395a58e4#comments-anchor
Post20	2021	https://www.ft.com/content/dd621de6-4047-46c3-833a-b21bd2423113
Post21	2021	https://www.linkedin.com/feed/update/urn:li:activity:6806575314370740225/
Post22	2021	https://www.ft.com/content/39d69f80-5266-4e22-965f-efbc19d2e776
Post23	2021	https://www.ft.com/content/fa585fe6-3c69-4e12-b3bb-d48560fbdbb2#comments-anchor
Post24	2021	Companies and accountants attack UK response to financial scandals | Financial Times (ft.com)
Post25	2021	https://www.linkedin.com/feed/
Post26	2021	https://www.linkedin.com/feed/update/urn:li:activity:6816299111222910976/?updateEntityUrn=urn%3Ali%3Afs_feedUpdate%3A%28V2%2Curn%3Ali%3Aactivity%3A6816299111222910976%29
Post27	2021	https://www.linkedin.com/feed/update/urn:li:activity:6843575775355133952/
Post28	2021	https://www.linkedin.com/in/hongdan-han-75a67774/detail/recent-activity/
Post29	2021	https://www.linkedin.com/in/hongdan-han-75a67774/detail/recent-activity/
Post30	2021	https://www.linkedin.com/pulse/why-cybersecurity-data-problem-bernard-marr/?trackingId=bN1TH2jEzJF7waLReAWu9g%3D%3D
Post31	2021	https://www.linkedin.com/in/hongdan-han-75a67774/detail/recent-activity/
Post32	2021	https://www.linkedin.com/in/hongdan-han-75a67774/detail/recent-activity/
Post33	2021	https://www.linkedin.com/in/hongdan-han-75a67774/detail/recent-activity/
Post34	2021	https://www.ft.com/content/8dfb3f06-ea4e-4437-90a8-6cc732fe2bf2?desktop=true&segmentId=7c8f09b9-9b61-4fbb-9430-9208a9e233c8#myft:notification:daily-email:content



Code	Date	Views	Length	YouTube Videos URL
YT-V1	22/11/2019	827 views	06:53	https://www.youtube.com/watch?v=v61vHbv3Y9U
YT-V2	27/05/2021	238 views	27:29:00	https://www.youtube.com/watch?v=tbXSWCDq5hI
YT-V3	31/03/2020	983 view	07:45	https://www.youtube.com/watch?v=FpaBxUWdD28
YT-V4	29/11/2019	1,748 view	13:53	https://www.youtube.com/watch?v=vk5qErW7FJU
YT-V5	05/02/2020	456 view	13:54	https://www.youtube.com/watch?v=PwrKWRAxoGI
YT-V6	15/10/2019	1,135 view	13:35	https://www.youtube.com/watch?v=AW5iMaVSU9E
YT-V7	09-Mar-20	3,019	14:06	https://www.youtube.com/watch?v=4_jRurLz0m4
YT-V8	02/03/2020	5,584	14:37	https://www.youtube.com/watch?v=wxavuvEHwG8
YT-V9	09/07/2021	321 views	19:15	https://www.youtube.com/watch?v=u2uoS4BNR1M
YT-V10	21/02/2020	991 views	10:40	https://www.youtube.com/watch?v=aDGm8oC7sI0
YT-V11	28/04/2021	485views	01:15:25	https://www.youtube.com/watch?v=DKy6cEP6Kgw
YT-V12	12/12/2019	489views	09:47	https://www.youtube.com/watch?v=jC6V3wpkbCs
YT-V13	24/02/2021	477 Views	01:04:18	https://www.youtube.com/watch?v=H0oNc1IWcew
YT-V14	04/11/2020	404 views	53:08:00	https://www.youtube.com/watch?v=NBxSlUFOloU
YT-V15	17/03/2021	1328	53:44:00	https://www.youtube.com/watch?v=oXQLmo0Yw5c
YT-V16	18/04/2021	20,801	39:59:00	https://www.youtube.com/watch?v=6Tqh1cx1Wz8
YT-V17	25/10/2021	6521	44:19:00	https://www.youtube.com/watch?v=vGpvt0TzsHA
YT-V18	11/02/2021	12,853	41:50:00	https://www.youtube.com/watch?v=_YQ-yZqnhXo
YT-V19	04/12/2018	6,044	45:22:00	https://www.youtube.com/watch?v=zIf5T5Y2EYU
YT-V20	21/12/2019	16,320	46:01:00	https://www.youtube.com/watch?v=Y7fH2iT1m7Q
YT-V21	22/08/2018	9,606	42:00:00	https://www.youtube.com/watch?v=E2amqNIoYUY
YT-V22	10/11/2021		6:10:00	https://www.ft.com/video/19aaadc2-a12a-4404-81c7-384a6c63fb49

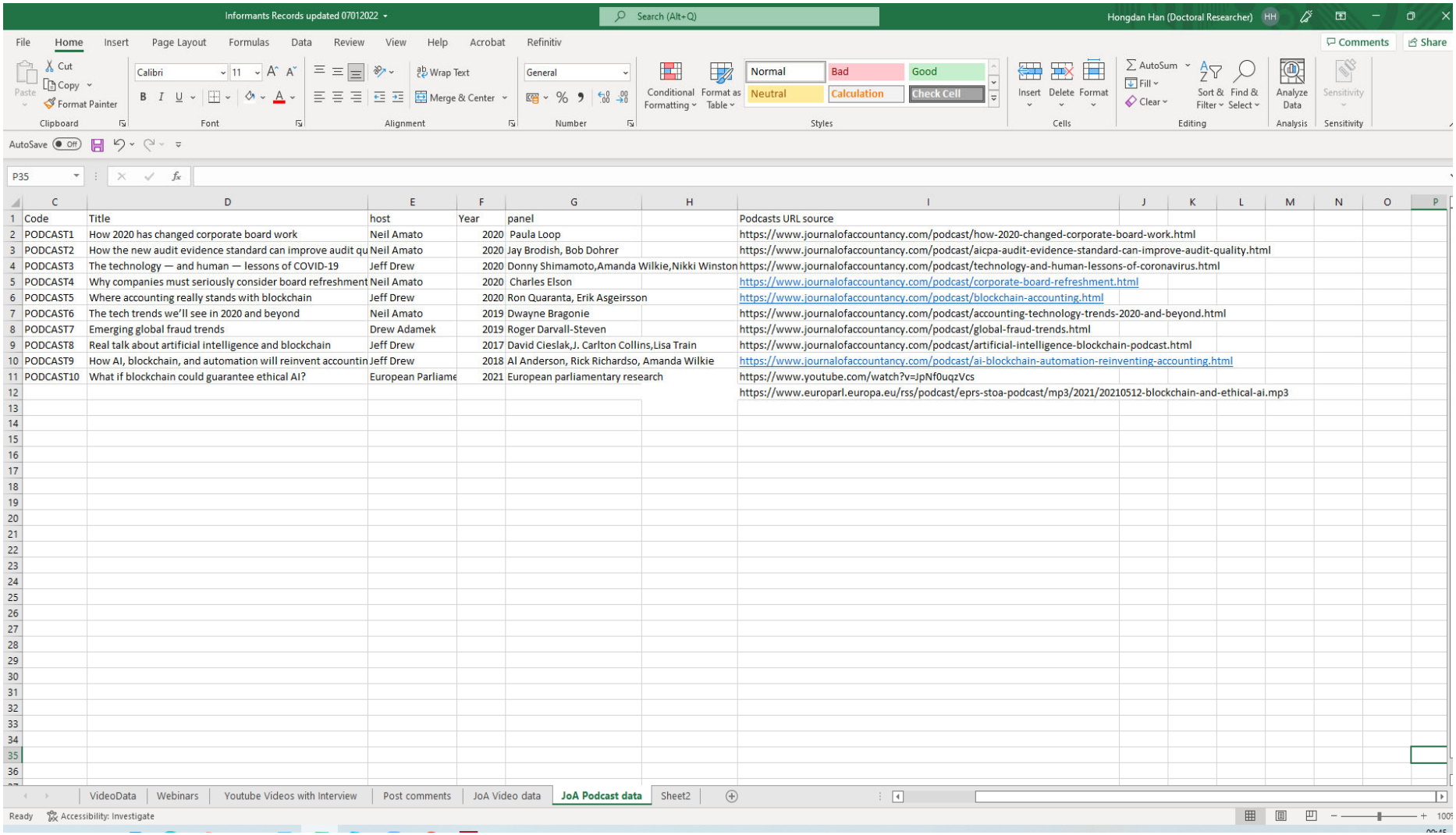


Code	Name	Expertise	Type	Channel	Views	Lengh	Video URL Source
V-P1	Juan Enriquez	Auther,academic, futurist	Video	TED2020	>1.3M	07:11	https://www.ted.com/talks/juan_enriquez_how_technology_changes_our_sense_of_right_and_wrong
V-P2	Genevieve Bell	Professor, anthoropologist	Video	TED2020	>1.6M	17:38	https://www.ted.com/talks/genevieve_bell_6_big_ethical_questions_about_the_future_of_ai
V-P3	Mainak Mazumdar	Data and research expert	Video	TED2020	>1.2M	09:51	https://www.ted.com/talks/mainak_mazumdar_how_bad_data_keeps_us_from_good_ai#t-5356
V-P4	Sylvain Duranton	Management Consultant	Video	TED2019	>2.2 M	13:59	https://www.ted.com/talks/sylvain_duranton_how_humans_and_ai_can_work_together_to_create_better_businesses
V-P5	Don Tapscott	Digital Strategist	Video	TED 2016	>5.9M	18:40	https://www.ted.com/talks/don_tapscott_how_the_blockchain_is_changing_money_and_business
V-P6	Bettina Warburg	Blockchain entrepreneure ar	Video	TED 2016	>4.1M	14:46	https://www.ted.com/talks/bettina_warburg_how_the_blockchain_will_radically_transform_the_economy
V-P7	Kriti Sharma	AI technologist	Video	TED 2018	>2.2M	12:01	https://www.ted.com/talks/kriti_sharma_how_to_keep_human_bias_out_of_ai
V-P8	Zeynep Tufekci	Techno-sociologist	Video	TED 2016	>1.7M	17:33	https://www.ted.com/talks/zeynep_tufekci_machine_intelligence_makes_human_morals_more_important
V-P9	Stuart Russell	AI expert	Video	TED2017	>1.5M	17:25	https://www.ted.com/talks/stuart_russell_3_principles_for_creating_safer_ai
V-P10	Sam Harris	Neuroscientist, Philosopher	Video	TED 2018	>5.5M	14:16	https://www.ted.com/talks/sam_harris_can_we_build_ai_without_losing_control_over_it
V-P11	Nick Bostrom	Philosopher	Video	TED 2015	>4.9M	16:17	https://www.ted.com/talks/nick_bostrom_what_happens_when_our_computers_get_smarter_than_we_are
V-P12	Jeremy Howard	Data scientst	Video	TED 2014	>2.6M	19:34	https://www.ted.com/talks/jeremy_howard_the_wonderful_and_terrifying_implications_of_computers_that_can_learn?referrer=playlist-new_tech_new_morals
V-P13	Tom Gruber	AI product designer	Video	TED 2017	>2.1 M	09:29	https://www.ted.com/talks/tom_gruber_how_ai_can_enhance_our_memory_work_and_social_lives?referrer=playlist-alternate_timelines_of_the_future
V-P14	Rachel Botsman	Trust Researcher	Video	TED 2016	>1.9M	16:59	https://www.ted.com/talks/rachel_botsman_we_ve_stopped_trusting_institutions_and_started_trusting_strangers
V-P15	Peter Eigen	Founder, transparency interr	Video	TED 2009	>888K	15:56	https://www.ted.com/talks/peter_eigen_how_to_expose_the_corrupt
V-P16	Kevin Kelly	Digital visinary	Video	TED 2016	>1.8M	13:29	https://www.ted.com/talks/kevin_kelly_how_ai_can_bring_on_a_second_industrial_revolution
V-P17	Markus Mutz	Entreprenuer, Supply chain i	Video	Ted 2019	>1.9M	13:20	https://www.ted.com/talks/markus_mutz_how_supply_chain_transparency_can_help_the_planet
V-P18	Paul Root Wolpe	Ethicist	Video	Ted 2010	>1.6 M	19:24	https://www.ted.com/talks/paul_root_wolpe_it_s_time_to_question_bio_engineering?referrer=playlist-new_tech_new_morals
V-P19	Avi Rubin	Computer Science Professor	Video	TED 2011	>1.3M	16:36	https://www.ted.com/talks/avi_rubin_all_your_devices_can_be_hacked?referrer=playlist-new_tech_new_morals#t-846
1							



Webniars

		Date	Organisor	Video Length	Panel	Video Link
Webinar1	Ethics & trust in Finance	09/03/2021	INSEAD Global Insitute	01:14:22	7	http://www.ethicsinfinance.org/2021/03/09/online-event/
Webinar2	Post-pandemic Leadership: Building Effective Boa	23/07/2021	Diligent	1hour	4	https://learn.diligent.com/AdaptingDigitalAge-BoardEffectivenessReplay.html
Webinar3	Incorporating Sustainability into your IT Strategy:	21-Jul-21	Citrix	60 Minutes	4	https://www.brighttalk.com/webcast/17266/490720?utm_campaign=communication_viewer_followup&utm_medium=email&utm_source=brighttalk-transact
Webinar4	Financial Regulatory Symposium 2021	29-30 June 20	CFA Institute	90 minutes	5	https://www.cfainstitute.org/research/multimedia/2021/financial-regulatory-symposium-2021?mkt_tok=MzU3LVRSSC05MzgAAAF-BuwJs52Gp8SS6w0fRA_rjQvucDkhWb5ni7
Webinar5	Building and securing the next generation agile er	22/04/2021	Forbes CIO	01:48:00	miltiple	https://www.forbes.com/sites/forbesvirtualciosummit/2021/03/09/2021-forbes-cio-summit-series-episode-2-building-and-securing-the-next-generation-agile-enterprise/
Webinar6	Digital transformation	19/04/2021	UK Fintech week 2021	46:26:00	5	https://www.pwc.co.uk/indus Transcipt ready on PWC website
Webinar7	Accelerate Through partnerships	21/04/2021	UK Fintech week 2021	01:31:45	4	https://www.pwc.co.uk/industries/financial-services/insights/highlights-from-uk-fintech-week-2021.html
Webinar8	FinTech Deals		UK Fintech week 2021	56:47:00	5	https://www.pwc.co.uk/industries/financial-services/insights/highlights-from-uk-fintech-week-2021.html
Webinar9	Scaling FinTechs		UK Fintech week 2021	58:45:00	5	https://www.pwc.co.uk/industries/financial-services/insights/highlights-from-uk-fintech-week-2021.html
Webinar10	The Future of Privacy	25-Jun-20	Bernard Marr &CO	01:00:24	4	https://www.youtube.com/watch?v=wUoB0PmxjfI
Webinar11	UK Natuional AI strategy 2021 on AI Ethics & Gover	11-Aug-21	House of Lords	58:14:00	2 chairs5 sp	https://www.youtube.com/watch?v=Zd677AVETsg
Webinar12	The Future of Blockchain Ethics	14/08/2020	Stanfordlawschool	01:04:18	7	https://www.youtube.com/watch?v=KLdb1qHzcwQ



Informants Records updated 07012022

Code	Title	host	Year	panel	Podcasts URL source
PODCAST1	How 2020 has changed corporate board work	Neil Amato	2020	Paula Loop	https://www.journalofaccountancy.com/podcast/how-2020-changed-corporate-board-work.html
PODCAST2	How the new audit evidence standard can improve audit qu	Neil Amato	2020	Jay Brodish, Bob Dohrer	https://www.journalofaccountancy.com/podcast/aicpa-audit-evidence-standard-can-improve-audit-quality.html
PODCAST3	The technology — and human — lessons of COVID-19	Jeff Drew	2020	Donny Shimamoto,Amanda Wilkie,Nikki Winston	https://www.journalofaccountancy.com/podcast/technology-and-human-lessons-of-coronavirus.html
PODCAST4	Why companies must seriously consider board refreshment	Neil Amato	2020	Charles Elson	https://www.journalofaccountancy.com/podcast/corporate-board-refreshment.html
PODCAST5	Where accounting really stands with blockchain	Jeff Drew	2020	Ron Quaranta, Erik Asgeirsson	https://www.journalofaccountancy.com/podcast/blockchain-accounting.html
PODCAST6	The tech trends we'll see in 2020 and beyond	Neil Amato	2019	Dwayne Bragonie	https://www.journalofaccountancy.com/podcast/accounting-technology-trends-2020-and-beyond.html
PODCAST7	Emerging global fraud trends	Drew Adamek	2019	Roger Darvall-Steven	https://www.journalofaccountancy.com/podcast/global-fraud-trends.html
PODCAST8	Real talk about artificial intelligence and blockchain	Jeff Drew	2017	David Cieslak,J. Carlton Collins,Lisa Train	https://www.journalofaccountancy.com/podcast/artificial-intelligence-blockchain-podcast.html
PODCAST9	How AI, blockchain, and automation will reinvent accountin	Jeff Drew	2018	Al Anderson, Rick Richardso, Amanda Wilkie	https://www.journalofaccountancy.com/podcast/ai-blockchain-automation-reinventing-accounting.html
PODCAST10	What if blockchain could guarantee ethical AI?	European Parliame	2021	European parliamentary research	https://www.youtube.com/watch?v=JpNf0uqzVcs
					https://www.europarl.europa.eu/rss/podcast/eprs-stoa-podcast/mp3/2021/20210512-blockchain-and-ethical-ai.mp3

Appendix 3 Research ethics risk assessment and management

Research Ethics Committee:

College of Business, Arts and Social Science

Cbass-ethics@brunel.ac.uk

Department: Business school

The impact of AI and blockchain adoption in corporate governance: ethical perspectives

RESEARCH ETHICS RISK ASSESSMENT AND MANAGEMENT

For Completion by the Researcher:

Identified Risks	**Likelihood**	**Potential Impact/Outcome**	**Risk Management/Mitigating Factors**
Identify the risks/hazards present	**High/Medium/Low**	**Who might be harmed and how?**	**Evaluate the risks and decide on the precautions, e.g., Health & Safety**
Semi-structured interviews (online)	Low	There are no anticipated disadvantages or risks associated with taking part in this study	There are not any lifestyle restrictions involved in this study. The risk is mitigated using online platforms
Netnography inquiry (online)	Low	There are no anticipated disadvantages or risks associated with taking part in this study	There are not any lifestyle restrictions involved in this study. The risk is mitigated using online platforms

Appendix 4 Participant Information Sheet

PARTICIPANT INFORMATION SHEET

Study title: The impact of AI and Blockchain Adoption in Corporate Governance: Ethical Perspectives

Invitation Paragraph:

You are asked to take part in a research study. Before you decide, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask me if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part. Thank you for reading this.

What is the purpose of the study?

AI and blockchain are believed to be able to make many changes in corporate governance. Blockchain offers a novel way of recording, sharing, and validating transaction information to fundamentally improve transparency and trust, and revise power and control. AI can support problem-solving and augment decision-making to enhance monitory and efficiency.

As such, the purpose of this study is to investigate the impact of AI and blockchain adoption in corporate governance from ethical perspectives.

Based on the aim of the research, this empirical investigation sets out to provide a deep understanding of the ethical benefits of using AI and blockchain based on their unique features and new capabilities, and the ethical issues companies will encounter when using these technologies to automate processes, and to further explicate how companies can govern the ethical use of these technologies to mitigate misuse and unwanted consequences to deliver growth and benefits for the society.

The duration of the data collection, analysis, and interpretation process will last approximately 10 months.

Why have I been invited to participate?

Our selection criteria for participants:

1. Participant who understands and works with AI and blockchain technologies, are familiar with those two technologies, and can comment on their ethical implications on businesses and people
2. Participant is willing to share their experience, thoughts on how to use these technologies in a socially responsible way to mitigate misuse and unwanted consequences.

Do I have to take part?

Participation is entirely voluntary. It is up to you to decide whether or not to take part. If you do decide to take part, you will be given this information sheet to keep and you may be

asked to sign a consent form. If you decide to take part, you are still free to withdraw at any time up until 30 Sep 2022 and without having to give a reason.

What will happen to me if I take part?

The interview spans around 45-90 minutes. The interview will be online via MsTeam, Zoom or Google Meet. This Participant Information Sheet, along with Consent form and predefined interview questions will be emailed to participants prior meeting. Researchers will take notes during and after the interview.

Are there any lifestyle restrictions?

There are not any lifestyle restrictions involved in this study.

What are the possible disadvantages and risks of taking part?

There are no anticipated disadvantages or risks associated with taking part in this study.

What are the possible benefits of taking part?

The findings of the research outcomes could be shared with participants upon request.

What if something goes wrong?

The person to be contacted if the participant wishes to complain about the experience should be the Chair of the College of Business, Arts and Social Sciences Research Ethics Committee– Professor David Gallear (David.Gallear@brunel.ac.uk)

Will my taking part in this study be kept confidential?

All information which is collected about you during the course of the research will be kept strictly confidential. The data will be kept and stored in the secure password protected Brunel network drive or locked file until 30th Sep 2022. Any information about you which leaves the University will have all your identifying information removed. With your permission, anonymised data will be stored and may be used in future research – you can indicate whether or not you give permission for this by way of the Consent Form.

Will I be recorded, and how will the recording be used?

The online interviews will be recorded only if permitted and agreed by participants. The recordings will be transcribed into textual data for analysis with anonymised participant identity.

What will happen to the results of the research study?

The results of the research will be used as part of my PhD thesis and publications at academic journals.

The participants will not be identified in any report or publication unless they specifically request it.

Who is organising and funding the research?

The research is being organised by Hongdan Han in conjunction with Brunel University London.

What are the indemnity arrangements?

Brunel University London provides appropriate insurance cover for research which has received ethical approval.

Who has reviewed the study?

College of Business, Arts and Social Sciences Research Ethics Committee

Research Integrity

Brunel University London is committed to compliance with the Universities UK Research Integrity Concordat. You are entitled to expect the highest level of integrity from the researchers during the course of this research.

Contact for further information and complaints:

Researcher name and details: Hongdan Han (Hongdan.han@brunel.ac.uk)

Supervisor name and details: Radha Shiwakoti (Radha.Shiwakoti@brunel.ac.uk)

For complaints, Chair of the Research Ethics Committee: Professor David Gallear (David.Gallear@brunel.ac.uk)

Appendix 5 Consent form

CONSENT FORM

The impact of AI and Blockchain Adoption on Corporate Governance: Ethical Perspectives

Name of Principal Investigator: Hongdan Han

APPROVAL HAS BEEN GRANTED FOR THIS STUDY TO BE CARRIED OUT BETWEEN 01/04/2021 AND 30/09/2022

The participant (or their legal representative) should complete the whole of this sheet.		
	YES	NO
Have you read the Participant Information Sheet?	☐	☐
Have you had an opportunity to ask questions and discuss this study? (via email/phone for electronic surveys)	☐	☐
Have you received satisfactory answers to all your questions? (via email/phone for electronic surveys)	☐	☐
Who have you spoken to about the study?		
Do you understand that you will not be referred to by name in any report concerning this study?	☐	☐
Do you understand that:		
• You are free to withdraw from this study at any time	☐	☐
• You don't have to give any reason for withdrawing	☐	☐
• Choosing not to participate or withdrawing will not affect your rights?	☐	☐
• You can withdraw your data any time up to 30/09/2022	☐	☐
I agree to my interview being audio and video recorded	☐	☐
I agree to the use of non-attributable quotes when the study is written up or published	☐	☐
The procedures regarding confidentiality have been explained to me	☐	☐
I agree that my anonymised data can be stored and shared with other researchers for use in future projects.	☐	☐
I agree to take part in this study.	☐	☐

Signature of research participant:	
Print name:	Date:

Appendix 6 Guided interview questions

Predefined Interview Questions

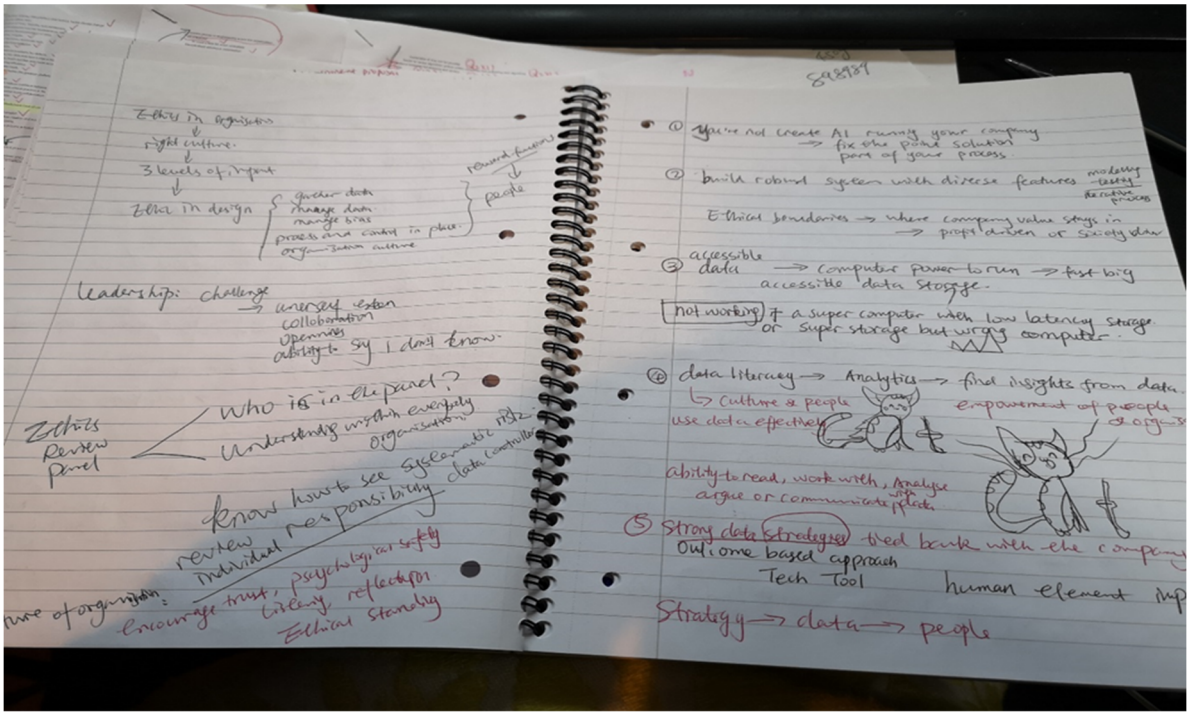
The primary aim of the research is to study the impact of AI and blockchain adoption in corporate governance from ethical perspectives.

