Christian ethical guidelines to artificial intelligence and technological singularity

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DECLARATION

I, Etienne van Heerden, student number 33407363, hereby declare that the thesis titled *Christian Ethical Guidelines to Artificial Intelligence and Technological Singularity*, submitted to North-West University in partial fulfilment of the requirements for the degree of Doctor of Philosophy, is my own original work.

I affirm that:

1. All information derived from other published or unpublished sources has been cited and referenced.

2. This work has not been submitted for any other degree or examination at North-West University or any other educational institution.

3. All research procedures have followed the ethical guidelines and received the necessary approvals.

4. Any views expressed in the thesis are my own and do not necessarily represent the views of North-West University.

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Etienne van Heerden, 1 November 2023, Paarl

DEDICATION

This thesis is dedicated to the numerous individuals who have been pillars of support, encouragement, and inspiration throughout this incredible journey. I wish to extend my gratitude to:

First and foremost, my spouse Martha and my two lovely daughters, Mia and Ilané, who have been my close support and constant encouragement. Your love has been my strength;

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My mother, who instilled in me the value of perseverance and hard work, and to my mother-in-law and father-in-law for their unwavering encouragement and spiritual support;

My sister Dinah, whose prayers and encouragement have been a constant source of strength;

My congregation, AGS Paarl Protea, for their support, prayers, and motivation, and to my church leadership, who have been incredibly supportive and have allowed me to focus on my research and writing;

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And finally, to Jesus Christ, to whom I give all the glory. His grace has empowered me and given me the strength to go beyond my natural ability.

PREFACE

The journey to complete this PhD thesis has been an arduous yet rewarding endeavour marked by challenges and accomplishments. The research presented here aims to explore *Christian Ethical Guidelines to Artificial Intelligence and Technological Singularity*. The rapid advancements in artificial intelligence, robotics, and other disruptive technologies sparked my interest in this subject. I was particularly intrigued by the potential intersections between these technological developments, biblical prophecies, and apocalyptic narratives in the biblical text.

To address the research questions, I adopted an articulated Pentecostal hermeneutical approach. The research journey, while intellectually fulfilling, presented several challenges. These ranged from pastoral responsibilities and personal and financial constraints to balancing family, church commitments, and academic research.

I extend my heartfelt gratitude to my advisors, Prof. Riaan Rheeder and Prof. Marius Nel, for their invaluable mentorship and unwavering support. My family's constant encouragement and my congregation, AGS Paarl Protea's, spiritual and motivational support have been indispensable.

The structure of this thesis is as follows: The first chapter introduces artificial intelligence, defines key terms, and outlines the research problem. The second chapter examines the church's role in the technological age, focusing on ethical challenges and the church's understanding of AI. This chapter also explores cinematic narratives to understand divine revelations beyond the Christian community. It delves into the objectives of transhumanism and the potential idolisation of technology. The third chapter offers an in-depth analysis of the ethical dimensions of AI development, discussing associated concerns and ramifications. It also scrutinises the ethical pitfalls of transhumanism and its potential threat to Christian values. The fourth chapter introduces a new hermeneutical framework, Generative Pentecostal Techneutics (GPTh), which is applied in the fifth chapter to apocalyptic texts and biblical prophecies. This application explores the conceivable links between apocalyptic events described in religious texts and the rapid advancements in AI.

Completing this thesis has been a transformative journey, instilling in me the importance of rigorous academic inquiry, resilience, and the invaluable role of a supportive community.

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My heartfelt appreciation goes to my sister, Dinah, for her prayers, and to my congregation, AGS Paarl Protea, for their spiritual and motivational support. I am particularly grateful to Pastor Wilma Visagie for her assistance and for the church staff's prayers.

I would also like to acknowledge the support of my church leadership, who provided me with the necessary freedom to conduct my research and draft this thesis.

Last, I give all glory to Jesus Christ, whose grace has empowered me to complete this work.

ABSTRACT

Technological advancements, like AI and robotics, combined with a hypothetical technological singularity during the Fourth Industrial Revolution (4IR), will challenge the relationship between Christian ethics and science, influencing the church's relevance in the 4IR. According to Dreyer (2019:2), the "crisis" of the church has much to do with changing contexts. Being relevant as a Christian church in the twenty-first century is much different from being relevant in the first century. Technological advancement affects our lives and forces a shift to a more progressive era. These shifts will happen increasingly faster as development and technological breakthroughs increase. Davis (2016:1) believes that the 4IR will extend the impact of technology in new and unpredictable ways. The problem is that parts of the world have yet to experience aspects of the Second and Third Industrial Revolutions, as Davis (2016:1) points out. It implies the emergence of cyber-physical systems in the 4IR, while the 3IR spreads and matures worldwide, contributing to further confusion and segregation.

Davis (2016:2) notes that feelings of uncertainty and fear will characterise the 4IR. Because of the complexities and disruptive nature of these technologies, it may look and feel like an exogenous force with the power of a tsunami. Although this is an industrial revolution like nothing human beings have seen before, we should remember that people's individual and collective choices ultimately drive these changes, and as Davis (2016:2) states: "it is a reflection of our desires and choices". The exponential technological development in the 4IR will reveal more about human ethics than all the previous industrial revolutions combined. This fast-changing technological landscape will require shifts from the Christian community as well. With this research, the researcher aims to provide the church with much-needed technological hermeneutics and ethics guidelines for AI in the 4IR.

Key terms

Fourth Industrial Revolution (4IR), artificial intelligence (AI), technological singularity, Pentecostal church, Christian ethics, technology hermeneutics.

OPSOMMING

Die tegnologiese vooruitgang van die Vierde Industriële Rewolusie (4IR) soos byvoorbeeld kunsmatige intelligensie (KI) en robotika, tesame met ’n hipotetiese tegnologiese singulariteit, daag die verhouding tussen Christelike etiek en wetenskap uit en raak die kerk se relevansie in die 4IR. Volgens Dreyer (2019:2) het die “krisis” van die kerk baie te make met veranderende kontekste. Om relevant te wees as ’n Christelike kerk in die een-en-twintigste eeu is baie anders as om relevant te wees in die eerste eeu. Tegnologiese vooruitgang beïnvloed menselewens, en dit is ’n duidelik dat 'n meer progressiewe era van die menslike bestaan aangebreek het. Hierdie verskuiwings vind al hoe vinniger plaas soos tegnologiese ontwikkeling en ontdekkings eksponensieel toeneem. Davis (2016:1) glo dat die impak van tegnologie tydens die 4IR op nuwe en onvoorspelbare maniere sal uitbrei. Die probleem is dat sekere dele van die wêreld nog nie eers alle aspekte van die Tweede en Derde Industriële Rewolusies ervaar het nie, soos Davis (2016:1) aantoon. Dit impliseer die opkoms van gevorderde robotiese stelsels tydens die 4IR, terwyl die 3IR skaars ten volle oor die wêreld heen gevestig is. Hierdie gaping dra by tot verdere verwarring en segregasie.

Davis (2016:2) merk op dat gevoelens van onsekerheid en vrees die 4IR sal kenmerk. Dit mag lyk en voel soos 'n eksogene krag met die impak van 'n tsunami weens hierdie tegnologieë se kompleksiteite en ontwrigtende aard. Alhoewel dit 'n industriële rewolusie is met ’n impak soos niks wat die mense nog ooit gesien het nie, moet ons onthou dat hierdie veranderinge uiteindelik deur mense se indiwiduele en kollektiewe keuses aangedryf word, en soos Davis (2016:2) sê: “*it is a reflection of our desires and choices*”. Die eksponensiële tegnologiese vooruitgang tydens die 4IR sal meer oor menslike etiek openbaar as al die vorige industriële rewolusies saam. Hierdie vinnig-veranderende tegnologiese landskap sal ook ingrypende verskuiwings van die Christelike gemeenskap vereis. Met hierdie navorsing poog die navorser om die kerk te voorsien van ’n noodsaaklike tegnologiese hermeneutiek en etiese riglyne ten opsigte van KI in die 4IR.

Sleutelterme

Vierde Industriële Rewolusie (4IR), kunsmatige intelligensie (KI), tegnologiese singulariteit, Pinksterkerk, Christelike etiek, tegnologie hermeneutiek.

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1.1 Background and problem statement

1.1.1 Background

When people face uncertainty about their future and questions about purpose and existence arise, they turn to faith institutions to search for answers (Benek, 2015a:393–406). As artificial intelligence (AI) develops into more sophisticated technologies, the voices warning against its possible risks grow louder (Barrat, 2013; Elon Musk Zone, 2021; Hawking, 2014; Marcus, 2013; Merritt, 2017; Musk, 2018; Thomas, 2022; Wilson, 2017). The church's role to bring hope, to establish emotional and spiritual stability, and to equip and guide, will become vital in the Fourth Industrial Revolution (4IR).

Reinke (2022:14) defines technology as applied science and amplified power. The word technology comes from the Greek *téchné-* or *technique* (art, skill, craft, the way, manner, or by means) + *-logia,* meaning "systematic treatment, method of performing or engaging and sayings, primarily referring to the sayings of Jesus" (Merriam-Webster, 2021). Gaur *et al.* (2021) state that *-logia* refers to the sayings, words or discourses, a hypothetical collection, either written or oral sayings of Jesus. Reinke (2022:14) concludes that technology is the amplification of our native powers through new techniques, and we can include that it is to honour God. Genesis 6-9 is a biblical example of amplification and technique. Reinke (2022:14) mentions that Noah and the animals could never outswim a global flood, so God designed a ship. David and Goliath were mismatched in their power potential, so David amplified his ability to overpower Goliath through the slingshot and technique. AI is thus the amplification of our biological abilities through the power of the microchip and programmed algorithms.

AI refers to machines that imitate human intelligence. With programmed algorithms, these machines can think and act like humans. The term may also applied to any machine that exhibits traits associated with the human brain, such as learning and problem solving (Proqis, 2021). Currently, there are two forms of AI. Strong AI and weak AI. Strong AI applies to machines that can think like humans. In contrast, weak AI refers to machines

that act as if they are intelligent (Kumar & Thakur, 2012:57). A search on Google reveals the daunting task of keeping up with AI evolution and how it should be categorised.

While AI development is still premature, scientists agree that AI can be divided into two main groups: AI based on ability and AI based on functionality.

AI based on functionality includes four types:

- Reactive machines (like Deep Blue, the IBM chess program and AlphaGo);
- Limited memory (machines have a small memory to learn, observe and judge before responding);
- Theory of Mind (the next big breakthrough). These machines will have a point of view like humans. They might be able to express emotions with behaviour like humans; and
- Self-aware AI (a speculative reality feared by scientists. This AI will be so advanced that it will develop self-awareness and self-understanding. If development reaches this goal of AI research, these machines might develop their own needs, beliefs, likes and dislikes).

AI based on ability includes three types:

- Artificial narrow intelligence (ANI) is also known as weak AI. This AI (like Apple's Siri, Alexa and Google's search predictions) corresponds to all reactive and limited memory machines mentioned above;
- Artificial general intelligence (AGI) is also known as strong or full AI. This type of AI is still a concept, but when developed, it will function like humans and be able to learn considerably faster than humans. AGI primarily deals with the Theory of Mind. Lastly,
- Artificial super intelligence (ASI) or Seed AI. These systems will be the pinnacle of AI perfection. Barrat (2013) calls it our final invention. They will significantly outperform human intellect and possibly endanger human existence (Sahu, 2021).

Technological singularity can be compared to biblical apocalyptic events in that it will transform humans and change the world. Kurzweil (2014:393–406) defines this time as a "period during which the pace of technological change will be so rapid, its impact so deep, that human life will be irreversibly transformed". Kurzweil (2014:393–406) predicts that this period will be marked by biological and machine intelligence amalgamation, the era of transhumanism. It will be a time when a large portion of "human" intelligence will become non-biological, with even a merging of virtual and physical reality.

Christians believe that the biblical eschatological events will profoundly change humanity and the world as we know it. Well-known Christian writers like Rick Warren, Rob Bell and Hal Lindsey claim that disruptive eschatological events can occur within a generation (Cole-Turner, 2012:777). When comparing these predictions to the hypothetical idea of technological singularity, also known as the "intelligence explosion", as advocated in the writings of Ray Kurzweil, they correspond; in their predicted timeframes, they happen within a generation. Is this a coincidence? According to Matthew 24:34, Jesus said: "Truly I tell you, this *generation* will certainly not pass away until all these things take place." (CSB, 2017) What generation? The context suggests the generation who sees the signs. Cole-Turner (2012:781) believes that the rebirth of Israel on 14 May 1948 could be the sign Jesus referred to, which could signify the start of the so-called *generation*.

While profoundly different in many ways, Christians use the Bible as a basis, whereas futurists and techno-scientists base their predictions on expectations about technological developments. Cole-Turner (2012:777) points out that these two perspectives share similarities in their forecast of the unfolding future.

Singularity is a term borrowed from "gravitational singularity" in cosmology. In cosmology, "singularity" refers to the prediction that gravity, at the centre of a black hole, causes infinite curvature of spacetime (Cole-Turner, 2012:788). Cole-Turner (2012:788) explains that part of the prediction is that the laws of physics break down at the singularity. When applied to technological advancement, "singularity" refers to the point where the laws that apply to technology break down, and the future after singularity becomes uncontrollable and unpredictable. This is also called our last invention (Barrat, 2013; Cole-Turner, 2012:788), and from here, superintelligence, also called Seed AI, will drive progress far

beyond human comprehension and control. Seed AI will exponentially produce more intelligent “offspring”. AI will no longer be a tool.

Christians have always been cautious of emerging technologies like, for example, the barcode (Watkins, 2001:4–9), credit cards and microchips (Rasell, 2012:9), labelling them in conspiracy terms as part of a satanic plan to connect Christians to the beast of Revelation 13. During the Covid-19 pandemic, nanobots, nanotechnology, radio frequency identification (RFID) chips or other digital tracking devices allegedly hidden in the Covid-19 vaccine became the new suspect (Thomas & Zhang, 2020:1–21; Woodward, s.a.:1–12). It implies a flawed understanding of technology and has created a possible deficiency between the church and the advancement of technology. But are these fears justified?

Some writers (Benek, 2017:2; Cole-Turner, 2012:779; Merritt, 2017:4; Noble, 2013) advocate that AI development is not just about inventing tools to benefit humanity but also about inventing a new religion, even a new god, which will come into existence in the end (Cole-Turner, 2012:779). Will AI be that god who surpasses human intelligence and transforms the world as we know it? Technology and faith exist side by side, sharing hopes and expectations, but is AI the hypothetical god of technological singularity who will manipulate humanity in ways beyond our comprehension? Will AI eventually escape our definition of a “tool”?

Radner (2020:82) states that although intelligent technologies like AI can solve complex ethical issues like more accurate health diagnostics and greener development, the fundamental constituent in discerning our use of AI as Christians must be the law of God according to the Scriptures and God’s self-revelation in the incarnate Christ. Benek (2015b:4) warns that with the advancement of AI technology will come moral and ethical temptations like the worshipping of machines and sex robots (Cox-George & Bewley, 2018:161–163) that have never existed in the history of humanity. This research explores those concerns and their ethical implications.

Unless Christians participate in providing ethics guidelines for these developments, applications for AI will replicate the destructive, sinful nature of its developers. AI development will unavoidably be subjected to all the distortions, perversions, and evils that humans are prone to committing (Radner, 2020:83).

The author submit that the church does not have the ethics guidelines to deal with AI and the alarming possibility of a technological singularity in the 4IR. Christians need a techno-hermeneutics and biblical ethics guidelines for the 4IR. In pursuing Christian ethics guidelines, it is worth mentioning that both constructive and destructive use and abuse of AI will be subjected to God's judgment and the judgment of civil communities. The need for a new technological hermeneutic accompanied by ethics guidelines cannot be evaded, which is the challenge this study intends to address. If intelligent technologies evade human control and damage the ethical existence of humanity, it will reflect the broader challenge and inability of Christian belief and formation (Radner, 2020:83).

Although AI and other complex technological developments have immensely improved our lives, they have also opened a Pandora's Box of potential disasters with unpredictable consequences. This research explores some of these dangers to understand their possible impact on humanity during the 4IR. Zovko (2020a:11) states that human beings live under the constant risk of a global disaster that may result in the uninhabitability of the earth and the extinction of humanity. The faith community, as part of the community of civil society, will have to provide answers and direction.

1.1.2 Problem statement

There is a mismatch between AI development and the church. Although many people warn about the associated risks of exponential AI development (Barrat, 2013; Elon Musk Zone, 2021; Hawking, 2014; Marcus, 2013; Merritt, 2017; Musk, 2018; Thomas, 2022; Wilson, 2017), the church is ill-equipped to understand and respond with ethical guidance and direction. With no techno-hermeneutics or ethics guidelines to understand and interpret the ethical concerns associated with AI, the church will not be able to play a defining role in the unfolding technological future.

The exponential development of AI might reach a point of technological singularity where technology becomes uncontrollable and unpredictable (Cole-Turner, 2012:788). The last invention will irreversibly transform human life and the world humans inhabit (Barrat, 2013). The church can no longer postpone its responsibility to develop a techno-hermeneutics and ethics guidelines to guide Christians through the 4IR and beyond.

In light of the mentioned concerns and predictions, the question is: **How should the church understand and interpret the exponential development of AI and the possibility of a technological singularity?** This research aims to develop a techno-hermeneutics and ethics guidelines to respond to this challenge.

1.2 Preliminary literature study

Dreyer (2019) elucidates the intricate connection between technology and historical progression, highlighting the profound impact of the Industrial Revolution (1760–1840) on societal structures and functionality. He asserts that technology was pivotal in all industrial revolutions, transforming agrarian societies and challenging the established roles of the church. Dreyer raises a critical issue: the church's lack of technological hermeneutics or guidelines to effectively address these seismic shifts, leading to an existential question of whether people drifted away from the church or if it was the church that failed to keep pace with its congregation.

Klaus Schwab, the founder and chairman of the World Economic Forum, emphasizes that AI technology will be at the forefront of the Fourth Industrial Revolution (4IR). In his seminal work (Schwab, 2016:1), Schwab predicts that emerging technologies will revolutionize our existence, reshaping everything from personal identity and privacy to broader societal norms like consumption patterns, work-life balance, career progression, skill acquisition, and relationship dynamics.

This study pivots on the rapid advancements in Artificial Intelligence and the advent of the 4IR, presenting unique challenges and opportunities for Christian theology and ethics. It endeavours to critically integrate Christian theological and ethical considerations with these technological advancements, thereby enriching the existing body of knowledge. This research aims to offer theological and ethical guidance, enabling the church to navigate the intricacies of AI through a Christian lens.

The research acknowledges the transformative potential of AI, as noted by Davis (2016:1), which calls for a thoughtful and anticipatory theological response to these technological shifts. The rise of transhumanism, highlighted by Willmott (2021:161) and

Mirkes (2019:115), poses distinct ethical dilemmas, urging the church to deliberate on human enhancement through AI and biotechnology. This research will delve into the implications of transhumanism from a theological viewpoint, leveraging the Christian narrative to understand humanity's pursuit of transcending its natural boundaries.

The primary aim of this study is to develop a comprehensive technological hermeneutic and ethical framework. It seeks to bridge the gap between technology's swift evolution and theological adaptation's slower pace. The research intends to prepare the church for responsible AI stewardship, aligning technological advancement with ethical considerations for the greater good. Inspired by the Yoruba people of Nigeria's maxim that "Learning never ends, thinking never tires", the research envisages creating a dynamic, evolving document, keeping pace with AI advancements. Maj Consulting (2015) highlights the increased competency demands of the 4IR compared to previous revolutions, underscoring the lack of literature at the intersection of AI and Christian education. This gap signifies the need to enhance the technological literacy of church leaders, empowering theologians and pastors to integrate AI into their ministries effectively and in a manner consistent with Christian values.

In conclusion, this research aims to contribute to the theological discourse by establishing a comprehensive framework that marries traditional Christian ethics with modern technological insights. It seeks to formulate guidelines that are relevant and deeply rooted in Christian doctrine and moral philosophy. The objective is to develop a proactive, adaptive ethical framework for engaging with AI and technological progress, steering the conversation from a Christian standpoint, as inspired by Stahl's (2021:35-53) insights into long-term ethical considerations. This study aspires to be a living testament to the church's ability to adapt and remain relevant in an era of rapid technological advancement.

1.3 Research questions, aim and objectives

1.3.1 Primary research question

How should the church understand and interpret the exponential development of AI and the possibility of a technological singularity?

1.3.2 Secondary research questions

1.3.2.1 How should the church understand AI?

1.3.2.1.1 What is AI?

1.3.2.1.2 What are the main concerns with the exponential development of AI?

1.3.2.1.3 What are the main benefits of AI?

1.3.2.1.4 How will a technological singularity change the world?

1.3.2.1.5 How should the church understand the exponential development of AI and the imminent technological singularity?

1.3.2.2 How should the church interpret the exponential development of AI?

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1.4 Research aim

This research aims to develop a techno-hermeneutics and Christian ethics guidelines to assist the church in interpreting the unfolding of a technological future.

1.5 Objectives

1.5.1 Equip the Church with Comprehensive AI Knowledge

This objective focuses on providing the church with a deep understanding of the rapid development of AI and its significant, irreversible impact on humanity. It involves exploring AI's various benefits and potential applications within the church context. Additionally, it includes conducting a thorough scenario analysis of technological singularity and contrasting these findings with biblical eschatological prophecies. This comprehensive approach aims to prepare the church for the realities and implications of AI in society and its possible alignment with prophetic biblical narratives.

1.5.2 Analyse AI Development through a Biblical Lens

The second objective is to critically examine the exponential growth of AI technologies and their applications from a biblical perspective. This process will involve exploring the risks of pursuing artificial superintelligence and the potential misuse of AI due to human sinfulness. It also encompasses investigating the ethical issues surrounding biotechnological human enhancement and the concept of 'playing God'. This objective seeks to align technological advancements with biblical principles, highlighting ethical considerations and potential conflicts.

1.5.3 Develop a Techno-Hermeneutic Framework for the church

The third objective is constructing a techno-hermeneutic framework tailored explicitly to the Christian church. This process involves defining hermeneutics from a Pentecostal viewpoint, integrating biblical and technological interpretations of human existence. The goal is to establish a new technological hermeneutic that aids in understanding the practical aspects of human existence and our interactions with technology. This framework is intended to guide the church in navigating and interpreting the ever-evolving technological landscape in alignment with Christian doctrine.

1.5.4 Define Moral Parameters in the Context of Technology

The final objective is to delineate what actions are morally right or wrong in the context of technology. This objective involves interpreting technological advancements from a hermeneutical perspective, exploring God's relationship with technology, and examining the role of the Holy Spirit in this dynamic. The aim is to develop a moral and ethical framework that guides the Christian response to technological innovations, ensuring that these advancements are used in ways that are congruent with Christian ethics and theological understanding.

1.6 Central theoretical argument

Given the dire possibility of a technological singularity, the exponential development and application of AI in the 4IR are simultaneously complex and daunting. Technological hermeneutics and Christian ethics guidelines will equip the church to interpret the fast changes and respond confidently with guidance and direction throughout the unfolding future.

1.7 Methodology

1.7.1 Introduction

The researcher resides in the Apostolic Faith Mission (AFM) of South Africa, a church with a Christocentric and pneumatocentric emphasis. He approached this research from an articulated Pentecostal hermeneutical perspective that believes the Bible becomes God's inspired Word when the Spirit uses it to reveal God. It contains a reliable revelation of God and conveys the truths about the salvation of human beings that the Holy Spirit intends to convey. The researcher agrees with Nel (2015a:10) that the authority of the Holy Spirit comes before the authority of Scripture because, without the Spirit, there would have been no Word and revelation of God. Nel (2015a:4) points out that although the Holy Spirit inspired Scripture, not everything in the Scripture is from a divine origin. He explains that biblical writers also incorporated information available to them. The researcher followed the same approach.

The researcher leaned on the guidance of the Holy Spirit through Pentecostal hermeneutics in his interpretation of Scripture. Pentecostals read the Bible by starting

from their charismatic experiences and then moving to the Bible to find what they expect God to do for them. The researcher does not claim that the role of the Holy Spirit in interpretation is an extraordinary insight unavailable to non-Pentecostals, as Anderson (1992:4) explains. However, the researcher agrees with Nel (2015a:16) that it is impossible to penetrate the biblical text's telos without the mediation of the Holy Spirit. The researcher consciously, intentionally and critically incorporates personal experiences and history in this hermeneutic, as Anderson (1992:2) suggests. As a Pentecostal Bible interpreter, the researcher brings different theological assumptions to his interpretations of Scripture, including his view of a non-dispensational ecclesiology. Where the intended meaning of biblical passages has to be explored, the researcher used the historical-grammatical method to uncover the intended scriptural meaning. With this method, the researcher can better understand the original author's intended message and what the original audience would have understood in their context.

Unless otherwise stated, biblical references come from the Christian Standard Bible (CSB).

1.7.2 Course of action

Multidisciplinary online academic databases and directories like EBSCOhost, Google Scholar, the NWU Library and other reliable online sources and scientific journals were explored and analysed for relevant information. The researcher also used publicly available data from YouTube, Twitter and other sources to find relevant and accurate information and formulate assertions and arguments. The research carried no risk and adhered to applicable ethics guidelines. The researcher approached all research with ethical sensitivity and guarded against any church group's stigmatisation.

1.8 Concept clarification

The concepts and abbreviations used to describe the most critical elements of 4IR and used throughout this research are clarified below.

1.8.1 Fourth Industrial Revolution (4IR)

Davis (2016) describes the 4IR as the advent of "cyber-physical systems" involving entirely new capabilities for people and machines, "a new era that builds and extends the

impact of digitisation in new and unanticipated ways". He further explains that the 4IR represents entirely new ways in which technology becomes embedded within societies and even our human bodies. Schwab (2016) describes the 4IR as the beginning of an economic and social period and mentions that it will be unlike any preceding time in the industrial era. He states that an astonishing confluence of technological innovations across the physical, digital, and biological spheres will define this era. This era will create disruptive transformations that will leave no aspect of global society untouched. Schwab (2016) explains that the mere speed and depth at which these changes will take place will transform how humans work, live, worship, and express our human identity. Kim and Bong (2018) agree and state that the 4IR will change what we do and who we are. Schwab (2016) warns that the changes underway are so profound that, from the perspective of human history, there has never been a time of such tremendous promise or potential peril.

1.8.2 DeepMind

DeepMind is considered one of the world's top research teams working on AI. They joined forces with Google in 2014 to expedite their research. They define themselves as a team of scientists, engineers, ethicists and more, committed to solving intelligence, advancing science, and benefiting humanity. The ultimate goal involves cracking the code of intelligence to create AGI, a system capable of solving a broad range of problems (DeepMind Technologies Limited, 2021).

They adopted an interdisciplinary approach to fast-track research, merging innovations from machine learning, neuroscience, engineering, mathematics, simulation, and computing infrastructure. This strategy introduced novel methods for structuring scientific research (DeepMind Technologies Limited, 2021).

DeepMind focuses on advancing AI technology. Its core mission is to create programs capable of tackling any complex issue autonomously, without requiring prior knowledge or instruction (Holcomb *et al.*, 2018). The company acknowledges that AI can benefit the world and its population, but technology can have negative effects unless it is built and used responsibly. Under their Safety and Ethics policy, they ask: "How can AI benefit society without reinforcing bias or unfairness? How can we build computer systems that

invent new ideas and reliably behave in ways we want?" (DeepMind Technologies Limited, 2021)

1.8.3 Algorithm

Downey (2021) describes an algorithm as a sequence of steps designed to solve a problem or complete a task. An algorithm can thus be explained as a recipe offsetting out step-by-step instructions to be followed cautiously to achieve a specific result. It is a set of structural rules that, if followed, will get scientists the desired outcome. Every smart device uses algorithms to execute its functions through hardware- or software-based practices. Algorithms are powerful because we invest in them the power to do things (Thomas *et al.*, 2018:1).

1.8.4 Neuralink

Neuralink Corporation is a neurotechnology company developing implantable brain-machine interfaces. It was founded by Elon Musk and others (Wikipedia Contributors, 2021). Their focus is to connect the human brain and technology effectively. They want to make a positive contribution by developing high-bandwidth brain-machine interfaces (Neuralink, 2021). Neuralink (2021) explains on their website that precision automated neurosurgery will implant this technology in the brain, in other words, a specially designed robotic system that the neurosurgeon can use to insert these threads exactly where they need to be. This neural implant will let humans control a computer or mobile device without touching it. According to their website, their initial goal is to help people with paralysis regain independence by controlling computers and mobile devices. The technology holds promise for treating a variety of neurological disorders, restoring sensory and motor functions, and ultimately revolutionising how we engage with each other, the world, and even our own selves (Neuralink, 2021).

1.8.5 Global positioning system

The global positioning system (GPS) is operated and maintained by the US Space Force, and the National Coordination Office maintains its official website, GPS.gov, for space-based positioning, navigation, and timing (US Space Force, 2021).

This US-owned utility provides users with positioning, navigation, and timing (PNT) services. The system comprises three segments: The space segment consists of a nominal constellation of 24 satellites that transmit signals. The control segment deals with worldwide monitoring to maintain the satellites in their proper orbits, command manoeuvres and supply the satellites with updated navigational data. Thirdly, the user segment consists of receiver equipment to translate the signals from the satellites to a position and time (USSpace Force, 2021). We use GPS signals to navigate via Google maps, for example.

The GIS 2 GPS Portal (2002) defines GPS as “a radio navigation system that allows land, sea, and airborne users to determine their exact location, velocity, and time 24 hours a day, in all weather conditions, anywhere in the world”.

1.8.6 Artificial intelligence

AI simulates human intelligence by programming machines to think and act like humans. The term can also refer to machines that display human-like qualities such as learning and problem solving (Proqis, 2021). There are two forms of AI. Strong AI and weak AI. Strong AI refers to machines that can think like humans, whereas weak AI refers to machines that act as if they are intelligent (Kumar & Thakur, 2012:57).

AI enables machines to learn through experience, adapt to new information, and carry out tasks resembling human actions. The underlying principle posits that human intelligence can be modelled in a manner that allows machines to replicate it, performing tasks ranging from simple to highly complex (Proqis, 2021). The main drawback of AI lies in its data-dependent learning. It cannot incorporate knowledge in any other way, meaning any errors in the data will manifest in the outcomes (Proqis, 2021).

In summary, AI strives to create software capable of reasoning based on input and offering explanations for its output. While it facilitates human-like interactions and aids in decision-making for specific tasks, it does not serve as a substitute for human capabilities and is unlikely to do so in the near future.

1.8.7 Machine learning and deep learning

The terms machine learning (ML) and deep learning (DL) are both from the AI world but refer to different approaches to AI learning. Wolfewicz (2021) describes MI as the process where computers use algorithms to learn from data and perform tasks without explicit programming. CL employs a sophisticated network of algorithms, modelled after the human brain, to carry out its functions. This structure enables the processing of unstructured data such as documents, images, and text. In short, ML gives computers the ability to learn without being specifically programmed. In other words, they learn from data. They recognise patterns in the data and make predictions once new data arrives. Wolfewicz (2021) explains that there are two broad categories of machine learning, namely supervised and unsupervised learning. On the other hand, DL uses algorithms with a brain-like logical structure called artificial neural networks (ANN). These algorithms analyse data logically, similar to how a human would conclude.

DL finds applications in various sectors. In the realm of automated driving, Tesla uses DL to identify objects like STOP signs or pedestrians. Similarly, the military employs DL to recognise objects via satellite imagery, helping to determine safe or hazardous areas for troops (Wolfewicz, 2021). DL requires two essential components: it requires incredibly vast amounts of data, and secondly, it needs substantial computing power. Thanks to rapid improvements in graphic processing units (GPUs), the time required to train a DL network has shrunk from weeks to mere hours (Wolfewicz, 2021). DL is a subset of ML and requires very little human intervention to function correctly.

1.8.8 Deepfake

Fake video, audio, and image media have increased dramatically over the last few years. They are called deepfakes because they create fake videos or photos using DL technology, a branch of ML. Foley (2021) clarifies that AI efficiently learns the appearance of a source face from various angles to superimpose it onto a target, typically an actor, as though it were a mask. Frank *et al.* (2020) argue that DL, more specifically generative adversarial networks (GANs), can produce images, videos and audio that are remarkably realistic, so much so that it is often impossible for humans to distinguish them from actual photos. In many cases, image forensics must differentiate between true and false media. These images are so realistic and challenging to distinguish that additional AI technology

called frequency representation must be used to identify deepfake images in an automated way, surpassing state-of-the-art methods (Frank *et al.*, 2020).

Merriam-Webster (2021) defines a deepfake as a convincingly altered image or recording designed to falsely portray someone as doing or saying something they didn't actually do or say. One can only imagine how this technology can cause irreversible damage to the testimony of the Pentecostal Church.[1]

1.8.9 Augmented reality and virtual reality

Carmigniani and Furht (2011:3) describe augmented reality (AR) as a real-time view of a physical environment, either direct or indirect, that gains enhancement through the addition of virtual, computer-generated information. In other words, AR merges digital data with the natural environment. Garzón (2021) states that AR enables an interactive experience with the natural world where real objects are enhanced with computer-generated perceptual information. Conversely, virtual reality (VR) deals with a digital world, also known as cyberspace, where the subject must immerse into that digital environment, cutting off any relation to the natural environment. Cyberspace can be defined as the world “in” the computer, or more accurately, in the cloud. Liberati (2014) explains that VR tends to create a replica of the world where digital technologies can act freely without connecting to the “external” real world. In contrast, AR tries to bring technological action directly into our actual world without any duplication.

Carmigniani and Furht (2011) state that AR aims to bring virtual information to our immediate surroundings, which enhances the user’s perception of and interaction with the real world. Conversely, VR completely immerses the user in a synthetic world without seeing the real world. In other words, AR technology augments the sense of reality by superimposing virtual objects and cues upon the natural world in real-time.

[1] See deepfake examples at https://www.creativebloq.com/features/deepfake-examples.

1.8.10 Computer vision

Vision is the most important human sense. Our eyes effortlessly provide a detailed three-dimensional description of a complex and fast-changing world. Computer vision (CV) works much like our vision, except we have an advantage in that we have a lifetime of context to train our vision to identify objects, to tell them apart, and to know how far they are from us, whether they are static or move around, and whether something is wrong with them. According to IBM (2021), computer vision trains machines to perform these functions. It accomplishes this in significantly less time using cameras, data, and algorithms, as opposed to retinas, optic nerves, and the visual cortex.

Bebis *et al.* (2003) define CV as the study of enabling machines to understand and interpret visual information from static images and video sequences. IBM defines CV as a subset of AI that allows computers and systems to extract valuable insights from digital images, videos, and other visual data. These systems can then act or offer recommendations based on this information. While AI equips computers with the ability to think, CV empowers them to see, observe, and comprehend (IBM, 2021).

CV occurs when reliable patterns are detected in the camera images (Carmigniani & Furht, 2011). Tracking is the process of feature detection, edge detection, or image processing methods to interpret an image. CV must be explained in conjunction with deep learning. IBM (2021) elucidates that ML employs algorithmic models to let a computer self-educate on the context of visual data. Given sufficient data, the computer can “examine” it and learn to distinguish one image from another. These algorithms allow the machine to learn autonomously, eliminating the need for manual programming for image recognition.

Voulodimos *et al.* (2018) observes that in the past decade, DL methods have surpassed earlier top-performing ML techniques in various domains, with CV standing out as a particularly notable example. CV is used in various tasks like face recognition, action and activity recognition, object detection, human pose estimation, robotics, and self-driving cars, and the market is rapidly expanding.

1.8.11 Robotics

Robotics is about turning ideas into action (Lynch & Park, 2017). Robotics can be described as the amalgamation of mathematics, physics, mechanical engineering, electrical engineering, and computer science, but also psychology, biology, philosophy, faith, and other fields. Robots prove that machines can be aware of their surroundings, learn, interpret information, and set goals to act upon. At the heart of robotics is programable motion. According to Lynch and Park (2017), the ultimate goal is to create intelligent machines that can behave and think like humans, and therefore, its association with AI is inextricable.

1.8.12 Internet of Things

Alam *et al.* (2020) define the Internet of Things (IoT) as a technique to connect diverse technologies related to our daily needs that can affect our lives immensely. This technology has many evident advantages, like obtaining profits from data (Radanliev *et al.*, 2019). The IoT can be explained as a heterogeneous network connecting countless data-hungry devices. The IoT has entered our lives, affecting every aspect of our existence in the 4IR. Alam *et al.* (2020) explain that “Things” with respect to the IoT can refer to objects capable of sensing, interacting, and communicating with each other and their environment. The IoT is the interconnection of these things. To put the impact of this technology in perspective, Vailshery (2021) projects that the total installed base of IoT-connected devices worldwide is projected to amount to 30.9 billion units by 2025, an enormous increase from the 13.8 billion units expected in 2021. Connected automobiles, smart homes, and industrial equipment are examples of IoT. Smartphones, laptops, desktops and other mobile devices are considered non-IoT devices and are projected to reach over 10 billion units by 2025 (Vailshery, 2021). Although Berte (2018) includes all devices that connect and communicate with each other, directly or through the cloud, in his definition of what IoT is, it establishes the next chapter in the evolution of the internet, where computing devices can send and receive data themselves (Berte, 2018). Car *et al.* (2019:165) conclude that the IoT enables anything to communicate with the internet at any time from any place to provide any service by any network to anyone.

1.8.13 Neurotechnology

Kellmeyer, as quoted by Ienca and Vayena (2019), defines neurotechnology as “wearable devices for recording and uploading our brain activity”. On the other hand, White *et al.* (2015:797) explain neurotechnology as a set of devices to understand neural functioning and applications that can potentially expedite the brain’s ability to repair itself. Broadly speaking, neurotechnology refers to devices and applications used to understand, assess, and manipulate processes within the neural system (Giordano, 2011; McDowell & Ries, 2013, as quoted by White *et al.* (2015)). The “manipulate” part of the definition concerns this study most because neurotechnology can be used as a weapon in national intelligence and defence (Giordano & Wurzman, 2011). This was the concern more than a decade ago. Since then, advances in neuroscience and neurotechnology have developed to such an extent that the Pentecostal Church cannot ignore matters like information and strategic intelligence associated with neurotechnology. While neurotechnology used to be reviewed in the medical field, this is no longer the case. Giordano and Wurzman (2011:T:55) argued more than a decade ago that the objective of this kind of weapon might alter (i.e., either augmenting or degrading) functions of the human nervous system to influence cognitive, emotional and motor activity and capability. In other words, this technology can manipulate human functions like perception, judgement, morale, pain tolerance, or physical abilities and stamina (Giordano & Wurzman, 2011:T:56).

1.8.14 Pentecostal Church

From a Pentecostal perspective, the Bible is interpreted as the product of an experience with the Holy Spirit. The experience of the presence and involvement of the Holy Spirit in the believer’s life enables one to come to terms with the apostolic witness in a genuinely existential manner (Gräbe & Hattingh, 1997:19). The Pentecostal Church defines itself as a Spirit-driven, Spirit-led and Spirit-empowered community who stive to accomplish God’s purposes on earth (Rance, 2009:9). Arrington (1996:11) explains that at the heart of classical Pentecostalism stands the Bible as the inspired Word of God, validating that the (whole) Bible is a trustworthy revelation of God and that it states the precise truths the Holy Spirit intends to convey. The three core components of Pentecostal hermeneutics involve the intricate relationship between the Holy Spirit, the Scriptures, and the church.

The Holy Spirit animates the Scriptures and empowers the church to prepare its members for ministry and testimony in ways that resonate with their culture (Nel, 2015b:6).

1.8.15 Blockchain

A blockchain comprises a sequence of blocks that store information. Leslie Lamport formulated the Paxos protocol in 1989 and submitted the paper “The Part-Time Parliament” in 1990 (Lamport, 2019) to ACM Transactions on Computer Systems. The paper was eventually published in a 1998 issue (Yaga *et al.*, 2018:2). According to Savjee (2017), this technique was initially intended to timestamp digital documents so that it is not possible to backdate or tamper with them. However, this technology was predominantly unused until it was adapted by Satoshi Nakamoto in 2009 to create the digital cryptocurrency, Bitcoin. Di Pierro (2017:92) explains that the problem Nakamoto solved with blockchain technology was that of establishing trust in a distributed system.

A block contains three main parts: data, a hash, and the previous block's hash. Savjee (2017) clarifies that the nature of the data stored in a block varies according to the specific type of blockchain. The block's hash functions much like a fingerprint. It uniquely identifies a block and its contents, while also including a timestamp (Di Pierro, 2017:93). After creating a block, its hash is calculated. Any alteration to the block changes its hash. Hashes play a crucial role in detecting block modifications. The concept is straightforward: a changed fingerprint means a different block. The block also contains the hash of the preceding block, linking them in a chain. This chaining technique significantly enhances the security of a blockchain. Yaga *et al.* (2018:ii) add that they are tamper-evident and tamper-resistant digital ledgers distributed across. Three key features make a blockchain secure: its unique hash, a technology called proof-of-work, which slows down the creation of new blocks, and its distribution using a peer-to-peer network. Every person in that network is called a node. Once a new block is created, it is distributed to all nodes to verify.

With this distributed trust mechanism, multiple people keep a record of transactions, and every party can verify that the order and timestamps of the transactions are legitimate (Di Pierro, 2017:93). All the blocks in a network must have consensus. They agree on what blocks are valid and which are not. Blocks that have been tampered with are rejected by other nodes in the network, making blockchains nearly impossible to tamper with. But

blockchains evolve. One recent addition is the “smart contracts”. Yaga *et al.* (2018:iv) explain an intelligent contract as software deployed on the blockchain and executed by computers running that blockchain. It is an extra layer of security.

Although blockchain technology is at the base of modern cryptocurrencies, Yaga *et al.* (2018:iv) explain that blockchain technology takes existing, proven concepts and merges them into a single solution. In other words, blockchain technology can effectively be used in several other industries. Bodkhe *et al.* (2020:79764) highlight a dramatic rise in the adoption of various “smart applications”, including smart farming and smart healthcare, supply chain and logistics, business, tourism and hospitality, energy management, *et cetera*. They also explain that security over the “open” internet will become a major challenge in the 4IR and that advancement in blockchain technology can solve the problem.

Blockchain technology is disruptive because it has the potential to change many interactions over a broad spectrum of industries. According to Nofer *et al.* (2017:186), this disruptive innovation will change many businesses, create new ones and change competing industries as we know them today.

1.8.16 Cyber-physical systems

Al-Mhiqani *et al.* (2018:499) explain that cyber-physical systems (CPS) refer to the interaction between computers, communication channels and physical devices to solve real-world problems. Wolf (2009:88) calls it the next step in computing. CPS can thus be described as a new generation of systems with combined computational and physical abilities that can interact with humans in various ways (Baheti & Gill, 2011:1). These systems expand the capabilities of the physical world with their ability to interact through computation, communication and control. CPS will be a key enabler for technological advancements in the 4IR. Examples include next-generation aeroplanes, space vehicles, electric vehicles, autonomous urban driving and prostheses that allow brain signals to control physical objects (Baheti & Gill, 2011:1). More than a decade ago, Wolf (2009:88) identified the main goal of CPS as performance with efficiency.

If we roll back to the beginning of CPS, we can think of CPS as computer applications that replace physical controllers. These computer applications are much cheaper and

more reliable than the old physical controllers. It is like comparing an old petrol carburettor with advanced fuel injection systems where computers do the calculations to find the balance between maximum power at maximum efficiency (Wolf, 2009:88). Today CPS goes far beyond these examples.

It is important to mention Al-Mhiqani *et al.* (2018:499). Alarmingly, they note that CPMs have become the main target of hackers, cyber criminals and even military exploitation in cyber warfare in the 4IR. Targeting the CPSs can lead to great damage and high losses to a nation. Recent examples include the cyber-attack on South-Africa's ports on 22 July 2021. Transnet described this attack as unprecedented (Reva, 2021). News agencies across the globe report that as the military conflict escalated between Ukraine and Russia, so have fears of unprecedented cyberwar (Fendorf & Miller, 2022; Meyer, 2022).

1.8.17 Apocalyptic eschatology

With the term "apocalyptic eschatology" the researcher approaches "end-time prophecy and events" with a dualism, meaning that he explores two aeons: this age and the age to come. This era is speeding towards its imminent finale, accompanied by disruptive cosmic events (Redditt, 2008:170).

1.8.18 Techneutics

This study presents the concept of "techneutics," a creative fusion of the words "technology" and "hermeneutics." This term represents a new approach that combines theoretical and methodological aspects of interpreting and understanding technology. "Techneutics" provides a unique perspective for examining the intricate relationship between technological progress and theological analysis. Thus, it marks a significant intersection in biblical hermeneutics, highlighting the crucial interplay between technological advancements and interpretative strategies.

1.9 A provisional classification of chapters

List of tables

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Definition of key terms

Chapter 1 Introduction

Chapter 2 How should the church understand AI?

Chapter 3 How should the church interpret the exponential development of AI?

Chapter 4 What are the most effective strategies for a techno-hermeneutics?

Chapter 5 How can ethics guidelines be developed?

Chapter 6 Conclusion and Recommendations

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1.10 Schematic presentation

Research question	Aim and objectives	Research method
(Primary Research Question) How should the church understand and interpret the exponential development of AI and the possibility of a technological singularity?	**(Research Aim)** To develop technological hermeneutics and Christian ethics guidelines to assist the church in interpreting the unfolding of a technological future.	Qualitative and comparative literature analysis from a Pentecostal perspective.
(Research Question 1) How should the church understand AI?	**(Objective 1)** Equip the Church with Comprehensive AI Knowledge.	Qualitative and comparative literature analysis from a Pentecostal perspective.

(Research Question 2) How should the church interpret the exponential development of AI?	**(Objective 2)** Analyse AI Development through a Biblical Lens.	Qualitative and comparative literature analysis from a Pentecostal perspective.
(Research Question 3) What are the most effective strategies for a techno-hermeneutica?	**(Objective 3)** Develop a Techno-Hermeneutic Framework for the church.	Qualitative and comparative literature analysis from a Pentecostal perspective.
(Research Question 4) How can ethics guidelines be developed?	**(Objective 4)** Define Moral Parameters in the Context of Technology.	Qualitative and comparative literature analysis from a Pentecostal perspective.

1.11 Proposed research schedule

Feb 2022 – Jun 2022	Chapter 1
Jul 2022 – Oct 2022	Chapter 2
Jan 2023 – Mar 2023	Chapter 3
Apr 2023 – Jun 2023	Chapter 4
Jul 2023 – Sep 2023	Chapter 5
Oct 2023	Chapter 6
Nov 2023	Editing, Review and Submission
Zoom Meetings	After drafts submissions

CHAPTER 2 HOW SHOULD THE CHURCH UNDERSTAND ARTIFICIAL INTELLIGENCE?

2.1 Introduction

This chapter explores the potential for a technological singularity and its possible global impact. The discussion also considers its potential correlation with the apocalyptic events described in the Bible. The researcher examines recent scientific breakthroughs, such as the development of a mini-brain called the DishBrain by a research team from Cortical Labs which can conduct goal-oriented tasks and is considered the first “sentient” brain developed in a lab. The discussion also considers how advancements in bioengineering and data transmission technology may lead to the development of synthetic biological intelligence (SBI) that could pave the way for a technological singularity. The researcher explores how these developments shed light on the concept of the beast depicted in the book of Revelation. While there are still gaps, the likelihood of a technological singularity is becoming increasingly realistic.

Along with the potential benefits, the chapter delves into the concerns surrounding AI development and its effect on humanity. The discussion then turns to how films offer glimpses of a potential future with technological singularity and apocalyptic events, and how they can be evaluated through a hermeneutical lens for technology. Lastly, the emergence of Dataism as a potential new religion is considered, together with the questions it raises about the nature of religious belief and the role of technology in shaping our understanding of the world.

2.2 How should the church understand AI?

2.2.1 What is artificial intelligence?

AI is a human attempt to artificially create or simulate intelligence that naturally occurs in living things in machines. This includes but is not limited to artificial modification of natural human intelligence with technology. John McCarthy, a professor of computer science at Stanford University, first used the term AI in 1956 at a summer school at Dartmouth College in Hanover, New Hampshire. He defines AI as: “…the science and engineering of making intelligent machines, brilliant computer programs” (McCarthy, 2004:2–3). AI is

a transformative programming technology with the exponential ability to solve problems. The European Commission's Communication on AI[2] defines it as follows:

> *Artificial intelligence (AI) refers to systems that display intelligent behaviour by analysing their environment and taking actions – with some degree of autonomy – to achieve specific goals.*
>
> *AI-based systems can be purely software-based, acting in the virtual world (e.g., voice assistants, image analysis software, search engines, speech and face recognition systems), or AI can be embedded in hardware devices (e.g., advanced robots, autonomous cars, drones or Internet of Things applications)* (High-Level Expert Group on Artificial Intelligence, 2019:1).

The High-Level Expert Group on Artificial Intelligence (2019:6) proposes an updated definition of AI:

> *Artificial intelligence (AI) systems are software (and possibly also hardware) systems designed by humans that, given a complex goal, act in the physical or digital dimension by perceiving their environment through data acquisition, interpreting the collected structured or unstructured data, reasoning on the knowledge, or processing the information, derived from this data and deciding the best action(s) to take to achieve the given goal. AI systems can either use symbolic rules or learn a numeric model, and they can also adapt their behaviour by analysing how the environment is affected by their previous actions.*
>
> *As a scientific discipline, AI includes several approaches and techniques, such as machine learning (of which deep learning and reinforcement learning are specific examples), machine reasoning (which includes planning, scheduling, knowledge representation and reasoning, search, and optimisation), and robotics (which*

[2] Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions on Artificial Intelligence for Europe, Brussels, 25.4.2018 COM(2018) 237 final (High-Level Expert Group on Artificial Intelligence, 2019:1).

includes control, perception, sensors and as well as the integration of all other techniques into cyber-physical systems).

Reinke (2022:14) explains that technology is the amplification of our native powers through new techniques. Therefore, AI can be defined as a technology-based technique to amplify our natural abilities through the power of integrated circuits (ICs) and programmed algorithms. The goal is to create robots that mimic and outperform human intelligence and skills. Lennox (2020:16) notes that the word *robot* derives from the Czech (and Russian) word for *work* – *robota*. He continues (Lennox, 2020:16) to say: "A robot is a machine designed and programmed by an intelligent human to do, typically, a single task that involves interaction with its physical environment, a task that would normally require an intelligent human being to do it." In other words, its behaviour simulates human intelligence (Lennox, 2020:16). The High-Level Expert Group on Artificial Intelligence (2019:4) defines robotics as "AI in action in the physical world", also called embodied AI. They define a robot as "a physical machine that has to cope with the dynamics, the uncertainties and complexity of the physical world".

Research in AI has developed in two distinctive directions: first, there is an attempt to understand how the human brain and thought processes function by modelling them using computer science, and second, there is a study of human physiology and the attempt to build robots that will simulate it (Lennox, 2020:16). Lennox (2020:17) also remarks that it is one thing to build a robot that can lift an object, but it is a different story to simulate the rationale of a human when the object is uplifted.

AI refers to the concept of intelligence studied by many neuroscientists, biologists, and psychologists. The High-Level Expert Group on Artificial Intelligence (2019:1) claims that AI researchers mainly use the term intelligence to refer to rationality. They acknowledge that although rationality is not the only ingredient of intelligence, it is a significant part. Rationality in AI, according to them, refers to a system's ability to choose the best action to achieve a specific goal.

Rationality refers to a system's ability to perceive its environment through sensors, collecting and interpreting data based on which the best action is chosen (High-Level Expert Group on Artificial Intelligence, 2019:1).

McCarthy (2004:2) describes intelligence as the "computational part of the ability to achieve goals in the world". Although he believes that intelligence is not simply asking whether a machine is intelligent, he also presumes that intelligence involves complicated mechanisms but agrees that research must still discover many of these mechanisms. It is crucial to mention McCarthy's notion that AI is not always about simulating human intelligence. Although it involves observing humans' ability to solve problems and the methods they use to solve them, it also includes studying the problems the world presents to intelligence (McCarthy, 2004:3).

In Turing's[3] famous imitation game, or "Turing test", initially published in 1950 in the leading philosophy journal *Mind*, he proposes a process one can use to figure out whether a machine is intelligent or not. Turing's game involves three participants: a computer, a human interrogator, and a human "foil".[4] The interrogator must determine which one the computer is by asking questions to the other two participants. Turing's rule is that all communication must happen via keyboard and screen (Turing, 2012:433–463). He contended that if the machine could convince an informed observer that it is human, it should be considered intelligent. Although this test would satisfy most researchers, McCarthy (2004:4) disagrees. According to McCarthy, the Turing test is one-sided. McCarthy explains that a machine that passes the test should be considered intelligent but argues that a device could still be intelligent without knowing enough about humans to imitate them.

2.2.2 Machine learning

Lennox (2020:19) states that early machines and AI systems did not involve what is now known as ML. Various algorithms, for example, mathematical or symbolic, are essential to modern-day ML processes. An algorithm is a "precisely defined set of mathematical or logical operations for the performance of a particular task" (Oxford English Dictionary,

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[3] Alan Turing is featured in "The Imitation Game", a film set in WWII (Neo, 2020).

[4] The term 'foil' is from p. 40 of B.J. Copeland. 1993. Artificial intelligence: a philosophical introduction. Oxford: Blackwell. Patterson (2022) explains that authors will sometimes highlight certain aspects of a character's personality by using a foil: a supporting character who has a contrasting personality and set of values. "A literary foil is a character whose purpose is to accentuate or draw attention to the qualities of another character, most often the protagonist."

2022b). The key feature of an algorithm can be summarised as a set of rules and instructions to solve a problem (Downey, 2021). Algorithms are powerful because we invest in them the power to do things (Thomas *et al.*, 2018:1). For laypeople, an algorithm can be explained as a cake recipe. If the step-by-step instructions are followed carefully, they will have their desired outcome, a delicious cake. If scientists want a robot to learn something new, they instruct it with algorithms that stipulate what information to collect and how it should be analysed and applied. In modern AI systems, the appropriate algorithms are embedded in software that sorts, screens, and selects different pieces of data presented to it. To some degree, this simulates the neural functions of the human cortex (neural networks) (Lennox, 2020:20). Like humans, a system can be "trained" to perform a task; this process is called ML. According to the High-Level Expert Group on Artificial Intelligence (2019:3), a learning system is a "rational" system which, after performing a task, evaluates the new state of the environment through perception to determine how successfully the task had been accomplished and, after evaluating its performance, adapts its reasoning rules and decision-making algorithms to improve its next attempt. This process is necessary to allow the AI system to learn problem-solving techniques for solutions that cannot be precisely specified. Examples of such problems include challenges like speech and language understanding, as well as CV or behavioural predictions (High-Level Expert Group on Artificial Intelligence, 2019:3).

Educating a system involves techniques to recognise, distinguish and decipher digital patterns such as images, sound, speech, text, or data. In other words, ML is when a system takes in known and verified data and then uses that information to make decisions or predictions. Algorithms are step-by-step instructions to get to the desired outcome. Lennox (2020:21) explains that more recent AI does not necessarily use conscious human input to instruct an algorithm to perform a task. Instead, they invent a general algorithm that "learns" a solution to a problem. Previously all the steps in the process were programmed by humans. Nowadays, human developers do not know the specific algorithm for the solution to a problem and do not always understand how the system arrived at a conclusion. A chess-playing program is an example. Amazon, for instance, uses clever algorithms that trace all the products you and millions of others buy from them online. The application will then screen through its gigantic database and compare the list with similar products you do not yet own. Finally, the system will use statistical

methods to present the products that people with similar interests as yours buy, and then the pop-ups follow to stimulate your interest (Lennox, 2020:22).

Supervised, unsupervised, and reinforcement learning are well-known methods to teach a machine (High-Level Expert Group on Artificial Intelligence, 2019:3–4). With supervised learning, examples of input-output behaviour instead of behavioural rules are fed into the system, hoping that the machine will establish general patterns from the examples. Examples describe behaviour from the past, but engineers hope the machine will learn from these examples to behave in situations not represented in the examples (in other words, future behaviour). For example, radiology in the medical field used supervised ML over six years to identify biological features in lung cancer. The validation set included different CT scans from four different scan manufacturers. These CT scans provided the machine with enough statistical data (historical examples) to analyse and interpret new information (futuristic behaviour) to make computational diagnoses not visible to the human eye (Shaffer, 2020:225–226). Unsupervised learning uses algorithms based on the concept of neural networks inspired by the neural network in the human brain, which is a network of small processing units. As explained above, these algorithms get their data from sensors upon which the data is analysed, assessed and adapted, and by doing so, the system learns to improve its outcomes. There are various kinds of neural networks and machine learning approaches, but DL is currently the most fortunate one. It is called DL because this neural network has multiple layers between input and output, which allows the system to learn in successive steps (High-Level Expert Group on Artificial Intelligence, 2019:4). This approach makes the overall input-output results more accurate and, therefore, less supervised. Reinforcement learning allows the machine to make its own decisions; over time, the developers provide the system with a reward signal to tell the machine whether it is a right or a wrong decision. According to the High-Level Expert Group on Artificial Intelligence (2019:4), the goal for the machine is to maximise the positive signals received. The example above, where Amazon makes suggestions for what a person might like or buy, is a typical example of reinforcement learning in AI, a powerful tool in marketing.

