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The Ethics of High-Risk, High-Return Decentralized Finance: How Cryptocurrencies Align with the Values of the Orthodox Christian Worldview

Dr. Ioannis Gazetas[1] and Dr. Ioannis Aznaouridis[2]

[1]Theologian Cleric of The Orthodox Church of Greece, Psychotherapist, Mental Health Counselor

[2]Economist, Public Administration, General Staff of The Hellenic Army

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ABSTRACT

The use of cryptocurrencies and blockchain technology raises ethical dilemmas and challenges, as they are driven by an instrumental financial rationalism that focuses on outcomes while often disregarding ethical values, they cause economic, social, and environmental consequences. In contrast, Orthodox Christian ethics emphasize the need for a human-centered approach to wealth creation and management, advocating for responsible technology use that prevents illicit financial activities, mitigates moral hazards, and respects the environment. Based on extensive literature review and analysis, this paper examines, from an interdisciplinary perspective, the relevance of modern cryptoeconomy to the human values of Orthodox Christian ethics. The findings highlight the strong outcome-oriented focus of cryptocurrency platforms, often ignoring principles such as ethical responsibility, social justice, and solidarity, which Orthodoxy upholds. At the same time, it reveals a new complex reality that questions the claimed decentralization, economic freedom, and transparency of cryptoeconomy, leading to the necessity of shaping an ethically sustainable approach.

Keywords: Blockchain technology, Cryptocurrencies, Decentralized finance Orthodox Christian ethics,

1. Introduction

The economic reality, as a fundamental parameter of social formation, has historically been characterized by "tradition, central control, and the market" (Christodoulakis, 2015, p. 45), a framework within which the behavior of homo economicus is shaped and reproduced, based on an individualistic utilitarianism (Keane, 2019). Economic rationalism, which is grounded in the "internal consistency of choice", "the maximization of individual interest" and "the

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maximization in general" (profits, utility, values) (Sen, 2017, pp. 301-306), and the ethical demands, with components such as the common good, dignity, solidarity, subsidiarity, support for the vulnerable, ecology, and sustainable development, often intertwine harmoniously but also dynamically conflict (Enderle, 2018, pp. 7-13; Keane, 2019).

As for the religious narrative, the main religions exhibit an inherent "orientation towards «purposeful action», attributing intention to human actions" (Karamousis, 2015, p. 18) with either a positive or negative connotation. Each religion has mechanisms that incentivize the promotion of economic and social activities or other existent actions, discouraging inertia, debt, and poverty (McCleary, 2007). In biblical reformist teaching, where material goods are meant to be instruments of offering, the message is conveyed that even worldly activities are "hiding places of God", meaning that in the simple and earthly He is perceived, therefore, every job, role, action, and responsibility can become a means of service to people and to God (Veirth, 2011). The post-economic pattern of decentralized markets in crypto-assets ("Markets in crypto-assets" / 'MiCA') is rapidly influencing the economic environment, attracting attention by sparking imagination and either exciting or troubling businesses, governments, institutions, social activists, privacy advocates, mass media, theorists, journalists, and individuals. The rapid development of cryptocurrencies may validate the statement of Swedish politician Rick Falkvinge that "Bitcoin will be to banks what email is to post offices" (Papanikolaou, Renasis, 2021), outlining the future of the economy.

The purpose of this study is to explore the ethical dimension of decentralized financing, focusing on its nature as a high-risk, high-return investment and its relationship with the values of the Orthodox Christian worldview. Specifically, the article examines how cryptocurrencies and DeFi platforms, operating outside the traditional financial framework, align (or diverge) from the fundamental principles of Christian orthodoxy such as justice, solidarity, transparency, and social responsibility, given the challenges, influences, and ethical risks that arise. It is noted that there is minimal research generally addressing the relationship between Christian ethics and cryptocurrencies (Senjaya & Simanjuntak, 2022), and none of these approaches the topic through the lens of harmonizing Orthodox values with financial technological innovation, highlighting a significant research gap.

2. Cash Economy

2.1 The origin and function of money

Money emerged as a social phenomenon to meet the evolving needs of transactions, without being the result of state or legislative intervention. However, over time, with state regulation, its functionality was improved, strengthened, and perfected (Menger, 2009). Initially, it appeared in

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the form of precious metals in Egypt and Mesopotamia during the 3rd millennium B.C. (Chumanidis, 1976). Economic life, with this intermediate good, transitioned from rigid barter to the flexible cash economy (Raftis, 1981). In Ephesus of Ionia, around 650 B.C., we find the earliest known coins of the Western world, while banknotes appeared in Europe in the late 17th century, always in combination with coins or backed by silver or gold (Weatherford, 1997). Historically, as forms of money, goods (cattle, skins, tea, salt, etc.), metals, coins, banknotes, book-entry money (cards, bank orders, etc.), and quasi-money (fixed-term deposits) have emerged.

The demand for various forms of money no longer concerns solely the facilitation of the exchange of goods and services, but also precaution for protection, speculation (Keynes, 2010)[1], achieving investment profits, exercising leverage policies, hedging risk (Rogers, 1999), shaping and transferring purchasing power (Tobin, 1978)[2], the division of labor (Samuelson, 1975), currency arbitrage, speculation on exchange rates, and hedging foreign exchange risk (Karafakis, 2008), etc. Modern economies, characterized by a high degree of specialization and a multiplicity of transactions, require money that is reliable, accessible, readily available, divisible, durable, circulable, ensuring liquidity, asset diversification, economic benefits, and social visibility (Karafakis, 2017; Raftis, 1981).