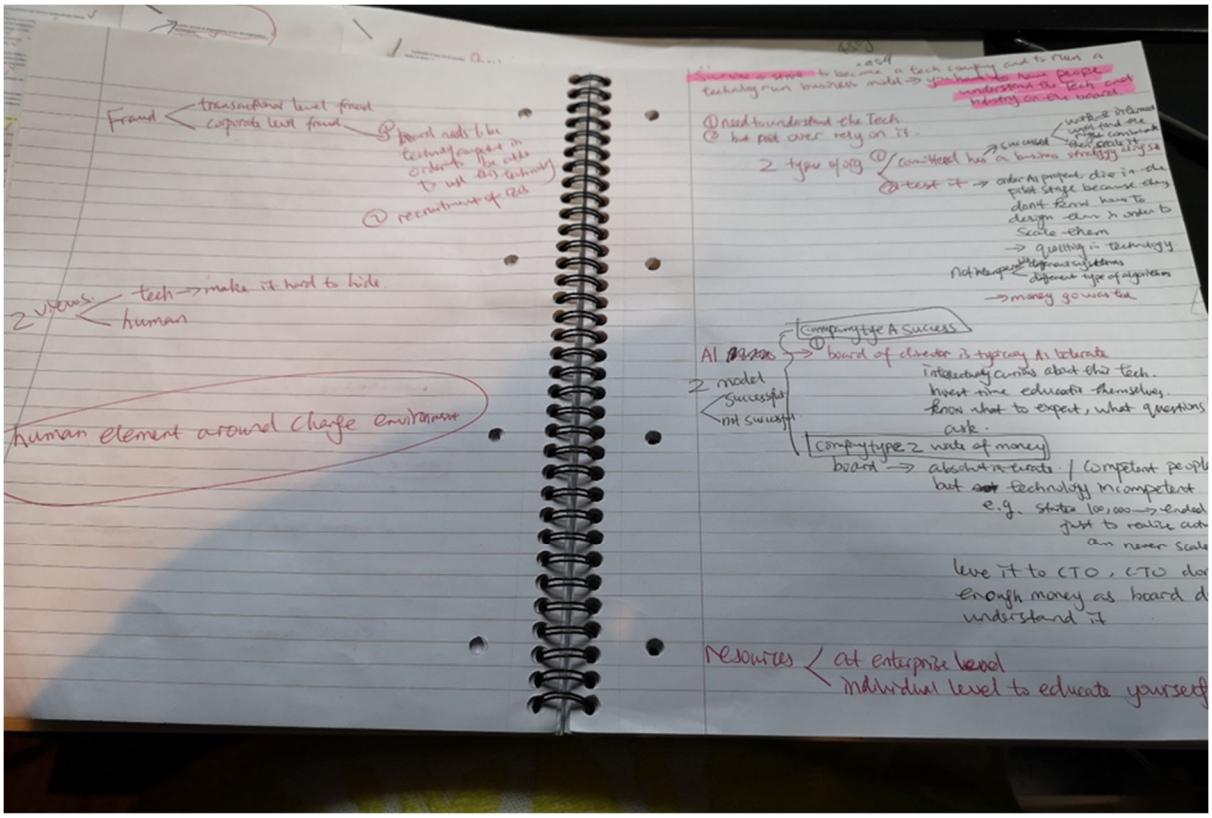
Based on the aim of the research, this empirical investigation sets out to provide a deep understanding of the ethical benefits of using AI and blockchain based on their unique features and new capabilities, and the ethical issues companies will encounter when using these technologies to automate processes, and to further explicate how companies can govern the ethical use of these technologies to mitigate misuse and unwanted consequences to deliver growth and benefits for the society.

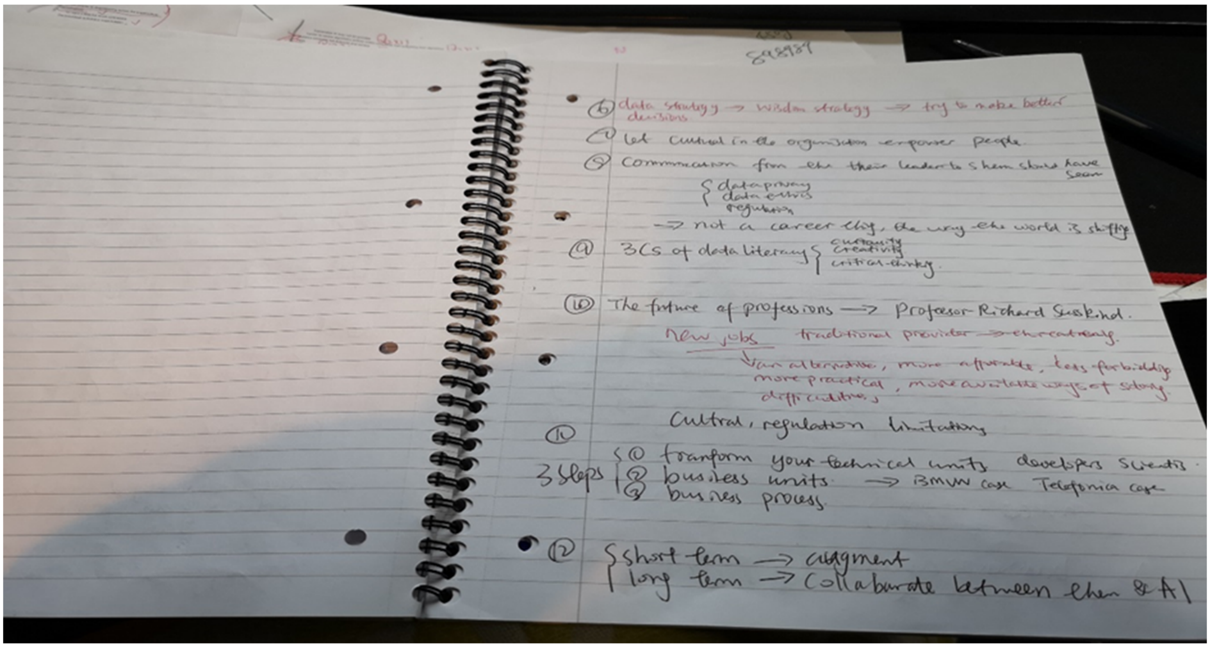
Q1	What is your general view of AI technology and blockchain technology?
Q2	In your opinion, will blockchain and AI shift the future of financial records and analysis in the corporate governance ecosystems?
Q3	What would be the promising benefits that businesses are looking to achieve using blockchain and AI?
Q4	When companies use AI to detect anomaly activities, and blockchain to offer transparency, in your opinion, would the use of these technologies reduce the opportunities for unethical behaviour or moral hazards from top management, and enhance their ethical decision-making since any suspicious transactions will be detected in real-time?
Q5	Do you think the decentralized protocol powered by blockchain technology that enhances transparency would foster ethical practice in financial aspects of corporate governance and restore trust in the public?
Q6	Will the use of blockchain and AI technology empower managers to work more closely with shareholders with aligned interests, and promote more collaboration and participants from different stakeholders?
Q7	The promising feature of AI and blockchain technologies is the automation, which will streamline business processes and cause changes in business model, which will upend our existing social reality guided by institutional values, beliefs, and rules, do you think organizations need to have a proper digital culture to respond to these technological pressures to govern the development and deployment of digital technology and data?
Q8	What do you think are the ethical issues the companies would encounter regarding the use of AI and blockchain technology?
Q9	In your opinion, how can companies govern the use of AI and blockchain to tackle these ethical issues?

Thank you very much for your time sharing your thoughts with me on this topic.

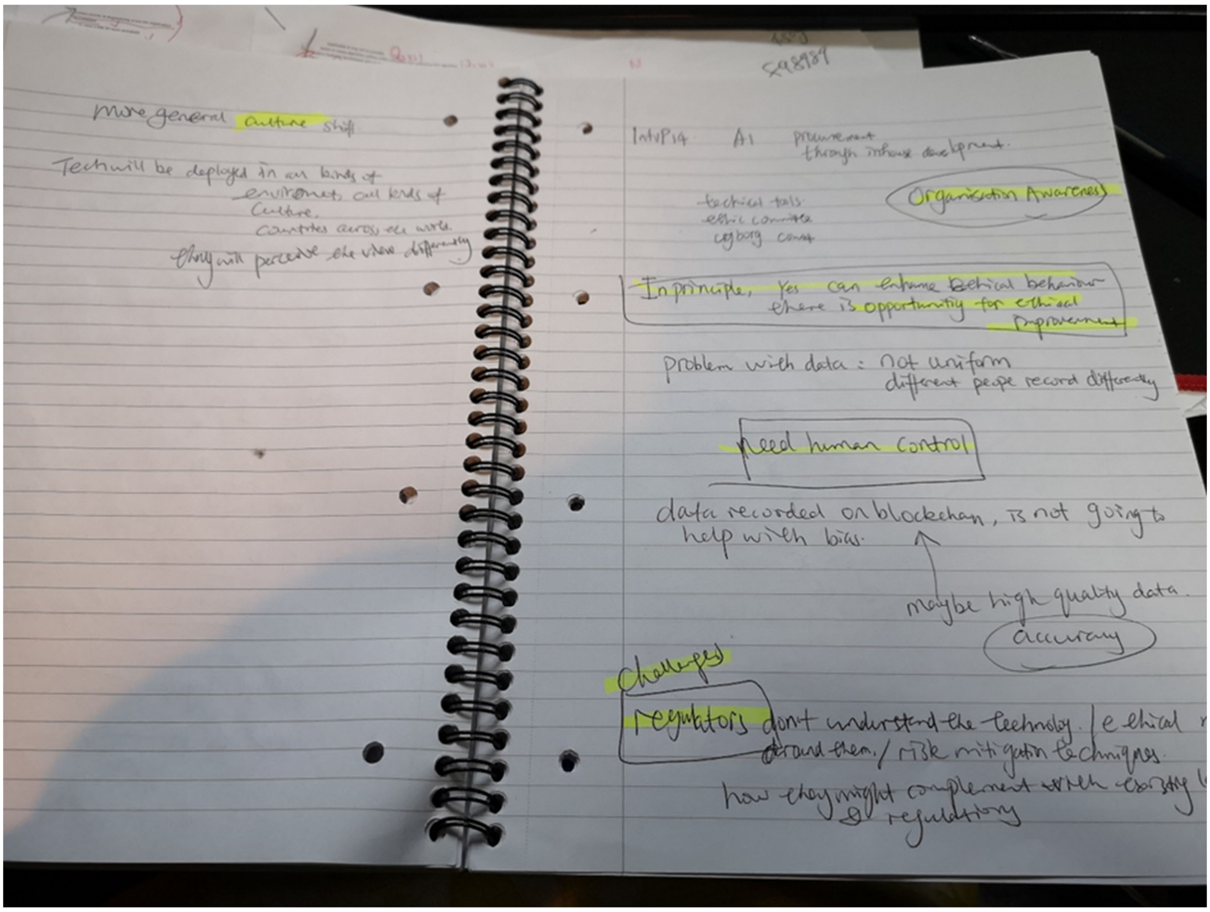
Appendix 7 Research notes from interviews



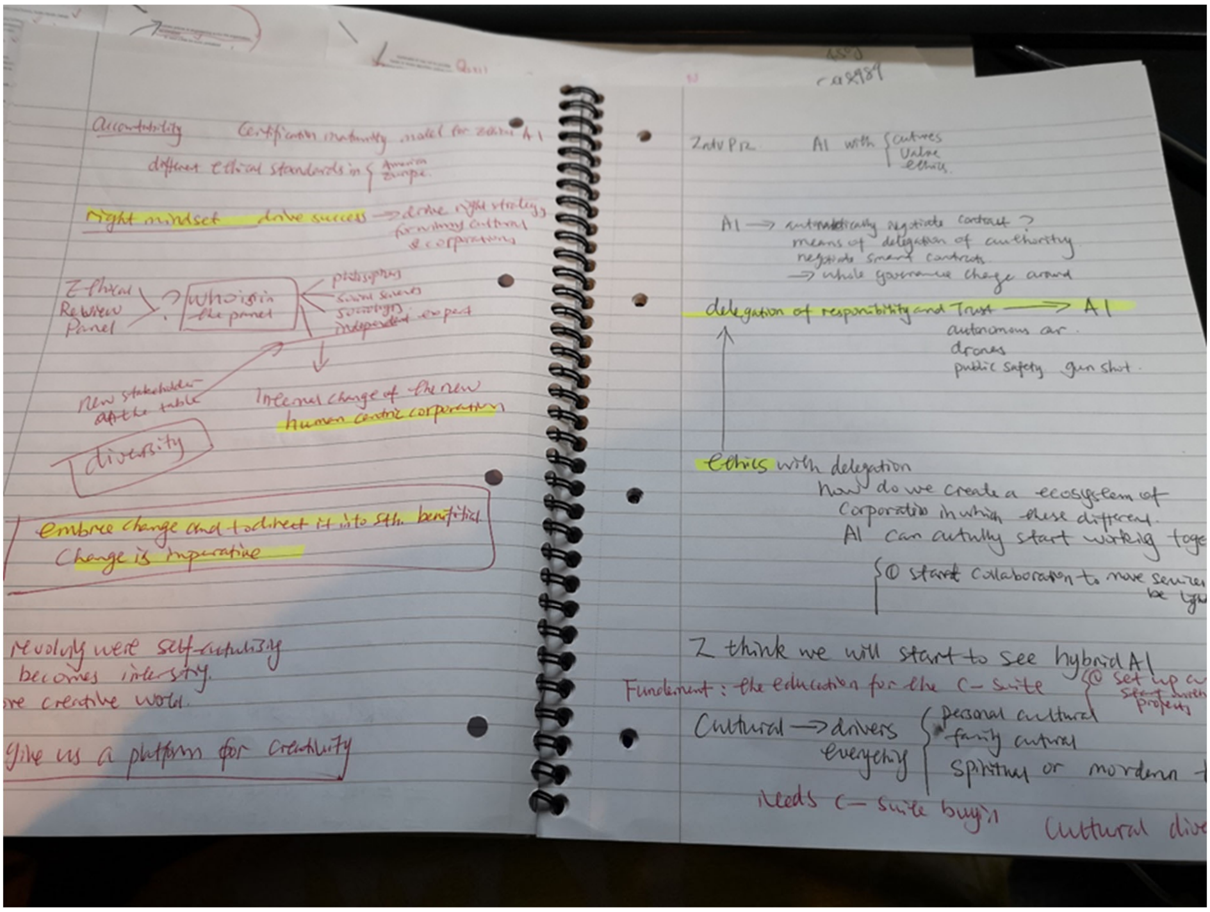


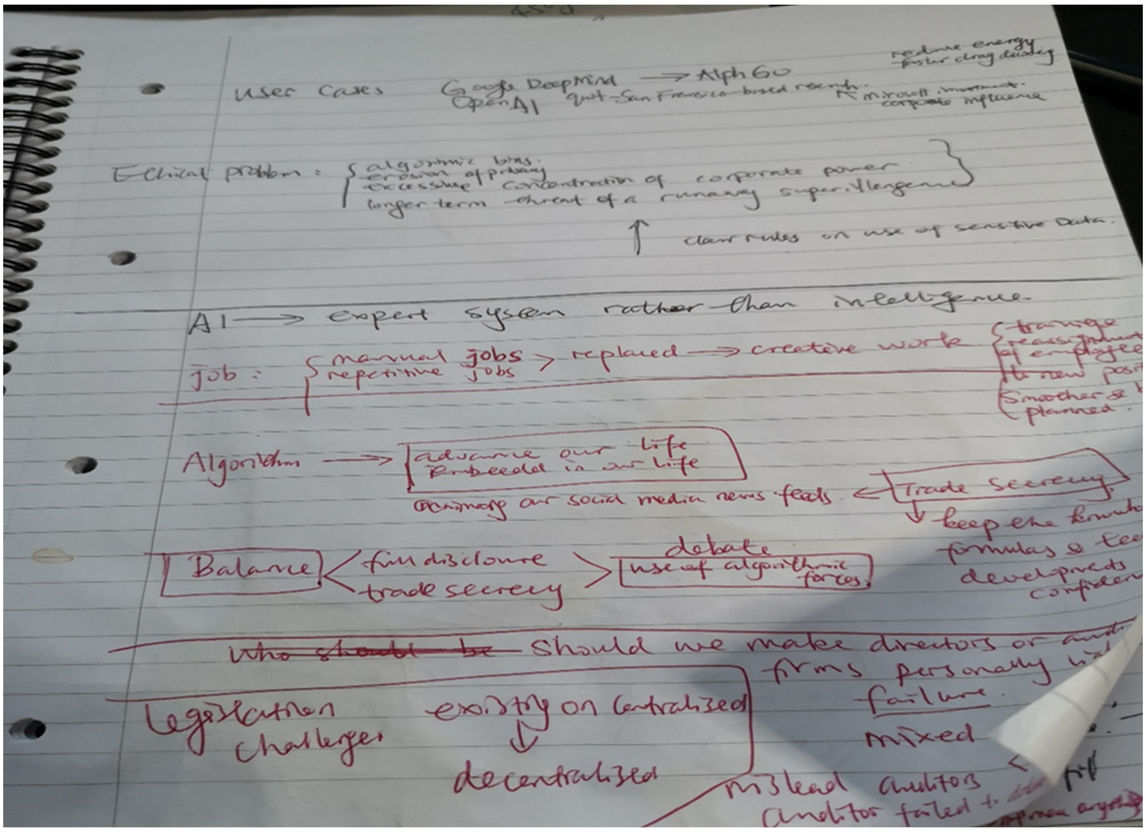


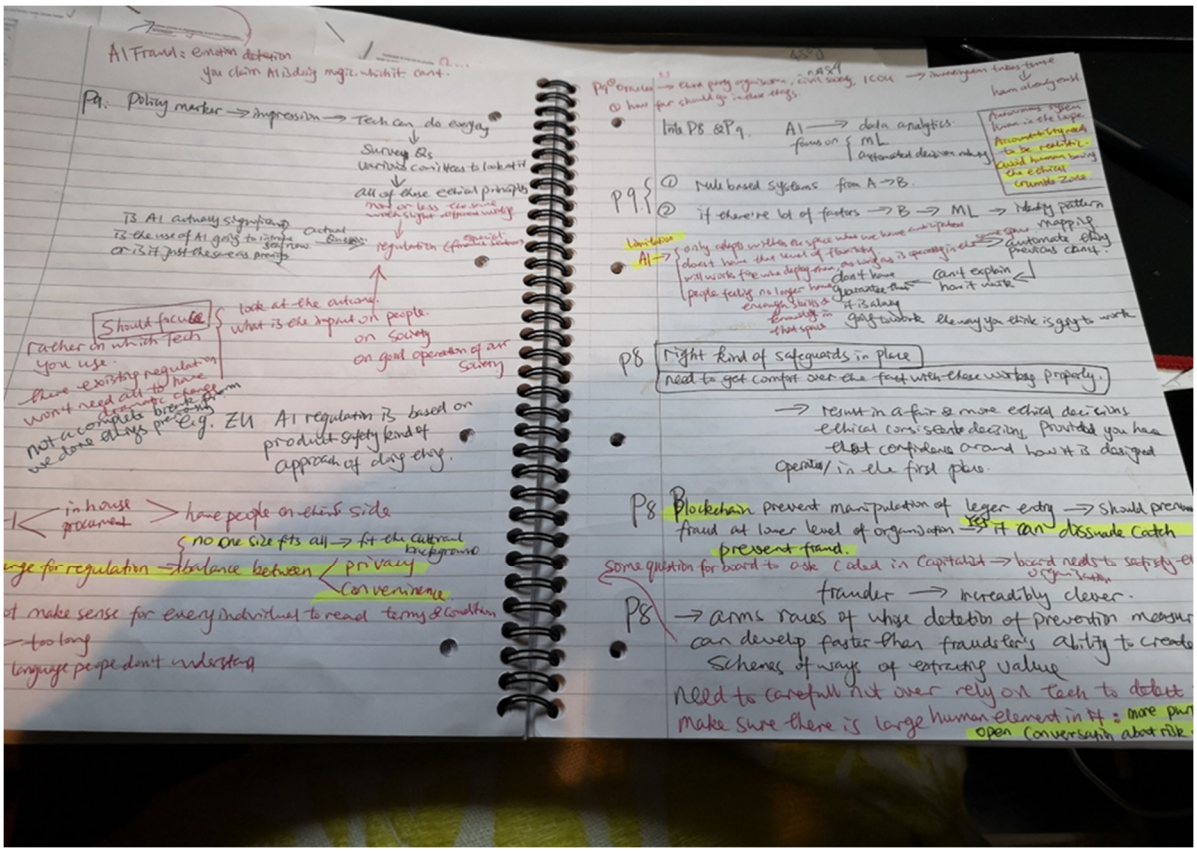
⑥ data strategy → wisdom strategy → try to make better decisions
⑦ let cultural in the organization empower people
⑧ Communication from the their leader to them should have seen
data privacy
data ethics
regulations
→ not a career thing, the way the world is shifting
⑨ 3Cs of data literacy
curiosity
creativity
critical thinking
⑩ The future of professions → Professor Richard Susskind.
new jobs
traditional provider
⑪ Cultural, regulation limitations
3 steps
① tranform your technical units developers scientists
② business units → BMW case Telefonica case
③ business process
⑫ short term → augment
long term → collaborate between them & AI

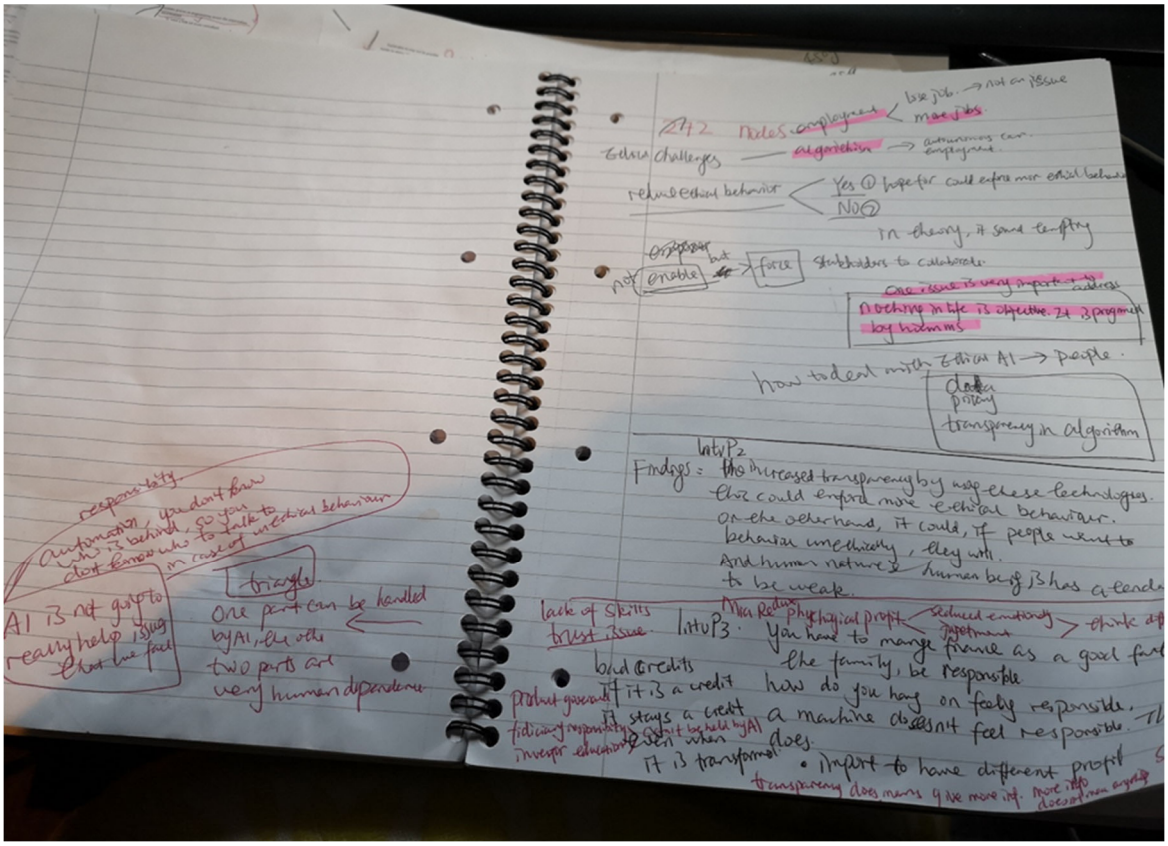


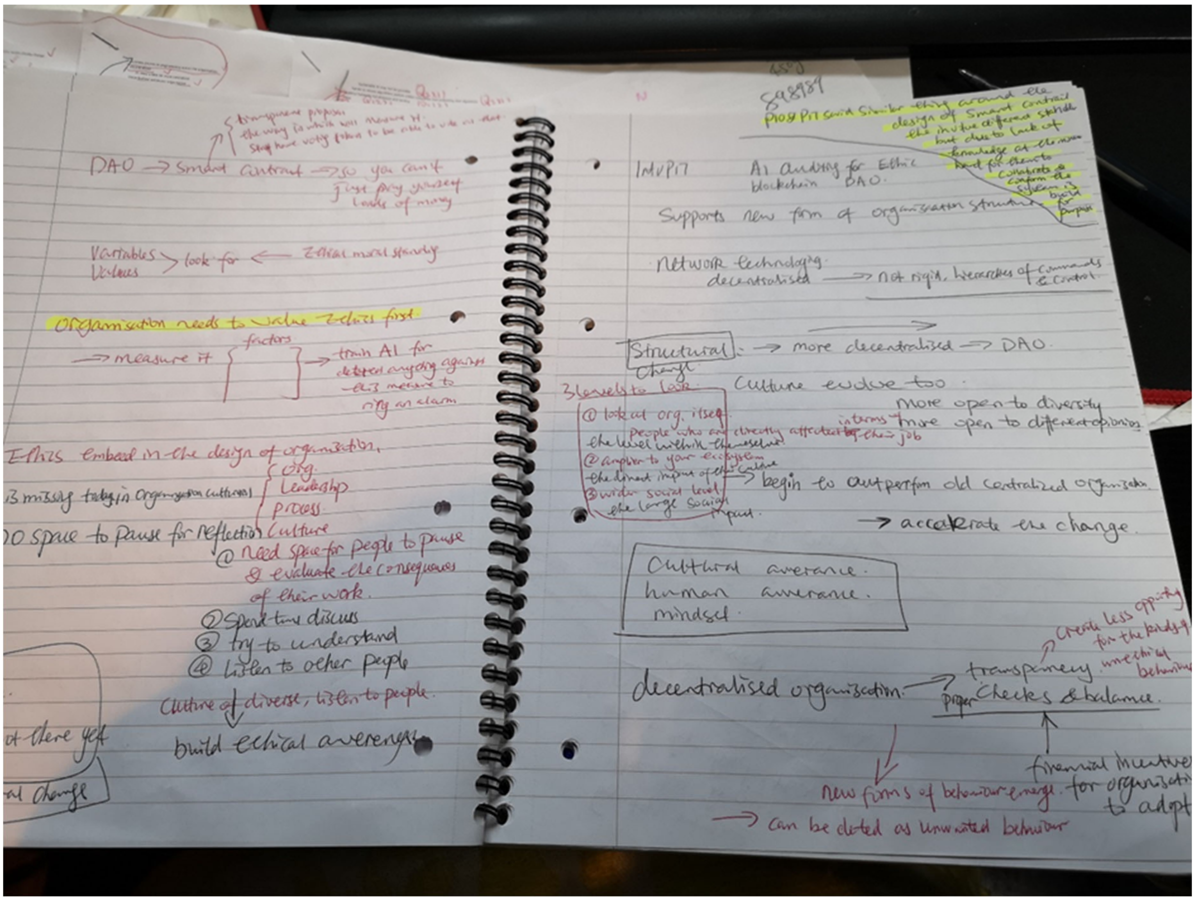
more general culture shift
Tech will be deployed in all kinds of environment, all kinds of culture.
countries across the world
they will perceive the view differently
Organization Awareness
In principle, yes can enhance ethical behavior
there is opportunity for ethical improvement
problem with data: not uniform
different people record differently
need human control
data recorded on blockchain, is not going to help with bias.
maybe high quality data.
accuracy
challenges
regulators don't understand the technology
risk mitigation techniques.
how they might complement with existing regulations