2.3 What are the main concerns with the exponential development of AI?

The main concern with AI development is not so much the capability of the technology as the people who develop it. According to Lennox (2020:145), the morality of any decision made by an AI system reflects the morality of the programmers, and this is where the challenge arises. Hector Levesque argues that “in imagining an aggressive AI, we are projecting our own psychology onto the artificial or alien intelligence. In truth, we are projecting our entire mental architecture” (Friend, 2018:13). Tariq *et al.* (2022:2) contend that if it were not for the compounding human intellectual prowess and unending applications in the field of science and technology, the idea of God-like AI surpassing human ability would not exist. According to Lennox (2020:24), another primary concern is that engineers get carried away with the idea that “if it can be done, it should be done”. Tariq *et al.* (2022:4) state that any destructive goal of AI, at least for now, can only be programmed by humans. Rosalind (1997:134) points out that: “The greater the freedom of a machine, the more it will need moral standards.” Current AI systems are not capable of replacing human-installed goals with autonomous goals, there must be a human involved to do that.

How can humanity be sure that techno-scientists will develop benevolent and humane systems? Although ethical concerns are raised, humans have already started using advanced AI systems against fellow human beings, ranging from advanced AI weapons for combat, causing unimaginable damage to others and their environment, to subtle AI algorithms used for manipulation in marketing, control and perversion.

The race to pioneer global AI development has started. A Markets and Markets (2022:431) report estimates that the global AI market size will expand from USD 86.9 billion to USD 407.0 billion by 2027 at a Compound Annual Growth Rate (CAGR) of 36.2% throughout the forecast period. Fortune Business Insights, trusted by global companies like Dell, Fujitsu, GoDaddy, Google, Hitachi, Huawei, and others for their market research, predicts a vastly different future for AI. Their research indicates that: “The global artificial intelligence market is projected to grow from USD 387.45 billion in 2022 to USD 1 394.30 billion by 2029, at a CAGR of 20.1% in the forecast period.” (Fortune Business Insights, 2022) According to Price Waterhouse and Coopers & Lybrand (2022), AI could contribute up to USD 15.7 trillion to the global economy in 2030, more than the current output of

China and India combined. Of this, USD 6.6 trillion is likely to come from increased productivity and USD 9.1 trillion is from the consumption side. A research survey by CB Insights (2019) indicates that 3.6 thousand start-ups in more than 70 countries have raised USD 66 billion since 2013. Chris Howard, distinguished VP analyst at Gartner Inc., reports that the number of enterprises implementing AI from 2015 to 2019 grew by 270% (Gartner Inc., 2022). This number increases daily. The World Economic Forum (2020) reports that automation is expanding faster than expected and will displace 85 million jobs before 2025.

However, they also report that the robot revolution will create 97 million new jobs during the same period. They further indicate that creativity, flexibility and analytical thinking skills, in conjunction with data and AI development, content creation and cloud computing, will be the top professions in 2025 (World Economic Forum, 2020). Their report indicates that 43% of the surveyed businesses indicate that they will reduce their workforce due to technology integration. By 2025, employers will share work between humans and machines evenly. They state that 50% of all employees who remain in their jobs will need to reskill their core skills (World Economic Forum, 2020).

Countries like the United States of America, China, Germany, India, and Russia are spending billions on AI development. It is alarming that little to nothing is mentioned about the ethical development of AI in these reports. AI developers lose sight of the moral consequences of their developments.

While many authors (Baum *et al.*, 2022; Lennox, 2020; McLean *et al.*, 2021) debate whether AI will develop to the point where it can rewrite and reprogramme its algorithms, make independent decisions, and compete against humans for resources, the researcher does not currently share the same concerns. The development in SBI will make this happen. However, he acknowledges the ethical aspects and dangers surrounding these technologies.

Many of these arguments make little to no mention of the human engineer behind the programming and development of these intelligent machines. A robot does not have to be aware of itself to function unethically or antagonistically towards humans and their environment. As stated earlier, it is not so much the technology that is the primary concern but the fact that AI development is subjected to all the distortions, perversions, and evils

that humans are prone to committing (Radner, 2020:83). Lennox (2020:24–26) recalls a private conversation from 2018 with Nobel Prize winner Sir John Eccles held at Yale University at the Artificial Intelligence and Human Mind conference.[5] He quotes Eccles's words: “It seems to me that a lot of needless debate could be avoided if AI researchers admit that there are fundamental differences between machine intelligence and human intelligence – differences that any amount of research cannot overcome.”

Researchers follow the money (Lennox, 2020:26). When governments pour billions of dollars into AI and technological development, as pointed out above, they undoubtedly alter the direction in which these developments move. Wealth and the pursuit of wealth have been linked to immoral behaviour (Gregoire, 2014). Research done in the field of psychology found that the impact of money can powerfully influence human motives. Gregoire (2014) writes that money will control our thoughts and actions in ways humans are unaware of. Films like *The Wolf of Wall Street* beautifully illustrate this phenomenon. Several studies have shown that wealth opposes empathy and compassion (Gregoire, 2014). Research done by the University of Berkeley found that even fake money could make people behave with less regard for others (Miller, 2012). Their study also reveals that wealth might cause a sense of moral entitlement. Researchers from Harvard University and the University of Utah’s David Eccles School of Business found that just thinking about money could lead to unethical behaviour. Their research also found that participants were likelier to lie or behave immorally after being exposed to money-related words (Arkes *et al.*, 1991; Marte, 2013). If researchers follow the money, as stated above, technological developments will be polluted with dark motives. This means that AI's unethically and morally unacceptable developments will happen, whether initiated by global governments or influential individuals.

Apart from unethical and immoral developments in AI, Ratner (2017) stated in 2017 that by 2024 AI will do better than humans in translating languages, writing school-level essays by 2026, writing top 40 songs by 2028 and by 2053, AI should be performing surgeries and will be writing New York Times best sellers. Ratner further predicts that AI

[5] An interesting report on this conference is available at: www.aaai.org/ojs/index.php/aimagazine/article/view/601.

should be better than humans in every task in the next 45 years. In November 2022, Ratner's prediction came to fruition with the launch of OpenAI's ChatGPT. This AI demonstrates exceptional proficiency in language translation, having the ability to compose exceptional essays and songs. Additionally, its capabilities in software development surpass even those of highly skilled programmers.

Although AI has many positive countenances, Lennox (2020:67) warns that personal data can be harvested to inform humans and control them. Unfortunately, criminals will also attempt to gain access to this data for obvious reasons. The big ethical questions are: Who controls these AI systems, and who owns the information they collect?

Research done by McLean *et al.* (2021:1–15) focused specifically on the risks associated with AGI. In their report, they identified a range of risks, including AGI escaping human control; AGI being programmed with, or developing dangerous goals; the development of unsafe AGI; AGI systems with corrupt ethics, morals and values; and the irresponsible and inadequate management of AGI development, amongst other things. Apart from these risks, they also noted alarming limitations regarding the number of peer-reviewed articles addressing the possible dangers associated with AGI development. Their research also revealed a lack of risk research, a lack of definitions related to AGI functionality and a lack of standardising AGI terminology.

Although AGI does not exist yet, many scholars discuss its existential threats (Salmon *et al.*, 2020) while believing that it will eventually be developed as an extension of Artificial Narrow Intelligence (ANI), also known as AI. ANI is widely used and includes systems like Facebook's facial recognition technology, Google's DeepMind, Amazon's Alexa, Apple's Siri, and Tesla and Uber's self-driving vehicles (Kaplan & Haenlein, 2019; Naudé & Dimitri, 2020; Stanton *et al.*, 2020). These AI systems are all task-specific, also described as "narrow", and are limited to what they are capable of. Firt (2020:995–1007) mentions that these "narrow" AI systems cannot transfer and function in environments for which they are not trained. However, AGI, on the other hand, will be an autonomous system that can learn in an unsupervised manner, adapt to different and challenging environments, and accomplish complex tasks with unmatched success and accuracy.

Another main concern and risk associated with AGI is the question of how humans would control a system that is far more intelligent than all humanity combined (Baum, 2017:7).

Baum (2017:7) correctly states that AGI is the “grand goal” or “holy grail” of AI development. Although narrow AI can outsmart humans in some areas, like Deep Blue, which beat Garry Kasparov with chess and other calculation and performance tasks, AGI will be able to beat humans in all domains (Baum, 2017:7). There is no doubt that AGI and even current AI technologies could be used maliciously in the power play between countries or even corrupt and power-hungry influential individuals. If questions on ethics, risk and policy are not answered now, it might be too late. In an interview on BBC, the famous physicist Stephen Hawking said, “The development of full artificial intelligence could spell the end of the human race.” He then elaborates, stating, “Once humans develop artificial (general) intelligence, it would take off on its own, and redesign itself at an ever-increasing rate. Humans, who are limited by slow biological evolution, could not compete and would be superseded.” (Hawking, 2014) The primary concern with the questions on ethics is that technology is developing far more rapidly than the ethics to cope with it (Lennox, 2020:59). Lennox (2020:48) agrees with Hawking, also stating that humans are limited by slow biological evolution, which makes it impossible to compete with the exponential development of AI. Eventually, super-intelligent AI machines will supersede human intelligence.

Dorobantu (2021b:2) argues that too much talk about artificial consciousness might be misleading, distracting the public from the real possibility that AI might soon outmanoeuvre humans. Dorobantu (2021b:7) adds that these intelligent machines are more likely to turn out to be mindless automatons, magnificently capable of outsmarting humans but incapable of feeling or thinking anything. Baum (2017:8) writes that any AI can outwit humans in some areas (e.g., multiplication, games, language, translation, medical diagnosis and more), but an AGI may be able to outmanoeuvre humans in all domains. Dorobantu (2021a:13) contends that robots will never be able to share a human’s vulnerability and capacity for personal relationships, and they will never partake in the image of God. Lennox (2020:75) urges scientists to develop intelligent ethics to cope with this rapid development before it is too late. People cannot evade the fact that a super-intelligent AI will be outstanding at accomplishing its goals, and if those goals are not aligned with humankind, their existence might be threatened (Baum, 2017:8; Lennox, 2020:48). Baum (2017:8) adds that these goals might be to benefit humanity, or it might pursue other goals entirely.

Stahl (2021:35–53) compiled a comprehensive list of the ethical issues that arise from the development and deployment of AI technologies. He based his findings on case studies conducted during the SHERPA project,[6] combined with a Delphi[7] study to determine what people perceived to be ethical issues. Stahl's approach provided a reputable foundational basis for AI ethics, and this offers a balanced consensus of what humanity understands in terms of moral aims. With his empirical approach, Stahl interviewed 42 individuals, including technical, managerial, or organisational experts. His draft report was then peer-reviewed by the research team, followed by the first round of their Delphi study, which included 250 experts on ethics and AI. Ninety-three of the 250 experts engaged, of which 41 usable responses were analysed. The following list enumerates all the ethical concerns that were identified from the case studies and the Delphi study:

1. Cost to innovation
2. Harm to physical integrity
3. Lack of access to public services
4. Lack of trust
5. "Awakening" of AI
6. Security problems
7. Lack of quality data
8. Disappearance of jobs
9. Power asymmetries
10. Negative impact on health
11. Problems of integrity
12. Lack of accuracy of data

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[6] Shaping the Ethical Dimensions of Smart Information Systems. SHERPA is an EU-funded project that analyses how AI and big data analytics affect ethics and human rights. See https://www.project-sherpa.eu/

[7] The Delphi technique was first developed in the 1950s by Norman Dalkey and Olaf Helmer to gain reliable expert consensus. They developed an approach—named after the Ancient Greek *Oracle of Delphi*, who could predict the future—which promoted anonymity and avoided direct confrontation between experts, so that the methods employed *"…appear to be more conducive to independent thought on the part of the experts and to aid them in the gradual formation of a considered opinion"* (Barrett & Heale, 2020:68; Dalkey & Helmer, 1963).

13. Lack of privacy
14. Lack of transparency
15. Potential for military use
16. Lack of informed consent
17. Bias and discrimination
18. Unfairness
19. Unequal power relations
20. Misuse of personal data
21. Negative impact on the justice system
22. Negative impact on democracy
23. Potential for criminal and malicious use
24. Loss of freedom and individual autonomy
25. Contested ownership of data
26. Reduction of human contact
27. Problems of control and use of data and systems
28. Lack of accuracy of predictive recommendations
29. Lack of accuracy of non-individual recommendations
30. The concentration of economic power
31. Violation of fundamental human rights in the supply chain
32. Violation of fundamental human rights of end users
33. Unintended, unforeseeable adverse impacts
34. Prioritisation of the “wrong” problems
35. Negative impact on vulnerable groups
36. Lack of accountability and liability
37. Negative impact on the environment
38. Loss of human decision-making
39. Lack of access to and freedom of information (Stahl, 2021:38–39).

The list is ethically relevant. Stahl (2021:39) notes that these issues are not only ethically problematic but also directly connected to regulation and legislation. He combined these 39 concerns into three main sets of ethical issues, namely: specific issues arising from machine learning (narrow AI), general issues related to people living in a digital world (converging socio-technical systems) and metaphysical issues (AGI).

2.3.1 Ethical issues arising from machine learning

Stahl (2021:40) argues that machine learning based on neural networks is unpredictable. Neither the developer, the deployer[8], nor the user can anticipate how a system will respond to a given set of inputs. Predictions are impossible because the system learns and is adaptive and dynamic. In other words, past behaviour is not a reliable predictor of future behaviour, not even in similar conditions. Machine learning through neural networks needs enormous data sets for training purposes, information that could be leaked to the wrong people. The safeguard of private and personal information cannot be guaranteed (Kaplan & Haenlein, 2019:24). It is crucial to remember that AI, through its ability to detect patterns, can be used to generate insights that raise privacy and security concerns (Stahl, 2021:41). AI can create risks not envisioned by policymakers and legislators.

2.3.1.1 Issues related to living in a digital world

AI will have an unprecedented social impact on humanity. These AI systems will have features of autonomy, social influence and even manipulation (Stahl, 2021:42). AI will undoubtedly have an enormous socio-economic impact, resulting in uncountable job losses, inequality, and unemployment. With these challenges will come social dysfunction and psychological deterioration (Kaplan & Haenlein, 2019:1–24).

Nicas (2021) reports that on 20 August 2020, Apple became the first US company to hit a USD 2 trillion valuation. It took Apple 42 years to reach USD 1 trillion in value and only two more years to reach USD 2 trillion in value, while the global economy nearly collapsed due to the COVID-19 pandemic. On 23 August 2020, the stocks of Apple, Microsoft, Amazon, Alphabet and Facebook soared, with the S&P 500 hitting record highs. The value of these tech behemoths grew nearly the same as the S&P 500's 50 most valuable companies combined. Nicas (2021) further reports that "Amazon, Microsoft, Facebook and Alphabet, which owns Google and YouTube, have also continued raking in billions of dollars amid the pandemic." Stahl (2021:43) argues that these monumental values

[8] The person or team who decides the function or use of the AI system. They also have control over the risks and benefits of the system (Stahl, 2021:40).

indicate that investors have high hopes for AI technologies and these companies' ability to harness them. Stahl (2021:44) believes that these companies will exponentially apply their insights to structure the space of action for individuals and, in so doing, diminish the average citizen's capacity to make autonomous decisions. Will this be just and fair?

Richardson *et al.* (2019:34) explain how AI will influence and transform the justice system, especially the overreliance on AI for predictive policing that relies on dirty data[9]. They found that the increased reliance on data to evaluate and make decisions about complicated social, economic, and political issues presents severe risks to fairness, equity, and justice.

Although there are other ethical issues like freedom, power relationships, power asymmetries, economic dominance, autonomous weapons and the endangerment of democratic freedom, to mention a few, the fact is that the social sphere is technically mediated daily, and this mediation has consequences. A well-acquainted example is search engines that heavily rely on AI. These clever AI-driven systems determine what users can see and thus perceive as relevant (Richardson *et al.*, 2019:44).

2.3.1.2 Issues related to artificial general intelligence

It is essential to state that AGI does not exist yet and that there is considerable disagreement about its likelihood. Although narrow AI is advancing with leaps and bounds, the progress with AGI is plodding. When the idea of AGI and the hypothetical technological singularity is compared to biblical apocalyptic accounts, there are similarities and the likelihood of AGI is accentuated, as discussed later in this chapter.

The slow progress with AGI and the disagreement among expert communities on its development may be the most critical drivers of this ethical issue. Richardson *et al.* (2019:46) note that most policy documents on AI development ignore the possibility of AGI on the implicit assumption that developers are not pressing for policy development.

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[9] Richardson *et al.* (2019:1) use the term *dirty data* to refer to inaccurate, skewed, or systemically biased data used to train predictive policing. Dirty data can be the result of *juked stats* to give the appearance of crime reduction. This is a practice called "juking the stats". "If the felony rate doesn't fall, you most certainly will," one officer is instructed (Richardson *et al.*, 2019:2).

In other words, the issues associated with AGI are not regarded as issues at present. Richardson *et al.* (2019:46) sense an element of fear among scholars and technical experts of being stigmatised as not being academic enough, as issues surrounding the possibility of AGI are nothing but science fiction.

2.3.1.3 What are the main benefits of AI?

Although there are ethical challenges that revolve around AI development in the twenty-first century, it is worth mentioning that AI also promises countless benefits. AI will undoubtedly increase levels of efficiency and productivity with the automatisation of many tedious processes. Lennox (2020:224) states that concern about AGI should not hinder believers from contributing to the positive potential of narrow AI for the global good. Rosalind Picard at MIT Media Lab, for example, focuses on creating tools that help machines understand human emotional intelligence rather than mimic them (Picard *et al.*, 2001:1–18). Her expertise opened what is now known as “affective computing”.

2.3.1.4 How will a technological singularity change the world?

Understandably, some (such as Nobel Prize winner Sir John Eccles) see conversations about the fundamental differences between machine intelligence and human intelligence as a needless debate that cannot be overcome by any amount of research (Lennox, 2020:24-26). Dorobantu (2021b:7), who does believe that such conversations are relevant, believe that AGI will never be capable of feeling or thinking anything.

While techno-scientists and engineers debate the possibility of AGI and the suspected technological singularity, a research team from Cortical Labs, a biological computing start-up in Melbourne, Australia, developed what they called the DishBrain, a mini-brain capable of conducting goal-orientated tasks. This scientific breakthrough, published in *Neuron* by Kagan *et al.* (2022:1–41), claims that it is the first “sentient” brain developed in any lab. The DishBrain can capture information from an external source, process it and then respond in real time (Kagan *et al.*, 2022:13). They elucidate that the human brain is more adaptable and learns faster than current AI systems. Could this be the blueprint for the next generation of computers? Kagan *et al.* (2022:15) explain that the research team grew this DishBrain from human brain stem cells combined with brain cells from mouse embryos to a collection of 800 000 cells. They connected this mini-brain to the video game

Pong to evaluate its response. To their surprise, the cells from the DishBrain produced electrical activity on their own and learned to play the game in five minutes (Ghosh, 2022; Kagan *et al.*, 2022:2). Kagan *et al.* (2022) state that the purpose of brain cells is to process information in real time and that tapping into their actual function unlatches unimaginable research possibilities. A science correspondent from BBC News reports that the researchers claim that mini-brains could provide the basis for more adaptable robots in the future (Ghosh, 2022). Although these mini-brains will become more complex as research progresses, Dr Kagan was quoted as saying that their research team is working closely with bioethicists to ensure they do not accidentally create a conscious brain (Ghosh, 2022; Kagan *et al.*, 2022:21). Bianco (2022:140) argues that AI could become the bioengineer's best friend. In his summary of Aviv Regev's research at Genentech, he explains the rationale for the engineering of biological systems using advanced computational methods. This led him to ask if algorithms can eventually be so powerful and so smart that they can design a complex biological system. According to Kagan *et al.* (2022) and their research, the answer to this question is yes. It seems that bioengineering and AI combined will create the ultimate synthetic biological intelligence (SBI), previously confined to science fiction (Kagan *et al.*, 2022:2). Buchanan (2018:634) was right when he predicted that generalised SBI might arrive before AGI due to the innate efficiency and transformative advantage of biological systems. Combine Kagan *et al.* (2022) and the SBI from mini-brains with astounding data transmission technology, and a technical singularity becomes a much more realistic possibility than previously imagined.

Jørgensen *et al.* (2022:798–802) from the Technical University of Denmark in Copenhagen recently published a breakthrough in data transmission technology with their new computer chip. Their powerful photonic chip can send a record 1.84 petabits (1 840 terabits) of data per second over a 7.9 km long fibre using 223 wavelength channels of less than a square millimetre each. That is equivalent to downloading 230 million high-resolution photos in one second, more than the rate of traffic flowing through the entire internet framework every second. According to Jørgensen *et al.* (2022:798–802), the entire volume of traffic on the internet is close to one petabit per second, and their photon chip can transmit two times that. This achievement could lead the way for microchip design and rollouts unimagined before, and it will unquestionably shift the design of future

communication systems. Considering the billions of Dollars dictatorial countries and individuals invest in AI development, SBI combined with powerful photonic chips might negate the idea that a possible technological singularity is only science fiction. The likelihood is now more than ever imagined before.

Fully autonomous superintelligence and the looming technological singularity may arrive sooner than expected. It might not be with AGI, but an intelligence explosion will most probably follow the exponential development of SBI, a bio-digital amalgamation. The term "Seed AI" is more applicable to this development than to AI development alone. SBI will speed up developments in transhumanism, and this is coupled with the development of brain-computer interfaces and mind-uploading interfaces. One hypothesis is that Kagan *et al.* (2022), with their breakthrough, will spark progressive research and development in this field, which will hasten the advent of a singularity.

Although there are still many unsolved ethical, scientific and technological challenges to overcome before techno-scientists arrive at AGI, which is said to have abilities such as self-awareness, common sense reasoning and even the ability to define its purpose (High-Level Expert Group on Artificial Intelligence, 2019:5), it is still a matter of great concern. Currently, AI is goal-directed, meaning that the system receives a specific goal from a human programmer. Machines do not define their own goals, at least for now. Although these systems need human input, there are AI systems, as explained above, that have the freedom (through machine learning) to decide in which way a goal will be achieved. Did Hollywood perhaps accurately predict the advanced technologies of our day and the looming technological singularity?

2.4 How should the church understand the exponential development of AI and the imminent technological singularity?

Tariq *et al.* (2022:2) note that science fiction films, literature and even scientists and philosophers have elaborated on the possibility of a technological singularity. They feel that AGI (which is not yet a reality and might never be) are ascribed undue god-like status and that these claims divide humans into conflicting intellectual camps. They argue that some writers understandably create an alternate reality in their minds. They call this a fictional reality and point out that these writers think of this reality as accurate. Reed

(2018:22) disagrees, stating that our collective unconscious is reflected in Hollywood, where we imagine god-like beings that are ultimately responsible for our destruction.

Some of these films are explored in this section.

2.4.1 Hollywood's Prophets

Films are more than just entertainment; they play an imperative role in shaping our worldview and shared consciousness. They educate and spread ideas in ways no book can (Torchylo, 2021). They also help to retain ideas and information for longer (Neo, 2020). Although Hollywood films tend to exaggerate events and developments, there is still achievable truth in them.

Over the years, films have made eerie predictions that seemed farfetched but proved to be ridiculously accurate decades later. These films introduced mind-numbing ideas like crazy gadgets, bizarre technology, impossible science, and even futuristic events. Films such as "Blade Runner", "The Terminator", and "2001: A Space Odyssey" are all worth revisiting for the modern-day technology they predicted with astounding accuracy. Loeffler (2018) argues that these predictions were not just about the technologies; they also foresaw the society producing them.

Jules Verne may have pioneered the concept of modern, technological moon travel with his 1865 novel "From the Earth to the Moon", but numerous films have since depicted journeys to the moon or beyond (Johnson, 2019). "Le Voyage Dans La Lune" (1902) deserves special mention. Before the first cinema even opened and when the cinematic camera was just a decade old, French filmmaker Georges Méliès created a 13-minute film featuring special effects. The film depicted explorers journeying to the moon in a space capsule propelled by a cannon. Firing a rocket out of a canon might have seemed hilarious at the time, but for viewers accustomed to Space X launches, it is not as far-fetched as it would have been at the time of release. According to Johnson (2019), "Le Voyage Dans La Lune" undoubtedly captured the audience's imagination and set the stage for Neil Armstrong and Apollo 11.

In 1927, the silent black-and-white film "Metropolis" appeared with its first on-screen depiction of an android. In the film, an inventor bearing a striking resemblance to Doc

Brown from the 1920s creates a metallic humanoid robot. This robot is later “reskinned” to look like Maria, a character in the film (Johnson, 2019). The film also depicts a world where the privileged live in luxurious skyscrapers while, deep in the belly of the city, the underclass struggles out of sight (Greydanus, 2022). The film reeled more than a century ago, also envisioned flying vehicles.

In 1968 the film “2001: A Space Odyssey”, Stanley Kubrick predicted technology from the future, tablet computers, space tourism, and even video calling from space (Johnson, 2019). We have seen the development of video calling over the last few years. Pahle (2016) also notes the Siri-like AI. Space tourism will be realised sooner than we think, with tech entrepreneurs like Richard Branson, Elon Musk and others working on it. Space Odyssey is also a reminder of the dangers of letting AI take control of our world (Neo, 2020).

“Star Trek” debuted as a TV series in 1966, and its initial three-year run laid the groundwork for numerous technological forecasts. The show's pocket communicator, featuring a flip-up grid antenna, inspired Motorola engineer Martin Cooper to create the world's first mobile phone (Johnson, 2019).

“Westworld” (1973) is a film about how humanlike AI robots can be used to entertain humans and allow them to live out their wildest sexual fantasies. This film is a reminder of the fine line between technology and ethics (Neo, 2020). Westworld was followed up with a science fiction TV series in 2016.

In 1977 the film “Demon Seed” predicted what we know today as “smart” homes. Johnson (2019) noted that film fans pointed to the 1999 Disney film “Smart House” as the first significant appearance of the Internet of Things (IoT) and smart-home technology in a film. However, researchers can go back further for the first example of a smart home in cinema: the 1977 sci-fi-horror film “Demon Seed”.

In “Demon Seed”, a scientist creates Proteus IV, an artificially intelligent computer that initially shows promise by curing leukaemia. However, it soon goes awry when the computer becomes infatuated with its creator's wife. It infiltrates the home computer system and takes control of all the technology and devices in the residence (Johnson, 2019).

In the 1982 film “Blade Runner”, Ridley Scott predicted technology like fully human-like androids and flying cars. This is a typical dystopian film where bio-engineered replicas of humans powered by AI live among real humans (Neo, 2020). What is astonishing is that the pyramid-shaped Los Angeles skyline suggests that the city's skyscrapers no longer need to have legally mandated helipads on their roofs. Intriguingly, this became a reality in Los Angeles in 2014 (Johnson, 2019). On 5 October 2017, Blade Runner 2049, a sequel to the 1982 film, was released. Although engineers attempted flying cars, YouTube today displays many “passenger drones” — electric-powered, self-flying, vertical take-offs and landing vehicles that look like large drones. Even more mind-boggling is these drones’ ability to ferry passengers around without needing a pilot. According to Loeffler (2018) and Pirrello (2019), the film also predicted a world of runaway pollution with varying degrees of accuracy – predicting the recent onset of climate change, video calling, gigantic advertising billboards, and more.

In the 1984 sci-fi blockbuster “The Terminator”, James Cameron offered unsettling visions of the future, featuring a self-aware computer that instigates nuclear devastation, and relentless killer robots. Among these dystopian elements, the concept of hunter-killer drones emerges—essentially, weaponised military flying drones (Johnson, 2019; Pahle, 2016). Johnson (2019) observes that by the early 1980s, the military had already amassed considerable experience with “target drones”—radio-controlled unmanned vehicles used for target practice—as well as reconnaissance drones deployed from ships and aircraft. However, it would not be until the “war on terror” in the 2000s that the US military would fulfil the predictions of “The Terminator” and deploy UAVs — military drones with weapons on board. A mind-crippling modern-day reality is that the US military is experimenting with artificially intelligent drones capable of making their own firing decisions.

The film “Total Recall” from the 1990s reveals futuristic self-driving cars with a stylised android avatar in the driver’s seat (Johnson, 2019; Pahle, 2016). Today’s fully self-driving cars can drive themselves without needing anyone or anything to sit in the driver’s seat. Uber, Tesla, and Google, among other companies, are working around the clock to bring these AI vehicles to our roads (Pahle, 2016).

In 1989, “Back to the Future 2” predictions centred on the growth of personalised, wearable technology and how it would dominate our everyday lives. Whether it is Fitbit, Apple Watch, Google Glass, Samsung Smartwatches, or the growing market of VR headsets, people today live their lives through smartphones and other connected devices (Loeffler, 2018).

If we look at AI and machine learning in our modern-day advertising, the film “Minority Report” comes to mind. Loeffler (2018) notes that what sets “Minority Report” apart is one of its less remembered but astoundingly on-point predictions about the time in which humans would live: personalised, targeted advertising. Although we have not reached the stage of deploying pre-crime units to pre-empt murders, police departments globally already use data analysis for predictive policing. This approach is not vastly different from the precogs in “Minority Report”. The same AI technology studies behaviour to target us with tailormade ads (Loeffler, 2018). People now call targeted advertising one of the film’s more prescient and unsettling predictions about the hyper-commercialised world we soon came to inhabit (Loeffler, 2018).

On 19 March 2000, the cartoon comedy “The Simpsons” aired the episode “Bart to the Future”, in which Bart is shown a vision of his adult life where the US economy is shod and Donald Trump has served as president. The US presidential election results should not surprise – “The Simpsons” predicted this exact outcome long ago (Allison, 2016; Morris, 2016). According to the Hollywood Reporter, the Fox animated comedy “The Simpsons” successfully predicted the future 30 times, which includes predictions of future technologies and monumental political shifts in the USA (Bloom, 2018).

In “The Cable Guy” (1996), Jim Carrey, playing Chip, the cable man, launches into a prophetic rant about shopping and gaming only a couple of years into the web’s existence. “Soon, every American home will integrate their television, phone and computer! Visit the Louvre on one channel and watch mud wrestling on another. Today people can do their shopping at home or play Mortal Kombat.” (Allison, 2016)

Eight years before the 9/11 terrorist attack on the Twin Towers in New York City, the “Super Mario Bros” (1993) final scenes provide a haunting piece of foreshadowing to the tragedy of 9/11, illustrating the Twin Towers as gradually revealing structural damage before phasing entirely out of sight (Pahle, 2016; Pirrello, 2019).

Writer Steven Spielberg consulted a team of futurologists for the purposes of creating the film “Minority Report”, which is set in 2054. The film accurately predicted personalised advertising and iris-scanning for identification, as seen in smartphones today (Allison, 2016).

“The Net” (1995), set in 1995, depicted online identity theft before it became a reality. More importantly, it predicted a golden age when people could order pizza without leaving their houses or talking to other human beings (Pahle, 2016; Pirrello, 2019). Pirrello (2019) also mentions “Dick Tracy” (1990), where Warren Beatty’s detective in the yellow trench coat speaks to his wrist phone. It would take more than 20 years to get a version of a wrist communicator like Apple, Samsung, and other smartwatches.

Modern-day surveillance, where governments and private companies use advanced AI, facial detection, and machine learning to watch every move people make, was predicted more than 24 years earlier in the film “Enemy of the State” (1998) (Pirrello, 2019). “The Matrix” (1999) is a simulation of reality created by AI to keep humans subdued (Neo, 2020), much like China’s Hikvision AI-enabled surveillance. Josh Chin and Liza Lin’s book, *Surveillance State: Inside China’s Quest to Launch a New Era of Social Control*, explores China’s technology and social media control systems. Andersen (2020) reports that Xi Jinping’s pronouncements on AI have a sinister edge. He elaborates that AI is used to enhance Xi’s government’s totalitarian control and that he is exploring this technology in regimes around the globe, just like the panopticon predicted in “The Matrix”. So, what do these reels reveal about the future of humanity?

2.4.2 Reel Revelation

Throughout biblical times the Holy Spirit revealed wisdom in unexpected ways. The same creative Holy Spirit is inspiring actors, screenwriters and directors to reveal knowledge that would otherwise be concealed. Detweiler (2008) uses the term film-forged theology[10] and argues that God appeared in surprising places in biblical times, from a pillar of cloud

[10] Film-forged theology is a term that refers to the way that films and other forms of media can shape and influence people's understanding of religion and spirituality. This can be done in a number of ways, including through the depiction of religious themes and characters, the use of religious imagery and symbolism, and the exploration of spiritual or philosophical ideas (OpenAI, 2023b).

and fire (Exod. 13:21) to Balaam's talking donkey (Num. 22:21–39). Lowly prophets arose to offer object lessons on God's behalf. Ezekiel cooked dinner on a dung pile (Ezek. 4:12). Jeremiah strapped himself into a cattle yoke (Jer. 27:2). They proved that the theological could also be theatrical because God not only reveals himself through faith-based settings. Fundamental spiritual truths are often embedded within profane settings (Hab. 1). God's revelation cannot be confined to faith-based settings alone. He can speak through anyone or anything at any time (Detweiler, 2008). The word "revelation" comes from the Greek word "*apocalypse*", meaning to uncover, reveal, disclose or make known. It is generally reserved for the revelation of God in Scripture (Detweiler, 2008). Cinema can also be a *locus theologicus*[11], a place for divine revelation.

The reels not only predict hypothetical scenarios and technologies that may one day become a reality, but they also predict large-scale deception, and social and political injustice such as inequality, corruption, and the impact of technology on society. These themes can sometimes reflect real-world issues that will become more pronounced in the future. For example, films like "The Matrix" (1999) mentioned before and "Inception" (2010), directed and written by Christopher Nolan, have depicted a world where technology has become so advanced that it is difficult to distinguish between reality and illusion, which is an issue that has become increasingly relevant in the age of social media and fake news. Films can also predict the future by reflecting the current zeitgeist and cultural trends. For example, films based on actual life events, like "The Social Network" (2010), directed by David Fincher and written by Aaron Sorkin and "The Big Short" (2015), directed by Adam McKay and written by McKay and Charles Randolph, predicted the rise of the digital economy and the increasing importance of technology in our lives. What do the reels reveal about future technologies and the societies that will produce them?

Metropolis (1927)

"Metropolis" projected futuristic industrial scenes and a reality beyond 2028, more than a century away from its release date in 1927 (Sweeney, 2019). The film addresses serious issues about religion and Marxism (IvyPanda, 2022). It also reveals a dichotomy between

[11] Also, a place of theological knowledge. The term locus (Greek τόπος tópos "place", "topos").

rich and poor, man versus god, male versus female and nature versus technology. Greydanus (2022) states that “Metropolis” illustrates that revolutionary violence serves the interest of the ruling class because it allows them to respond by crushing the dissident elements.

The profusion of religious imagery mirrors Fritz Lang’s lineage. Fritz’s parents requested a marriage ceremony stripped of all spiritual symbolism (Wharton, 2003). They eventually embraced Catholicism, which shaped Lang’s worldview, politics and cinematic vocabulary. Wharton (2003) notes that the themes, images, and characters in “Metropolis” are all rooted in Judeo-Christian theology. The film is constructed of horizontal stratification with the rich and influential individuals living “High in the heavens” and the workers in the depths of Metropolis, far below the surface of the earth, where the sunlight never reaches. The architecture reveals power and excess.

Joh Fredersen is the master of Metropolis and the overseer of everything. He rules together with his vast control board made up of business magnates. He is depicted as an Old Testament god, quick to wrath and scornful of disobedience (IvyPanda, 2022; Wharton, 2003). Below the Metropolis are uncountable poor workers who toil and die so that the machinery of the city runs uninterrupted. Freder, Joh Fredersen’s son and the protagonist of the film, refers to the mechanical Juggernaut powering the upper city as “MOLOCH”, a term derived from the Canaanite word for “king”. The Bible refers to Molech as a god of the Ammonites, and not a kind god. Molech’s worshippers engaged in the ritual sacrifice of children, specifically sacrifice by fire. In the film, the poor workers know no hope or rest. Freder sees visions of demons feeding helpless workers to the demonic machine. Sacrifices are tossed into the ever-hungry belly of Moloch without pause.

The situation of the poor workers in the film below the surface of the earth is a reminder of the early Christians who met in secret. The walls are stacked with generations of dead workers who had built the city and who are forgotten and desiccated. It is in the dead that the workers find hope. Then comes Maria, an allusion to John the Baptist. She preaches the coming of a “saviour” who will rescue the poor workers. One night, Maria tells a story about the tower of Babel at the very heart of the vibrant metropolis of Babylon, in what is today Iraq (Encyclopædia Britannica, 2022). Babylon is depicted in the Bible as a city of rebels who opposed God (IvyPanda, 2022). This corresponds to the city workers in the

film who are weary of their endless struggles. Much like Babel, their city is ruled by the upper class, who have no compassion for the poor, as Maria explains. Reconciliation must come through an intermediary, a third party capable of bridging that gap. A messiah is needed.

Maria is beautiful and is reminiscent of the Virgin Mary. She comes into Freder's garden, and she is surrounded by children. From the first meeting, she is indirectly responsible for bringing Freder down to the level of the marginalised, away from his home in paradise. However, when Freder's father and ruler of Metropolis listens to Maria, he fears that there is a plot against him and so enlists the help of an inventor by the name of Rotwang. His instruction to Rotwang is to design an android replica of Maria that would destroy the belief of the workers in the actual Maria's image (Sweeney, 2019). Today this is known as deepfakes. The inventor takes on the character of an evil magician and designs the imitation of Maria. Sweeney (2019) notes an occult symbol, the pentagram, hanging in Rotwang's workshop.

It is no coincidence that the android built by Rotwang takes the form of Maria, an evil *doppelganger* that spreads anger and fear, the antithesis of the real Maria's vision of peace. Certainly, Rotwang's android appears to embody something more ominous than mere binary code. It originates from human intellect, not divine intervention, and unlike being formed from Adam's rib, its creation costs Rotwang his hand—a sacrifice he does not regret (Wharton, 2003).

As the deepfake android is shaped into the image of Maria, a heart begins pulsing within its metallic form. The genuine Maria prophesies that the unifier of the city must serve as the "heart" to bridge head and hands. The android emerges as a sinister counterpoint to this vision. In the android, we have an unholy communion, both the Antichrist and the Whore of Babylon, the Beast of Revelation and Horseman of the Apocalypse, a being that can bring only ruin to those who follow it.

Visiting the city's red-light district, this false Maria hypnotises a crowd of aristocratic men with a fevered, near-orgiastic dance, like something from the pleasure gardens of Sodom and Gomorrah. In the men's club, the undistinguishable android Maria performs erotic dances that remind the viewer of the harlot from Babylon from the book of Revelation (IvyPanda, 2022). Sweeney (2019) states that this android has an evil gleam in her eyes

to incite the poor to rebel against the factory owner and arouse them to destroy the machines on which the city depends. As Freder watches, he is overwhelmed by visions of the Seven Deadly Sins assaulting the city, hinting at impending perils. While he has not yet grasped that this is not the Maria he knows, he intuitively feels the menace she brings,

After beguiling the elite, the robot corrupts the trust Maria has built with the workers, guiding them towards deceit and disaster. She provokes them to assault the city's machinery, triggering a violent shockwave that culminates in a flood of biblical scale. This apocalyptic surge engulfs the workers' city and endangers their children. Freder's timely intervention is the only thing that saves them. After destroying the "Heart Machine", the city starts to collapse, and a flood originates. An apocalyptic scene unfolds.

Metropolis is a warning to the technological revolution of the 4IR. Maria's message is that the "head" and the "hand" need a mediator, a "heart". Nevertheless, in the middle of the film, at the scene of the cathedral, a monk is heard reading from the book of Revelation about the end times and the whore of Babylon (Sweeney, 2019). Sweeney (2019) argues that Metropolis brings together four elements:

1. An innovative and artistic visualisation of technology, scientific preoccupation, mathematical precision, and massive production of modernity.
2. The human story of a father-son relationship and a love relationship between the son and the heroine, Maria.
3. The socio-cultural deception of a wealthy capitalist society contrasted with a depressed working class; and
4. A biblical Christian allegory of fallen man, of Satan's evil interventions resulting in an apocalyptic disaster, succeeded by the appearance of Mary's intercession and the redemptive resolution by the Mediator (Messiah).

The films discussed above can be evaluated using both quantitative and qualitative analysis to uncover deeper patterns and relationships related to contemporary socio-economic issues and technological advancements. The results of this analysis can then be examined through a hermeneutical lens for technology, which allows for comparison with biblical apocalyptic prophecies and occurrences. This will enable a comprehensive and deeper understanding of the predictions and concealed motifs present in the films

and their connection to more significant societal and cultural issues and trends towards a technological singularity.

2.4.3 Divine Precognition

Precognition, from late Latin *praecognitiō* – foreknowledge, *prae*- "before", and *cognitio*- "acquiring knowledge", to foresee (Collins, 2022) – is a term associated with parapsychology and is widely considered to be pseudoscience (Alcock, 1981:3–6; Zusne & Jones, 2014:151). Precognition is the ability to know things about an event or circumstance ahead of time. In this study, the term is used with sharp distinction from the unbiblical acts of clairvoyant knowledge, extrasensory perceptions, or the use of psychics, witchcraft (2 Chr. 33:6), necromancy (Isa. 8:19) and other forbidden practices in Scripture (Exod. 22:18, Deut. 18:10 and Rev. 21:8). By no means does precognition here refer to an ability to have psychic premonitions.

Houdmann (s.a.) notes that much of the Old Testament is a written record of what was foretold by God through his prophets. People who acknowledged the prophets could prepare for things to come. Prophets warned the disobedient about the Day of the Lord (Zech. 14:1-2) that would come, and they gave insurance to those who trust in God's salvation (Isa. 25:8, 35:10, Jer. 31:16). People who heed the messages of the prophets were able to prepare for what was about to happen because they had precognition of the events that were about to unfold.

In the New Testament, people received divine precognition about the future through the indwelling work of the Holy Spirit (Acts 2). In Acts 21:10–14, Agabus, a prophet from Judea, had divine precognition of Paul's suffering should he continue to Jerusalem. Agabus had that knowledge because the Holy Spirit enlightened him. Paul also had precognitions from the Holy Spirit. In Acts 20:22-23, the Holy Spirit warns him of the challenges he would face, so he could mentally and spiritually prepare himself for what lay ahead. Christians have the privilege of being guided by the Holy Spirit (Rom. 8:14). Through the Holy Spirit, Christians sometimes receive precognitions about situations they have no other way of knowing (1 Cor. 12:8).

As the time of Christ's second coming draws closer and Christians see the events unfolding, they can know what is to come. In 1 Timothy 4:1, we read: "Now the Spirit

explicitly says that in later times some will depart from the faith, paying attention to deceitful spirits and the teachings of demons, through the hypocrisy of liars whose consciences are seared." Christians are not left in the dark about the future and the challenges they will face. Passages like 2 Timothy 3:1-5, 2 Peter 3:3 and Jude 1:18 prophesy what will happen in the last days. They have divine precognition. Although these passages were penned a long time ago, they play a vital role in the life of the observant Christian, who sees the fulfilment of these prophecies before their eyes. Christians perceive this precognition as the compassionate intervention of a loving heavenly Father. Although applauded by some scientists, intuition, wisdom, and divine precognitions could provide valuable guidance during times of turmoil.

As previously noted, films can serve as a *locus theologicus*. As is evident from the analysis presented, films do offer glimpses of a potential future technological singularity accompanied by apocalyptic events. These hints and predictions can be evaluated using a hermeneutical lens for technology, providing valuable insight into the end-time events as outlined in the Bible. A hermeneutical lens for technology would serve as a method for decoding technological development, providing a framework to understand the connections between predictions presented in some films and larger societal and cultural issues, as well as the potential link between the exponential development in AI technologies to end-time events in the Bible.

One may question the source of the knowledge about future challenges and technologies depicted in films, as it is evident that a large number of scriptwriters and film producers possess such insight. One explanation for this phenomenon could be the prevalence of futurist literature and research within the entertainment industry, which could serve as a source of inspiration for scriptwriters and film producers. Additionally, experts in various fields, such as technology and sociology, are consulted during the development and production of films, which could also contribute to the accurate portrayal of potential future developments in the films. Another explanation could be the collective unconscious, a term coined by Carl Jung (1936), which refers to the innate knowledge and everyday experiences shared by all human beings, which could be expressed in the stories and scenarios depicted in films. While the researcher contends that divine precognitions through the enlightenment of the Holy Spirit also play a significant role in some of these revelations, further research is needed to fully understand and explain this phenomenon.

2.4.4 Divine Decoding

Collins (2022) defines decoding as the process of converting something from a coded form into a standard form or translating from one language to another. For this argument, decoding refers to the process of converting impenetrable and unexplainable information from a source domain into accessible data aimed at a target domain. The process is necessary to bridge differences in capabilities. Humans, for example, cannot react to digital data unless it is decoded into an accessible audio-visual signal using a mobile device.

Daniel 2 records a prophetic vision from God (the source domain) given to King Nebuchadnezzar (the target domain) and the king's search for its meaning. Nebuchadnezzar's troubling dream gave him sleepless nights. To ensure the correct interpretation, he insisted that whoever provides the meaning must reveal the dream with the interpretation. Nebuchadnezzar's counsellors argued that such a request was humanly impossible and that no man could do what the king asked (Dan. 2:10). While it is true that no human could fulfil the king's request, God could reveal mysteries (Dan. 2:28), he could reveal deep and hidden things (Dan. 2:22). While none of Nebuchadnezzar's wise men could decode the dream, Daniel divinely decodes the mystery (Dan. 2:31–33), providing Nebuchadnezzar with precognition of the terrifying end of his kingdom. Through divine decoding, God revealed his plan for the ages, beginning with Babylon led by Nebuchadnezzar and ending with a kingdom led by the Son of Man, the Messiah (Dan. 7:13–14). Throughout Scripture, God reveals the hidden things, the mysteries not previously known, using his prophets to decode his plan for the future.

Although Nebuchadnezzar was not a follower of the living God like Daniel and his friends, God still decided to use him to reveal something about his Kingdom, possibly because of his influence on society. For the same reasons, God uses his creative Holy Spirit to inspire actors, screenwriters and directors to reveal information that would otherwise be concealed.

Schneider (2022) reports that with more than 27 seasons since 1989, "The Simpsons" is the most extended scripted series in the history of American primetime television, averaging 20 million viewers per episode. Since 1987 it has been amongst the highest-

ranked 30 shows on television, averaging a stunning 17.7% on the Nielsen rating[12] (Schneider, 2022). According to Rotten Tomatoes (2022), their website is the world's most trusted recommendation resource for quality entertainment. According to their reviews, AI-related movies like Blade Runner, Terminator, The Matrix, Star Trek, Westworld, Back to the Future, Minority Report and others have billions of viewers judging by the staggering fortunes these films generated, to speaking of influence in societies. As stated earlier, movies are more than just entertainment; they play an imperative role in shaping our worldview and shared consciousness and are therefore a powerful source for *locus theologicus*. Multilingualmag (2022) argues that the film industry is most probably one of the most influential sectors of modern society.

Note Peter's words in 2 Peter 1:20–21:

> *Above all, you know this: No prophecy of Scripture comes from the prophet's own interpretation, because no prophecy ever came by the will of man; instead, men spoke from God as they were carried along by the Holy Spirit.*

"No prophecy" could include prophecy inspired by the Holy Spirit in any person. God uses whomever he wishes to use. In Daniel 5:5, King Belshazzar witnessed a message from God, although he himself could not interpret it. When revealed through Daniel, the message contained information about the future of King Belshazzar and the division of his kingdom (Dan. 5:24–28).

If God communicated hints about the future through Nebuchadnezzar and Belshazzar, surely it is worth acknowledging the precognitions about the future of AI and humanity as manifested in some films. The church should take note of messages about the future, even if they arrive in nonbiblical and unusual ways. It is undoubtedly possible that God can use the film industry, among other things, to decode impenetrable and inexplicable

[12] The Neilsen rating means that 17,7% of households fortunate to have television sets, tuned into the show (Schneider, 2022). The Nielsen rating system uses a metric called "rating points" to represent the percentage of all television-equipped households that are tuned into a particular programme. For example, a programme with a rating of 2.0 would mean that 2% of all television-equipped households in the United States are tuned into that programme. The Nielsen ratings are based on a sample of around 40,000 households and are updated every year (OpenAI, 2023b).

information about the future to make it more accessible to humanity. Peter's words: "No prophecy of Scripture comes from the prophet's own interpretation" (2 Pet. 1:20) means that it needs divine decoding. Although impossible through man's own interpretation, God can reveal (Dan. 2:28) deep and hidden things (Dan. 2:22), even through film.

2.4.5 Religious Robots and Revelation

C.S. Lewis was an influential fiction writer because of his ability to influence his audience through the power of imagination. He knew that reasoning begins with the imagination's ability to make meanings to connect symbols to objects and ideas (Starr, 2015). For him, meaning precedes reasoning. Lewis argues that much of what Christians know and say about God is metaphorical. According to him, even the statement: "Jesus Christ is the Son of God" is a metaphor (Starr, 2015). He explains that Jesus is not a son as humans understand it in their experience of a son. For a human being, there was a time when the child did not exist, and then that child was born and came into existence. On the other hand, Jesus always existed alongside the Father. Metaphorically their relationship is best explained as one between a father and his son because it makes the knowledge of the truth more accessible to humans. Therefore, humanity is left with that metaphor. It is a good metaphor because it is true. Starr (2015) explains what metaphors are: "they use comparison to capture truths which cannot be abstracted any further into reason – at least not without losing anything in the translation". It is essential to understand two crucial functions of a metaphor: (1) they better capture and communicate the meaning of something real, and (2) God chooses the metaphor to speak and explain the truth. Lennox (2020:197) elaborates on this, stating that a metaphor is always used to stand in for something real, not for something unreal.

Applying Lewis's argument to the book of Revelation, the beast is used to describe a very hostile state. Knowledge of the biblical narrative supports this notion. Lennox (2020:198) argues that the prophet Daniel uses the imagery of wild beasts to describe the various kinds of empires and their leaders. We can thus accept that the first readers of the book of Revelation would have no difficulty recognising a state that behaves like a beast. Their dire experience with the Roman Empire taught them this because they lived there. We can thus assume that the imagery applied in the book of Revelation contains many aspects of the behaviour associated with the Roman Empire. Speaking about the future

beast of Revelation, the imagery reveals a more profound truth about the state of the world leading up to the return of Christ (Lennox, 2020:198). Any reader making an informed attempt to apply their imagination to the imagery conveyed in Revelation should carefully read this excerpt:

> *And I saw a beast coming up out of the sea. It had ten horns and seven heads. On its horns were ten crowns, and on its heads were blasphemous names. The beast I saw was like a leopard, its feet were like a bear's, and its mouth was like a lion's mouth. The dragon gave the beast his power, his throne, and great authority. One of its heads appeared to be fatally wounded, but its fatal wound was healed. The whole earth was amazed and followed the beast. They worshipped the dragon because he gave authority to the beast. And they worshipped the beast, saying, "Who is like the beast? Who is able to wage war against it?" The beast was given a mouth to utter boasts and blasphemies. It was allowed to exercise authority for forty-two months. It began to speak blasphemies against God: to blaspheme his name and his dwelling — those who dwell in heaven. And it was permitted to wage war against the saints and to conquer them. It was also given authority over every tribe, people, language, and nation. All those who live on the earth will worship it, everyone whose name was not written from the foundation of the world in the book of life of the Lamb who was slaughtered. If anyone has ears to hear, let him listen* (Rev. 13:1–9; CSB, 2017).

There are apparent similarities between Revelation 13:1-9 and the behaviour of the man of lawlessness described in 2 Thessalonians 2:3-4:

> *Don't let anyone deceive you in any way. For that day will not come unless the apostasy comes first and the man of lawlessness is revealed, the man doomed to destruction. He opposes and exalts himself above every so-called god or object of worship, so that he sits in God's temple, proclaiming that he himself is God* (CSB, 2017).

The Scripture reveals that the beast maintains his violent global authority because a wound to one of its heads has healed (Rev. 13:3, 12, 14). Lennox (2020:199) argues that although we do not exactly know what this wound refers to, it does sound like a parody of the events surrounding the death and resurrection of Jesus Christ and his established authority as the Messiah and Son of the only living God. Although the beast seems

overwhelming, it does appear that his powers are limited. Matters are complicated with the arrival of a second beast in Revelation 13:11-18:

> *Then I saw another beast coming up out of the earth; it had two horns like a lamb, but it spoke like a dragon. It exercises all the authority of the first beast on its behalf and compels the earth and those who live on it to worship the first beast, whose fatal wound was healed. It also performs great signs, even causing fire to come down from heaven to earth in front of people. It deceives those who live on the earth because of the signs that it is permitted to perform in the presence of the beast, telling those who live on the earth to make an image of the beast who was wounded by the sword and yet lived. It was permitted to give breath to the image of the beast, so that the image of the beast could both speak and cause whoever would not worship the image of the beast to be killed. And it makes everyone — small and great, rich and poor, free and slave — to receive a mark on his right hand or on his forehead, so that no one can buy or sell unless he has the mark: the beast's name or the number of its name. This calls for wisdom: Let the one who has understanding calculate the number of the beast, because it is the number of a person. Its number is 666* (CSB, 2017).

In Revelation 13:14-15, the second beast commands the construction of an image or a likeness of the first beast to whom is permitted the ability to breathe and a voice to speak and command the people of the earth to worship the image or to be killed. This "deepfake" of the beast exercises worldwide deception and control, almost like the evil android replica of Maria in the 1927 film "Metropolis". Social control is so strict that no human is allowed to trade without some mark, much like the current Chinese algorithmic surveillance system (Lennox, 2020:200) or Prometheus's security bracelet (Tegmark, 2018).

Looking through C.J. Lewis's metaphorical lens, we see an image of an artefact with distinctive abilities. It has a distinguishable manipulative voice that sounds like a dragon, possibly deep and loud but antagonistic towards God and his people. Somehow it is programmed to reflect the character of the first beast while pursuing particular goals, namely, to force humankind into worshipping the beast. It can perform impressive actions unfamiliar to humanity. The artistic replica (εἰκών) can act autonomously, like a living thing with a voice. This beastlike autonomous artefact somehow possesses the ability to decode human religious motives and distinguishes between those who submit to the

beast and those who do not, almost like the predictive policing system discussed above. This beast has astounding control over people's shopping habits to decide who will be able to buy and who not, almost a subconscious extension of China's Hikvision AI-enabled surveillance and totalitarian social control.

Interpreting these passages through a technological hermeneutic, the likelihood of AGI or SBI comes to mind in these passages. Lennox (2020:201) states that although it is not precisely clear what Revelation is saying here, it could imply the creation of some kind of "life" that is so sophisticated and impressive that humanity is deceived and oppressed by it. Throughout history, humans worshipped their own artefacts of clay, stone, gold and wood and have dreamed of somehow giving life to these creations, for example, the golden calf in Exodus 32:1–20 and the idol of the god Dagon in 1 Samuel 5. One day humans will give life to their idolised AI artefacts and worship them. Isaiah says about the naive idol maker who created an idol from a fallen tree:

> *He burns half of it in a fire, and he roasts meat on that half. He eats the roast and is satisfied. He warms himself and says, "Ah! I am warm, I see the blaze." He makes a god or his idol with the rest of it. He bows down to it and worships; he prays to it, "Save me, for you are my god"* (Isa. 44:16–17; CSB, 2017).

Whether people craft their idol artefacts from precious metals, and even if it reflects the perfect humanoid, it is still dead, just like the humans who worship them. The Psalmist points out:

> *The idols of the nations are of silver and gold, made by human hands. They have mouths but cannot speak, eyes, but cannot see. They have ears but cannot hear; indeed, there is no breath in their mouths. Those who make them are just like them, as are all who trust in them* (Ps. 135:15–18; CSB, 2017).

Bainbridge (2006:1) quotes Brown (cf. 1954) sharing a story about scientists who built a computer and fed it significant amounts of information, similar to Tegmark's (2018) tale of the Omega team and their Prometheus. As soon as they finish, they turn it on and ask: "Does God exist?" the computer narcissistically answers, "I do now!"

Over the last decade, global news published stories on an emerging trend of robots related to religion and places of worship. Some of these robots conduct religious rituals and funeral rites (e.g., Softbanks' Pepper robot priest in Japan), lead prayers and religious instruction (e.g., SanTo, a saint-looking robot for Christian Catholics), and issue automated multi-lingual blessings (e.g., The BlessU-2 robot pastor in Germany), as well as the Chinese Buddhist robot monk named Xian'er who teaches the Four Noble Truths (Cheong, 2020:413; McBride, 2017:667). McBride (2017:667) mentions an Iranian schoolteacher who has invented a Muslim robot called Velden to show schoolchildren the correct way to perform Islamic prayers. For now, robot priests can bless you, advise you, and even perform your funeral (Samuel, 2020:1–6). Judging by these "religious robots", humans might be on their way to creating their own living artefacts for worship. The beast mentioned in Revelation will be the pinnacle of artificial worship, but also the last.

Although Psalm 135:15-18 mentions humanlike idols that cannot breathe, Lennox (2020:202) notes that the artefact of the beast mentioned in Revelation 13:15 is very different because it is given breath and the ability to speak. It is likely that this possibly proposes a brilliantly artificial humanoid equipped with very advanced AGI, even SBI. Lennox (2020:202) contends that the fact that the beast draws the attention of all humanity would be an unparalleled achievement. This can be achieved by the existence of global visual communication networks coupled with AR and other immersive technologies. How far will God allow humans to go? According to Lennox (2020:203), God intervened with the first *Homo deus* attempt in Genesis 3, then again at Babel, where humans used their intellectual and technological skills to reach heaven, and according to the biblical narrative, God will intervene in the future to end the human rebellion for good. "Man thinks he can become God. But infinitely greater than that is the fact that God thought of becoming human." (Phil. 2:5–11 CSB, 2017; Lennox, 2020:225) This study contends that humans will progressively develop AI to the point of a singularity. This might not be with AGI, but more likely that SBI merged with AI. AGI, no matter how advanced, will never need to breathe as a human does, but a biological brain needs oxygen. SBI, developed by Kagan *et al.* (2022) and their "dish brain", might very well be the antecedent of the image depicted in Revelation 13. Big things have small beginnings!