2.2 Financial mutations

The various quantitative theories emphasize that money should reflect the legally exchangeable material wealth of a society. In this context, the financial environment is organized around the sources of financing and financial intermediation (Weston & Brigham, 1986; Andrikooulos, 2022), incorporating legal rules and ethical norms, which are determined by the authoritative structures of society. Thus, a centralized system of institutional regulations is formed, ensuring the smooth flow of capital between economic individuals and business entities.

Economic activity began to gradually expand/shift, from the production and exchange of goods and services to more complex forms of financial transactions (McDaniel, 2011; Hiriotis & Vasileiou, 2018), with speculation being the main motive. A key factor in this development was technology, which is now considered the "natural environment of man, his natural space" (Waters, 2006, p. 47), and is accepted as the prerequisite, means, and necessary condition for every form of progress (Brunner, 1949).

The combined action of financial management and engineering with FinTech technology has created a financial environment with new data and challenges, which has fostered financial

[1] Liquidity preference
[2]Tobin' s portfolio theory

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innovation and investment opportunities, while simultaneously increasing the associated risks (Schmidli, 2017).

As a society, we have entered "an era of uncertainty and questioning of traditional value systems" (Plexidas, 2018, p. 290), characterized by faith in progress, logic, and rationality in thinking and action. For the economy, the period of postmodernity[3], has dawned, where skepticism challenges grand narratives, and fluid uncertainty is prioritized over traditional institutions and monolithic ideologies (Bauman, 2006; Lyotard, 1984). The economy seems to be sinking into "the absurdity of a new, technological messianism, centered on the myth of perpetual growth, perpetual information, perpetual consumption, and perpetual euphoria" (Yagazoglou, 2016, p. 239) and "the illusion of perfect calculation" (Christodoulakis, 2015, p. 267). Today, complex financial products and cryptocurrencies are rewriting a new "Gospel of Wealth" (Garfinkle, 2007), where individuals are distinguished between economic winners and losers. The economy, with the help of technology, acquires new characteristics as a result of a multi-layered osmosis of principles, methods, and values, not by investing, but by betting on invented values (Forrester, 1997), moving away from traditional centralized systems and principles. The use of Blockchain technology innovation shapes the 21st-century Post-Economy, raising ethical dilemmas and security issues.

2.3 From Fiat Money to Cryptocurrencies

Fiat money is issued, controlled, and certified by the Central Banks of countries, which have the exclusive right to issue it and implement the respective monetary policy. Payments require an intermediary (commercial banks, PayPal, Revolut) and use the internet as a tool for the transfer of fast digital money. Trust here relies on the ability of the government and the Central Bank (Titman, Keown & Martin, 2015; Howells & Bain, 2009; Thomadakis & Xanthakis, 1990). On the other hand, decentralized finance (DeFi), through cryptocurrencies and blockchain technology, is shaping a new financial environment, where traditional intermediaries and custodians are absent from its operation and accessibility.

Cryptocurrencies are not representative money (they do not have a physical form), but rather 'digital units of value', primarily of a speculative nature, which are issued, circulated, and stored

[3] An era of questioning, deconstruction, subjectivity, differentiation, and interdependencies. It is characterized by the crisis of the grand narratives about progress, values, scientific truths, etc. (Lyotard, 1984), the deconstruction of the concepts of stable truth and objectivity (Derrida, 2015), the belief in the historical fluctuation of concepts and truths, which are interconnected and always subject to interpretive changes, the perception of the cultural logic of a sluggish capitalism, the restructuring of culture in relation to the economy (Jameson, 1992), the connection with economic change and globalization, the impact of the global market on modern societies and culture (Harvey, 2009), and generally the questioning of the established and the emphasis on relativity.

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using complex algorithms, exclusively in a network of billions of computing machines (Tapscott & Tapscott, 2016; Antonopoulos, 2017). They thus constitute a new type of monetary circulation, 100% digital, that is not subject to central regulatory and supervisory authorities, but follows a trust protocol, which, according to its creators, forms a reliable transaction platform (Prasad, 2024) free from mismanagement, corruption, and control[4]. It should be noted that, beyond cryptocurrencies, any type of money that is transferred or stored digitally can be classified as digital money [5]. Already, the European Central Bank, as a result of digital transformation, is designing the digital euro, universally accepted and convertible throughout the Eurozone (ECB, 2024).

The internet for cryptocurrencies is not a tool, but an ecosystem. It is the environment in which they are issued and exist, with the required trust being placed in an open and accessible code. The foundation of cryptocurrencies was laid in 2008 with Bitcoin, using blockchain technology for the security and transparency of transactions, combining software, network, and value storage functions (Kessler, 2024; Mahato, Khatua, Das, & Chowdhury, 2019). This approach laid the groundwork for the creation of decentralized financial transaction systems.

The next development came with platforms like Ethereum, which introduced the ability to execute computational code within the blockchain. This innovation made it possible to develop decentralized applications (DApps) and smart contracts, expanding the use cases of cryptocurrencies beyond simple financial transactions. These applications enabled the creation of new forms of governance and organization, such as decentralized autonomous organizations (DAOs) (Mahato, Khatua, Das, & Chowdhury, 2019).

As demands increased, new challenges emerged (increased complexity, scalability issues, and low speed), which drove the development of innovative projects to overcome the limitations of older platforms, introducing more efficient systems with lower costs and increased speed (Wu, Yuan, Xie & Dai, 2024). The future remains open to new development pathways based on artificial intelligence (Fraga-Lamas & Fernández-Caramés, 2022) or other cutting-edge technologies.