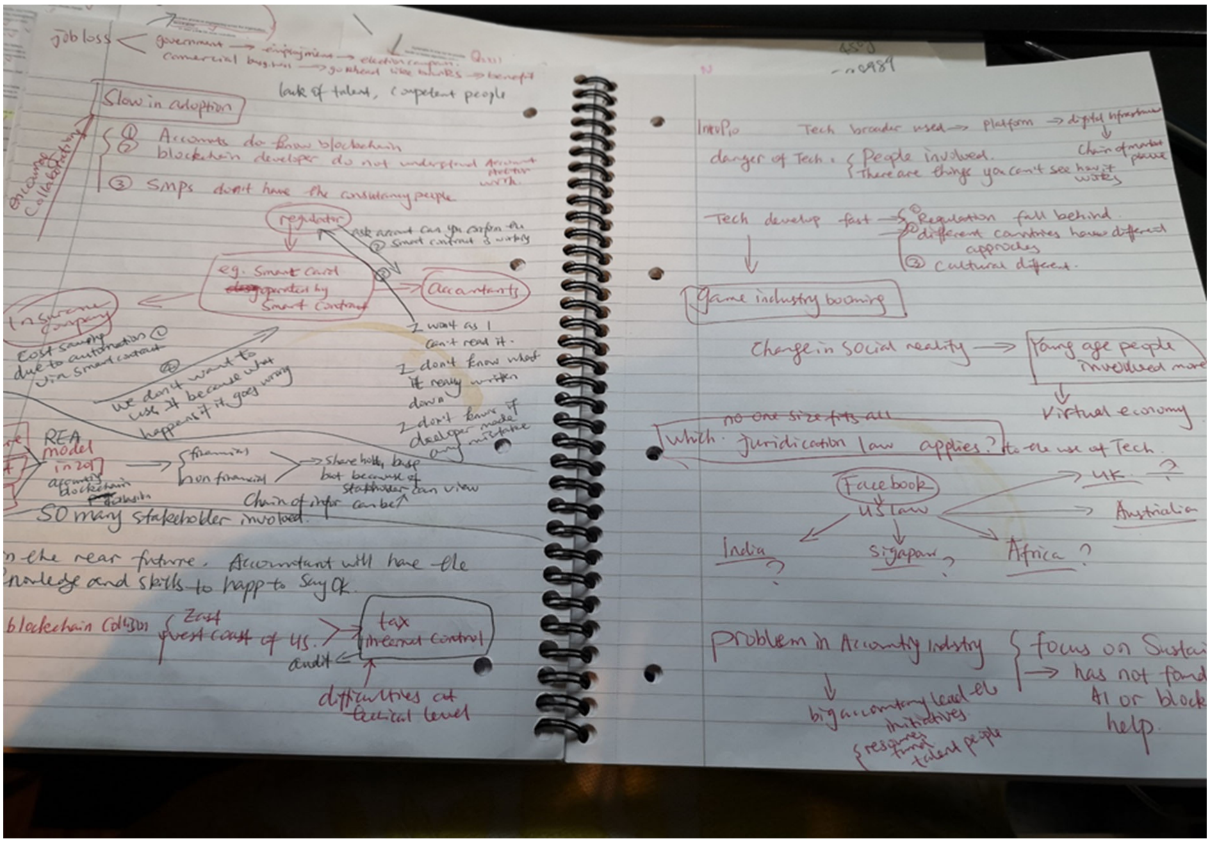

accountability
different ethical standards in America Europe
Right mindset drive success
Ethical Review Panel
who is in the panel
philosophers
diversity
internal change of the new human centric corporation
embrace change and to direct it into sth beneficial
Change is imperative
give us a platform for creativity
AI with cultures Value ethics
delegation of responsibility and Trust → AI
autonomous car
drones
public safety gun shot
Ethics with delegation
how do we create a ecosystem of corporation in which these different AI can actually start working toge
I think we will start to see hybrid AI
Cultural → drivers everything
personal cultural
family cultural
spiritual or mordern
needs C-Suite buy in
Cultural div


User Cases
Google DeepMind → AlphGo
OpenAI
Ethical problem:
algorithmic bias
erosion of privacy
excessive concentration of corporate power
longer term threat of a runaway superintelligence
clear rules on use of sensitive Data.
AI → expert system rather than intelligence
job: manual jobs repetitive jobs > replaced → creative work
Algorithm → advance our life Embedded in our life
Trade secrecy
keep the formulas & tec developed confiden
Balance < full disclosure trade secrecy
debate
use of algorithmic forces
Should we make directors or firms personally liable
failure
mixed
Legislation challenges
existing on centralized
decentralized
mislead auditors
Auditor failed to

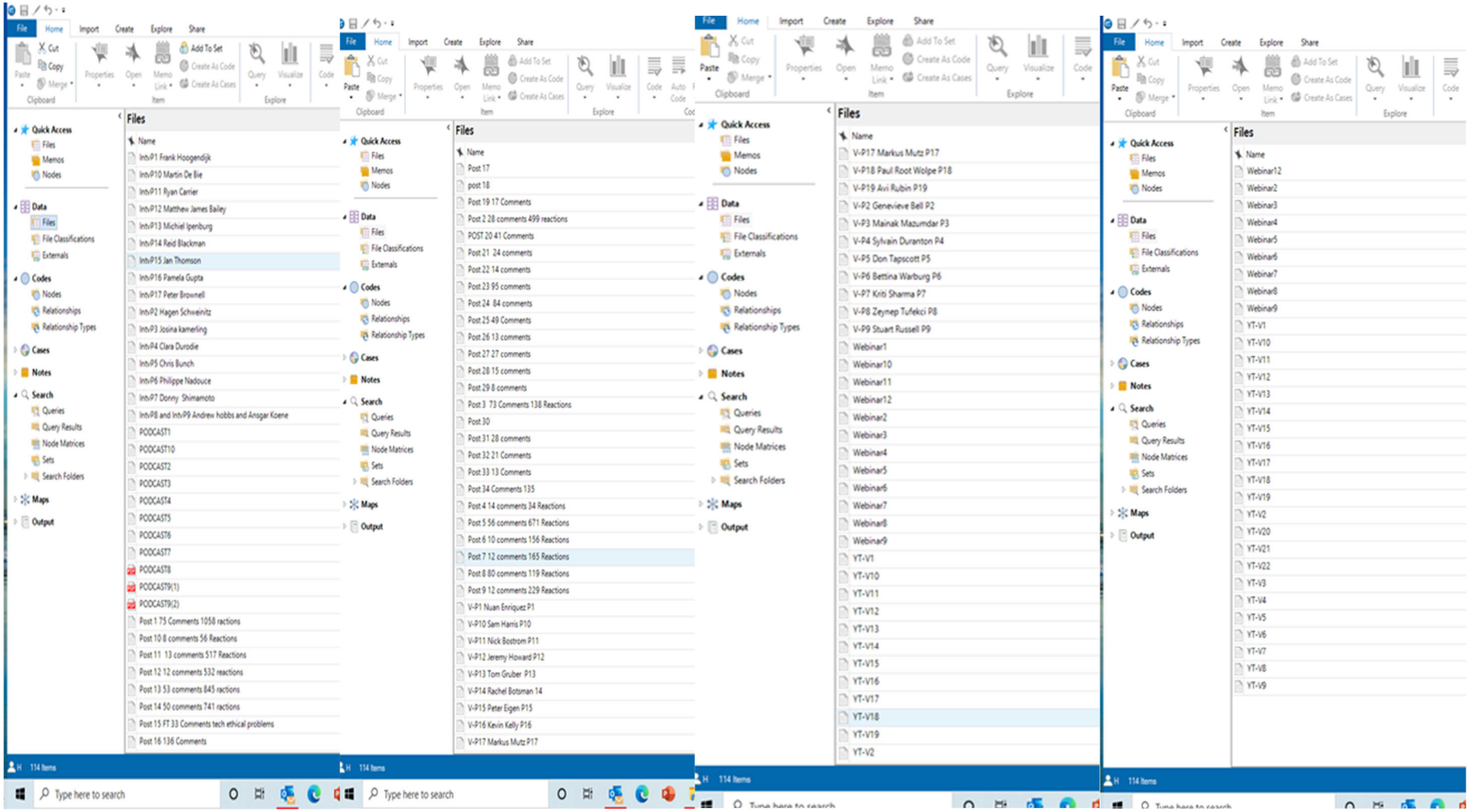




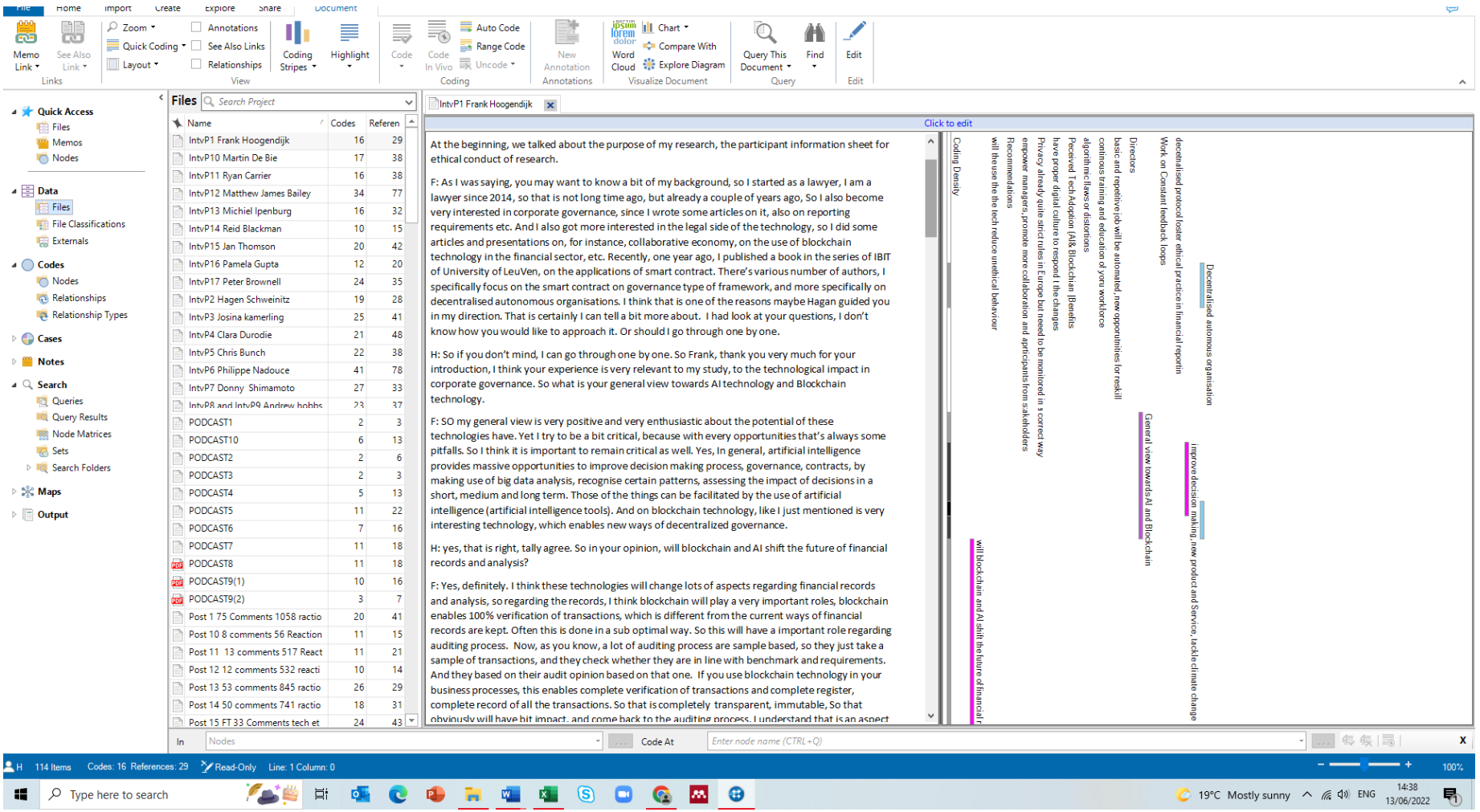

DAO → Smart contract → so you can't just pay yourself loads of money
Variables / Values > look for ← Ethical moral standards
Organisation needs to value Ethics first
→ measure it
train AI for detect anything against → measure to ring an alarm
Ethics embed in the design of organisation
org. / leadership / process / culture
No space to pause for reflection
① need space for people to pause & evaluate the consequences of their work.
② spend time discuss
③ try to understand
④ listen to other people
culture of diverse, listen to people
build ethical awareness
AI auditing for Ethic blockchain DAO.
Supports new form of organisation structure
network technology decentralised → not rigid, hierarchies of commands & control
Structural change → more decentralised → DAO.
3 levels to look
① look at org. itself
culture evolve too.
more open to diversity
more open to different opinions
begin to outperform old centralized organization
→ accelerate the change.
Cultural awareness.
human awareness.
mindset.
decentralised organisation → transparency
proper checks & balance.
financial incentive for organisation to adopt
new forms of behaviour emerge
→ can be dicted as unwanted behaviour

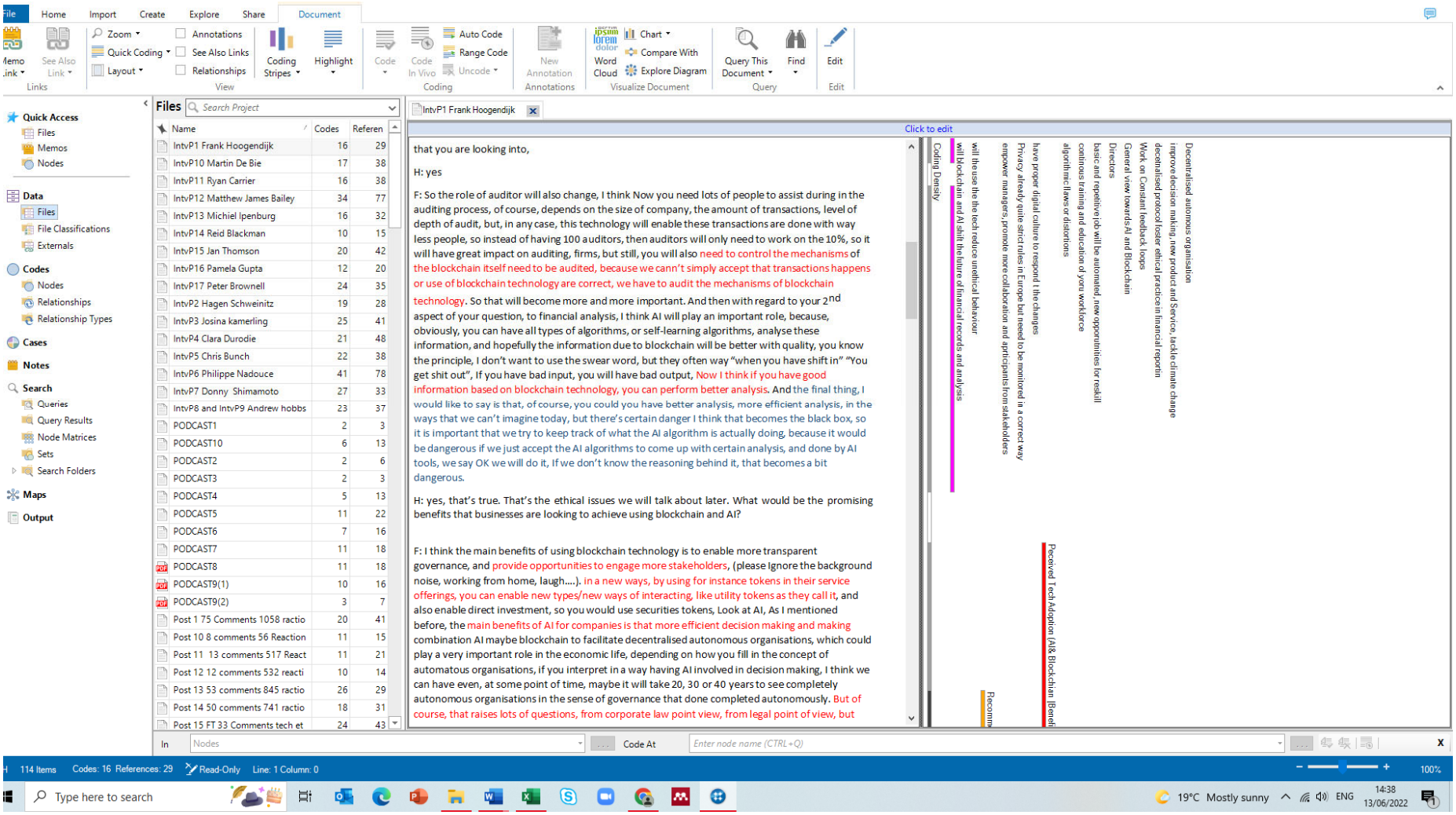

Job loss
lack of talent, competent people
Slow in adoption
① Accountants do know blockchain
② blockchain developer do not understand Accountant
③ SMPs don't have the consultancy people
regulator
Accountants
Insurance company
cost saving due to automation
we don't want to use it because what happens if it goes wrong
REA model
financial
non financial
so many stakeholder involved.
In the near future. Accountant will have the knowledge and skills to happy to say ok.
blockchain collision
tax
audit
difficulties at technical level
danger of Tech. { People involved. There are things you can't see how it works
Tech develop fast → Regulation fall behind / different countries have different approaches / cultural different.
Game industry booming
Change in social reality → Young age people involved more
Virtual economy
no one size fits all
which jurisdiction law applies? to the use of Tech.
Facebook
US law
UK
Australia
India
Sigapore
Africa
Problem in Accounting Industry
focus on Sustain
has not found AI or block help.
big accountancy lead the initiatives

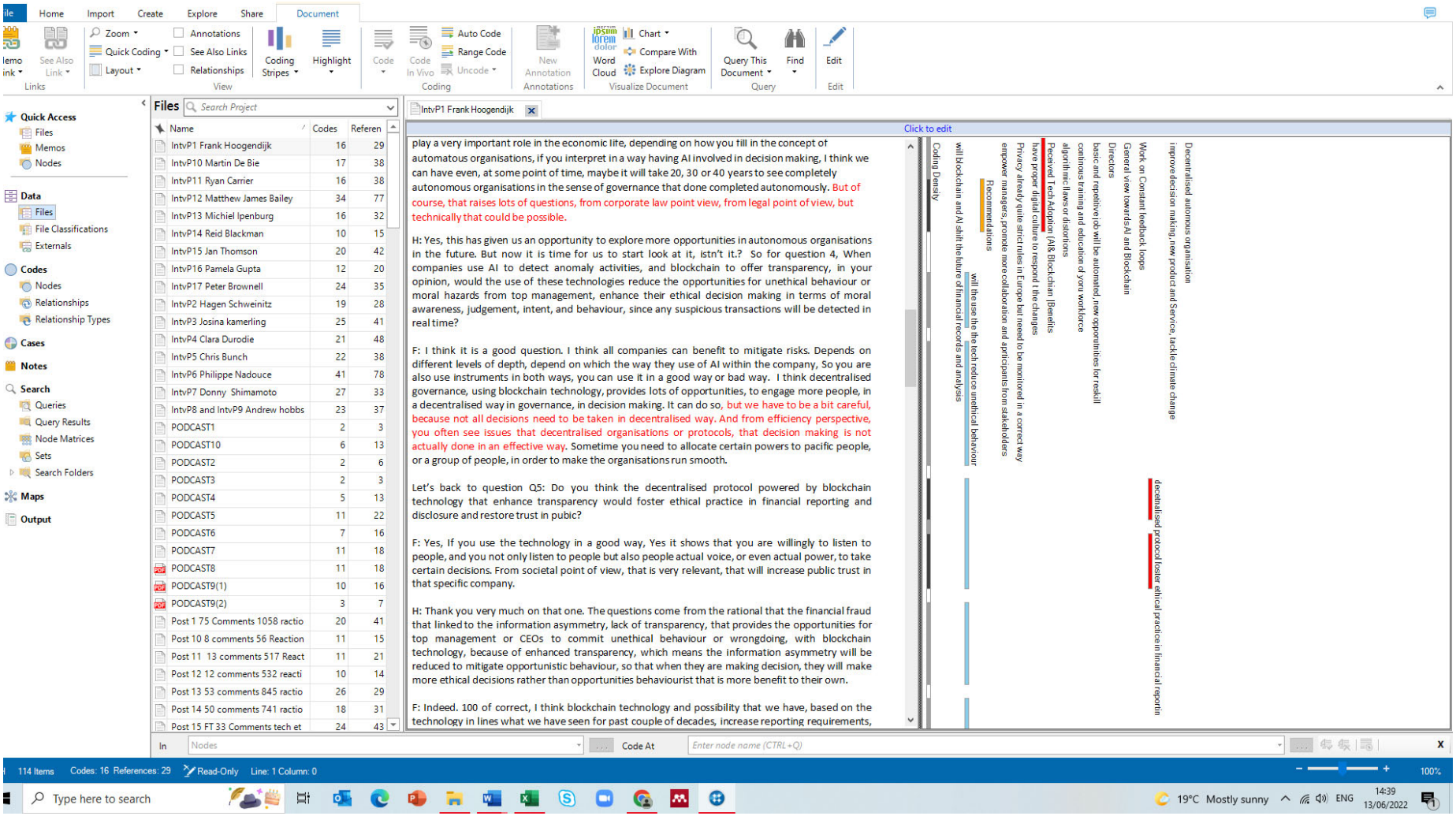
Appendix 8 Data files imported in NVivo

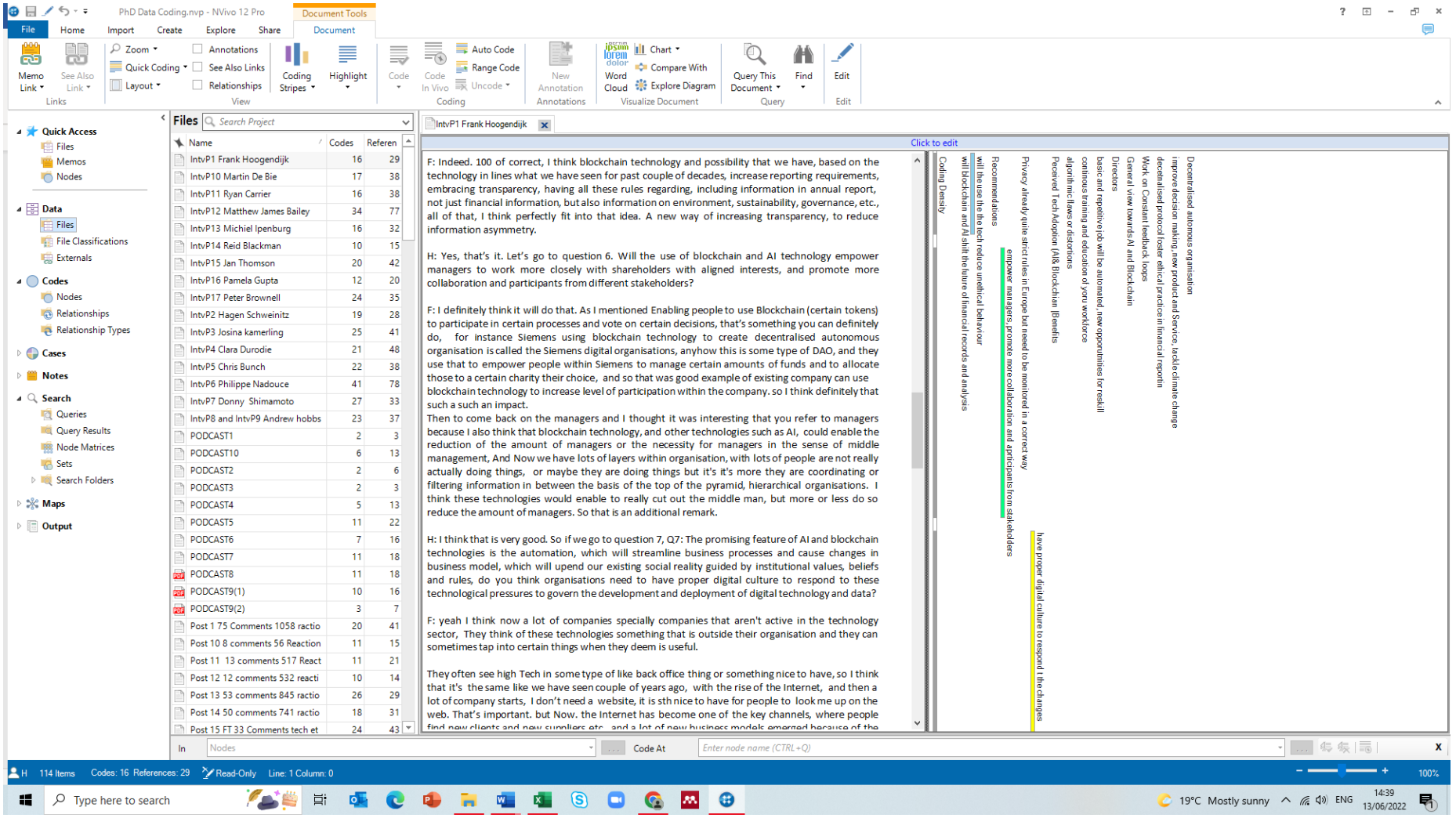


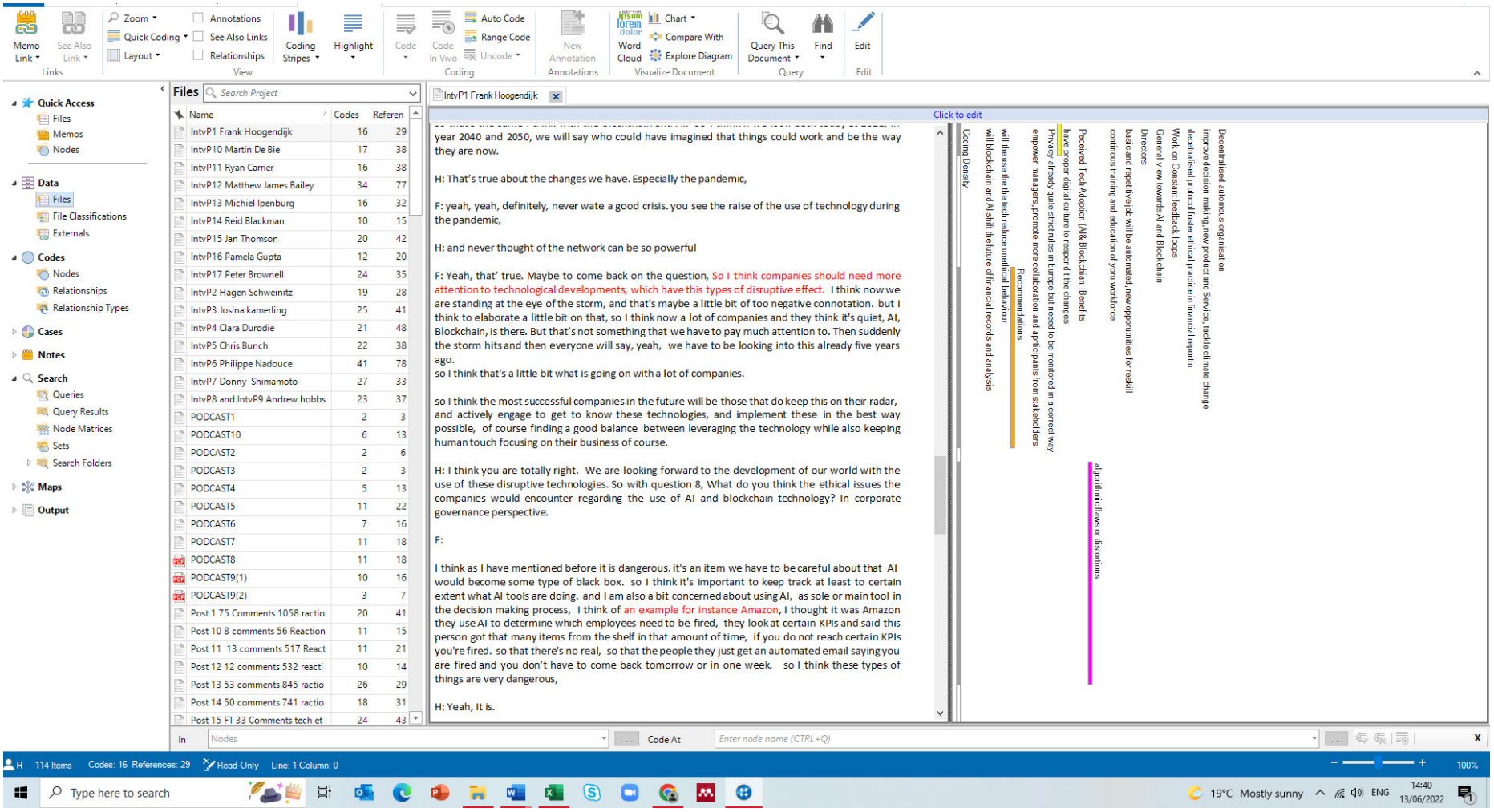
Appendix 9 Evidence of an example of coding visualized in coding stripes