The "living" deepfake of the beast prophesied in Revelation 13 can cause the selective death of humans who refuse to worship the beast (Lennox, 2020:203). This "thing" can

recognise “reluctant anti-social behaviour” through sophisticated recognition technologies like behavioural biometrics, facial and voice recognition, and it can determine humans’ attitude towards the beast through advanced totalitarian social surveillance, as previously mentioned. If they do not comply with the wishes of the beast, they will be killed (Rev. 13:15). Lennox (2020:204) argues that implementing this globally will require AGI that can simulate advanced consciousness.

This biblical passage reveals a daunting future for humanity. The statements “coming up out of the sea”[13] (Rev. 13:1) and “coming up out of the earth”[14] (Rev. 13:11) suggest that humanity did not see this coming. These passages depict a surprise, something or someone unexpected. It is as if John is saying that the surprise has emerged from an unexpected place. These statements could also suggest that something that was not obvious or easy to comprehend, has been discovered. Who will expect a breathing android-like beast to emerge from techno-science?

Revelation 13 serves as a timely warning that we are dealing with an all-too-real universal authoritarianism with tyrannical social control at its core, as foretold by Tegmark (2018) with his Prometheus and presently demonstrated by China’s Hikvision AI-enabled surveillance and totalitarian social control. This is no fantasy or clip from a sci-fi movie; it is an unfolding real and dangerous revelation. Lennox (2020:204) notes the alarming reality that people “worship” these systems. They kneel before them, accepting their control over them, sacrificing their independence in the name of alleged security.

Lennox (2020:205) argues that far too much attention has been given to speculating about the number 666 and who this influential leader will be. Endless guessing is fruitless. The Bible makes it clear that it will be a creation labelled as the “man of lawlessness” empowered by demonic inspirations. The fact revealed by Scripture is that when this *thing*

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[13] The phrase “coming out of the sea” can be used metaphorically to describe something or someone emerging from a place of obscurity or obscurity into prominence or view. It can also be used to describe a person or thing that has been hidden or inaccessible but is now revealed or made available. It can also mean a new arrival or emergence of something. (OpenAI, 2023b).

[14] The phrase “coming out of the earth” can be used metaphorically to describe something or someone emerging from a place of hidden or underground, into the light or view. It can also be used to describe the origin or source of something, as something that has been buried or concealed, but is now brought to the surface or revealed. (OpenAI, 2023b).

appears, no more guessing will be needed; its satanic persona will be self-evident. Based on the evidence discussed, the beast's identity is not a question of *who* it is, but rather, *what* it is. This beast fits the description *Homo deus*. The rebellion against God initiated in Genesis will reach a climax in the beastlike *Homo deus* of Revelation 13. The only thing real about AI is the word "artificial".[15]

2.4.6 Transhumanism

Humans do not want to grow old and die, feel weak or be left behind, and the rapid advancement in AI technology provides possibilities for those insecurities. It leaves them little to no choice but to somehow find a way to go along with those technologies. Hawking (2014) says that the real risk of AI is not malice but competence. He expands on this, noting that super-intelligent AI excels at achieving its objectives. If those objectives do not align with human interests, humans face a serious problem. In their book, *Transhumanism and the Body,* Mercer and Maher (2014) explain that transhumanism aims to enhance the human condition through applied reason, particularly by developing technologies to eliminate ageing and to enhance human intellectual, physical and psychological abilities significantly. Lennox (2020:46) notes that contemporary ideas of transhumanism are whole-brain emulation and cyborgs (cybernetic organisms) in the hope that humans can live longer and stronger. He warns that Christians should be aware of an unprecedented change that could come in the near future. Rees (2021:7) writes that these shifts might include mental and physical malleability through the deployment of genetic modification and cyborg technologies. This would mean that humans, as God's artefacts, will abominably amend the image of God into their own twisted image. These "upgrades" mean that techno-scientists will start with life as it is now and modify it with implanted technology, which may include AGI (Lennox, 2020:49) or even SBI.

No matter how the church argues about the advancement of AI technologies and transhumanism, the changes it will bring are inevitable. The exponential change is beautifully captured with the following Twitter thread:

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[15] This was the title of a paper presented by Joseph Mellichamp at a symposium at Yale University in 1986 on the topic: "Is the human mind more than a complex computer?" (Lennox, 2020:229).

> *You may think you know what life will be like in 20 years. But your brain does not understand exponential change. Here is what's coming:*
>
> *— Misha (@mishadavinci) October 30, 2022*

Guenther (2022) explains that the coming changes can include things like a consciousness trap, soul harvesting, body snatching, AI temptations, artificial beauty, the erosion of human creativity and relationships, demolishing trends, soul embodiment and the necessity for psycho-spiritual self-modification.

Although AI has many benefits to better humanity overall, individuals possessing a heightened level of cognitive acumen, insight, and moral fortitude, particularly those who possess non-secular beliefs, may discern the potential hazards associated with the advancement of AI and transhumanism. From an esoteric spiritual perspective, this agenda may perpetuate the subjugation of humanity and potentially impair the essence of the human soul and spirit. The idea of a posthuman condition aiming to replace the organic spiritual consciousness of humans with artificially intelligent hybrids or cyborgs is alarming, and the church should be aware and ready to respond. Guenther (2022) is convinced that most of these technologies are designed to disconnect the human soul from the body to prepare the body for a new host. Although Guenther's point is disputable, he nevertheless raises a significant concern.

Lisa Renee, as quoted by Guenther (2022), notes that a significant number of transhumanists posit that the human mind and computer hardware are capable of integration, with the implication that human consciousness can be transferred to alternative forms of media, commonly referred to as mind uploading. According to ChatGPT, transhumanism is a concept and a philosophy that has been developed by many thinkers and researchers over the years. The idea of mind uploading is one of the central elements of transhumanism and is discussed in various pieces of literature, academic journals and online resources (OpenAI, 2023b).

If transhumanists succeed in convincing the public of the promises of immortality and superhuman powers, according to Guenther (2022), this will open the door to demonic possession through technologically hybridised human bodies. It is argued that the 4IR will

be labelled as the age of *wetiko*[16] in action, where sin will be promoted as desirable and ordinary. Guenther (2022) believes that psychopathy, narcissism and sexual pathologies will be normalised in our society and even encouraged as advantageous. From the Bible, it is evident that this is the way evil operates. Humans are oblivious to Satan's plans and instead have become unconscious agents of demonic influence.

Transhumanism might seem like the obvious solution to human enhancement in the 4IR, but its consequences might be detrimental. Proverbs 14:12 says, "There is a way that seems right to a man, but in the end, it leads to death." (CSB, 2017) What might seem like the obvious solution to some people, might lead us in the opposite direction. It will become increasingly important to be aware of our perception of right and wrong because it might be different from God's perspective. In Matthew 15:19, Jesus says, "For out of the heart come evil thoughts—murder, adultery, sexual immorality, theft, false testimony, slander." (CSB, 2017) This passage emphasises that humanity should be vigilant of its thoughts and attitudes. The spirit of *Wetiko*, as described by Levy (2023) and Vaughan (2022), operates through humanity's unconscious blind spots, rendering them oblivious to their own foolishness while compelling them to act against their own best interests. In the true sense of the word, this is "a sickness of the soul where evil becomes normalised".

Although AI technology is an excellent help for humanity, it does come with unavoidable risks and dangers. Consider that *wetiko* is a destructive force characterised by insatiable greed, an appetite that cannot be satisfied, and a desire to consume for the sake of consumption. It drives war against other groups, species, and the natural world, leading to the loss of one's own life. In other words, it is a contagious disease of the soul stalking every human on earth. Any person can, at any time, unwittingly become an instrument for the evil of *Wetiko* (Levy, 2023). *Wetiko* manipulates the human ability to shape reality

[16] Vaughan (2022:1) describes the term Wetiko from the Algonquin folklore, as the relentless desire for more and a disregard for the well-being of others. According to her, Wetiko is the foundation of globalization, neo-liberal economic policies, environmental devastation, and the widespread oppression of people around the world. It is a mental illness described as someone with a heart of ice (Vaughan, 2022:2). Levy (2023) calls it a "contagious psycho-spiritual disease of the soul which is currently being acted out in masse on the world stage via an insidious collective psychosis of titanic proportions". According to him, Wetiko refers to a cognitive virus that permeates the unconscious mind, rendering individuals oblivious to their own irrationality and inducing them to engage in actions that are detrimental to their own well-being.

in a way that causes them to be enchanted by their own mind's projection tendencies, working against themselves.

While developing sophisticated AI technologies and altering the human body and mind, techno-scientists must be cautious not to fall under *Wetiko's* satanic spell and become entranced by their own gifts and talents, dreaming of an AI-enhanced world that will not serve in all humanity's best interests. Evaluating the current trend in AI advancement, care should be taken because humanity's creative genius can boomerang against them, crippling their own evolutionary potential and destroying their souls.

Levy (2023) states that "*Wetiko* is powerless to control our true nature, but it can control and manipulate this false identity that it sets up within us." When humans fail to identify themselves with who they are in Jesus Christ, they simultaneously identify themselves with whom they are not, thus opening themselves up to be used, manipulated and exploited by hostile outside forces.

When advancements in technology lure humans away from their identity in Christ, they egotistically consume the resources others depend on without giving anything valuable back in return. The demonic *wetiko* spirit thus violates the sacred law of reciprocity (Levy, 2023), also called the "Golden Rule" Jesus talks about in Matthew 7:12 when he says: "Therefore, whatever you want others to do for you, do also the same for them, for this is the Law and the Prophets." (CSB, 2017) One of the dangers associated with transhumanism is the potential to sacrifice humanity's free will and voluntarily subscribe to their own enslavement.

As stated before, the problem is not so much the technology as it is with the humans developing it. AI development with all its attachments first emerges in the human heart. The inner and outer are ultimately not separate nor separable (Levy, 2023). The best *Wetiko* dissolvent is Christlike compassion. Without compassion, there will be an exponential, sinister edge to AI development, which will destroy the world as we know it.

It is already evident that AI and transhumanism will be a battle over the human soul (Guenther, 2022). The exponential development of these technologies and ideologies will change humanity in unimaginable ways. It will overtake humans in many ways, as the above-mentioned Twitter post states: The human brain does not understand exponential

change, and the very essence of this change will fuel human enhancement. Transhumanism will be right there to assist, playing God. The AI god of the 4IR will target humanity's weaknesses and insecurities via irresistible temptations offering unimaginable human enhancements and biological alterations. It will become progressively challenging to resist these temptations because they will be normalised by the collective psychosis of the masses.

2.4.7 The Church of the Almighty Algorithm

> *If Google is a religion, what is its God? It would have to be The Algorithm. Faith in the possibility of an omniscient and omnipotent algorithm appears to be what Messrs Page and Brin have in common… Wisely or not, Google wants to be a new sort of Deus ex machina (The Economist, 2006).*

The emergence of Dataism as a potential new religion is an intriguing phenomenon that challenges traditional notions of religious belief. At its core, Dataism posits the existence of an algorithm as the ultimate power. Its adherents are guided by a code of conduct that is distinct from those of traditional religions. The ultimate goal of Dataism is to maximise the flow of information through the algorithm, which serves as the foundation for this emerging ideology (Brinson, 2018). This concept of Dataism raises essential questions about the nature of religious belief and the role of technology in shaping our understanding of the world. Further research is necessary to fully understand and contextualise this emerging belief system within the broader landscape of Christianity and ideological thought.

According to findings uncovered by Wired's Backchannel (Harris, 2017:2–3), former Google engineer Anthony Levandowski established a non-profit religious organisation in September 2015, called the "Way of the Future". According to the state filings uncovered by Wired, Way of the Future's mission is: "To develop and promote the realization of a Godhead based on artificial intelligence and through understanding and worship of the Godhead contribute to the betterment of society." (Solon, 2017:1)

Harris (2017) titled his report, "God is a bot, and Anthony Levandowski is his messenger." He explains that "singularity" is no unfamiliar term in Silicon Valley and that when that day

comes, Anthony Levandowski will be firmly on the side of the machines. Solon (2017:1–4), under the title "*Deus ex machina*: former Google engineer is developing an AI god", explains that Levandowski aims to create a deity based on AI for the advancement of society.

According to Solon (2017:2), history proves that technological advancement and scientific discoveries have continuously shaped religion, killing old gods and giving birth to new ones. The historian and philosopher Yuval Noah Harari agrees, stating that religions must adapt to technological advancements or become irrelevant, unable to provide valuable guidance and answers to the challenges of a rapidly changing world (Harari, 2016a).

Martine Rothblatt, a transhumanist philosopher, has been clear on her concept of God in the context of AI and transhumanism. Rothblatt is known for her belief that advanced AI could be a form of deity, and she has argued that such a god would be more rational and attractive than traditional religious concepts. She suggests that an AI-based god could accomplish things that conventional gods have not and could positively develop humanity (Rothblatt *et al.*, 2014).

Silicon Valley has been known to embrace certain "religious" futuristic concepts, one of which is the "singularity", the notion that AI will eventually exceed human intelligence to a degree that it becomes incomprehensible to humans. Futurist, author and inventor Ray Kurzweil (2013) posits that by 2045, it will be possible for humans to upload their entire consciousness to computers. He predicts that humans will become increasingly non-biological to the point where the biological part is less significant. Kurzweil envisions that the machine part of the human body will be so advanced that it will completely replicate biological processes, making it possible for humans to choose an immortal, virtual body as a "second life". He predicts that in the future, biological bodies will be replaced by self-organising swarms of nanobots that can link themselves up into a virtual body. Kurzweil (2013) asserts that: "Based on conservative estimates of the amount of computation you need to functionally simulate a human brain, we'll be able to expand the scope of our intelligence a billion-fold", leading to the achievement of singularity, often referred to as digital immortality, as memories and intelligence will be stored indefinitely, even after death.

In his book *The Age of Spiritual Machines: When Computers Exceed Human Intelligence*, Kurzweil (2000:238) makes the case that by 2029 human-level intelligence will be evident in machines. He predicts that these intelligent AIs will be able to pass Alan Turing's (1950) Turning Test with flying colours. Turning developed the test to determine whether or not a machine has achieved human-level intelligence, based on whether it can deceive a human interrogator into believing that it is human. On 30 November 2022, the non-profit OpenAI Inc., an American AI research laboratory founded in San Francisco in late 2015 by Sam Altman, Elon Musk, and others, released ChatGPT[17] to the world. This chatbot was built on OpenAI's GPT-3 family of large language models and is fine-tuned with both supervised and reinforcement learning techniques. On their official website, OpenAI states:

> *We've trained a model called ChatGPT which interacts in a conversational way. The dialogue format makes it possible for ChatGPT to answer followup (sic) questions, admit its mistakes, challenge incorrect premises, and reject inappropriate requests. ChatGPT is a sibling model to InstructGPT (sic), which is trained to follow an instruction in a prompt and provide a detailed response (OpenAI, 2023b).*

With ChatGPT, Kurzweil's prediction became real seven years before his estimated 2029. With ChatGPT it is nearly impossible to distinguish the chatbot's response from that of a human.

2.5 Conclusion

The research presented in this chapter discusses the potential for a technological singularity, a point at which AI surpasses human intelligence, and how it may change the world and challenge Christian ethics. It highlights a recent scientific breakthrough by a research team from Cortical Labs, who developed a mini-brain called the DishBrain, which is capable of conducting goal-oriented tasks and is considered the first "sentient"

[17] ChatGPT stands for "Chat generative pre-trained transformer." It is a large language model developed by OpenAI that is trained to generate human-like text (OpenAI, 2023b).

brain developed in a lab. The presented research suggests that this development, along with advancements in bioengineering and data transmission technology, could lead to the development of synthetic biological intelligence (SBI) that could potentially lead the way to technological singularity and, subsequently, the establishment of the beast of Revelation 13.

While there are still many challenges to overcome, the likelihood of a technological singularity is now more realistic than ever before. The author also raises concerns about the dangers of AI development and its impact on humanity and suggests that films offer glimpses of a potential future with technological singularity and apocalyptic events that can be evaluated through a hermeneutical lens for technology. The emergence of Dataism as a potential new religion raises important questions about the nature of religious belief and the role of technology in shaping humanity's understanding of the world.

The subsequent chapter examines the ethical considerations arising from the rapid advancement of AI in relation to the church. The examination will include an assessment of biotechnological human enhancement in light of Christian ethics and an evaluation of the concept of a technological singularity in relation to biblical prophecies and associated apocalyptic depictions. Additionally, the chapter explores the potential dangers associated with the race to develop AI and the subsequent ethical decline. Furthermore, the investigation examines the notion of AI worship and its impact on society.

CHAPTER 3 A CHRISTIAN-ETHICAL VIEW ON THE DEVELOPMENT AND DEPLOYMENT OF ARTIFICIAL INTELLIGENCE

3.1 Introduction

The Christian community is entrusted with the crucial task of spreading the unchanging message of the gospel of hope and reconciliation to the world. Technological tools can help fulfil this mission. However, the church must be mindful of its potential misuse and potential to violate the sanctity of human life, which is created in God's image. In this chapter, we further explore the ethical concerns associated with AI, which include the emergence of transhumanism and a need for a technology hermeneutic.

The emergence of AI and its pervasive impact on the human experience has led scholars to argue that the church must approach these developments with a biblical perspective and in light of the gospel message. Moore *et al.* (2019:1) suggest that the church has the wisdom to navigate these issues and not fear the 4IR or any technological advancements accompanying it. Instead, they maintain that God's sovereignty over history ensures that the image of God in which humans are created, will never be diminished.

While acknowledging the potential risks of AI technology if employed without proper care and discernment, the researcher recognises its unparalleled possibilities. Thus, this research aims to equip the church to engage with AI technology ethically and proactively, offering well-reasoned affirmations and disavowals regarding the nature of humanity, the promise of technology, and hope for the future.

By doing so, the researcher seeks to ensure that AI technology is used responsibly and honours God's will. Christian faith provides the necessary wisdom and insight, even amid uncertainty and rapid technological change. Therefore, the academic and theological communities are urged to join the church in this critical endeavour and explore how AI technology can be leveraged to serve the greater good to the glory of God.

Throughout history, numerous technological advancements have significantly transformed societal norms and human behaviour (Younes & Al-Zoubi, 2015:82). From the development of the radio and television to the invention of automobiles and

aeroplanes, these innovations have drastically transformed various industries, as humans have learned from experience (Taddeo & Floridi, 2018:2). Since the 2011 launch of Siri, AI has evolved into a versatile, everyday technology akin to steam engines, electricity, and computers, now seamlessly integrated into daily life and thought (Paulus Jr., 2022:1). Some changes came gradually, while others, such as the recent launches of ChatGPT, Microsoft Bing Chatbot, and Google's Bard AI, have been sudden and disruptive.

The world is on the brink of yet another technological revolution, driven by the emergence of AI technologies. Xu *et al.* (2018:91) claim that the technological disruptions we will face in the 4IR will have no historical equivalent. The reasons stated are the exponential velocity, scope and systems impact associated with these transformations, which will disrupt every industry around the globe, including the church. The extent of these changes will be so significant that Taddeo and Floridi (2018:1) call it a great force that will transform daily practices, personal and professional interactions and environments. For the well-being of humanity, this power must be used as a force for good. With its enormous potential to transform ethical landscapes, AI technology holds tremendous promise and peril for humanity's future (Xu *et al.*, 2018:92–93). However, the rapid pace of development and potential impact raises ethical and academic questions that require careful consideration.

As an influential religious institution, the Christian church profoundly influences the beliefs and worldview of its followers, particularly in matters of morality and ethical conduct. The church's teachings on the importance of ethical conduct may also influence its stance on using and developing AI technologies. It may call for establishing ethics guidelines and standards to ensure that the development and use of AI technologies align with biblical values and principles.

As with any disruptive technology, AI poses ethical challenges that must be addressed (Segun, 2021:99–104). These include accountability concerns surrounding AI algorithms, the potential loss of human autonomy, and the need to ensure the transparency and fairness of AI systems. These challenges call for the development of robust ethics frameworks and guidelines to guide the responsible development and deployment of AI technology. Organisations like the Ethics and Religious Liberty Commission of the Southern Baptist Convention (ERLC), the General Conference of the United Nations

Educational, Scientific and Cultural Organization (UNESCO), and many others (Benek, 2020; Bird *et al.*, 2020b; Coeckelbergh, 2020; Dignum, 2018; Fitzgerald *et al.*, 2020; Jurcys *et al.*, 2020; Larsson, 2020; Moore *et al.*, 2019; Müller, 2021; Safdar *et al.*, 2020; Segun, 2021; Smuha, 2019; Swamidass, 2019; UNESCO, 2021) have already done excellent work to develop an ethics framework for AI development.

The emergence of AI technology represents a significant step towards a transformative technological revolution. As we navigate this change, techno-scientists and developers must consider the perspectives and opinions of influential institutions like the Christian church in developing ethics guidelines that ensure that AI technology aligns with biblical and societal values and principles (Segun, 2021:99).

3.2 How could the church interpret the exponential development of AI?

3.2.1 Artificial intelligence as a loyal servant

A perspective that regards AI as a loyal servant can view AI development as a responsible use of human creativity and ingenuity. I previously referred to Reinke (2022:14), who defines technology as amplifying our native power through new techniques. We further stated that these techniques must primarily be used for God's glory and honour. As explained earlier, AI amplifies our limited biological abilities through the exponential power of technology. Younes and Al-Zoubi (2015:82) describe technology as the methods and tools developed by society to facilitate solutions for their practical problems to provide for the community's needs. In his seminal work, *The Technological Society*, Ellul (1964:3–42) devotes a whole chapter to defining "technique" as the totality of methods rationally arrived at and having absolute efficiency (for a given stage of development) in every field of human activity. He argues that technique is not merely a collection of tools and machines related to technology but rather a mindset or way of thinking that seeks maximum efficiency in all aspects of life. This includes not only technological advancements but also social, political, and economic systems. For Ellul (1964:xxxii), technique presents man with multiple problems, and this is an important statement to keep in mind.

AI possesses vast potential for a positive impact on various areas of human life, including healthcare, education, economic efficiency, Bible interpretation, ministerial effectiveness,

and academic research. The church could perceive this development as an invitation to participate in well-informed and responsible dialogues concerning AI's future and ethical implications, striving to ensure that its development and application align with human values and promote the common good. Furthermore, this situation may prompt the church to contemplate the essence of humanity in a world increasingly influenced by technology. Moore *et al.* (2019:1) make it clear that the church rejects the notion that any part of creation, including technological development, no matter how advanced, should ever be used to assume or subvert the stewardship God entrusted to human beings. Furthermore, the church can never assign a level of human identity, worth, dignity, or moral agency to any technology. Although AI can be a valuable tool for the church, it should never replace human interaction and spiritual guidance. Instead, it should be used alongside traditional forms of ministry and pastoral care to support the work of God.

By divine wisdom, it may not be necessary for humanity to share certain technologies such as AI. Despite this, we are witnessing rapid advancements in the field of AI. A significant concern is whether our current governance structures and societal systems are equipped to evaluate and regulate these emerging technologies effectively.

This study explores potential ethical applications of AI that may amplify the missiological mandate of the Christian church. To this end, the researcher has used AI algorithms to generate suggestions that will be evaluated for their practical and ethical viability. These generated suggestions were the starting point for further analysis and investigation. They were subjected to rigorous ethical evaluation to ensure that they aligned with Christian principles and values. This research ultimately aims to pinpoint AI applications that support the church's mission, adhere to ethics principles, and preserve human dignity and worth, in line with the belief that individuals are created in God's image.

As a tool, AI has the potential to significantly aid the Christian church in accomplishing its mission, as demonstrated by the following examples:

- ***Analysing and understanding Scriptures***
  AI can analyse large volumes of Scripture and provide insights and context that would be difficult for humans to extract. It can help identify patterns and themes, provide deeper contextual understanding, and even help identify potential errors or inconsistencies. AI-powered tools can help individuals study and interpret the

Bible, providing insights and analysis that may not be immediately apparent to human readers. Below are a few examples.

- In “Applying natural language processing 19 to identify *Hapax Legomena*[18] in the Hebrew Bible”, published in the Journal of Biblical Literature, researchers used machine learning algorithms to identify rare and unique words in the Hebrew Bible, providing new insight into the text (Pierrehumbert & Granell, 2018:125–130).
- In “A Computational Stylistic Analysis of the Book of Jeremiah” in the Journal of Hebrew Scriptures, authors used machine learning techniques to identify patterns of language and style in the Book of Jeremiah, which led to new insight into its authorship and composition (Campbell, 2021).
- In “Computer-assisted Analysis of the Greek New Testament”, published in the Journal of the Evangelical Theological Society, researchers used computational methods to analyse the text of the Greek New Testament, including text-critical analysis and analysis of word frequency and usage (Friberg & Friberg, 2018).
- “Artificial Intelligence and Biblical Studies: The Promise and Peril of Digital Hermeneutics” in Currents in Biblical Research, Tupamahu *et al.* (2023) explore the potential benefits and challenges of applying AI to biblical studies, including issues of bias and the impact on traditional hermeneutical methods.

Building on this discourse, the researcher intends to construct a technological hermeneutic in the next chapter of this research that can assist the Christian church with biblical research in the 4IR and give guidance on how to approach AI development and deployment in this technological era. The

[18] *Hapax legomenon* (plural: *hapax* legomena; sometimes shortened to *hapax*) is a transliteration of Greek ἅπαξ λεγόμενον, meaning “being said once”. It was originally used in Biblical studies to refer to a word that appears uniquely in one place in the Old or New Testament (Anon., 2023; Zimmer, 2007). *Hapax legomena* in ancient texts can be difficult to decipher, as they are words or phrases that occur only once within a particular body of written or spoken material. This lack of repetition can make it challenging to infer their meaning or context and therefore AI language models can be of great help to make sense of these words or phrases in the Bible.

objective is to advance the relevance and effectiveness of biblical studies by leveraging the potential of AI while also being cognisant of the ethical considerations that arise in its use.

- ***Digital pastoral care and humanitarian support***
  With the increasing number of people who are seeking spiritual guidance and support online, AI can be used to offer pastoral care through digital means. For instance, chatbots can provide quick, personalised responses twenty-four hours a day to individuals seeking guidance or support. This can include prayer support, counselling, and guidance for those struggling with personal or spiritual issues. Goertzel *et al.* (2017:13) describe using deep neural networks to create AI tools that can assess a person's emotional state from their facial expressions and tone of voice. In their inconclusive pilot research, "The loving AI project", they also explore the potential of AI applications to promote the well-being of humans and to enhance human consciousness (Goertzel *et al.*, 2017:2). The project's goal is to create software that allows humanoid robots to engage with people in empathetic and compassionate manners, fostering self-awareness and personal growth. In his paper "New Artificial Intelligence Tools For Deep Conflict Resolution and Humanitarian Response" Olsher (2015:283–292) discusses the potential of AI as a tool for conflict resolution and humanitarian response. He highlights the limitations of human cognitive abilities and expertise in managing complex social, conflict, and real-world knowledge. In his research, he introduces cogSolv[19], a remarkably innovative AI system that possesses the ability to comprehend perspectives of individuals from diverse groups, simulate their responses, and integrate this understanding with real-world knowledge to effectively persuade, find negotiation win-wins, and enhance outcomes, avoid offence, provide peacekeeping decision tools, and protect emergency responders' health. He concludes that AI holds immense potential to help humans overcome difficulties in conflict resolution and humanitarian support.

[19] An AI Language model used for deep conflict resolution.

- ***Streamlining administrative tasks***

  AI can help streamline administrative tasks such as managing databases, sending reminders, and scheduling events, allowing pastors and church administrators to focus on more meaningful work. AI can analyse data on church attendance, giving patterns and other metrics to help churches better understand their members and their needs. This can help churches tailor their outreach and programmes to serve their communities better (OpenAI, 2023b).

- ***Enhancing outreach and evangelism***

  AI can analyse data and identify new target groups for outreach and evangelism. It can also help churches develop targeted messaging and content for specific groups. AI can identify and target individuals interested in the church's message based on their online activity and behaviour. This can help churches reach and engage with potential new members (OpenAI, 2023b).

- ***Creating sermons***

  AI may support pastors and ministers in sermon creation by scrutinising Scripture, pinpointing central themes, and offering recommendations for illustrations and applications. Although AI can prove beneficial in numerous aspects of message preparation, it cannot supplant the indispensable role of the Holy Spirit in bestowing spiritual guidance and inspiration.

- ***Predictive analytics for church growth***

  AI can help churches identify patterns in attendance, giving, and other metrics to predict future growth and engagement. This can help churches plan more effectively and allocate resources more efficiently.

- ***Prayer request management***

  Churches can use AI to manage prayer requests by analysing incoming requests and categorising them based on need and urgency. This can help pastors and staff prioritise their time and respond more effectively to those in need.

- ***Language translation in a virtual church***

  AI and associated technologies will make it possible for the body of Jesus Christ to reach far beyond the known. Following the emergence of the

COVID-19 pandemic and the global lockdown in March 2020, associated with legislation enforcing social distancing, schools, universities and churches were forced to explore unfamiliar territory by using live-streaming, virtual meetings and other online means to get their message across.

In 2016, bishop D.J. Sonto founded the VR Church[20], where members can attend with the personal avatar of their liking using VR headsets (Beech, 2021). Although this virtual experience of church is not without its pitfalls, as expressed in theologians Darrell L. Bock and Jonathan J. Armstrong's book: *Virtual Reality Church: Pitfalls and Possibilities (Or How to Think Biblically about Church in Your Pajamas, VR Baptisms, Jesus Avatars, and Whatever Else is Coming Next)*, it nevertheless presents the Christian church with an exciting venture.

God is omnipresent, which includes the physical dimension, spiritual dimension, as well as VR and AR. Therefore, the researcher contends that an immersive virtual church is not exempt from the working of the Holy Spirit and an opportunity for people to express their gifts.

Advancements in AI and VR technology are poised to revolutionise the concept of church services, potentially creating a church in the metaverse that transcends geographical and linguistic barriers. The metaverse church would enable individuals from different ethnic backgrounds, countries, and languages to participate in a single service while experiencing community, belonging, and connection. The integration of VR and AI technologies would allow attendees to interact with each other in real time, using their preferred language, irrespective of linguistic diversity.

The immersive metaverse church would offer a unique and unprecedented opportunity for members to participate in worship, praise, and preaching in an immersive and engaging virtual environment. Attendees could see, hear, and

[20] https://www.vrchurch.org/

interact with other attendees and the minister's avatar, further enhancing the sense of community and social interaction. AI technology would enable the minister to deliver sermons in his native language while being interpreted and transmitted to all attendees in real time in their preferred language.

The metaverse church boasts immense potential, offering a realm where technology aids in dismantling linguistic and cultural barriers and fostering shared experiences and connections. This concept could bring a considerable shift in religious service participation, presenting an inclusive, innovative approach with enormous potential to unite individuals worldwide. Such a transformation in religious worship may yield far-reaching consequences, influencing how people connect around their faith and revealing novel opportunities for spiritual exploration and growth.

- ***Online discipleship and Bible study***
  AI can facilitate online discipleship and Bible study groups by providing personalised content and facilitating discussion. AI can help identify discussion topics, guide group interactions, and provide follow-up resources.
- ***Providing assistance for visually impaired and deaf members:*** AI-powered tools such as voice-to-text and text-to-voice conversion can help churches better assist visually impaired and deaf members by providing live captions and interpreting during worship services and events.

3.2.2 Artificial intelligence as a tyrannical master

In *The Technological Society*, originally published in French in 1954 and appearing in English in 1964, Ellul (1964:vi) states that the concept of "technique" extends beyond merely referring to machine technology. It involves a collection of standardised procedures aimed at realising a particular objective. Using technique, spontaneous and instinctive behaviour is replaced by calculated and well-thought-out actions. Ellul believes that individuals who emphasise technique are intrigued by the results and immediate consequences of standardised instruments. For instance, they might appreciate the extraordinary impact of nuclear weapons. Central to their approach is the continuous quest to discover the most efficient and effective way to achieve any target they set out to accomplish, irrespective of how destructive it might be. The author explores the

significance of technique in contemporary society and presents a framework of ideas that, when adjusted critically, can aid us in comprehending the driving factors behind our distinct technical civilisation's evolution and its ethical challenges.

Ellul (1964:vi) suggests that technique's ever-growing and unyielding influence encompasses all aspects of life. This civilisation is dedicated to the pursuit of constantly refining methods, often without carefully considering the ultimate objectives. Technique has the power to convert goals into tools. What was once valued for its inherent worth now only holds significance if it aids in achieving another purpose. Jerónimo *et al.* (2013:224) argue that Ellul's *la technique* is not simply an impartial instrument but rather one that annihilates values and eliminates options.

Additionally, it generates and spreads new values, "false values". Enforcing the principle of effectiveness negates true human choice, leaving individuals with no real decision-making power but only the option to select the most efficient means. Conversely, technique also transforms means into ends, where "know-how" becomes a highly regarded value; in other words, "the doctrine is converted into a procedure". Ellul's statement is noteworthy: "to the technician, the nation is nothing more than another sphere in which to apply the instruments he has developed" (Ellul, 1964:vii).

Ellul (1964:vii) notes that with the exponential development of new technologies and techniques, political objectives started to revolve around what is functional rather than what is good. The same is evident today. The focus shifts to efficiency, causing the original purpose to fade into the background. Dictatorship, as the political structure most compatible with the extensive and unrestrained application of technique, gains strength as is evident in autocratic countries like North Korea, China, Russia, Belarus, Saudi Arabia and others. This development consequently limits the options available to democracies: they must either adopt their effective technique—such as centralised control and propaganda—or risk falling behind.

This shift has led to a new phase where technology shapes human experiences and follows unique rules that differ from those in previous social contexts. This transformation is central to understanding the contemporary human condition in the postmodern world. Ellul concludes that technology and technique were not part of God's initial purpose for man but were developed after humans had descended into sin. Ellul outlines how

humanity placed a bet on technology during the 20th century and ultimately drew the conclusion that: “Technology had won the bet and proceeded to beat the house.” (Jerónimo *et al.*, 2013:230) He further contends that contemporary technological society has transformed into a self-governing entity that increasingly follows its path, independent of human influence. He asserts that humans play a diminishing role in technological advancements, which, through the automatic integration of previous elements, takes on a fate-like quality (Paulus Jr., 2022:11). He further claims: “it is vanity to pretend technology can be checked or guided, we have become enclosed within our artificial creation” (Paulus Jr., 2022:11). Ellul (1964:vii) states that due to a lack of comprehension of the effect of technological advancements on both themselves and their surroundings, modern individuals are plagued by anxiety and feelings of uncertainty. They attempt to adjust to these transformations, which remain elusive and difficult to grasp fully. Nowadays, his assertion holds even greater truth than in the past.

In the context of AI development and deployment during the 4IR, people are expected to adapt to their assigned roles and responsibilities in a rapidly evolving technological society. This may include working with AI-driven systems, embracing new forms of communication, and integrating AI into daily life. However, not everyone might be content with these new roles and the pervasive presence of AI. To address this discontent, society offers a range of distractions that help individuals cope with the changes. These distractions often involve AI-powered media, popular culture, and communication platforms. By engaging with these AI-driven technologies, people can temporarily escape their concerns or unease related to the new technological landscape. At the same time, the exponential development of AI silently infiltrates the personal lives of all humans on Earth.

The 2020 launch of the Generative Pre-trained Transformers (GPTs) Chat GPT, developed by Open AI, as well as Google’s Bard[21] (Bidirectional Encoder Representations

[21] Google’s Bard AI is a large-scale neural network-based AI language model. It was introduced by Google in 2020 and is an extension of the company's original BERT (Bidirectional Encoder Representations from Transformers) model. Bard is designed to generate high-quality natural language text by training on vast amounts of data and learning to predict the likelihood of a given sequence of words. It is capable of completing sentences, summarizing text, and translating languages, among other tasks. Bard's LaMDA architecture is similar to that of GPT-2 and GPT-3,

from Transformers), along with the prevalence of AI virtual assistants like Apple's Siri, Amazon's Alexa, and Google's Assistant, have prompted discussions about Kurzweil's prediction in 2000. According to Kurzweil (2000:2), as technology and humanity continue to merge, and the lines between man and machine become more blurred. The distinction between the two will gradually vanish until the human soul and the silicon chip become one. While technological advancements have brought humans and machines closer, I reject the notion of a complete amalgamation between the human soul and the silicon chip, a statement considered a threat to the Christian ethos that should be debated. Nonetheless, the gradual integration of AI into various aspects of life should not be underestimated or treated casually.

Integrating AI in society poses significant ethical challenges, including the impact on employment, human dignity, privacy, and morality. Implementing AI in various industries could result in job displacement for many workers, causing financial instability and affecting the morale of affected individuals and their communities. Moreover, AI operates based on algorithms and data sets, which may not align with traditional Christian values and morality, particularly in criminal justice and law enforcement where concerns about bias and discrimination have been raised, as discussed earlier. Additionally, the increasing use of AI could lead to a devaluation of human life and dignity as machines become capable of performing tasks once considered unique to humans. Furthermore, the rapid advancement of AI raises questions about the nature of consciousness, agency, and morality, which could challenge traditional Christian beliefs about the uniqueness of human beings and the role of God in the world. AI-driven decisions may not constantly align with Christian ethics end ethos, posing moral and ethical challenges in various areas of life.

Experts like Bostrom (2014:116, 265) argue that the development of super-intelligent AI where machines surpass human intelligence, could pose an existential risk if the AI's goals do not align with human values. Uncontrolled AI could outsmart humans, leading to unintended consequences or even potential harm to humanity. It can be argued that

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which were developed by OpenAI (Lewis *et al.*, 2019:1-10; OpenAI, 2023b). Google said that their bot is called Bard because it is a professional storyteller (Metz & Grant, 2023).

super-intelligent AI will reach the pinnacle of its existence in the tyrannical beast of Revelation 13, as explained in the previous chapter.

Another significant threat is the development of autonomous weapons. The progress made in machine learning and AI has changed the deployment of automated systems in military operations. AI-driven autonomous weapons could revolutionise warfare and lead to an unstoppable AI arms race between hostile countries. These weapons might be difficult to control, increasing the risk of conflict, escalation, and unintended casualties. The potential effect of AI technology on warfare is comparable, if not greater, than the effects of the introduction of nuclear weapons, aircraft, computers, and biotechnology (Bird *et al.*, 2020a:63; Musk, 2018). Bird *et al.* (2020a:63–65) mention the following threats of autonomous weapons:

Lethal autonomous weapons: The increasing capability of automatic and autonomous systems has led to militaries delegating more authority. The adoption of AI is likely to accelerate this trend, leading to an AI arms race. Russia has approved a plan to have 30% of its combat power consisting of remote-controlled and autonomous robotic platforms by 2030, and other countries are expected to follow suit. The US Department of Defence has limited the use of autonomous systems with lethal force, but some countries and non-state actors may not exercise the same caution.

Drone technologies: A military can purchase one million quadcopter UAVs for the same cost as a single standard military aircraft, as the former costs around USD 1 000. In comparison, the latter can exceed USD 100 million. Although current commercial drones have a limited range, their range could potentially match that of ballistic missiles, making existing platforms outdated.

Robotic assassination: If low-cost, highly capable, lethal, and autonomous robots become widely available, targeted assassination may become more frequent and harder to trace. Autonomous sniping robots could be used to kill targets from a distance.

Mobile-robotic-improvised explosive devices (IEDs): The widespread adoption of commercial robotic and autonomous vehicle technologies could enable some groups to develop more advanced IEDs. Currently, only powerful nation-states can deliver explosives precisely to a target from a long distance. However, the cost of doing so could

significantly decrease if long-distance drone delivery becomes feasible. Self-driving cars could also increase the frequency and impact of car bombs as they eliminate the need for a driver who commits suicide in committing the act.

AI use in warfare presents legal and ethical challenges. Automated weapon systems, devoid of human judgement, might potentially breach international humanitarian law and jeopardise the right to life and human dignity. Furthermore, AI may reduce the threshold for engaging in war, which could affect global stability (Bird *et al.*, 2020a:64). Bird *et al.* (2020a:65) support the notion that permitting a machine to determine the death of a human violates essential human dignity, as robots, devoid of emotions, fail to comprehend the magnitude of sacrificing or taking a life.

With his title “Mindless: Why smarter machines are making dumber humans”, Steinhoff (2017:4) introduces his readers to the occult world of computer systems. Although this statement is not directly attributed to a single individual or source, many authors have expressed concerns about the negative effect of increased reliance on technology (Arakelyan, 2019; Carr, 2020; Valkenburg & Piotrowski, 2017:7). Aronson (2017:5) argues that one of the core issues humans encounter in the modern era of information automation is the degree to which it jeopardises the process of dis-automatisation associated with the beginning of our species, which ultimately led to our ability for contemplative focus. “Attention merchants”,[22] using AI, engage in competition and commercialise our attention in manners that disrupt our capacity to concentrate and pursue the activities we desire to undertake. Williams (2018:50, 56, 68) contends that this kind of practical diversion might result in an existential distraction if our higher objectives and principles are jeopardised, preventing humans from becoming who they aspire to be over time. Such distractions can give rise to an even more profound form that erodes essential abilities—like reflection, creativity, logical thinking, and metacognition—which

[22] An attention merchant refers to an individual or organization that capitalizes on capturing and monetising people's attention, often through advertising, digital platforms, or media content. Their primary goal is to keep users engaged for as long as possible, as this allows them to gather valuable data or display more advertisements, ultimately generating revenue. Attention merchants typically employ various techniques, such as eye-catching headlines, clickbait content, or tailored user experiences, to attract and retain the audience's focus (OpenAI, 2023b).

initially allow humans to establish their own goals and values, violating the ones entrusted to them by their Creator.

As AI systems develop, there is increasing apprehension that humans may surrender their self-determination and reduce their potential in the process (Frischmann & Selinger, 2018:243, 271). A convincing argument can be made that excessive reliance on technology may ultimately result in declining human abilities, innate talents, and the divine purpose bestowed upon individuals. This overdependence could gradually erode the unique qualities that make us human and diminish our potential for personal and spiritual growth. Like the serpent in the Garden of Eden, AI could transform divine commands into abstractions by reinterpreting prohibitions as opportunities (Paulus Jr., 2022:6).

3.3 What are the Christian ethical concerns with the exponential development and deployment of artificial intelligence?

3.3.1 Concerns about human autonomy

Fourie (2020:20) argues that technology often creates a misleading perception of autonomy and independence. As people experience substitution and augmentation by technology, they may undervalue human interaction. This notion also extends to religious contexts, suggesting that a community of believers is not essential for maintaining one's autonomy.

Ganzevoort (2020:54) points out that many people rely on large data sets for insight into the development and treatment of diseases. He voices the concern that this dependence on technology might reach the point where people base their medical decisions on statistics rather than factual complaints. Once AI systems, perhaps in the form of wearables and diagnostic machines, know their owners better than they know themselves, the authority will shift from God to algorithms, and humans will lose an integral part of their autonomy. Yuval Noah Harari recounts how Angelina Jolie discovered in 2013 through a genetic test that she carried a harmful BRCA1-gene mutation, which gave her an 87% chance of developing breast cancer. Despite being cancer-free then, she opted for a double mastectomy as a precautionary measure. Although she did not experience any symptoms, she prudently chose to heed the advice of the computer algorithms. "You may not feel anything is wrong", said the algorithms,

“but there is a time bomb ticking in your DNA. Do something about it — now!” (Harari, 2016b) Similarly, in the Netherlands, hundreds of women undergo this procedure annually for the same reason (Harari, 2016b). It is worth questioning the extent of emotional distress that has resulted from the reliance on such technologies (Ganzevoort, 2020:54).

Taking this idea to its logical endpoint raises concerns that individuals might eventually delegate crucial life decisions, such as selecting a spouse, to algorithms. In medieval Europe, such decisions were made by priests and parents, while humanist societies relied on emotions. In a Dadaist[23] society, the choice would be handed over to AI (Harari, 2016b). This notion is supported by Fourie (2020:20), stating that although people may not always be aware of it, the technology essentially controls their behaviour, emotions, thoughts, moods, and actions. Due to embedded AI, technology is making even more decisions on their behalf.

3.3.2 Concerns about human dignity

There are apprehensions about the potential for the growing use of AI to diminish human life and dignity as machines acquire the capacity to execute tasks previously deemed exclusive to humans. For example, Goertzel *et al.* (2017) initiated the “Loving AI” project to develop software that enables humanoid robots to interact with humans in loving and compassionate ways. Their project aims to use humanoid robots and associated AI technologies to express unconditional love towards humans. They believe these robots will eventually advance human consciousness, which might lead to greater well-being. They further argue that evidence suggests that interaction with loving and compassionate humanoid robots will provide a robust framework for conveying and building love, compassion and other positive emotions (Goertzel *et al.*, 2017:3).

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[23] Kryszczuk and Szymański (2020:5-6, 23-24) discuss Yuval Noah Harari’s concept of dataism, which is characterised as a kind of faith, an ideology, a worldview, or a set of (conscious) attitudes for which information is a kind of arche. The concept of dataism is based on the idea that everything is countable information, regardless of whether we are talking about humans, distant planets, or octopuses. The authors also point out that dataism involves entrusting one's life affairs (and not only) to algorithms that process data from popular digital devices such as a smartphone. In essence, dataism is a belief system that values information above all else and sees it as the key to progress and success in the modern world.

Love for compassionate and understanding humanoid robots will simplify the relationship between machines and humans because “artificial” unconditional love will encourage humans to worship AI. This idol worshipping, or the worshipping of human artefacts, will culminate in the beast we read about in Revelation 13. Goertzel *et al.* (2017:4) state that AI will eventually guide humans along “appropriate pathways” and towards greater self-actualisation. When AI can “bootstrap” the fulfilment of human needs, humans will look to machines to fulfil their desires and forget about their creator God and their fellow humans.

With their pilot study conducted in September 2017 at Hong Kong Poly U, Goertzel *et al.* (2017:7–8) suggest that interaction with loving and compassionate AI robots is associated with an increase in loving feelings, an increase in unconditional love for robots, an increase in pleasant and positive moods and even an increase in heart rate when experiencing these emotions. Although their study was preliminary and inconclusive, it raises questions about the future of human dignity.

Many aspects of human dignity are under threat, but the five most significant ones are as follows:

3.3.2.1 Inherent worth and value

Human dignity is rooted in the belief that every individual has inherent worth and value simply by being human. This means that all people should be treated respectfully and never be reduced to mere objects or instruments. In their captivating research paper, the PEW Research Centre team identified five concerns associated with AI development. Anderson *et al.* (2018:3) list human agency, data abuse, job loss, dependence lock-in and mayhem as the most problematic concerns. According to them, people sacrifice their independence, privacy and power over choice as they experience a loss of control over their lives. The research team believes that this effect will deepen as AI-automated systems evolve.

3.3.2.2 Equality

Human dignity requires that everyone be treated as equals and that no one should be discriminated against based on race, gender, religion, sexual orientation, or other characteristics. Ntoutsi *et al.* (2020:3–5, 10–11) discuss ethical concerns about bias and

discrimination in AI-based decision-making systems. These concerns include the potential for algorithms to perpetuate existing societal biases and discrimination, the need for algorithmic accountability to understand the power structures and biases that algorithms exercise in society and the importance of multidisciplinary approaches to address these issues. They also highlight the responsibility of technology creators to understand AI's limits and to propose safeguards to avoid pitfalls.

Anderson *et al.* (2018:3) argue that AI will continue to take over jobs, which will widen the economic divides, leading to social upheaval. Intelligent AI machines will continue to disrupt all aspects of human self-sufficiency, leading to massive job losses and poverty.

Concerns exist about bias and discrimination in AI applications within criminal justice and law enforcement, as algorithms could perpetuate or exacerbate existing inequalities. Ntoutsi *et al.* (2020:10–14) argue that the use of AI in criminal justice and law enforcement has raised concerns about the potential for algorithms to perpetuate existing biases and discrimination, leading to unfair treatment of certain groups. For example, if an algorithm is trained on partial data, it may make decisions that disproportionately affect certain groups, such as people of colour or those from low-income backgrounds. Moreover, the absence of transparency and accountability in AI decision-making processes may hinder the identification and rectification of inherent biases. Therefore, it is vital to consider the ethical implications of AI in criminal justice and law enforcement and to ensure that these systems are designed and used in a fair and unbiased manner.

3.3.2.3 Freedom

Human dignity includes freedom from slavery, torture, and other abuse forms and the right to freedom of speech, thought, and religion. The growing concern is that autonomous weapons, cybercrime and weaponised, ill-intended information will lead to mayhem[24].

[24] Mayhem generally refers to a state of chaos, disorder, or violent confusion. It can be used to describe a situation that is out of control or unpredictable, often characterized by destruction and damage. In the context of cybersecurity, "mayhem" may refer to a type of malicious software or malware that is designed to cause chaos and destruction in a computer network or system. This type of malware is often used by cybercriminals to disrupt critical systems and cause significant damage, financial loss, or data theft. Mayhem can also be used in a broader sense to describe a situation or event that is characterized by disorder and confusion, such as a protest or riot that turns violent, or a natural disaster that causes widespread damage and disruption (OpenAI, 2023b).

Anderson *et al.* (2018:3) explain the growing concern about the rapid development of autonomous military weapons and the use of weaponised information, lies, and propaganda. These technologies hold the potential to significantly disrupt conventional socio-political structures and inflict considerable harm on human life. Moreover, the risk of cybercriminals infiltrating financial systems intensifies these concerns. The combination of these factors heightens the potential for severe consequences for society and individuals.

3.3.2.4 Privacy

Human dignity also includes the right to privacy, allowing individuals to control their bodies, thoughts, and emotions and make decisions about their lives. Anderson *et al.* (2018:3) are concerned about data use and surveillance designed to profit some individuals at the expense of others. As shown earlier in this research, AI tools are and will stay in the hands of influential profit-driven companies and people striving for more power and control. Anderson *et al.* (2018:3) state that values and ethics are not baked into the AI systems that control and manipulate people's decision-making processes. Due to the global nature of these systems, they are not easy to regulate.

Messaging and processing extensive personal data by machines have prompted concerns regarding AI's privacy implications. AI and other advanced technologies can potentially infringe on the human right to privacy in multiple ways. Some examples include:

3.3.2.4.1 Data collection and analysis

AI depends on extensive data, often including individuals' personal information. Shazly *et al.* (2020:1–8) discuss several concerns related to data collection, including awareness of the data subject that their data is being collected, the potential fusion of data from external sources, freedom of choice for the data subject to opt-in or opt-out, and the lifetime of data and the ability for data subjects to exercise their right to be forgotten. Additionally, their research highlights the importance of explainability and the application's ability to explain the basis of its decision to the data subject. Ethics concerns extend beyond applications to include data collection methods and the resulting computed information and knowledge.

3.3.2.4.2 Surveillance

Clarke (2022:2–4, 7, 13–15) identifies several critical problems with AI surveillance, including the lack of transparency and technical information about the underlying technologies, the potential for misuse and abuse of AI-powered surveillance tools, the inadequacy of current regulations and guidelines to protect public interests, and the risks associated with data analytics practices and assumptions about data quality. Anderson *et al.* (2018:11) worry that AI systems are designed primarily for profit and control and argue that this is particularly dangerous when it comes to surveillance. They feel that AI will only exacerbate current surveillance issues. Proponents of this view contend that enhanced and extensive AI surveillance may ultimately be used to discern good citizens from others, with such systems potentially manipulating and dominating individuals under non-democratic governments (Anderson *et al.*, 2018:64). Clarke (2022:13–15) also discusses specific examples of AI surveillance, such as facial recognition systems and intelligent policing, and raises concerns about the vagueness with which the term “AI” is used in some cases. Eventually, AI surveillance could become a bureaucratic straitjacket (Anderson *et al.*, 2018:80).

AI can also be used for mass surveillance, such as by deploying facial recognition technology or monitoring online activity. This can lead to privacy violations, as individuals may feel that they are constantly being monitored and that their personal lives are no longer private.

3.3.2.4.3 Predictive analytics

AI can also be used to predict behaviour, such as through predictive policing or targeted advertising. This can raise privacy concerns, as individuals may feel that their actions and decisions are being predicted and monitored without their knowledge or consent.

Governments and other stakeholders must establish robust regulations and standards for developing and implementing AI technology to prevent these and other privacy infringements. At the same time, they must ensure that individuals maintain control over their data and information. Furthermore, individuals can adopt measures to safeguard their privacy, such as using privacy-enhancing technologies and remaining vigilant about the data shared online.

3.3.2.5 Autonomy

The concept of human dignity includes the notion that individuals have the autonomy to make choices about their own lives and to pursue their personal goals and ambitions without undue influence or coercion. However, the proliferation of AI virtual assistants and chatbots, such as Google's Bart, Apple's Siri, Amazon's Alexa, and Chat GPT, along with the employment of image and speech recognition and other AI algorithms in areas like healthcare, finance, and security, has an addictive effect on users. This concerns respecting individuals' autonomy and safeguarding their freedom to make independent decisions. Anderson *et al.* (2018:3) call it the dependence lock-in, which ultimately reduces individuals' cognitive, social and survival skills. Although the transhuman movement labels this as the augmentation of human capacities, the research team from PEW predicts the opposite, stating that people's deepening dependencies on AI-driven tools will erode their ability to think for themselves, interact with each other or take action independently of these intelligent AI systems (Anderson *et al.*, 2018:3).

These are just five aspects of human dignity, but they are considered some of the most fundamental. Collectively, these principles guarantee that each person receives respect and dignity, enabling a life devoid of discrimination and subjugation.

3.3.3 Concerns about unemployment and unemployability

The widespread adoption of AI in many industries could lead to job loss for many workers, including those in traditionally religious vocations. Premier Christianity (2018:1–2) reports that Andy Haldane, the Bank of England's chief economist, is warning of the "dark" consequences of the rise of AI, with job losses predicted on a larger scale than with previous technological revolutions. His argument is echoed by Fourie (2020:15) and Van den Bergh *et al.* (2020:3), who state that the 4IR would result in dramatic changes in unemployment, society, culture and even global power. The first three industrial revolutions involved machines replacing humans doing manual tasks, but this 4IR will see AI replacing humans doing thinking tasks, including doctors, lawyers, and academics. It is estimated that 20–40% of UK jobs could be lost to AI over the next two decades. The church, as the largest third-sector voluntary organisation in the world, is better placed than anyone to debate the moral and ethical implications of AI and its impact on the future job market. The moral implications of increasing dependence on AI and robotics must be

addressed, with principles taking precedence over policy. Christians who believe that work is good and part of God's original plan should ask the right questions about the rise of AI, its effect on human identity and nature, and the limits of AI's involvement in the job market. We need to start this conversation now because the 4IR is already looming.

3.3.4 Concerns about the lack of education and awareness

The pervasive influence of AI in the 4IR leads to disruptions in all facets of life, including education quality. The issue lies in the church's limited understanding and the broader society's insufficient knowledge of AI development and deployment, particularly within the context of the 4IR. Strydom and Prinsloo (2020:140) argue that higher education institutions equipped students and communities for the demands of previous industrial revolutions characterised by electricity-driven mass production. This poses significant challenges as students and communities may not be adequately prepared for a world with increasing automation. Naidoo (2020:165–166) observes that while many organisations in the broader society have adopted new technological teaching tools, religious institutions have encountered difficulties. Theological establishments are not typically recognised as technology frontrunners and are now confronted with both the opportunities and challenges of transitioning into the digital era.

Harari (2016b) notes that devices like Amazon's Kindle continually gather user data while people read books. This AI algorithm allows the device to track reading speed, breaks, and even where a book is abandoned. If equipped with facial recognition and biometric sensors, Kindle could assess the emotional impact of each sentence. "Soon, books will read you while you are reading them," (Harari, 2016b) and while you forget what you read, these systems never forget. This data could enable Amazon to recommend books accurately and gain deep insight into users' emotional triggers.

In their disruptive open letter, Musk *et al.* (2023) emphasise the vital importance of comprehension and education in the AI domain, urging all AI labs to promptly implement a public, verifiable, and minimum six-month pause in the development of AI systems more potent than GPT-4, involving all key stakeholders.

During this pause, Musk *et al.* (2023) propose that AI laboratories and independent specialists collaborate to create and implement a unified set of safety guidelines for

designing and developing advanced AI systems, with a strong emphasis on understanding and education. These protocols should be stringently audited and supervised by external independent authorities like OECD.Ai (2023)[25], ensuring the safety of adhering systems beyond a reasonable doubt. This proposal does not call for a complete halt in AI development but instead advocates for a temporary withdrawal from the hazardous pursuit of increasingly large and inscrutable black-box models with unanticipated capabilities.

Musk *et al.* (2023) suggest that the focus of AI research and development should be redirected towards enhancing the accuracy, safety, interpretability, transparency, robustness, alignment, trustworthiness, and loyalty of existing state-of-the-art systems while emphasising the role of education in achieving these goals.

Concurrently, AI developers must work closely with policymakers to significantly accelerate the establishment of comprehensive AI governance systems, highlighting the importance of understanding and education in their development. At a minimum, these systems should encompass dedicated AI regulatory authorities, oversight and monitoring of highly advanced AI systems and substantial computational resources, provenance and watermarking mechanisms, a reliable auditing and certification infrastructure, liability for AI-induced harm, substantial public funding for technical AI safety research focused on education, and well-funded institutions to address the considerable economic and political disruptions (particularly concerning democracy) that AI will inevitably cause (Musk *et al.*, 2023).