[4] Regulation (EU) 2023/1114, however, establishes rules for issuers and providers of crypto-assets that are not regulated by the EU through other acts, regarding transparency, licensing, supervision, organization, operation, protection, and information.

[5] Digital Currencies: These include cryptocurrencies based on blockchain technology, CBDCs issued by central banks as digital money (digital yuan), and electronic money or interbank transactions that represent real money (euros, dollars) deposited in bank accounts and transferred through banks, payment providers, e-banking, or other electronic systems.

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2.4 The basic principles of cryptocurrencies

Through the evolution and operation of cryptocurrencies, the following principles emerge (Tapscott & Tapscott, 2016):

a. **Decentralization-Distributed Authority**: They do not depend on any central regulatory authority, and the management and validation of transactions are distributed among the participants.

b. **Transparency-Networked Integrity**: Transactions on the blockchain are public, accessible by anyone, permanently recorded, and visible to all network members.

c. **Security**: Cryptography, assisted by complex algorithms, ensures transactions are protected from malicious actions. Strong security is a fundamental requirement in a decentralized transaction system.

d. **Pseudonymity-Privacy**: Public transactions on the blockchain are protected by pseudonyms (alphanumeric addresses).

e. **Scarcity - Value as Motivation**: Many cryptocurrencies have their own monetary policy that combines limited supply with a growing inflow into the market (Bitcoin has a limit of 21 million BTC, which will gradually enter the market until 2140). This policy leads to the maintenance of value and avoidance of inflation.

f. **Freedom and Global Access-Maintenance of Rights**: Transactions occur without restrictions or geographical barriers, enhancing economic freedom and independence from local and international constraints (Pieters & Vivanco, 2017).

g. **Autonomy and Self-Management-Inclusion**: Users have full control over the management of their funds, without the need for intermediaries and without external supervision. This way, the uncertainties of traditional financial markets are avoided.

3. Relationships between religion and economy

Religions promote values that influence people's beliefs and shape economic behaviors. Specifically, they establish a value framework that includes work ethics, honesty, trust, charity, solidarity, financial prudence, the spirit of hospitality, and support for the weak. These values emerge as a “factor for boosting investments and economic development” (McCleary & Barro, 2006, p. 51).

Exploring the issue of the development of rational capitalism in the early 20th century, exclusively in Western countries, Weber highlighted the significant role of religion and the

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Protestant work ethic as the cause of its development (Weber, 2010). Specifically, he attributed the economic superiority of the USA and Northern Europe 'to the values of Protestantism regarding the work ethic, compared to the more relaxed standards prevailing in other countries' (Christodoulakis, 2015, p. 155).

Protestantism[6] articulated "a new framework of individual ethics and rules of economic organization" (Christodoulakis, 2015, p. 101), where wealth is not sanctified only for the ruler, work is a personal duty and a factor of progress, while saving, tax compliance, and fulfilling the state's requirements are obligations of major importance for everyone. In this way, the salvation of the world is sought through a secular function, economic progress (Nelson, 2019). The terms secular and religious found common ground in economic progress, for the sake of the earthly paradise.

The Orthodox worldview, although it does not place emphasis on the transient, does not isolate the spiritual from the material aspect of life. On the contrary, it accepts that economic cooperation and social coexistence require an economy that works for the benefit of people and not for profit (Mantzaridis, 2020b). In this sense, activities that involve high risk without a clear orientation towards the common good may be considered morally questionable. At the same time, it is recognized that the modern man of the Western world seeks the "eternal euphoria of programmed pleasures and needs" (Yagkatzoglou, 2003, p. 75), replacing Christian principles with the values of nihilistic hedonism. In contemporary Orthodox Christian thought, the prevailing observation is that "humanity has been transformed from a set of communal relationships into a mere tool for producing economic results and, more specifically, into an anonymous cog in the machine of a consumer survival system" (Bria, 1988, p. 120; Dumitrascu, 2010, p. 304). The long-standing tradition of the Orthodox Church has shaped and proposed ways of managing human needs. However, it has not advanced to a detailed and systematic treatment of the problem of Political Economy and the Sociology of Economics (Kotsiopoulos, 2017).

4. Orthodox Christian Ethics

4.1 The Orthodox view on the ethical use of money and wealth

In the Orthodox Christian view, money and wealth do not have intrinsic value, but function as means that call a person to a profound ethical stance. They are not only tools but also tests of the heart[7], challenging the willingness to manage them with love, humility, and care for others. The

[6] The protests of Luther in Germany (1591), Calvin in France, Zwingli in Switzerland, and Huss in the Czech Republic led to a new framework of ethics.

[7] St. John Chrysostom: 'The real thorn is wealth' (Third Homily on 2 Corinthians).

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teaching of the Orthodox Church urges the faithful to approach money and its derivatives in a righteous manner, avoiding any act of greed. Christian ethics presents God as the only true source of joy. Greed is considered a dangerous passion because it leads to separation from communion with God and to self-serving at the expense of others (Luke 12:15 / Colossians 3:5). In contrast, offering to others is a central virtue, as it transforms wealth into a tool of love and care (Tobit 4:7). As it is aptly noted, "wealth and luxury cultivate pride, while poverty and simplicity foster humility" (Mantzaridis, 2020b, p. 461). Thus, the Orthodox Church invites humans to view money as a means of Christian diakonia contributing to the healing of selfishness and isolation.