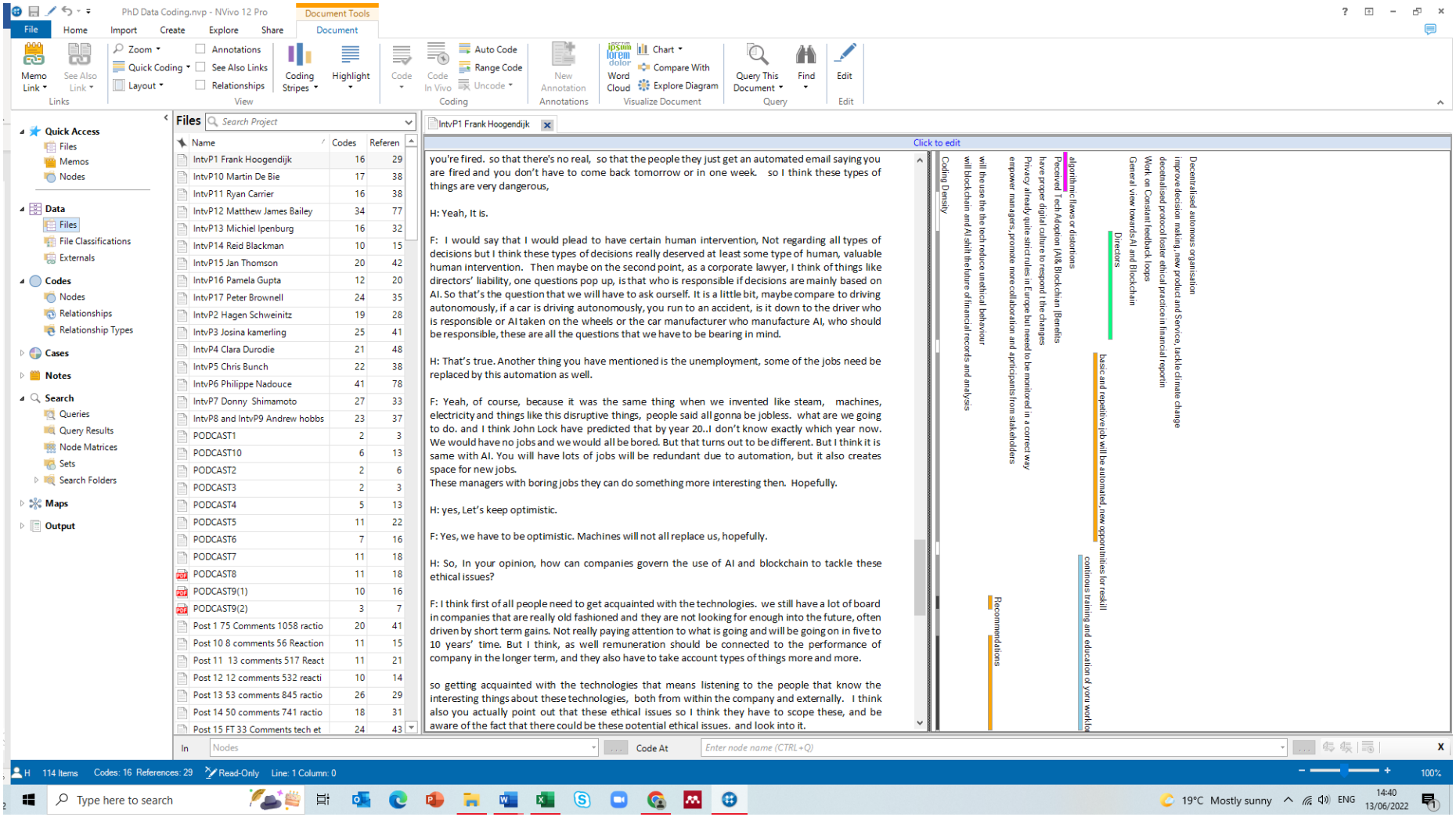


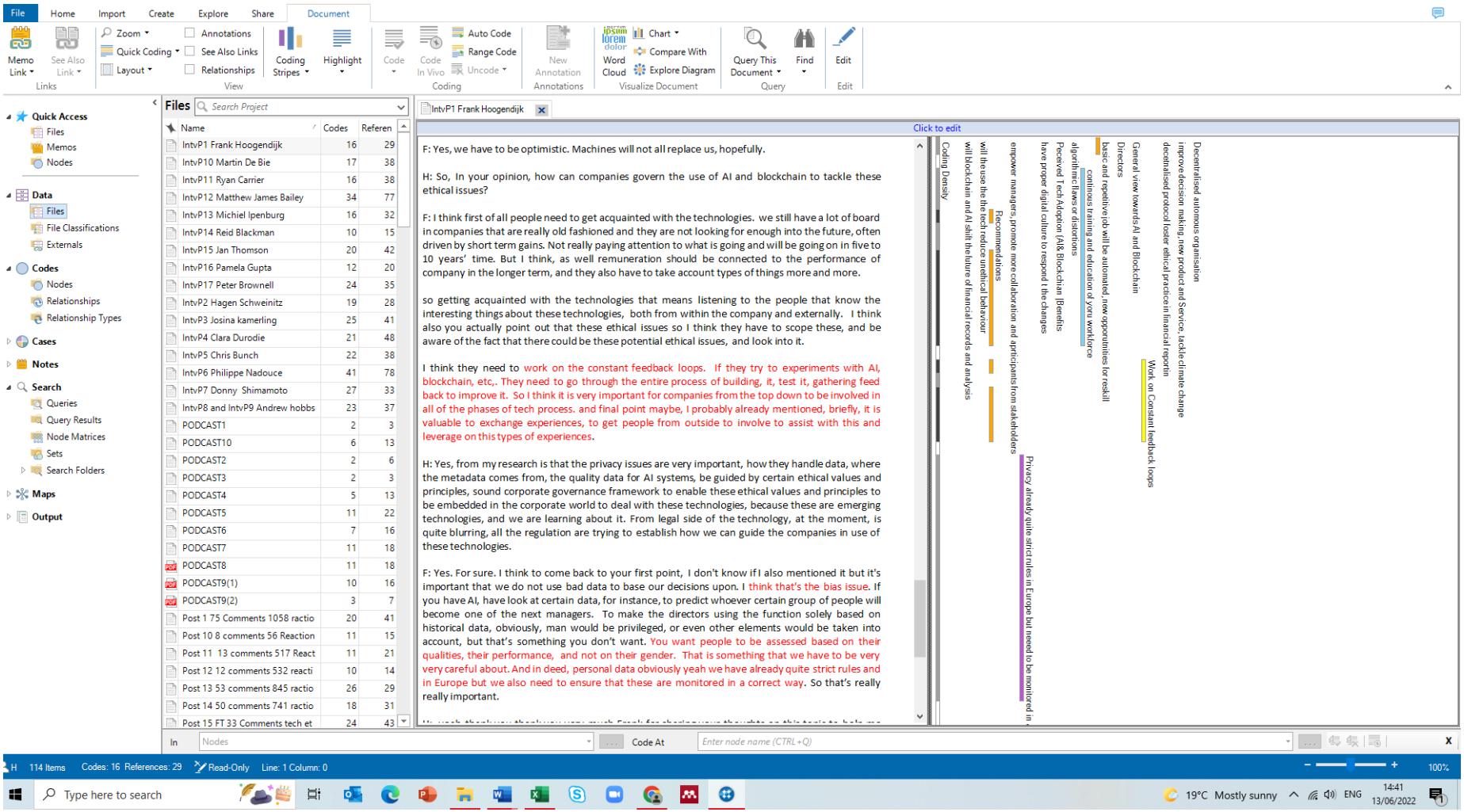

File
Home
Import
Create
Explore
Share
Document
Zoom
Quick Coding
Layout
Annotations
See Also Links
Relationships
Coding Stripes
Highlight
Auto Code
Range Code
Uncode
Code
Code In Vivo
New Annotation
Word Cloud
Chart
Compare With
Explore Diagram
Query This Document
Find
Edit
Links
View
Coding
Annotations
Visualize Document
Query
Edit
Quick Access
Files
Memos
Nodes
Data
Files
File Classifications
Externals
Codes
Nodes
Relationships
Relationship Types
Cases
Notes
Search
Queries
Query Results
Node Matrices
Sets
Search Folders
Maps
Output
Files
Search Project
Name
Codes
Referen
IntvP1 Frank Hoogendijk 16 29
IntvP10 Martin De Bie 17 38
IntvP11 Ryan Carrier 16 38
IntvP12 Matthew James Bailey 34 77
IntvP13 Michiel Ipenburg 16 32
IntvP14 Reid Blackman 10 15
IntvP15 Jan Thomson 20 42
IntvP16 Pamela Gupta 12 20
IntvP17 Peter Brownell 24 35
IntvP2 Hagen Schweinitz 19 28
IntvP3 Josina kamerling 25 41
IntvP4 Clara Durodie 21 48
IntvP5 Chris Bunch 22 38
IntvP6 Philippe Nadouce 41 78
IntvP7 Donny Shimamoto 27 33
IntvP8 and IntvP9 Andrew hobbs 23 37
PODCAST1 2 3
PODCAST10 6 13
PODCAST2 2 6
PODCAST3 2 3
PODCAST4 5 13
PODCAST5 11 22
PODCAST6 7 16
PODCAST7 11 18
PODCAST8 11 18
PODCAST9(1) 10 16
PODCAST9(2) 3 7
Post 1 75 Comments 1058 ractio 20 41
Post 10 8 comments 56 Reaction 11 15
Post 11 13 comments 517 React 11 21
Post 12 12 comments 532 reacti 10 14
Post 13 53 comments 845 ractio 26 29
Post 14 50 comments 741 ractio 18 31
Post 15 FT 33 Comments tech et 24 43
IntvP1 Frank Hoogendijk
Click to edit
that you are looking into,
H: yes
F: So the role of auditor will also change, I think Now you need lots of people to assist during in the auditing process, of course, depends on the size of company, the amount of transactions, level of depth of audit, but, in any case, this technology will enable these transactions are done with way less people, so instead of having 100 auditors, then auditors will only need to work on the 10%, so it will have great impact on auditing, firms, but still, you will also need to control the mechanisms of the blockchain itself need to be audited, because we can't simply accept that transactions happens or use of blockchain technology are correct, we have to audit the mechanisms of blockchain technology. So that will become more and more important. And then with regard to your 2nd aspect of your question, to financial analysis, I think AI will play an important role, because, obviously, you can have all types of algorithms, or self-learning algorithms, analyse these information, and hopefully the information due to blockchain will be better with quality, you know the principle, I don't want to use the swear word, but they often way "when you have shift in" "You get shit out", If you have bad input, you will have bad output, Now I think if you have good information based on blockchain technology, you can perform better analysis. And the final thing, I would like to say is that, of course, you could you have better analysis, more efficient analysis, in the ways that we can't imagine today, but there's certain danger I think that becomes the black box, so it is important that we try to keep track of what the AI algorithm is actually doing, because it would be dangerous if we just accept the AI algorithms to come up with certain analysis, and done by AI tools, we say OK we will do it, If we don't know the reasoning behind it, that becomes a bit dangerous.
H: yes, that's true. That's the ethical issues we will talk about later. What would be the promising benefits that businesses are looking to achieve using blockchain and AI?
F: I think the main benefits of using blockchain technology is to enable more transparent governance, and provide opportunities to engage more stakeholders, (please Ignore the background noise, working from home, laugh....). in a new ways, by using for instance tokens in their service offerings, you can enable new types/new ways of interacting, like utility tokens as they call it, and also enable direct investment, so you would use securities tokens, Look at AI, As I mentioned before, the main benefits of AI for companies is that more efficient decision making and making combination AI maybe blockchain to facilitate decentralised autonomous organisations, which could play a very important role in the economic life, depending on how you fill in the concept of automatous organisations, if you interpret in a way having AI involved in decision making, I think we can have even, at some point of time, maybe it will take 20, 30 or 40 years to see completely autonomous organisations in the sense of governance that done completed autonomously. But of course, that raises lots of questions, from corporate law point view, from legal point of view, but
Coding Density
will blockchain and AI shit the future of financial records and analysis
empower managers, promote more collaboration and aprticipants from stakeholders
have proper digital culture to respond t the changes
Privacy already quite strict rules in Europe but need to be monitored in a correct way
basic and repetitive job will be automated, new opportunities for reskill
continous training and education of yoru workforce
algorithmic flaws or distortions
Directors
General view towards AI and Blockchain
Work on Constant feedback loops
decentralised protocol foster ethical practice in financial reportin
improve decision making, new product and Service, tackle climate change
Decentralised autonomous organisation
Perceived Tech Adoption (AI& Blockchain |Benefi
In
Nodes
Code At
Enter node name (CTRL+Q)
114 Items
Codes: 16 References: 29
Read-Only
Line: 1 Column: 0
100%
Type here to search
19°C Mostly sunny
ENG
14:38
13/06/2022


Home
Import
Create
Explore
Share
Document
Files
Search Project
Name
Codes
Referen
IntvP1 Frank Hoogendijk
IntvP10 Martin De Bie
IntvP11 Ryan Carrier
IntvP12 Matthew James Bailey
IntvP13 Michiel Ipenburg
IntvP14 Reid Blackman
IntvP15 Jan Thomson
IntvP16 Pamela Gupta
IntvP17 Peter Brownell
IntvP2 Hagen Schweinitz
IntvP3 Josina kamerling
IntvP4 Clara Durodie
IntvP5 Chris Bunch
IntvP6 Philippe Nadouce
IntvP7 Donny Shimamoto
IntvP8 and IntvP9 Andrew hobbs
PODCAST1
PODCAST10
PODCAST2
PODCAST3
PODCAST4
PODCAST5
PODCAST6
PODCAST7
PODCAST8
PODCAST9(1)
PODCAST9(2)
Post 1 75 Comments 1058 reactio
Post 10 8 comments 56 Reaction
Post 11 13 comments 517 React
Post 12 12 comments 532 reacti
Post 13 53 comments 845 reactio
Post 14 50 comments 741 reactio
Post 15 FT 33 Comments tech et
Click to edit
play a very important role in the economic life, depending on how you fill in the concept of automatous organisations, if you interpret in a way having AI involved in decision making, I think we can have even, at some point of time, maybe it will take 20, 30 or 40 years to see completely autonomous organisations in the sense of governance that done completed autonomously. But of course, that raises lots of questions, from corporate law point view, from legal point of view, but technically that could be possible.
H: Yes, this has given us an opportunity to explore more opportunities in autonomous organisations in the future. But now it is time for us to start look at it, istn't it.? So for question 4, When companies use AI to detect anomaly activities, and blockchain to offer transparency, in your opinion, would the use of these technologies reduce the opportunities for unethical behaviour or moral hazards from top management, enhance their ethical decision making in terms of moral awareness, judgement, intent, and behaviour, since any suspicious transactions will be detected in real time?
F: I think it is a good question. I think all companies can benefit to mitigate risks. Depends on different levels of depth, depend on which the way they use of AI within the company, So you are also use instruments in both ways, you can use it in a good way or bad way. I think decentralised governance, using blockchain technology, provides lots of opportunities, to engage more people, in a decentralised way in governance, in decision making. It can do so, but we have to be a bit careful, because not all decisions need to be taken in decentralised way. And from efficiency perspective, you often see issues that decentralised organisations or protocols, that decision making is not actually done in an effective way. Sometime you need to allocate certain powers to pacific people, or a group of people, in order to make the organisations run smooth.
Let's back to question Q5: Do you think the decentralised protocol powered by blockchain technology that enhance transparency would foster ethical practice in financial reporting and disclosure and restore trust in pubic?
F: Yes, If you use the technology in a good way, Yes it shows that you are willingly to listen to people, and you not only listen to people but also people actual voice, or even actual power, to take certain decisions. From societal point of view, that is very relevant, that will increase public trust in that specific company.
H: Thank you very much on that one. The questions come from the rational that the financial fraud that linked to the information asymmetry, lack of transparency, that provides the opportunities for top management or CEOs to commit unethical behaviour or wrongdoing, with blockchain technology, because of enhanced transparency, which means the information asymmetry will be reduced to mitigate opportunistic behaviour, so that when they are making decision, they will make more ethical decisions rather than opportunities behaviourist that is more benefit to their own.
F: Indeed. 100 of correct, I think blockchain technology and possibility that we have, based on the technology in lines what we have seen for past couple of decades, increase reporting requirements,
Coding Density
will blockchain and AI shift the future of financial records and analysis
Recommendations
will the use the tech reduce unethical behaviour
empower managers,promote more collaboration and artipcipants from stakeholders
Privacy already quite strict rules in Europe but need to be monitored in a correct way
have proper digital culture to respond t the changes
Perceived Tech Adoption (AI& Blockchain)Benefits
algorith mic flaws or distortions
continous training and education of yoru workforce
basic and repetitive job will be automated, new opportunities for reskill
Directors
General view towards AI and Blockchain
Work on Constant feedback loops
improve decision making, new product and Service, tackle climate change
Decentralised automous organisation
decentralised protocol foster ethical practice in financial reportin
Code At
Enter node name (CTRL+Q)
114 Items
Codes: 16 References: 29
Read-Only
Line: 1 Column: 0
100%
Type here to search
19°C Mostly sunny
ENG
14:39
13/06/2022

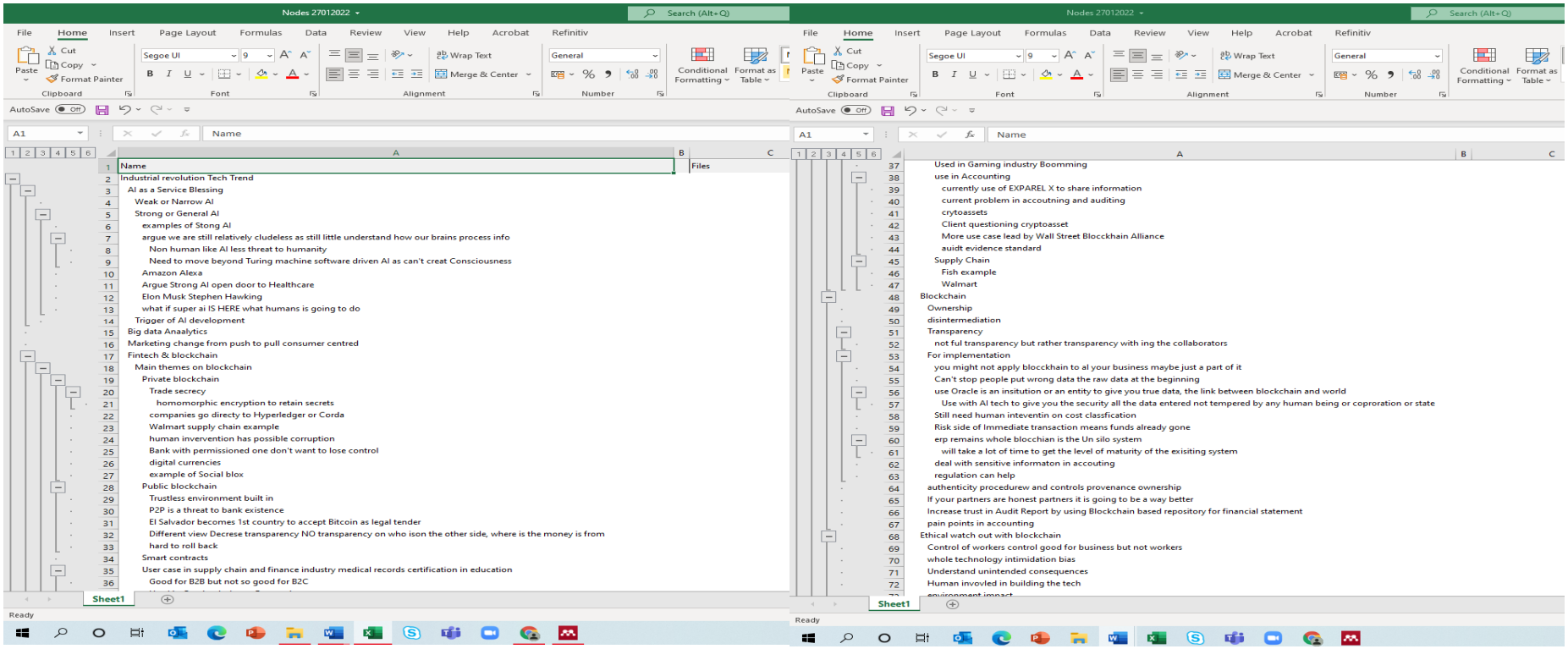

PhD Data Coding.nvp - NVivo 12 Pro
Document Tools
File
Home
Import
Create
Explore
Share
Document
Memo Link
See Also Link
Zoom
Quick Coding
Layout
Annotations
See Also Links
Relationships
Coding Stripes
Highlight
Code
Code In Vivo
Auto Code
Range Code
Uncode
New Annotation
Word Cloud
Chart
Compare With
Explore Diagram
Query This Document
Find
Edit
Links
View
Coding
Annotations
Visualize Document
Query
Edit
Quick Access
Files
Memos
Nodes
Data
Files
File Classifications
Externals
Codes
Nodes
Relationships
Relationship Types
Cases
Notes
Search
Queries
Query Results
Node Matrices
Sets
Search Folders
Maps
Output
Files
Search Project
Name
Codes
Referen
IntvP1 Frank Hoogendijk 16 29
IntvP10 Martin De Bie 17 38
IntvP11 Ryan Carrier 16 38
IntvP12 Matthew James Bailey 34 77
IntvP13 Michiel Ipenburg 16 32
IntvP14 Reid Blackman 10 15
IntvP15 Jan Thomson 20 42
IntvP16 Pamela Gupta 12 20
IntvP17 Peter Brownell 24 35
IntvP2 Hagen Schweinitz 19 28
IntvP3 Josina kamerling 25 41
IntvP4 Clara Durodie 21 48
IntvP5 Chris Bunch 22 38
IntvP6 Philippe Nadouce 41 78
IntvP7 Donny Shimamoto 27 33
IntvP8 and IntvP9 Andrew hobbs 23 37
PODCAST1 2 3
PODCAST10 6 13
PODCAST2 2 6
PODCAST3 2 3
PODCAST4 5 13
PODCAST5 11 22
PODCAST6 7 16
PODCAST7 11 18
PODCAST8 11 18
PODCAST9(1) 10 16
PODCAST9(2) 3 7
Post 1 75 Comments 1058 ractio 20 41
Post 10 8 comments 56 Reaction 11 15
Post 11 13 comments 517 React 11 21
Post 12 12 comments 532 reacti 10 14
Post 13 53 comments 845 ractio 26 29
Post 14 50 comments 741 ractio 18 31
Post 15 FT 33 Comments tech et 24 43
IntvP1 Frank Hoogendijk
Click to edit
F: Indeed. 100 of correct, I think blockchain technology and possibility that we have, based on the technology in lines what we have seen for past couple of decades, increase reporting requirements, embracing transparency, having all these rules regarding, including information in annual report, not just financial information, but also information on environment, sustainability, governance, etc., all of that, I think perfectly fit into that idea. A new way of increasing transparency, to reduce information asymmetry.
H: Yes, that's it. Let's go to question 6. Will the use of blockchain and AI technology empower managers to work more closely with shareholders with aligned interests, and promote more collaboration and participants from different stakeholders?
F: I definitely think it will do that. As I mentioned Enabling people to use Blockchain (certain tokens) to participate in certain processes and vote on certain decisions, that's something you can definitely do, for instance Siemens using blockchain technology to create decentralised autonomous organisation is called the Siemens digital organisations, anyhow this is some type of DAO, and they use that to empower people within Siemens to manage certain amounts of funds and to allocate those to a certain charity their choice, and so that was good example of existing company can use blockchain technology to increase level of participation within the company. so I think definitely that such a such an impact.
Then to come back on the managers and I thought it was interesting that you refer to managers because I also think that blockchain technology, and other technologies such as AI, could enable the reduction of the amount of managers or the necessity for managers in the sense of middle management, And Now we have lots of layers within organisation, with lots of people are not really actually doing things, or maybe they are doing things but it's it's more they are coordinating or filtering information in between the basis of the top of the pyramid, hierarchical organisations. I think these technologies would enable to really cut out the middle man, but more or less do so reduce the amount of managers. So that is an additional remark.
H: I think that is very good. So if we go to question 7, Q7: The promising feature of AI and blockchain technologies is the automation, which will streamline business processes and cause changes in business model, which will upend our existing social reality guided by institutional values, beliefs and rules, do you think organisations need to have proper digital culture to respond to these technological pressures to govern the development and deployment of digital technology and data?
F: yeah I think now a lot of companies specially companies that aren't active in the technology sector, They think of these technologies something that is outside their organisation and they can sometimes tap into certain things when they deem is useful.
They often see high Tech in some type of like back office thing or something nice to have, so I think that it's the same like we have seen couple of years ago, with the rise of the Internet, and then a lot of company starts, I don't need a website, it is sth nice to have for people to look me up on the web. That's important. but Now. the Internet has become one of the key channels, where people find new clients and new suppliers etc. and a lot of new business models emerged because of the
Coding Density
will blockchain and AI shift the future of financial records and analysis
Recommendations
empower managers; promote more collaboration and aprticipants from stakeholders
Privacy already quite strict rules in Europe but need to be monitored in a correct way
Perceived Tech Adoption |AI& Blockchain |Benefits
algorithmic flaws o distortions
continuous training and education of yoru workforce
basic and repetitive job will be automated ,new opportunities for reskill
Directors
General view towards AI and Blockchain
Work on Constant feedback loops
decentralised protocol foster ethical practice in financial reportin
improve decision making ,new product and Service, tackle climate change
Decentralised autonomous organisation
have proper digital culture to respond t the changes
In
Nodes
Code At
Enter node name (CTRL+Q)
H 114 Items Codes: 16 References: 29 Read-Only Line: 1 Column: 0
100%
Type here to search
19°C Mostly sunny
ENG
14:39
13/06/2022