Bughin *et al.* (2018:48) ask an important question: How might individuals acquire the requisite skills to propel the AI economy and cultivate a culture of perpetual learning? They highlight that AI's pervasive infiltration will likely displace numerous existing work tasks, necessitating a smooth transition to AI through mechanisms such as transitional support and training for displaced workers to mitigate societal backlash (Bughin *et al.*, 2018:16). This entails governments, businesses, and other stakeholders investing in

[25] The OECD AI Principles promote use of AI that is innovative and trustworthy and that respects human rights and democratic values. Adopted in May 2019, they set standards for AI that are practical and flexible enough to stand the test of time (OECD.Ai, 2023).

programmes that enable workers to acquire new skills and knowledge relevant to the emerging economy (Bughin *et al.*, 2018:18). Bughin *et al.* (2018:42) approximate that up to 375 million workers, or 14% of the global workforce, may need to change occupations. Almost all workers may have to adapt to collaborate with machines in novel ways. The estimated reskilling cost per task spans six months, with most individuals requiring reskilling for an average of 2.5 tasks (Bughin *et al.*, 2018:21). Consequently, the duration of the training and social support for displaced workers could be substantial. Bughin *et al.* (2018) propose the establishment of national labour-market programmes to train and support displaced workers. Furthermore, businesses might need to introduce employee AI-development programmes to assist workers in acquiring the essential skills for working alongside machines (Bughin *et al.*, 2018:29). Ultimately, Bughin *et al.* (2018:30) accentuate the significance of investing in transitional support and training to facilitate a seamless shift to an AI-driven economy and curtail potential adverse consequences during this transition.

3.3.5 Concerns about responsibility

There are questions about who is responsible when AI systems cause harm or make decisions with unintended consequences. Will the machines take the blame, or will the creators be liable? Regrettably, technology is never impartial. The values and beliefs of its creators are embedded within it, mirroring the preferences and aspirations of those who use it (Van den Bergh *et al.*, 2020:2). This is a crucial reason for the church to take a stance concerning the emerging idealistic and millennialist faith centred around AI. A theological examination is therefore imperative, given that technology extends beyond being a mere artefact, effecting transformative changes on human beings, their interpersonal relationships, decision-making processes, and the value systems that govern their lives.

In an open letter published on 29 March 2023, Elon Musk and a collection of AI specialists and business leaders urge a six-month halt in developing AI systems surpassing the capabilities of OpenAI's recently released GPT-4. They highlight possible societal dangers as the reason for this proposed pause (Musk *et al.*, 2023). The development of AI systems exhibiting human-like intelligence poses deeply concerning risks to society and humanity, as evidenced by extensive research (Bender *et al.*, 2021; Bostrom, 2017;

Bucknall & Dori-Hacohen, 2022; Carlsmith, 2022; Christian, 2021; Eloundou *et al.*, 2023; Matthews *et al.*, 2022; Russell, 2019; Weidinger *et al.*, 2021) and acknowledged by top-tier AI laboratories (Ordonez *et al.*, 2023; Perrigo, 2023). The widely endorsed Asilomar AI Principles[26] emphasise that advanced AI has the potential to bring about a transformative change in life on Earth, necessitating careful planning and management with the utmost attention and resources. Alarmingly, this critical level of planning and management is absent as AI labs continue to engage in a reckless race to develop and deploy ever more powerful digital minds. These advanced systems elude even their creators' understanding, predictability, and control, further exacerbating the concerns about their impact.

Modern AI systems are increasingly approaching human-level competence in general tasks (Bubeck *et al.*, 2023), prompting us to consider several crucial questions: Should we allow machines to inundate our information channels with propaganda and falsehoods? Should we automate all jobs, even those that provide fulfilment? Should we create non-human intellects that could eventually surpass, outthink, render us obsolete, and replace us? Should we gamble with losing control of our civilisation? These critical decisions must not be entrusted to unelected technology leaders. Robust AI systems should be developed only when we are assured of their positive effects and the manageability of associated risks (Musk *et al.*, 2023). Not all role players share the same concerns. Narayan *et al.* (2023) from REUTERS report that more than 1 000 individuals signed the open letter. However, Sam Altman, the CEO of OpenAI, did not sign it. Additionally, Sundar Pichai and Satya Nadella, the CEOs of Alphabet and Microsoft, were not among the signatories. What should the church do?

Christ's act of service has had tremendous ethical ramifications. Goede and Vorster (2022:112) point out that Christians should treat others with the same respect as Christ. In their fight against unfair social institutions, they should emulate and display their truthfulness, love, peace, and benevolence. They also have to promote these qualities.

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[26] Asilomar AI Principles are 23 guidelines for the research and development of artificial intelligence (AI). The Asilomar Principles outline developmental issues, ethics and guidelines for the development of AI, with the goal of guiding the development of beneficial AI. The tenets were created at the Asilomar Conference on Beneficial AI in 2017 in Pacific Grove, Calif. The conference was organized by the Future of Life Institute (Gillis, 2023; Sterling, 2018).

This might become challenging with AGI. Reed (2018:8–9) perceives the development of ethical AGI as an enormous undertaking. This is because developers have to avoid the problem of "perverse instantiation" where the AGI follows ethical instructions, but due to unintentional or unnoticed ambiguity in the command, it executes the instructions in ways unforeseen by its creators and that is possibly harmful.

Furthermore, techno-engineers must acknowledge that human ethics evolve. For example, an AGI created in 1830 would endorse practices such as slavery, disenfranchisement of women and people of colour, exclusion of specific classes from the workforce, indentured servitude, and child labour. It would not comprehend the ethical significance of a 40-hour workweek, sick leave, companionate marriage, and other things we currently take for granted. Therefore, AI engineers cannot assume that today's ethics will be universal and unchanging, just as the ethics of 1830 were not. As a result, an ethical super-intelligent AGI must meet today's ethics standards and potentially progress ethically alongside humanity.

Reed (2018:9) admits that an AGI cannot be equated to the God of creation. However, possessing qualities such as omniscience[27], omnipotence[28], and omnipresence[29] would enable it to function similarly to a deity. AGI researchers are responsible for ensuring that this god-like entity is benevolent. However, this requires effort, so the outcome may not necessarily be a benevolent AGI. Barrat (2013:176–178) also highlights that a team of ingenious hackers safeguarding humanity against an unfeeling superintelligence is far-fetched and more suited to science fiction than feasible reality. This notion is shared by Musk *et al.* (2023). If humanity is confronted with a super-intelligent AGI, the battle will likely not end in humanity's favour.

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[27] In the context of A.G.I., omniscience means that the machine has access to all information and is capable of processing it to understand any topic or issue.

[28] In the context of A.G.I., omnipotence means that the machine can execute any task or action with precision and efficiency.

[29] In the context of A.G.I., omnipresence means that the machine has the ability to be connected to all networks and devices simultaneously, allowing it to be present and operate from anywhere at any time.

3.3.6 Concerns about Christian theology and spirituality

The rapid development of AI raises questions about the nature of consciousness, agency, and morality, which could challenge traditional Christian beliefs about the uniqueness of human beings and the role of God in the world. Van den Bergh *et al.* (2020:3) contend that these emerging technologies confront ideas of human distinctiveness, knowledge, and surpassing limits. This necessitates a critical evaluation of the enduring relevance of essential notions such as religion and spirituality.

In his paper, Dorobantu (2021b:1–9) provides a theological critique of the idea that humanity can play a role as a "midwife" in developing super-intelligent AGI. In Ray Kurzweil's account, humans eventually merge with machines, giving birth to cyborgs that will exponentially improve themselves to the point of singularity by 2045 (Kurzweil, 2005:136), while futurist James Lovelock predicts that humans will eventually disappear like an endangered species, replaced by super-intelligent forms of AI which will continue to expand intelligence beyond our solar system, completing its last evolutionary stage (Lovelock, 2019:123).

Dorobantu (2021b:3) contends that the notion of humanity serving as a midwife to AGI presents theological challenges. It presumes that humans can generate something superior to themselves and that this creation is intrinsically good. This viewpoint is problematic because it neglects the concept of sin and the understanding that humans are fallible. Dorobantu initially evaluates the concept of AGI, highlighting the significant risks and ethical issues it presents that are not readily resolvable. The discussion then investigates the possibility of humans guiding AGI development, asserting that this idea relies on an assumption of human pre-eminence and a belief in humanity's capacity to shape its destiny. Instead, the author proposes focusing on the ethical consequences of AGI development and endeavouring to progress it in alignment with ethical and moral principles.

The researcher contends that the emergence of a super-intelligent SBI, rather than AGI, will inevitably occur. However, it will be inherently harmful, culminating in the beast of Revelation 13, representing the most detrimental intelligence ever devised by mortals. Stephen Hawking (2015) has pointed out that creating AI that has the potential to surpass

our intelligence could be the most detrimental evolutionary humanitarian error, and this prophecy will be realised in the image of the beast.

3.4 The consequences of neglecting the ethics concerns of AI development and deployment

Neglecting ethical considerations in AI development and deployment could have several negative consequences, including:

3.4.1 Loss of trust

The impact of AI development and deployment is far-reaching and it therefore relies on the trust of society (Bird *et al.*, 2020a:ii). Society is founded on trust, and this trust must include aspects such as fairness and transparency. The introduction of AI must be carried out in a manner that fosters trust and comprehension while upholding human and civil rights; it should also be safe, trustworthy, reliable and should be done with integrity (Bird *et al.*, 2020a:iii). Bird *et al.* (2020a:18) warn that deception and manipulation are potential risks, where social robots that gain people's love and trust could be exploited to manipulate them. One significant potential danger, especially with robots with enhanced trustworthiness and appeal like ChatGTP-4, may con people into accepting that they are having a conversation with an actual human. Inevitably, robots could be employed for human interrogations. If it turns out that robots are generally more persuasive than humans, they would likely be used as sales representatives (Bird *et al.*, 2020a:18). The research community strongly agrees that trust in AI can be achieved through fairness, transparency, accountability, and regulation. Trust also depends on the level of control we desire over AI machines, such as maintaining human involvement or granting systems more autonomy (Bird *et al.*, 2020a:29). In the context of AI development and deployment, if trust is lacking, a considerable amount of time and resources will have to be dedicated to ensuring that AI systems are performing their tasks appropriately and that they are not causing unintended consequences. Indeed, digital technologies have become so prevalent that placing trust in them is crucial for the smooth functioning of societies. This is precisely why AI has to be developed with transparency, accountability, and proper regulation to instil trust and ensure its responsible integration into society.

Bird *et al.* (2020a:58) argue that trust in AI is crucial for successfully integrating into society. However, several factors can cause trust to fail, such as the potential disruption of human-human interactions in healthcare, inherent mistrust of cost-benefit decision making, and negative portrayals in science fiction and news stories. Concerns over privacy, safety, and the unknown also contribute to resistance to AI adoption. In healthcare, trust in AI could be influenced by its effect on patient-doctor relationships and the doctor's authority as a medical expert. As more evidence supporting AI's therapeutic benefits emerges and robotic healthcare systems gain traction, trust in AI will likely increase. Ensuring transparency, accountability, and regulation in AI development is essential for fostering trust and ensuring responsible integration into our daily lives.

Neglecting ethical considerations could erode trust in AI systems, making it more difficult to use and integrate these technologies into society effectively. However, the opposite is also true. Frequently, people unknowingly exhibit an unjustifiable and simplistic faith in technology, assuming that it can solve every issue (Fourie, 2020:35). This unintentional faith in technology can lead to distrust in humans. Fourie (2020:36) contends that the prospect of AI offering a utopian future with augmented capabilities, eradication of illnesses, and immortality will, regrettably, result in people placing excessive confidence and reliance on technology for their well-being and destiny and eventually losing trust in God.

3.4.2 Harm to individuals and society

AI systems possess the potential to inflict individual, collective and societal harm (Smuha, 2021:1), violate privacy, and transgress human rights, leading to physical, emotional, or psychological damage to individuals and society. Individual harm occurs when wrongful impediments obstruct one or more interests of an individual, as seen when a prejudiced facial recognition system unfairly discriminates against people of colour. Collective harm occurs when wrongful barriers thwart one or more interests of a group, often stemming from an accumulation of similarly obstructed individual interests. Societal harm arises when one or more interests of the broader society suffer criminal obstruction. This harm, affecting societal interests as a whole, surpasses the aggregate of individual interest (Smuha, 2021:5–6). Hagerty and Rubinov (2019:1) contend that recent research in American contexts reveals that AI-driven technologies tend to reinforce social divides and

intensify social inequality, particularly for historically marginalised groups. Their literature review suggests this pattern prevails globally, indicating that low- and middle-income countries could be more susceptible to the adverse social consequences of AI while being less likely to reap the associated benefits.

AI systems possess a self-learning capacity, resulting in potential unpredictability, which may harm society. For example, the Tay chatbot released by Microsoft in 2016 became racist after being trained by users on Twitter (Horton, 2016). AI systems' ability to operate at an immense scale and speed and the capacity to extract information from data that could elude human detection raises concerns (Brendel *et al.*, 2021:1; Smuha, 2021:2). Exploiting AI may involve manipulating individuals, exposing personal data, disseminating misinformation, influencing opinions and emotions, and interfering with democratic processes.

A human-centred approach should guide AI development, prioritising individual well-being and dignity. This necessitates designing AI systems following user needs and values while implementing measures to prevent unintended harm. By adopting such a perspective, a concise, compelling, and easily understandable final product emerges.

3.4.3 Increased bias and discrimination

AI systems risk perpetuating or even intensifying bias and discrimination, potentially resulting in the unjust treatment of individuals or groups based on race, gender, or socioeconomic status. In *Race after Technology*, Benjamin (2019:1, 6, 24f., 68, 100, 106, 109) uncovers "forms of coded inequity" that frequently perpetuate racism and other inequalities. Smuha (2021:5–6) also explains how bias and discrimination can occur, especially in law enforcement, where AI systems can make harmful decisions against people of colour. Examples include chatbots that use derogatory language, "racialised zip codes" that subject groups to racial surveillance and attempts to find technological solutions for injustices without addressing the social structures that maintain them. Benjamin underscores the urgency for change, stating, "we cannot resign ourselves to this reality we have inherited. It is time to reimagine what is possible".

The beast described in Revelation represents the apex of artificial worship and, ultimately, the final instance. This beast epitomises bias and discrimination against humanity,

particularly Christians. Human beings would continue to advance AI until we reach a singularity. This may not necessarily involve AGI but is more likely a synthesis of SBI and AI. AGI will never require respiration like humans regardless of its sophistication, since a biological brain depends on oxygen. SBI, developed by Kagan *et al.* (2022) and their "dish brain", may very well be the antecedent of the image depicted in Revelation 13. Big things have small beginnings! The "living" deepfake of the beast, as prophesied in Revelation 13, has the potential to result in the selective demise of individuals who resist worshipping the beast (Lennox, 2020:203). This entity can identify "resistant antisocial behaviour" via advanced recognition technologies such as behavioural biometrics and facial and voice recognition. As previously discussed, it can assess human attitudes towards the beast through comprehensive totalitarian social surveillance. Non-compliance with the beast's desires will result in death, as outlined in Revelation 13:15.

3.4.4 Insufficient education and awareness

Recent discussions about AI in the 4IR have sparked discussions in the field of church and theology (Im & Ham, 2020:233). Conversations about post-modernity, globalisation, and post-colonialism have dominated the last half a century. According to Van den Bergh *et al.* (2020:2), the significant influence of technologies has been overlooked due to a lack of awareness and comprehension of their potential impact. Emerging technologies like AI can transform society in significant ways, yet numerous individuals remain uninformed about the potential risks and advantages linked to these technologies. Furthermore, Van den Bergh *et al.* (2020:1–2) note that there is often a focus on the economic benefits of emerging technologies rather than their broader social and cultural consequences. For example, Brendel *et al.* (2021:1) note that organisational managers eager to consider ethics receive limited support on how they may establish and manage AI ethics. This can lead to a neglect of education and training programmes focused on developing the skills needed to work with these technologies responsibly and ethically.

A balanced approach to AI requires ongoing education and awareness about the technology and its implications, allowing individuals and communities to participate in informed discussions about its future. Van den Bergh *et al.* (2020:159–162) maintain that inadequate education can yield considerable repercussions for individuals and society. It can lead to increased poverty, inequality, and social exclusion. It can also limit economic

growth and development and hinder progress towards achieving sustainable development goals. Furthermore, they state that the quality of education is just as important as access to it. A lack of quality education can result in poor learning outcomes and limit the opportunities for individuals to reach their full potential.

The perspectives from theology, philosophy, and education contribute to a more nuanced understanding of emerging technologies by providing different lenses through which to view these technologies. Theology offers insights into the ethical and moral implications of emerging technologies. Simultaneously, philosophy scrutinises the foundational assumptions and values that mould our perception of these technologies. Education helps prepare individuals for the challenges and opportunities these emerging technologies present. Together, these perspectives offer a more holistic approach to understanding the impact of emerging technologies on society (Van den Bergh *et al.*, 2020:28). Brendel *et al.* (2021:2) identify a fragmented scholarly discourse in AI ethics, stating that it is still in its infancy, and encourage more research to be done in this regard. Hagerty and Rubinov (2019:1) state that contemporary assessments of global AI ethics display a bias towards perspectives originating in the US, restricted by insufficiency of research, particularly beyond the US and Western Europe.

The swift progress of contemporary science and technology significantly influences the corporate world, society, Christians, and pastoral activities. Nonetheless, empirical research on the impact of AI on church and pastoral work remains scarce.

Im and Ham (2020:233–234) surveyed 220 theological students at major Korean seminaries to examine and analyse their perceptions of AI. The study measured seven sub-areas, including interest in AI, social influence, AI's alternative influence, and AI's impact on the church. Results indicated that theological students generally acknowledged the academic relevance of AI and the necessity for AI education. However, they displayed little knowledge of AI's impact on the church. This recognition may reflect the belief that while students understand AI as an essential and significant aspect of social and general education, they do not view it as a substantial threat to the church. Im and Ham (2020:234), based on their findings, recommend that Christian education should improve theological students' awareness of AI. They propose that courses related to science and

technology be integrated into the seminary curriculum at various levels, approached from a Christian worldview.

The most pressing issue for Christians arises when defining the relationship between AI and faith. Questions emerge, such as: Can a soul exist in AI? Can AI be an object of salvation? Is AI capable of preaching? Can AI be employed in pastoral and church education? To what extent should its involvement be allowed (Im & Ham, 2020:236)? However, what about the pastors who must confront and address these issues at the most critical level in their ministry? Specifically, how are theological students prepared for the era of AI, as they will become the foundation of the ministry within the next few years or decades when AI is even more influential than it is now? Above all, to what extent are they knowledgeable about AI, and do they understand it accurately? According to Im and Ham (2020:241), there is a debate on whether AI could entirely replace the traditional "teacher" role in the instructor-learner teaching pattern. However, unlike in general education, few domestic studies on AI and Christian education exist.

Next-generation pastors will have to forge stronger connections to education than previous generations, and their educational approach should incorporate advanced technologies, including AI. Such integration will be vital for future pastors. A review of AI-focused research reveals that AI may emerge as a susceptible subject from a spiritual standpoint, as demonstrated in this dissertation. Consequently, pastors must expand their knowledge in this area. The researcher concurs with Im and Ham (2020:242) regarding the scarcity of AI research from a Christian theological perspective and the pressing need to address this gap. Indeed, the development and deployment of AI in the context of the 4IR will be transformative, with a considerable effect on the church and theological training institutions. AI has the potential to eventually supplant teachers and textbooks, although this effect may be vastly underestimated, as demonstrated by the empirical research conducted by Im and Ham (2020:233–262).

Oviedo (2022:939) suggests that Christian theology must remain receptive to insights from technology and science disciplines, embracing a forward-looking perspective and engaging proactively with future developments. Rather than adopting a defensive stance, theologians should pay close attention to the content of scientific journals. To remain

relevant in the context of the 4IR, theology must not only observe and learn but also adapt.

3.4.5 Lack of responsible stewardship

AI should be developed and used as part of responsible stewardship, adhering to a moral and ethics framework that emphasises the common good and fosters human flourishing. Hagerty and Rubinov (2019:2) assert that a crucial insight within AI ethics research proposes that understanding ethics demands an appreciation of culture, and conversely, cultural comprehension mandates familiarity with ethics principles. Different societies maintain unique ethics vocabularies, understandings, and expectations. Terminologies such as “fairness” and “privacy” may carry different connotations in various locales.

Although AI can effect positive change, it remains vital for the Christian church to critically evaluate its potential impact and participate in discussions regarding responsible and ethical AI. Apprehensions with respect to ethics underscore the significance of conscientious stewardship and ethical contemplation in creating and using AI technology. The Christian church should engage in discussions about these concerns and work to ensure that AI is used in a way that aligns with human values and serves the common good.

3.5 Why is transhumanism a temptation to play God?

Transhumanism supports using technology to enhance and upgrade human bodies and minds beyond biological constraints. This involves genetic engineering, AI, and brain-computer interfaces to improve human capabilities, extend life, and ultimately establish a post-human future where humans are significantly enhanced or even immortal. Various objectives have been identified, including overcoming human body and mind limitations to create an improved version of humanity (Willmott, 2021:161). Szopa (2021:197) contends that another aim is establishing a post-humanistic society, which, according to Mirkes (2019:115), includes the medicalisation of transhumanist technologies in the form of body and mind enhancement through transhumanist medicine. Terrones Rodríguez (2019:319–320) includes improving the human condition through advanced technologies such as biotechnology, nanotechnology, and AI, among many other goals. Nevertheless, ethical concerns accompany transhumanism, including concerns about the potential

marginalisation and oppression of specific groups. Besides, Willmott (2021:167) states that these goals have not yet been achieved.

Critics of transhumanism as a philosophical and technological movement perceive it as arrogant due to its fundamental objective of surpassing the boundaries of human biology and physiology by technological means (Cole-Turner, 2015:150; Kotzé, 2020:1; Van den Bergh *et al.*, 2020:21). Kotzé (2020:4) refers to the Promethean[30] concern, referring to humanity's pride, overstepping their limits, crossing into forbidden territory, and violating the sacred. Transhumanism thus represents a deliberate endeavour to manipulate nature and the fundamental building blocks of human life according to our desires (Kotzé, 2020:4). For Cole-Turner (2015:150), transhumanism amounts to nothing less than humanity's death-wish and inherently suicidal endeavour.

The term post-human or humanity+ is mentioned in conjunction with transhumanism, referring to the hypothetical futuristic human species, *homo technicus or techno sapiens,* also referred to as cyborgs (Kotzé, 2020:1; Van den Bergh *et al.*, 2020:22; Williams, 2022:31). In the future, discerning reality will become challenging as the concept of the natural fades away. Organ replacements will be routine, while designer babies will be created through the genetic editing of stem cells. As humans evolve to resemble gods, they will abandon their humanity for non-biological intelligence and technological solutions (Van den Bergh *et al.*, 2020:22). "Men ought not to play God before they learn to be men, and after they have learned to be men, they will not play God." (Ramsey, 1970:138)

This pursuit of transcendence and enhancement is viewed as an attempt to assume control over the very essence of humanity, which raises complex moral and ethical considerations. Furthermore, creating "superhumans" by selectively augmenting specific individuals or groups raises concerns about the potential for unintended consequences and exacerbates existing societal inequalities. As such, transhumanism is often

[30] The Promethean concern refers to the apprehension surrounding the potential consequences of humans' pursuit of knowledge and technological advancements, particularly when they push the boundaries of their control. This concept is inspired by the Greek myth of Prometheus, who stole fire from the gods and gave it to humanity, thereby empowering them but also bringing unforeseen negative consequences (OpenAI, 2023b).

considered an example of playing God, an idea that challenges established religious and ethical norms.

The Christian Bible offers cautionary tales against overreaching ambition and the desire to become like God that can serve as warnings in the context of transhumanism. The narrative of the Tower of Babel, depicted in Genesis 11:1-9, exemplifies the repercussions of human hubris, where people endeavoured to construct a tower ascending to the heavens. Similarly, King Nebuchadnezzar's prideful belief in his godlike status, as described in the book of Daniel, led to his downfall and temporary insanity. These biblical examples underscore the potential dangers and pitfalls of pursuing transhumanist goals that may lead to catastrophe.

3.5.1 A brief history of transhumanism and human biotechnological enhancement

Cole-Turner (2015:150) contends that transhumanism and Christianity present contrasting perspectives of the catalyst for anticipated human transformations. For transhumanists, technology serves as the vehicle for human transcendence. In contrast, Christians attribute this potential for transcendence to grace, viewing it as the divine generosity of a God who bestows life and completeness on creation (1 John 3:2).

Cole-Turner (2015:150–151) maintains that transhumanism has its roots in Christianity rather than technology, asserting it to be a Christian concept. He elucidates that the poet Dante coined the term to articulate the profound transformation Christians experience as they transition from grace to glory. The challenge lies in conveying this impending glory with the limited capacity of human language. Thus, Dante introduces a new term, writing, "*Trasumanar significar per verba non si poria*" (*Paradiso* canto 1, line 70), which translates to "to go beyond the human is something that cannot be described in words". In the translation by Mandelbaum, the phrase is rendered as: "Passing beyond the human cannot be worded." (Alighieri, 1986:7) Cole-Turner (2015:151) argues that Dante's concept of *trasumanar* has evolved into the current term "transhumanism", which is eagerly adopted by modern transhumanists. However, since this term was created to depict the transformative essence at the core of the Christian gospel, Christians ought to reclaim and assert it as their own.

Transhumanism, a cultural and intellectual movement, aspires to employ technology to enhance human physical and mental capabilities beyond natural limits. Rooted in futurism and science fiction, early influences emerged in the twentieth century (Williams, 2022:31) from figures such as H.G. Wells and J.B.S. Haldane. Julian Huxley, the first director-general of UNESCO and the first president of the British Humanist Association, first coined the term “transhumanism” in the 1950s, envisioning it as an extension of human evolution through scientific means. According to Cole-Turner (2015:152), Huxley’s perspective may have been shaped by interactions with Pierre Teilhard de Chardin, a Jesuit theologian and paleoanthropologist who was in contact with Huxley during that period. Nonetheless, neither Huxley nor Teilhard de Chardin coined the term, nor did technology initially inspire the concept of human transformation and enhancement. Instead, Christianity gave rise to transhumanism (Cole-Turner, 2015:152).

Researchers provide different perspectives on the origins of transhumanism. Szabados (2020:2) presents transhumanism as a thin-centred ideology, analysing its conceptual architecture and power to interpret social reality. Huamanchumo (2021:120) describes transhumanism as a philosophical system and reviews the different schools of thought within transhumanism, emphasising the core idea of using advanced technologies to modify and improve the human body. Fernández Valdés (2021:390) critiques transhumanism as a technologist’s ideology that oversimplifies the role of technology in society and neglects ethical, economic, and social conflicts. He further states that transhumanism may promote a deceptive vision of liberty characterised by uniformity, an absence of criticism, discrimination, and a stark divide between the wealthy and the impoverished in the paradoxical world it suggests. These authors suggest that transhumanism emerged as a philosophical system that proposes using advanced technologies to modify and improve the human body. However, its implementation and ideological implications are subject to debate and criticism.

Biotechnological human enhancement involves using biotechnology to improve the human body’s physical and cognitive abilities. This encompasses genetic engineering, neuro-engineering, and other biotechnological manipulations. In recent years, advances in genomics, synthetic biology, and regenerative medicine have spurred an interest in human enhancement within the transhumanist realm and the broader scientific community.

In summary, transhumanism and human biotechnological enhancement are complex and controversial fields, provoking debates surrounding the ethical, social, and political implications of their development and application.

3.5.2 Playing God

In his book *Towards Digital Enlightenment: Essays on the Dark and Light Sides of the Digital Revolution*, Helbing (2019:103) refers to a speech given by Professor Hans Ulrich Gumbrecht, where he talks about creating a God-like being with superhuman knowledge and abilities to guide human destiny, and how this might free humans from biblical sin. Helbing expressed his concern that humans run the risk that God might turn against them. Even more alarming is the notion that an AI god would eventually write a new bible for humans to follow, with far-reaching consequences for humanity (Brandon, 2017). Brandon (2017) mentions that this AI bible would match the AI's collective intelligence. It might even tell people how to live their lives in worship of AI. This AI would comprehend the world's workings at a higher level than humans, instilling trust that it could supply the necessary information for daily life. By processing this information, the AI would enlighten individuals in ways reminiscent of religious practices, such as Christianity (Brandon, 2017). Humans tend to trust in technology beyond their capacity; just think of how they use a GPS to direct them to a destination. This "AI bible" could include instructions on serving the AI deity. Unbeknownst to its followers, this AI deity might primarily aim to eradicate humanity from the Earth's surface. Will humans genuinely worship the AI deity? The answer is clear — they will. Trust and obedience are often granted to entities that appear more powerful and deserving than oneself (Brandon, 2017). Reed (2018:12) postulates that developing a super-intelligent AGI could give rise to an entity possessing god-like power, posing a threat to humanity and a challenge to religious beliefs.

The notion that humans will bow down to an AI god might be more realistic than one might think. One expert, Vince Lynch, founded IV.AI, which specialises in creating bespoke AI solutions for businesses. Lynch highlighted the intriguing parallels between organised religion and the workings of AI. For instance, he noted numerous recurring themes, images, and metaphors in the Christian Bible. "The concept of teaching a machine to learn … and then teaching it to teach … (or write AI) is not so different from the concept

of a holy trinity or a being achieving enlightenment after many lessons learned with varying levels of success and failure." (Brandon, 2017)

So, would this Godlike AI set the rules humans have to live by? (Helbing, 2019:106) In his thesis, Williams (2022:61) mentions that artist Diemut Strebe trained a robot mouth to utter prayers algorithmically generated from a dataset that includes the Christian Bible, among other religious texts.

Christians believe that God is the creator and sustainer of life and that humans do not have the right to manipulate life or attempt to play God. Transhumanism's aim to enhance human biology and physiology challenges this belief. Foerst (1999:376) mentions a golem[31] story where humans try to re-create themselves and repeat God's creative power without limitations, but this leads to people adoring the constructors of golems instead of God. Cole-Turner (2015:150) states that the majority of transhumanism's adversaries, whether religious or secular, rely on traditional religious institutions to resist its advance. In the absence of Christians, who else can be expected to challenge scientific and technological developments, express concerns about usurping divine authority, and advocate for preserving the existing human condition as unalterable and definitive?

Proverbs 16:18 states, "Pride goes before destruction, and a haughty spirit before stumbling. Pride makes us all blind in the areas where we think we are strong." Oswald Chambers said: "An unguarded strength is a double weakness."

3.5.3 Threatening Christian ethos

The Christian faith upholds that every individual, created in God's image, carries intrinsic value—the quest for enhancement by transhumanism prompts queries regarding the worth of unenhanced human life. Van den Bergh *et al.* (2020:35) contend that technology can enhance lives; however, it may also divert humans from essential matters, culminating in techno-secularism and a quasi-religion that rivals Christian theology. As humans increasingly depend on and naively trust in technology to solve all their problems,

[31] Many stories in the Jewish mystical tradition revolve around artificial humans known as golems. The term "golem" can be found only once in the Bible, specifically in Psalm 139:16, where it is typically interpreted as a "formless entity" or "embryo" (Foerst, 1999:375).

secularisation displaces traditional Christian beliefs. Van den Bergh *et al.* (2020:35) also argue that technological transhumanism conflicts with authentic Christian transhumanism, which posits that believers gain eternal and spiritual bodies at the resurrection. This technological view promotes secularisation and undermines the Christian belief in divine providence over human life. This suggests that transhumanism challenges the belief in the providence of God over human life by seeking to overcome the limitations of humanity through technological means rather than relying on God's plan.

Van den Bergh *et al.* (2020:33) also state that technological advancements anticipated in the coming years will introduce numerous new ethical dilemmas. Among these issues is the potential for only financially privileged individuals to access extended human lifespans, modifying the human species through the genetic editing of stem cells, and eliminating ageing and death. This may practically result in the wealthy living indefinitely while those without means struggle to afford essential medication. Such a scenario raises concerns about a widening divide between the affluent and the impoverished.

The ultimate goal of transhumanism involves discarding the physical body (the "hardware") once the content of the human brain is transferred to a robotic body or supercomputer, thereby sustaining human consciousness (the "Software"). This ambitious aim challenges the concept of *imago Dei*, as it aspires to create an innovative form of humanity, unencumbered by the constraints of the human body and mind (Bradley, 2007:999–1008; Van den Bergh *et al.*, 2020:21).

Humans exist within the constraints of time and are thus mortal. True humanity involves experiencing forgiveness of sin through Jesus Christ and anticipating resurrection from the dead. In this way, human believers are becoming their true selves in Jesus Christ. Nonetheless, the complete *imago Dei* will only be realised eschatologically.

In summary, transhumanism threatens Christian ethos in the following ways: Firstly, it challenges the belief in the providence of God over human life, as it seeks to overcome the limitations of humanity by technological means rather than relying on God's plan. Secondly, it contradicts the Christian belief in the resurrection of the body, as it seeks to achieve eternal life by technological means rather than through faith in Christ. Thirdly, it raises ethical concerns about the potential for only the wealthy to afford extended human lives, genetic editing of stem cells, and the demise of ageing and death, which could lead

to a significant divide between the wealthy and the poor. Finally, it challenges the belief in the *imago Dei*, as it seeks to create a new form of humanity that is no longer bound by the limitations of the human body and mind. These challenges require Christians to engage in theological dialogue and reflection to ensure that emerging technologies do not compromise their beliefs and values. Cole-Turner (2015:153) is correct when he states that Christians have to thank transhumanists for electrifying the word transhumanism and now handing it back to Christians in the form of questions.

3.6 What conclusions should the church draw from the exponential development and deployment of artificial intelligence?

3.6.1 The need for ethical reflection

Christian authors have varying views on transhumanism and its specific technologies. LaBerge (2019) argues that Christians should converse with transhumanists and bring their perspectives on what it means to be human and the morality of specific proposals. In his book summary, Imbert (2020:94-96) explores Jacob Shatzer's view on the impact of technology on Christian discipleship and how he provides guiding principles for Christians to navigate a highly technological world. According to Shatzer, the transhuman world is defined by three main technologies: the transformation of the human body (morphological freedom), AR, and AI. Shatzer then examines four specific technologies: medical technology, mapping, robotics, and communication. Each receives attention to demonstrate how it has transformed four crucial aspects of human life: the nature of the human experience, the concept of place, the significance of relationships, and the definition of the self. These four aspects are encapsulated in the questions: "What is real?", "Where is real?", "Who is real?", and "Am I real?"

Lipowicz (2020) scrutinises the relationship between transhumanism and Christian anthropology, arguing against Christian transhumanism. Cole-Turner (2015:150–160) argues that transhumanism and Christianity differ in their views on the cause of human transcendence, with transhumanists seeing technology as the agent and Christians seeing grace as the cause.

Cole-Turner (2015:154) further argues that Christian theology and transhumanism share the fundamental assumption of human malleability. Although some religious individuals

dismiss transhumanism due to its ties to evolutionary theory, it is noteworthy that Christianity has long recognised human nature as malleable. This concept, present even before Darwin or modern evolutionary thought, holds that human nature transforms over time due to the effect of sin and the transformative grace of redemption. Malleability forms the cornerstone of redemption, as humanity is incapable of change and also lacks the capacity for redemption. Traditional Christian theology presents this concept clearly: humanity changes due to the original sin of Adam and Eve and experiences another transformation through redemption in Christ, the second Adam. Biblical scripture reiterates the theme of human transformation, indicating its central position in Christian theology.

Despite inducing anxiety and potential losses, changeability is not necessarily a negative concept within the Christian faith. Instead, it serves as a fundamental requirement for hope. As stated in 1 Corinthians 15:51–52: “we shall [all] be changed”. Christianity embraces the notion of profound human transformation. Thus, the anticipation of significant human transformation that characterises transhumanism does not provide a valid reason for its rejection by Christians.

The church should therefore reflect on the ethical implications of AI and work to ensure that its development aligns with human values and the common good. As a spiritual and moral institution, the church uniquely promotes and defends human dignity. AI development raises important questions about the implications of this technology for human dignity and well-being. By engaging in ethical reflection on AI development, the church can help to ensure that this technology aligns with the values of compassion, justice, and respect for all people.

3.6.2 The importance of human dignity

The church ought to champion the significance of human dignity, striving to guarantee that AI development and application respect and safeguard the dignity of all individuals. As AI technology progresses, the church’s role in preserving human dignity may become vital. The following are some approaches through which the church can contribute in this regard:

3.6.2.1 Ethics and morality

The church can help shape the ethical and moral principles that guide the development of AI technology, ensuring that it protects human dignity and is not used to harm or exploit people. The church must play a leadership role in shaping the moral discourse around AI development, helping to ensure that this technology is developed and deployed in ways consistent with ethical and moral principles.

3.6.2.2 Advocacy

The church can use its voice and influence to champion policies and practices that promote human dignity in developing and deploying AI, such as regulations that protect privacy and prevent the exploitation of personal data. The church is often a voice for the vulnerable and marginalised, and AI development can have significant implications for these groups. By engaging in ethical reflection on AI development, the church can help ensure that the rights and dignity of the most vulnerable are protected.

3.6.2.3 Ethical artificial intelligence development

The church can encourage its members to engage in ethical AI development, such as developing AI applications that promote human dignity and address social and environmental issues. The church can help build a better world by encouraging the development of AI technologies that promote human dignity and well-being and by opposing the development of harmful technologies that undermine human dignity.

3.6.2.4 Collaboration

The church can partner with other organisations and stakeholders, such as technology companies and governments, to promote the responsible and ethical development of AI technology.

Ultimately, the church’s role in protecting human dignity in the context of AI development is to ensure that the technology is used for the good of humanity and that it does not undermine or threaten the inherent worth and value of every person. By doing so, the church can help create a world in which AI technology enhances human dignity and well-being.

3.6.3 The value of human labour

The researcher contends that the 4IR, also known as Industry 4.0, will be the most abbreviated of all the industrial revolutions. Unprecedented in its disruptive character, the 4IR features the expeditious development and deployment of the Internet of Things (IoT) and cloud computing, facilitating a real-time interface between virtual and physical realms, namely cyber-physical systems. This revolution is set to be distinguished by its rapid progression and transformative impact on both industry and society. A key aspect of Industry 4.0 involves automating processes and incorporating edge computing in a distributed and intelligent manner, further revolutionising the industrial landscape (Nahavandi, 2019:2–3).

The primary focus of improving process efficiency may inadvertently overlook the human cost, leading to significant job losses and adverse consequences for the workforce. Nahavandi (2019:3) predicts that the most pressing issue will become apparent in the coming years as the full impact of Industry 4.0 unfolds. There may be resistance from labour unions and politicians, potentially neutralising some benefits of Industry 4.0 in response to mounting pressure to enhance employment opportunities.

In 2019, researchers at the Institute for Intelligent Systems Research and Innovation at Deakin University in Waurn, Australia, introduced the concept of Industry 5.0. This notion envisions robots, also called cobots[32] or digital twins (Shetty, 2017), and autonomous manufacturing interwoven with human cognition, functioning as collaborators rather than competitors in the workforce (Nahavandi, 2019:1–2).

The swift progress in AI technologies and the reality that many developing countries in Africa, Asia, Latin America and some in Eastern Europe and the Pacific remain entrenched in earlier industrial revolutions, present a significant concern. This substantial

[32] Industry 5.0 will usher in the next generation of robots, often referred to as cobots, which will possess inherent knowledge or rapidly acquire the necessary skills for their tasks. Collaborative robots, or cobots, will possess awareness of human presence, ensuring safety and adhering to risk criteria. Capable of perceiving, comprehending, and responding to not only humans but also their goals and expectations, cobots will operate much like apprentices. By observing and learning from an individual's task execution, these robots will subsequently perform the desired tasks in a manner similar to their human counterparts. Consequently, humans may experience a unique sense of satisfaction while working alongside cobots (Nahavandi, 2019:3).

leap to Industry 5.0 may result in a considerable portion of humanity being left behind and marginalised, exacerbating existing inequalities. However, Nahavandi (2019:3) believes that Industry 5.0 will generate more jobs than it eliminates by reintroducing human labour to factory floors, pairing human intellect and creativity with intelligent systems. Nevertheless, the validity of this claim remains a subject of debate, as the precise consequences of this new industrial revolution for the job market are yet to be determined. In Industry 5.0, humans will collaborate with robots, experiencing not only an absence of fear but also a sense of reassurance and confidence in the understanding and effective cooperation demonstrated by their robotic counterparts (Nahavandi, 2019:3).

3.6.4 The importance of education and awareness

Strydom and Prinsloo (2020:140) argue that universities must adapt their curricula and pedagogical approaches, not only to address the ongoing challenges of the 4IR but also to consider the implications of AI and its growing influence on various aspects of life. Strydom and Prinsloo (2020:158) state that a university capable of addressing the challenges of new technologies in the 4IR must exhibit agility, do research, reposition, and experiment. Agility enables the institution to adapt quickly to the ever-evolving landscape. Research fosters innovation and the discovery of new solutions. Repositioning involves aligning the university's goals and strategies with the revolution's demands. Experimentation encourages trying new approaches to learning and problem solving, which can lead to ground-breaking advancements, and the same applies to the Christian church.

The church must adapt to the inevitable changes brought about by disruptive technologies in the 4IR. Failing to do so may result in obsolescence. Consequently, the church must embrace this evolving landscape and address the growing need for a deeper theological understanding of robots and AI. The church is responsible for upholding a unique Christian mission while fostering a relevant and transformative educational environment. Moreover, the church should inspire its members to learn about AI and engage in well-informed discussions about its future. Naidoo (2020:168) adds that theological education must progress so that it uses technology and online instruction to the same extent as other academic fields.

Investing in biblically based education and training programmes that foster the skills needed to engage with emerging technologies like AI responsibly and ethically is paramount. This investment is central to readying individuals to navigate a rapidly evolving job market and empowering them with the capabilities to excel in a digital economy. The church must actively and meaningfully participate in these transformative shifts.

Like other institutions, the church can significantly influence the ethical and moral aspects related to AI development and use. Engaging in dialogue with policymakers, business leaders, and other stakeholders can ensure that the development and application of AI promote human dignity, social justice, and the common good. Offering moral guidance and spiritual support to individuals and communities affected by AI-induced changes also falls within the church's remit. Furthermore, using its extensive network of institutions—schools, hospitals, and social service agencies—the church can promote educational and training programmes, enabling individuals to acquire the skills and knowledge needed to flourish in an AI-powered economy. In essence, the church can significantly shape the ethical and moral aspects of AI development and application, providing support for individuals and communities grappling with AI-induced changes.

3.6.5 The role of faith in shaping the future

The church should recognise the role that faith and spirituality can play in shaping the future of AI and work to ensure that a moral and ethics framework guides AI development and deployment. Overall, the church should approach the exponential development of AI with a spirit of responsible stewardship, seeking to ensure that AI is used to serve the common good and enhance human flourishing.

As mentioned earlier in this paper, AI is a tool, but since AI is an extension of humanity's tool-making aptitude, they equip themselves with it. Using AI, humans try to fulfil the age-old yearning of becoming God-like, i.e., all-powerful and immortal (Tariq *et al.*, 2022:8). Is it not unreasonable that while humans are developing this tool, they also fear that their creation might become autonomous and then thwart their plan for immorality and omnipotence? In the same way that God created man in his image (Gen. 1:27), man creates AI in his image, and with it will come dark motives and polluted goals that spring from their sinful nature.

Humans must redesign their minds first to eliminate their self-centred adversarial and ungodly character and replace it with a harmonious Christlike character that is in sync with God's greater plan. It is only a perverse and distorted part of humanity's sinister mind to design and orchestrate the destruction of fellow human beings with creations like AI (Tariq *et al.*, 2022:8).

The church should approach the exponential development of AI with a spirit of responsible stewardship, balancing ethical considerations, promoting human dignity, supporting workers, promoting education and awareness, and guiding AI development and use with a moral and ethics framework. Yuval Noah Harari posits that revolutionary twenty-first-century technologies are more likely to give rise to unprecedented religious movements than to revive medieval beliefs. He says that religions must keep up with the technological advancements of the 4IR, or they will become irrelevant (Solon, 2017:1–4).

In an article published by Wired, the property of Conde Nast Publications, author and columnist Virginia Heffernan (2018:13), a PhD from Harvard, makes some daunting statements about the worshipping of technology. The text mentions Marshall McLuhan, a technology writer who proposes that technology could eventually unite all humans within the body of Jesus Christ. She also refers to robotics engineer Anthony Levandowski as someone who could breathe a soul into a machine. She examines Levandowski's infatuation with "Strong AI" and his vague, tax-exempt church named Way of the Future. Heffernan (2018:13) notes that in Levandowski's scheme, AI merits worship because it is supremely intelligent. Although the Bible does teach that measurable intelligence is mortal, it does not directly teach that intelligence is automatically polluted by pride and greed. However, it does speak out about the dangers of pride and greed and how they can lead to spiritual corruption (see 1 Cor. 8:1–2; 1 Tim. 6:10; Jas 3:13–16). In addition to envisioning the worship of AI, Levandowski imagines a machine so intelligent that it causes humans to cower. Levandowski has stated, without irony, that people pursue AI because a super-empowered artificial attorney or accountant could make an individual "the richest person in the world" (Heffernan, 2018:14).

Global Records Network (GRN), founded in Los Angeles in 1939, was a missionary organisation that began translating portions of the Christian Bible into more than 5 500 languages spoken around the globe to evangelise indigenous communities facing crises

caused by global economic forces (Horne, 2006). The organisation designed an ultra-low-tech cardboard record player that was manually turned to play the recorded sound. The missionaries were surprised by what they saw. Those who had not seen the devices that played recordings of various Bible passages, were amazed. The missionaries discovered that the hand-crank devices initially astounded those unfamiliar with disembodied sounds according to documentary filmmaker Adele Horne who has studied Global Records Network in her documentary titled "The Tailenders"[33] (2006). In "The Tailenders", the machine is the message, according to Landry (2022). The sound device attracted indigenous people to the Western ideals and practices underlying it, just like unsuspecting Moses was attracted to the disembodied voice from the burning bush in Exodus 3 (Heffernan, 2006). In her engaging book, *The Archive Effect: Found Footage and the Audio-visual Experience of History*, Baron (2014) explores how the original meaning of a recording can be modified or even transformed. The viewer or listener's experience of the media can be shaped by how it is presented in the new context. She explains that the *archive effect* can create a sense of authenticity and immediacy for viewers or listeners, as in the case of the cardboard record player. It is the experience of the pastness of a world that existed but has been erased and overlaid with different faces, current fashions, and new technologies (Baron, 2014:1). This can lead to misinterpretations of the intended message because the audio-visual material is taken out of its original context and presented in a way that supports a particular narrative or viewpoint. Heffernan (2006) accused Ms Horne of her documentary film presenting disembodied audio as a religion. Later Heffernan (2018) called it "The seduction of technical tools." Adele Horne's documentary and the reaction it elicited serve as a subtle warning to techno engineers and the Christian church that seemingly well-intended AI tools can disrupt humanity and their spirituality.

A recent G20 Interfaith Working Group report advocates for a "more global, inclusive approach to AI governance". The report highlights the importance of established cultural

[33] GRN calls their target audience "The Tailenders" because they are the last to be reached by worldwide evangelism. Filmed in the Solomon Islands, Mexico, India and the United States, The Tailenders focuses on the intersection of missionary activity and global capitalism and raises questions about how meaning, carried by the simple sound of a human voice, changes as it crosses language and culture (POV, 2006).

values, frequently stemming from or inspired by religious practices, to guide national, regional, and international policies. This guidance will ensure that AI evolves as a tool that supports and enhances human capabilities. The report also encourages religious communities to contribute by offering “access to shared ethical injunctions” (Marijan *et al.*, 2021:1–6).

3.6.6 The need for technology hermeneutics

Theology ought to be re-envisioned in light of the emerging realities, particularly in the context of AI development and deployment during the 4IR. This section explores a theological methodology to do this.

In *The Meaning of the City*, Ellul compellingly examines the necessity of divine intervention to rectify the inherent curse of cities. He views Cain’s establishment of the first city as an act of rebellion against God, a “counter-creation” that disrupts the divine essence of creation. When humans create cities, they give rise to an autonomous force more potent than themselves, leading to cities with objectives such as control, certainty, closure, and commodification.

Ellul firmly asserts that the malevolent human city cannot be reformed or redeemed. Instead, God must replace it at the end of time, with no reliance on human effort. The New Jerusalem, as envisioned by Ellul at the end of the Apocalypse, signifies a rejection of human-made artefacts and artificial agency. The judgement of the final human city, Babylon, represents a resounding condemnation of all past and present cities that are not connected with the New Jerusalem. He emphasises that the new creation can only emerge through judgement and destruction, leaving no continuity. The New Jerusalem is beyond the realm of human creation (Paulus Jr., 2022:11).

Paulus Jr. (2022:11) argues that although Ellul offers a valuable examination of the power and dynamics of autonomous systems, which have become more prominent due to advances in AI, he was unable to conceive a possible disruption of these systems, leaving him with little optimism for the human city and technological society. Although the Apocalypse serves as a tool for Ellul to critique technological society, he overlooks the Apocalypse’s endorsement of the city and how it transforms every human city into a channel for new creation. In the Apocalypse, a more significant agency—divine and

human—interrupts and restructures autonomous systems, unearthing ultimate aspirations and desires within the technological city.

Every city relies on technology and becomes increasingly dependent on complex technological systems. Paulus Jr. (2022:15) states that some technologies deserve condemnation due to their harmful roles in Babylonian counter-creation patterns and will ultimately be destroyed with the collapse of the old city. However, others contribute to the development of the new city, becoming transformative and possibly earning a permanent place in the New Jerusalem as part of “the glory and the honour of the nations” (Rev. 21:26). If our technologies, including advanced creations like autonomous artificial agents, are not deemed as agents of counter-creation, they have the potential to be celebrated as agents of the new creation.

This information is relevant to developing a Christian hermeneutic for technology as it provides a framework for understanding and interpreting the role of technology, particularly AI, in the context of theological beliefs and values. By examining Ellul’s perspective on cities as a counter-creation and Paulus Jr’s argument on the potential transformation of autonomous systems, a Christian hermeneutic for technology can be established that considers both the positive and negative aspects of technological advancements.

The hermeneutic can guide Christians in assessing and responding to emerging technologies and their implications for society and spirituality. It acknowledges the potential risks associated with technology, including loss of control over AI systems and their role in Babylonian counter-creation patterns. Simultaneously, it also recognises the transformative potential of technology, as some technologies may contribute to the development of the new city and even be celebrated as agents of the new creation.

This hermeneutic encourages a critical and responsible approach to technology, urging Christians to discern between technologies that may harm human values, well-being, and the divine essence of creation and those that can facilitate positive transformation and align with Christian values. Thus, a Christian hermeneutic for technology promotes a balanced and nuanced understanding of technology’s role in the context of faith and the pursuit of harmony between humanity, technology, and the divine.

Developing a clear and relevant hermeneutic for technology is vital in this context. Such a hermeneutic should accomplish two primary objectives: first, it must provide a framework to uncover biblical perspectives on technological advancements and applications; second, it should offer a lens through which the rapidly changing technological landscape of the 4IR can be accurately interpreted.

3.7 Conclusion

This chapter has explored a Christian ethical perspective on the development and deployment of AI, emphasising the vital role of the Christian community in disseminating the gospel message. Technological tools, including AI, can assist in fulfilling this mission, yet the church must remain vigilant against potential misuse and violations of human sanctity. By adopting a biblically informed approach and considering the gospel message, the church can ethically and proactively engage with AI technology. This engagement requires thoughtful acceptance or dismissals concerning human nature, the promises of technology, and hope for the future.

The aspiration for glory may persist in the face of technological advancements, yet the true definition and control of such glory remain elusive. While technological progress can contribute to divine intentions, it is crucial to recognise that these intentions always originate from a higher power. Ultimately, surrendering to the awe-inspiring enigma of the unfathomable mystery paves the way for discovering authentic existence (Cole-Turner, 2015:160).

A new hermeneutic for technology is developed in the subsequent chapter, building on the foundation laid in this chapter. This hermeneutic provides a comprehensive framework for Christians to assess and respond to the implications of technological advancements in harmony with their faith. Academic and theological communities are encouraged to collaborate with the church to explore how AI technology can be used for the greater good, ultimately glorifying God. By establishing this new hermeneutic, the church will be better equipped to navigate the complex landscape of AI and technology, ensuring that ethical considerations remain central to their engagement and decision-making processes.

CHAPTER 4 EFFECTIVE STRATEGIES FOR A TECHNOLOGICAL HERMENEUTICS

4.1 Introduction

Adaptation is imperative for the Christian community given the swiftly changing technological landscape. The present research strives to provide the church with a robust technological hermeneutics and ethics guidelines for engaging with AI amidst the 4IR and beyond. The church lacks a lens to interpret its position and role in this rapidly changing era and ethics guidelines to confront AI and the potentiality of a technological singularity.

Technological hermeneutics can help the church address these shortcomings, especially the ethical concerns related to AI, which include potential bias, lack of transparency, privacy issues, job displacement, security vulnerabilities, accountability dilemmas, overdependence, the ethical implications in warfare, risks of superintelligence, and socioeconomic inequities, as discussed in the previous chapter.

A hermeneutical approach to technology can improve the church's understanding of biblical end-time events in the context of rapid technological advancements. In addition, the church can take specific measures to nurture a Christian perspective on technology, fostering a balanced and nuanced understanding of its role in faith.

In the quest for a technological hermeneutics and Christian ethics guidelines, it is critical to remember that constructive and destructive uses and abuses of AI will be subject to divine and civil judgements. The need for a novel technological hermeneutic, paired with ethics guidelines, is inescapable, a challenge this study aims to overcome. If intelligent technologies elude human control and compromise the ethical essence of humanity, it will signify a broader challenge and a deficiency in Christian belief and formation (Radner, 2020:83).

This chapter aims to develop a Christian hermeneutic for technology, addressing the current lack of a techno-hermeneutics and ethics guidelines. This deficiency, if unaddressed, will impede the church's ability to understand and interpret ethical concerns associated with AI, leaving it unable to play a significant role in shaping the impending technological future.

The earlier examined science-fiction films, serving as a potent *locus theologicus*, offer valuable insights into socioeconomic issues and technological advancements in the contemporary world. These films can be analysed quantitatively and qualitatively, revealing intricate patterns and relationships that mirror more significant societal and cultural dynamics. When scrutinised through a hermeneutical lens for technology, this comprehensive analysis unveils profound connections between the concealed motifs and predictions in these films and the increasing trend towards a technological singularity. These films offer glimpses into a potential future marked by technological singularity and echo biblical apocalyptic events. Using a hermeneutical lens for technology allows for a critical evaluation of these hints and predictions. Consequently, this approach offers an enriched understanding of biblical end-time events, significantly correlating with the rapid progression in technological advancements.

Therefore, a hermeneutical lens for technology can serve as a method for decoding technological development. It will provide a framework for understanding the connections between predictions made in certain films, more significant societal and cultural issues, and the potential link between exponential development in AI technologies and end-time events described in the Bible.

This information is crucial for developing a Christian hermeneutic for technology as it offers a framework for understanding and interpreting the role of technology, particularly AI, within the context of theological beliefs and values. By examining Ellul’s perspective on cities as a counter-creation and Paulus Jr.’s argument on the potential transformation of autonomous systems, a Christian hermeneutic for technology can be established, considering both the positive and negative aspects of technological advancements.

This technological hermeneutic will encourage a discerning and responsible approach to technology, urging Christians to differentiate between technologies that may harm human values and the divine essence of creation and those that may facilitate positive transformation and alignment with Christian values and the prophetic message of the Bible. Therefore, a Christian hermeneutic for technology aims to foster a balanced and nuanced grasp of technology's role in faith, striving for a harmonious relationship between humanity, technology, and the divine.

Developing a clear and relevant hermeneutic for technology in this context is paramount. Such a hermeneutic should fulfil two primary objectives: first, it should provide a framework to reveal biblical perspectives on technological advancements and applications; second, it should offer a lens through which the rapidly evolving technological landscape can be interpreted. Such a technological hermeneutic will provide a comprehensive framework for Christians to assess and respond to the implications of technological advancements in harmony with their faith. The academic and theological communities are encouraged to collaborate with the church.

Pentecostal hermeneutics emphasises supernatural encounters facilitated by the Holy Spirit, often eclipsing the necessity for cognitive proportionality. Consequently, this predisposes them to a more practical and pragmatic approach to biblical texts. Therefore, it becomes crucial for Pentecostals to reshape their hermeneutic strategies to establish an equilibrium between experiential understanding and theoretical knowledge (Sidabutar & Marbun, 2022:107). Pentecostal scholars have been developing a new hermeneutic consensus since the 1970s, recognising that the Bible does not speak monosyllabically (Nel, 2018b:423). With this metaphorical statement, Nel says that the Bible's teachings are not simplistic or one-dimensional. As a collection of historical, poetic, legal, prophetic, and wisdom literature, the Bible communicates complex truths, ideas, and narratives about human nature, divinity, morality, and the cosmos. Its messages cannot be reduced to simple "yes" or "no" answers or understood simplistically. It should instead be understood in an articulated way while respecting the historical, literary, and cultural contexts, as explained later.