According to the Holy Scripture, wealth is a gift from God (Deut. 8:18) that should be used wisely and without attachment. Christ calls humans to show generosity by giving freely to their fellow human beings (2 Cor. 9:11), and teaches that one should be content with what they have, avoiding greed, as attachment to material goods distances the heart from God (Luke 16:3). God reminds us, 'He who loves money will never be satisfied' (Eccl. 5:9), indicating that a person must seek a deeper fulfillment of the heart. Trust in God's providence is also encouraged (Matt. 6:31) for meeting one's needs, with an exhortation to be freed from daily worries and to entrust them to God, who cares for man. It is absolutely clear that wealth obtained through injustice is not associated with God (Prov. 10:2, 13:11, Jer. 17:11).

In the same spirit, Saint John Chrysostom teaches that money and wealth exist to be shared, not to be accumulated[8]. The proper use of wealth thus serves as a daily reminder of the Christian responsibility to care not only for our own good but also for the good of our neighbor.

The faithful Christian, living a truly experiential and not merely intellectual relationship with God, prioritizes in his life selfless love, philanthropy, humility, temperance, prudence, justice, peace, generosity, almsgiving, self-restraint, discernment, and freedom (Gal. 5:22-23, Eph. 5:9). With these spiritual fruits, Orthodoxy addresses the issue of wealth accumulation. The Christian is called to use his wealth in balance, between the individual self and the collective us, avoiding excessive accumulation and selfish use.

Selfless love empowers an individual to view material goods as means of offering and not as an end in themselves, while charity urges one to support those in need, cultivating a sense of community and solidarity. Humility prevents the arrogance that often accompanies wealth. Temperance removes excesses that divert from the spiritual ideal. Justice abolishes exploitation and inequality. Peace, the fruit of divine connection, promotes tranquility and prevents attachment to transient material things. Generosity and almsgiving direct excess to those in need.

[8] 19th Homily of his on the 'Gospel of John'.

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Self-control protects from excess, while discernment grants the individual the ability to evaluate when and where to direct the material resources at their disposal. Finally, freedom grants independence from the influence of wealth, breaking the bonds of material attachment.

In conclusion, in the Orthodox worldview, wealth and money, when managed by individuals in a deep relationship with God, are transformed through generosity into channels of spiritual growth, promoting solidarity in place of egocentrism.

4.2 The Orthodox Christian ethics in comparison with other ethical systems

Orthodox Christian ethics has a unique character, as it is not based on moral imperatives or socially constructed values, but rather stems from the very existence of Jesus Christ. Specifically, it is a way of life experienced through the personal relationship between the individual and God, rather than simply a set of rules. Just as trees produce fruits that reflect their nature, the faithful Christian is called to express and share, with all those around them, the characteristics-fruits of the Creator (love, justice, mercy, forgiveness, and humility), not out of obligation or duty, but because the relationship with Christ inspires them to express these selflessly, just as He did." (Vlachos, 2018; Tsitsingos, 2018; Nikolaidis, 2009).

This fundamental approach radically differentiates Orthodox ethics from other Christian traditions, such as Roman Catholicism and Protestantism. Roman Catholic ethics, in particular, is largely based on natural law, meaning ethical principles that are considered inherent in human nature and understood through reason, while being guided and illuminated by the Christian faith, thus giving a theological dimension to the natural moral order. Furthermore, ethics is also rooted in Catholic Social Teaching (CST), which includes papal encyclicals (Bucciarelli, Mattoscio & Persico, 2011). At the same time, it draws influences from philosophical teachings, such as those of Aristotle and Thomas Aquinas, which reinforce the perception of ethics as a system of values and duties (Nikolaidis, 2009).

Similarly, Protestant ethics is largely defined by individual interpretation, as each believer is called to apply God's commandments based on their personal faith and understanding of the Bible. Thus, moral formation takes place on an individual level, with each believer autonomously deciding what they consider morally right or wrong (Nikolaidis, 2009).

In comparison to the above Christian approaches, philosophical ethics follows a different path, as it is primarily based on logic and intellectual understanding of ethics. According to Aristotelian ethics, what promotes eudaimonia (flourishing or happiness) is considered moral, an approach that broadly resembles the principle of Utilitarianism, as anything deemed beneficial can be considered moral (Vlachos, 2018; Nikolaidis, 2009).

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Therefore, Orthodox Christian ethics is not a set of rules but an immutable, timeless way of life, a living experiential journey that stems from the union of the human being with God and naturally permeates their daily life. In contrast, other ethical systems are based on different criteria, such as normative, autonomist, and judicial-rationalist criteria, where rules and principles change and adapt to the subjective needs of each era, and are mainly applied as moral duties or obligations (moralism).

5. Discussion

5.1. Instrumental Rationality and Ethical Contradictions in Cryptoeconomics

The modern financial environment is entirely governed by the philosophy of instrumental rationality, which significantly transforms the intellectual perceptions of the world and opposes any form of regulatory framework (Harvey, 2011). This approach focuses on the efficient selection of means to achieve specific goals. At the core of this philosophy lies the pursuit of maximum efficiency, often independently or at the expense of ethical and value-based parameters or principles. Every human action is evaluated based on the desired outcomes, rather than values, ethical principles, or social consequences (Habermas, 1984; Weber, 1920; Yannaras, 2006; Tsivakou, 2019). It is also noted that the pursuit of maximum efficiency may not be truly sustainable or may lead, in the long term, to negative consequences.