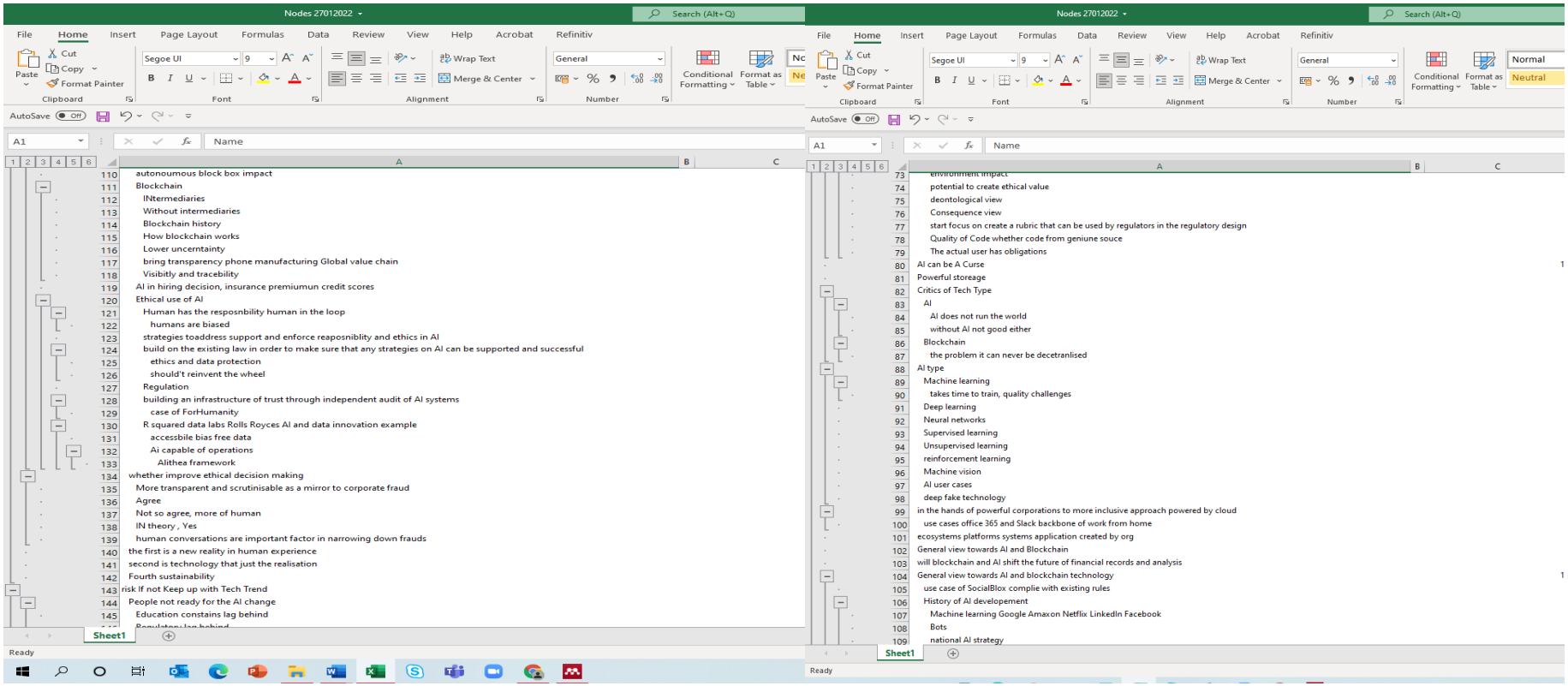

Memo Link
See Also Link
Links
Zoom
Quick Coding
Layout
Annotations
See Also Links
Relationships
View
Coding Stripes
Highlight
Code
Code In Vivo
Auto Code
Range Code
Uncode
Coding
New Annotation
Annotations
Word Cloud
Chart
Compare With
Explore Diagram
Visualize Document
Query This Document
Find
Query
Edit
Edit
Quick Access
Files
Memos
Nodes
Data
Files
File Classifications
Externals
Codes
Nodes
Relationships
Relationship Types
Cases
Notes
Search
Queries
Query Results
Node Matrices
Sets
Search Folders
Maps
Output
Files
Search Project
Name
Codes
Referen
IntvP1 Frank Hoogendijk 16 29
IntvP10 Martin De Bie 17 38
IntvP11 Ryan Carrier 16 38
IntvP12 Matthew James Bailey 34 77
IntvP13 Michiel Ipenburg 16 32
IntvP14 Reid Blackman 10 15
IntvP15 Jan Thomson 20 42
IntvP16 Pamela Gupta 12 20
IntvP17 Peter Brownell 24 35
IntvP2 Hagen Schweinitz 19 28
IntvP3 Josina kamerling 25 41
IntvP4 Clara Durodie 21 48
IntvP5 Chris Bunch 22 38
IntvP6 Philippe Nadouce 41 78
IntvP7 Donny Shimamoto 27 33
IntvP8 and IntvP9 Andrew hobbs 23 37
PODCAST1 2 3
PODCAST10 6 13
PODCAST2 2 6
PODCAST3 2 3
PODCAST4 5 13
PODCAST5 11 22
PODCAST6 7 16
PODCAST7 11 18
PODCAST8 11 18
PODCAST9(1) 10 16
PODCAST9(2) 3 7
Post 1 75 Comments 1058 actio 20 41
Post 10 8 comments 56 Reaction 11 15
Post 11 13 comments 517 React 11 21
Post 12 12 comments 532 reacti 10 14
Post 13 53 comments 845 actio 26 29
Post 14 50 comments 741 actio 18 31
Post 15 FT 33 Comments tech et 24 43
IntvP1 Frank Hoogendijk
Click to edit
year 2040 and 2050, we will say who could have imagined that things could work and be the way they are now.
H: That's true about the changes we have. Especially the pandemic,
F: yeah, yeah, definitely, never wate a good crisis. you see the raise of the use of technology during the pandemic,
H: and never thought of the network can be so powerful
F: Yeah, that' true. Maybe to come back on the question, So I think companies should need more attention to technological developments, which have this types of disruptive effect. I think now we are standing at the eye of the storm, and that's maybe a little bit of too negative connotation. but I think to elaborate a little bit on that, so I think now a lot of companies and they think it's quiet, AI, Blockchain, is there. But that's not something that we have to pay much attention to. Then suddenly the storm hits and then everyone will say, yeah, we have to be looking into this already five years ago.
so I think that's a little bit what is going on with a lot of companies.
so I think the most successful companies in the future will be those that do keep this on their radar, and actively engage to get to know these technologies, and implement these in the best way possible, of course finding a good balance between leveraging the technology while also keeping human touch focusing on their business of course.
H: I think you are totally right. We are looking forward to the development of our world with the use of these disruptive technologies. So with question 8, What do you think the ethical issues the companies would encounter regarding the use of AI and blockchain technology? In corporate governance perspective.
F:
I think as I have mentioned before it is dangerous. it's an item we have to be careful about that AI would become some type of black box. so I think it's important to keep track at least to certain extent what AI tools are doing. and I am also a bit concerned about using AI, as sole or main tool in the decision making process, I think of an example for instance Amazon, I thought it was Amazon they use AI to determine which employees need to be fired, they look at certain KPIs and said this person got that many items from the shelf in that amount of time, if you do not reach certain KPIs you're fired. so that there's no real, so that the people they just get an automated email saying you are fired and you don't have to come back tomorrow or in one week. so I think these types of things are very dangerous,
H: Yeah, It is.
Coding Density
will blockchain and AI shift the future of financial records and analysis
will the use the tech reduce unethical behaviour
Recommendations
empower managers; promote more collaboration and apriticipants from sakeholders
Privacy already quite strict rules in Europe but needed to be monitored in a correct way
have proper digital culture to respond t the changes
Perceived Tech Adoption (AI& Blockchian)Benefits
continous training and education of yoru workforce
basic and repetitive job will be automated, new opportunities for reskill
Directors
General view towards AI and Blockchain
Work on Constant feeback loops
decentralised protocol foster ethical practice in financial reportin
improve decision making, new product and Service, tackle climate change
Decentralised autonomous organisation
algorithmic flaws or distortions
In
Nodes
Code At
Enter node name (CTRL+Q)
H 114 Items Codes: 16 References: 29 Read-Only Line: 1 Column: 0
100%
Type here to search
19°C Mostly sunny
ENG
14:40
13/06/2022

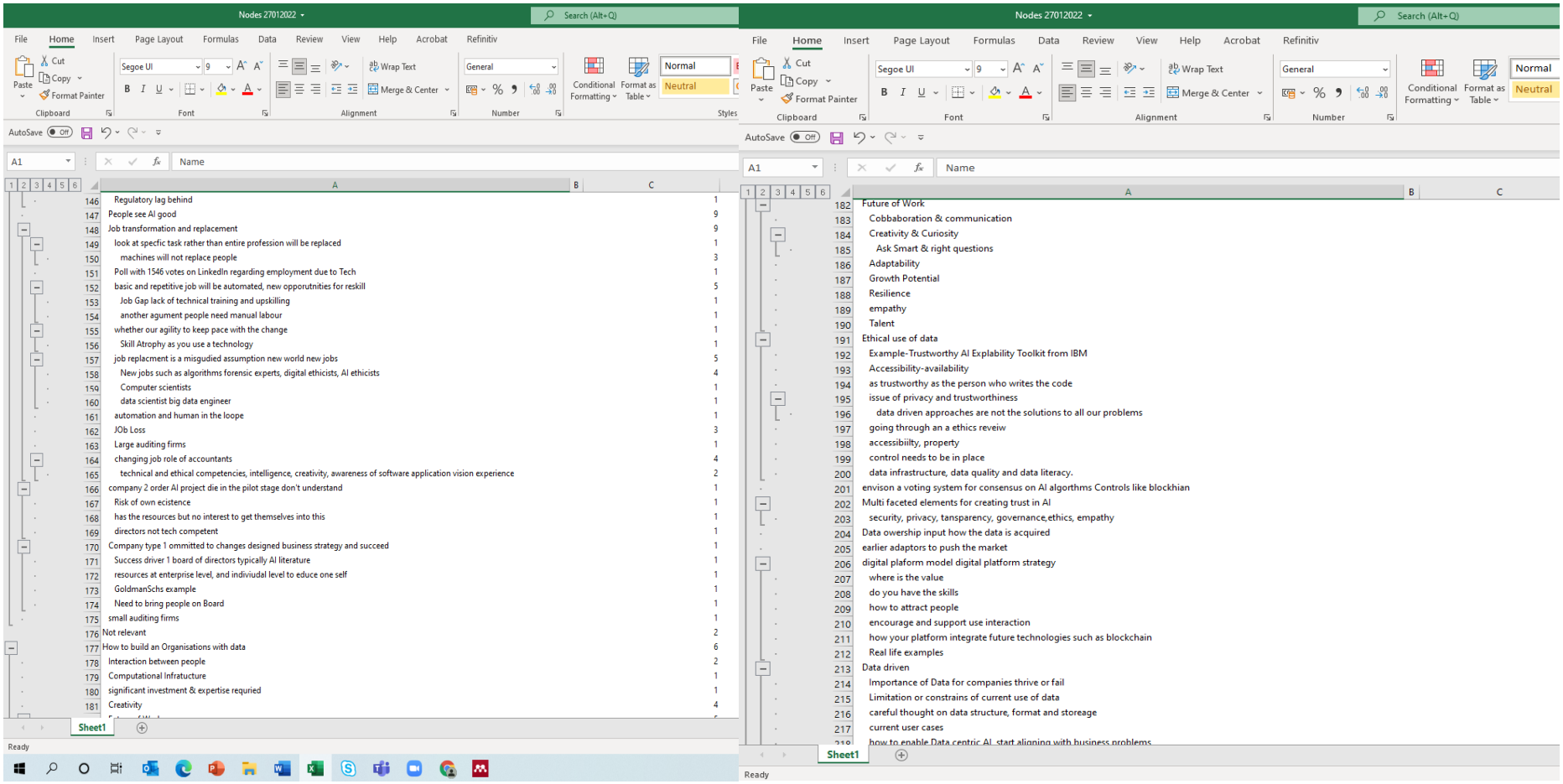

PhD Data Coding.nvp - NVivo 12 Pro
Document Tools
File
Home
Import
Create
Explore
Share
Document
Memo Link
See Also Link
Links
Zoom
Quick Coding
Layout
Annotations
See Also Links
Relationships
Coding Stripes
Highlight
View
Code
Code In Vivo
Auto Code
Range Code
Uncode
Coding
New Annotation
Annotations
Word Cloud
Chart
Compare With
Explore Diagram
Visualize Document
Query This Document
Find
Query
Edit
Edit
Quick Access
Files
Memos
Nodes
Data
Files
File Classifications
Externals
Codes
Nodes
Relationships
Relationship Types
Cases
Notes
Search
Queries
Query Results
Node Matrices
Sets
Search Folders
Maps
Output
Files
Search Project
Name
Codes
Referen
IntvP1 Frank Hoogendijk 16 29
IntvP10 Martin De Bie 17 38
IntvP11 Ryan Carrier 16 38
IntvP12 Matthew James Bailey 34 77
IntvP13 Michiel Ipenburg 16 32
IntvP14 Reid Blackman 10 15
IntvP15 Jan Thomson 20 42
IntvP16 Pamela Gupta 12 20
IntvP17 Peter Brownell 24 35
IntvP2 Hagen Schweinitz 19 28
IntvP3 Josina kamerling 25 41
IntvP4 Clara Durodie 21 48
IntvP5 Chris Bunch 22 38
IntvP6 Philippe Nadouce 41 78
IntvP7 Donny Shimamoto 27 33
IntvP8 and IntvP9 Andrew hobbs 23 37
PODCAST1 2 3
PODCAST10 6 13
PODCAST2 2 6
PODCAST3 2 3
PODCAST4 5 13
PODCAST5 11 22
PODCAST6 7 16
PODCAST7 11 18
PODCAST8 11 18
PODCAST9(1) 10 16
PODCAST9(2) 3 7
Post 1 75 Comments 1058 actio 20 41
Post 10 8 comments 56 Reaction 11 15
Post 11 13 comments 517 React 11 21
Post 12 12 comments 532 reacti 10 14
Post 13 53 comments 845 actio 26 29
Post 14 50 comments 741 actio 18 31
Post 15 FT 33 Comments tech et 24 43
IntvP1 Frank Hoogendijk
Click to edit
you're fired. so that there's no real, so that the people they just get an automated email saying you are fired and you don't have to come back tomorrow or in one week. so I think these types of things are very dangerous,
H: Yeah, It is.
F: I would say that I would plead to have certain human intervention, Not regarding all types of decisions but I think these types of decisions really deserved at least some type of human, valuable human intervention. Then maybe on the second point, as a corporate lawyer, I think of things like directors' liability, one questions pop up, is that who is responsible if decisions are mainly based on AI. So that's the question that we will have to ask ourself. It is a little bit, maybe compare to driving autonomously, if a car is driving autonomously, you run to an accident, is it down to the driver who is responsible or AI taken on the wheels or the car manufacturer who manufacture AI, who should be responsible, these are all the questions that we have to be bearing in mind.
H: That's true. Another thing you have mentioned is the unemployment, some of the jobs need be replaced by this automation as well.
F: Yeah, of course, because it was the same thing when we invented like steam, machines, electricity and things like this disruptive things, people said all gonna be jobless. what are we going to do. and I think John Lock have predicted that by year 20..I don't know exactly which year now. We would have no jobs and we would all be bored. But that turns out to be different. But I think it is same with AI. You will have lots of jobs will be redundant due to automation, but it also creates space for new jobs.
These managers with boring jobs they can do something more interesting then. Hopefully.
H: yes, Let's keep optimistic.
F: Yes, we have to be optimistic. Machines will not all replace us, hopefully.
H: So, In your opinion, how can companies govern the use of AI and blockchain to tackle these ethical issues?
F: I think first of all people need to get acquainted with the technologies. we still have a lot of board in companies that are really old fashioned and they are not looking for enough into the future, often driven by short term gains. Not really paying attention to what is going and will be going on in five to 10 years' time. But I think, as well remuneration should be connected to the performance of company in the longer term, and they also have to take account types of things more and more.
so getting acquainted with the technologies that means listening to the people that know the interesting things about these technologies, both from within the company and externally. I think also you actually point out that these ethical issues so I think they have to scope these, and be aware of the fact that there could be these potential ethical issues. and look into it.
Coding Density
algorithmic flaws or distortions
Perceived Tech Adoption (AI& Blockchain)Benefits
have proper digital culture to respond t the changes
Privacy already quite strict rules in Europe but need to be monitored in a correct way
empower managers, promote more collaboration and aprticipants from stakeholders
will the use the tech reduce unethical behaviour
will blockchain and AI shit the future of financial records and analysis
Directors
General view towards AI and Blockchain
Work on Constant feedback loops
decentralised protocol foster ethical practices in financial reportin
improve decision making, new product and Service, tackle climate change
Decentralised autonomous organisation
basic and repetitive job will be automated, new opportunities for reskill
continous training and education of yoru workfo
Recommendations
In
Nodes
Code At
Enter node name (CTRL+Q)
H 114 Items Codes: 16 References: 29 Read-Only Line: 1 Column: 0
100%
Type here to search
19°C Mostly sunny
ENG
14:40
13/06/2022

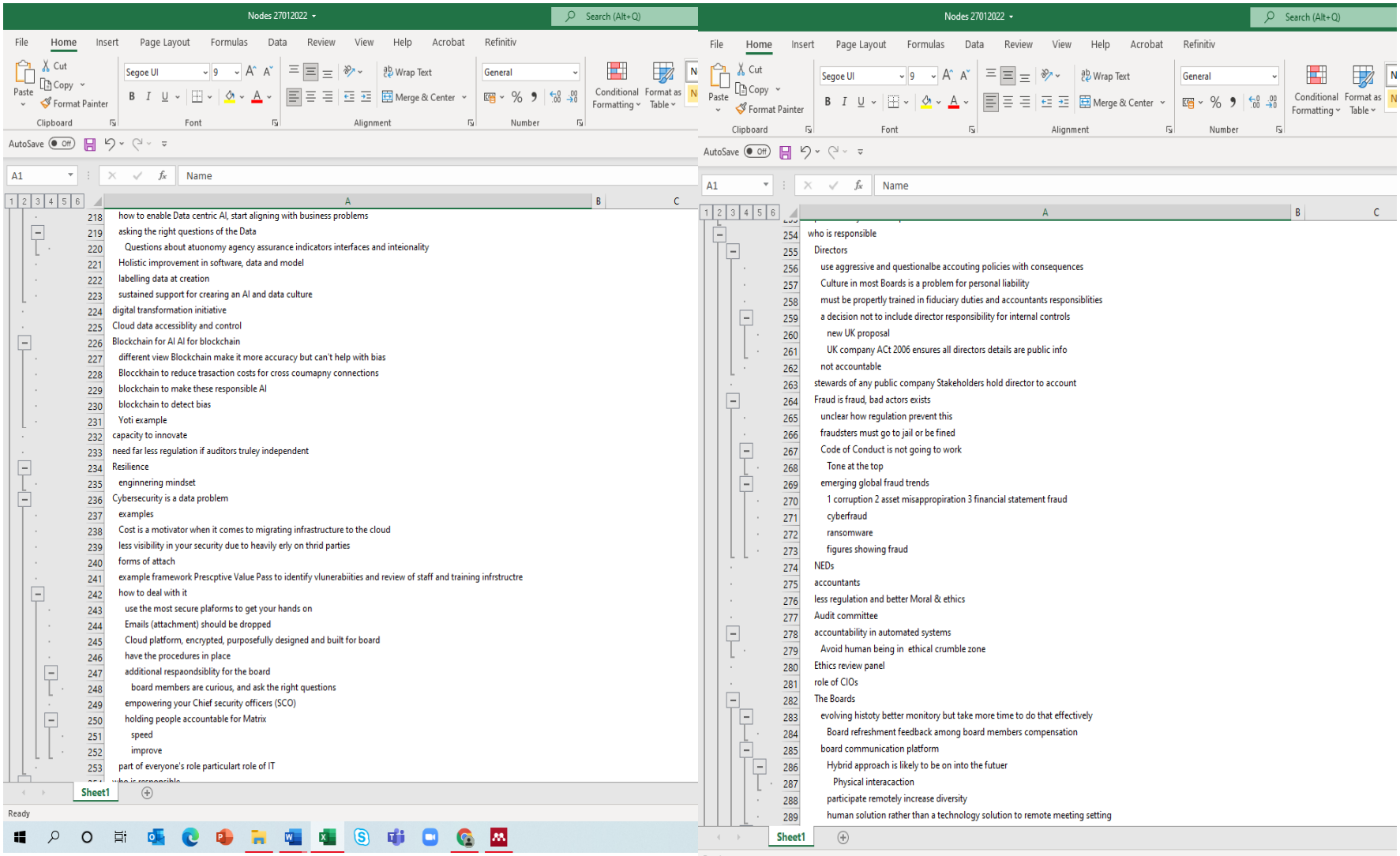

File
Home
Import
Create
Explore
Share
Document
Memo Link
See Also Link
Links
Zoom
Quick Coding
Layout
Annotations
See Also Links
Relationships
Coding Stripes
Highlight
View
Code
Code In Vivo
Auto Code
Range Code
Uncode
Coding
New Annotation
Annotations
Word Cloud
Chart
Compare With
Explore Diagram
Visualize Document
Query This Document
Find
Query
Edit
Edit
Quick Access
Files
Memos
Nodes
Data
Files
File Classifications
Externals
Codes
Nodes
Relationships
Relationship Types
Cases
Notes
Search
Queries
Query Results
Node Matrices
Sets
Search Folders
Maps
Output
Files
Search Project
Name
Codes
Referen
IntvP1 Frank Hoogendijk 16 29
IntvP10 Martin De Bie 17 38
IntvP11 Ryan Carrier 16 38
IntvP12 Matthew James Bailey 34 77
IntvP13 Michiel Ipenburg 16 32
IntvP14 Reid Blackman 10 15
IntvP15 Jan Thomson 20 42
IntvP16 Pamela Gupta 12 20
IntvP17 Peter Brownell 24 35
IntvP2 Hagen Schweinitz 19 28
IntvP3 Josina kamerling 25 41
IntvP4 Clara Durodie 21 48
IntvP5 Chris Bunch 22 38
IntvP6 Philippe Nadouce 41 78
IntvP7 Donny Shimamoto 27 33
IntvP8 and IntvP9 Andrew hobbs 23 37
PODCAST1 2 3
PODCAST10 6 13
PODCAST2 2 6
PODCAST3 2 3
PODCAST4 5 13
PODCAST5 11 22
PODCAST6 7 16
PODCAST7 11 18
PODCAST8 11 18
PODCAST9(1) 10 16
PODCAST9(2) 3 7
Post 1 75 Comments 1058 ractio 20 41
Post 10 8 comments 56 Reaction 11 15
Post 11 13 comments 517 React 11 21
Post 12 12 comments 532 reacti 10 14
Post 13 53 comments 845 ractio 26 29
Post 14 50 comments 741 ractio 18 31
Post 15 FT 33 Comments tech et 24 43
IntvP1 Frank Hoogendijk
Click to edit
F: Yes, we have to be optimistic. Machines will not all replace us, hopefully.
H: So, In your opinion, how can companies govern the use of AI and blockchain to tackle these ethical issues?
F: I think first of all people need to get acquainted with the technologies. we still have a lot of board in companies that are really old fashioned and they are not looking for enough into the future, often driven by short term gains. Not really paying attention to what is going and will be going on in five to 10 years' time. But I think, as well remuneration should be connected to the performance of company in the longer term, and they also have to take account types of things more and more.
so getting acquainted with the technologies that means listening to the people that know the interesting things about these technologies, both from within the company and externally. I think also you actually point out that these ethical issues so I think they have to scope these, and be aware of the fact that there could be these potential ethical issues, and look into it.
I think they need to work on the constant feedback loops. If they try to experiments with AI, blockchain, etc,. They need to go through the entire process of building, it, test it, gathering feed back to improve it. So I think it is very important for companies from the top down to be involved in all of the phases of tech process. and final point maybe, I probably already mentioned, briefly, it is valuable to exchange experiences, to get people from outside to involve to assist with this and leverage on this types of experiences.
H: Yes, from my research is that the privacy issues are very important, how they handle data, where the metadata comes from, the quality data for AI systems, be guided by certain ethical values and principles, sound corporate governance framework to enable these ethical values and principles to be embedded in the corporate world to deal with these technologies, because these are emerging technologies, and we are learning about it. From legal side of the technology, at the moment, is quite blurring, all the regulation are trying to establish how we can guide the companies in use of these technologies.
F: Yes. For sure. I think to come back to your first point, I don't know if I also mentioned it but it's important that we do not use bad data to base our decisions upon. I think that's the bias issue. If you have AI, have look at certain data, for instance, to predict whoever certain group of people will become one of the next managers. To make the directors using the function solely based on historical data, obviously, man would be privileged, or even other elements would be taken into account, but that's something you don't want. You want people to be assessed based on their qualities, their performance, and not on their gender. That is something that we have to be very very careful about. And in deed, personal data obviously yeah we have already quite strict rules and in Europe but we also need to ensure that these are monitored in a correct way. So that's really really important.
Coding Density
will blockchain and AI shift the future of financial records and analysis
Recommendations
will the use the tech reduce unethical behaviour
empower managers,promote more collaboration and aprticipants from stakeholders
have proper digital culture to respond t the changes
Perceived Tech Adoption (AI& Blockchain)Benefits
algorithmic flaws or distortions
continous training and education of yoru workforce
basic and repatitive job will be automated, new opportunities for reskill
Directors
General view towards AI and Blockchain
Work on Constant feedback loops
decentralised protocol foster ethical practice in financial reportin
improve decision making, new product and Service, tackle climate change
Decentralised autonomous organisation
Privacy already quite strict rules in Europe but need to be monitored in
In
Nodes
Code At
Enter node name (CTRL+Q)
H
114 Items
Codes: 16 References: 29
Read-Only
Line: 1 Column: 0
100%
Type here to search
19°C Mostly sunny
ENG
14:41
13/06/2022