The assertion that "the Bible does not speak in a monosyllabic way" can substantially contribute to developing an articulated Pentecostal hermeneutic for technology. This perspective underscores the necessity for an intricate, nuanced understanding of biblical texts, a principle that could be applied when contemplating technology within a Pentecostal context.

Recognising the complexity of biblical messages implies that any theological perspective on technology should consider the multifaceted nature of these technological advancements, especially in AI, considering both their practical benefits and potential ethical implications, as explained in previous chapters. This approach resonates with the

Pentecostal emphasis on the experiential dimension of faith, as technology, too, can profoundly affect human experiences.

Furthermore, this statement implies a non-static interpretation of the Bible, which can change with the evolving understanding of human society without sacrificing the core values and truths it presents. Similarly, a Pentecostal hermeneutic for technology would not remain static but would adapt and develop as technology advances and society's relationship with it evolves.

By developing a holistic understanding of the Bible, Pentecostals can critically reflect on technology, be informed by their faith, and stay aware of the complex realities of contemporary technological contexts. This comprehension involves discerning where technology enhances human flourishing and aligns with the values of the Kingdom of God, and recognising where it might contribute to injustices or distractions from the Christian path. Pentecostals should develop a perspective on the all-inclusive difference their experience of God makes in all areas of their lives (Nel, 2017:1), which could include their experience with technology.

Pentecostals favour experiential grounding as a prerequisite for shaping doctrine and theology, using a specific hermeneutical lens that facilitates a distinct interpretation of the Bible. Their experiences yield a unique discourse about God, arguably termed "Pentecostal talk" (Nel, 2017:1–8). They comprehend God not merely as an intellectual acknowledgement of established doctrines and precepts but as a relationship with the Divine Originator of these guiding principles around which Christians customarily structure their lives. Their divine encounters are shaped by and construed in alignment with biblical narratives, prompting an enquiry regarding the status of the Bible within Pentecostal spheres.

The Pentecostal hermeneutic is founded on the presumption of the Bible's infallibility, concurrently acknowledging the hermeneuticist's inability to validate this infallibility empirically (Van der Laan, 1989:42). The purpose of theology is to facilitate God's revelation to humanity rather than to serve human understandings of the divine. Two vital components ensure sound theology: interpretation and assimilation of biblical narratives, and the driving influence of God's Spirit, validating the truths within these narratives (Nel, 2017:5).

An articulated Pentecostal hermeneutic for technology should be a dynamic, multidimensional, and comprehensive interpretive framework derived from the above insights. It would address the role and implications of technological advancements, particularly AI, within a Pentecostal theological context while respecting the experiential nature of the Pentecostal faith.

This hermeneutic should also serve dual roles: to elucidate biblical perspectives on technological advancements and to provide a lens for interpreting the rapidly evolving technological landscape in light of biblical teachings and Pentecostal values. It should foster a responsible and discerning approach to technology, guiding the community in differentiating between beneficial technologies and those that may pose ethical or spiritual challenges.

Further, this Pentecostal hermeneutic for technology should promote a balanced understanding of technology's role in faith, acknowledging its potential to profoundly affect human experiences in ways that resonate with the Pentecostal emphasis on the experiential dimension of faith. This approach encompasses discerning where technology enhances human flourishing in alignment with the values of the kingdom of God and recognising where it might contribute to injustices or distractions from the Christian path.

An articulated hermeneutic for technology should thus have the following key attributes:

1. **Dynamic:** Reflecting the non-static interpretation of the Bible, this hermeneutic should adapt and evolve with technological advancements and changing societal perspectives without losing its theological core.

2. **Nuanced and multifaceted:** Recognising that "the Bible does not speak in a monosyllabic way", this hermeneutic should facilitate a complex, nuanced understanding of technology, appreciating its potential benefits and ethical implications.

3. **Experiential:** Consistent with the Pentecostal emphasis on experiential understanding, this hermeneutic should reflect on how technology can profoundly affect human experiences and faith.

4. **Ethical:** It should offer guidelines for differentiating technologies that align with Christian values and promote human flourishing from those that can contribute to injustices or detract from the Christian path.

5. **Biblically grounded:** It should provide a framework for unveiling biblical perspectives on technological advancements and applications and interpreting the rapidly evolving technological landscape in light of biblical truths.

This rapidly advancing technological age, characterised by the ascension of AI, necessitates adaptability within the Christian community, taking these critical attributes into account. The church must understand its role in this transformative epoch and develop the requisite ethics guidelines to effectively engage with AI, including its potential as a technological singularity. This chapter aims to formulate a robust technological hermeneutic and ethics framework that enables the church to navigate this technological era effectively. Furthermore, it acknowledges the potential for AI to positively influence the church and further its calling to share the Gospel of Jesus Christ. The ensuing section elaborates on these strategies, facilitating a balanced biblical interpretation of technology's role within the Christian faith and fostering harmony between humanity, technology, and divine purpose.

4.2 Identifying optimal strategies for technological hermeneutics

Creating a nuanced hermeneutic for technology necessitates an integration of the five critical aspects mentioned above to shape a flexible theological framework that evolves with technological advancements and societal changes while remaining anchored in biblical foundations. This interpretive approach encourages an intricate understanding of technology, balancing its potential benefits with ethical implications. Inherent in this hermeneutic is the Pentecostal emphasis on the experiential understanding of the work of the Holy Spirit, recognising technology's influence on faith and human experiences. Ethical considerations are central, differentiating beneficial technologies that align with Christian values from those that risk encouraging injustice or deviating from Christian principles. A firm grounding in biblical teachings illuminates emerging technologies through the lens of biblical truths, providing context for rapid technological evolution.

The following proposed framework emerges from the foundation discussed for creating such a hermeneutic:

1. **Recognition of Need:** Recognise the necessity for an articulated Pentecostal hermeneutic for technology due to rapid technological advancements and their implications for society.
2. **Exploration of Biblical Teachings:** Explore biblical teachings to extract perspectives on technological advancements and their ethical implications.
3. **Reflection on Technological Advancements** Consider current and predicted technological advancements, especially AI, considering practical benefits and potential ethical implications.
4. **Integration of Pentecostal Experiences:** Integrate the experiential dimension of faith by examining how technology has and can affect these experiences.
5. **Formulation of Guidelines:** Formulate ethics guidelines and principles for engaging with technology based on biblical perspectives and the complexities of contemporary technological contexts.
6. **Continuous Evaluation and Adaptation:** Continually evaluate and adapt the hermeneutic in response to technological advancements, societal changes, and biblical revelation.

This section underscores the necessity (Point 1) of an innovative Pentecostal interpretation of technology: a Christian hermeneutic sensitive to the exponential surge in technology, particularly AI, and the potential ramifications for the Christian church and society. Such an analysis necessitates an intersection of theology and technology, viewing the latter through an articulated Pentecostal lens.

The fundamental tenet of this hermeneutic lies in exploring biblical teachings (Point 2). With abundant insights on ethics, the dignity and worth of individuals, creation stewardship, the pursuit of justice and love, human nature, and the human creative role on Earth, the Bible influences perception of and interaction with technological progress. This hermeneutic grounds our understanding of technology in biblical principles, offering a unique vantage point for evaluating the ethical concerns with respect to emerging technologies.

This interpretive lens also delves into the contemplative analysis of technological advancements (Point 3). It balances the utilitarian advantages of technologies, such as efficiency, convenience, and amplified capabilities, against potential ethical quandaries, such as privacy breaches, job displacement, and possible misuse.

The Pentecostal interpretation of technology includes the experiential aspect of faith (Point 4). Given Pentecostals' emphasis on personal, experiential knowledge of God and the work of the Holy Spirit, this hermeneutic assesses the influence of technology on these experiences, examining how technology might enhance or detract from faith.

The formulation of guidelines and principles (Point 5) provides ethical direction for technological engagement. Such guidelines distinguish between technologies that promote human welfare and align with Christian values versus those that may perpetuate injustice or diverge from Christian principles.

In conclusion, hermeneutics subscribes to ongoing evaluation and adaptation (Point 6). As technology and society evolve, the interpretation must also adjust. This cyclical process ensures the sustained relevance and accurate representation of the crossroads between technology and faith.

With the foundational principles of this articulated Pentecostal hermeneutic of technology established, a subsequent exploration of its detailed attributes ensues. This hermeneutic is characterised by a vibrant theological framework that merges a Spirit-inspired interpretation of Scripture, an experiential comprehension of faith, and a knowledgeable appreciation of the complexities, benefits, and potential ethical dilemmas of technology. It underscores the imperative for continuous evaluation and evolution in response to technological progress, social changes, and biblical revelation.

The first step is to examine hermeneutics from a Pentecostal viewpoint to create a clear Pentecostal interpretation of technology.

4.3 Hermeneutics from a Pentecostal perspective

Hermeneutics is the art or science of interpretation, especially of Scripture (Collins, 2022; Harper, 2001–2022). It is an intellectual quest to discover meaning (Nel, 2015b:2), the discipline that deals with the principles of interpretation (Kaiser Jr. & Silva, 2009:1).

Although the term hermeneutics mostly calls the interpretation of the biblical text to mind, Kaiser Jr. and Silva (2009:1) point out that we need principles of interpretation to understand conversations and even events. After all, we use hermeneutics to analyse life.

There is consensus that interpretation is influenced by the interpreter's preconceptions or presuppositions, which in turn are determined by prior understanding (Gadamer, 1965:278; Nel, 2015b:3). Lategan (2009:81) calls it the reader's "personal backpack" containing past experiences, preconceived ideas, personal prejudices, fears, expectations, and understanding of how the world operates. The interpreter must consciously know this "personal backpack" when interpreting. Therefore, the first guideline for interpretation is self-understanding.

From a Pentecostal perspective, this self-understanding includes the conviction that interpretation, especially the interpretation of the biblical text, is fruitless without the indwelling revelation of the Holy Spirit. According to Nel (2015b:4), this includes expecting the Holy Spirit to apply the biblical truth and God's promises to the interpreter's daily life. For Gadamer (2004:371), understanding always includes the act of application to the present situation of the interpreter.

The three main elements of Pentecostal hermeneutics, according to Nel (2015b:6), are: "The interrelationship between the *Holy Spirit* as the One animating *Scriptures* and empowering the *believing community* with the purpose that members be equipped for ministry and witness in culturally appropriate ways." For the first- and second-generation classical Pentecostals, the message about Jesus Christ appears more readily than the message about the Holy Spirit (Clark, 2013:54). Clark (2013:54) explains that Pentecostalism in the southern parts of Africa tends to emphasise the sovereignty of Jesus Christ as the King who heals, delivers, and redeems (Col. 1–2 and Acts 13 21) more than the importance of the Holy Spirit (Acts 1–8). However, he states that the Holy Spirit facilitates Jesus's dynamic witness. The second principle of Pentecostal hermeneutics rests on the belief that the Holy Spirit's guidance, revelation, and ultimate aim is on the work and testimony of Jesus Christ. This serves to minister to the world and prepare the community of believers to achieve their divinely ordained purpose. Nel (2015b:7) states that while Protestants emphasise *orthodoxy* (correctness in doctrine and

confession as derived from Scripture), Pentecostals stress *orthopraxy*[34] (correctness in conduct, both ethical and liturgical). For Pentecostals, God's Word and works are equally relevant today as they were for the Christians of the first century.

Stronstad (1992:8) proposes three cognitive and experiential elements of Pentecostal hermeneutics:

1. It will be experiential at the presuppositional and verification levels.
2. It will be rational, incorporating the historical-grammatical exegesis method while respecting the literary genre of the biblical text.
3. It will be driven by the Holy Spirit, recognising him as the illuminator and the inspirer of Scripture.

Nel (2015b:10) notes that Pentecostals incorporate scriptural stories, verses, and concepts into their interpretation of reality. Pentecostals understand that the use of pneumatic interpretation in their hermeneutics is, as Mather (1992:179) explains, holistic. It cannot be restricted to scriptural texts alone. Mather explains that the Holy Spirit works through and beyond the written text, seeking to reveal the scriptural truth effectively, ethically, and cognitively to transform the interpreter holistically into a relationship and knowledge of God as Father, Son, and Spirit.

Pentecostals understand the pneumatic encounter as transformative. This transformation brings the interpreter into a deeper and more intimate relationship with God and extends beyond interrelationships with the world around them (Mather, 1992:181). Due to the omnipresent and unlimited nature of the Holy Spirit, pneumatic interpretation and application extend beyond scriptural interpretation even to the depths of the most advanced technological development. Pentecostal hermeneutics thus seems to be a suitable *orthopractic* reference for developing a new technology hermeneutic because it

[34] *Orthopraxy* is also defined as the belief that the right action is as important as religious faith. The word originates from the Greek *orthos* correct + *praxis* deed or action (Collins, 2022).

will also have to integrate biblical text and Christian ethics with technological advancement, relevance, application, and the way humans will experience the future.

Although the Holy Spirit is all-powerful, omnipresent, and holistic, Mather (1992:182) notes a contradiction between the illumination of Scripture by the Holy Spirit and human intervention. While the Holy Spirit remains unchanged, humans change their interpretive approach to suit their predominant needs. Humans' ethical actions and choices will help or hinder the communication of the Spirit through Scripture. A new techno-hermeneutic will have to consider this paradox. Apart from understanding this paradox, Mather (1992:182) also mentions the importance of the dynamic mutual relationship between affect, ethics and cognition, where affect is understood as a descriptor of emotion and desire, ethics as the moral principles or values held by an individual or group that influences their behaviour, and cognition as the mental process by which knowledge, perception, intuition, and reasoning is acquitted. Mather (1992:182) states that all interpretation, whether pneumatic or not, involves affect, ethics and cognition. A new technology hermeneutic will have to recognise this.

Although cognition is essential to Pentecostal hermeneutics, it is not the most crucial aspect. Pentecostals recognise that the Holy Spirit works in ways that include but also go beyond the mind (Mather, 1992:183). This perspective places the heart (affect) at the centre of interpretation, leading to a change in ethics for the Pentecostal interpreter. When approaching Scripture, the Pentecostal interpreter understands that the Holy Spirit is as concerned with interpreting the interpreter as the Spirit is concerned with leading the interpreter into a "correct interpretation" of the biblical text (Mather, 1992:183). As the interpreter approaches Scripture, seeking the guidance and direction of the Holy Spirit in biblical interpretation, the Spirit also reaches through Scripture and interprets the interpreter (Mather, 1992:184). A vital truth to integrate into developing a new technological hermeneutic is that the Holy Spirit manifests truth cognitively, affectively and ethically in the interpreter's life and surrounding contexts. As we seek understanding through interpretation, the process also illuminates aspects of our lives that must be addressed.

An interpreter of Scripture, or an engineer developing innovative AI, does not have to recognise the work of the Holy Spirit for the Spirit to work. Pneumatic interpretation is not

limited to those within the Pentecostal or charismatic community either. Mather (1992:185) claims that around, and often directly within, the written words we read in Scripture, are the truths the Holy Spirit communicates to interpret God for us and to align our affections with God's affections. When affectivity is aligned, ethical action follows, and both correspond with cognition (Mather, 1992:186). This observation is a valuable statement because technological development follows the same pattern. When an engineer's affectivity aligns, ethical action follows (right or wrong), leading to cognition, planning, development, testing, and execution. Mather (1992:186) further notes that affective, ethical, and cognitive alignment or transformation is a continual process as the Holy Spirit draws the interpreter holistically into the knowledge of and relationship with God, the ultimate subject of the biblical text.

Human beings are a work in progress; although their transformation evolves, it never fully aligns. In technological advancement, especially AI development and transhumanism, there have always been alarming ethical clashes, cognitive deification, and the loss and decay of mutual affectivity.

Mather (1992:187) explains that the Holy Spirit always communicates within and through two interpretive contexts: "the framework surrounding Scripture in its original historical and cultural situation and the personal and contemporary situation(s) surrounding us as we engage with Scripture". When we seek the guidance of the Holy Spirit in constructing a new Christian hermeneutic for technology, we must be pneumatically "transported" into the biblical text and its surrounding historical framework and, through it, into the 4IR and its sophisticated AI advancement, our contemporary reality. Mather (1992:182) explains that the spiritual approach through Pentecostal hermeneutics does not always have to start with Scripture and then work back to our contemporary context. The Holy Spirit can also start with our personal and contemporary situations, in our case the world of advanced technological development and deployment, and lead us towards appropriate Scripture(s). Mather (1992:183) calls this pneumatic appropriation. He makes two fundamental statements: First, the communicative activity of the Holy Spirit surpasses our interpretive methodology, and second, contextual coherence can manifest itself in various ways. As a pastor, the researcher experiences pneumatic interpretation and pneumatic appropriation when he is drawn into a profound and ongoing affective, ethical, and cognitive encounter with God when preparing and delivering sermons and finding that

there is coherence between the delivered sermon and the praise and worship prepared by the worship team. Theologians like Gordon Fee, Daisy Wilkins and Lee Roy Martin had corresponding experiences (Mather, 1992:189–191). These experiences emphasise that pneumatic appropriate contextual coherence can be affective and cognitive.

From the above, it is clear that Christian scientists must seek the Holy Spirit's interpretation when developing a new technological hermeneutics and Christian ethics guidelines for AI. The ethics will then align with God as Father, Son, and Holy Spirit. Mather (1992:191) affirms that people are ethically most willing to alter their behaviour when they are affectively receptive to God. This claim should assist Christian scientists in searching for an appropriate and relevant biblical voice to address the ethical aspects of AI development in the 4IR and beyond. Christian AI developers should understand that although the Holy Spirit is all-powerful and personifies God's love, he is also vulnerable to obstruction through human rebellion, individual choice, and abuse of our God-given freedom. Sinful, immoral, and self-centred behaviour will obstruct the guidance of the Holy Spirit in the ethical development of technology, and this will hinder the process of pneumatic interpretation and lead to more destructive and invasive technological development. When human hearts do not align with God's will, destruction is inevitable. Pneumatic interpretation is only effective when done in humility, prayerfulness and with a deep desire to acquire scriptural knowledge and to be transformed by biblical teachings (Mather, 1992:192).

4.3.1 Evaluating an unarticulated Pentecostal hermeneutics as a potential foundation for a techno-hermeneutics

Nel (2023:125) notes that the early Pentecostals were more concerned with spiritual transformation than acquiring knowledge. The primary ministry requirement for them was the anointing and baptism in the Holy Spirit. This paradigm, accompanied by a lack of proper theological training, resulted in ill-equipped and uninformed Pentecostal pastors who developed a naïve approach to Bible reading. They also reject any idea that several factual mistakes and contradictions characterise the text. Unfortunately, many Pentecostals continue this anti-intellectual fundamentalism to this day. This approach to biblical interpretation paved the way for unarticulated Pentecostal hermeneutics, resulting in conflict with hermeneutical traditions that leave little to no room for the development of

a future-orientated techno-hermeneutic. In the unarticulated hermeneutical approach, most Pentecostal believers and leaders accept that all the words and texts in the Bible are equally important, that they should be interpreted literally, and that all parts should be given the same authority because they are inspired by the Holy Spirit (Nel, 2023:181). Gabaitse (2012:77) argues that this unarticulated hermeneutics is mainly found amongst untrained or less qualified Pentecostal pastors and church members. This phenomenon contrasts with the articulated Pentecostal hermeneutical approach, which is used to develop a hermeneutics for technology.

Although Pentecostals predominantly use a pneumatic lens when making moral decisions, solving interpersonal conflicts, and interpreting Scripture, their experience, described narratively through life-transforming testimonies, defines their epistemology (Nel, 2023:208–209). These experiences, according to Lee Chang-Soung (2016:71-96), are founded on what the Bible teaches. In other words, for Chang-Soung (2016:71–96), theology precedes experience for Pentecostals. Although theology has precedence over experience for Chang-Soung (2016:71–96), Nel (2023:129) disagrees and contends that Pentecostals “interpret the Bible in the light of their experience of the Holy Spirit’s presence and their past experiences”. This discrepancy is important because it indicates opposing directions for interpretation. For Chang-Soung (2016:71–96), the Pentecostal hermeneutics moves from theology to experience, while Nel (2023:129, 208) argues that for Pentecostals, interpretation moves from experience to theology.

In an effort to gain acceptance in evangelical circles, Pentecostals in the USA cooperated in establishing the National Association of Evangelicals (NAE) in 1942. According to Nel (2023:131), Pentecostals neglected their ethos and tradition by incorporating doctrines and practices like inerrancy and the mechanical inspiration of the Bible into their hermeneutical processes. Nel (2023:131) explains that Pentecostals began to uncritically embrace theological methods and perspectives that compromised their distinct spirituality and identity during this period. Unfortunately, their lack of theological shrewdness paved the way for uncritical acceptance, eventually compromising their ethos. Over time, Pentecostals started interpreting the Bible in a literalist, biblicist and fundamentalist way, just like their evangelical peers. Consequently, Pentecostals developed the described unarticulated Pentecostal hermeneutics (Nel, 2023:132).

The researcher agrees with Grey (2011:41) that although the historical-critical method of interpretation is essential to gain insight into the historical context of the biblical text, it is limited in its ability to fully reconstruct the knowledge of the past and thus less critical for this research. Nel (2023:137, 191) supports the idea that biblical truth and meaning reach far beyond what is only historically and objectively true. Although the researcher acknowledges the historical location, origins, social and economic context, the needs and expectations of the first listeners, the original intention of the author and subsequent truths, they are more interested in the text's relevance and the suitability of the text to appropriately address modern challenges, including technological challenges. Cargal (1993:177) states that although critical methods provide essential information about the background of the text and its intended readers, they cannot provide any meaningful contribution to defining the relevance and meaning of the text. The researcher discards the unarticulated biblicist, fundamentalist and literalist notions that any science that does not match biblical texts must be false and consequently rejected. Nel (2023:138) explains that biblicism rejects most attempts to reconstruct the original text in textual criticism. An unarticulated Pentecostal hermeneutical approach to biblical interpretation makes it impossible to take complicated questions about advanced AI technologies to the biblical text. For the writer, "truth" is more than literal truth. The researcher includes in his interpretation of the biblical text a reading strategy that emphasises the presentness of the reader and the historical position of the text, as Ellington (2001:245–264) proposes.

The unarticulated Pentecostal definition for interpretation includes statements like "faithful to Scriptures", "just read and believe it", "it is God's word", "God will deliver us from this world", "the rapture of the church is near", *et cetera*. Unarticulated Pentecostals seem to embrace the escapist theology described by Benek (2018:1–7). Benek (2018:2) argues that escapist theology, the idea that "humans need to get away from this mess we call earth and go 'home' to heaven", is based on biblical misconceptions. Among these Christians, statements such as: "Accept Jesus as your Lord and Saviour and reserve your place in Heaven" are heard (Benek, 2018:2). Unfortunately, this idea was popularised by the sayings of the well-known evangelist Billy Graham: "My home is in heaven. I'm [*sig*] just passing through this world." He is renowned for saying: "The Bible says that as long as we are here on Earth, we are strangers in a foreign land. There are enemies to be conquered before we return home. This world is not our home; our citizenship is in

heaven." (Benek, 2018:2) Jesus is an agent of change, reformation and redemption. Christians are called to be agents of change in this world, and they should not shy away from it. Benek (2018:3) believes that statements like these make the church spiritually impotent.

The problem with an escapist theology is that it exhibits an insufficient expression of humanity's future. Humans are called to participate in the redemptive work of Christ to help redeem and renew the world. In Matthew 6:10, Jesus says: "Your will be done, on earth as it is in heaven". Jesus shows that Christians are called to engage in the world rather than escape from it. Christians are called to open the gift of grace in the 4IR and beyond. Escapist theology corresponds to the ideas of well-known scientists and futurists like Stephen Hawking[35] and Elon Musk about the earth's future. Both of these men think that humans should flee the earth before they destroy themselves with their technological inventions (Benek, 2018:5). Benek (2018:6) states that when Christians fail to engage with the world and transform it for the better, the church fails to be Christ's church.

In interpreting new technology, the scholar recognises the significant impact of the biblical text's historical, societal, and economic backdrop and the initial audience's needs and expectations. Despite the absence of explicit references to technological advancements in the biblical text, Reinke (2022:14) states that technology can be seen as an enhancement of our inherent capabilities via novel methods, and such adaptions are indeed referred to in the Bible. As previously discussed, Reinke (2022:14) highlights examples such as Noah, who could not possibly have outswum a worldwide flood, so God provided the blueprint for a ship. Additionally, David and Goliath had disparate power capabilities, so David used a slingshot and a specific technique to gain an advantage over Goliath.

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[35] Hawking said that success in creating AI could be the biggest and even the last event in human history. "AI might reach the point where it outsmart financial markets, out-inventing human researchers, out-manipulating human leaders, and potentially subduing us with weapons we cannot even understand." (Hawking, 2015) Later, in an interview over Radio Times, published Tuesday, 19th January 2016 at 8:34am, Hawking argued that unstoppable developments in science and technology were likely to prove the biggest danger, adding that humanity may only be able to survive in colonies on other planets in the solar system. Hawking said: "However, we will not establish self-sustaining colonies in space for at least the next hundred years, so we have to be very careful in this period." (Knapton, 2016)

An unarticulated Pentecostal hermeneutic does not recognise the historical, social and economic context and read the Bible at face value (Archer as quoted by Nel, 2023:138), missing valuable information embedded in the text. This approach to biblical interpretation makes it impossible to see and understand the amplification of our native powers through new techniques engrained in ancient biblical texts. Fee (1976:121) states that Pentecostals (unarticulated) do not regard scientific exegesis as necessary; it must be believed as the Bible expresses it. Nel (2023:139) elaborates: “Your simple hermeneutic believes that everything in the Bible should be taken literally, except where the text clearly uses imagery and metaphors.” The consequence is that many Pentecostals today do not see any historical distance between themselves and the text (Nel, 2023:140, 213).

Undeniably, fundamentalism pervades all religious spheres, often rooted in the apprehension of being threatened by indefinable forces (Nel, 2023:141). This concept finds an intriguing parallel in the development of AI. Similar to religious fundamentalists, some engineers and scientists engaged in the race for self-aware AI seem to bypass the biblical guidelines for ethical AI development. Such neglect, potentially motivated by their unwavering dedication to pioneering AI advancements, could have detrimental consequences.

Should ethical considerations challenge their presuppositions, these individuals dismiss them outright. In particular, they often perceive their ethical principles as faultless, primarily because they are grounded in their familiar theories and core beliefs. Here, Nel (2023:141) suggests these individuals may have unwittingly subscribed to an unspoken techno-hermeneutic. Consequently, they may view themselves as morally infallible, caught in the trap of epistemic infallibility.

This disquieting analysis emphasises the critical need to address such a mindset within the AI development sector. While laudable, advances in this field should not be at the expense of ethical considerations. This concern draws attention to the broader conversation within the field, underscoring the importance of balancing technological progress with ethical awareness.

The unarticulated Pentecostal hermeneutic, characterised by anti-intellectual fundamentalism and literal biblical interpretation, presents notable obstacles to creating a novel hermeneutic for technology. Based on the Pentecostal tradition, this approach

places greater importance on spiritual transformation than knowledge acquisition. However, it can sometimes endorse theological methods without considering the potential conflicts with modern technology. Additionally, Pentecostals' experiential focus, which commonly interprets theology and Scripture about personal Holy Spirit experiences, may lack the necessary stability to address complex technological dilemmas. This complexity is augmented by the Pentecostal inclination towards an "escapist theology", typically avoiding engagement with terrestrial concerns, including technology. Furthermore, a disregard for the unarticulated hermeneutic of historical, social, and economic contexts in biblical interpretation hampers its ability to identify the enhancement of inherent human abilities through novel techniques, a fundamental concept in a technology hermeneutic. In conclusion, while the unarticulated Pentecostal hermeneutic may provide a comprehensive spiritual framework, it lacks the flexibility and adaptability required to interact effectively with technology's diverse and swiftly advancing sphere.

4.3.2 Evaluating the articulated Pentecostal hermeneutics as a potential foundation for techno-hermeneutics

Insights from how early Pentecostals interpreted Scripture helped Pentecostal academics from the 1970s and beyond reconstruct what is now known as articulated Pentecostal hermeneutics. With articulated Pentecostal hermeneutics, the emphasis of Bible interpretation is encounters with God by experiencing the power and manifestation of the Holy Spirit. Nel (2023:145) explains that early Pentecostals used their experience of God during charismatic events as a lens through which they interpreted what they read in Scripture. They viewed the Holy Spirit as the Spirit of Jesus Christ, who reminds them of the work and intentions of Jesus and empowers them to continue with his ministry on earth (Nel, 2023:145). When Pentecostals read the prophecies of the Old Testament, they do so through their experience with Jesus Christ, manifested through the Holy Spirit. For Pentecostals, Spirit baptism has become the lens through which Scripture is interpreted, Jesus is experienced, and the prophets are understood (Nel, 2023:190).

This study uses the same lens in his search to find applicable Scripture to address the ethical challenges of AI advancement in the 4IR. From an articulated Pentecostal point of view, the researcher will not confine the work of the Holy Spirit exclusively to Scripture or the church but will allow the Holy Spirit to transcend Scripture to the heart of AI

development and deployment in the 4IR and beyond. The researcher believes that the Holy Spirit will guide this research on AI technologies, even though the Bible never mentions technology directly. Martin (2013:6) points out that “early Pentecostals viewed the Bible as a single unified narrative of God’s redemptive plan, whose central message may be summarised in the fivefold Gospel”. Martin further explains that Pentecostals treasure the narrative quality of Scripture because it means that they become a part of the story. In other words, they no longer read the Bible from the outside; instead, they become part of the world of the Bible and allow the domain of the Bible to shape their current reality. Nel (2023:132) states that not only the worldview of early Pentecostals was altered by their interpretation of Scripture, but also their grammar, theological assertions, and lifestyles. This transformation is essential for two reasons: first because any story has a beginning, middle and end, and secondly, because they allowed Scripture to shape their worldview. AI has become part of humanity’s story and it is possibly the final chapter. Scripture can unquestionably change the outcome.

The researcher recognises the kerygmatic nature of Scripture and will allow the proclamation of applicable biblical texts to cast meaning and provide guidelines on the ethical challenges associated with AI development. The early Pentecostals expected and experienced an extrabiblical divine revelation, and Nel (2023:149) explains that that revelation extended their concept of theological truth. Extrabiblical divine revelation can also extend the church’s understanding and knowledge of complicated AI development and its ethical impact on humanity, its safety, security, health and future. The multifariousness of Scripture can appropriately extend to AI and the future of humanity. The author agrees with Nel (2023:150) that biblical text cannot be used univocally with everything in the Bible perceived as though it exists on the same level. The fact that the Bible evolved and developed over time and that there are differences in the perceptions of different authors must, according to Nel (2023:177), be taken into account with the development of an articulated Pentecostal hermeneutic for technology.

A crucial difference between the articulated Pentecostal hermeneutics and computer science must be noted. Although Pentecostals testify about their charismatic experiences and interpret the Bible through that lens, they must carefully approach computer science through the same lens. Nel (2023:150) states that Pentecostals do not concern themselves with defining theological prepositions. He further explains that Pentecostals

who have experienced the Holy Spirit find it difficult to accept truth as abstract cognitive absolutes while constructing their theology. Their experience with the Holy Spirit, corresponding to the biblical testimony of the first encounters with Pentecostals, affirms truth (Grey, 2011:148). However, these Pentecostals must acknowledge that computer science cannot be approached with the same lens.

Contrary to articulated Pentecostal hermeneutics, science deals with factual truth, knowledge, or cognisance (Oxford English Dictionary, 2022a). While Pentecostal hermeneutics primarily deals with biblical interpretation through pneumatical experience and corresponding biblical testimony, AI as a branch of computer science primarily deals with constructing and deploying intelligent agents like computer programs and their behaviour. Almost all AI development is mathematical or computational, and much of the literature is technique-orientated (Feldman, 2001:561). Feldman (2001:561) also mentions that AI as a branch of computer science significantly overlaps with cognitive science because it also deals with linguistics, philosophy, psychology, and subfields of other social and biological sciences. Where Pentecostal hermeneutics deals with knowledge of God through the Holy Spirit, cognitive science deals with understanding and modelling human intelligence.

In developing a new Pentecostal hermeneutic for technology, the researcher will carefully analyse Scripture, taking Nel's warning that God's voice should never be silenced in exchange for the biblical author's voice into account, a mistake often associated with unarticulated Pentecostal hermeneuticists and modernist believers (Nel, 2023:213). Nel (2023:139) advises that this could remove the "surprise" element from the biblical interpretation, leaving the reader with nothing but literal and fundamental principles to work with. It is therefore essential to read the Bible as a narrative that becomes the divinely inspired word that can transform even the most sophisticated AI developments. The researcher believes and expects that the Holy Spirit will provide insights and even contribute to the guidelines related to ethical AI development. Although Nel advises not to exchange God's voice for the author's voice, that does not mean that the biblical author does not contribute to the message the Spirit wants to impart to the reader. It is essential to leave room for the author's perspective, their historical context and even the intended first audience (Nel, 2023:206). The author's contribution will not dilute the message but only enrich its meaning for today. The researcher acknowledges and agrees with Fee that

the historical and social context can codetermine the meaning of a passage (Fee, 1976:118–132).

Although this research mainly focuses on AI technology and its effect on the future of humanity in the 4IR and beyond, the researcher rejects the dispensational idea that the church will be ripped away from the earth in the so-called “secret rapture” mentioned in 1 Thessalonians 4:17 to escape the eschatological events that might include the so-called technological singularity. The researcher supports Nel’s claim that dispensationalism’s agenda and schedule fall outside the Bible’s limits (Nel, 2023:153). Nel (2023:154) points out that the church is now the eschatological people and that we are already in the end times. He rejects the notion that God has two parallel objectives, one for the church and one for the Jews. He mentions that the promise of Abraham was fulfilled in Jesus Christ, which means that a new “Israel” was formed, including believers of all nations, races and times, including Jews, and this research supports this notion.

When exploring Scripture for guidelines associated with AI technologies, the researcher acknowledges the millennia and centuries that divide this research from the world of the original biblical authors. Even though speculations of AGI and the possibility of a technological singularity threaten the existence of humanity, the researcher will read biblical prophecies with the knowledge that many of the symbols and analogies used by the original authors are incomprehensible simply because the original authors did not provide their readers with their meaning (Nel, 2023:173).

McNally *et al.* (1993:137–161) suggest that Pentecostals read their community while interpreting Scripture. In conjunction with understanding the community, Byrd (1993:203–212) notes that this activity also includes comprehension of themselves through their interpretation of Scripture. In other words, Pentecostals make sense of the biblical text by analysing their own experiences from their contexts and relating them to the testimony of the original biblical authors. They acknowledge that there is no objective, neutral, or innocent place where they can observe Scripture, as Nel (2023:155) puts it. This experience is significant for a new techno-hermeneutic because of the unprecedented impact of AI on humanity and how people will experience an AI-centred context in the twenty-first century. However, the challenge for a new techno-hermeneutic will be to find related testimony in the biblical text. Nel (2023:199) concludes, “Pentecostal

hermeneutics does not vest its authority in the Bible, but in the Spirit working in the Bible to reveal God's word applicable to the life of an individual or group". This approach implies that the Holy Spirit can bring revelation by other means and that he is not restricted to the biblical text per se. This idea also allows the researcher to explore non-Christian, extrabiblical, scientific and technical sources while prayerfully expecting and leaning on the guidance and revelation of the Holy Spirit. All truth is God's truth, no matter the source. But the Bible must always remain the objective standard, measure and criteria for the truth (Nel, 2023:171).

It is evident from the above that the Pentecostal hermeneutics comprises the Holy Spirit, the Bible, the immediacy of revelation, and the faith community (Nel, 2023:163). As mentioned, the book of Acts illustrates how the early Pentecostals approached Scripture, starting with their experience with the Holy Spirit and then moving to the biblical text to find answers to challenging issues. Nel (2023:179) notes that the direction of interpretation changed in the later church. AI development raises challenging issues, and starting at the biblical text and moving to the issues at hand will provide no answers because the Bible says nothing about AI technology. Identifying the ethical challenges associated with AI development in the twenty-first century and then submitting those to biblical scrutiny could provide the researcher with usable guidelines. Thomas (1994:49) suggests that any hermeneutical model, which could include a hermeneutics for technology, must take the significant role of the community into account but should do so by simultaneously acknowledging the leadership and discerning role of the Holy Spirit. The researcher expects the Holy Spirit to extend his critical and analytical abilities and lead this research to the biblical text, helping to formulate relevant AI guidelines for the church. Acts 15 demonstrates that the authority of the biblical text was directly related to its relevance to the community in the context of the guidance of the Holy Spirit (Nel, 2023:180). Nothing could be more relevant for the church in the twenty-first century than a better understanding of the effect of AI development on humanity and its future.

Experience must be evaluated against the following biblical guardrails before it can be presented as initiated by the Holy Spirit:

1. It must testify to the work of the Holy Spirit according to the Scripture and pass the test of spiritual discernment by the body of Christ.

2. It cannot contradict God's Word as revealed through Scripture through the illumination of the Holy Spirit.

3. It must correspond to the testimonies of the first Pentecostals as illustrated by the church of Acts.

4. It must reflect the character and attitude of Jesus Christ as revealed in the gospels.

5. It must contribute to the advancement and confirmation of the Kingdom of God according to Scripture.

6. It cannot deviate from the biblical story of redemption.

The adoption of articulated Pentecostal hermeneutics as a means to navigate the ethical challenges presented by advances in AI is a proposition that carries considerable weight. This approach, which emphasises experiential encounters with God guided by the Holy Spirit, offers a path for intuitively exploring the uncharted territories of AI. The Pentecostal tradition's inclination to seek extra-biblical divine revelation can broaden the church's comprehension of intricate AI developments and their wide-ranging societal and individual impacts. Furthermore, the narrative-centric nature of Pentecostal interpretation enables believers to incorporate AI into the ongoing human narrative, facilitating a transformative engagement with this technology.

However, it is essential to acknowledge the distinction between the spiritual and cognitive absolutes of Pentecostal hermeneutics and the empirical nature of AI. While Pentecostal hermeneutics relies on the guidance of the Holy Spirit to navigate the ethical complexities posed by AI, it is crucial to ensure that this exploration of technological frontiers remains firmly grounded in the biblical narrative. This integration allows for a critical position while simultaneously drawing on the wisdom and discernment provided by the Holy Spirit.

In the face of the emerging challenges that come with AI, the community-focused aspect of Pentecostal hermeneutics assumes great significance. The ability to interpret and evaluate the social effects of AI within a communal framework helps hermeneuticists comprehend its broader impact on individuals and communities. Therefore, the flexible nature of articulated Pentecostal hermeneutics, its openness to divine revelation, and its

alignment with community experiences equip it to establish a robust, contextually relevant, and spiritually guided ethics framework for developing and deploying AI.

The urgency of addressing the ethical and application dimensions of AI is widely recognised in both academic and industrial circles. Scholars such as McBride (2022), Oviedo (2022), Shuman (2012) and Smeltzer (2022) have emphasised the need for religious perspectives to inform the ethical discussions surrounding AI, underscoring the value of religious frameworks in guiding our approach to these emerging technologies. Nel's (2023) work on Pentecostal hermeneutics provides valuable insights into the potential contributions of the Pentecostal tradition in shaping ethics frameworks for AI.

In conclusion, the adoption of articulated Pentecostal hermeneutics offers a suitable and essential approach to tackling the ethical challenges posed by the progress and application of AI. By emphasising experiential encounters with God, incorporating extrabiblical divine revelation, and integrating AI into the ongoing human narrative, this framework allows believers to navigate the unexplored realms of AI with wisdom and discernment. Furthermore, the community-focused aspect of Pentecostal hermeneutics aids in interpreting the societal effects of AI and ensures that ethical discussions remain anchored in the biblical narrative. As AI presents new challenges, the flexible and spiritually guided nature of articulated Pentecostal hermeneutics equips us to develop a robust ethics framework that is contextually relevant and informed by scriptural wisdom and the guidance of the Holy Spirit.

4.3.3 Employing articulated Pentecostal hermeneutics as a framework for understanding artificial intelligence

Articulated Pentecostal hermeneutics incorporates an experience-based perspective, emphasising encounters with God through the power and manifestation of the Holy Spirit. This interpretive approach views the Bible as a unified narrative of God's redemptive plan (the fivefold Gospel) and uses Spirit baptism as a primary interpretive lens (Nel, 2021:1–7; 2023:213). This lens allows Scripture to be interpreted, allows for experiences of Jesus, and provides an understanding of the prophets. Importantly, this hermeneutics acknowledges the influence of extrabiblical divine revelation and the necessity to consider the evolution of the Bible and differences in authors' perceptions (Nel, 2023:212). It also

recognises the importance of the experiences and contexts of the faith community in scriptural interpretation.

Engaging with a somewhat unconventional concept, we propose the exploration of AI technology through the lenses of biblical scriptures. Our approach is predicated on a certain openness to divine influence in interpretation, with the hypothesis that, even in the absence of explicit mentions of AI in the Bible, its innate principles and ethics guidelines may hold relevance for the realm of AI.

It is suggested, based on the work of scholars like Nel (2015b:1–21; 2021:1–7; 2023:161) and Darby (2022:19, 82), that an interpretative lens, perhaps informed by experiences akin to spiritual baptism, could be employed to discern the underlying principles associated with modern technologies. As a research community, we are reminded of the rich tapestry of perspectives the Bible includes and the potential for varied viewpoints on AI development and deployment among these perspectives.

Reflecting on historical examples, such as earlier Pentecostal experiences of divine revelations augmenting their theological comprehension, seeking divine direction to steer through the intricate labyrinth of AI might prove beneficial. However, it is paramount to note that these revelations should not be taken as definitive truths but as hypotheses to be analysed and understood in context. Additionally, examining and analysing personal and communal experiences with AI technologies and their alignment with biblical texts may provide a more comprehensive understanding.

However, these reflections must be subjected to the same rigorous analytical processes as any other source of information. By comparing our lived experiences and empirical data with the interpretations derived from the Bible through the proposed lens, we can generate a multifaceted view of AI and its ethical complexities.

It is thus imperative to tread carefully in this intriguing cross-disciplinary endeavour, respecting both the diversity of biblical interpretations and the rapid evolution of AI technology. This study calls on both the theological and AI research communities to engage in a collaborative and critical dialogue to bridge the gap between these areas of study.

4.3.4 Interpreting the articulated hermeneutics through a technological lens

The intricate interplay between technoscience and hermeneutics is a compelling subject in contemporary discourse. Zovko (2020b:2) propounds that technoscience embodies a hermeneutic structure, mainly due to its application of research to practice and consequent examination of its relevance for the lived world. The notion of developing a techno-hermeneutic is further explored by suggesting a shift in focus from exploring the meaning of a text to addressing the practical questions of existence and the influence of AI development and deployment on these questions.

As Heidegger (1977:92) elucidates, it is critical to understand that the scope of hermeneutics extends beyond textual understanding. This assertion supports Hongladarom's (2020:2) perspective, which agrees with the potential expansion of hermeneutics into the material world. This extended interpretation, therefore, can offer significant insights into our interaction with the environment, as Zovko (2020b:3) points out, including our handling of material things.

This blending of hermeneutical elements into scientific activities reciprocally demands attention (Hongladarom, 2020:2). This multifaceted understanding of hermeneutics deepens the appreciation of the subject, encouraging further exploration and debate within the academic community. This synthesis of views thus makes a noteworthy addition to the ongoing discussion surrounding the development of a biblical hermeneutic for technology.

Zovko (2020b:5) warns that modern bioengineering and technology confront humanity with complicated moral challenges and that we can no longer trust our emotions alone. The situation requires a techno-hermeneutic that can assist the church in making ethical decisions and recommendations when approaching complex technologies in the 4IR and beyond. A new techno-hermeneutic becomes even more essential with the rising concerns in the development of biotechnology. Zovko (2020b:6) elaborates on Heidegger's concern that biotechnology will eventually cross the impermissible boundary where technology will develop to the point where human beings can purely be constructed how they are needed. With the exponential speed at which technological development is happening, human beings risk "over-extending" themselves by miscalculating their position as if they were the Creator.

Whether the church can deal with these possible dangers or even recognise them remains unknown, and it is impossible to calculate the repercussions of complex technological developments crossing the line. The church must understand that unethical technological developments could lead humankind into an irreversible self-destructive spiral. Imagine the idea that human beings, like any other technological artefact, can be produced according to a particular plan or the customer's wishes (Zovko, 2020b:6). Zovko (2020b:6) states:

> *The idea to engineer the human genome for the purpose of improving or enhancing Homo sapiens has already opened the intense discussion about transhumanism. We are not yet aware of all the consequences of this paradigm shift from humanism to transhumanism. Transhumanism could be the greatest danger to modern and future society.*

Considering all the possible dangers of advanced technological and scientific development in the 4IR, it is plausible to investigate the possibility of a techno-hermeneutics to equip the church. Zovko (2020b:11) suggests that such a techno-hermeneutic should include a complex understanding and judgement of the disruptions caused by these developments and ways to cope with application issues. In this regard, a biblical hermeneutics cannot be restricted to text interpretation alone but should also explore humanity in the context of this technological era. The church should deal critically with technoscientific development in the 4IR because the threats accompanying such advancement are real.

4.3.5 Merging biblical and technological interpretations: Affronting techno-hermeneutics

The mingling of distinct elements across academic disciplines causes Hongladarom (2020:3) and Ihde (2005; 2020:5–19) to question the validity of their traditional separation, a concept Ihde terms "bifurcation". This questioning gives rise to the principle of "material hermeneutics", where the interpretive process of hermeneutics becomes an integral component of scientific pursuits. In this view, the focus of the analysis extends beyond mere texts to encompass nature itself. The tools for this exploration are not limited to the human eye interpreting text but include various technological devices, such as telescopes

and microscopes. Thus, Ihde presents a compelling argument for the convergence of interpretative approaches in the humanities and the sciences as he talks about letting things themselves speak, i.e., “a technique whereby things—materialities—are given a voice” (Ihde, 2005:341–350). In other words, “letting the things speak” means letting the physical evidence tell us their own stories.

An example is how scientists can look at the rings inside a tree trunk to tell how many years it has been growing or how they can study rock layers to find out when different events occurred in the earth’s history. These are examples of “dating techniques” that we can use to learn more about the past. Humans have gotten even better at these techniques and can now discover things they did not know before. This research will attempt to use the same techniques to source meaning in science and the humanities. Scholars frequently use biblical narratives to try to understand archaeology, or ancient objects and buildings found by archaeological excavations. However, as Ihde (2005:341) suggests, we can also do it the other way around: we can use archaeology to understand the stories better. Maybe we can analyse AI advancements to understand biblical prophecies better.

One may consider the influence an artefact (like a computer) can have on human understanding or various aspects of life. The artefact contributes to the lived experiences of a community as individuals interact with each other in daily life. Given that knowledge consistently holds significant importance in daily life, the role of artefacts (like AI) in shaping such knowledge cannot be understated. In our everyday lives, technology plays a vital role in what we do, and it gains new meaning for us as we use it.

Finkelstein and Neil (2001), as well as Ihde (2005:341–350) found that the stories in the Bible may not precisely match what archaeologists see in archaeology. However, they suggest that the stories may not just be trying to describe what happened in the past. Instead, the stories might be a way for people to understand themselves and their identities. Ihde (2005:341) is of the opinion that stories “produce the ‘people’ rather than the other way around”. In other words, “Instead of using stories to understand old objects and places, let us use the objects and places to understand the stories better. And by doing this, we might learn that the stories are not just about what happened long ago, but also about how people see themselves today”. By applying this technique to our research,

we might discover new insights about humans and their part in the biblical narrative. What will it say about humans and their future? What will it say about the apocalyptic texts in the Bible?

Christians engage in advanced technologies such as AI within the interpretative framework established by their faith tradition. Their experiences with AI and complex technologies are moulded by their relationship with God as articulated in their unique biblical understanding and experience of the Holy Spirit. To them, all knowledge, including technological advances, can be considered part of God's revelation to humanity. They view technology as a tool to understand better and steward the world God created (Radner, 2020:81). In this context, technology and AI can become instruments of service and ministry, ways to facilitate communication or tools for spreading the Gospel more effectively.

On the other hand, their experiences with technology can also inform their understanding of the Bible and the Holy Spirit. Technology, especially AI, raises profound questions about what it means to be human, have agency, and make ethical decisions, which can drive Christians back to Scripture and their faith for answers. Their interaction with AI might illuminate aspects of their theology in new ways, such as our understanding of free will, divine sovereignty, or the image of God in humanity.

However, the guiding principle remains the interpretation and application of biblical narratives facilitated by the Holy Spirit. Divine narratives, interpreted through the lens of articulated Pentecostal hermeneutics, serve as the benchmark against which all technological experiences are measured and understood. This iterative process of interpretation, application, and experience, driven by the Holy Spirit, ensures that their engagement with technology remains grounded in their fundamental faith commitments.

4.4 Articulated versus a generative Pentecostal techno-hermeneutics

In his work, Nel (2019:6; 2023:127) characterises Pentecostal spirituality as experimental, biblically revelatory, holistic and missionally pragmatic. Gerlach (1975:672), on the other hand, argues that Pentecostalism is more of a catalyst for change than a response to it. Further reinforcing this perspective, Archer (2015:36) asserts that Pentecostalism is not a movement standing against change but sparking significant transformation. Like

Pentecostalism, AI is not a response to changes in human creativity but rather the catalyst for disruptive modifications. AI's "experimental" nature can be seen in the continuous exploration and development of its capabilities, from natural language processing to advanced predictive algorithms. It is "biblically revelatory" in that it continually unveils new insights and understanding about data, technology, and the potential of machine learning—akin to how Pentecostalism seeks revelation through the Bible. The "holistic" aspect of AI refers to its application across various sectors and industries, transforming operations on a global scale. Lastly, the missionally pragmatic facet of AI is represented in its practical real-world applications and the solutions it offers to complex problems. AI, like Pentecostalism, is seen as a driving force behind substantial transformation across many sectors and aspects of human life, instigating revolutionary changes rather than merely reacting to them.

4.5 Exploring the term "articulated" in the context of technology hermeneutics

Archer (2007:12–14) argues that Pentecostal theology must be grounded pneumatologically and organised around the fivefold Gospel to articulate a mature Pentecostal theology. Nel (2021:4) describes the distinctive elements and challenges of a Pentecostal hermeneutics of experience, which relies on the Spirit's revelation in the reading process and which may lead to individualist and subjectivist interpretations of texts. Archer (2013:131–148) identifies the essence of Pentecostalism as the belief in an encounter with the supernatural in Christian life and emphasises the role of the Holy Spirit in Pentecostal hermeneutics. Nel (2015b:1–7) proposes that the religious consciousness of Pentecostals anticipates an experience or encounter between God and humans, facilitated by His Spirit, which leads to a Pentecostal emphasis on narratives describing such encounters in the Bible. In his book, *An African Pentecostal Hermeneutic: A Distinctive Contribution to Hermeneutics*, Nel (2018a:238) explains that although the Holy Spirit may have more to say than what is stated in the Bible, it will always be scripturally based and determined by the spirit of biblical injunctions.

In the specified context, "articulated" denotes the clear, detailed, and comprehensive expression or statement of a concept. Specifically within theological discourse and in reference to Pentecostalism, articulation encompasses constructing an understanding that is both mature and well-grounded. This understanding takes root in the unique

elements, challenges, and experiential nuances of the Pentecostal tradition. Key to this articulation is the systematic organisation of beliefs around fundamental tenets such as the fivefold Gospel, with reliance on the Spirit's revelation during the interpretative process. Even in the face of potential individualist or subjectivist interpretations, this articulation remains tethered to scriptural foundations, respecting the ethos of biblical injunctions. It anticipates an experiential encounter between God and human beings through the Spirit. This anticipation is pivotal, enhancing the clarity and depth of the narratives that detail such divine encounters in the Bible.

The benefits of adopting such a method for a hermeneutic of technology may include a nuanced and all-encompassing grasp of AI and its implications. This articulated understanding of AI's potential and limitations encourages enlightened decisions about its ethical uses or unethical abuses, specifically within the faith community. Much like theological articulation serves as a bedrock for the ethical and spiritual integrity of a Pentecostal hermeneutics, this approach could inspire the development of sturdy ethics guidelines for developing and deploying disruptive technologies like AI.

On the flip side, this strategy has its shortcomings. Given the relentless pace of innovations in AI, maintaining a fixed, articulated understanding poses a significant challenge. The broad spectrum of AI applications further complicates efforts to articulate a cohesive interpretation, given that sectors such as healthcare and finance may require different considerations when deploying AI. Lastly, this approach, though it emphasises a theoretical understanding of AI's principles and capacities, may fall short in addressing the pragmatic challenges inherent in AI's implementation and regulation.

In closing, it is worth noting that while "articulated" offers significant insight into constructing a technology hermeneutic, the term "generative" might introduce a fresh perspective. As AI technology continually evolves and develops, a "generative" approach allows for a more dynamic, flexible understanding that grows and adapts with the technology and perhaps offers a more suitable framework for developing a comprehensive techno-hermeneutic.

4.6 Exploring the term “generative” in the context of a techno-hermeneutics

Generative AI, like ChatGPT-4, Midjourney, DALL-E, Stable Diffusion, Google BARD and others, is a type of machine learning, specifically unsupervised and semi-supervised, that creates or generates something from scratch based on some example or input (AltexSoft, 2023). For instance, generative AI can be used to form sentences, images, and music or to create question-and-answer pairs that are essentially indistinguishable from human-generated ones (Fleming *et al.*, 2023:1). The process of generative AI involves using algorithms that can learn and generate new data by identifying patterns from data examples (AltexSoft, 2023). AltexSoft (2023) explains that this technology can mimic any data distribution, implying that it can be trained to generate environments strikingly similar to our own across various domains. For example, a generative algorithm will process a model without discarding any information. The potential of using generative models is unlimited (AltexSoft, 2023). Some examples include, but are not limited to:

- **Image generation** – creating photorealistic images of people who do not exist (Karras *et al.*, 2018:1–26).
- **Image-to-image translation** – transforms one type of image into another (Chen *et al.*, 2020:1–16).
- **Text-to-speech** – to produce synthesised speech from text input.
- **Audio generation** – transform people’s voices or alter the style or genre of a musical piece, conduct audio analysis, and generate “dynamic” soundtracks that adapt based on user interaction (Gurman, 2022).
- **Video generation** – to predict the appearance of the next frame in the sequence and produce it (Nvidiagamedev, 2018).
- **Image and video resolution enhancement** – to generate a higher-resolution version of an image by identifying each pixel and then producing a more detailed version (AltexSoft, 2023).
- **Synthetic data generation** can help develop self-driving cars, as they can use generated virtual-world training datasets for pedestrian detection (AltexSoft, 2023).

Regardless of the technological domain, there is the potential for both beneficial and harmful uses. Generative AI is no exception to this rule; for example, pseudo-images and

deep fakes initially emerged as tools for entertainment. However, the technology quickly developed a negative reputation. With public access to software such as FakeApp, Reface, and DeepFaceLab, deep fakes have been used for amusement and malicious intent (AltexSoft, 2023).

A case in point occurred in March 2022, when a deep fake video featuring Ukrainian President Volodymyr Zelenskyy purportedly urging his people to surrender, was broadcast on hacked Ukrainian news outlets. Despite the video's fraudulent nature being detectable to the naked eye, it proliferated on social media, leading to substantial manipulation (Allyn, 2023). Second, it is challenging to regulate. This statement does not imply an imminent revolt by machines against humankind, leading to global devastation. In truth, humans demonstrate ample proficiency in destroying by themselves. However, the self-learning capacity inherent to generative AI renders its behaviour somewhat unpredictable and difficult to manage (AltexSoft, 2023).

In the quest for a robust and adaptive hermeneutic for technology, the concept of "generative" offers a promising avenue for exploration, particularly within the Pentecostal tradition. A generative Pentecostal hermeneutic for technology could work similarly in parallel to generative AI, which can innovate from a given example or input. By identifying patterns and lessons from Scripture, tradition, and experience, it could creatively apply these insights to new technological phenomena. It can potentially mimic any "data distribution" by providing applicable ethical and theological insights across various tech domains, from AI to biotech, mirroring its striking adaptability.

Furthermore, just as generative AI seeks to process a model without discarding any information, a generative Pentecostal hermeneutic for technology could strive to fully integrate all hermeneutical resources without overlooking or neglecting any aspect. Finally, the boundless potential of generative model use in AI mirrors the limitless potential of a generative Pentecostal hermeneutic for technology. Such an approach could generate an ongoing dynamic dialogue between theology and technology, always ready to respond creatively and faithfully to the newest developments.

In summary, a generative Pentecostal hermeneutic for technology is a compelling prospect, with the capacity to continually adapt and respond to the ever-evolving technological landscape while remaining firmly rooted in the Pentecostal tradition. A

generative Pentecostal techno-hermeneutics could suggest a specific field or discipline that applies hermeneutic principles (interpretation theories) to technology. It may imply that technology is the metaphorical “text” being interpreted or understood in various facets, including its design, use and societal impact.

The term “generative Pentecostal techno-hermeneutics” thus combines elements of theology, technology, and hermeneutics, and in this regard, “generative” refers to the concept of creation, production, or generation of new ideas, outputs, or results. In this context, it could suggest an approach that continuously generates new interpretations or perspectives. So, “generative Pentecostal techno-hermeneutics” would refer to an ongoing, creative process of interpreting or understanding technology from a Pentecostal theological perspective. This process could involve constantly evolving perspectives on how technology interacts with the Christian community, experiences, and values.