Under the spirit of this instrumental rationality, cryptocurrencies and blockchain technology represent the ultimate mechanistic approach to value. The decentralized nature and anonymity they introduce (Mnif, Zghidi & Jarbui, 2023; Tschorsch & Scheuermann, 2016) reinforce individualism, while automated functions (such as smart contracts) reduce the need for human judgment, creating a de-ethicized value mechanism, solely oriented towards individual interest and the personal Ego (Senjaya & Simanjuntak, 2022).

Technology, although it increases investment options and security (Senjaya & Simanjuntak, 2022), is based on instrumental rationality (Weber, 1988), which weakens and externally defines the role of the human being (Yannaras, 2006). Methodological individualism and massification in a context where individuals are not considered responsible constitute the foundation of cryptoeconomics (Enderle, 2018). As elements of counter-argument against the dominance of such rationality, issues like alienation from moral values, lack of trust, environmental costs, and the promotion of economic and, consequently, social inequality could be raised. However, despite the ethical contradictions, we must not overlook that “economic rationality and ethical demands can be compatible or even mutually reinforcing” (Enderle, 2018, p. 21). In this way, ethically neutral technology acquires ethical content through its use.

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Here, the Orthodox Christian worldview provides a unique perspective on the use of technology, placing the freedom and responsibility of the human being at the center. Technology should not be viewed solely as a tool for efficiency or innovation, as, as noted, “maximizing utility or performance does not always mean rationality” (Enderle, 2018, p. 14). On the contrary, it serves as a mirror of internal motivations and the orientation of the heart (Yannaras, 2011).

This framework leads us to recognize the need for an ethical approach to technology that highlights the spiritual dimension of human existence. Humans are called to be guided by their conscience[9] and values, avoiding uncontrolled dependence on technology and submission to the functional demands of efficiency, which often overlook the moral and spiritual aspects of human existence (Fanaras, 2020). This freedom is connected to personal identity and individual responsibility, elements that form the foundation for an ethical stance toward technological choices.

In Orthodox theology, human creativity is considered a gift from God[10], and the development of technology is a result of this creativity (Ware, 2018). As "created in the image and likeness of God" (Genesis 1:26), humans are called to use technology not only for their own benefit but also for the service of others and the entire Creation. The fact that "God is the owner and man is merely the steward" (Senjaya & Simanjuntak, 2022, p. 31) places the responsibility for the proper use of technology on humanity. In the case of cryptocurrencies, the transparency and security of charitable actions (Popper, 2016) are contrasted with the financing of illegal activities or the facilitation of money laundering (Böhme et al., 2015). Irresponsible use of technology poses risks of alienation, turning it into an object of worship or addiction, as excessive use can degrade the quality of human relationships and distance people from genuine social life (Postman, 1993; Ludovikos, 2021). This is linked to the tendency, especially in the Western world, for people to submit to their creations, turning them into idols that they themselves construct (Paraskevaidis, 2000). In response to the dangers posed by instrumental rationality, the Orthodox Church proposes a balanced and spiritually enriched approach based on responsibility. It calls on humans to use technology with a focus on the common good, the protection of Creation, and the preservation of meaningful human relationships. In this context, technology is seen as a tool that, when guided by ethical values and spiritual discernment, serves both humanity and society in a way that honors the Creator.

[9] Conscience is understood as the internal and diagnostic voice of God, which, through purification and cultivation, reveals the true state of the human being. See Romans 2:14-15.

[10] See Exodus 31:3; Baruch 3:37; Wisdom of Solomon 1:9-10; Sirach 38:6, where cognitive and creative abilities are presented as gifts from God to man.

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5.2. The illusion of decentralization

Decentralization is one of the fundamental principles of cryptocurrencies. It is argued that through DeFi technology, the need for central intermediaries, such as banks, governments, etc., is eliminated, while transactions are carried out with transparency and without concentration of power. This principle seems to reflect certain values of Orthodox Christian ethics, such as freedom, equality, collectivity, and justice. However, in practice, the implementation of decentralization in cryptocurrencies presents significant deviations, which raise ethical questions.

Despite the promise of a decentralized system, the reality shows that power and control are shifting to new centers of concentration.

a) Mining

Concentration in large companies or "mining pools": The top miners, who dominate the cryptocurrency mining process through powerful companies or "mining pools," exert disproportionate influence on the network. According to research, Bitcoin mining is characterized by significant concentration, as a few large mining pools control a large percentage of the total computational power (hashrate) of the network. Specifically, a study by Romiti et al. (2019) showed that in three of the four largest Bitcoin mining pools, a small number of participants (≤ 20) absorbed over 50% of the total rewards in BTC. These findings demonstrate trends of concentration both in large mining pools and in cryptocurrencies in general. At the same time, the geographic concentration of mining in areas with cheap energy, such as Kazakhstan, further underscores this trend (Kinsley, 2024).

b) Centralization in exchange platforms

The concentration in exchange platforms is evident, as they manage a significant percentage of global cryptocurrency transactions. According to the cryptocurrency market data provider website CoinGecko (https://www.coingecko.com/en/exchanges), on 12/10/2024, Binance held the top position with a trading volume of $38.6 billion in 24 hours, while Bybit ranked second with $14.6 billion.