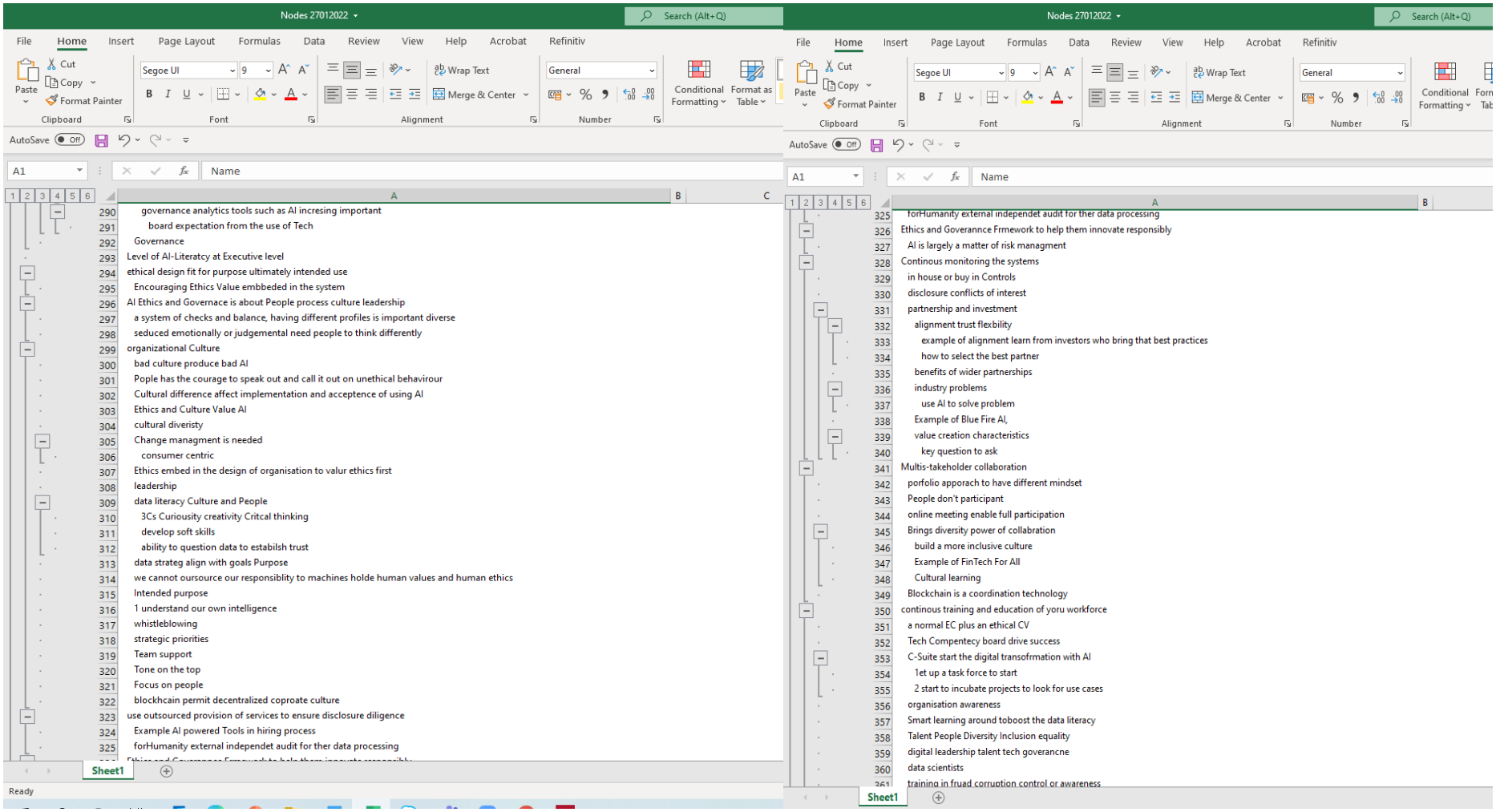
Appendix 10 Evidence of Initial codes

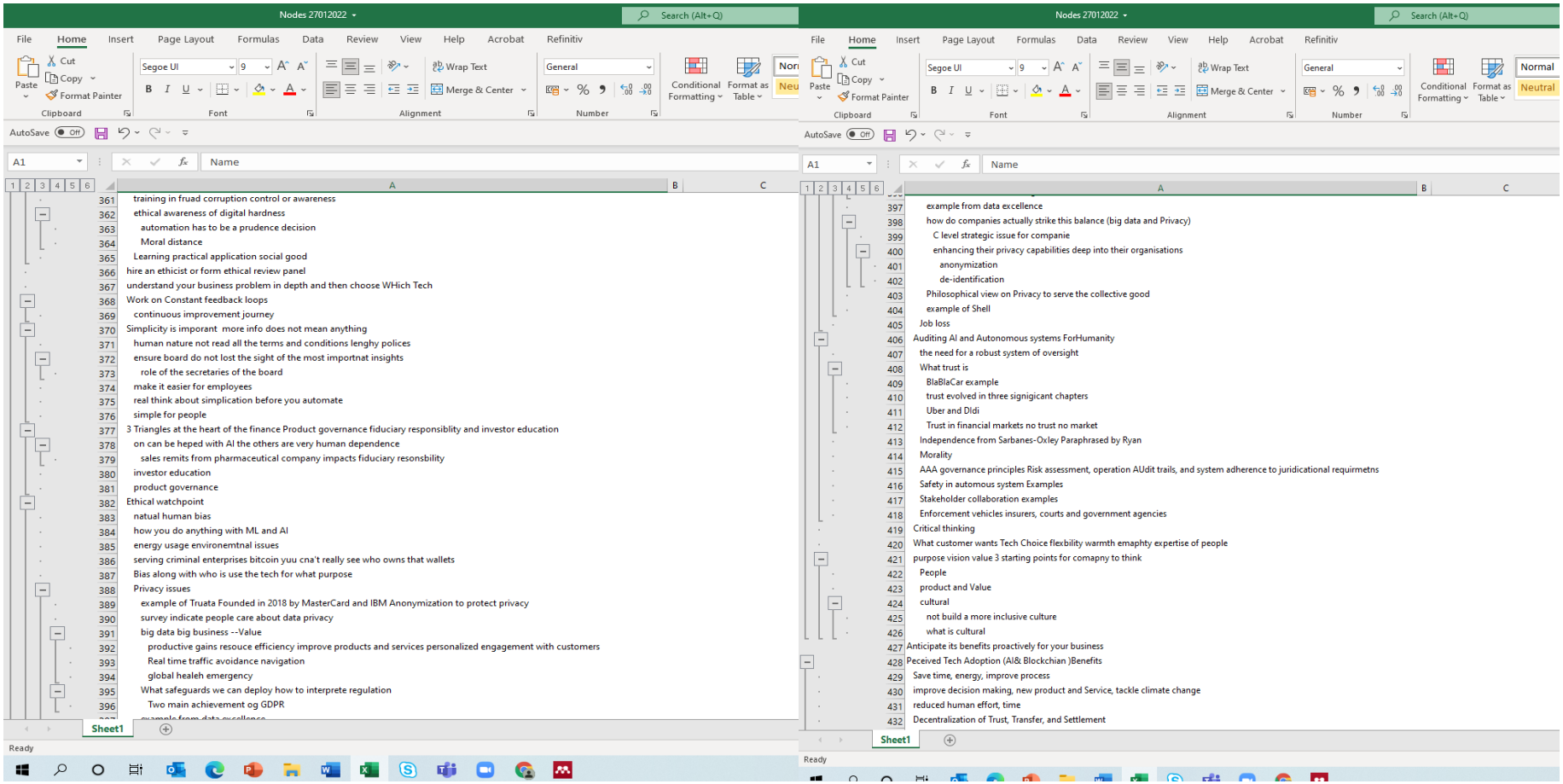


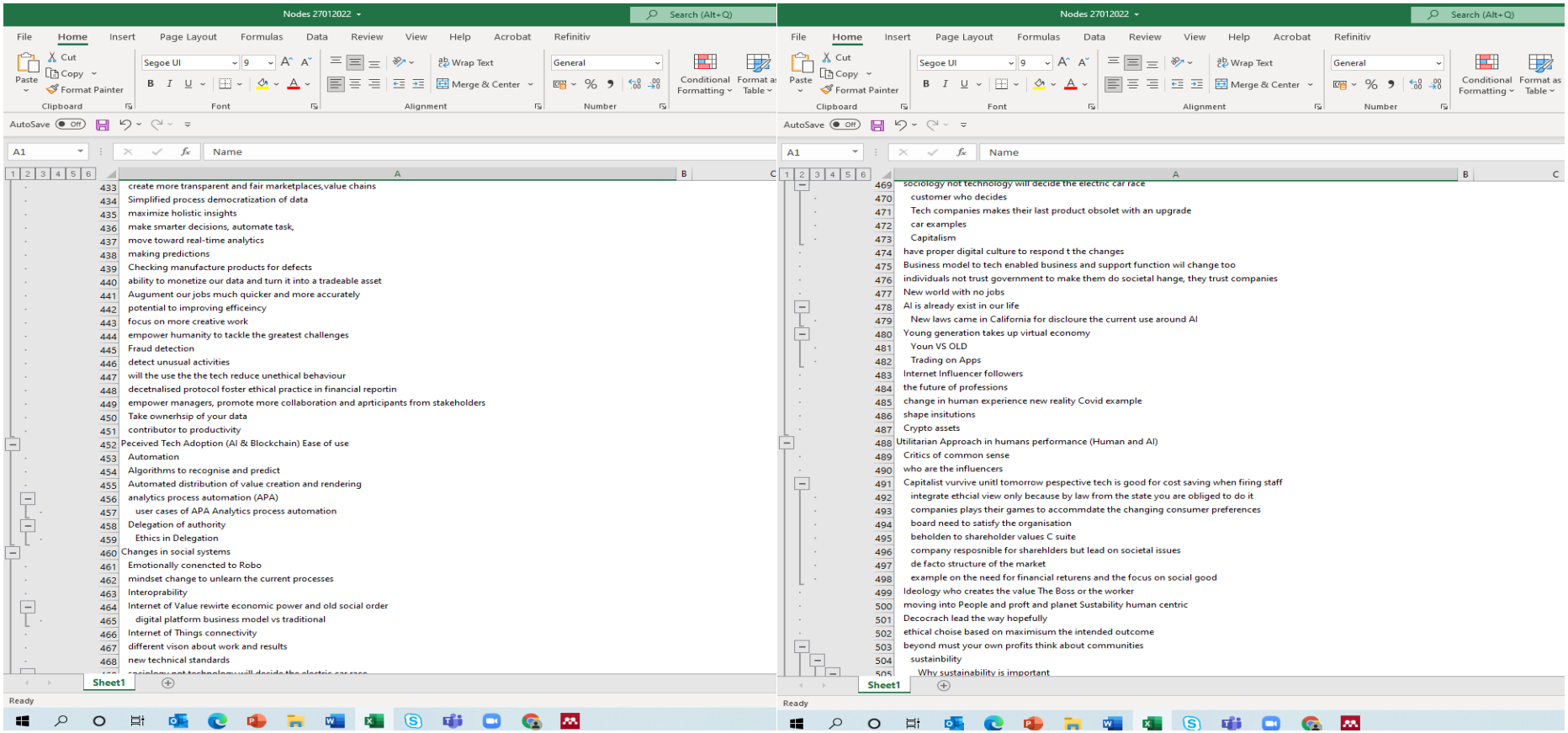

Nodes 27012022
Search (Alt+Q)
File Home Insert Page Layout Formulas Data Review View Help Acrobat Refinitiv
Cut Copy Format Painter Paste Clipboard
Segoe UI 9 Font
Wrap Text Merge & Center Alignment
General Number
Conditional Formatting Format as Table
AutoSave Off
A1 Name
Sheet1
Ready
110 autonoumous block box impact
111 Blockchain
112 INtermediaries
113 Without intermediaries
114 Blockchain history
115 How blockchain works
116 Lower uncerntainty
117 bring transparency phone manufacturing Global value chain
118 Visibitly and tracebility
119 AI in hiring decision, insurance premiumun credit scores
120 Ethical use of AI
121 Human has the resposnbility human in the loop
122 humans are biased
123 strategies toaddress support and enforce reaposniblity and ethics in AI
124 build on the existing law in order to make sure that any strategies on AI can be supported and successful
125 ethics and data protection
126 should't reinvent the wheel
127 Regulation
128 building an infrastructure of trust through independent audit of AI systems
129 case of ForHumanity
130 R squared data labs Rolls Royces AI and data innovation example
131 accessbile bias free data
132 Ai capable of operations
133 Alithea framework
134 whether improve ethical decision making
135 More transparent and scrutinisable as a mirror to corporate fraud
136 Agree
137 Not so agree, more of human
138 IN theory , Yes
139 human conversations are important factor in narrowing down frauds
140 the first is a new reality in human experience
141 second is technology that just the realisation
142 Fourth sustainability
143 risk If not Keep up with Tech Trend
144 People not ready for the AI change
145 Education constains lag behind
Nodes 27012022
Search (Alt+Q)
File Home Insert Page Layout Formulas Data Review View Help Acrobat Refinitiv
Cut Copy Format Painter Paste Clipboard
Segoe UI 9 Font
Wrap Text Merge & Center Alignment
General Number
Conditional Formatting Format as Table
Normal Neutral
AutoSave Off
A1 Name
Sheet1
Ready
73 environment impact
74 potential to create ethical value
75 deontological view
76 Consequence view
77 start focus on create a rubric that can be used by regulators in the regulatory design
78 Quality of Code whether code from geniune souce
79 The actual user has obligations
80 AI can be A Curse 1
81 Powerful storeage
82 Critics of Tech Type
83 AI
84 AI does not run the world
85 without AI not good either
86 Blockchain
87 the problem it can never be decetranlised
88 AI type
89 Machine learning
90 takes time to train, quality challenges
91 Deep learning
92 Neural networks
93 Supervised learning
94 Unsupervised learning
95 reinforcement learning
96 Machine vision
97 AI user cases
98 deep fake technology
99 in the hands of powerful corporations to more inclusive approach powered by cloud
100 use cases office 365 and Slack backbone of work from home
101 ecosystems platforms systems application created by org
102 General view towards AI and Blockchain
103 will blockchain and AI shift the future of financial records and analysis
104 General view towards AI and blockchain technology 1
105 use case of SocialBlox complie with existing rules
106 History of AI developement
107 Machine learning Google Amaxon Netflix LinkedIn Facebook
108 Bots
109 national AI strategy

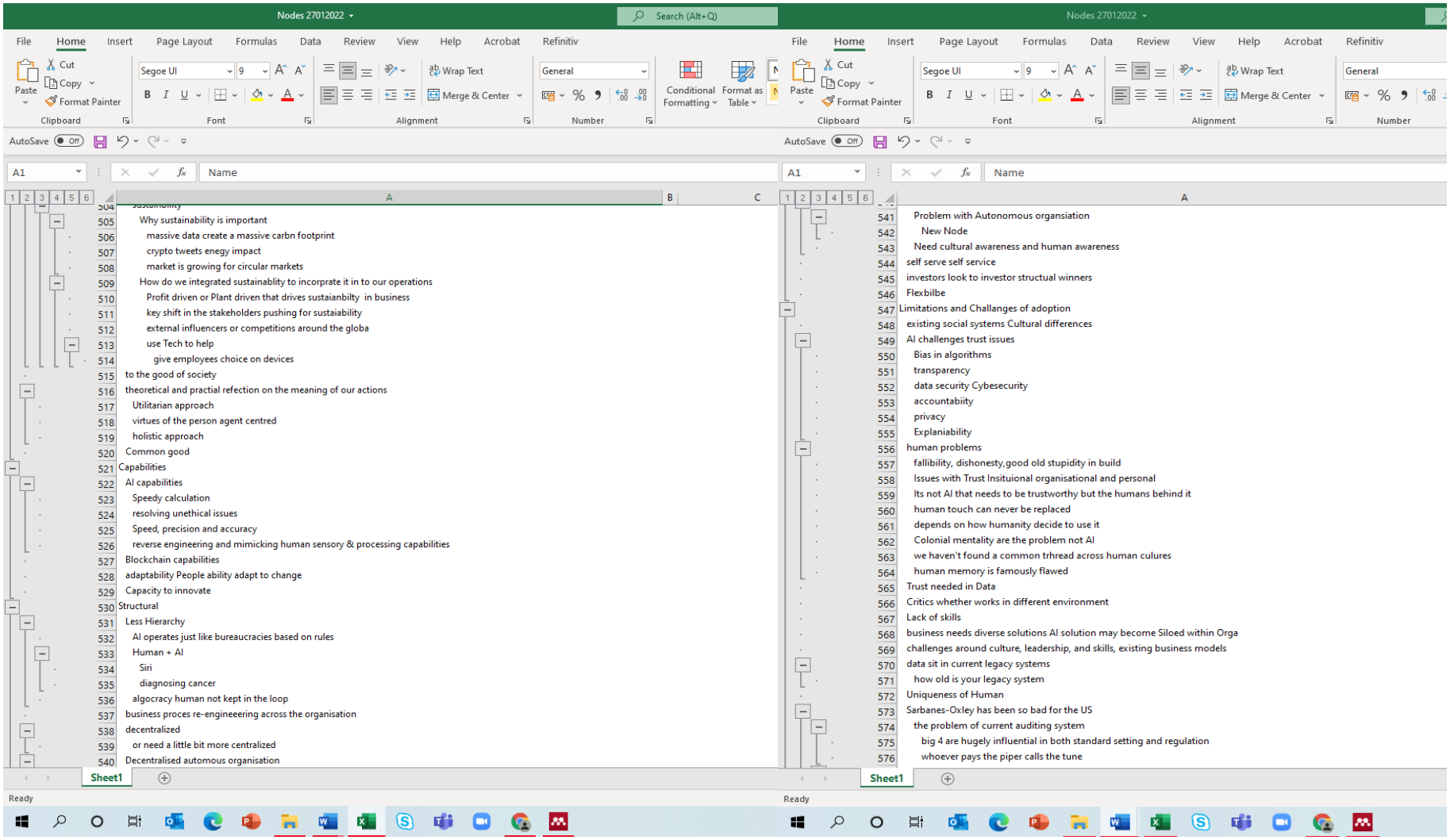

Nodes 27012022
Search (Alt+Q)
File Home Insert Page Layout Formulas Data Review View Help Acrobat Refinitiv
Cut Copy Format Painter Paste Clipboard
Segoe UI 9 Font
Wrap Text Merge & Center Alignment
General Number
Conditional Formatting Format as Table
Normal Neutral Styles
AutoSave Off
A1 Name
1 2 3 4 5 6
A B C
146 Regulatory lag behind 1
147 People see AI good 9
148 Job transformation and replacement 9
149 look at specfic task rather than entire profession will be replaced 1
150 machines will not replace people 3
151 Poll with 1546 votes on LinkedIn regarding employment due to Tech 1
152 basic and repetitive job will be automated, new opporutnities for reskill 5
153 Job Gap lack of technical training and upskilling 1
154 another agument people need manual labour 1
155 whether our agility to keep pace with the change 1
156 Skill Atrophy as you use a technology 1
157 job replacment is a misgudied assumption new world new jobs 5
158 New jobs such as algorithms forensic experts, digital ethicists, AI ethicists 4
159 Computer scientists 1
160 data scientist big data engineer 1
161 automation and human in the loope 1
162 JOb Loss 3
163 Large auditing firms 1
164 changing job role of accountants 4
165 technical and ethical competencies, intelligence, creativity, awareness of software application vision experience 2
166 company 2 order AI project die in the pilot stage don't understand 1
167 Risk of own ecistence 1
168 has the resources but no interest to get themselves into this 1
169 directors not tech competent 1
170 Company type 1 ommitted to changes designed business strategy and succeed 1
171 Success driver 1 board of directors typically AI literature 1
172 resources at enterprise level, and indiviudal level to educe one self 1
173 GoldmanSchs example 1
174 Need to bring people on Board 1
175 small auditing firms 1
176 Not relevant 2
177 How to build an Organisations with data 6
178 Interaction between people 2
179 Computational Infratucture 1
180 significant investment & expertise requried 1
181 Creativity 4
Sheet1
Ready
Nodes 27012022
Search (Alt+Q)
File Home Insert Page Layout Formulas Data Review View Help Acrobat Refinitiv
Cut Copy Format Painter Paste Clipboard
Segoe UI 9 Font
Wrap Text Merge & Center Alignment
General Number
Conditional Formatting Format as Table
Normal Neutral
AutoSave Off
A1 Name
1 2 3 4 5 6
A B C
182 Future of Work
183 Cobbaboration & communication
184 Creativity & Curiosity
185 Ask Smart & right questions
186 Adaptability
187 Growth Potential
188 Resilience
189 empathy
190 Talent
191 Ethical use of data
192 Example-Trustworthy AI Explability Toolkit from IBM
193 Accessibility-availability
194 as trustworthy as the person who writes the code
195 issue of privacy and trustworthiness
196 data driven approaches are not the solutions to all our problems
197 going through an a ethics reveiw
198 accessibiiilty, property
199 control needs to be in place
200 data infrastructure, data quality and data literacy.
201 envison a voting system for consensus on AI algorthms Controls like blockhian
202 Multi faceted elements for creating trust in AI
203 security, privacy, tansparency, governance,ethics, empathy
204 Data owership input how the data is acquired
205 earlier adaptors to push the market
206 digital plaform model digital platform strategy
207 where is the value
208 do you have the skills
209 how to attract people
210 encourage and support use interaction
211 how your platform integrate future technologies such as blockchain
212 Real life examples
213 Data driven
214 Importance of Data for companies thrive or fail
215 Limitation or constrains of current use of data
216 careful thought on data structure, format and storeage
217 current user cases
Sheet1
Ready

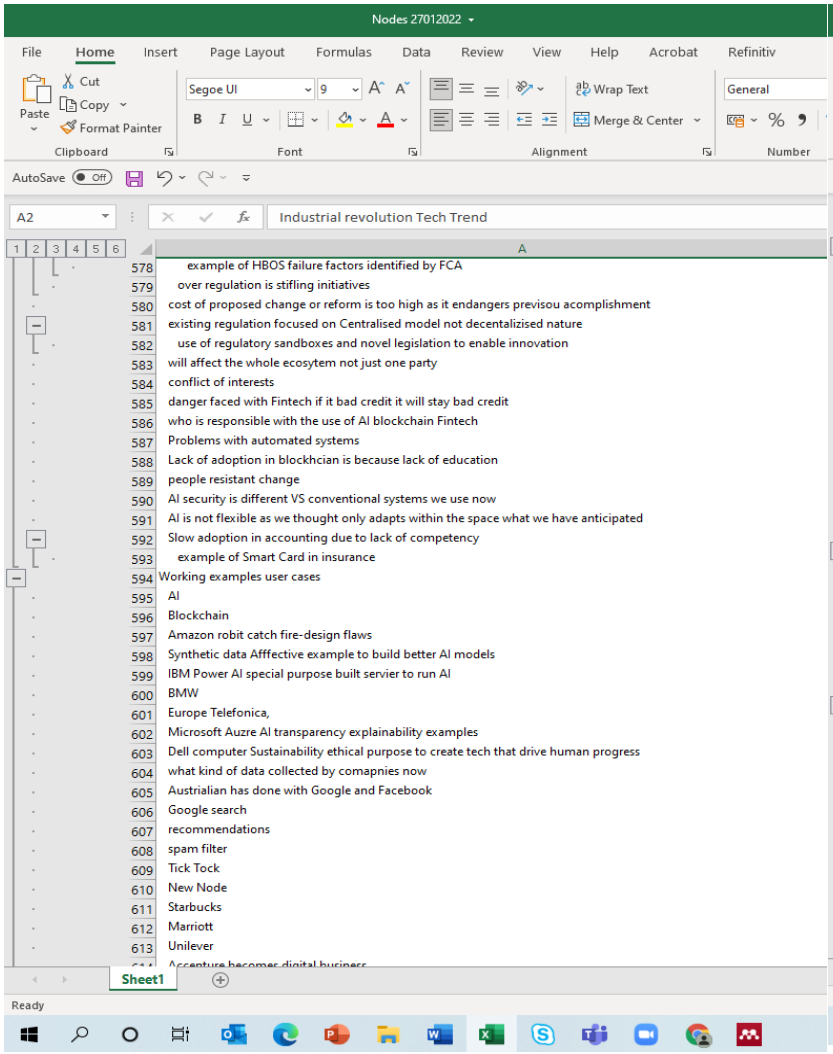

Nodes 27012022
Search (Alt+Q)
File Home Insert Page Layout Formulas Data Review View Help Acrobat Refinitiv
Cut Copy Format Painter Paste Clipboard
Segoe UI 9 Font
Wrap Text Merge & Center Alignment
General Number
Conditional Formatting Format as Table
AutoSave Off
A1 Name
how to enable Data centric AI, start aligning with business problems
asking the right questions of the Data
Questions about atuonomy agency assurance indicators interfaces and inteionality
Holistic improvement in software, data and model
labelling data at creation
sustained support for crearing an AI and data culture
digital transformation initiative
Cloud data accessiblity and control
Blockchain for AI AI for blockchain
different view Blockchain make it more accuracy but can't help with bias
Bloccкhain to reduce trasaction costs for cross coumapny connections
blockchain to make these responsible AI
blockchain to detect bias
Yoti example
capacity to innovate
need far less regulation if auditors truley independent
Resilience
enginnering mindset
Cybersecurity is a data problem
examples
Cost is a motivator when it comes to migrating infrastructure to the cloud
less visibility in your security due to heavily erly on thrid parties
forms of attach
example framework Prescptive Value Pass to identify vlunerabilities and review of staff and training infrstructre
how to deal with it
use the most secure plaforms to get your hands on
Emails (attachment) should be dropped
Cloud platform, encrypted, purposefully designed and built for board
have the procedures in place
additional respaondsiblity for the board
board members are curious, and ask the right questions
empowering your Chief security officers (SCO)
holding people accountable for Matrix
speed
improve
part of everyone's role particulart role of IT
who is responsible
Directors
use aggressive and questionalbe accouting policies with consequences
Culture in most Boards is a problem for personal liability
must be propertly trained in fiduciary duties and accountants responsiblities
a decision not to include director responsibility for internal controls
new UK proposal
UK company ACt 2006 ensures all directors details are public info
not accountable
stewards of any public company Stakeholders hold director to account
Fraud is fraud, bad actors exists
unclear how regulation prevent this
fraudsters must go to jail or be fined
Code of Conduct is not going to work
Tone at the top
emerging global fraud trends
1 corruption 2 asset misappropiration 3 financial statement fraud
cyberfraud
ransomware
figures showing fraud
NEDs
accountants
less regulation and better Moral & ethics
Audit committee
accountability in automated systems
Avoid human being in ethical crumble zone
Ethics review panel
role of CIOs
The Boards
evolving histoty better monitory but take more time to do that effectively
Board refreshment feedback among board members compensation
board communication platform
Hybrid approach is likely to be on into the futuer
Physical interacaction
participate remotely increase diversity
human solution rather than a technology solution to remote meeting setting
Sheet1
Ready