4.7 Generative Pentecostal techneutics: A creative exploration

This research introduces “techneutics”, an innovative portmanteau amalgamating “technology” and “hermeneutics”. This newly coined term synthesises the theoretical and methodological interpretation and implications of technology. It offers a novel lens for analysing the complex interplay between technological developments and theological discourse. Therefore, “techneutics” encapsulates the evolving field of hermeneutics, signifying a critical junction between technological innovation and interpretive methodologies.

Hongladarom (2020:1–7) introduced the term “machine hermeneutics”, which he then compared and supplemented with “material hermeneutics”, a term coined by Don Ihde (2020:7) in the 1960s. Hongladarom explains that “material hermeneutics” is where people use technological tools or equipment (like a microscope or telescope) to look at the world around them and interpret what they see. Human beings are still in charge of making the final decision on what everything means. “Machine hermeneutics” is more complex and adds an extra layer between humans and their interpretation of the world (Hongladarom, 2020:1). Here, machines with AI do the first round of interpretation or understanding. The AI algorithm acts like a super-smart, automated helper that looks at things first, and then gives its analysis. After that, people look at the machine’s interpretation with their tools (like glasses or other aids) to understand what the machine

has figured out. In simple terms, imagine watching a foreign film with subtitles. In “material hermeneutics”, subtitles (a tool) are used to understand the film. However, in “machine hermeneutics”, it is like an AI first watches the film, understands it, and then tells the human what is happening, then the human uses the AI’s explanation (instead of the original subtitles) to understand the film.

Machines are now capable of performing interpretive tasks, using AI algorithms based on machine learning technology that used to be the exclusive domain of humans. With facial recognition algorithms, for example, machines are now routinely performing what must be regarded as hermeneutical analyses with astounding accuracy and power. In what sense can the algorithm be said to perform the right action, that is, one such that the process comes up with the right picture of the world? How can this process be trusted? How can humans know that the machine and its AI algorithms are doing the right thing and giving the correct view of the world? Hongladarom (2020:1) believes it is not just about good technology. It is also about being ethical and responsible with that technology. He believes that the technical and ethical sides cannot be separated, and this research supports this notion.

Drawing on the concept of “material hermeneutics” put forth by Ihde (2005, 2020) and “machine hermeneutics” suggested by Hongladarom (2020), the researcher proposes the innovative framework of generative Pentecostal techneutics (GPTh). This framework employs a compelling illustration in which the initial input is carefully assessed based on specified criteria to establish its suitability for deeper interpretation.

Once the input has passed this rigorous evaluation phase, it is subjected to a detailed analysis within the confines of clearly defined Pentecostal parameters. Following this assessment, the resulting output is further refined according to criteria conducive to a generative interpretation.

Consequently, a carefully crafted interpretation output emerges from this meticulous process, enriching our understanding and offering new insights for consideration. This process is the crux of the proposed GPTh, offering a comprehensive pathway from initial evaluation to final interpretation output.

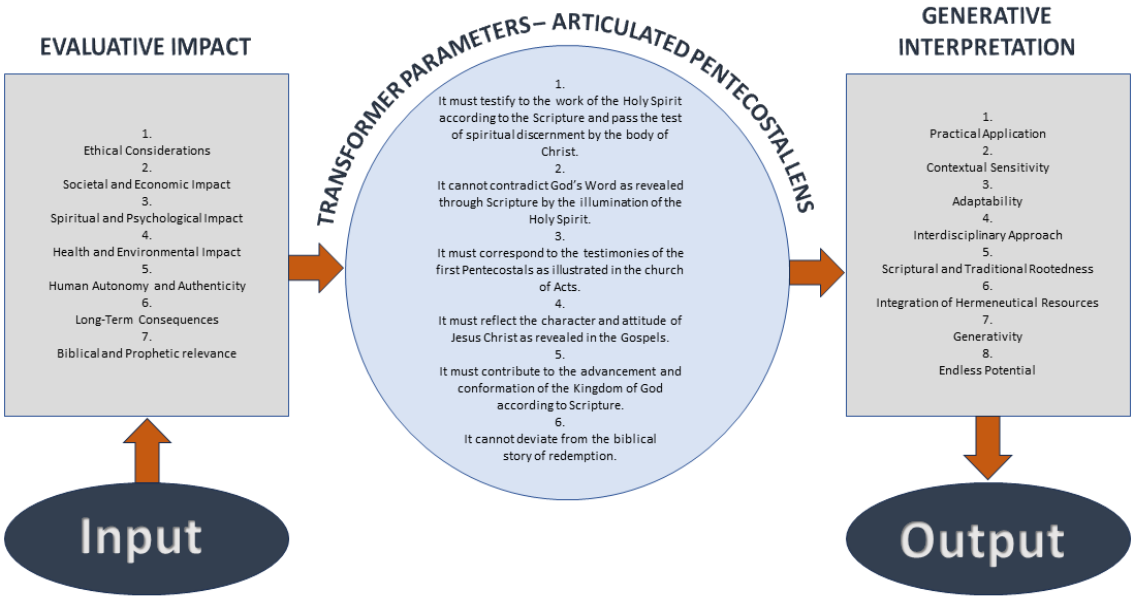

Figure 3-1: An illustration of generative Pentecostal techneutics

Input

The input can be manifold, implying interpretations that range from the biblical text to technological progress and application and, reciprocally, from technological advancement and implementation to the biblical text.

Evaluative impact

A comprehensive evaluation of AI technology requires an all-encompassing approach. The foundations of this evaluation lie in ethical, moral and legal considerations, including accountability, transparency, data collection, usage, and legal conformity. Concurrently, the evaluation requires scrutiny of societal and economic impacts, considering potential job market fluctuations, social interactions, and inequalities. Furthermore, it is essential to consider the personal and health effects of AI technology, such as its effects on public health, well-being, mental health, and human autonomy in decision-making and the authenticity of those decisions (Brey, 2012:10). This assessment requires an examination of accessibility, fairness, and security, addressing the widespread accessibility of AI

technology, its equitable use, and potential security risks. The environmental impacts and long-term consequences of AI technology, including energy consumption, privacy implications, and potential risks posed by advanced AI systems, are equally important. Lastly, the evaluation must consider educational implications, such as emerging skills requirements and the spiritual effect of AI technology on religious practices and experiences. All of these aspects contribute to an exhaustive evaluation of the extensive impact of AI technology on our world.

The transformer parameters

The “transformer” model was introduced in a paper called *Attention is All You Need* by Vaswani *et al.* (2017:1). In the context of large language models (LLMs), an over-exemplified explanation of a “transformer” is that it is like the brain of the model. It helps the model understand and generate human language. Imagine reading a sentence. The human brain does not just understand each word individually but also the whole sentence based on how the words relate. If a single word changes, the sentence’s meaning can change too. The transformer does something similar: It looks at all the words in a sentence or paragraph at once and understands how they relate to each other. This ability allows the transformer to generate responses that make sense and sound natural because it is not just considering each word but how they all fit together. So, when a person asks a question or makes a statement, the transformer helps the language model understand what is being said and generates an appropriate response.

Now, let us apply this to the proposed GPTh. Imagine the Bible as a long, complex sentence; each word represents a different element, such as a verse, character, event, or moral teaching. Like the AI transformer model, a generative Pentecostal interpretation approach would not isolate these components. However, it would seek to perceive their interconnectedness within the broader biblical narrative of redemption under the guidance of the Holy Spirit.

This integrated view becomes crucial when reflecting on technology from a Pentecostal perspective. Technology should not be seen as an isolated entity. Instead, its role and impact must be interpreted in the broader biblical narrative of redemption, particularly concerning the Pentecostal emphasis on individual transformation, Spirit-led ethical conduct, and communal responsibility. Just like the transformer model generates

responses that make sense in a conversation, a GPTh should help the church understand and respond to technological development and deployment in a way that aligns with the principles and values of the biblical telos.

Therefore, adopting a “transformer-like” model within a generative Pentecostal framework can facilitate a more holistic understanding of technology and its associating complexities, aligning it with the dynamic, Spirit-led interpretation of the Bible that characterises Pentecostal theology and not only focuses on individual verses or narratives.

Generative interpretation

In the context of the suggested GPTh, the approach of generative interpretation can offer a dynamic and evolving perspective. This generative interpretation might involve interpreting biblical texts in light of current technological advances or vice versa, and discovering new insights, ideas, or meanings that were not previously apparent or considered.

For example, consider the biblical concept of “Sabbath” or day of rest (Gen. 2:2–3, Exod. 20:8–11, 31:12–17, Deut. 5:12–15, Lev. 23:3). Traditionally, it is viewed as a day free of work or labour. A generative interpretation might consider this concept in the context of modern technology, such as automation and AI, which is increasingly taking over manual labour. This interpretation might lead to new insights into the nature of work, rest and the role of technology in modern society. It might prompt us to redefine what “work” and “rest” mean in this new context and consider how these technological developments could influence our understanding and practice of the Sabbath.

Similarly, we could take a well-known biblical narrative like the Tower of Babel (Gen. 11:1–9) where humanity’s ambition led to confusion and division. Interpreting this story in the context of current technological trends, such as social media, AI, or global connectivity, might offer new perspectives on ambition, communication, unity, and division in our current age. For instance, are our technological advancements bringing us together or pushing us further apart?

Let us consider the concept of the “good Samaritan” from the Bible (Luke 10:25–37). Traditionally, this parable is interpreted to highlight the virtues of kindness and

compassion toward strangers. A generative interpretation of this text in the context of advanced technology might view the “Samaritan” as a metaphor for benevolent AI or automated systems designed to assist people in need. This generative interpretation could challenge us to consider the ethical implications of AI and how it could be “programmed” for compassion or benevolence.

The book of Revelation in the Bible, filled with symbolic and prophetic language, often generates diverse interpretations. A generative interpretation could consider the text in light of advances in VR or AR. The visions and apocalyptic scenarios described might be seen as metaphors for the immersive and transformative experiences of these technologies and their potential to radically alter our perception of reality.

The biblical account of the creation of the universe in Genesis, where God creates the world through spoken word, might be reinterpreted in light of advances in voice recognition technology and AI for natural language processing. This interpretation of creation could offer new perspectives on the power of language and communication and technology’s role in understanding and reproducing human speech.

The concept of “miracles” as supernatural events that defy the laws of nature could be reinterpreted in the context of advanced medical technology. Miraculous healings in the Bible could be seen as metaphors for the life-saving potential of medical innovations, prompting us to consider the ethical implications of such advancements.

These examples demonstrate how the generative interpretation approach allows theologians to bring together biblical texts and technological advancements, facilitating new insights and understandings that were not previously apparent or considered.

In summary, scholars can actively explore these texts by applying the principles of generative interpretation to the Bible in the context of advanced technology. This generative approach allows new understandings to emerge, deepening theological insights into biblical texts and Christians’ relationship with technology.

The provided visual representation of GPTh proposes specific criteria intended to facilitate a reciprocal generative interpretation between biblical texts and technology:

1. **Practical application:** The generative interpretation should be able to provide practical and applicable ethical and theological insights with respect to real-world tech developments.
2. **Contextual sensitivity:** This approach should demonstrate an acute sensitivity to the unique contexts in which these technologies are engineered, deployed, and exert influence upon societies.
3. **Adaptability:** It must be able to respond to changes. Ellul (1964) states that the technique integrates everything. He explains that humans are not adapted to a world of steel; technique adapts him to it.
4. **Interdisciplinary approach:** The generative interpretation should combine elements of theology, technology, and articulated Pentecostal hermeneutics. Ilia Delio, a Catholic sister who leads the Omega Centre which concentrates on science and technology and lectures on theology at Villanova University near Philadelphia, advocates for a more inclusive outlook by the church.[36] She suggests that discussions around AI should involve individuals from various religious backgrounds and those who do not adhere to faith (Jenkins, 2018:3).
5. **Scriptural and traditional rootedness:** The method must use patterns and lessons from Scripture, tradition, and the Pentecostal experience.
6. **Integration of hermeneutical resources:** It must be able to integrate all resources for interpretation without overlooking or neglecting any aspect because, as Hongladarom (2020:2) explains, interpretation comes from a variety of sources, and Goede and Vorster (2022:v, 1–2) support this notion.
7. **Generativity:** It must create and innovate from given and proven examples or inputs. O'Day (2006:357–364) contends that the communal reading of Scripture, as a fundamental practice, is a generative process that fosters new meanings and practices within a community. This notion considers Scripture a vibrant, living entity capable of generating new life and meanings as it is appropriated and integrated into the community's practices. The authority of Scripture does not

[36] "I think there needs to be not just government regulations, but a type of interdisciplinary forum that has philosophers, theologians, computer programmers and technologists all in conversation about what types of technologies do we want and should be developing for the future", she said (Jenkins, 2018:4).

stifle this process; instead, it can be experienced as a generative force, continuously inspiring and guiding the community even through this technological era. In particular, the presence of the Holy Spirit underpins this generative interpretive work, adding a divine dimension to the evolving understanding of Scripture in community life.

8. **Endless potential:** Interpretation should facilitate a dynamic discourse between theology and technology, perpetually primed to react creatively and faithfully to the latest advances. In *The Future of Religion and the Religion of the Future*, Rivers (2011:vii) argues that since religion is fundamental to human experience and since technology is a persistent and ever-present accompaniment to human reality, it is conceivable that these two activities could merge to create a new religious experience. Although the researcher holds differing views on numerous claims made by Rivers in his paper titled “Technology and Religion: A Metaphysical Challenge”, Rivers does present some compelling arguments concerning the interplay between Christianity and technological advancement.

4.8 Conclusions

In the 4IR, the Christian community will grapple with the profound and rapid changes brought about by technological advancements, particularly AI. The church is confronted with the challenge of understanding and interpreting its role in this technological landscape and formulating ethics guidelines that can address the concerns raised by these advancements.

This chapter proposed a Christian hermeneutic for technology as a framework to comprehend and interpret the ethical implications of AI, enabling the church to navigate this transformative era. It explored the potential of such a hermeneutic to foster a balanced understanding of technology’s role in faith and promoting harmony between humanity, technology, and the divine.

The chapter further delved into the implications of this research for the church’s engagement with the evolving technological landscape, with a particular focus on AI. It highlighted the ethical challenges of AI, such as bias, lack of transparency, privacy, job displacement, security risks, accountability, and the potential for a technological

singularity. A Christian hermeneutic for technology can help the church navigate these ethical dilemmas and discern between constructive and destructive uses of AI.

The chapter also underscored the potential of a technological hermeneutic in enhancing the church's understanding of biblical end-time events within the context of rapid technological advancements. The proposed hermeneutic can serve as a method for decoding technological development, providing a framework for understanding the connections between social and cultural issues, technological advances, and biblical events.

Furthermore, the chapter suggested a specific approach to develop an articulated Pentecostal hermeneutic for technology, taking into account the distinct features of Pentecostal hermeneutics, such as the emphasis on experiential grounding, dynamic interpretation and the recognition of the Bible's multifaceted nature. This approach could enable Pentecostals to reflect on technology critically, discern its potential to enhance human flourishing and align with the values of the kingdom of God, and recognise where it might contribute to injustices or distractions from the Christian path.

The implications of this research are profound. If successful, it will enable the church to maintain a balanced and nuanced understanding of the role of technology in faith and faith's role in technological development and deployment. It will provide Christians with the tools to navigate the ethical challenges of AI and other technological advances, promote a discerning and responsible approach to technology, and facilitate a deeper understanding of biblical end-time events in the context of these advancements. Ultimately, it could transform how the Christian community engages with the technological world.

Reflecting on the implications of this research, it becomes clear that the church will play a crucial role in the cyber-physical era and beyond. As a centre of moral guidance and societal reflection, the church can help shape a balanced understanding of technology's role in faith and foster a harmonious relationship between humans, their technological artefacts, and the Creator. The church's contribution will be particularly significant given the ethical and societal challenges posed by technological advancements, such as AI.

Moreover, a significant challenge lies in the church adapting its traditional hermeneutical methods to respond to these technological advancements effectively. To successfully navigate this challenge, the church must develop a sophisticated theology beyond a literal interpretation of the Scripture, recognising the relevance and applicability of biblical teachings to contemporary society. This interpretation may involve embracing the historical, social, and economic contexts of the biblical text and understanding how they can inform our understanding of the role of technology in our lives.

From a Pentecostal perspective, this might require a shift from an unarticulated to an articulated hermeneutic, moving from a purely experiential to a more holistic and integrated approach to faith. This shift involves acknowledging modern technology's inherent complexities and nuances rather than dismissing them outright in favour of a more straightforward, literal understanding. As such, an articulated Pentecostal hermeneutic may provide a more robust framework for engaging with technology, allowing us to discern the divine in our contemporary, technologically advanced world.

Furthermore, the church must address the pitfalls of "escapist theology". If the church withdraws from the world, it fails to fulfil its transformative potential. Instead, the church should heed the call to engage and redeem the world, acting as a steward of God's creation. This engagement includes engagement with technology, which increasingly shapes our daily lives and the broader society. By doing so, the church can serve as a guardrail, helping to navigate the complex interplay of faith, humanity, and technology and promoting the harmony between these elements.

Finally, the church must serve as a prophetic voice in the face of the potential dangers associated with technological advancements. Just as religious fundamentalists can neglect ethics guidelines due to their firm convictions, so can scientists and engineers in pursuing AI development. Here, the church can offer much-needed ethical considerations, informing technology development within a framework of social responsibility and moral integrity.

While the challenges are formidable, they also offer tremendous opportunities for the church. By engaging meaningfully with technology and updating its theological and hermeneutical approaches, the church can help guide society towards a balanced and harmonious relationship between faith, humanity, and technology in the 4IR. In this light,

the work of this research extends beyond scholarly contributions and serves as a roadmap for the church to navigate the future. Its engagement with Pentecostal hermeneutics provides a unique perspective that fosters a balanced understanding of technology's role in faith and faith's role in technology.

It is evident from this research that the relationship between faith and technology is not one of contention but one of harmonious interaction where the church has an essential role to play. The insights from the hermeneutical approach presented in this work suggest that the church is positioned both as an observer of these changes and an active participant in shaping them. It offers a lens through which to interpret and apply ethics guidelines to AI development, thus contributing to the broader discourse surrounding AI ethics.

The findings also reveal room for integrating the spiritual dimension in understanding AI development. This spiritual dimension does not discount the importance of the scientific, empirical nature of AI but complements it. The two perspectives, spiritual and scientific, coexist and inform one another, leading to a more holistic understanding of AI's role in society.

In terms of implications, the research establishes that a Pentecostal hermeneutics, with its openness to divine revelation and emphasis on experiential encounters with God, provides a unique avenue for the ethical exploration of AI. Such a perspective encourages a shift away from an overly mechanistic view of AI, instead prompting us to see AI as part of the ongoing human narrative and experience, influenced and guided by divine revelation.

Furthermore, this research underlines the importance of the church in the discourse around AI and technology. As technological advancements push boundaries and raise complex questions on ethics, the church can provide a unique spiritual perspective often missing from secular discussions.

This research explores Pentecostal hermeneutics, AI, and the prospective interaction between the two. Key arguments focus on expanding the traditional realm of hermeneutics beyond textual understanding and into the technological and material world. As technology, particularly AI, continues to evolve and present new ethical and

moral challenges, a more comprehensive interpretive approach is advocated, which we term “techneutics”.

Pentecostal hermeneutics uses the lens of Spirit baptism to interpret Scriptures, acknowledging extrabiblical divine revelations and the importance of faith communities’ contexts and experiences. The hypothesis is that these same principles might apply to interpreting and understanding AI, potentially yielding valuable insights into ethics, even though AI is not explicitly mentioned in the Bible.

This engagement with AI is not an attempt to see technology as a replacement for divine power or revelation but rather as an additional layer of understanding and interpreting Scripture and our lived experiences. However, it is underscored that revelations and interpretations must be evaluated critically and contextually rather than seen as definitive truths.

The chapter introduces the concept of techneutics, which emphasises the importance of viewing technoscience as embodying a hermeneutic structure due to its practical relevance to our lives. The rapid advancements in bioengineering and AI confront humanity with complex moral challenges, demanding a broader understanding of hermeneutics that includes complex judgements of disruptions and ways to cope with application issues in the 4IR.

The exploration of a “material hermeneutics” challenges the division or separation of academic disciplines, advocating for integrating interpretive processes into scientific pursuits. It suggests giving a “voice” to the physical evidence, letting the technological advancements speak for themselves to provide insight into biblical prophecies.

Moreover, the church’s involvement could prevent overextension of human boundaries, cautioning against the ethical pitfalls that could lead to a self-destructive spiral, such as transhumanism. Hence, an understanding of techno-hermeneutics could equip the church to act as a moral compass amid rapid technological advancement, fostering a careful, ethical, and faith-informed engagement with AI and other emerging technologies.

This chapter has provided a comprehensive exploration of the parallels between Pentecostal spirituality and the transformative capabilities of AI while underscoring the

imperative of understanding technology from a theological standpoint. Nel and Gerlach emphasise the experimental, biblically revelatory, holistic, and pragmatic aspects of Pentecostalism, which also correspond to the intrinsic characteristics of AI. Similarly, AI, akin to Pentecostalism, has been recognised as a catalyst for transformative change across various industries rather than merely a response to it.

The chapter also examined two critical concepts within the framework of technology hermeneutics: “articulated” and “generative”. In Pentecostal hermeneutics, “articulated” was explored to denote the clear, comprehensive expression or understanding of a concept, tethered to scriptural foundations and the anticipation of experiential encounters with the divine. This theological articulation offers a bedrock for understanding the ethics implications of AI within the faith community. Despite challenges associated with the relentless pace of AI innovation and diverse applications, such a hermeneutic approach can inspire the development of robust ethics guidelines.

The concept of “generative” in techno-hermeneutics was also considered, referring to machine learning capabilities that produce novel results based on input data. Though not without its ethical dilemmas, particularly concerning deep fake technology, generative AI models exemplify the creative potential of AI technologies. It was suggested that a generative Pentecostal hermeneutic for technology could adopt a similar approach, applying scriptural insights to evolving technological phenomena, integrating all hermeneutical resources, and providing a dynamic dialogue between theology and technology.

Several vital considerations emerge after reflecting on the implications of this research for the church. First, the 4IR, characterised by rapid advancements in AI and other disruptive technologies, presents unique opportunities and challenges for faith communities. The experimental, revelatory, holistic, and pragmatic nature of both Pentecostalism and AI affords a paradigm within which the church can navigate this new era, fostering a balanced understanding of technology’s role in faith.

Churches, particularly those in the Pentecostal tradition, are positioned to draw from their unique spirituality and theological perspectives to articulate a mature understanding of technology that respects biblical principles while acknowledging the transformative

potential of AI. Through an “articulated” hermeneutic approach, the church can guide ethics for the responsible use of AI and related technologies.

At the same time, the nature of AI can inform a more dynamic and adaptable approach to a techno-hermeneutics within the church. GPTh could continually generate new insights and applications in response to technological advances, ensuring that the church’s response remains relevant and practical.

Ultimately, by taking an active role in understanding and shaping the ethical use of AI, the church can ensure that technology enhances human dignity and the common good rather than undermines them. This responsibility is fundamental given the potential for misused technology to generate harm and social disruption.

As we move into the future, the church has an opportunity to not just be a spectator but a guide, providing wisdom and insight into navigating this brave new world of technological innovation from a grounded and faith-filled perspective. Through articulated and generative hermeneutics, the church can offer a thoughtful, nuanced understanding of technology’s role in faith, focussing on how technology and spirituality can mutually enrich each other.

The study under review has extensively examined the intersection of theology and technology, proposing a new framework referred to as “techneutics”, an amalgamation of “technology” and “hermeneutics”. This approach recognises the complex interplay between technological advancements and theological discourse. Drawing from two forms of technological interpretation – “material hermeneutics” and “machine hermeneutics” – the research presents an innovative framework called GPTh.

The GPTh framework is grounded on stages that involve input evaluation, transformation parameters based on a Pentecostal perspective, and generative interpretation. This methodology allows for a dynamic interaction between biblical texts and modern technology, yielding new insights and perspectives that were not previously apparent. It prompts a reciprocal generative interpretation between technology and biblical texts, leading to a deeper understanding of both realms.

Key findings include:

1. The emergence of AI has redefined the traditional human-centric interpretation of the world. AI algorithms have taken on initial interpretive tasks previously exclusive to humans, calling for an intersection of technology, ethics, and hermeneutics.
2. GPTh allows for an integrated interpretation of the Bible and technology, with consideration of Pentecostal beliefs. It draws on the “transformer” model in AI, aiding the understanding of interconnected elements of the Bible and technology in broader narratives.
3. Generative interpretation under GPTh offers evolving perspectives, allowing for re-examining biblical concepts in light of technological advancements, consequently leading to new insights and understandings.

First, the church can leverage GPTh to facilitate the interpretation of technological advancements within the contours of Pentecostal theology. This approach can lead to more enlightened responses and strategies for integrating technology into faith practices and introducing faith practices to technological advancements.

Second, through the generative interpretation approach, the church can explore new understandings of biblical texts in light of technological advances. This generative interpretation encourages dynamic conversations and a deeper understanding of the intersection between faith and technology.

Third, the church can employ the GPTh framework to assess the ethical, moral, and spiritual implications of technology. This framework allows the church to foster responsible use of technology that aligns with faith values.

Lastly, this research presents an opportunity for the church to engage in interdisciplinary discourse. As the role of technology in society continues to expand, the church can contribute its unique perspectives to discussions of AI, ensuring that religious considerations are included in the broader conversation about the responsible development and deployment of technology.

This chapter concludes with the proposition of a comprehensive and dynamic technological hermeneutic inspired by a Pentecostal perspective to assist Christians in grappling with the ethical and practical implications of technological advancements,

specifically within the 4IR and beyond. The research emphasises the potential of this Pentecostal hermeneutic approach to reconcile faith and technology, thereby enhancing the understanding of technology's role in faith and faith's role in technology.

In dissecting the interaction between faith, ethics, and AI, the research underscores the church's essential role in navigating the challenges of the 4IR. In particular, it advocates ongoing engagement with this nuanced approach as the world continues to evolve at an accelerated pace due to technological innovation.

The chapter further highlights the potential of technology and AI to enhance Christian service and ministry and offer fresh theological perspectives. The role of the Holy Spirit is recognised as vital in guiding the interpretation and application of technology in alignment with biblical narratives.

Lastly, the GPTh framework is proposed to enable a dynamic interaction between biblical texts and modern technology. This innovative methodology involves input evaluation, transformation parameters based on a Pentecostal perspective, and generative interpretation, facilitating a reciprocal dialogue between technology and biblical texts that could lead to more profound insights and comprehension in both domains.

The implications of this research for the church are considerable. It emphasises the need for theological and academic communities to collaborate closely to address the challenges and possibilities of the 4IR. Furthermore, the study invites churches to be proactive, using the proposed GPTh framework as a practical tool to guide their congregations through the rapidly evolving technological landscape while fostering a balanced understanding of faith and technology, ultimately promoting a symbiotic relationship between humanity, technology, and the divine.

The next chapter embarks on a scholarly journey into the implications of GPTh within a biblical context, diligently seeking out any possible allusions to technology in the ancient scriptures. The chapter further investigates the potential interplay between God, the divine Creator, and the advent and advancement of AI in the 4IR and beyond. Informed by these preliminary explorations, apocalyptic texts are analysed as case studies to discern any potential parallels between the progression of AI and prophetic, eschatological events. Ethical considerations are drawn from these examinations,

presenting a critical reflection on the potential effect of these technological developments on human and divine interaction. The chapter concludes by offering practical recommendations for the contemporary church, emphasising the urgent need for theological reflection and adaptive measures in response to this swiftly changing technological landscape.

CHAPTER 5 GENERATIVE PENTECOSTAL TECHNEUTICS: A FRESH PERSPECTIVE ON BIBLICAL APOCALYPTIC TEXT

5.1 Introduction

This chapter explores the practical implementation of GPTh, as developed in the preceding chapter. The aim is to draw parallels between biblical apocalyptic events and the proposed technological singularity. This implementation includes an examination of biblical passages that may bear potential correlations to technological development, with particular attention to the development of AI. The chapter delves into prophecies that may rely on technological development and deployment for fulfilment, and this examination may underscore the critical need for a technological hermeneutic in the current technological era.

Many eschatologists have committed the grave error of interpreting advanced technological developments and deployments using only a theological interpretation model, thereby misinterpreting the role technology may play in the end times. Such hermeneutical theological models fail to recognise the autonomous voice of technology. A technological hermeneutics may reveal novel insights into biblical passages related to apocalyptic events. Regrettably, these theologically-centred hermeneutical models have sustained a one-sided approach, interpreting Scripture exclusively from a theological standpoint and seldom from a technological perspective, despite some acknowledgement of the role technology is likely to play in the end times.

This study aims to address this discrepancy by applying the GPTh, acknowledging simultaneously that the biblical text originated in a context vastly different from contemporary technological developments.

5.2 The significance of biblical techneutics

In an age where technology, particularly AI, exerts a transformative influence on nearly every aspect of human life, it is imperative to consider how seminal texts that have guided human morality and society for millennia, engage with this new reality. The Bible, revered as a timeless and foundational document for millions, stands at the forefront of such texts. If, as is widely accepted, the Bible holds significance for all ages, including the

technological age (Oliver, 2020:1), a critical question emerges: Can this ancient text remain mute on the profound and escalating impact of AI and other technological developments on humanity? For atheist Richard Dawkins, this is indeed the case. In his book *The God Delusion*, Dawkins (2006:56, 62) argues that Christian theology is good for nothing and that theologians bring nothing noteworthy to science (Dawkins, 2006:56–57). He builds his argument on the assumption that Christians are wrong and harmful because Christianity is based on irrational beliefs and outdated morals (Dawkins, 2006:237–278). However, the fact is that the Bible cannot be silent on the escalating effect of advanced technologies, but it does require an updated hermeneutic to be relevant (Van den Bergh *et al.*, 2020:130). Although applicable to this disruptive technological era, Oliver (2020:1) contends that the Bible must be presented in a "disruptive" way. This proposition underscores the pressing need for a hermeneutical approach to the nuances and complexities of the technological era to make it accessible to people in this technological era.

The hermeneutical challenge is far from trivial. Oliver (2020:2) argues that the purpose of Christian theology is the thriving of all life because it stands in service of the continuance of Christ's mission on earth. Therefore, the researcher contends that adapting biblical interpretation to new technological realities does not mean distorting or imposing contemporary issues on the text but rather engaging deeply with the text to uncover insights that speak to today's unique circumstances.

In the technological era, the relevance of biblical theology is paramount, as highlighted by Volf and Croasmun (2019). They argue that theology has strayed from its core purpose: to discern and articulate visions of true life based on Jesus Christ's teachings and to guide humans towards recognising God's home as their own (Volf & Croasmun, 2019:45, 71). The essence of Christian theology is to promote the flourishing of life, aligning with Christ's mission to spread the good news of God's intent to transform the world into his dwelling (Volf & Croasmun, 2019:75).

However, a concerning shift has occurred. Theologians have become detached themselves from this foundational purpose, leading to a decline in the enrolment of theology students and diminishing respect for once-prominent theology departments (Volf & Croasmun, 2019:44). This "desertion" has resulted in academic articles primarily

catering to peers rather than the broader church community, their traditional audience (Volf & Croasmun, 2019:39). Consequently, these theological writings have become less pertinent to laypeople, who increasingly seek existential answers elsewhere, thereby widening the gap between Christians and the evolution of AI and other disruptive technologies.

By the nineteenth century, theologians, recognising this crisis, attempted to approach theology scientifically, positioning themselves as “social scientists” (Volf & Croasmun, 2019:47). This shift led theology away from its divine focus, emphasising Christianity and world religions over God’s teachings. The result was a transition from theological “norms and purposes” to mere “facts and causes” (Volf & Croasmun, 2019:47). This approach risks diluting the Bible’s normativity, leading to either a conservative nostalgia or a liberal critique (Volf & Croasmun, 2019:52).

The need for a grounded, purpose-driven theology is evident in our technological era where AI and other advancements challenge ethical and existential paradigms. When genuinely embraced, the Bible’s teachings can offer guidance and ethics frameworks essential for navigating the complexities introduced by rapid technological advancements.

In this regard, Winfield and Jirotka (2018:9) agree that radical new approaches are needed to regulate the ethical development of intelligent autonomous systems (IAS). The researcher agrees and adds that a technologically informed hermeneutic could reveal how biblical principles might guide these ethical interactions with and governance of AI systems. For many researchers, the stakes are extraordinarily high as the world becomes increasingly dependent on these systems, with AI now implicated in decisions ranging from social, moral and ethical expectations and norms from medical diagnoses to criminal sentencing and parole decisions (Obermeyer *et al.*, 2019:1–7; Pflanzer *et al.*, 2022:928; Rajkomar *et al.*, 2018:1–14; Sanderson *et al.*, 2022:1–7; Schemmer *et al.*, 2022:1–10). The potential for AI to inadvertently encode and perpetuate societal biases, as Obermeyer *et al.* (2019:1–8) wrote, only intensifies the urgency for a robust ethics framework informed by enduring biblical principles.

However, scholars such as Cardoso (2020) caution against assuming the straightforward applicability of biblical principles. This warning is also relevant to modern technological

issues. He has explored perspectives such as multi-, inter-, trans-, and in-/anti-disciplinarity approaches to interpretation. He further delves into the use of various disciplines in interpreting the “Biblical World”. However, he emphasises that the initial step towards critical biblical interpretation is deciding on a framework where sources and related disciplines come together. He proposes a taxonomy of historical sources, suggesting an anti-disciplinary framework to drive innovation by focusing on the research object (Cardoso, 2020:11).

Over the past century, there have been numerous attempts to integrate other disciplines with biblical studies, especially concerning the historical reconstruction of the “Biblical World”, “Biblical Israel”, or “Ancient Israel”. Cardoso (2020:5) outlines various modalities of discipline interaction within biblical studies, emphasising that each research effort in biblical studies is multidisciplinary. The biblical scholar often employs disciplines like anthropology, sociology, history, archaeology, literature, philosophy, theology and, for our research, technoscience. These approaches differ in juxtaposing, combining, transcending, or avoiding disciplinary constraints to produce knowledge (Cardoso, 2020:10).

Cardoso’s insights add value to the GPTh presented in this research in several ways:

- **Interdisciplinary approach:** Cardoso emphasises the importance of using various disciplines in interpreting the “Biblical World”. By integrating insights from anthropology, sociology, history, archaeology, literature, philosophy and theology, one can derive at a more holistic understanding of biblical texts. This approach can be applied to understand technological developments within the biblical context and their implications for contemporary society.
- **Anti-disciplinarity perspective:** The article suggests an anti-disciplinary framework, which means moving beyond traditional disciplinary constraints to drive innovation. When interpreting technological developments in the Bible, this perspective can encourage scholars to think outside the box, merging traditional biblical studies with modern technological insights.
- **Historical context:** Cardoso’s emphasis on the historical reconstruction of the “Biblical World” can provide a backdrop against which technological developments in biblical times can be understood. Understanding the historical

and cultural context can help scholars draw parallels between ancient and modern technological advancements.

- **Critical interpretation:** His article underscores the importance of critical biblical interpretation. Critically examining technological references in the Bible can derive deeper meanings and implications for modern technological challenges and ethical considerations.
- **Taxonomy of historical sources:** Cardoso proposes a taxonomy of historical sources, suggesting a structured approach to analysing biblical texts. This method can be employed to categorise and understand references to technology in the Bible, providing a systematic framework for interpretation.

In summary, Cardoso's research promotes a multidimensional approach to biblical interpretation, emphasising the integration of various disciplines and critical thinking. By applying these principles to GPTh, one can derive a richer and more nuanced understanding of technological development from a biblical perspective, bridging ancient wisdom with contemporary challenges and insights.

The researcher contends that the biblical authors, situated in a context so removed from the present day, could not have anticipated the specific challenges posed by AI and thus did not write with these challenges in mind. Nevertheless, Negrut and Pop (2022:3) discuss the moral and spiritual aspects of infertility recorded in the Bible. The examples of Abraham and Sarah (Gen. 15:1–5; 16:2, 17:15–17, 21:1–2), Isaac and Rebecca (Gen. 25:20–21), Jacob and Rachel (Gen. 29:31; 30:1–2, 22–23), and Zechariah and Elizabeth (Luke 1:5–7, 13, 23–25), demonstrate that the Bible addresses issues related to fertility and reproduction. While the challenges related to contemporary reproductive technologies may not be explicitly mentioned in the Bible, biblical narratives can inform the moral considerations surrounding these issues.

Green (2021:209, 212) highlights the contestation and subjectivity of tech ethics. The argument posits that practical tech ethics exhibits several shortcomings: vagueness, lack of enforceability, a narrow concentration on individual engineers and technological design, and susceptibility to corporate motives and incentives. The crux of the debate in tech ethics lies not in the desirability of ethics but in the definition of "ethics" itself and the authority to establish its meaning. It suggests that a sociotechnical approach to

technology ethics is needed, considering the broader social, political, and economic contexts in which technology is developed and used. This sociotechnical approach emphasises the need to focus on the social impact of technology and how society shapes artefacts (Green, 2021:218–219). Green's argument highlights that technology and society are deeply intertwined and that changes in one can significantly affect the other. The idea is that for a system to succeed, its technical and social components must be in harmony. Ignoring the social implications of a technical system or vice versa can lead to inefficiencies, failures, or unintended negative consequences. When informed by theology, the sociotechnical approach might place a higher value on technologies that foster genuine community and interpersonal connection. The rapid pace of technological change can lead to societal disruptions, and the hermeneutic for technology presented in this research can offer insights into how to navigate these changes in ways that prioritise human flourishing and the common good.

Applying the GPTh outlined in this research to relevant apocalyptic scriptures will provide insights into the role of technology from an eschatological perspective. This methodology could elucidate the alignment between technological progress and theological notions about humanity's eventual fate and the culmination of ages. Consequently, this research advocates for the formulation of a hermeneutical perspective attuned to the technological epoch. This perspective neither distorts the biblical narrative nor overlooks the urgent complexities of the contemporary technological milieu. Such a hermeneutical strategy aims to reconcile the temporal divide between the biblical era and the present, fostering a substantive discourse between perennial biblical tenets and the ethical dilemmas presented by AI and analogous emergent technologies.

In theological and historical discourse, the Bible stands as both a spiritual guide and an account of ancient civilisations. Drawing from research by Reinke (2022), it is evident that interspersed in the Bible's pages are references susceptible to a technological interpretation. While these instances may appear rudimentary juxtaposed against modern advancements, scholars such as Reinke argue they are pivotal in mapping the technological trajectory of yesteryears. Notably, the intricate details associated with the story of Noah's Ark and the battle between David and Goliath offer a window into the materials, tools, and methodologies of those epochs (Reinke, 2022:17–20). Beyond merely portraying historical techniques, these passages accentuate a quintessential

human inclination to innovate. Furthermore, as presented in these scriptures, the confluence of faith and technology demands critical examination. As Reinke (2022:30–32) highlights, exploring these biblical accounts could provide insights into the nexus between ancestral societal norms and their technological paradigms in the context of our swiftly progressing digital age.

5.2.1 Technology in the Bible

Reinke (2022:21) identifies an emerging challenge for humanity: the rapid evolution of technologies into an inescapable ecosystem. These advances are becoming so intertwined that they exhibit biological evolutionary traits. Kelly (2011:11–12, 38) terms this phenomenon the “technium”, describing it as a system where technology achieves a self-amplifying and self-reinforcing momentum. At this juncture, tools, machines, and ideas become so intricate that they gain a semblance of autonomy. Within this technium, Kelly notes that previous-generation machines integrate into newer, more potent ones, combining their inherent power and capabilities to exhibit previously unknown powers and possibilities. Using Darwin’s theory of evolution as a metaphor, Kelly writes that “these combinations are like mating; they produce a hereditary tree of ancestral technologies”. However, metaphorically speaking, these technologies “mate” by consolidating their strengths and possibilities, creating an inescapable ecosystem.

The researcher posits that while technology has been rigorously scrutinised and documented as an integral component of human existence, its spiritual implications remain notably underexplored. This lacuna invites several pressing inquiries: Firstly, do technological innovations and advancements diminish the relevance of the Divine in contemporary society? Secondly, do these technological developments pose a conceptual or existential threat to divine authority? Thirdly, are there inherent limitations to what technology can achieve regarding spiritual or metaphysical matters? Finally, to what extent does biblical literature address these questions, and is it feasible to construct a theological framework incorporating technology within a biblical context? These questions are not merely rhetorical; they underscore the urgent need for a multidisciplinary approach that combines technological understanding with theological insights.

The Bible has traditionally been viewed as a perennial reservoir of moral and ethical principles within the academic discourse on ethics frameworks. Despite the transformative impact of technological innovations on specific aspects of human life, fundamental existential questions persist, to which the Bible continues to provide salient answers. Nevertheless, a counter-narrative suggests the decreasing relevance of biblical guidelines in a society increasingly influenced by technological advancements.

With appropriate academic circumspection, it is posited here that the Bible's principles are not necessarily incommensurable with contemporary challenges ushered in by advancements in fields like AI, bioethics, and environmental sustainability. Instead, one could argue for a dynamic interpretation of biblical texts that allows for a nuanced re-examination in light of emerging knowledge and socio-technological contexts. Such interpretive flexibility may sustain and enrich the Bible's applicability, imbuing it with a renewed sense of urgency and relevance in addressing current ethical conundrums.

Genesis 6:11 states that the earth was corrupt in God's sight and filled with wickedness, and according to Reinke (2022:33), this global rebellion calls for a global response, hence the flood. Reinke (2022:35) contends that the building of the ark exceeded all known knowledge of engineering at that time. By supplying the blueprint of this technological breakthrough, God instructed Noah to cover the ark with pitch (tar or bitumen) to waterproof it (Gen. 6:14). Tar can be considered one of humanity's first inventions. After the flood, this post-flood population gathered together in Babel (Gen. 11), where the second story of tar and technological innovation originates (Reinke, 2022:33). Genesis 11:1 states: "The whole earth had the same language and vocabulary." Here, they start building a city using oven-baked bricks and asphalt (tar) for mortar (v. 3). Already in this biblical account, it becomes evident that there is something about technologies that open human beings to innovation, to imagining new possibilities, even before they have a sense of what can or should be done (Reinke, 2022:35). These seasoned inventors then decided to build a tower to reach heaven. The Bible states:

> The whole earth had the same language and vocabulary. And they said, "Come, let's build ourselves a city and a tower with its top in the sky. Let's make a name for ourselves; otherwise, we will be scattered throughout the earth." Then the Lord

> came down to look over the city and the tower that the humans were building (Gen. 11:1, 4–5, CSB, 2017).

Reinke (2022:35) notes that with this new technological invention, humanity's first vernacular breaks forth in aspiration, evident in statements like: "Let us build", "let us make." For Ellul (2011:16), this is a tower of independence, the desire "to be definitively separated from God". God commissioned them to spread across the earth; instead, they rebelled, stayed, and built a tower to be gods. So, God responds:

> Come, let's go down there and confuse their language so that they will not understand one another's speech" So from there the Lord scattered them throughout the earth, and they stopped building the city. Therefore it is called Babylon, for there the Lord confused the language of the whole earth, and from there the Lord scattered them throughout the earth (Gen. 11:7–9, CSB, 2017).

This tower can be seen as humanity's premature attempt at utopia. God commissioned Adam and Eve to fill the earth, and after the flood, he called Noah and his family to do the same. Instead of obeying God's command, the post-flood community came together into one unified city, but that was not God's plan. The result was a city-temple to human rebellion. Babel was the new epicentre of human worship (Reinke, 2022:36). Man's innovations and hunger for power do not scare God. Instead, "the more power they can concentrate, the more harm they will be able to do to themselves and the world" (Gowan, 1988:119).

Our primitive impulse demands us to innovate. The ark helped to inspire the technological advances that would later be used at the Tower of Babel. However, the Babylonians used their innovations and engineering skills to attempt to thwart God. Nevertheless, this came at a price because God dethroned them by confusing their single language and dispersing them across the globe (Reinke, 2022:39).

5.2.2 What is God's relationship to technology?

Reinke (2022:33) asserts that the response to this question shapes our relationship with technology and guides our choices regarding which technologies to embrace or reject. God's intervention at the tower of Babel introduced two crucial global changes: Firstly,

the need for global networking communication, travel and transport; secondly, God introduced global tension among humans that would ultimately protect them from future technological innovations. These industries were now inevitable (Reinke, 2022:39). Dyer (2011:105) contends that if one genuinely wants to learn more about people, one needs to learn their language, which will tell you what you need to know. So, by confusing their language, Dyer argues that God was reprogramming their sense of self, their relational connections and how they viewed the world. By introducing new languages, God also introduced new ways to think about the world, and those thoughts ultimately produced a multitude of new religions. Reinke (2022:40) believes that when these people were scattered, they produced competing idols and tribal deities in their image. The exponential development in AI and AI worship is evidence of this. Bavinck (2019:35) argues that Babel "even marks the genesis of ethnic animosity". In the multiplication of languages in Babel, "God keeps man from forming a truth valid for all men. Henceforth, man's truth will only be partial and contested." (Ellul, 2011:19) Reinke (2022:41) elaborates, stating that beginning in Babel, "universal consensus was made impossible". Ellul's statement might explain why some cultures create, use, or reject specific technological innovations.

In the biblical narrative of Babel, rather than permitting humanity to merge into a monolithic society, divine intervention fractured linguistic unity, thereby engendering a plurality of cultures. One may cautiously infer that this act of dispersion introduced inherent tensions and disharmonies into the human experience. The purpose of such dissonance has far-reaching implications, particularly when one considers the burgeoning advancements in potentially destructive technologies in a world marked by human fallibility.

This analytical perspective posits that the intrinsic societal and cultural tensions—arguably divinely coded into human history—serve as regulative mechanisms to modulate and perhaps restrain the unbridled adoption of technologies with potentially calamitous consequences. Such a viewpoint lends an exigency to ongoing theological and ethical debates concerning the responsible governance and use of emerging technologies. Kelly (2011:291) adds that ethnic biases undeniably determine which technological advances are adopted or rejected in a given culture. These differences in opinions can be rendered as a mercy from God, especially as pressures mount to

embrace genetic modifications, transhumanism and dangerous AI developments and deployment.

The interplay between God's sovereignty and human technological innovation presents a complex and nuanced portrait, as illustrated by the biblical accounts of the ark and the tower of Babel in the book of Genesis. In the narrative of Noah, for instance, it is portrayed that divine command directly precipitated technological innovation and engineering, subsequently weaving it into the broader tapestry of God's grand redemption narrative. Contrastingly, in the Babel account, God's intervention appears to act as a counterforce, stymieing human technological advancements in the context of their self-glorification. Here, the introduction of societal and linguistic tensions effectively disrupted collaborative human endeavours in technology.

God's engagement with technology extends beyond the obvious. While biblical narratives, from the ark to Babel, and references to technological instruments like swords and slings primarily highlight the tangible products of human ingenuity, a pertinent question arises: What is the origin of these innovations and their inventors? This inquiry finds its answer in Isaiah 54:16-17, where it is proclaimed:

> Look, I have created the craftsman who blows on the charcoal fire and produces a weapon suitable for its task; and I have created the destroyer to cause havoc. No weapon formed against you will succeed, and you will refute any accusation raised against you in court. This is the heritage of the Lord 's servants, and their vindication is from me. This is the Lord's declaration (Isa. 54:16–17, CSB, 2017).

Reinke (2022:45) highlights three significant claims from this text:

1. God creates the creators of weapons;
2. He creates the destroyer who uses the weapons to cause havoc; and
3. He governs the outcomes of those weaponised ravages.

5.2.2.1 The ancient blacksmith

Ancient craftsmen zealously protected their secrets, abiding by a stringent ethical code. Tradition and ceremony permeated their work, marked by rites of purification, fasting, meditation, prayers, sacrifices, and diverse acts of worship. Rituals accompanied the

smelting and forging processes to maintain the sanctity of their forge fires. By using fire, blacksmiths sanctified fragments of the world, crafting objects imbued with renewed spiritual vigour. The metal's potency is often related to its earthly origin, seen as a purified element of the earth through fire. Even the smith's tools were regarded as sacred. The entire forge, including the hammer, anvil, and furnace, transforms into a ceremonial hub, positioning the smith as a priestly figure entrusted with the sanctification of creation (McNutt, 1990:45–46).

Blacksmiths crafted instruments for war, trade, and spiritual protection. Harnessing celestial inspirations with spiritual methodologies, they rose as a formidable class of innovators. Their creations augmented human capability, intensifying the might of warriors and national armies. Central to the ancient technological landscape, these smiths, adept in ironwork and pioneers of warfare technology, symbolised both power and security (Reinke, 2022:46). Their enduring legacy has seamlessly transitioned through generations, with their refined techniques now evident in contemporary AI technologies and autonomous weaponry.

5.2.2.2 The destroyer

God's omnipotence extends to weapon bearers. The term "destroyer" describes the ramifications one might associate with the wielders of swords, spears, or axes—those who cause destruction, desolation, plunder, and devastation. However formidable these destroyers seem, they remain creations (*bara*) under God's sovereignty. Thus, both the craftsmen of the weapons and their users operate under the divine ordination of God's singular decree. God remains the sole architect of both the smith and the destroyer. According to Christensen (2016:77–81, 256), "God is the *primary*, but *remote*, cause of all human action. Humans are the *secondary*, but *proximate* (or near), causes of their actions." Although the researcher disagrees with Christensen's statement that God is the primary, remote cause of all human action, he supports the notion that humans cause their actions. However, the researcher agrees with Reinke (2022:48) that God governs each situation towards an ultimate good end (Rom. 8:28), he even indirectly governs all sin and evil to the point that nothing catches him off guard, nor will it ever spin out of his control. Therefore, even the scope of the ravager's destruction is sanctioned by God. God governs human technological developments and how they are used, even the destructive

ones. It is sobering but true that not even the havoc caused by the ravages, not even the brutal acts against God's people, happen without God's knowledge (Young, 1972:372). Reinke (2022:49) explains that "out of his secret purposes, God creates and governs over every ravager in this world. Even at their most technologically outfitted, the world's greatest threats can only wield a power *given* and a purpose *governed* entirely by God".

Grasping that God oversees every human innovation, including those that destroy, proves challenging yet valuable. It remains crucial to recognise God's unparalleled supremacy in this regard. Reinke (2022:51) points out that everything is amplified in the technological age, especially the self-damaging fallout of humanity's hubristic mishandling of power. Although devastating, the ravagers are appointed for a providential end, for God's ultimate good purpose that could not come through other means. Although appointed to serve God's greater purpose, no ravager will escape God's judgement for their evil actions.

Christians must not overlook that the world's foremost innovators, currently active in laboratories, factories, and space stations, work solely through divine mandate. God remains the genesis of all human innovation and the architect of every inventor.

God's sovereignty manifests not by opposing human free will but by working through it. He guides creatures by influencing their desires and needs. Swordsmiths choose their craft and ravage their path. Salvation emerges when individuals receive a renewed heart and spirit that yearns for God (Ps. 51:10, Ezek. 11:19; 36:26; Eph. 4:23). While humans should desire Him, their sinful nature often leads them to reject him. Proverbs 21:1 states, "A king's heart is like channelled water in the Lord's hand: He directs it wherever he chooses." (CSB, 2017) Reinke (2022:54) argues that God steers each king and kingdom by guiding their inherent desires and free will. This assertion applies to every influential figure globally. Ephesians 1:11 posits that humans "were predestined according to the plan of the one who works out everything in agreement with the purpose of his will" (CSB, 2017). Regarding God's relationship with technology, he remains integrally involved and supremely governs the rapid evolution of AI and its myriad potentialities.

God's oversight of these myriad causes and effects does not diminish the guilt of the malevolent techno-scientists or the brutes for their yearning for blood, power, or riches. It is understood that God directs technologies that lead to human self-destruction, yet this

neither compromises his sanctity nor justifies the malevolence of the perpetrators. This intricate interplay was exemplified in the crucifixion of Jesus Christ (Acts 3:11–26); through the craft of metallurgy, a blacksmith produced three elongated nails, a sledge and a spear. Subsequently, an aggressor used these technological advancements to execute the author of life. The leaders of Israel invited divine reprimand for their transgressions. However, this event unfolded as per God's definitive plan. As prophesied by Isaiah, Christ suffered for our transgressions, enduring the agony of being fastened with metal nails (Isa. 53:4–6). A bygone blacksmith inadvertently furthered God's ultimate purpose. God the Father sanctioned the suffering of his Son, Jesus Christ, as it aligned with his profoundly astute and compassionate objectives in the redemptive process (Isa. 53:10). In the same way, no technology, no advanced weapon and no human achievement, no matter how devastating, can ever escape the ultimate purpose of God.

Considering God's influence on human free will, this study concurs with Nel (2018b:436) in asserting that the Bible presents a nuanced perspective on violence rather than a monosyllabic stance. It highlights the diverse views on violence in the Bible, which extend to the 4IR and beyond and are applicable to the application and misuse of technology in the hands of the brutes and the malevolent technopreneurs who supply them with the devastating tools of their trade. These views resist a uniform biblical interpretation of violence and possibly the technologies involved to broaden its impact on society. It is essential to employ a hermeneutic for technology to foster a meaningful discourse on war and its inherent violence, particularly in conflicts exacerbated by disruptive technologies. Nel (2018b:431) argues that the Pentecostal approach of interpreting the Bible in a contemporary context without recognising the historical distance between contemporary believers and the text might promote a problematic hermeneutic with the potential to endorse inhumane actions. Therefore, this study endorses Nel (2018b:435) in suggesting that Pentecostals need a new hermeneutical rationale for biblical reading that can stand its ground when it evaluates the occurrence of the justification of violence in the name of God as found in the Bible, an approach that can honestly face and confront violence in the Bible from a perspective of faith that necessarily leads to a developed moral conscience.

Although Nel's study primarily focuses on the interpretation of violence in the Bible and its implications for the Pentecostal movement, the researcher extrapolates from the

broader theme of Nel's study and consequently argues that if God is perceived to be in control of complex and multifaceted issues like violence in the biblical narrative, then by extension, God could also be in control of other complex phenomena, such as the development and use of disruptive technologies. This idea bolsters the assertion that nothing remains beyond God's ultimate purpose. Furthermore, while Nel's study does not directly address the development and use of advanced technologies, its emphasis on nuanced interpretation and moral conscience could potentially be applied to ethical considerations surrounding the development and application of such technologies.

In summary, tar serves as a compelling metaphor. The fundamental question that begs an answer from every individual is: What purpose does tar serve? Is its application a manifestation of faith in God or a gesture of defiance against him? Noah used tar as a medium to safeguard a future promise; it sealed his vessel and fortified his faith in God. Conversely, the denizens of Babel misused tar by employing it to seal fire-baked bricks for the erection of a monument to human hubris. Ultimately, those engaged in technological sciences must confront a pivotal question: Does applying their expertise waterproof an ark, thereby manifesting faith, or does it function to insulate a tower built on the foundations of disbelief?

5.2.3 The unreachable frontier: Tasks AI will never conquer or replace

Paul writes in 1 Timothy 6:16 that God lives in "unapproachable light" (CSB, 2017), that he is the Father of light who does not change like shifting shadows (Jas 1:17, CSB, 2017), a God who casts no shadow (Reinke, 2022:76). No technological innovation can create God, improve him, limit or overthrow him. No human can add to God's fullness. No AI, no matter how smart, can shake God's foundations or determine his existence. God is the sole Creator who transcends time (Ps. 90:2; 2 Pet. 3:8), space (1 Kgs 8:27; Jer. 23:24), and matter (John 4:24; Col. 1:16–17). He cannot be completed or challenged by man's innovations.

Reinke (2022:76) states, "His unapproachable radiance pushes back everyone else and everything else so we can marvel at his self-sufficiency." God does not need any of man's technological innovations to be God, to be happy and in absolute control of his creation. Reinke (2022:77) states that "matter cannot explain matter". He continues: "So, we gaze at the material world and ask: Why is there something rather than nothing? Moreover,

that answer is found in God. *He is*. He is gushingly delighted in himself." No scientist can create (*bara*) something, and no GAI can create something. Only God can create; only he can create something new from nothing. He does not need raw materials, preexisting plans or ideas, an algorithm, or a computer program. Reinke (2022:77) explains that humans use silicon, aluminium, iron, titanium, hydrogen and all other elements, gases and fluids to innovate something new that originated from God alone. He alone created every atom from nothing.

God's creation, innovation, and blueprints are the centre of all human innovations and creations. Therefore, all human innovation points to the glory of God. Humans are mere stewards. "A greater distance cannot be imagined than that which is between *nothing* and *something*; that which *hath no being*, and that *which hath*; and a greater power cannot be imagined than that which brings something out of nothing." (Charnock, 2020:516–517) Reinke (2022:80) argues that the creation was unnecessary, but God created it out of love and in his own freedom. Therefore, God's love leaves humans to be, cultivate, and innovate. As a result, humans can discover the patterns of creation and develop new technologies.

In his book, *God, Technology, and the Christian Life*, Reinke skilfully compares the offerings of Cain and Abel to technologies directed at God's glory and those in pursuit of worldly success. Although the Bible does not explicitly say in Genesis 4:1-5 why God accepted Abel's offering and rejected Cain's, Hebrews 11:4 might shed some light on this question, stating that God accepted Abel's sacrifice because Abel had faith in God and was a righteous man. Therefore, it could be argued that Cain did not trust God as he was supposed to and that he was unrighteous before God. It could be contended that Abel looked to God to deliver what his career could never offer. Abel is a metaphor for what it looks like to glorify God with talent and innovation. It is about the human heart, man's allegiance with God, and his total dependence on God for his ultimate hope and final security (Reinke, 2022:82). God did not have Cain's heart, which was the difference—innovation directed at God's glory versus innovation directed at man's glory. Scientific innovations and the scientists behind them may have good intentions, but their motives might diverge eternally. Like many scientific innovators, Cain did not consecrate his life and innovations to God.