Furthermore, central exchanges operate as custodians of funds, managing private keys and thus controlling access to users' assets (Huffman, 2024). This practice undermines the fundamental principle of decentralization in cryptocurrencies, according to which users retain full control over their assets. The concentration of funds on such platforms poses risks, such as security breaches or access restrictions, eroding the cornerstone of the cryptocurrency ecosystem.

c) Concentration of wealth in large cryptocurrency holders (whales)

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In the cryptocurrency space, there is a marked concentration of wealth among a few large holders, known as "whales," who hold disproportionate economic power (Guillamón, 2024). This concentration allows them to directly influence the market and the operation of the network, causing price fluctuations and raising questions about the sustainability of the decentralization vision. This practice exacerbates economic inequalities and demonstrates that decentralization remains more of an ideal than a reality. A striking example is the Bitcoin network, where about 2% of holders control 95% of the total supply (Pazopoulos, 2021).

d) Dependency on developer groups

The design, development, and maintenance of software and various blockchain protocols depend on developer groups, leading to a concentration of power that impacts the governance and direction of these protocols. For example, Ethereum relies heavily on the Ethereum Foundation (https://ethereum.org/en/foundation) and its leading developers for its development and maintenance. This concentration of control can influence the governance and direction of the protocol, undermining its decentralized nature. Furthermore, the dependency on small developer teams presents risks, such as security breaches or access restrictions, eroding the principle of decentralization.

The principle of decentralization expresses a core of freedom, allowing users to have full control over their assets. The concept of freedom, according to Orthodox theology, is a gift from God, which is connected to free will and responsibility (Damaskinos, 2020). However, the concentration of capital in miners, exchanges, large cryptocurrency holders (whales), and dependence on developer teams may undermine the promised freedom. By entrusting third parties with control over their assets, users risk losing the free will that decentralization seeks to uphold.

The concentration of power in the hands of a few large players contradicts the principles of collectivity and equality, which are fundamental values in Orthodox theology (Yannaras, 2011). In the Orthodox tradition, collectivity and the equal contribution of all members of the community are expressions of unity and solidarity, as the community of believers is understood as a gathering of free and unique persons (Lossky, 2007). Within this gathering, individual personality is founded on love, and the collective on justice, revealing a contrast between the ideal promise of decentralization (Nakamoto, 2008) and the often different reality (Scott, 2016).

According to Orthodox Christian ethics, money should be placed where it can serve humanity and promote the common good, not be accumulated (Chrysostom, 1862) in banks or central platforms. In this way, it becomes a means to strengthen social cohesion and promote true freedom (Zizioulas, 2023). Its value is determined by its use, which must be characterized by

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transparency, justice, and care for others (Nikolaidis, 2002). In this context, the freedom offered by the decentralization of cryptocurrencies becomes truly beneficial when accompanied by responsibility (Yannaras, 2011), accessibility, and equality before the law (De Fillipi & Wright, 2018).

Any dependence, even if technically necessary, raises concerns regarding the nature of governance in the digital space of crypto-assets. The Orthodox tradition emphasizes collective participation and collective responsibility in governance, ensuring that the role of the community in decision-making is not weakened, and that crypto-assets adhere to practices of true decentralization. This calls us to reflect on whether the technology adopted can truly serve the ideal of decentralization or, in reality, ends up reproducing the same power concentration practices it seeks to overcome.

5.3. Ethical dilemmas surrounding anonymity and transparency

The situations of anonymity and transparency, which characterize crypto-assets, raise serious ethical dilemmas, serving as fields of intense scholarly debate, as two fundamental values of social and economic life—privacy and accountability—clash (Zohar, 2015; Narayanan et al., 2016; Böhme et al., 2015; Möser et al., 2013; Javaid et al., 2022; Fanning & Centers, 2016). Anonymity and transparency each present their own positive and negative aspects in transactional practices (Narayanan et al., 2016). Anonymous transactions protect the right to privacy and ensure that users are not monitored by authorities, governments, or private companies (Meiklejohn, 2013; Zohar, 2015; Koshy et al., 2014). However, this fact may facilitate illegal activities, such as tax evasion, financing criminal activities or organizations, and money laundering (Böhme et al., 2015; Möser et al., 2013).

Transparency, on the other hand, increases accountability and, in this way, enhances users' trust in the system, providing them with a sense of protection. However, the negative aspects of transparency may include the exposure of sensitive information and violations of users' privacy (Olaseni Shoetan, Tolulope Familoni, 2024), such as through blockchain analysis to identify patterns and relationships (blockchain forensic analysis) or techniques like "transaction deanonymization" or linking addresses to data, among others. According to other researchers, the transparency of blockchains could "negatively impact both corporate governance by complicating administrative processes and economic innovation due to the dissemination of strategic information" (De Filippi & Wright, 2018).

The decentralization of the system, which is strengthened by anonymity, limits the power of central authorities, but at the same time enhances its vulnerability to fraud or abuse (Möser et.al, 2013). Anonymity hinders the necessary data analysis for combating fraud and crime. On the

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other hand, transparency can be strategically used for surveillance and the violation of freedoms (Fanning & Centers, 2016).