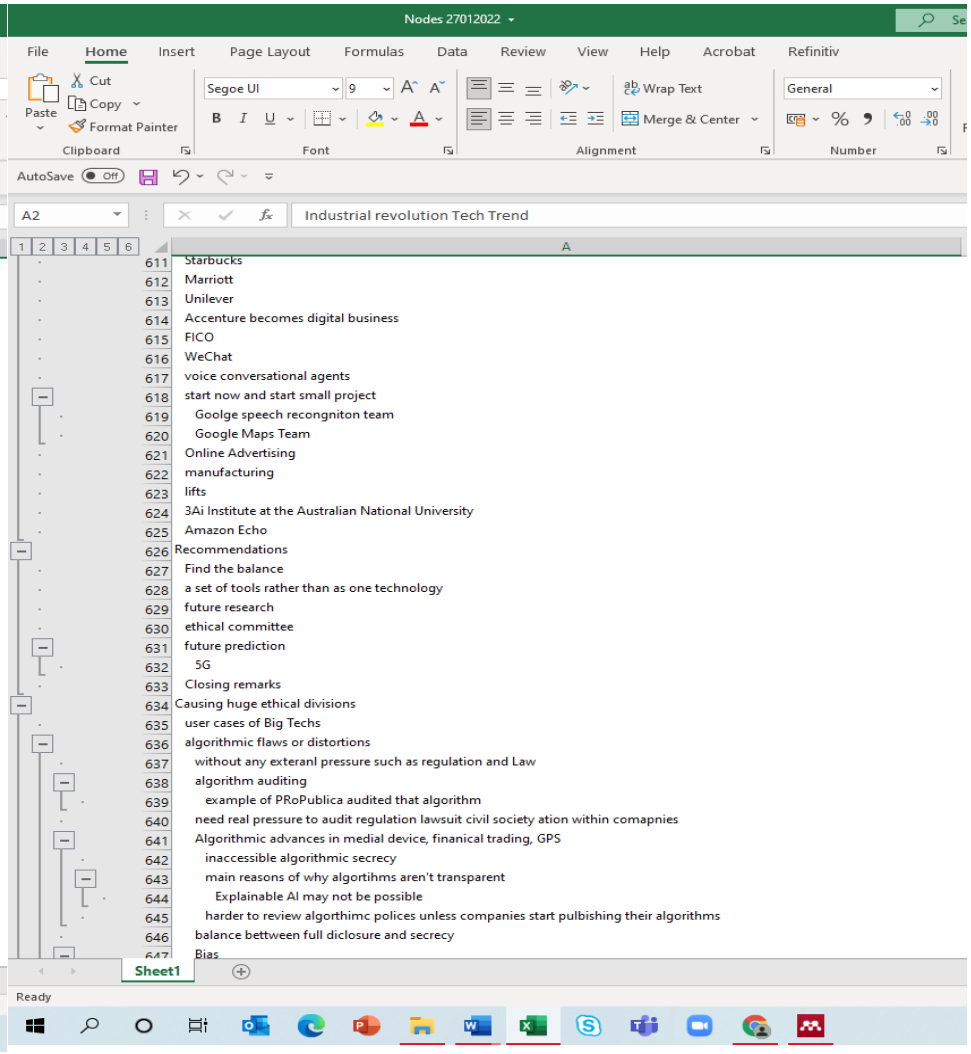

Nodes 27012022
Search (Alt+Q)
File Home Insert Page Layout Formulas Data Review View Help Acrobat Refinitiv
Cut Copy Format Painter Paste Clipboard
Segoe UI 9 Font
Wrap Text Merge & Center Alignment
General Number
Conditional Formatting Format as Table
AutoSave Off
A1 Name
governance analytics tools such as AI incresing important
board expectation from the use of Tech
Governance
Level of AI-Literatcy at Executive level
ethical design fit for purpose ultimately intended use
Encouraging Ethics Value embbeded in the system
AI Ethics and Governace is about People process culture leadership
a system of checks and balance, having different profiles is important diverse
seduced emotionally or judgemental need people to think differently
organizational Culture
bad culture produce bad AI
Pople has the courage to speak out and call it out on unethical behavirour
Cultural difference affect implementation and acceptence of using AI
Ethics and Culture Value AI
cultural diveristy
Change managment is needed
consumer centric
Ethics embed in the design of organisation to valur ethics first
leadership
data literacy Culture and People
3Cs Curiousity creativity Critcal thinking
develop soft skills
ability to question data to estabilsh trust
data strateg align with goals Purpose
we cannot oursource our responsiblity to machines holde human values and human ethics
Intended purpose
1 understand our own intelligence
whistleblowing
strategic priorities
Team support
Tone on the top
Focus on people
blockhcain permit decentralized coproate culture
use outsourced provision of services to ensure disclosure diligence
Example AI powered Tools in hiring process
forHumanity external independet audit for ther data processing
Sheet1
Ready
forHumanity external independet audit for ther data processing
Ethics and Goverannce Frmework to help them innovate responsibly
AI is largely a matter of risk managment
Continous monitoring the systems
in house or buy in Controls
disclosure conflicts of interest
partnership and investment
alignment trust flexbility
example of alignment learn from investors who bring that best practices
how to select the best partner
benefits of wider partnerships
industry problems
use AI to solve problem
Example of Blue Fire AI,
value creation characteristics
key question to ask
Multis-takeholder collaboration
porfolio apporach to have different mindset
People don't participant
online meeting enable full participation
Brings diversity power of collabration
build a more inclusive culture
Example of FinTech For All
Cultural learning
Blockchain is a coordination technology
continous training and education of yoru workforce
a normal EC plus an ethical CV
Tech Compentecy board drive success
C-Suite start the digital transofrmation with AI
1et up a task force to start
2 start to incubate projects to look for use cases
organisation awareness
Smart learning around toboost the data literacy
Talent People Diversity Inclusion equality
digital leadership talent tech goverancne
data scientists
training in fruad corruption control or awareness

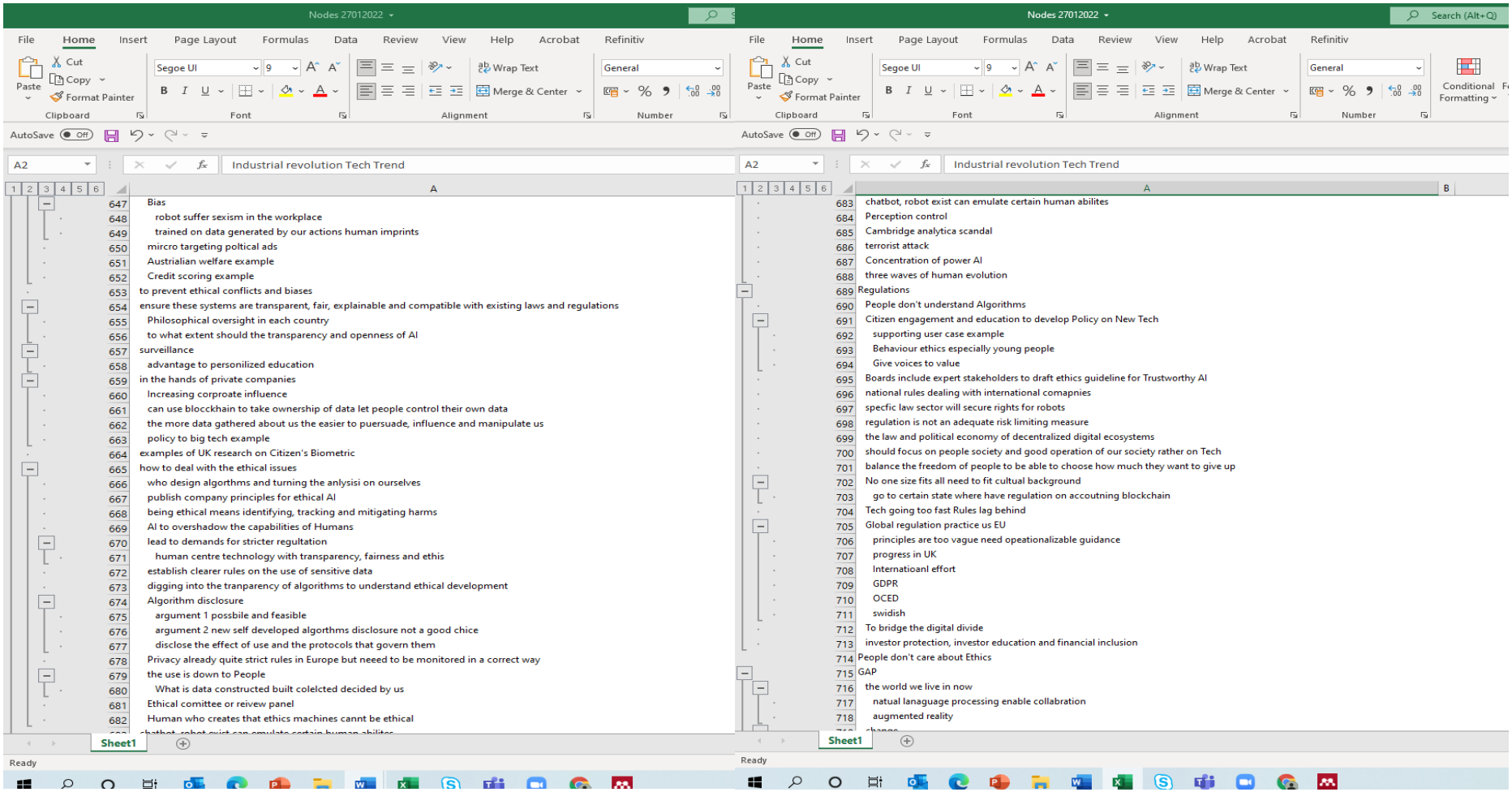

Nodes 27012022
Search (Alt+Q)
File Home Insert Page Layout Formulas Data Review View Help Acrobat Refinitiv
Cut Copy Format Painter Paste Clipboard
Segoe UI 9 Font
Wrap Text Merge & Center Alignment
General Number
Conditional Formatting Format as Table
AutoSave Off
A1 Name
training in fruad corruption control or awareness
ethical awareness of digital hardness
automation has to be a prudence decision
Moral distance
Learning practical application social good
hire an ethicist or form ethical review panel
understand your business problem in depth and then choose WHich Tech
Work on Constant feedback loops
continuous improvement journey
Simplicity is imporant more info does not mean anything
human nature not read all the terms and conditions lenghy polices
ensure board do not lost the sight of the most importnat insights
role of the secretaries of the board
make it easier for employees
real think about simplication before you automate
simple for people
3 Triangles at the heart of the finance Product governance fiduciary responsiblity and investor education
on can be heped with AI the others are very human dependence
sales remits from pharmaceutical company impacts fiduciary resonsbility
investor education
product governance
Ethical watchpoint
natual human bias
how you do anything with ML and AI
energy usage environemtnal issues
serving criminal enterprises bitcoin yuu cna't really see who owns that wallets
Bias along with who is use the tech for what purpose
Privacy issues
example of Truata Founded in 2018 by MasterCard and IBM Anonymization to protect privacy
survey indicate people care about data privacy
big data big business --Value
productive gains resouce efficiency improve products and services personalized engagement with customers
Real time traffic avoidance navigation
global healeh emergency
What safeguards we can deploy how to interprete regulation
Two main achievement og GDPR
example from data excellence
how do companies actually strike this balance (big data and Privacy)
C level strategic issue for companie
enhancing their privacy capabilities deep into their organisations
anonymization
de-identification
Philosophical view on Privacy to serve the collective good
example of Shell
Job loss
Auditing AI and Autonomous systems ForHumanity
the need for a robust system of oversight
What trust is
BlaBlaCar example
trust evolved in three signigicant chapters
Uber and Didi
Trust in financial markets no trust no market
Independence from Sarbanes-Oxley Paraphrased by Ryan
Morality
AAA governance principles Risk assessment, operation AUdit trails, and system adherence to juridicational requirmetns
Safety in automous system Examples
Stakeholder collaboration examples
Enforcement vehicles insurers, courts and government agencies
Critical thinking
What customer wants Tech Choice flexbility warmth emaphty expertise of people
purpose vision value 3 starting points for comapny to think
People
product and Value
cultural
not build a more inclusive culture
what is cultural
Anticipate its benefits proactively for your business
Peceived Tech Adoption (AI& Blockchian)Benefits
Save time, energy, improve process
improve decision making, new product and Service, tackle climate change
reduced human effort, time
Decentralization of Trust, Transfer, and Settlement
Sheet1
Ready

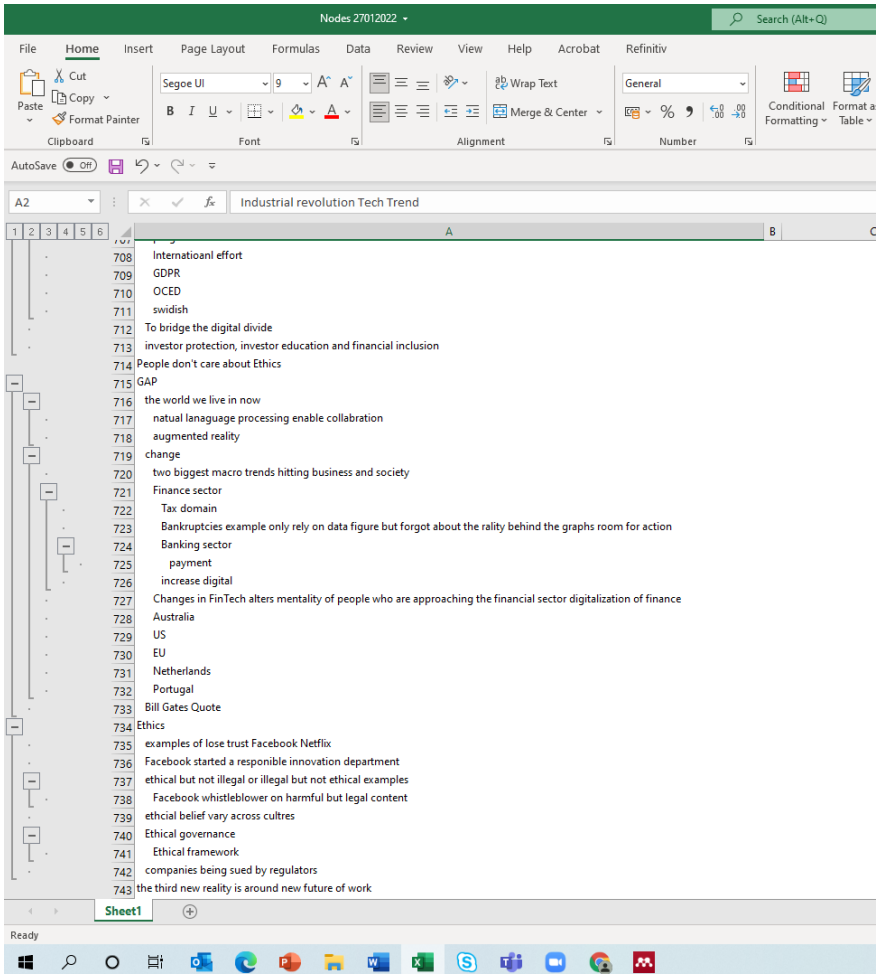

Nodes 27012022
Search (Alt+Q)
File Home Insert Page Layout Formulas Data Review View Help Acrobat Refinitiv
Cut Copy Format Painter Paste Clipboard
Segoe UI 9 Font
Wrap Text Merge & Center Alignment
General Number
Conditional Formatting Format as Table
AutoSave Off
A1 Name
1 2 3 4 5 6 A B C
433 create more transparent and fair marketplaces,value chains
434 Simplified process democratization of data
435 maximize holistic insights
436 make smarter decisions, automate task,
437 move toward real-time analytics
438 making predictions
439 Checking manufacture products for defects
440 ability to monetize our data and turn it into a tradeable asset
441 Augument our jobs much quicker and more accurately
442 potential to improving efficeincy
443 focus on more creative work
444 empower humanity to tackle the greatest challenges
445 Fraud detection
446 detect unusual activities
447 will the use the the tech reduce unethical behaviour
448 decetnalised protocol foster ethical practice in financial reportin
449 empower managers, promote more collaboration and aprticipants from stakeholders
450 Take ownerhsip of your data
451 contributor to productivity
452 Peceived Tech Adoption (AI & Blockchain) Ease of use
453 Automation
454 Algorithms to recognise and predict
455 Automated distribution of value creation and rendering
456 analytics process automation (APA)
457 user cases of APA Analytics process automation
458 Delegation of authority
459 Ethics in Delegation
460 Changes in social systems
461 Emotionally conencted to Robo
462 mindset change to unlearn the current processes
463 Interoprability
464 Internet of Value rewirte economic power and old social order
465 digital platform business model vs traditional
466 Internet of Things connectivity
467 different vison about work and results
468 new technical standards
Sheet1
Ready
Nodes 27012022
Search (Alt+Q)
File Home Insert Page Layout Formulas Data Review View Help Acrobat Refinitiv
Cut Copy Format Painter Paste Clipboard
Segoe UI 9 Font
Wrap Text Merge & Center Alignment
General Number
Conditional Formatting Format as Table
AutoSave Off
A1 Name
1 2 3 4 5 6 A B C
469 sociology not technology will decide the electric car race
470 customer who decides
471 Tech companies makes their last product obsolet with an upgrade
472 car examples
473 Capitalism
474 have proper digital culture to respond t the changes
475 Business model to tech enabled business and support function wil change too
476 individuals not trust government to make them do societal hange, they trust companies
477 New world with no jobs
478 AI is already exist in our life
479 New laws came in California for discloure the current use around AI
480 Young generation takes up virtual economy
481 Youn VS OLD
482 Trading on Apps
483 Internet Influencer followers
484 the future of professions
485 change in human experience new reality Covid example
486 shape insitutions
487 Crypto assets
488 Utilitarian Approach in humans performance (Human and AI)
489 Critics of common sense
490 who are the influencers
491 Capitalist vurvive unitl tomorrow pespective tech is good for cost saving when firing staff
492 integrate ethcial view only because by law from the state you are obliged to do it
493 companies plays their games to accommdate the changing consumer preferences
494 board need to satisfy the organisation
495 beholden to shareholder values C suite
496 company resposnible for sharehlders but lead on societal issues
497 de facto structure of the market
498 example on the need for financial returens and the focus on social good
499 Ideology who creates the value The Boss or the worker
500 moving into People and proft and planet Sustability human centric
501 Decocrach lead the way hopefully
502 ethical choise based on maximisum the intended outcome
503 beyond must your own profits think about communities
504 sustainibility
505 Why sustainability is important
Sheet1
Ready


Nodes 27012022
Search (Alt+Q)
File Home Insert Page Layout Formulas Data Review View Help Acrobat Refinitiv
Paste Cut Copy Format Painter
Segoe UI 9 Wrap Text Merge & Center General
Conditional Formatting Format as Table
Clipboard Font Alignment Number
AutoSave Off
A1 Name
Why sustainability is important
massive data create a massive carbn footprint
crypto tweets enegy impact
market is growing for circular markets
How do we integrated sustainablity to incorprate it in to our operations
Profit driven or Plant driven that drives sustaianbilty in business
key shift in the stakeholders pushing for sustaiability
external influencers or competitions around the globa
use Tech to help
give employees choice on devices
to the good of society
theoretical and practial refection on the meaning of our actions
Utilitarian approach
virtues of the person agent centred
holistic approach
Common good
Capabilities
AI capabilities
Speedy calculation
resolving unethical issues
Speed, precision and accuracy
reverse engineering and mimicking human sensory & processing capabilities
Blockchain capabilities
adaptability People ability adapt to change
Capacity to innovate
Structural
Less Hierarchy
AI operates just like bureaucracies based on rules
Human + AI
Siri
diagnosing cancer
algocracy human not kept in the loop
business proces re-engineeering across the organisation
decentralized
or need a little bit more centralized
Decentralised automous organisation
Problem with Autonomous organsiation
New Node
Need cultural awareness and human awareness
self serve self service
investors look to investor structual winners
Flexbilbe
Limitations and Challanges of adoption
existing social systems Cultural differences
AI challenges trust issues
Bias in algorithms
transparency
data security Cybesecurity
accountabiity
privacy
Explaniability
human problems
fallibility, dishonesty,good old stupidity in build
Issues with Trust Insituional organisational and personal
Its not AI that needs to be trustworthy but the humans behind it
human touch can never be replaced
depends on how humanity decide to use it
Colonial mentality are the problem not AI
we haven't found a common trhread across human culures
human memory is famously flawed
Trust needed in Data
Critics whether works in different environment
Lack of skills
business needs diverse solutions AI solution may become Siloed within Orga
challenges around culture, leadership, and skills, existing business models
data sit in current legacy systems
how old is your legacy system
Uniqueness of Human
Sarbanes-Oxley has been so bad for the US
the problem of current auditing system
big 4 are hugely influential in both standard setting and regulation
whoever pays the piper calls the tune
Sheet1
Ready

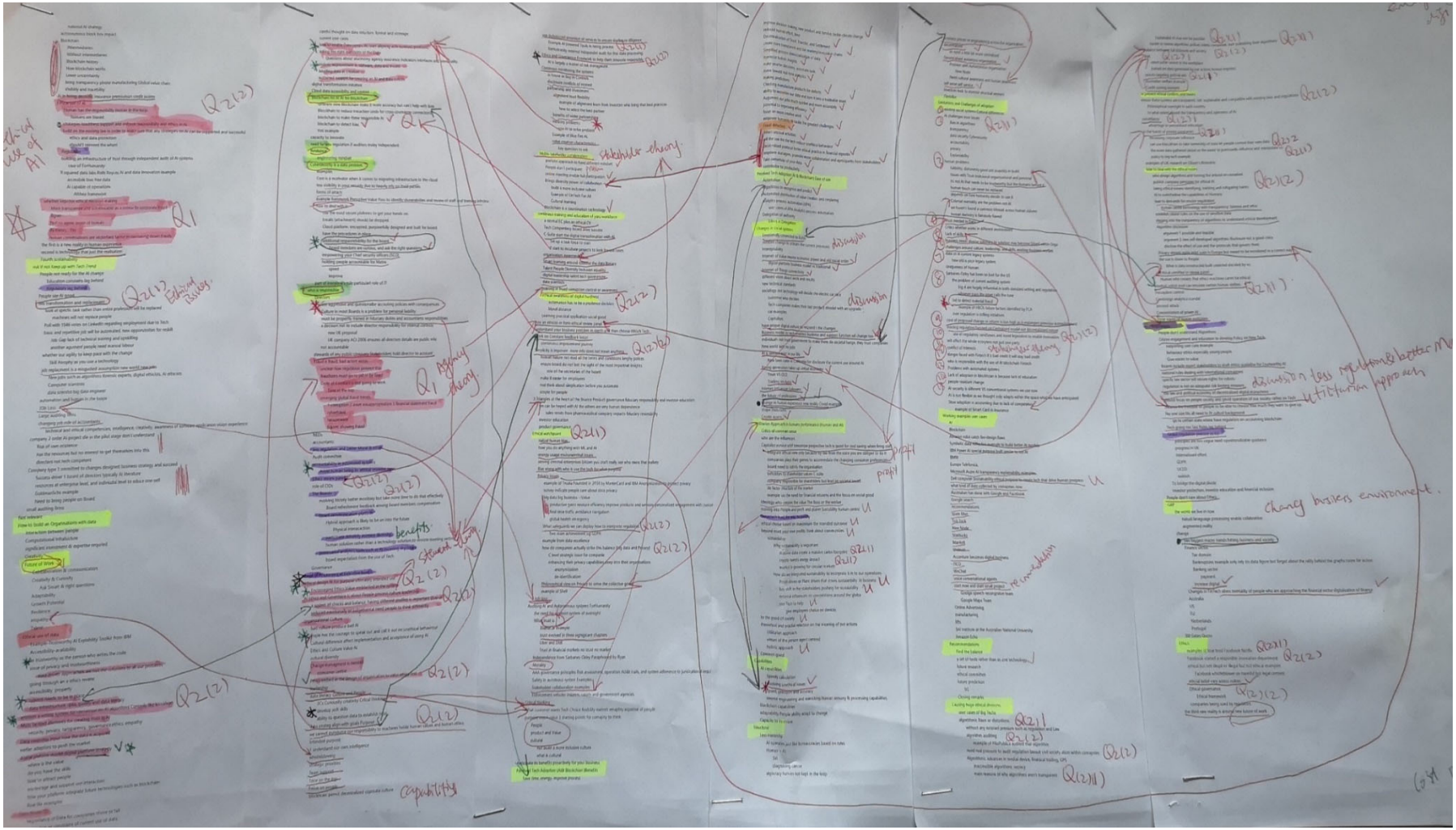

Nodes 27012022
File Home Insert Page Layout Formulas Data Review View Help Acrobat Refinitiv
Paste Cut Copy Format Painter
Segoe UI 9 Wrap Text Merge & Center General
Clipboard Font Alignment Number
AutoSave Off
A2
Industrial revolution Tech Trend
A
578 example of HBOS failure factors identified by FCA
579 over regulation is stifling initiatives
580 cost of proposed change or reform is too high as it endangers previsou acomplishment
581 existing regulation focused on Centralised model not decentalizised nature
582 use of regulatory sandboxes and novel legislation to enable innovation
583 will affect the whole ecosytem not just one party
584 conflict of interests
585 danger faced with Fintech if it bad credit it will stay bad credit
586 who is responsible with the use of AI blockchain Fintech
587 Problems with automated systems
588 Lack of adoption in blockhcian is because lack of education
589 people resistant change
590 AI security is different VS conventional systems we use now
591 AI is not flexible as we thought only adapts within the space what we have anticipated
592 Slow adoption in accounting due to lack of competency
593 example of Smart Card in insurance
594 Working examples user cases
595 AI
596 Blockchain
597 Amazon robit catch fire-design flaws
598 Synthetic data Afffective example to build better AI models
599 IBM Power AI special purpose built servier to run AI
600 BMW
601 Europe Telefonica,
602 Microsoft Auzre AI transparency explainability examples
603 Dell computer Sustainability ethical purpose to create tech that drive human progress
604 what kind of data collected by comapnies now
605 Austrialian has done with Google and Facebook
606 Google search
607 recommendations
608 spam filter
609 Tick Tock
610 New Node
611 Starbucks
612 Marriott
613 Unilever
Sheet1
Ready


Nodes 27012022
File Home Insert Page Layout Formulas Data Review View Help Acrobat Refinitiv
Paste Cut Copy Format Painter
Segoe UI 9 Wrap Text Merge & Center General
Clipboard Font Alignment Number
AutoSave Off
A2
Industrial revolution Tech Trend
A
611 Starbucks
612 Marriott
613 Unilever
614 Accenture becomes digital business
615 FICO
616 WeChat
617 voice conversational agents
618 start now and start small project
619 Goolge speech recongniton team
620 Google Maps Team
621 Online Advertising
622 manufacturing
623 lifts
624 3Ai Institute at the Australian National University
625 Amazon Echo
626 Recommendations
627 Find the balance
628 a set of tools rather than as one technology
629 future research
630 ethical committee
631 future prediction
632 5G
633 Closing remarks
634 Causing huge ethical divisions
635 user cases of Big Techs
636 algorithmic flaws or distortions
637 without any exteranl pressure such as regulation and Law
638 algorithm auditing
639 example of PRoPublica audited that algorithm
640 need real pressure to audit regulation lawsuit civil society ation within comapnies
641 Algorithmic advances in medial device, finanical trading, GPS
642 inaccessible algorithmic secrecy
643 main reasons of why algortihms aren't transparent
644 Explainable AI may not be possible
645 harder to review algorthimc polices unless companies start pulbishing their algorithms
646 balance bettween full diclosure and secrecy
Bias
Sheet1
Ready