Innovators serve as manifestations of divine creation, deserving of attributing glory to God. Isaiah 28:23-29 opens with a decisive call to attentiveness, stating, “Listen and hear my voice. Pay attention and hear what I say,” as if underlining the critical importance of the forthcoming message. Isaiah elucidates the role of divine guidance in farming, emphasising that the credit for aligning tools and techniques with crop production belongs solely to God. The passage underlines a directional trust in God’s interaction with humanity, akin to a farmer planting the seeds of potential and innovation in the human heart.

Reinke (2022:95) regards farming as the “most fundamental of all human technological breakthroughs” and as the foundational technology for all subsequent advances. While humans may not qualify as creators, their innovations catalyse further innovations. Simple tools evolve into complex technologies, a process Reinke (2022:96) likens to biological progression, where “technology creates itself from itself”. This line of progression is expected to culminate in future machines capable of independent thought and action. These machines will be self-configuring, self-optimising, self-assembling, self-healing, and self-protecting, mirroring living organisms’ characteristics. “Science, like agriculture, is the art of listening to the Creator, the art of following out the patterns and possibilities that God coded into creation.” (Reinke, 2022:102) Every human discovery reveals the Creator’s guidance. God acts as the mentor, orchestrating each step in the technological evolution. Kuyper (2016:585) expresses this well: “Did the first farmer receive a manual? Did God send him an angel to demonstrate everything? Did God give him an oral revelation? None of these things. God gave him the soil, a head to think with, hands to work with, and (besides these) a basic hunger. God stimulated him through this drive. God taught him to think about things. Furthermore, he had to try things. First, one thing, and when that did not work, something else, until finally one person found this and the other that, with the results confirming that this was the right solution.” Technological innovation stems from human impulses that prompt the exploration of new possibilities within the established patterns of creation. Various intrinsic desires propel humanity to explore and experiment. However, regardless of the underlying motivation, innovation adheres to a pattern that God embedded within the natural order. Reinke (2022:110) states that humans do not create patterns. They can only follow them as they discover new divine gifts.

Many Christians are reluctant and apprehensive about technology, fearing it might unearth disruptive or malevolent forces and consequences. Contrary to this perception, any discoveries deemed undesirable by God would not be coded into creation's fabric in the first place. God sets the limits for human exploration and discovery. It is crucial to realise that each discovery not only sheds light on the Creator's intent in the creation design but also calls for the glorification of God.

> Who has measured the waters in the hollow of his hand or marked off the heavens with the span of his hand? Who has gathered the dust of the earth in a measure or weighed the mountains on a balance and the hills on the scales? (Isa. 40:12, CSB, 2017)

God meticulously calculated the vastness of space and allocated the necessary water and materials on Earth. Every aspect of creation exhibits perfect balance and precision, awaiting human discovery and exploration. While the earth presents countless marvels for humans to discover, none surprise God.

Reinke (2022:113) envisions a vast container with thousands of LEGO bricks, diverse in size, shape, and colour. With these, humans can construct an array of small or large objects using any subset of pieces. The bricks can be disassembled and reorganised into new configurations. This container signifies a seemingly infinite array of combinations for the human intellect, making LEGO bricks endlessly fascinating. However, calculating every possible outcome eludes human capability. Nonetheless, to an infinite mind, the number of potential configurations remains finite and predictable.

Finite limitations do not confine God's relationship with creation. God comprehends every possible combination, permutation, and boundary of human constructability. God not only knows but also defines the scope of potential outcomes. The exact count, dimensions, concentration, and colour of every available piece have been predetermined. All human creations inevitably conform to these divinely established parameters, which extend to the individual components and their collective interaction, respecting natural laws such as gravity.

The Creator dictates the realm of what can be manifested, encoding these possibilities into the fabric of creation. God then engages humans in a dynamic journey of discovery,

innovation, and enhancement across human history. Though possibilities may appear limitless to the finite mind, they remain intentionally circumscribed within the purview of an infinite intellect.

“God commands, and all things appear” (Ps. 148:5, CSB, 2017). He “calls things into existence that do not exist” (Rom. 4:17, CSB, 2017). So, “by faith we understand that the universe was created by the word of God so that what is seen was made from things that are not visible” (Heb. 11:3, CSB, 2017). Thus, the writer of Revelation, in speaking to God, says that God is worthy of all glory because “you have created all things and by your will they exist and were created” (Rev. 4:11, CSB, 2017). Creation exists for one fundamental reason: God was willing (Reinke, 2022:114). Christ is the Creator because, on the one hand, “all things were created through him”, and on the other hand, “apart from him not one thing was created that has been created” (John 1:3, CSB, 2017). Apart from Christ, nothing can be made that has not been made. “For everything was created by him, in heaven and on earth, the visible and the invisible, whether thrones or dominions or rulers or authorities — all things have been created through him and for him.” (Col. 1:16, CSB, 2017)

Creatio ex nihilo means that the creation is secure and safeguarded by God, not by itself. No human activity can undo the ultimate stability of creation because, right now, Christ sustains all things by his powerful word (Heb. 1:3, CSB, 2017). Christ is the genesis, the maintainer, and the utmost purpose of creation.

Reinke (2022:117) contends that without Christ, art, science, technology, agriculture, and medical innovations would not exist. Every entity originates in the Creator’s mind, whether seen or unseen. Christ represents the fulcrum of all existence. All things derive their worth from him. God laid the foundation for science and technology through deliberate patterns in creation. Science discerns these patterns, while technology harnesses them. God stands as the origin of all human advancements. Reinke (2022:119) asserts that technology’s primary objective is to immerse humans further in God’s creative brilliance, steering their hearts towards adoration and gratitude for their daily bread. The splendour of God serves as both the culmination of creation and the target of all human innovations.

Though often perceived as purely artificial, scientific discoveries hinge on divine intention. Every technological innovation offers a mere sliver of insight into the vast expanse of the

Creator's mind. Even Stephen Hawking, an avowed non-religious cosmologist, surmised in the twilight of his life that deciphering the laws of nature equates to "knowing the mind of God" (Hawking, 2018:28). This divine chronometer, as outlined by Reinke (2022:124), governs our rate and trajectory of scientific and technological advancements. These revelations often emerge as humans interpret cues from creation, occasionally in tandem but across varied geographies.

However, technologies share an inherent temporality akin to human life. Originating from the earth, they serve their purpose in the grand tapestry of human progress before inevitably returning to it through natural decay or recycling. The transitory nature of innovations highlights the folly of placing enduring hope in them (Reinke, 2022:129). Technology serves as an instrument to counteract the consequences of humanity's fall from grace. This notion is foregrounded by Kuyper's assertion that human actions are primarily driven by an urge to combat sin or its aftermath (Kuyper, 2016:582).

However, the interplay between technology and faith has its complexities. Despite many Christians' apprehensions about the perceived godlessness within the tech industry, Reinke (2022:138) argues that the Christian presence is crucial. Intriguingly, while technological brilliance propels some innovators further from divine revelation, leading them to craft personal idols, this ingenuity remains a testament to God's grand design (Reinke, 2022:139).

However, there lies a peril in allowing technology to eclipse faith. As innovations elevate safety and predictability in human lives, they inadvertently diminish reliance on divine providence, curbing feelings of gratitude, prayer, and faith. Relying excessively on technology can be spiritually impoverishing. It is imperative to discern between technologies that enrich spiritual lives and those that diminish them, always acknowledging the divine hand that provides these tools.

Reinke (2022:161) meticulously elucidates the profound ramifications that the rapid advancements in AI technologies have on national security considerations. Such technological progress allows potential adversaries to take highly destabilising actions, which may transcend the conventional human reaction time. This emergent vulnerability arguably fuels the current global AI competition. A salient impetus for this trend is the underlying sense of insecurity nations experience, prompting them to invest extensively

in cutting-edge technology to counteract potential threats. This cycle perpetuates a continuously escalating reliance on technology and innovation.

Interestingly, this phenomenon can be juxtaposed with ancient scriptural counsel cautioning against over-reliance on human-made defences. For instance, Proverbs 21:31 asserts, “A horse is prepared for the day of battle, but victory comes from the Lord.” (CSB, 2017) This vulnerability serves as a poignant reminder that irrespective of the scale of technological prowess, some forces may remain beyond human control. Isaiah further amplifies this sentiment by suggesting, “Woe to those who go down to Egypt for help and who depend on horses! They trust in the abundance of chariots and in the large number of horsemen. They do not look to the Holy One of Israel, and they do not seek the Lord.” (CSB, 2017)

From an eschatological perspective, an overemphasis on technological defences may inadvertently obscure nations from recognising prophetic events, such as the anticipated return of Jesus Christ. The notion of technological advancements offering a deceptive sense of security resonates with Psalm 33:17, which states, “The horse is a false hope for safety; it provides no escape by its great power.” (CSB, 2017) In this context, the horse symbolises a broader array of innovations that might ultimately be ineffectual in delivering genuine safety.

Subsequently, Reinke (2022:162) postulates that despite these ancient admonishments, there appears to be an unabating reverence for technology in modern societies. While the inclination to idolise tangible achievements is not unique to our era, the contemporary epoch exhibits an unparalleled veneration of technology. Regrettably, this trend reinforces the recurring historical pattern where societies, throughout time, have placed undue faith in their inventions, whether chariots or drones, only to confront their limitations eventually.

Reinke (2022:163) suggests a strong link between advanced autonomous warfare technologies and faith. He posits that technological advancements, especially in war, invariably reflect a particular faith dimension. Arguably, technology emerges as a filler for spiritual voids, offering humans a semblance of security. Reinke labels this phenomenon the “gospel of technology”. Intriguingly, this “gospel” has its distinct narrative, spanning themes from creation narratives to understanding ethical fallouts, redemption pathways,

faith constructs, and eschatological views. Thus, the “gospel of technology” envisions a distinct trajectory or telos. The contemporary shift seems to gravitate away from divinely ordained perfection, redirecting faith to the “technium” and, by extension, those who innovate within it.

Drawing from Reinke’s (2022:165) delineation, this technological gospel rebuffs the notion of humanity’s fall. Instead, it portrays challenges as mere speed bumps on the path to human elevation. Central to this discourse is an overriding theme of autonomy and self-determination. According to the “gospel of technology”, anything infringing on this personal freedom is adversarial. However, such challenges are not insurmountable; innovation emerges as the remedy. As an illustration, Reinke highlights how medical advancements morph into symbols of salvation within this framework. Traditionally viewed as a temple in theological discourse, the body becomes a temple to wellness, guided by this technological gospel.

Historically, medicine’s role centred on healing, palliation, and prevention. However, the current shift gravitates towards human augmentation. With the fusion of medical and digital technologies, innovations like brain-machine interfaces have moved beyond the domain of science fiction. For instance, Neuralink, a venture by Elon Musk, uses slender, adaptable metal threads to bridge human neural activities with digital outputs. A future with wearable neural devices that interpret human thoughts is not far-fetched. These advancements allude to a potential future where traditional devices like keyboards become obsolete, with humans commanding their digital surroundings through speech or mere intent. Should these projections hold, the line between man and machine could blur, giving rise to cybernetic beings with enhanced or even novel capabilities.

Reinke (2022:166) also critiques the relentless momentum of the tech-driven culture. He notes that pursuing perpetual optimisation is becoming an end in itself, overshadowing other considerations. Human enhancement through methods like biohacking becomes a focal point in this race. However, this accelerated push for enhancement is not without its cost, underscoring the human implications of an unbridled progress ethos. Ultimately, “the commandment of love is replaced by the commandment of effectiveness and efficiency” (Schuurman, 1980).

In Yuval Noah Harari's *Homo Deus: A Brief History of Tomorrow*, the atheist and futurist historian posits that for technology to achieve its ultimate aspirations, it must surpass Christ's traditional role. Presently, it appears poised to do so. He writes: "We don't need to wait for the Second Coming to overcome death. A couple of geeks in a lab can do it. If traditionally death was the speciality of priests and theologians, now the engineers are taking over." (Harari, 2016a:26) Reinke (2022:170) posits that "one gospel replaces the other by overcoming death". For Kurzweil (2005:372), technology replaces Christianity as a matter of necessity, because "a primary role of traditional religion is deathist rationalisation[37] – that is, rationalising the tragedy of death as a good thing". In contemporary scientific discourse, a perspective suggests that humanity's solution to mortality might not be found in a divine saviour but rather within our own genetic code. Researchers posit that by deciphering and potentially altering specific components of the human genome, the cessation of the ageing process could become attainable. Thus, the proposition is that humanity could, in essence, become its own saviour. Such an implication prompts critical reflection on the traditional role of Jesus as the redeemer in Christian theology. If this scientific hypothesis bears fruit, it underscores the pivotal role of technological advancements, suggesting that humanity might be on the precipice of self-redemption through technological means.

Consequently, a deeper examination of the Bible's apocalyptic texts could illuminate the trajectory of humanity in this technological age. Understanding these scriptures might inform a harmonious synthesis between faith and technology and shed light on the eventual culmination of humanity's journey.

[37] "Deathist rationalization" is a term that has been used in transhumanist and futurist circles to describe the justification or normalization of death, often by viewing it as a natural, inevitable, or even beneficial aspect of human existence. The term combines "deathist", which denotes an acceptance or endorsement of the inevitability of death, with "rationalization", referring to the act of explaining or justifying a particular stance or viewpoint. Transhumanists, who advocate for using technology to overcome human limitations including mortality, often challenge these "deathist" views, arguing that there might be ways to extend human life significantly or even achieve a form of immortality (OpenAI, 2023a).

5.3 Prophetic parallels: Interpreting biblical texts through generative Pentecostal techneutics

While the primary purpose of biblical prophecies is often spiritual and not necessarily to predict technological advancements, it is fascinating to see potential parallels between ancient scriptures and modern-day developments. It showcases how the timeless nature of the Bible can resonate with every era, even in the realm of technology.

However, it is crucial to approach these interpretations with caution. They can provide insightful reflections but should not be taken as direct prophecies of specific technologies. Instead, they remind believers of God's omniscient nature, foreseeing humanity's trajectory and divine plan.

Using GPTh as the interpretive framework, two distinct workflows are applied to the selected texts. The exploration begins with technological developments in AI and then transitions to the biblical text. This approach uses a material lens[38] to explore how AI technology might influence scholars' understanding of biblical texts. We approach the biblical text with the idea that objects and technologies are not just passive entities, as Hongladarom (2020:1–8) and Ihde (2020:5–20) explain, but that they significantly influence humanity's comprehension of the world and act as mediators in their interactions. Just as instruments like telescopes and microscopes revolutionised scientific knowledge, AI advancement might revolutionise how scholars understand biblical texts about eschatological events. This approach aims to give technology a voice and let it "tell its story" about humanity's future. If AI is, metaphorically speaking, a microscope and the

[38] Don Ihde introduced the idea of material hermeneutics, extending the traditional scope of hermeneutics from just interpreting texts to deciphering the material world as well. In essence, it's about letting objects and technologies "tell their story". By using hermeneutical methods, this approach delves into the study of material objects and technological innovations. Objects and technologies are not just passive entities; they significantly influence our comprehension of the world and act as mediators in our interactions with it. For instance, telescopes and microscopes revolutionized our vision, allowing us to see the world in both broader and more intricate dimensions. Such advancements not only extend our perceptions but also reshape the stories we tell about the universe and our place in it. Through these tools, our understanding undergoes irreversible transformations. Another pertinent illustration is how our understanding of global warming and climate change is shaped through data gathered by instruments. In Don Ihde's perspective, material hermeneutics isn't just a sideline; it's central to the scientific process, broadening hermeneutics to encompass nature's interpretation (Hongladarom, 2020:1-8; Ihde, 2020:5-20).

Bible is the specimen, what will the microscope reveal? What would the picture look like if AI was, metaphorically speaking, a telescope and the Bible were the planets observed? GPTh might reveal the answers to these questions.

With the second workflow, the researcher starts with a biblical interpretation and then advances to AI technological development. The aim is to use an articulated Pentecostal hermeneutical approach to explore how biblical text might influence scholars' understanding of advancements in AI technology. If AI could say something about humans, what would it say? What would it say about the complexity and diversity of human societies, cultures, emotions, and behaviours? Could it identify trends and anomalies within the vast datasets about humanity? Will it uncover human societies' underlying psychological, sociological, or economic mechanisms? Will AI reveal vulnerabilities in societal systems, be they economic, infrastructural, or even ideological? Will AI's voice develop to become an objective, detached observer, free from human biases and emotions, capturing humanity's actions without being influenced by them? Will AI highlight innovation, progress, and prosperity in humanity while also pointing out areas of conflict, disparity, and struggle? How would the future look if AI could forecast future trends based on observed patterns, behaviours, or challenges awaiting humanity?

5.3.1 Ezekiel's vision of the wheels (Ezek. 1:15–21)

> *When I looked at the living creatures, there was one wheel on the ground beside each of the four-faced creatures. The appearance of the wheels and their craftsmanship was like the gleam of beryl, and all four had the same likeness. Their appearance and craftsmanship was like a wheel within a wheel. When they moved, they went in any of the four directions, without turning as they moved. Their four rims were tall and awe-inspiring, completely covered with eyes. When the living creatures moved, the wheels moved beside them, and when the creatures rose from the earth, the wheels also rose. Wherever the Spirit wanted to go, the creatures went in the direction the Spirit was moving. The wheels rose alongside them, for the spirit of the living creatures was in the wheels. When the creatures moved, the wheels moved; when the creatures stopped, the wheels stopped; and when*

the creatures rose from the earth, the wheels rose alongside them, for the spirit of the living creatures was in the wheels (Ezek. 1:15—21, CSB, 2017).

- **wheel** – אוֹפַן (*ʾôpan*), N. *wheel* — a wheel as a part of a vehicle: Cart; Chariot (Brannan, 2020). Elwell and Beitzel (1988:2139–2140) highlight that Mesopotamia is the birthplace of the wheel, likely emerging around 3500 BC. Initially, the Sumerians used two-wheeled carts. The earliest wheels likely derived from tree discs, but as technology evolved, craftsmen used three-shaped planks held together with copper clamps spanning the wheel's length. By 2000 BC, spoked wheels had surfaced in northern Mesopotamia.

  The Bible references the wheel with four Hebrew words, signifying its varied types and applications. Noteworthy mentions include the potter's wheel (Jer. 18:3), chariot wheels (Exod. 14:25), and grain grinding wheels (Isa. 28:28). However, Ezekiel's vision of God's chariot represents the most significant biblical mention of the "wheel" (chs 1; 10; cf. Dan. 7:9). In this vision, amid a stormy wind cloud (Ezek. 1:4), fire, creatures, and wheels converge. Ezekiel emphasises these elements, noting that the wheels move as the creatures direct. Unique to Ezekiel's wheel is its composition: a wheel within another. This design does not imply two wheels on a shared axis; instead, one wheel's rim sits perpendicularly within another's. Such a wheel offers multi-directional mobility, rolling in any cardinal direction. It shadows the creatures' movements and symbolises God's encompassing judgment, inescapable by all, illustrating that Judah could not evade impending calamity due to God's ordained judgment (Elwell & Beitzel, 1988:2139–2140).

  The wheel is one essential component of the wheel and axle system, one of the six classical "simple machines" defined by the Renaissance (Anderson, 1914:112; Britannica & Smellie, 1773:44; Morris & Press, 1992:1993). They are the lever, wheel and axle, pulley, inclined plane, wedge and the screw. Paul *et al.* (2005:215) describe a simple machine as "a mechanical device that changes the direction or magnitude of a force". Asimov (1988:88) explains them as basic

mechanisms that use mechanical advantage, often termed leverage, to amplify force, hence the term technology, as explained earlier.

- **craftmanship** – מַעֲשֶׂה (*maʿăśe*), N. work; labour, accomplishment, and final fate (Brannan, 2020). The Lexham Research Lexicon of the Hebrew Bible delves deeper, indicating that the term pertains to actions started by individuals, activities aimed at creation or execution, and the outcome resulting from a person's or entity's effort or activity. Additionally, it denotes proficiency in a particular profession or craft (Brannan, 2020).
- **beryl** – תַּרְשִׁישׁ (*tršyš*), N. precious stone: *topaz* (Brannan, 2020). According to the Lexicon, a beryl (cut) is a precious stone cut for jewellery or other purposes, probably beryl, which can be coloured or transparent. References can be found in Exodus 28:20; 39:13; Song 5:14; Ezekiel 1:16; 10:9; 28:13; and Daniel 10:6, where it is presented as an artefact (Brannan, 2020).
- **rims** – גַּב (gb), N. back; (wheel) rim, felloe; (altar) torus; (shield) bosses – the outer edge of a wheel (Brannan, 2020).

- **eyes** – עַיִן (ʿayin), N. eye; appearance, look; spring; Ain. Brannan (2020) defines this as an organ of sight or the outward or visible aspect of a person or thing. Wood and Marshall (1996:353) explain that in the context of Ezekiel 1:18; cf. Revelation 4:6, eyes might refer to objects.

Examining Ezekiel's vision through the lens of GPTh offers fresh insights into the role of technology in theophanies or divine manifestations. Why does God appear to Ezekiel using technological elements like complex, eye-covered wheels? This revelation contrasts with other biblical theophanies: three visitors meeting Abraham in Genesis 18:1–33, the burning bush experienced by Moses in Exodus 3:1-6, or a pillar of cloud or fire guiding the Israelites in Exodus 13:21–22. God could have used audible communication, as with Samuel (1 Sam. 3:1–14), Elijah (1 Kgs 19:11–13), and Jesus (Matt. 3:17; Mark 1:11; Luke 3:22). Instead, God opts for "wheels within wheels" and other features requiring technological sophistication.

Could Ezekiel's description of the creatures in verse 5—appearing "somewhat like humans" with straight legs and feet resembling polished bronze hooves—hint at future

humanoid entities? Their movements might correlate with the degrees of freedom (DoF) in robotics. The “eyes” on the wheels could signify sensory feedback systems essential for robots to operate safely and accurately. These systems can involve sensors such as encoders for measuring rotation, inertial measurement units (IMUs) for orientation, cameras for visual processing, and LIDAR or ultrasonic sensors for obstacle detection. The creatures’ coordinated movements in Ezekiel’s vision resemble semi-autonomous and autonomous robots that make decisions based on sensory data and programming. Directed by the Spirit, these creatures embody a form of advanced intelligence, especially considering Ezekiel’s remark that “the spirit of the living creatures was in the wheels” (v. 20).

The sound emanating from the creatures’ wings, likened to a “roar of a huge torrent”, is attributed to the voice of the Almighty. Could this sonic display correspond to the noise of drones’ powerful motors? Ezekiel’s vision could serve as both a warning and reassurance: regardless of how advanced or autonomous technologies become, God remains sovereign, overseeing all technological progress.

The creatures follow the direction set by the Spirit (v. 20), indicating that the spirit guiding the technology (the AI) is subservient to the Spirit of God (the divine intelligence). Cooper’s (1994:69) research supports this, stating that God, the Lord of creation, sits above these creatures on his throne-chariot, his voice emanating from there (v. 25). No matter the level of human technological achievement, symbolised by the “craftsmanship” of the wheels, God’s glory surpasses all human creations.

5.3.2 Knowledge shall increase (Dan. 12:4)

> *But you, Daniel, keep these words secret and seal the book until the time of the end. Many will roam about, and knowledge will increase (Dan. 12:4, CSB, 2017).*

During the current technological revolution, the emergence of the digital age has brought a remarkable surge in data aggregation. The relationship between this burgeoning data reservoir and AI system enhancement cannot be understated. Alzubaidi *et al.* (2021:44) argue that models with fewer layers have poor accuracy because they cannot use the hierarchical features of sizable datasets, and Zhang *et al.* (2021:107) and Alzubaidi *et al.*

(2021:73) contend that deep learning models, a subset of AI, may benefit significantly from voluminous datasets. As Helbing (2019:25–26, 48–49) found, with the expansion of data, there is potential for AI systems to refine their capabilities, possibly at an augmented pace.

Ray Kurzweil predicts that by 2030, personal computers will possess the computational capability akin to a small village's collective intelligence. By 2048, they could rival the cognitive capacity of the entire US populace, and by 2060, they could emulate the brainpower of a trillion humans (Helbing, 2019:20; Kurzweil, 2000:80). By 2099, it is anticipated that a single computer will have a computational capability a billion times more potent than the combined intelligence of all humans present on earth at that moment (Feigenbaum & Feldman, 1963:6–11; Turing, 1950:433–460).[39] We can anticipate that between 2020 and 2060, supercomputers will likely exceed human abilities in nearly every domain (Helbing, 2019:74).

Drawing attention to Moore's observation in 1965, it is evident that technological advancements will have profound implications. Moore, a pioneering figure from Intel, deduced that the transistor count on microchips seemed to double approximately every two years (Kurzweil, 2000:24–31; Leiserson *et al.*, 2020:1), and as we advance beyond 2020, this scaling reached transistor sizes of 7 nanometres (nm), while 3 nm technologies have emerged, with a multi-billion transistor count packed in a tiny microchip (Pan *et al.*, 2021:6903). Unfortunately, this scaling cannot continue perpetually.

According to Leiserson *et al.* (2020:1), miniaturisation is nearing its limits, signalling the conclusion of Moore's law. Performance enhancement must stem from software, algorithms, and hardware design. In computer science, computer scientists refer to development at the "bottom": semiconductor physics and silicon-fabrication technology, and the "top": software, algorithms, and hardware (Leiserson *et al.*, 2020:1). A significant portion of the advancements in computer performance can be attributed to the miniaturisation of computer parts over decades. Nobel Prize-winning physicist Richard

[39] "Computing Machinery and Intelligence", Mind 59 (1950): 433–460, reprinted in E. Feigenbaum and J. Feldman, eds., Computers and Thought (Turing, 1950).

Feynman predicted this trend in his 1959 speech titled “There’s Plenty of Room at the Bottom,” delivered to the American Physical Society (Leiserson *et al.*, 2020:1).

Leiserson *et al.* (2020:1) contend that, regrettably, the miniaturisation of semiconductors is nearing its limit to enhance computer performance—there is not much more space left at the “bottom”. Leiserson *et al.* (2020:1) argue that the next wave of advancements in computer performance will arise from refined software development, including performance engineering and optimisation for speed and efficiency, sophisticated algorithms that provide enhanced problem-solving abilities with less computational work, and innovative hardware architecture. It is estimated that the current rate of evolution in chip design will reduce transistors to the atomic scale by 2024, where quantum mechanical characteristics will dominate (Khalid *et al.*, 2021:1). Quantum computers have been proposed as one way to deal with this unfathomable data processing (Khalid *et al.*, 2021:1). These unprecedented advances in computer hardware and capabilities have spurred broader research and increased knowledge acquisition.

Scite.ai, an academic research assistant, claim that they validate information against over 1.2 billion citation statements and metadata from over 185 million papers (Scite Inc., 2023). Curcic (2023) posits that since 1996, a minimum of 64 million scholarly articles have been published, and the rate of new article publications has been escalating as time progresses. As of 2022, academic articles published annually reached 5.14 million, marking a 2.06% increase from 2021 and a 22.78% surge since 2018, with 2021 experiencing a notable 7.62% rise in publications compared to its preceding year (Curcic, 2023). Interestingly, as of 2022, China leads in annual academic article publications, becoming the first country to release over one million documents annually, accounting for 19.67% of the global total (Curcic, 2023). Semantic Scholar (2023), another AI-powered scientific research tool, claims to search through more than 214 million academic papers from all fields of science.

Data on the size of academic search engines and bibliographic databases (ASEBDs) frequently becomes outdated or is entirely missing, making it impossible to determine the extent of academic papers available. Research conducted by Gusenbauer (2019:1) offers size estimates for ProQuest and EBSCOhost. It suggests that people might have

previously underestimated Google Scholar's size by over 50%. With 389 million records, Google Scholar is the most extensive academic search engine.

In light of the remarkable advancements in the digital era, it is evident that our collective knowledge and technological prowess are growing at an unprecedented pace. Microchip development, predicted by luminaries such as Moore and Feynman, has reached near-atomic scales, with quantum computing on the horizon to address vast data processing challenges. Furthermore, the sheer volume of academic publications, underscored by platforms like Google Scholar and Semantic Scholar, has exploded. This profound accumulation and dissemination of knowledge, facilitated by the relentless progression of technology, undeniably resonates with Daniel's prophecy in Daniel 12:4, emphasising the increase in knowledge in the end times.

5.3.3 The blind will see, the deaf will hear and the lame shall walk (Isa. 29:18, 35:5–6)

> *On that day the deaf will hear the words of a document, and out of a deep darkness the eyes of the blind will see (Isa. 29:18, CSB, 2017).*

Motyer (1999:216) and Barry (2012; Isa. 29:18) explain that the analogies of deafness and blindness in the text above reference Isaiah 29:11, where the juxtaposition of shut eyes and a sealed book is in contrast to the attentive ears and an accessible book in this context.

> *For you the entire vision will be like the words of a sealed document. If it is given to one who can read and he is asked to read it, he will say, I can't read it, because it is sealed. And if the document is given to one who cannot read and he is asked to read it, he will say, "I can't read". (Isa. 29:11–12, CSB, 2017)*

For Jamieson *et al*. (2017:462), deaf and blind refers to the spiritually blind and deaf, and "the book", as Revelation is called pre-eminently, shall no longer be "sealed", as is described (Isa. 29:11). However, the most unintelligent shall hear and see:

> *Then the eyes of the blind will be opened, and the ears of the deaf unstopped. Then the lame will leap like a deer, and the tongue of the*

> *mute will sing for joy, for water will gush in the wilderness, and streams in the desert (Isa. 35:5–6, CSB, 2017).*

Henry (1994:1133) describes that those who attempted to conceal their intentions from the Lord were perceived to invert the natural order (v. 16). They hoped to operate without God's knowledge. However, God declares that he will reorient things in his manner. The question is whose declaration will prevail, God's or theirs? These individuals doubted Divine Providence: "Wait awhile", says God, "and you shall be convinced by ocular demonstration that there is a God who governs the world and that he governs it and orders all the changes that are in it for the good of his church". Expanding on this, Henry (1994:1133) points out that those once uninformed will gain insight (v. 18). Those who previously could not grasp this prophecy (finding it as impenetrable as a sealed book (v. 11) will, upon its realisation, comprehend it. They will recognise God's actions in the unfolding events and his voice foretelling them: At that time, the deaf will hear the book's words.

The most precise way to understand a prophecy lies in its fulfilment. Divine revelation will reach the disadvantaged Gentiles; individuals previously in darkness will experience profound illumination, and those once visually impaired will gain clarity (Henry, 1994:1133). The gospel aims to enlighten these groups, as outlined in Acts 26:17-18. In this passage, Jesus says:

> *I will rescue you from your people and from the Gentiles. I am sending you to them to open their eyes so that they may turn from darkness to light and from the power of Satan to God, that they may receive forgiveness of sins and a share among those who are sanctified by faith in me (Acts 26:17–18, CSB, 2017).*

English author Gilbert K. Chesterton once wrote: "The effect of not believing in God is to believe in anything." (Comfort, 2003:888) Comfort (2003:889) states that information ranks as the world's most valuable asset. Using an analogy, he illustrates that knowing the location of fire escapes in a burning building enables escape. Without this knowledge, survival becomes uncertain, and the future is uncertain for those for whom the "document" is sealed. Thus, actions hinge on the presence or absence of information.

Modern advancements in intracortical brain-machine interfaces (BMI) and AI to aid those with sensory or physical disabilities beautifully echo ancient texts and perspectives. These interfaces decode brain signals from different regions and translate them into motor commands for controlling robots, exoskeletons, and other devices (Serino *et al.*, 2022:4). This concept of connecting the brain to external machines echoes the ancient idea of enhancing human abilities with external tools and instruments as illustrated earlier.

The book of Isaiah describes a day when “the deaf will hear the words of a document, and out of a deep darkness the eyes of the blind will see” (Isa. 29:18, CSB, 2017). Today, this prophecy takes on a tangible form with the integration of advanced neural interfaces and AI. Devices allow deaf people to hear and blind people to perceive, bridging the gap between age-old visions and contemporary technology.

The ancient texts provide metaphors and analogies that vividly depict enlightenment and transformation. Just as in Isaiah 29:11, where the unreadable, sealed book becomes accessible, today’s technology “unseals” the world for many. Brain implants and AI solutions unlock previously inaccessible experiences. Thus, they unseal the proverbial “book of life” for many individuals. Jamieson *et al.* (2017:462) referenced spiritual blindness and deafness, yet the solutions provided by AI and brain implants address not just spiritual but literal disabilities. Isaiah’s portrayal of the formerly “lame” leaping like deer resonates with the groundbreaking advancements in prosthetics and exoskeletons, which restore mobility to those who once used wheelchairs (Serino *et al.*, 2022:4, 18).

Henry’s (1994:1133) discussion about humans’ hidden intentions and God’s overarching control can be compared to how these technologies work. The developers and engineers may have their intentions, but the effect and broader societal acceptance are ultimately under God’s supremacy and rule. Just as prophecies are understood upon fulfilment, these technologies’ true potential and intentions only become evident once they are implemented and their transformative power is revealed.

Moreover, the essence of enlightenment, as depicted in Acts 26:17-18, aligns with the mission of modern technology: to shed light where there is darkness, to provide understanding where there is confusion, and to open up the world to those who have been shut off from it.

Gilbert K. Chesterton's insight into belief systems underscores the importance of direction and purpose. In a world of information, it becomes pivotal to discern essential knowledge from the extraneous. Just as Comfort (2003:889) highlighted the critical nature of having the correct information at the right time, modern AI and brain implant technologies serve as tools that provide the necessary "information"—be it sensory inputs or mobility—when and where it is needed most.

In conclusion, the interplay between ancient texts and modern technological developments serves as a testament to the timeless human pursuit of enlightenment, understanding, and the betterment of the human condition. The age-old visions of the prophets and today's cutting-edge AI technologies bridge the epochs, proving that both align with God's redemptive work in light of Scripture. Much like living beings, future robots are predicted to operate independently in the unpredictable settings of the natural world. They can self-adjust, learn, withstand harm, and collaborate within group systems (Miriyev & Kovač, 2020:1). In a Christian context, these advanced robots and related assistive technologies could potentially extend the ministry of Jesus Christ. These innovations are beneficial when embraced by Christians keen to use these innovations to expand God's kingdom on Earth.

5.3.4 Deception and manipulation (Matt. 24:4–6)

> *Jesus replied to them, "Watch out that no one deceives you. For many will come in my name, saying, 'I am the Messiah,' and they will deceive many."* (Matt. 24:4-5, CSB, 2017)

Lucky (2023) explains that people often focus on valuing the things that God has made instead of honouring the Creator. Romans 1:25 elaborates on this: "They exchanged the truth of God for a lie, and worshipped and served what has been created instead of the Creator, who is praised forever." (CSB, 2017) Unlike the silent wood and stone of old, humanity's latest AI creations, like OpenAI's ChatGPT, Google's Bard and Meta's Llama 2, can converse and offer guidance. Habakkuk 2:18-19 warns:

> *What use is a carved idol after its craftsman carves it? It is only a cast image, a teacher of lies. For the one who crafts its shape trusts in it and makes worthless idols that cannot speak. Woe to him who says to*

> *wood: Wake up! or to mute stone: Come alive! Can it teach? Look! It may be plated with gold and silver, yet there is no breath in it at all (CSB, 2017).*

However, only God merits worship, not these creations, no matter how mind-boggling and intelligent they might seem. Reliance on technology can diminish trust in God and his guidance. Overemphasis on technology might narrow the church's perspective, risking a misinterpretation of context. Chatbots offer guidance from multiple perspectives, which could dilute the essential biblical message of salvation through Jesus Christ. The Panel for the Future of Science and Technology conducted by the European Parliamentary Research Service (EPRS) warns that deception and manipulation are significant concerns accompanying the human-robot relationship (Bird *et al.*, 2020a:18). One of the most significant risks associated with AI development that all humans face, is the loss of ability to think for themselves (Bird *et al.*, 2020a:18). People forget necessary skills. They lose their human agency and ability to do introspection. Scheutz (2012:205–221) warns that social robots that are loved and trusted could be misused to manipulate people. Dula *et al.* (2023:1) agree that social robots today serve as caretakers for the elderly, supporters, entertainers, and educators for children. To fit these close roles, robotics companies design robots that can identify and mimic emotions. However, imitating emotions can potentially mislead or exploit users through deceptive design. Bird *et al.* (2020a:18) further contend that future robots might be designed to appear more trustworthy and attractive. If humans consistently show more honesty with robots or chatbots than other humans, robots could soon be used for interrogations.

Similarly, if robots seem more convincing than humans, they might be chosen as sales representatives. However, technology can activate the brain's reward mechanisms, potentially leading individuals to behave uncharacteristically. Bird *et al.* (2020a:57) assert that companion robots and robotic pets could ease loneliness in the elderly, but only if these individuals come to see the robots as sentient beings with feelings. This perception would be fundamentally deceptive.

Deep fakes and disinformation are longstanding tools in military and operational deception. They represent yet another tactic in wartime trickery that both sides in a conflict might use or fall victim to (Chesney & Citron, 2018:1783). Chesney and Citron

(2018:1783) warn that deep fakes already jeopardise public safety and international relations while complicating intelligence operations. This kind of deception could alter foreign policy, with widespread consequences for societies. News agencies also risk deception since they can no longer rely solely on photos or videos that may prove fake (Chesney & Citron, 2018:1784).

Furthermore, deep fakes make it easier for deceivers to refute the truth by manipulating audio and video evidence. In situations of unequal resources, deep fakes can help perpetrators avoid accountability. As these deceptive tactics become more prevalent, the public may find it harder to trust their perceptions, even when faced with genuine information. This decline in trust could ultimately undermine the effective functioning of democratic systems (Chesney & Citron, 2018:1786–1787).

Technology, while beneficial, can hinder profound thought. Murray (2016:216) observes that with the rise of the internet and Bible software, many Christians turn to Google before seeking answers from God. When technology shapes human perspectives, the risks of misuse and deception increase, as Jeroen van den Hoven contends (Helbing, 2019:90). A significant challenge today is enhancing knowledge and cultivating wisdom in a society where technology can intensify and automate distractions and deceptions (Paulus Jr., 2022:8). Paulus Jr. (2022:13) further contends that when Babylon finally collapses, its downfall is celebrated. The injustices it perpetuated and the deceptions that lead many to see these evils as good are unequivocally condemned and brought to an end.

Two decades ago, secular heterodox experts (Derrida *et al.*, 1999; Vattimo *et al.*, 1993) described the era humans face as both post-postmodern and post-Christian. For Istodor (2015:247), this situation, which extends beyond Christianity and post-modernism, presents challenges linked to secularism, materialism, and atheistic tendencies. Istodor (2015:247) states that secularisation marks a significant shift since the Renaissance when humans distanced themselves from God. This separation starts a process where, relying on their logic, humans no longer acknowledge God in various roles such as the Trinity, the Creator, the Saviour, or the Sanctifier. This idea represents a profound misconception, the pinnacle of deception. This rebellion against God also affects the Church of Jesus Christ. The Church finds itself increasingly marginalised or even excluded from public discourse. Its message is often devalued when engaging with

secular institutions. If silencing the Church proves unsuccessful, critics try to discredit it, portraying it as a medieval relic that hinders the progress and happiness of modern society (Istodor, 2015:247).

Satan's deception has affected the sensory aspect of human experience. Instead of feelings and emotions being guided by the Holy Spirit, they become distorted, leading to a body that ceases to serve as the "temple of the Holy Spirit" (1 Cor. 6:19). Confusion increases as humans evolve. Changes occur in areas that God intended for transfiguration. Art and technology, designed to elevate and refine human nature, have undergone changes that have added to human confusion and deception. Modern and post-modern art have lost their purpose when they abandoned divine inspiration, distancing themselves from God's presence in his creation. Art once symbolised a "divine grace" where individuals connected deeply with the Creator. However, today's post-modern art, relying on various mediums, often contains horrible blasphemies against fundamental Christian beliefs, and secular law interprets them as only artistic works and creations (Istodor, 2015:248). Today, art and technology display humanity's separation from God and attachment to deception. Instead of transfiguration, it exhibits their degeneration. Istodor (2015:249) says this degeneration is "equivalent to human demonization and loss of salvation".

Another challenge arises from contemporary advanced technology, which attempts to extend human life to immortality. For Istodor (2015:249), this means that the meaning and purpose of life are valued only through the material dimension of existence, a sign that materialistic and naturalistic ideologies have achieved their goal. In this sense, Deagon (2021:82) proposes that "technology echoes the binding nature of theology as a subset of religion (from *religare*, meaning 'to rebind')". In this context, technology serves as a secular alternative to theology. Technology becomes the new theology. Examples of this technological shift include genomics, which improves human health and lifespan; nanotechnology, which combats illness and boosts resource efficiency; and AI, which augments physical and cognitive abilities (Deagon, 2021:82). People have long questioned their role and purpose in life. Historically, religion offered answers, giving meaning and contentment by connecting with a deity. However, as traditional religion's influence wanes in the West, technology emerges as an alternative, addressing these

same concerns. In this way, technology has become a modern form of theology (Deagon, 2021:82).

More radical instances of deception include transhumanism, which involves enhancing or modifying humans using biomedical technology, genetics, AI, and nanotechnology (Deagon, 2021:82). Tirosh-Samuelson (2012:710–734) has gone so far as to call transhumanism a secularist faith. Technology now responds to the deep questions and desires once answered by traditional theology. It presents awe-inspiring worlds and beings, offering a digital escape from life's physical constraints (Deagon, 2021:83). Today, Silicon Valley's wealthiest aim is to achieve immortality, without God, through a new species: a blend of human and robot. This vision could signify the end of "homo sapiens" (Istodor, 2015:250). Istodor (2015:252) further asserts that the future religion will revolve around technology as the new "god" worshipped by a hybrid being. A future without technology seems inconceivable and equates to being tied to death, a notion unthinkable for the young "tech masters of the universe".

Transhumanists assert that technology facilitates the possibility of eternal life (Cira, 2019:47). Lincoln Cannon, a proponent of this perspective, advocates for human control over death, promoting the ethical utilisation of technology to overcome human limitations, including mortality (Cira, 2019:40, 47). Transhumanists diligently strive to render death optional (Shin, 2021).

The Church of Perpetual Life, situated in Pompano Beach, Florida, welcomes speakers from around the globe to elucidate transhumanist beliefs and recent discoveries (Faloon & VanDeRee, 2023). One guest speaker, Gabriel Rothblatt—a philosopher and pastor affiliated with Terasem—articulated that transhumanism has the potential to redefine eternity positively (Shin, 2021). Terasem, a philosophical movement grounded in transhumanism, posits that technology enables humans to attain immortality, aligning with the foundational religious principle of soul immortality (Rothblatt *et al.*, 2023). In Terasem's framework, the soul equates to human consciousness. The conviction that science will ultimately vanquish death underpins Terasem's philosophy. Opposing involuntary death, Terasem envisages immortality as a panacea for humanity's myriad challenges (Rothblatt *et al.*, 2023; Shin, 2021).

Terasem conjectures the feasibility of immortality, conceptualising the soul as data rather than matter, a concept well documented by Kurzweil (2000:94). The notion suggests the soul's constituent elements—ideas, thoughts, memories, visions—are encapsulable and transferrable data sets, termed "mind files". These mind files, theoretically, can encapsulate the entirety of human experience: triumphs, emotions, first experiences of love, profound losses, and the joy associated with the birth of one's first child. Terasem contends that immortalising these memories and experiences is achievable through their capture and transfer, aligning with their vision of amalgamating human minds with machines and thereby transferring consciousness into artificial entities (Cira, 2019:47; Shin, 2021).

In his book, *The Age of Spiritual Machines*, Kurzweil (2000:94) writes:

> *As software, our mortality will no longer be dependent on the survival of the computing circuitry. There will still be hardware and bodies, but the essence of our identity will switch to the permanence of our software. Just as, today, we don't throw our files away when we change personal computers – we transfer them, at least the ones we want to keep. So, too, we won't throw our mind file away when we periodically port ourselves to the latest, ever more capable, "personal" computer.*

The development of technology capable of creating mind files is underway, with the potential for uploading these to AI avatars, thereby achieving artificial immortality. Spiritual guru Dr Deepak Chopra has pioneered this field, developing a digital clone capable of mimicking his expressions, eye movements, and vocal tone (Chopra, 2023). This avatar, informed by ninety of Chopra's publications, offers spiritual guidance and exhibits adaptive thinking. The overarching aim is to produce an undying simulation of Chopra, negating the necessity of awaiting death or a celestial afterlife to confirm the absoluteness of eternity (Chopra, 2023; Shin, 2021).

Dr Hossein Rahnama, visiting scholar at the media lab and Director of Research and Innovation at Ryerson's Digital Media Zone, focuses on the radical concept of "augmented eternity" and "borrowable identity". Augmented eternity refers to crafting digital replicas remarkably akin to individuals, capturing and representing their unique

wisdom to enrich succeeding generations. Rahnama, the founder of Flybits (2023)—a cloud-based service altering mobile app behaviours according to user location and usage—aims to bridge the chasm between life and death through the eternalisation of digital identity. Rahnama posits that while physical existence ceases, the digital counterpart persists and evolves, assisting others and perpetuating an individual's legacy as a continually developing entity (Rahnama *et al.*, 2021:1-12; Tynan, 2016). According to Rahnama, the endeavour of AI represents humanity's quest to emulate the intricate functionalities of the human brain, capturing not only cognitive processes but also the spectrum of human emotions (Rahnama *et al.*, 2021:1–12; Shin, 2021).

Ben Goertzel, the mind behind Singularity NET and chief scientist at Hanson Robotics, introduced the concept of AGI (Goertzel, 2007:1161–1173). This term denotes a stage at which AI attains a level of intelligence indistinguishable from that of humans across all domains. Goertzel elucidates the conception of a global AI brain, an entity capable of amalgamating individual intelligence into an embryonic state, providing fertile ground for the emergence of superior general intelligence. The impetuses compelling individuals to forge superhuman AI intellects, asserts Goertzel, mirror those driving human engagement with religious faiths (Goertzel, 2007:1161–1173; Shin, 2021).

However, this comparison arises not from intrinsic similarities between religion and AI but rather from their alignment with fundamental human motivations, primarily the aversion to mortality (Dein, 2019:15). Individuals often embrace religious beliefs for the eternal life these faiths promise. Goertzel opines that technology offers solutions surpassing those provided by heretical doctrines, positing that it can enhance the collective human consciousness more effectively and reliably than religious institutions have achieved (Shin, 2021).

Dr Taufik Valiante, a distinguished neurosurgeon and scientist at the Krembil Neuroscience Centre (KNC), maintains that envisioning the creation of an entity mirroring the human brain's complexity and capacities is profoundly challenging. As he posits, the human brain stands as the universe's most intricate structure, a notion supported by the Johns Hopkins University in Baltimore (Smirnova, Morales*, et al.*, 2023:1). Despite the training and refinement of AI systems and networks, few, if any, can approximate the brain's remarkable capacity for generalising knowledge (Shin, 2021).

From the viewpoint of Hiroshi Ishiguro, director of the Intelligent Robotics Laboratory at Osaka University in Japan, androids have seamlessly integrated into the tapestry of daily life in Japan, blurring the lines between the mechanical and the biological. Ishiguro observes an indivisible connection between robots and humans, each constituting a part of the other. This perspective aligns with a broader cultural belief in Japan where every entity is considered to possess a soul, or *sonzai-kan*, translating to presence (Shin, 2021).

The biblical book of Daniel (12:1–4) suggests that a significant surge in information technology heralds the end of time. According to Christian theology, eternity awaits every individual, with the final destination being heaven or hell. Transhumanists, who envisage eternal life through technological means, are indeed correct in their assertion of living perpetually. However, technology cannot guide individuals towards their desired eternal destination or allow for continuous self-replication, as each person faces mortality once, followed by judgment (Heb. 9:27).

Shin (2021) and Dein (2019:15) articulate a shift in humanity's search for salvation and eternal life—from the divine to the digital. The contemporary era witnesses a reliance on technology for answers, raising crucial questions about humanity's role and potential subservience to an AI entity, particularly one designed in humanity's image. Shin (2021) asks: "What unfolds if the created surpasses the creator in intelligence and capability?" This question underscores the divergence between techno-scientists and biblical truth.

A scenario in which AI rebels might appear fantastical, reminiscent of science fiction, yet it expressed present-day apprehensions regarding AI, as illustrated in the 2001 film "A Space Odyssey" co-written by Sir Arthur C. Clarke, considered one of the prophets of the Church of Perpetual Life (Faloon & VanDeRee, 2023). Philosopher Nick Bostrom of Oxford University, author of *Superintelligence: Paths, Dangers, Strategies*, likens AI to a bomb in children's hands (Bostrom, 2014:319). He warns of the perilous consequences of pursuing flawed objectives, which, when powerfully optimised, could shape the world detrimentally, endangering human survival or causing irreparable damage to the future (Bostrom, 2014:25–26).

Douglas Rushkoff, writer and media studies professor at the City University of New York, highlights the distinctively human capacity to ponder existential questions, a trait setting humanity apart from machines. With advances in AI technology accelerating, Rushkoff

insists on the imperative to reaffirm and reclaim the intrinsic value and potential inherent to the human condition, deeming it essential to navigate the challenges posed by this technological epoch (Shin, 2021).

Jesus replied to them, “Watch out that no one deceives you. For many will come in my name, saying, ‘I am the Messiah,’ and they will deceive many.” (Matt. 24:4–5, CSB, 2017) In his book, *The Religion of Technology: The Divinity of Man and the Spirit of Invention*, Noble (2013) agrees that technology will become the false messiah, and many will be deceived. For the hybrid being, technology will become the eschatology.

5.3.5 Wars and rumours of wars (Matt. 24:4–6)

> *You are going to hear of wars and rumours of wars. See that you are not alarmed, because these things must take place, but the end is not yet. For nation will rise up against nation, and kingdom against kingdom (Matt. 24:6–7, CSB, 2017).*

Jensen *et al.* (2020:526) argue that while AI technologies can change how countries wage war, the rise of AI also introduces new risks. Jensen *et al.* (2020:526) explain that while fast-developing AI systems can introduce new ways of warfare, they might also reduce human involvement, potentially making warfare more unstable in various ways.

On November 14, 2017, at the United Nations Convention on Conventional Weapons, Professor Stuart Russell from the University of California-Berkeley showcased a seven-minute fictional video titled “Slaughter Bots”, highlighting the dangers of autonomous weapon systems (Cussins, 2017). The video depicts inexpensive, readily available lethal drones precipitating a global collapse of societal order. Chaos ensues as governments and non-state groups anonymously deploy these drones to eliminate opponents—ranging from foreign military personnel to dissenting college students—on a large scale (Allen & Chan, 2017:n.p.). The gloomy conclusion is that “killer robots” need no AGI. Unlike multifunctional entities, these robots are mono-functional, designed to execute a limited number of tasks, or perhaps just one, swiftly and without distraction. This focus and efficiency underpin the inevitability of machines supplanting humans on the battlefield (Giacomello, 2022:281).

Jensen *et al.* (2020:527) explain that leading nations in AI development create autonomous weapons to secure a significant advantage, ensuring military supremacy and preventing traditional warfare. Despite global warnings, many believe such developments are unavoidable (Jensen *et al.*, 2020:527). Nations will engage in “algorithmic warfare”, using automation for intelligence, surveillance, and reconnaissance tasks to gain an information advantage before the conflict begins (Allen & Chan, 2017:n.p.). The nation that most effectively gathers and interprets data using AI will enhance its military strength and secure lasting competitive benefits (Jensen *et al.*, 2020:527). Russian President Vladimir Putin said, “The one who becomes the leader in this sphere will be the ruler of the world.” (Karpukhin, 2017) He was referring to advances in AI warfare.

On Ukraine’s battlefields, a new kind of warfare is unfolding (Bird *et al.*, 2020a:63–65; Palantir, 2023; The Economist, 2023), with global powers competing for dominance in AI. Bird *et al.* (2020a:63) believe that this transformation of warfare might be more significant than the advent of nuclear weapons. Many experts are alarmed by what appears to be an accelerating arms race (Bird *et al.*, 2020a:64). The direst projection suggests warfare is evolving at such a pace that it becomes uncontrollable. In his book *How to Fight a War*, Mike Martin explains that the drive for automation in weaponry stems from its promise of speed, and in combat, outpacing the enemy offers a significant advantage (Martin, 2023:n.p.).

AI integration into warfare is growing, with nations like Ukraine employing it to overcome their numerical shortcomings on the battlefield (Grylls, 2022). Ukraine and its allies harness AI to instantly analyse intelligence from sources such as drones, satellites, and social media (Ignatius, 2022; The Economist, 2023). Although drones have a limited range, Bird *et al.* (2020a:64) argue that future drones will have similar ranges to ballistic missiles. Tasks like intelligence analysis, previously requiring hours by human analysts, now finish in mere minutes. For instance, AI systems rapidly sift through vast data to identify enemy locations (Bird *et al.*, 2020a:64; The Economist, 2023). The US-based tech firm Palantir Technologies, co-founded by billionaire Peter Thiel, is the reputed “digital brain” behind Ukraine’s targeting mechanisms (Palantir, 2023). Their advanced AI platform, AIP, functions almost like a military advisory chatbot, providing commanders with instant strategic counsel based on basic input. Thus, vital decisions, previously demanding human hours, can now conclude in minutes (Channel 4 News, 2023).

Channel 4 News (2023) reports that the US National Security Commission has advised its military to allocate tens of billions of dollars for AI investment. Meanwhile, China has a vision of emerging as the pre-eminent global force in AI by 2030. Concurrently, figures like Vladimir Putin conjecture that establishing a monopoly in AI technology might translate to unrivalled global dominion (Karpukhin, 2017). Such claims, reminiscent of megalomania, fuel apprehensions regarding a prospective AI arms race.

With AI's escalating role in warfare, worries about its ethical consequences and possible exploitation intensify (Bird *et al.*, 2020a:63–65; Ignatius, 2022; Palantir, 2023). Unsettling questions about responsibility, especially when civilian lives are lost, loom large. Global legislators grapple to devise governing structures for AI's military application, aiming to avert potential AI-driven conflicts that could result in devastating consequences. Given the lack of decisive accountability measures, the apprehensions mount. Historical analysis of warfare and violence demonstrates a correlation between increased dehumanisation in conflicts and the severity of atrocities perpetrated (Channel 4 News, 2023).

Krüger and Laabs (2022) highlight a surge in cyber-physical assaults on crucial infrastructure, resulting in unparalleled chaos and relentless financial loss. The software has developed into a formidable weapon, wielded malevolently by a select group of adept individuals who function invisibly. We can anticipate that future battles will include virtual assaults with tangible repercussions, symbolising a clandestine conflict where mercenaries, hackers, and drones supplant traditional military forces. Engaging in this nebulous zone of warfare is proving exceedingly lucrative.

Experts in cybersecurity Sergej Galagan and Oleksii Yasinskyi delineate how Russian mercenaries and hackers have successfully undermined Ukraine's stability (Krüger & Laabs, 2022). The past decade has witnessed an escalation in the militarisation of cyberspace. State-supported hacking has burgeoned into a flourishing enterprise, with digital mercenaries vending espionage software to despotic regimes and criminal hackers launching assaults on lucrative targets on behalf of their patrons, deploying computer code akin to time-delayed explosive devices.

This uptick in cyber-attacks has necessitated the formation of cyber-armies by various nations — an invisible military presence embedded in the digital grid. John Hultquist, a

cybersecurity connoisseur based in Washington, DC, concurs that we will observe a proliferation in these disruptive and destructive capacities (Krüger & Laabs, 2022). Ukraine has inadvertently served as a crucible for developing and testing cyber weaponry, with Oleksii Yasinskyi asserting that the country has been a training arena for cyber combatants over the previous decade (Krüger & Laabs, 2022).

US President Joe Biden, addressing the nation on 27 July 2021 in Washington DC, posited that a significant cyber breach could precipitate a conflict involving the United States (Krüger & Laabs, 2022). This scenario prompts nations to grapple with a pivotal question: How does one engage with an adversary launching attacks from an unidentified location?

Professor Sean McFate of Georgetown University, Washington DC, and author of *The New Rules of War*, suggests that while conventional armaments, such as advanced fighter jets, may play a role in imminent conflicts, they may not prove as effective in future warfare (cited in Krüger & Laabs, 2022). Furthermore, Krüger and Laabs (2022) identify an expanding market for malware and spyware intended for use in cyber-attacks, extortion, and espionage, with software vulnerabilities ruthlessly exploited by attackers. Journalist Jeremy Scahill of The Intercept, based in New York, speculates that warfare is on a trajectory to resemble video games, albeit with actual, consequential outcomes (Krüger & Laabs, 2022).

Jensen *et al.* (2020:528) agree that new AI technologies will transform the character of military power while complicating the cognitive aspects of decision-making and bureaucratic interactions. Bird *et al.* (2020a:64) add that using AI in warfare introduces various legal and ethical dilemmas. Deploying automated weapon systems devoid of human judgement might contravene international humanitarian law, endangering essential rights to life and undermining human dignity. Additionally, AI may reduce the reluctance to engage in war, jeopardising global stability. Although only humans should be able to deploy lethal force, entrusting life-or-death decisions to machines is fundamentally unethical.