Moral hazard is both present and evident. Methods such as Ponzi schemes, MLM schemes, rug pulls, pump & dump schemes constitute fraudulent pyramid-like structures, investor abandonment, deception, and misinformation, disguised as strategic choices, revealing that moral hazard is not absent from the cryptocurrency environment. Cases of fraud in this space are numerous and often difficult to recognize, especially for novice investors (Theodorakis, 2018). The reasons for their spread are due to the relatively new nature of the sector and limited experience. Bitcoin (BTC) experienced the fastest capitalization of any asset on the planet, the freedom of entry into the market allows even criminal elements to participate, and the unwarranted appearance of good faith, along with limited knowledge about how cryptocurrency technology works. The knowledge gap, combined with the large number of crypto assets (Filippas, 2017) and individuals' greed for quick and easy wealth, constitutes the point that fraudsters exploit, exhibiting unethical behavior (Christodoulakis, 2015; Tschorsch & Scheuermann, 2016; Möser, Böhme & Breuker, 2013; Stratiev, 2018; Theodorakis, 2018). It should be clarified that from a technical standpoint, blockchain technology, due to its architecture, provides a very high level (100%) of security. In this case, the weak point lies in the key that an individual possesses (e.g., on their mobile device) to transact (personal key). Security concerns and fraud prevention require users to take personal care and responsibility (Olaseni & Tolulope, 2024).

Anonymity and transparency in cryptocurrencies raise ethical dilemmas, related, on the one hand, to balancing the protection of privacy and safeguarding against criminal activities, and on the other hand, to the demand for transparency, accountability, and oversight. These dilemmas are approached in Orthodox thought through the lens of justice and truth, which are fundamental principles of Christian ethics, always with the aim of cultivating discernment (John of Sinai, 1999). Discernment, as a core virtue, guides the proper use of freedom and the means it provides, ensuring the promotion of the common good and the avoidance of abuse.

Anonymity, as a means of protecting privacy, can be considered ethically acceptable when it serves purposes that align with the protection of human dignity and human rights, functioning as a shield of freedom and personal security. However, based on the virtue of discernment, it is deemed unacceptable when used for unethical, illegal, or abusive purposes, such as undermining social cohesion through tax evasion, promoting criminal activities, concealing illicit gains, and deceiving justice (Theodorakis, 2018). These are practices that contradict the principle of justice, threatening social order and well-being.

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Regarding transparency, blockchain technology provides a high level through the public recording of transactions. However, this is not absolute, as the existence of closed systems and platforms (known as private or "permissioned" blockchains), which restrict free access to information, diminishes its effectiveness (Amiri, Agrawal & El Abbadi, 2021· Androulaki et al., 2018). Furthermore, the use of techniques such as "mixers" to mix coins (Pakki et al., 2021), which obscure the origin and destination of transactions, complicates the complete tracking of financial flows.

Transparency in blockchain proves to be not just a technological feature, but also an ethical imperative. It reflects the human tendency to utilize innovations, sometimes for the common good and other times for darker purposes (Grinberg, 2012). The critical question that arises is whether technology can evolve beyond its limits to truly serve the principles of justice and trust. Perhaps the answer lies not only in technical improvements but in the development of a new framework where transparency and ethics are not merely goals but an integral part of the system's very identity.

In Orthodox ethics, which encourages empathy and responsibility in actions[11], transparency is a fundamental value. Believers are called to act with honesty and integrity, which is reflected in the need for transparency in actions and resource management (Ware, 2018). However, in the case of cryptocurrencies, transparency is anonymous; it does not aim to encourage responsibility and integrity but is limited to preventing the recognition of accountability. In this way, responsibility to others and to society as a whole is overlooked. The choice between anonymous transparency and truly responsible transparency is not merely a technological dilemma but an ethical call to reexamine the values that guide us (Meyendorff, 1987). In the context of Orthodox ethics, truth and justice are not merely principles but signposts toward true freedom, responsibility, and social cohesion. It is a challenge for Orthodox Christianity to ensure that technological innovations do not become vehicles for illegal and abusive practices.

5.4. Ethical challenges and social implications of high-risk speculative investment choices

An ethical challenge factor is the determination of investment motivations in the selection of cryptocurrencies. These assets are unstable investments, on the one hand due to their rapid, frequent, and high volatility (Philippas, 2017), and on the other hand, due to the lack of regulatory standards (Mendoza-Tello et al., 2018). The instability is expressed through high financial risk, regulatory risk, and technological risk inherent in cryptocurrencies (Moore & Christin, 2013; Philippas, 2017). The 131 "deaths" of BTC that have been predicted (as of today) by Nobel laureates, university professors, and market players through official publications, along

[11] Apostle Paul calls believers to act with integrity before God and men (2 Cor. 8:21) and to live as "children of light," acting with love, justice, and truth (Eph. 5:8-9).

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with the very high returns, refer to financial "bubbles" and create excessive expectations and risks. For example, on 18/07/2010, Bitcoin was worth $0.07, while on 21/10/2017 it had risen to $6,180. Therefore, if an investor had invested $1,000 in Bitcoin in 2010 and held it until October 2017, they would have received over $66 million (Philippas, 2017).

It is evident that the primary motivation for these types of investments is quick and easy profit (Senjaya & Simanjuntak, 2022), as they do not involve the production of goods and services directed toward society, but rather values that pass into the ownership of an investor, resulting in what is purchased being merely an expectation. Additionally, miners who maintain the system gain benefits that exceed the high costs of mining (Paschalie & Santoso, 2020).

Investments of this type, we believe, do not contribute to the developmental efforts of economies, wealth redistribution, employment, poverty alleviation, prosperity, or generally to the advancement of society. They do not contribute to the improvement of human capital (education, health) or social capital (relationships, trust). Furthermore, the escape of capital outside the tax system deprives economic and social structures of the state from resources (Forrester, 1997) and ultimately does not lead to "improvement of a workforce that evolves and seizes opportunities" (Christodoulakis, 2015, p. 245).