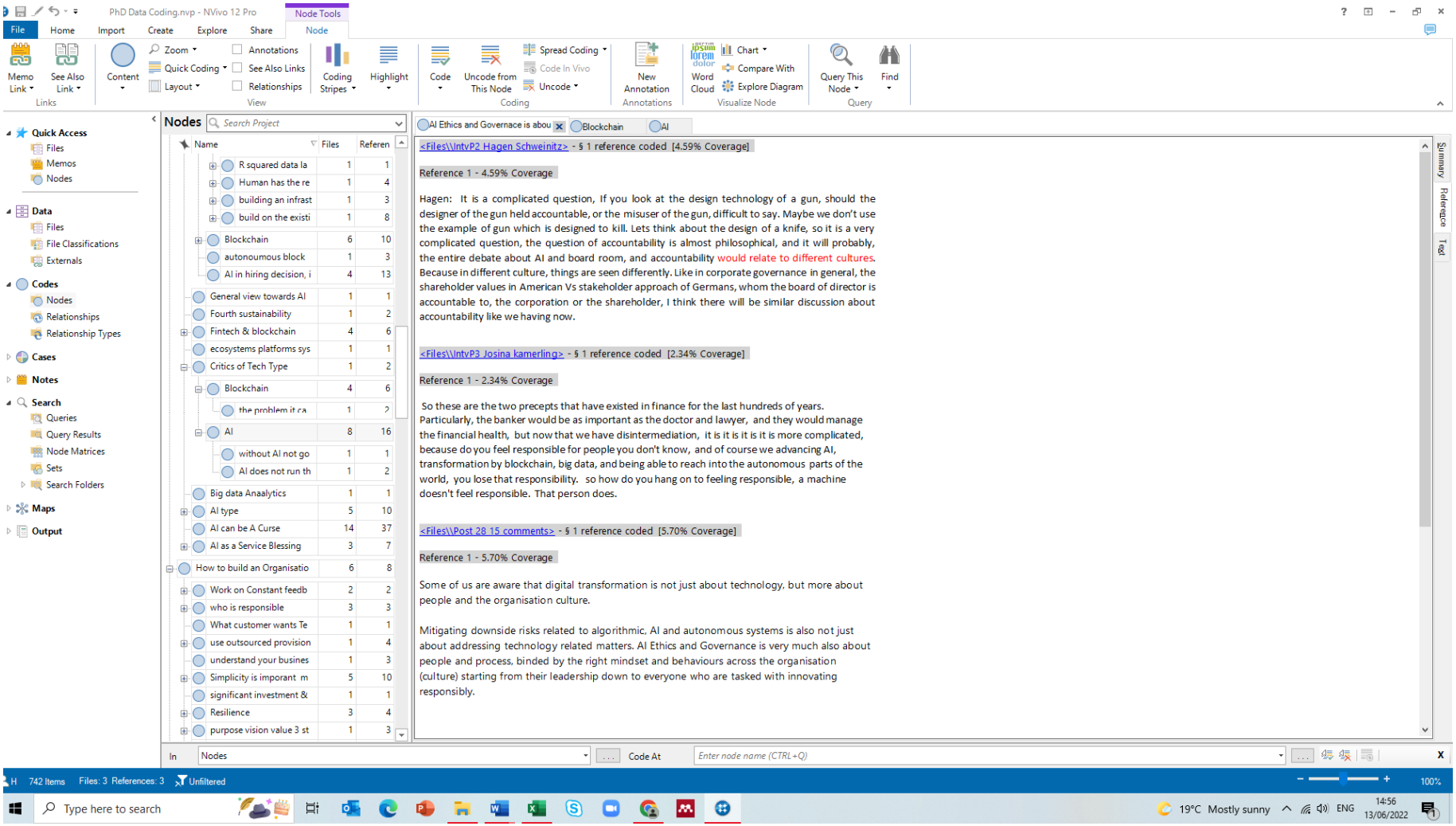

Nodes 27012022
Industrial revolution Tech Trend
Bias
robot suffer sexism in the workplace
trained on data generated by our actions human imprints
mircro targeting poltical ads
Austrialian welfare example
Credit scoring example
to prevent ethical conflicts and biases
ensure these systems are transparent, fair, explainable and compatible with existing laws and regulations
Philosophical oversight in each country
to what extent should the transparency and openness of AI
surveillance
advantage to personilized education
in the hands of private companies
Increasing corproate influence
can use blocckhain to take ownership of data let people control their own data
the more data gathered about us the easier to puersuade, influence and manipulate us
policy to big tech example
examples of UK research on Citizen's Biometric
how to deal with the ethical issues
who design algorthms and turning the anlysisi on ourselves
publish company principles for ethical AI
being ethical means identifying, tracking and mitigating harms
AI to overshadow the capabilities of Humans
lead to demands for stricter regultation
human centre technology with transparency, fairness and ethis
establish clearer rules on the use of sensitive data
digging into the tranparency of algorithms to understand ethical development
Algorithm disclosure
argument 1 possbile and feasible
argument 2 new self developed algorthms disclosure not a good chice
disclose the effect of use and the protocols that govern them
Privacy already quite strict rules in Europe but neeed to be monitored in a correct way
the use is down to People
What is data constructed built colelcted decided by us
Ethical comittee or reivew panel
Human who creates that ethics machines cannt be ethical
chatbot, robot exist can emulate certain human abilites
Perception control
Cambridge analytica scandal
terrorist attack
Concentration of power AI
three waves of human evolution
Regulations
People don't understand Algorithms
Citizen engagement and education to develop Policy on New Tech
supporting user case example
Behaviour ethics especially young people
Give voices to value
Boards include expert stakeholders to draft ethics guideline for Trustworthy AI
national rules dealing with international comapnies
specfic law sector will secure rights for robots
regulation is not an adequate risk limiting measure
the law and political economy of decentralized digital ecosystems
should focus on people society and good operation of our society rather on Tech
balance the freedom of people to be able to choose how much they want to give up
No one size fits all need to fit cultual background
go to certain state where have regulation on accoutning blockchain
Tech going too fast Rules lag behind
Global regulation practice us EU
principles are too vague need opeationalizable guidance
progress in UK
Internatioanl effort
GDPR
OCED
swidish
To bridge the digital divide
investor protection, investor education and financial inclusion
People don't care about Ethics
GAP
the world we live in now
natual lanaguage processing enable collabration
augmented reality
Sheet1
Ready

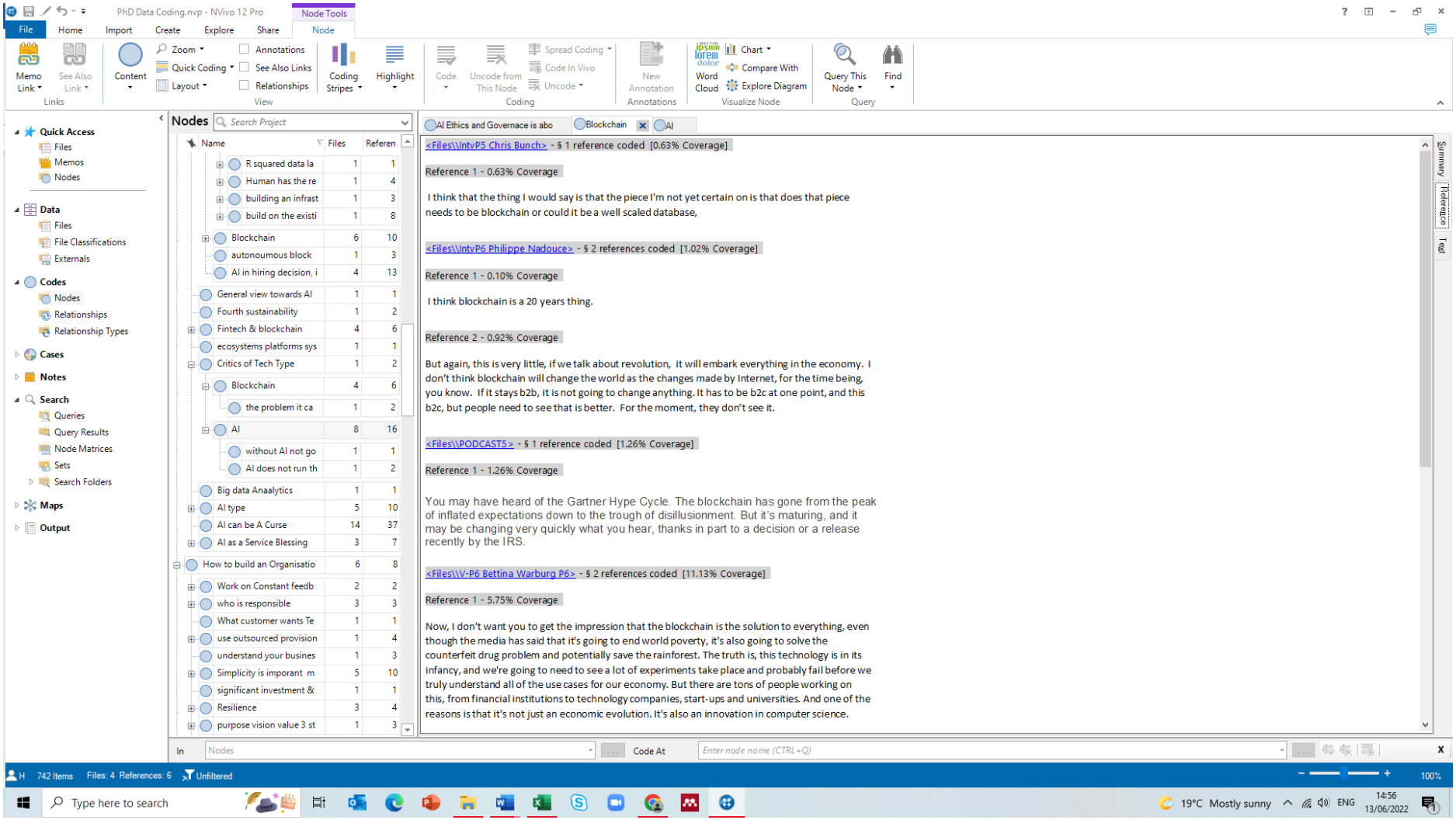

Nodes 27012022
Search (Alt+Q)
File Home Insert Page Layout Formulas Data Review View Help Acrobat Refinitiv
Cut
Copy
Format Painter
Paste
Clipboard
Segoe UI
9
Font
Wrap Text
Merge & Center
Alignment
General
Number
Conditional Formatting
Format a Table
AutoSave Off
A2
Industrial revolution Tech Trend
A
B
C
708 Internatioanl effort
709 GDPR
710 OCED
711 swidish
712 To bridge the digital divide
713 investor protection, investor education and financial inclusion
714 People don't care about Ethics
715 GAP
716 the world we live in now
717 natual lanaguage processing enable collabration
718 augmented reality
719 change
720 two biggest macro trends hitting business and society
721 Finance sector
722 Tax domain
723 Bankruptcies example only rely on data figure but forgot about the rality behind the graphs room for action
724 Banking sector
725 payment
726 increase digital
727 Changes in FinTech alters mentality of people who are approaching the financial sector digitalization of finance
728 Australia
729 US
730 EU
731 Netherlands
732 Portugal
733 Bill Gates Quote
734 Ethics
735 examples of lose trust Facebook Netflix
736 Facebook started a responible innovation department
737 ethical but not illegal or illegal but not ethical examples
738 Facebook whistleblower on harmful but legal content
739 ethcial belief vary across cultres
740 Ethical governance
741 Ethical framework
742 companies being sued by regulators
743 the third new reality is around new future of work
Sheet1
Ready

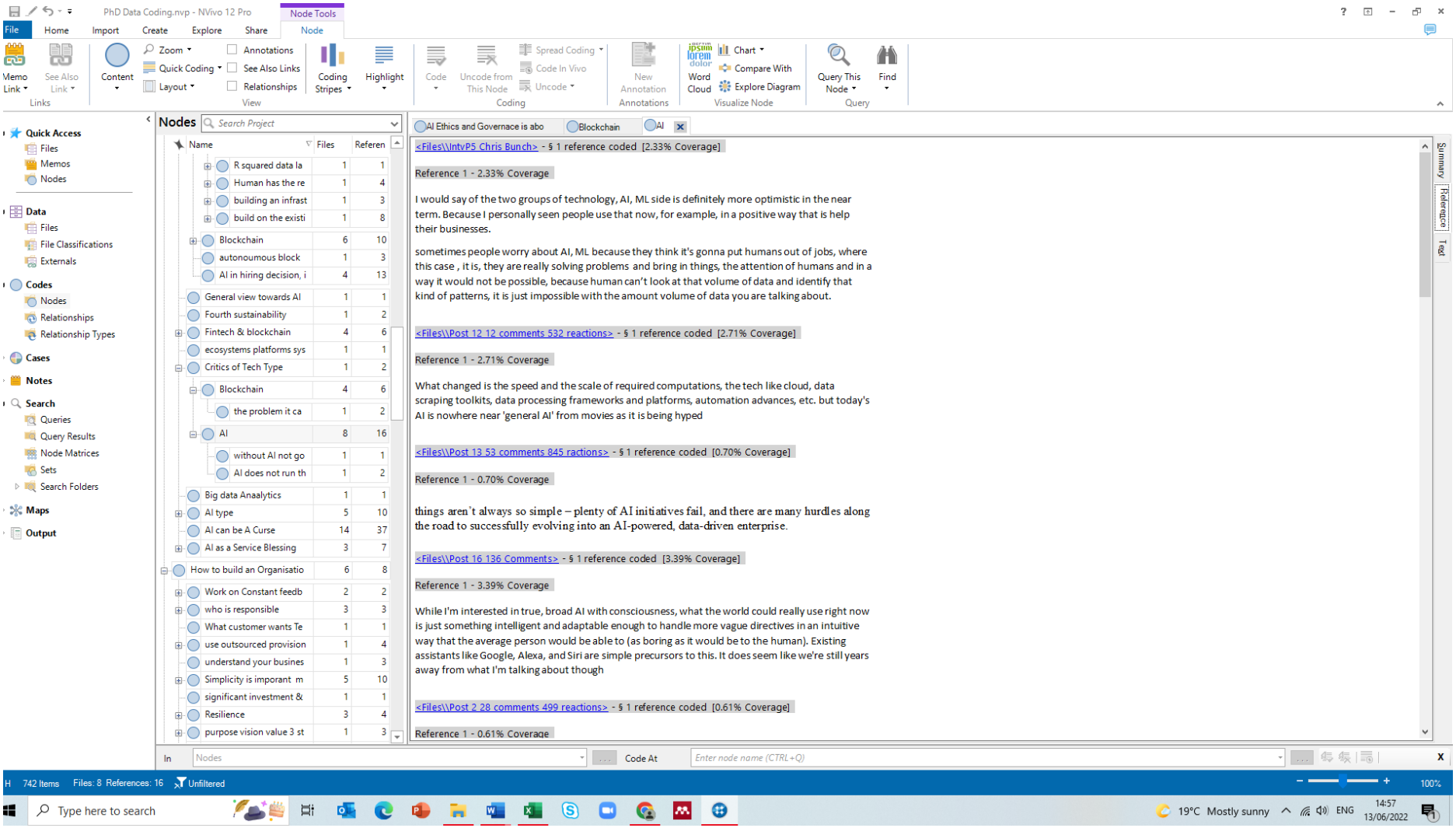
Appendix 11 Evidence of regrouping codes

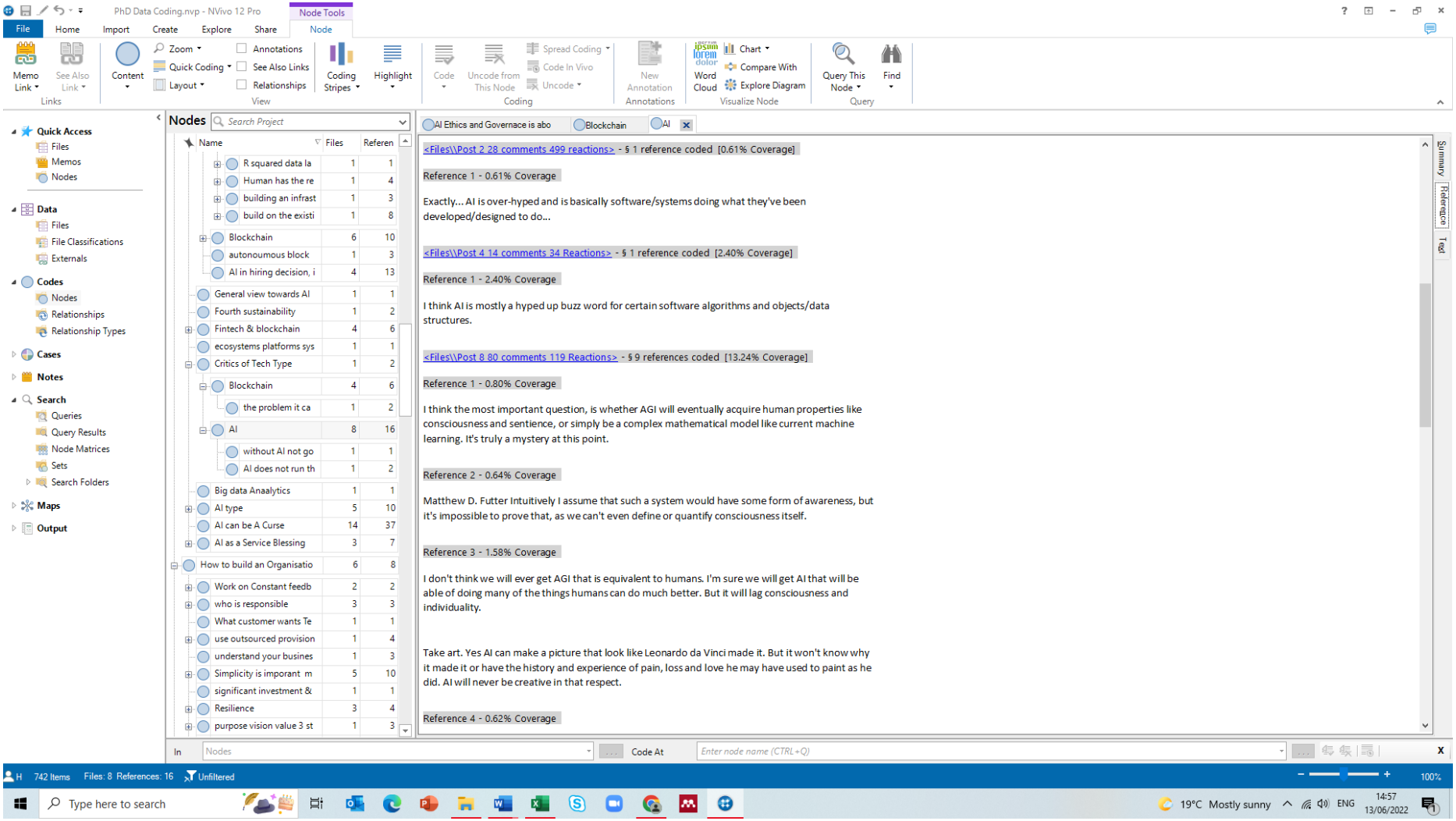


Appendix 12 Evidence of an example of original data extracted from the NVivo node




PhD Data Coding.nvp - NVivo 12 Pro
Node Tools
File
Home
Import
Create
Explore
Share
Node
Memo Link
See Also Link
Content
Zoom
Quick Coding
Layout
Annotations
See Also Links
Relationships
Coding Stripes
Highlight
Code
Uncode from This Node
Spread Coding
Code In Vivo
Uncode
New Annotation
Word Cloud
Chart
Compare With
Explore Diagram
Query This Node
Find
Links
View
Coding
Annotations
Visualize Node
Query
Quick Access
Files
Memos
Nodes
Data
File Classifications
Externals
Codes
Relationships
Relationship Types
Cases
Notes
Search
Queries
Query Results
Node Matrices
Sets
Search Folders
Maps
Output
Nodes
Search Project
Name
Files
Referen
R squared data la
Human has the re
building an infrast
build on the existi
Blockchain
autonoumous block
AI in hiring decision, i
General view towards AI
Fourth sustainability
Fintech & blockchain
ecosystems platforms sys
Critics of Tech Type
Blockchain
the problem it ca
AI
without AI not go
AI does not run th
Big data Anaalytics
AI type
AI can be A Curse
AI as a Service Blessing
How to build an Organisatio
Work on Constant feedb
who is responsible
What customer wants Te
use outsourced provision
understand your busines
Simplicity is imporant m
significant investment &
Resilience
purpose vision value 3 st
AI Ethics and Governace is abo
Blockchain
AI
<Files\\IntvP5 Chris Bunch> - § 1 reference coded [0.63% Coverage]
Reference 1 - 0.63% Coverage
I think that the thing I would say is that the piece I'm not yet certain on is that does that piece needs to be blockchain or could it be a well scaled database,
<Files\\IntvP6 Philippe Nadouce> - § 2 references coded [1.02% Coverage]
Reference 1 - 0.10% Coverage
I think blockchain is a 20 years thing.
Reference 2 - 0.92% Coverage
But again, this is very little, if we talk about revolution, it will embark everything in the economy. I don't think blockchain will change the world as the changes made by Internet, for the time being, you know. If it stays b2b, it is not going to change anything. It has to be b2c at one point, and this b2c, but people need to see that is better. For the moment, they don't see it.
<Files\\PODCAST5> - § 1 reference coded [1.26% Coverage]
Reference 1 - 1.26% Coverage
You may have heard of the Gartner Hype Cycle. The blockchain has gone from the peak of inflated expectations down to the trough of disillusionment. But it's maturing, and it may be changing very quickly what you hear, thanks in part to a decision or a release recently by the IRS.
<Files\\V-P6 Bettina Warburg P6> - § 2 references coded [11.13% Coverage]
Reference 1 - 5.75% Coverage
Now, I don't want you to get the impression that the blockchain is the solution to everything, even though the media has said that it's going to end world poverty, it's also going to solve the counterfeit drug problem and potentially save the rainforest. The truth is, this technology is in its infancy, and we're going to need to see a lot of experiments take place and probably fail before we truly understand all of the use cases for our economy. But there are tons of people working on this, from financial institutions to technology companies, start-ups and universities. And one of the reasons is that it's not just an economic evolution. It's also an innovation in computer science.
Summary
Reference
Text
In
Nodes
Code At
Enter node name (CTRL+Q)
742 Items
Files: 4 References: 6
Unfiltered
100%
Type here to search
19°C Mostly sunny
ENG
14:56
13/06/2022


PhD Data Coding.nvp - NVivo 12 Pro
Node Tools
File
Home
Import
Create
Explore
Share
Node
Memo Link
See Also Link
Links
Content
Zoom
Quick Coding
Layout
Annotations
See Also Links
Relationships
View
Coding Stripes
Highlight
Code
Uncode from This Node
Spread Coding
Code In Vivo
Uncode
Coding
New Annotation
Annotations
Word Cloud
Chart
Compare With
Explore Diagram
Visualize Node
Query This Node
Find
Query
Quick Access
Files
Memos
Nodes
Data
Files
File Classifications
Externals
Codes
Nodes
Relationships
Relationship Types
Cases
Notes
Search
Queries
Query Results
Node Matrices
Sets
Search Folders
Maps
Output
Nodes
Search Project
Name
Files
Referen
R squared data la 1 1
Human has the re 1 4
building an infrast 1 3
build on the existi 1 8
Blockchain 6 10
autonoumous block 1 3
AI in hiring decision, i 4 13
General view towards AI 1 1
Fourth sustainability 1 2
Fintech & blockchain 4 6
ecosystems platforms sys 1 1
Critics of Tech Type 1 2
Blockchain 4 6
the problem it ca 1 2
AI 8 16
without AI not go 1 1
AI does not run th 1 2
Big data Anaalytics 1 1
AI type 5 10
AI can be A Curse 14 37
AI as a Service Blessing 3 7
How to build an Organisatio 6 8
Work on Constant feedb 2 2
who is responsible 3 3
What customer wants Te 1 1
use outsourced provision 1 4
understand your busines 1 3
Simplicity is imporant m 5 10
significant investment & 1 1
Resilience 3 4
purpose vision value 3 st 1 3
AI Ethics and Governace is abo
Blockchain
AI
<Files\\IntvP5 Chris Bunch> - § 1 reference coded [2.33% Coverage]
Reference 1 - 2.33% Coverage
I would say of the two groups of technology, AI, ML side is definitely more optimistic in the near term. Because I personally seen people use that now, for example, in a positive way that is help their businesses.
sometimes people worry about AI, ML because they think it's gonna put humans out of jobs, where this case , it is, they are really solving problems and bring in things, the attention of humans and in a way it would not be possible, because human can't look at that volume of data and identify that kind of patterns, it is just impossible with the amount volume of data you are talking about.
<Files\\Post 12 12 comments 532 reactions> - § 1 reference coded [2.71% Coverage]
Reference 1 - 2.71% Coverage
What changed is the speed and the scale of required computations, the tech like cloud, data scraping toolkits, data processing frameworks and platforms, automation advances, etc. but today's AI is nowhere near 'general AI' from movies as it is being hyped
<Files\\Post 13 53 comments 845 ractions> - § 1 reference coded [0.70% Coverage]
Reference 1 - 0.70% Coverage
things aren't always so simple – plenty of AI initiatives fail, and there are many hurdles along the road to successfully evolving into an AI-powered, data-driven enterprise.
<Files\\Post 16 136 Comments> - § 1 reference coded [3.39% Coverage]
Reference 1 - 3.39% Coverage
While I'm interested in true, broad AI with consciousness, what the world could really use right now is just something intelligent and adaptable enough to handle more vague directives in an intuitive way that the average person would be able to (as boring as it would be to the human). Existing assistants like Google, Alexa, and Siri are simple precursors to this. It does seem like we're still years away from what I'm talking about though
<Files\\Post 2 28 comments 499 reactions> - § 1 reference coded [0.61% Coverage]
Reference 1 - 0.61% Coverage
Summary
Reference
Text
In
Nodes
Code At
Enter node name (CTRL+Q)
742 Items
Files: 8 References: 16
Unfiltered
100%
Type here to search
19°C Mostly sunny
ENG
14:57
13/06/2022


PhD Data Coding.nvp - NVivo 12 Pro
Node Tools
File
Home
Import
Create
Explore
Share
Node
Memo Link
See Also Link
Content
Zoom
Quick Coding
Layout
Annotations
See Also Links
Relationships
Coding Stripes
Highlight
Code
Uncode from This Node
Spread Coding
Code In Vivo
Uncode
New Annotation
Word Cloud
Chart
Compare With
Explore Diagram
Query This Node
Find
Links
View
Coding
Annotations
Visualize Node
Query
Quick Access
Files
Memos
Nodes
Data
File Classifications
Externals
Codes
Relationships
Relationship Types
Cases
Notes
Search
Queries
Query Results
Node Matrices
Sets
Search Folders
Maps
Output
Nodes
Search Project
Name
Files
Referen
R squared data la
Human has the re
building an infrast
build on the existi
Blockchain
autonoumous block
AI in hiring decision, i
General view towards AI
Fourth sustainability
Fintech & blockchain
ecosystems platforms sys
Critics of Tech Type
Blockchain
the problem it ca
AI
without AI not go
AI does not run th
Big data Anaalytics
AI type
AI can be A Curse
AI as a Service Blessing
How to build an Organisatio
Work on Constant feedb
who is responsible
What customer wants Te
use outsourced provision
understand your busines
Simplicity is imporant m
significant investment &
Resilience
purpose vision value 3 st
AI Ethics and Governace is abo
Blockchain
AI
<Files\\Post 2 28 comments 499 reactions> - § 1 reference coded [0.61% Coverage]
Reference 1 - 0.61% Coverage
Exactly... AI is over-hyped and is basically software/systems doing what they've been developed/designed to do...
<Files\\Post 4 14 comments 34 Reactions> - § 1 reference coded [2.40% Coverage]
Reference 1 - 2.40% Coverage
I think AI is mostly a hyped up buzz word for certain software algorithms and objects/data structures.
<Files\\Post 8 80 comments 119 Reactions> - § 9 references coded [13.24% Coverage]
Reference 1 - 0.80% Coverage
I think the most important question, is whether AGI will eventually acquire human properties like consciousness and sentience, or simply be a complex mathematical model like current machine learning. It's truly a mystery at this point.
Reference 2 - 0.64% Coverage
Matthew D. Futter Intuitively I assume that such a system would have some form of awareness, but it's impossible to prove that, as we can't even define or quantify consciousness itself.
Reference 3 - 1.58% Coverage
I don't think we will ever get AGI that is equivalent to humans. I'm sure we will get AI that will be able of doing many of the things humans can do much better. But it will lag consciousness and individuality.
Take art. Yes AI can make a picture that look like Leonardo da Vinci made it. But it won't know why it made it or have the history and experience of pain, loss and love he may have used to paint as he did. AI will never be creative in that respect.
Reference 4 - 0.62% Coverage
Summary
Reference
Text
In
Nodes
Code At
Enter node name (CTRL+Q)
742 Items
Files: 8 References: 16
Unfiltered
100%
Type here to search
19°C Mostly sunny
ENG
14:57
13/06/2022