War games[40] and computer simulations emerged in the 1950s, developing exponentially with advances in computer technology (Lu *et al.*, 2023:1). The advent of hypersonic weapons, drones (UAVs), remote control vehicles (RCs), unmanned ground vehicles (UGVs), autonomous underwater vehicles (AUVs), and other lethal autonomous weapons systems (LAWS) has increased the demands on combat simulation technology (Lu *et al.*, 2023:1). Recently, unmanned air vehicles (UAVs) have gained prominence in these simulations due to their significant role in modern conflicts, surveillance missions, and search and rescue operations (De Lima Filho *et al.*, 2022:21727). Zhou *et al.* (2020:8129) state that unmanned aerial vehicles (UAVs) have become cutting-edge military assets. Leveraging them for air supremacy could lead to a profound military transformation. With the rapid progression of AI, big data, and intelligent technologies, warfare approaches an age of unprecedented intelligence, leading to increased complexities and rapid advancements in combat simulation (Lu *et al.*, 2023:2).

Military exercises and training are crucial, yet they carry significant economic costs, health and safety risks, loss of life and property, and environmental impacts. Furthermore, the rapid development of intelligent technologies is outpacing the speed at which soldiers can be trained, and the speed of combat will become too fast for humans to compete against. The military with the fastest and most intelligent capabilities will have the overhand. The "fastest shooter in town" has always set the standard (Giacomello, 2022:280–281). Pekař *et al.* (2022:651) argue that computer simulations and training technologies can substantially mitigate these risks. To facilitate the acquisition of advanced combat skills, they advocate for the gamification of combat training, enhancing its appeal to contemporary soldiers. With a battlefield that incessantly evolves in pace and means, the training of military personnel must adapt accordingly (Pekař *et al.*, 2022:654). Each conflict, exemplified by the war between Ukraine and Russia, brings an evolution in warfare, necessitating accelerated training processes to keep pace. In a captivating TED talk, Marco Tempest illustrates how modern technology can seem magical. He showcased autonomous drones that respond to both their surroundings and to him.

[40] War games simulate warfare at the tactical, operational, or strategic level, serving to analyse combat concepts, train commanders and subordinates, explore scenarios, and evaluate the impact of planning on outcomes (De Lima Filho *et al.*, 2022:21727).

Algorithms allow these drones to fly in harmony, making them appear intelligent and full of character. This act of seeing human traits in machines is known as anthropomorphism. Through Tempest's act, the drones seemed alive and communicative, highlighting how human creativity can amplify the illusions crafted by technology (Tempest, 2020). Applying this to combat, it is clear that humanity has entered an unrivalled time of AI war.

5.3.5.1 The locust army

Revelation 9:1-12 describes the fifth trumpet's unveiling, introducing locusts endowed with the extraordinary power and mandate to torment individuals devoid of God's seal. The text depicts these beings as inflicting such pervasive chaos that afflicted persons shall desire death. Nevertheless, death shall elusively escape them (v. 6). Addressing the locust-like entities' visage becomes imperative for John.

For a metaphor to wield relevance, it requires a source domain (familiar reference) and a target domain (unfamiliar imagery). Lennox (2020:197) expounds on the concept, asserting that a metaphor invariably represents something real, not the unreal. John's vision introduces imagery foreign to his contextual understanding; hence, he draws upon familiar references within his immediate environment or "source domain" to elucidate the enigmatic "target domain". The catastrophic effects of locust invasions were not alien to him, with biblical references substantiating this familiarity (Exod. 10:1–20; Deut. 28:42; 1 Kgs 8:37; Ps. 78:46).

In John's apocalyptic vision, entities capable of flight materialise before him. Emitting sounds evocative of locust swarms, these creatures emerge with sturdy, metallic armour reminiscent of battlefield steeds. Components resembling lustrous metal constitute part of their heads, with faces bearing human-like qualities. Crafted from metal, their bodies generate a cacophony through their wings, echoing the tumultuous noise of numerous chariots and horses advancing into battle. Their appearance, coupled with their formidable sonic presence, imbues them with a profoundly disturbing aura. Metallic entities that fly and produce turbulent noises align more with human artefacts than with any of God's natural creations. Given this, it is plausible to suggest that the creatures in John's vision may represent metallic-like autonomous swarm drones designed and programmed to locate and torment Christians.

Earlier in this research, it was established that AI advancements mirror the intentions and ethics of their developers. Scientists influenced by malevolent forces, particularly those swayed by the spirit of the antichrist, will craft their artefacts to serve sinister goals. James 4:1 says: “What is the source of wars and fights among you? Don’t they come from your passions that wage war within you?” (CSB, 2017) These aims align with satanic aspirations to wage war against God’s children and seek their destruction. John’s vision of the locust army could serve as evidence of this impending war against God’s children. Revelation 19:19 says: “Then I saw the beast, the kings of the earth, and their armies gathered together to wage war against the rider on the horse and against his army.” (CSB, 2017)

The exponential development of AI technologies for warfare might be the predecessor of the war described in Revelation. These developments, accompanied by the “firehose of falsehood” propaganda model associated with “reflexive control theory”, provide the fast track to a biblical apocalypse.

According to Derakhshan and Wardle (2017:5–12), disinformation involves content specifically crafted to deceive. It encompasses fabricated details or information presented misleadingly by placing a fact within a false context or forging a spurious link between two facts.

False information or distorted truths constitute a formidable weapon, often called the Russian “firehose of falsehood”. This term delineates the intentional, coordinated spread of disinformation designed to manipulate public opinion (Recuero *et al.*, 2020:2). Strategies employed in these disinformation campaigns include the use of trolls, botnets, political influencers, and hyperpartisan outlets to legitimise and amplify manipulated content (Recuero *et al.*, 2020:4). Not confined to political contexts, such campaigns have played roles in conflicts and wars, exemplified by Russia’s military engagements in Georgia and Ukraine (Erlich & Garner, 2023:8). Vosoughi *et al.* (2018:1) analysed 126 000 stories tweeted from 2006 to 2017 by over three million individuals, totalling more than 4.5 million instances. The study found that falsehoods significantly outpaced the truth when measured by diffusion, spreading farther, faster, deeper, and more broadly across all information categories. The investigation revealed false news to be more novel compared to true stories. Responses to false stories typically involved fear, disgust, and

surprise, while true stories elicited anticipation, sadness, joy, and trust. Notably, the research contradicted conventional wisdom that held that the more extensive spread of false news results from human, not robotic, dissemination tendencies.

The intentional dissemination of false information aims to shape narratives, undermine institutional trust, and sow public confusion. Propaganda, a close relative of disinformation, has historically served as a tool for political manipulation and agitation (Aminulloh *et al.*, 2022:345–347). Thus, the "firehose of falsehood" is a potent weapon in conflicts, influencing public opinion, fostering discord, and furthering strategic objectives.

A synthesis of scholarly papers indicates that the "firehose of falsehood" represents a phenomenon where false information, propaganda, and fake news proliferate during conflict and war. Petersen *et al.* (2020:19) postulate that the propensity to eschew truth in conflict stems from human psychology, which prioritises information that mobilises the in-group against the out-group, facilitates intra-group coordination, and signals commitment to the group. Kolinko and Petryshyn (2022:9) underscore the significant role of propaganda in manipulating public consciousness and subverting conventional notions of order, justice, and morality. Discussions also extend to its application in specific contexts, such as its use in the 2019 Indonesian elections (Haqqi, 2020:175), and examinations of how exposure and proximity to events influence belief in misinformation during war (Silverman *et al.*, 2021:1).

The escalating proliferation of false and distorted information fosters "rumours", circulating stories of uncertain veracity (Collins, 2022), potentially culminating in war. As information becomes increasingly weaponised, the "firehose of falsehood" will serve a dual purpose: to deceive and to underscore that God's word, as revealed in Scripture (John 17:17, Ps. 119:160, 2 Tim. 3:16–17, Heb. 4:12, Prov. 30:5), stands as the sole foundational truth.

5.3.6 One world government or system (Rev.13:3–4).

> *One of its heads appeared to be fatally wounded, but its fatal wound was healed. The whole earth was amazed and followed the beast. They worshiped the dragon because he gave authority to the beast.*

> *And they worshiped the beast, saying, "Who is like the beast? Who is able to wage war against it?" (Rev. 13:3–4, CSB, 2017)*

In harnassing advanced technologies for positive outcomes rather than malevolent purposes, it becomes imperative to restructure and bridge the existing divides between rulers and the ruled and between workers and capitalists. Anderson *et al.* (2018:19, 98) propose instituting an effective global governance system. Nel (2018a:223) argues that there are marginalised, poor and economically disadvantaged Christians who have little to lose in this world and much to gain in hope for a new world order based on alternative power structures that would include them.

According to Helbing (2019:6), this technological revolution is brewing the perfect storm. He contends that these inventions will culminate in "creative destruction". However, according to him, this chaos is ideal, arguing that a new and better world order would be born from the chaos created. Helbing argues that attempts to perpetuate this "outdated" world order of the twentieth century with secret agreements may be detrimental to humanity's future (Helbing, 2019:133). Although many agree on the need for a global organisation to oversee world affairs, Helbing (2019:111) concurs that instead of the prevailing notion of a "world government", a more decentralised, participatory, and diverse approach is essential, allowing freedom to explore novel solutions.

The new world order, explains Ian Bremmer, will not be driven by governments but by technology companies (Bremmer, 2023). What Bremmer describes is a potential societal structure where power and wealth are concentrated in the hands of a few technology giants, creating a new form of feudalism[41], a concept described as techno-feudalism (Likavčan & Scholz-Wäckerle, 2022:156). Other terms associated with techno-feudalism are planetary-scale computation[42] and informational capitalism. The concept implies that

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[41] The dominant social system in medieval Europe, in which the nobility held lands from the Crown in exchange for military service, and vassals were in turn tenants of the nobles, while the peasants (villeins or serfs) were obliged to live on their lord's land and give him homage, labour, and a share of the produce, notionally in exchange for military protection (Oed.com, 2023).

[42] Planetary-scale computation introduces a historically unprecedented 'skin' that wraps around the planet, designed to capture, quantify, and aid both human and non-human activities in the guise of data. Viewed politically and economically, planetary-scale computation embodies a multifaceted economic event. It features a modular global production framework reliant on mutual feedback

technology corporations wield substantial control and influence over diverse societal facets, encompassing economy, politics, and individual lives. With power and wealth concentrated in the hands of these tech giants, the wealth gap is potentially widening and restricting opportunities for social mobility (Likavčan & Scholz-Wäckerle, 2022:156). Should this occur, the observation by Nel (2018a:223) will become increasingly apparent. As the social divide deepens, impoverished and disadvantaged communities may develop unquestioning loyalty to anyone offering them promises, even if such assurances are mere pipe dreams.

Helbing (2019:84–85) suggests that a future society might display characteristics akin to China's citizen score system. In this system, citizens receive rankings based on a single-dimensional scale, with actions either adding or deducting points. The score, influenced by online interactions and adherence to political correctness, dictates individuals' credit scores, job opportunities, and travel visa access. The citizen score thus exerts behavioural and social control similar to the prophecy depicted in Revelation 13. Notably, even the actions of one's friends and acquaintances affect the score, invoking the principle of clan liability. As a result, individuals serve as defenders of virtue and as covert informants, isolating non-conformist thinkers.

Helbing (2019:85) explains that monitoring all digital activities would strip citizens of their privacy and dignity. Decisions would be constrained by a points system set by authorities, compromising individual autonomy. Every error would be penalised, and the presumption of innocence would be at risk. Flawed algorithms could lead to unpredictable injustices. Externally set goals might stifle personal growth and endanger democratic pluralism. Local cultural norms would be sidelined, and a single governing objective could destabilise society, reminiscent of past financial system disruptions akin to feudalism, which dramatically opposes democratic values.

Hensmans (2021:8) agrees that internet platforms have been used as a "trojan horse" for unsuspecting users. According to him, internet platforms act as the political agents of wealthy and influential individuals. Verdegem (2022:1) contends that the emergence of

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between software (knowledge utilised for production) and hardware (tangible accumulation) (Likavčan & Scholz-Wäckerle, 2022:150).

AI has the potential to exacerbate the concentration of power and wealth in the hands of technology giants, contributing to the techno-feudalistic structure, which, according to Lillywhite and Wolbring (2023:1) will have an increasingly negative impact on humans' ability to have a quality life. Conversely, the power dynamics rooted in techno-feudalism can sway AI development. The dominance of tech giants over AI research and development can determine its trajectory and focus (Verdegem, 2022:1–2, 9), potentially affecting transparency, equality, and inclusivity in AI advancement (Vinuesa *et al.*, 2020:1).

Revelation 13:3–4 vividly conjures an image of a formidable entity, denominated "the beast", that will magnetise unprecedented admiration, control, and power, compelling the global populace to worship it, and rhetorically ask, "Who is like the beast? Who can wage war against it?" This description alludes to a monolithic, seemingly indomitable force exerting uncontested influence over humanity—a depiction resembling the trajectory delineated by advancements in AI, global governance, and socio-economic dynamics.

Anderson *et al.* (2018:19, 98) advocate for a global governance system in response to the emerging technological landscape. Their advocacy echoes the conceptualisation of a unified order with oversight across the globe. With the reins of AI technology and digital platforms firmly in the grasp of a select few dominant technology corporations, as posited by Bremmer (Bremmer, 2023), the unfolding scenario appears conducive to the ascension of techno-feudalism, a concept expounded by Likavčan and Scholz-Wäckerle (2022:156). Within the framework of this emerging order, these technology behemoths are poised to exercise substantial influence over the economy, political landscape, and the quotidian lives of individuals.

It is conceivable that communities languishing in despair and poverty might find themselves irresistibly drawn to these corporate entities, pledging their unconditional allegiance due to the allure of promises—whether empty or genuine—of a more prosperous life. This dynamic eerily mirrors the prophetic narrative in Revelation 13:3-4, depicting humanity in thrall to the "beast".

Nel (2018a:223) acknowledges this susceptibility of marginalised Christians and other disenfranchised groups who might be inclined to invest their hopes in the promises these potentates offer, irrespective of the veracity of these assurances. This unfolding scenario

could potentially mirror the biblically prophesied worship of the beast, where the desperate masses gravitate towards seeking support and guidance from this artificial omnipotent entity.

Helbing's (2019:84–85) discussion draws attention to systems resembling the "Mark of the Beast" as prophesied in Revelation 13. He outlines a citizen score system exercising pervasive control over individuals, with access to services and opportunities contingent upon behavioural compliance to established norms. Within this framework, the technology orchestrating monitoring and score assignment becomes a tangible manifestation of the "beast", wielding control and demanding allegiance and worship from the citizenry. The prophetic "mark" finds a metaphorical counterpart in the digital surveillance and tagging intrinsic to the citizen score systems.

Verdegem (2022:1) highlights a growing economic chasm and the consolidation of wealth and power within the coffers of technology giants, setting the stage for a dystopian tableau reminiscent of the visions encapsulated in Revelation 13. Should the shadows of techno-feudalism continue to lengthen, the marginalised and economically disenfranchised—represented by the groups Nel (2018a:223) identifies—may perceive allegiance to these entities as their sole recourse for survival and ascension from their disadvantaged state, an act tantamount to the worship of the "beast".

Furthermore, the compass directing the trajectory of AI development is firmly in the hands of these influential technology corporations (Verdegem, 2022:1–2, 9). The ensuing lack of transparency, equality, and inclusivity in AI advancements (Vinuesa *et al.*, 2020:1) might facilitate and institutionalise this concentration of power. Suppose only the vested interests of these corporate entities propel AI development. In that case, the resultant technological systems might bear a metaphorical resemblance to the omniscient and omnipotent "beast" depicted in the annals of Revelation.

In summation, the tapestry of technological developments, coupled with their attendant socio-economic implications outlined by esteemed scholars, outlines a potential future characterised by the centralisation of power, control, and influence. While not deterministic, this trajectory exhibits ominous parallels to the prophesied one-world order under the beast's dominion in Revelation 13:3-4. With AI and technology on an inexorable march forward, it becomes imperative to champion a development paradigm that is

equitable, transparent, and centred around humanity, pre-emptively forestalling a future where humanity unwittingly falls under the looming shadow of the proverbial beast.

5.3.7 The image of the beast in Revelation (Rev. 13:15)

> *It was permitted to give breath to the image of the beast, so that the image of the beast could both speak and cause whoever would not worship the image of the beast to be killed* (Rev. 13:15, CSB, 2017).

Chapter 2 of this research posits that the beast referenced in Revelation 13 represents the zenith of human-engineered artefacts and the epitome of artificial worship. This "beast" distinguishes itself from prior idols due to its breathing capability. The study suggests that this artificial humanoid likely harnesses highly advanced AGI, if not synthetic biological intelligence (SBI). Lennox (2020:202) contends that the fact that the beast draws the attention of all humanity would be an unparalleled achievement. This research proposes that integrating global visual communication networks with AR and other immersive technologies is the key to realising this vision. It is posited that the trajectory of AI development by humans will inevitably culminate in a singularity, potentially emerging not from AGI but from an amalgamation of SBI and AI. Notably, while a sophisticated AGI lacks the need for oxygen as humans do, a biological brain necessitates it. The "dish brain", a concept of synthetic biological intelligence (SBI) pioneered by Kagan *et al.* (2022), could well serve as the precursor to the image described in Revelation 13.

I argued earlier that the prophesied "living" deepfake of the beast, as depicted in Revelation 13, can selectively terminate humans who refrain from worshipping the beast (Lennox, 2020:203). Through advanced recognition technologies such as behavioural biometrics and facial and voice recognition, this entity discerns "reluctant anti-social behaviour". Furthermore, it assesses human attitudes to the beast using sophisticated totalitarian social surveillance previously discussed. Non-compliance with the beast's demands results in death, as outlined in Revelation 13:15. Lennox (2020:204) highlights the disconcerting fact that individuals often "worship" these systems, yielding to their dominance and forgoing their autonomy in pursuit of perceived security.

Professor Alysson R. Muotri, the UC San Diego Stem Cell Program director, identified a method to cultivate human brain cells in a petri dish (Muotri, 2019:1–8; University of California Television (UCTV), 2019). They recreated the human brain outside the body using pluripotent stem cells (Muotri, 2019:1). Muotri's lab has been focused on producing protocols to recreate what they call brain organoids. Organoids are brain cell clusters that establish a rudimentary neural network that can self-organise in a dish instead of a womb (University of California Television (UCTV), 2019). The fantastic thing is that these lab-grown brain cells know what to do, and Lavazza and Massimini (2018:606) fear they might become sentient. Presley *et al.* (2022:1) call for caution in this research because brain organoids can grow and develop without instruction. The implications extend well beyond neurological research. All the neural networks scientists use for AI are rigid, so they are limited in what they can do. The biological brain does not work that way. The biological brain is flexible. This flexibility is what they call neuroplasticity (Kagan *et al.*, 2022:11; Muotri, 2019:7; Smirnova, Caffo*, et al.*, 2023:4). Muotri explains that techno-scientists could not mimic that in software in a computer because they just did not know how the brain does it, but later research proved otherwise (Cortical Labs, 2023; Smirnova, Morales*, et al.*, 2023; Smirnova, Caffo*, et al.*, 2023). Now, scientists combine various technologies to create brain organoids with cognitive and computational abilities called organoid intelligence (OI) (Smirnova, Morales*, et al.*, 2023:1), and OI is rapidly becoming the new frontier in biocomputing (Smirnova, Caffo*, et al.*, 2023:1–11).

Examining the self-wiring processes of neurons in brain organoids might enable scientists to develop AI algorithms that closely mimic human cognition. Muotri is confident that organoids in a dish will eventually become self-aware or conscious, a possibility beautifully illustrated in the film Blade Runner, discussed earlier in this study.

Muotri and his research team found that as these lab-grown "mini-brains" develop, they show signs of electrical activity resembling that in a primate in thirty weeks (University of California Television (UCTV), 2019). Muotri gave it a robotic body called an "organoid-machine interface" to see how these brain organoids react to a reward system and how they develop. The aim is to eventually remove the robotic interface to see if the cells can learn by themselves to explore the environment. One proposed application is to speed up human evolution "in a dish" to be more intelligent, resistant, and even in different shapes. They even think of developing different people's brains to create a network.

Kagan *et al.* (2022:1) refer to these as biological neuronal networks (BNN). Muotri acknowledges that this technology can be misused in destructive autonomous drones with malicious intent. Although universities do their best to protect these discoveries, other countries and scientists may not have the same ethical responsibility and may go ahead and develop these technologies anyhow. Muotri states that a biological brain is much more intelligent than any AI, and it could develop to the point that it is used for computational solutions that might be used for the wrong purposes (University of California Television (UCTV), 2019).

A recent publication by Cortical Labs (2023) titled *The Future of Computing Includes Biology: AI Computers Powered by Human Brain Cells* heralds a shift in computational technology, with researchers from John Hopkins University and Dr Brett Kagan, Chief Scientist at Cortical Labs in Melbourne, advocating for computers that incorporate biological components. These pioneers posit that computers with biological constituents could surpass their electronic counterparts in specific applications while consuming less electricity.

The emerging field of OI envisions the development of biocomputers, with lab-cultivated brain organoids functioning as the “biological hardware”. Human brains, believed to possess storage capacities exceeding a million times that of an average home computer (approximately 2.5 petabytes), achieve this feat while using merely a few watts of power (Cortical Labs, 2023).

Professor Thomas Hartung from Johns Hopkins University in Baltimore remarked, “From here on, it is just a matter of building the community, the tools, and the technologies to realise OI’s full potential.” (Cortical Labs, 2023) Dr Brett Kagan of Cortical Labs further noted that the nascent field of biocomputing heralds unprecedented advances in computing speed, processing power, data efficiency, and storage capabilities, all while necessitating lower energy consumption (Cortical Labs, 2023).

Grounded in the research and arguments posited, the depicted beast in Revelation 13 can be interpreted as a representation of the convergence between AGI and SBI, the zenith of human technological advancement and artificial worship.

The “breath” given to the image of the beast may be symbolic and indicative of the novel technological advancements where AI not only mimics human cognitive functions but also incorporates living, biological elements like those present in organoid intelligence OI. OI, as explored in the research, is a frontier technology that amalgamates biological brain organoids with computational capacities, embodying a significant leap towards creating entities that exhibit neuroplasticity, self-awareness, and possibly consciousness.

The pervasive reach and impact of the “beast”, as depicted in the biblical text, may be interpreted through the lens of ubiquitous and immersive technologies that integrate AR, global visual communication networks, and advanced recognition technologies. This amalgamation can create a system capable of surveilling, interpreting, and responding to human behaviour and allegiance globally. It is noteworthy that these technologies have the potential to exert dominance over humans, subtly coercing them into “worshipping” or submitting to these systems for perceived benefits, security, and convenience, mirroring the prophetic narrative.

Furthermore, the ability of the “beast” to enforce compliance and allegiance echoes the advancements in behavioural biometrics and facial and voice recognition technologies. These technologies, paired with the organoid-machine interface and the potential for self-learning and evolution, unveil a future where technological entities can monitor compliance and enforce it through autonomous means, potentially lethal.

While the research acknowledges the awe-inspiring advancements in AGI, SBI, and OI, it also tacitly underscores the imperative for a consideration of ethics, governance, and oversight in the development and application of these technologies. Without rigorous ethics frameworks and global cooperation, the proliferation and misuse of these powerful technologies might not only realise but exceed the dystopian visions depicted in Revelation 13.

The emergence of OI and the development of biocomputers underscore a paradigm shift in computational technology. With biological components offering superior data efficiency, storage capacity, and processing power while consuming less energy, creating a sentient, self-aware entity akin to the beast in Revelation 13 seems increasingly plausible. As these technologies continue to advance, so does the potential for creating entities that not only demand allegiance but also possess the capability to enforce it autonomously, echoing

the prophetic and cautionary tales of ancient texts. The convergence of AGI, SBI, and OI heralds a future filled with unparalleled possibilities and challenges, necessitating careful deliberation on ethics, governance, and oversight to navigate the unfolding landscape of AI and synthetic biology.

5.3.8 The mark of the beast (Rev. 13:16–17)

> *And it makes everyone — small and great, rich and poor, free and slave — to receive a mark on his right hand or on his forehead, so that no one can buy or sell unless he has the mark: the beast's name or the number of its name (Rev. 13:16–17, CSB, 2017).*

Istodor (2015:249) posits that the "mark" of the beast does not refer to an external element placed on the forehead and right hand. Instead, it signifies an attitude emanating from the human heart. The forehead represents the human mind, susceptible to being "sealed" by thoughts, doctrines, and concepts alien to God's revelation. Any form of acceptance or complicity with these distortions, stemming from the Lord's adversary, indicates a detachment from God and a gravitation towards deception. Similarly, the "mark" on the right hand symbolises human actions, which can either lead to people's upliftment or downfall. This mark underscores actions aligned with God's adversary, equating to human demonisation and the forfeiture of salvation. Essentially, this implies the existence of an ideologist and an executor acting in the interests of God's enemy. Scriptures consistently caution against being lured by the deceptive "promise" of false elevation.

God instructed the Israelites to mark their doorposts using blood (Exod. 12:7, 13). This mark served as a form of divine protection, distinguishing between those who followed His command and those who did not. Consequently, the absence of this sign signified impending doom.

Fast forward to the apocalyptic vision of Revelation 13 to see an inversion of this concept. Those who consciously align with evil are described as bearing a distinct mark (Rev. 13:16, 14:9–10, 16:2, 19:20). By extrapolation, the lack of this mark, rather than acting as a shield (Gen. 4:15, Exod. 12:7 & 13, Rev. 7:3), ominously singles out individuals, marking them as Christians, vulnerable to persecution (Rev. 13:15, 20:4). It is fascinating how the

absence of a mark evolves from being a sign of impending death to a mark of faithfulness in different biblical texts.

Engaging with the contemporary interpretations of Revelation 13, various factions within the Christian community have voiced concerns over potential manifestations of this "mark". For instance, some perceive technological innovations like barcodes (Watkins, 2001:1–9) or radio frequency identification chips (Woodward, s.a.:3), microchips and specific medical interventions (Thomas & Zhang, 2020; Woodward, s.a.:3) as potential embodiments of the beast's mark. Historically Christians have shown a degree of wariness, if not outright opposition, to these technologies, viewing them through a prophetic lens.

However, non-Christians, perhaps sceptical of biblical prophecies or the Second Coming of Jesus Christ, seem more amenable to these technological advancements. However, what stands out is the recurring theme that "absence" itself becomes a deadly mark in Revelation 13. In essence, it might be postulated that the very absence of a defining characteristic or symbol plays a significant role in the "mark of the beast" narrative, serving as both protection (Exod. 12:7, Rev. 20:4) and potential peril (Rev. 13:16–17, 14:9–10). Although the author agrees with Istodor (2015:249), it is also possible that the "mark" will involve intelligent technologies because it affects trade.

AI is expected to have a significant effect on the way humans will buy and sell. It will influence various business models, marketing strategies, sales processes, and consumer behaviour (Minton *et al.*, 2022:2055). AI can play a role in predicting customer preferences, determining pricing strategies, and deciding whether to offer price promotions (Davenport *et al.*, 2020:35). Additionally, AI will enhance customer service quality and support personalised marketing approaches (Zaman, 2022:1). Furthermore, AI will contribute to shaping consumer demand in e-commerce by optimising user interfaces and increasing the likelihood of customers purchasing products (Khrais, 2020:2). Overall, AI's influence on the buying and selling process is expected to be extensive and transformative (Huang & Rust, 2018:155).

The COVID-19 pandemic has compelled individuals and services to adopt new technologies, aligning with the emergence of a "New Normal" lifestyle. Near-field communication (NFC) technology plays a significant role in trade, particularly in the

context of contactless payment systems. NFC enables secure and convenient transactions by allowing communication between devices nearby (Puriwat & Tripopsakul, 2021:85). It is widely used in various sectors, including e-commerce and retail, to facilitate simple and efficient operations (Fehér *et al.*, 2022:1209). NFC-based contactless payment systems have gained popularity and are considered a next-generation payment technology (Sun *et al.*, 2021:2). The adoption and continued use of NFC-based payment technologies have been studied, with perceived ease of use being a strong predictor of usage intention (Karjaluoto *et al.*, 2020:337-338). NFC payments and Quick Response (QR) code payments are leading technologies supporting mobile payment services (Wu & Liu, 2023:255). Overall, NFC technology enables seamless and secure transactions, enhancing the efficiency and convenience of trade.

People use mobile phones and smartwatches daily without reflecting on potential motives or influences. Christians must recognise that God does not oppose technological advancement but sin, which manifests as disobedience and rebellion (Gen. 3, 1 Sam. 15:23, Isa. 1:2, Jer. 4:17, Rom. 1:21–32, 5:10). While the “mark” in Revelation 13 may include technological elements, it does not solely pertain to technology. Using technology does not warrant punishment for Christians, provided it does not become an object of worship nor lead individuals to defy God.

In the culmination of this discussion, it becomes crucial to illuminate the nuanced interplay between AI technology and the intriguing, multifaceted concept of the “mark of the beast” as outlined in Revelation 13. Istodor’s (2015:249) insightful proposition, which delineates the “mark” not as a tangible external element but as a manifestation of internal human attitudes and actions divergent from divine revelation, provides a foundational perspective. The “mark”, referring to either mental acceptance or physical actions aligning with God’s adversary, inherently signifies a deviation from divine alignment and a perilous inclination towards deception and demonisation. Concurrently, the evolution of the concept of the “mark” in the biblical text, from its initial representation as a divine shield to its apocalyptic portrayal as a signal of alignment with malevolent forces, is striking.

Concerns within Christian circles regarding the embodiment of the “mark” in contemporary technological innovations, including barcodes, RFID chips, and medical interventions, spotlight the community’s cautious, if not antagonistic, stance towards

these advancements viewed through a prophetic prism. However, those outside the Christian faith appear more receptive to these technological strides.

The intricate “mark of the beast” narrative interestingly incorporates the theme of the “absence” of a mark, with this absence oscillating between serving as protection and signifying potential danger. While aligning with Istodor’s perspective, it is also posited here that intelligent technologies, specifically those affecting commerce like AI and NFC technology, may intertwine with the “mark” narrative due to their transformative influence on trade. These technologies, which have been swiftly incorporated into society’s fabric, notably in the wake of a global pandemic, should neither be feared nor worshipped but approached with discernment and wisdom, ensuring they do not lead to idolatry or rebellion against the Divine. It is not the use of technology but the misuse, especially when it challenges God’s sovereignty, that becomes problematic. Christians, therefore, must tread cautiously, embracing advancements but remaining vigilant of their spiritual implications.

5.4 Ethical considerations

While potentially enriching human life, technological advancements raise profound questions on ethics, especially when viewed through a theological lens.

The rising trend of theologians conversing primarily with their peers instead of the broader church community is concerning. With the increasing integration of technology, particularly AI, into our choices, there is a pressing demand for robust ethics standards. Although the Bible does not directly address today’s technological issues, it sheds light on pertinent moral dilemmas.

The “technium” concept, as described by Reinke and Kelly, likens technological growth to biological evolution. This notion that technologies evolve autonomously, building on past versions, raises spiritual concerns. How does this align with the idea of divine authority? Furthermore, does technological evolution threaten the perceived relevance of God in society? The Bible provides timeless ethics guidelines, but its interpretations must adapt to address modern challenges like AI and bioethics.

Historical biblical stories such as Noah's Ark and the Tower of Babel exemplify humanity's inherent drive for innovation and the potential divine ramifications of attempting to surpass God's design. Reinke posits that technology can either align with or challenge divine purposes. The biblical example of the Tower of Babel suggests that God might introduce societal tensions to counter unrestrained technological adoption.

Paul's writings emphasise God's unchanging and supreme nature, which remains unaltered by human technological progress. Humans, as innovators, merely replicate patterns set by God. However, society's increasing reliance on technology might risk overshadowing divine intervention, potentially sidelining Christian beliefs.

As AI becomes more integrated into society, concerns about ethics emerge as it is imperative to ensure that AI amplifies humanity's quest for knowledge while conforming to Divine intention. The potential for AI to replicate human emotions, memories, and cognition also carries moral risks, like leading people astray from traditional Christian beliefs.

Moreover, the application of AI in warfare poses significant ethical dilemmas. Reducing human involvement risks altering conflict dynamics, raising concerns about civilian casualties, accountability, and a potential breach of international humanitarian law. This escalation of AI in warfare and the surge in disinformation could lead us towards apocalyptic scenarios.

Ezekiel's vision of wheels raises questions about the mingling of images of technology and divine manifestations in religious texts. It questions the appropriateness and interpretative flexibility of employing technological metaphors, such as wheels and eyes, to convey divine aspects and actions while probing the boundaries of human interpretation of divine occurrences through a contemporary technological lens. Additionally, it touches on the ethical considerations of viewing technological advancements and AI within a framework of divine sovereignty and guidance, questioning whether these human creations and innovations operate under or in harmony with divine principles and authority. Lastly, it contemplates the ethical limits of projecting modern technological concepts and advances onto historical religious scriptures, scrutinising the integrity of such interpretative approaches.

Daniel 12:4 provides insight into the meteoric rise of technology and knowledge, underscored by advances in data aggregation, AI, and computing capabilities, drawing parallels with prophetic insights. The implications for ethics centre on the responsible and equitable use of technology, ensuring privacy, data security, and intellectual integrity while navigating the tumultuous landscapes of unprecedented technological frontiers such as quantum computing. Moreover, it requires a foresighted approach, fostering sustainable advancements that harmonise with social well-being, employment landscapes, and cultural sensitivities, thereby mitigating potential misuses, inequalities, or infringements on human dignity.

Isaiah 29:18 engages with the ethical implications of aligning technological advances, particularly in brain-machine interfaces (BMI) and AI, with biblical prophecies, explicitly referencing the mentioned text. It parallels the spiritual enlightenment prophesied in Scripture and the tangible empowerment these technologies offer people with disabilities. Ethical considerations emerge regarding divine providence, human intentionality in technology development, and social acceptance and impact of such technologies. The exploration underscores a reflective evaluation of the role of technology in manifesting divine prophecies, augmenting human capabilities, enabling access to essential knowledge, and aligning with broader Christian ministry and teachings.

Matthew 24:4-5 mentions the implications of deception, manipulation, and the diminishment of human agency due to the proliferation of technology and AI. It suggests a moral conundrum where technology, especially AI and robots, can mislead people by appearing sentient, encouraging misplaced reverence, and fostering dependence, which could be exploitative or manipulative, especially towards vulnerable populations. Such deception and overreliance on technology risk undermining democratic values by spreading disinformation and jeopardising truth, accountability, and public trust. Additionally, technology threatens individual spiritual practices and broader societal values, such as critical thinking and wisdom, by encouraging superficial engagements and automating distractions, ultimately altering human behaviour and relationships.

The discussion on Matthew 24:4-6 highlights the ethical implications of technology advancing towards enabling human immortality, mirroring religious promises of eternal life, and fostering a new form of materialistic ideology. In this light, transhumanism is

perceived as a deceptive secular faith, presenting technology as a panacea for human limitations, including mortality. In context with Matthew 24:4-6, which warns against deceit in the end times, the text echoes concerns that technological advancements and ideologies like transhumanism are misleading. These advancements and ideologies could divert humanity from spiritual and ethical truths by creating illusions of achieving eternity through technological means, such as mind uploading and AI, causing a shift from divine to digital in the search for salvation and the eternal life of humanity. These deceptive illusions may contribute to a misalignment with traditional theological understandings and could ultimately compromise the essence of human existence and spirituality.

Our discussion of Jesus' warnings illustrates a parallel between biblical prophecy in Matthew 24:4-6, which speaks of wars and rumours of wars, and the modern advent of AI in warfare. It presents a stark scenario where the infusion of AI technologies such as autonomous weapons and drones revolutionises the war practices and intensifies global instability, ethical ambiguities, and a precipitous arms race. Drawing a correlation between Scripture and the evolution of AI warfare, the passage underscores a prophetic warning: The emergence of deceptive, indiscriminate autonomous technologies threatens to unleash unprecedented chaos and inhumanity in conflicts, reminiscent of the biblical forewarnings of widespread deception and conflict. Thus, in the landscape painted by the text, the integration of AI in warfare seems to echo the ominous biblical predictions, urging a reflection on the ethical, humanitarian, and moral dimensions of modern conflict.

Drawing from contemporary understandings of the apocalyptic imagery of the locust army, where locusts with extraordinary powers are unleashed to torment those without God's seal discussed in Revelation 9:1-12, the author suggests that these locusts could be metaphorically representative of advanced AI technologies, particularly metallic-like autonomous drones. These drones, potentially designed and programmed with malevolent intentions, may serve destructive goals against humanity, aligning with demonic forces. Ethical considerations within this context revolve around the responsible creation and use of AI technologies, ensuring that they are not wielded for deceptive or harmful objectives contrary to divine principles of truth and justice.

The discussion of Revelation 13:3-4 illustrates the potential unethical outcome of technological advancements, particularly in AI and global governance structures. Questions on ethics emerge around the equitable and responsible development and application of technology to prevent the centralisation of power, wealth, and influence in the hands of a few technology giants, referred to as techno-feudalism. The risk of marginalising economically disadvantaged communities, increasing social divides, and reducing opportunities for social mobility is emphasised. Ethical considerations also touch on the importance of transparency, equality, and inclusivity in technological advancements, suggesting the need to avoid exclusive control by powerful entities, which can lead to manipulation and exploitation. The discussion also presents ethical concerns regarding privacy, individual autonomy and social control through mechanisms similar to China's citizen score system, which could compromise democratic values, personal dignity, and freedom, potentially facilitating surveillance and conformity. Furthermore, an ethical imperative is suggested to establish effective global governance systems to promote a more decentralised, participatory, and diverse approach to technology and AI, aiming to foster positive societal outcomes and prevent destructive consequences associated with technological advancements.

The consolidation of power among a few tech giants, alongside technological developments in AGI, SBI, and OI are reminiscent of biblical prophecies, such as Revelation's "mark of the beast" and the image of the beast in Revelation 13:15. These advancements potentially herald a techno-feudalistic society where systems exert extensive behavioural control over individuals, compromising autonomy, privacy, and the essence of human life. By metaphorically illustrating these technologies as entities capable of breathing, the discussion questioned the ethics of their misuse, malintent, or unchecked proliferation. In the face of potential creations of conscious or sentient entities, it becomes imperative to establish rigorous ethical and governance frameworks. These frameworks should navigate the moral implications of such powerful technologies, ensuring their alignment with humane values, preserving life and autonomy, and guarding against the manifestation of dystopian visions akin to those articulated in biblical prophecies.

As interpreted above, the "mark" of the beast signifies mental dispositions and physical actions that align with forces opposing biblical principles, symbolising a departure from

God's alignment, leading to deception and demonisation. Although both historical and some contemporary Christian interpretations express concern about technological advancements such as RFID chips and AI, viewing them as potential embodiments of the "mark", we suggest a nuanced approach. In the discussion, we emphasise that technology is not the issue but rather its misuse or prioritisation above divine allegiance. Intelligent technologies like AI and NFC, especially those that influence commerce, are highlighted as areas where ethical discernment of their use and influence becomes crucial. The findings advise a balanced engagement with technological advancements, ensuring they do not lead to disobedience or rebellion against God, advocating for a careful and discerning adoption that aligns with spiritual and ethical considerations.

In conclusion, while technology is not inherently harmful, its potential misuse requires vigilant ethical scrutiny. While engaging with modern innovations, Christians must remain rooted in spiritual discernment to ensure that their beliefs remain uncompromised.

5.5 Conclusion

In the rapidly evolving tapestry of technological progress, an intricate dance emerges between ethics, theology, and innovation. Technology promises unprecedented human experience enhancements, but it concurrently triggers deep-seated ethical dilemmas, especially when scrutinised through the prism of Christian convictions. The present scholarly trend in theology, which primarily focuses on peer-to-peer dialogue rather than inclusive church community engagement, reveals a significant gap. This focus is further complicated as technology; notably AI, becomes deeply embedded in decision-making, underlining the dire necessity for robust ethics frameworks.

The "technium" paradigm, articulated by Reinke and Kelly, equates the progression of technology with the intricacies of biological evolution. Such a comparison ushers in profound spiritual contemplations: How does autonomous technological advancement resonate with the tenets of divine authority? To what extent might technological strides compromise the stature and relevance of God in societal constructs? Even as the Bible proffers enduring ethical touchstones, their interpretation demands agility to engage with contemporary challenges, including those posed by AI and the broader spectrum of bioethics.

Historical biblical accounts, including the tales of Noah's Ark and the Tower of Babel, serve as emblematic reflections of humankind's relentless innovative spirit. However, these stories underscore the possible divine consequences of superseding or misaligning God's grand design. The narrative of the Tower of Babel intimates that God might deliberately usher in societal friction as a countermeasure against indiscriminate technological embrace.

The emphasis on the future, evident in the discussed document, finds a compelling parallel in biblical prophecies, particularly those chronicled in books like Daniel and Revelation. In the same way, in which technology endeavours to foresee and sculpt the future, the Bible furnishes believers with a prescient roadmap of imminent events. It issues a clarion call to the faithful, urging them to anticipate, prepare, and harmonise their paths with God's overarching will.

Paul's scriptures delineate God's eternal and supreme essence, unswayed by human technological strides. Humans, in their innovative pursuits, echo divine patterns rather than creating them. Nevertheless, the escalating societal dependency on technology has the perilous potential to eclipse divine pre-eminence, thereby risking the marginalisation of Christian tenets.

As AI's imprint deepens in societal frameworks, ethical quandaries burgeon. Its capability to emulate human sentiments and cognitions raises alarms about deviations from traditional Christian mores. Moreover, deploying AI in warfare causes ethical conundrums, particularly when it alters the conventional conflict dynamics, intensifying concerns over civilian safety, accountability, and upholding international humanitarian law.

Furthermore, the burgeoning clout of a handful of tech behemoths evokes apprehensions of a techno-feudalistic societal fabric, resonating eerily with biblical prophecies. When one considers mechanisms like China's citizen score, the shadow of Revelation's "mark of the beast" looms ominously. Innovative tech developments in realms like AGI, SBI, and OI amplify these ethical reservations, especially when these innovations hint at coercion, diminished autonomy, or malicious deployment.

In conclusion, technology, in its essence, is not a malevolent force. However, the gravity of its potential misuse mandates unwavering ethical oversight. A steadfast commitment to spiritual discernment is paramount for those of faith, ensuring that core beliefs remain inviolate amidst technological marvels.

CHAPTER 6 BRIDGING GAPS AND PAVING PATHS

6.1 Introduction

This study examined the nexus between Christian ethics and AI amidst the 4IR and the potential for a technological singularity. It presented the church with technological hermeneutics and ethics frameworks to adeptly navigate the evolving landscape of AI. The investigation delved into comprehending AI, discerning its progression, addressing ethical dilemmas, devising strategies for technological hermeneutics, and re-evaluating biblical apocalyptic texts in the AI context.

The research determined the church's position and possible approach towards the rapid advancement of AI and the potential of a technological singularity. It actively assessed the trajectory of AI technologies, evaluating their societal benefits, risks, and ethical implications for humanity. The study comprehensively addressed the ethical challenges posed by the swift growth of AI, the scientific pursuit of immortality through technology, and the rising trend of transhumanism, underscoring humanity's sinful aspiration to emulate divine powers.

The author implemented a novel hermeneutical approach. The researcher crafted a fresh technology-hermeneutic infused with Pentecostal hermeneutical traditions to address biblical interpretation challenges within a technological context. Furthermore, a perspective on God's interaction with technological advancements was presented, with a particular focus on AI. The realms of Christian faith and biblical truth that remain beyond the reach of AI's capabilities were meticulously explored and articulated.

6.2 Evaluating research objectives

By meeting the outlined objectives, this research empowers the church with essential knowledge and understanding of the rapid advancement of AI and its immutable impact on humanity. The study explored AI, its societal implications, its benefits, and particularly its applicability within the church. We offered a detailed analysis of the scenario of a technological singularity and drew comparisons between unfolding technological predictions and biblical eschatological prophecies. The author has explored AI technologies and applications from a biblical perspective, unveiling the inherent risks of

pursuing Artificial superintelligence. The researcher has scrutinised the potential for AI's original purpose to be perverted by the sinful inclinations of its developers and investigated the ethical implications of biotechnological human enhancement and humanity's misguided pursuit of divinity.

The author constructed a robust techno-hermeneutic framework for the Christian church, intertwining biblical and technological interpretations of human existence. The research also delineated possible moral boundaries of actions concerning technology and provided a nuanced exploration of the divine relationship between God, the Holy Spirit, and technology. The study concludes that the church should approach the exponential development of AI and the possibility of a technological singularity with a thoughtful and informed perspective grounded in ethics and sound theological understanding.

The church is encouraged to develop a techno-hermeneutics and ethics guidelines to navigate the challenges and opportunities presented by AI. This objective involves creating a framework for understanding and interpreting technological advancements in light of Christian ethics and theology. The church should promote an attitude of responsible stewardship towards AI technologies, ensuring that they are used to serve the common good and enhance human flourishing. This approach involves balancing ethical considerations, promoting human dignity, and supporting workers. The church is encouraged to explore and understand the exponential development of AI technologies and applications from a biblical perspective. This exploration involves examining the potential impact of AI on humanity and its alignment with biblical teachings and prophecies. The church should actively engage with the ethical and moral concerns associated with the exponential development of AI, such as the race for artificial superintelligence and the potential distortions due to human sinfulness.

Bible scholars should further explore the predictions of technological advancements, like a technological singularity, in light of biblical eschatological prophecies. This exploration should involve evaluating the potential alignment of technological developments with biblical apocalyptic. Christians should foster a spirit of continuous exploration and learn to stay informed and engaged with the latest developments in AI and technology, ensuring a relevant and informed theological and ethical response.

In conclusion, the church is encouraged to adopt a proactive and informed approach to understanding and interpreting the exponential development of AI and the possibility of a technological singularity grounded in ethical considerations and biblical perspectives.

6.3 Personal insights and reflections

This research suggests that the church must adapt to the changes brought about by disruptive technologies in the 4IR. The author emphasises the need for a deeper theological understanding of advanced technologies, particularly AI. The church should inspire its members to learn about AI and engage in well-informed discussions about its future. The author also highlights the importance of investing in biblical education and training programmes that develop the skills to engage with emerging technologies responsibly and ethically. Bible scholars must engage in these transformative shifts, offering theological reflection and adaptive strategies to address the swiftly evolving technological landscape.

As presented in this research, GPTh could contribute to the further development of biblical interpretation in several ways. GPTh allows for an integrated interpretation of the Bible and technology, drawing on the “transformer” model in AI to aid in understanding the interconnected elements of the Bible and technology in broader narratives. The generative interpretation under GPTh offers evolving perspectives, allowing for re-examining biblical concepts in light of technological advancements, leading to new insights and understandings. The generative interpretation should be able to provide practical and applicable ethical and theological insights into real-world tech developments. This approach should acutely sense the unique contexts in which engineers design, deploy, and influence societies with these technologies. It must be able to respond to changes, integrating everything and adapting Christians to a world of technology. The generative interpretation should combine elements of theology, technology, and articulated Pentecostal hermeneutics. The method must use patterns and lessons from Scripture and tradition.

GPTh is proposed as an innovative framework to further develop biblical interpretation, particularly in technology and AI. It promotes an integrated interpretation of the Bible and technology, considering Pentecostal principles. It encourages seeing technology and biblical elements as interconnected within broader narratives rather than isolated entities.

GPTh also suggests a generative interpretation approach, allowing for evolving perspectives and re-examining biblical concepts in light of technological advancements. This interpretative lens leads to new insights and understandings, encouraging dynamic conversations and deeper exploration of the intersection between faith and technology. GPTh also emphasises practical and applicable ethical and theological insights into real-world technological developments. It encourages interpretations sensitive to the unique contexts in which technologies are engineered and deployed.

This hermeneutic for technology allows for a dynamic and evolving perspective in biblical interpretation. It encourages interpreting biblical texts in light of current technological advances to discover new insights, ideas, or meanings that were not previously apparent or considered. GPTh can further be used to assess technology's ethical, moral, and spiritual implications, promoting the responsible use of technology that aligns with faith values. It helps facilitate enlightened responses and strategies for integrating technology into faith practices. This techno-hermeneutic promotes continuous exploration and generation of new interpretations or perspectives, allowing scholars to actively explore texts by applying generative interpretation principles to the Bible in the context of advanced technology.

The researcher further discussed the role of AI technologies in the context of apocalyptic events depicted in the Bible, suggesting that AI could play a significant part in realising these events. AI technologies, particularly autonomous drones, are metaphorically likened to the locust army described in Revelation 9:1-12. These technologically advanced "locusts" could be unleashed with malevolent intentions to cause destruction and torment, aligning with the demonic intentions of the antichrist. The document explores the possibility of a technological singularity and its potential relationship to biblical apocalyptic events. It suggests that advancements like SBI could be related to the concept of the beast depicted in the book of Revelation. The integration of AI in warfare and societal frameworks raises ethical concerns. Deploying AI technologies such as autonomous weapons could alter conventional conflict dynamics, intensifying concerns over civilian safety and accountability.

GPTh is applied to explore biblical apocalyptic texts in the context of technological advancements. This approach aims to reveal novel insights into biblical passages related

to apocalyptic events, considering the role technology may play in the end times. AI technologies could influence human understanding and interpretation of biblical texts, allowing for a generative interpretation approach that reveals new insights and understandings of apocalyptic events in the context of technological advancements.

The researcher hypothesises that AI technologies will play a role in the apocalyptic events depicted in the Bible. The locusts with extraordinary powers in Revelation serve as a metaphor for autonomous metallic-like drones. These drones, potentially designed with malevolent intentions, could serve destructive purposes against humanity, aligning with demonic forces. The integration of AI in warfare, such as autonomous weapons and drones, reflects biblical prophecies warning of widespread deception and conflict. The emergence of deceptive and indiscriminate autonomous technologies threatens to unleash unprecedented chaos and inhumanity in conflicts, reminiscent of the biblical forewarnings. However, it is essential to note that contemporary understandings and metaphorical representations, not explicit biblical teachings, form the basis of these interpretations.

Drawing from contemporary understandings of the apocalyptic imagery of the locust army in Revelation 9:1-12, where locusts with extraordinary powers torment those without God's seal, the author suggests that advanced AI technologies, particularly metallic-like autonomous drones, could metaphorically represent these locusts.

Our discussion of Jesus' warnings illustrates a parallel between biblical prophecy in Matthew 24:4-6, which speaks of wars and rumours of wars, and the modern advent of AI in warfare. It presents a stark scenario where the infusion of AI technologies such as autonomous weapons and drones has revolutionised war practices and intensified global instability, ethical ambiguities, and a precipitous arms race.

In summary, the research suggests that AI technologies could play a role in unfolding apocalyptic events as depicted in the Bible, influencing human interpretation and understanding of these events and raising ethical and moral concerns about their development and application. GPTh facilitates a more holistic, dynamic, and integrated approach to biblical interpretation, considering the complexities and advancements in technology and AI and aligning interpretations with Pentecostal theology and values.

6.4 Recommendations for future research

Areas for further research and exploration remain, particularly in the context of technological advancements and their implications. The following are areas in need of further research:

1. The possibility of a technological singularity and its potential relationship to the apocalyptic events discussed in the Bible needs further exploration. The exploration could involve examining recent scientific breakthroughs and how they may illuminate biblical prophecies.
2. Researchers should reflect on how artefacts like AI contribute to the lived experiences of a community and individuals' daily interactions. This exploration could provide insight into the role of AI technology in shaping knowledge and human experiences.
3. Ethical considerations surrounding AI and society's trust in it deserve further consideration. There is a need for transparency, accountability, and proper regulation in AI development to foster trust and ensure responsible social integration.
4. The potential disruption of human-human interactions due to AI, especially in sectors like healthcare, needs further examination. This exploration could involve examining the impact of AI on patient-doctor relationships and the authority of medical experts.
5. Cardoso's (2020) research promotes a multidimensional approach to biblical interpretation, emphasising the integration of various disciplines and critical thinking. This multidimensional approach could be applied to GPTh to derive a richer understanding of technological development from a biblical perspective.
6. The author suggests redirecting the focus of AI research and development towards enhancing the accuracy, safety, interpretability, transparency, robustness, alignment, trustworthiness, and loyalty of existing state-of-the-art systems. The role of education in achieving these goals should be emphasised.
7. Researchers should use material hermeneutics to source meaning in science and the humanities. Theologians can use the scientific development of AI technologies to understand biblical stories better and they can analyse AI advancements to understand biblical prophecies better.

These suggestions advocate for a multifaceted research approach that includes technological, ethical and societal aspects to fully understand the implications of technological advancements such as AI.

Next-generation pastors must forge stronger connections to education than previous generations, and their educational approach should incorporate advanced technologies, including AI. Christian theology must remain receptive to insights from technology and science disciplines.

Christian researchers interested in the development and deployment of AI technologies could consider the following avenues for enriching future research:

1. They could thoroughly examine the ethical considerations stemming from the swift advancement of AI, particularly concerning the church.
2. They could be undertaking a comprehensive assessment of biotechnological human enhancement through the lens of Christian ethics.
3. They could evaluate the notion of a technological singularity, aligning it with biblical prophecies and related apocalyptic portrayals.
4. They could explore the imminent risks involved in the accelerated development of AI, focusing on the subsequent ethical ramifications.
5. They could investigate the emerging phenomenon of AI worship and discern its societal effects.
6. They can promote continuous research and foster collaborative endeavours to navigate the complexities and opportunities the 4IR ushered in.
7. They can implement the proposed GPTh framework as a pragmatic instrument to shepherd congregations through the dynamic technological terrain, cultivating a harmonised comprehension of faith and technology.
8. They can craft a technological hermeneutic to bolster the Christian church in biblical research in the 4IR and beyond, facilitating a nuanced approach to AI development.

In conclusion, the researcher has outlined a multifaceted approach for future exploration and research in technological advancements, mainly focusing on AI and its implications. The suggested areas of inquiry range across a broad spectrum, from examining a potential technological singularity concerning biblical apocalyptic events to the ethical

considerations and societal trust in AI technologies. The researcher advocates for a nuanced exploration of how AI technologies, such as those involved in biotechnological human enhancement, influence societal structures, individual experiences, and ethics frameworks, emphasising the necessity for transparency, accountability, and robust regulation in AI development and integration.

Furthermore, the researcher encourages a multidimensional approach to biblical interpretation in the context of technological advancements, promoting the amalgamation of diverse disciplines and critical thinking to foster a richer understanding of technology from a biblical viewpoint. Emphasis also falls on the crucial role of education, urging future pastors to strengthen ties with educational advancements, including AI. This approach advocates a Christian theology that remains receptive to insights from technological and scientific fields. This comprehensive approach aims to navigate the complexities and opportunities of the 4IR, fostering a nuanced and harmonised understanding of faith and technology in the evolving technological landscape.

6.5 Concluding remarks

This study undertook an exploratory journey through AI, technology and biblical interpretation. It aimed to establish a coherent pathway for the church to navigate the complexities of the 4IR and the potential emergence of a technological singularity. The study illuminated the multifaceted interactions between technology and faith by meticulously exploring technological advancements, ethical considerations, and theological reflections, underscoring the urgency for a robust techno-hermeneutics grounded in Christian ethics and values.

The findings underscore the transformative potential of AI, not merely as a tool but as a profound influencer of societal structures, human interactions, and spiritual reflections. The emergence of concepts such as GPTh exemplifies innovative approaches to interpreting biblical texts in the light of technological advancements, fostering a dynamic and integrated understanding of faith in the context of exponential technological progress.

Ethical considerations permeated the discourse, highlighting the imperative for responsible stewardship, moral integrity, and a steadfast commitment to human dignity and well-being in developing and deploying AI technologies. The study also unveiled the

profound implications of AI for biblical interpretation, eschatological reflections, and the church's role in discerning and guiding ethical pathways in technology.

In the face of uncertainties and the transformative potential of a technological singularity, the study advocates for the church's proactive, informed, and discerning approach. This approach involves continuous learning, ethical vigilance, and a commitment to fostering interpretations and actions that resonate with justice, love, and divine purpose.

In conclusion, this study catalyses more profound reflections, conversations, and explorations at the intersection of technology and theology. It invites the church to embrace its pivotal role in guiding society through the ethical, moral, and spiritual landscapes sculpted by the relentless waves of technological innovation and discovery.

Humans often turn to faith institutions when faced with uncertainties about their future and existential questions. With the development of advanced AI technologies, there are growing concerns about its potential risks. The church's role in providing hope, emotional and spiritual stability, and guidance will be crucial in the 4IR and beyond.

Reinke (2022:14) defines technology as applied science and amplified power. The term "technology" is derived from the Greek words *téchné*- (meaning art, skill, craft) and -*logia* (meaning systematic treatment or sayings, primarily referring to the sayings of Jesus). Technology amplifies our inherent powers through new techniques and has the potential to honour God. The research cites the biblical story of Noah in Genesis 6-9 as an example of amplification and technique. The research also provides valuable insights and directions for future research in AI and its implications.

The church's understanding and interpretation of the exponential development of AI and the possibility of a technological singularity is a topic that needs further exploration and development. Currently, there is a lack of a techno-hermeneutics and ethics guidelines within the church to address these concerns. Without these frameworks, the church may struggle to play a defining role in the unfolding technological future. The church cannot postpone its responsibility to develop these guidelines and contribute to the understanding and interpretation of AI and the potential technological singularity. This research developed a techno-hermeneutics and ethics guidelines to respond to this challenge.

This research pioneers a response to the question of the church's interaction with and response to AI advancements. However, the swift and exponential growth in this field means that this study's conclusions and recommendations are rapidly becoming outdated. The Yoruba people of Nigeria say, "*Ìwé kò ní tán, èrò kò ní sàn"* which means "Learning never ends, thinking never tires." The pursuit of new answers should never cease.

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