The recent global financial crisis of 2008 highlighted an environment of escalating speculative culture, where generally, “credit money, a creation of some banking accounting entry 'out of nothing,' if left unchecked, tends to lead to destruction within a revelatory speculative orgy” (Lavdiotis, 2012, p. 34). This is the development of “a huge acrobatic market based on nothing or perhaps based on itself, far from any reality” (Forrester, 1997, p. 148) and economic logic. In response to the scandalous speculation, the unreliability, and failure of the traditional banking system, cryptocurrencies such as Bitcoin emerged, in part.

Seeking the social footprint of these particular investment choices, we observe that the majority of participants in the cryptocurrency market resemble the idle rentier (income earner, property holder), whose euthanasia Keynes sought during the interwar period in order to liberate 'productive' capital from the dominance of 'financial' capital (Keynes, 2010). Today, we often encounter greedy managers of 'smart' money, idle individuals who enrich themselves from the various bubbles of financial engineering. Additionally, it is noted that such investment behavior 'perpetuates the failure of the global financial system to integrate the poorest countries into a process of systematic development, economic stability, and social justice, and to pull them out of the “debt trap” (Christodoulakis, 2015, p. 258). Among the most widespread cryptocurrencies, Bitcoin requires highly expensive mining equipment, while Ethereum entails high gas fees, creating conditions for social exclusion. Furthermore, due to social stratification and income inequality, individuals’ entry into the cryptocurrency market occurs under “asymmetric material

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terms" (Christodoulakis, 2015, p. 244). These characteristics exacerbate existing inequalities, undermining the prospect of more equitable participation in the global economy.

Each cryptocurrency does not constitute real money, but rather an investment vehicle with an inherent risk element, which is reflected in its price volatility (Ciaian et al., 2016; Paschalie & Santoso, 2020). The large fluctuation in the value of cryptocurrencies (Brière et al., 2015) does not make them digital gold, as supporters of BTC claim. On the contrary, as the economic reality demonstrates, returns and risks require great caution (Blau, 2018). Any excess profits exacerbate inequality, while any losses lead to destruction. It is emphasized that rational expectations should be based on information, which includes all possible updates, and the ability to effectively analyze and process that information (Christodoulakis, 2015; Grigoropoulou, 2019), especially in the decentralized industry of crypto assets. Investment decisions for speculative purposes (trading) primarily require 'technical analysis,' while long-term investments (assets) require 'fundamental analysis' (Fry & Cheah, 2016). As with any financial product, the "illusion of perfect calculation" (Christodoulakis, 2015, p. 267) and the difficulty in controlling the realism of assumptions apply here as well. These represent conditions of particular weight for high-risk products, which makes the system resemble an "automatic betting machine" (Christodoulakis, 2015, p. 273) or an "investment robot" (Patterson, 2010, p. 138).

The economic individual, by nature, shuns uncertainty, always striving to predict developments and choosing risk when the economic expectation is high (Petrakis, 2008). The realism check of the system's assumptions, as a deductive process and method, offering statistical reasoning for decision-making problems, constitutes a complex issue in the case of cryptocurrencies. High-volatility investment schemes are calculated in many ways, often based on arbitrary projections rooted primarily in psychological forecasts. The fully automated system displays methodological pathologies similar to those of complex financial products, such as "methodological bias", "quantification without theory", and "theory without quantitative analysis" (Christodoulakis, 2015, pp. 285-287). This environment complicates the understanding of the characteristics, valuation, selection, and risk degree of cryptocurrencies, and intensifies both the exogenous systemic risk (market risk) and the endogenous non-systemic risk (selection risk). Recently, initiatives by the EU and OECD have begun to form a regulatory framework with axes focusing on the operation, reduction of institutional uncertainty, taxation, and control of cryptocurrencies, to combat their use in illegal activities.

In Orthodox Christian thought, speculation as an end in itself raises particular concerns, as it does not contribute to the common good but rather exacerbates social inequalities (Nikolaidis, 2009). This practice, even though some may present it as a source of positive outcomes, such as contributing to collective benefit (Smith, 2018), often relies on egoistic motives, such as greed or an excessive desire to accumulate wealth (Nikolaidis, 2009).

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Christian life places particular emphasis on the use of material goods as a means to build relationships of love and solidarity, rejecting any form of exploitation or enrichment that isolates a person from the community. High-risk investment practices, when they serve speculation, promote an alienating mindset, in which the individual becomes a servant of wealth, turning means into an end in themselves. As St. Basil the Great writes in his work *To the Wealthy* (PG 31, 277-304), greed not only destroys the relationship between people but also with God, as it creates false security in wealth, dismissing His providence. These practices distort the concept of freedom as understood in Orthodox ethics (Kardamakis, 1985; Nikolaidis, 2002). True freedom is not found in the accumulation of wealth, but in overcoming passions and cultivating self-denial. When the accumulation of wealth becomes an end in itself, the person risks becoming enslaved to the desire for more, which contradicts the call to a life of simplicity and truth. Finally, an obsession with immediate profit undermines spiritual maturity, as it fosters a mentality of impatience and self-sufficiency, which is in opposition to the virtues of trust and humility. Wealth accumulation without spiritual cultivation leads to a way of life where the heart cannot find peace, as it is dominated by the restless desires of the world (Ware, 2018).

Orthodox Christian ethics invites a different way of life, where wealth gains meaning only through service and social responsibility, aiming not at accumulation, but at a community of love.

5.5. Environmental consequences of mining

The entire philosophy of blockchain technology and the mining process (distributed consensus system) is underpinned by a rationalism focused solely on wealth production. A goal that clearly disregards other values and consequences. The technological production of economic value requires vast amounts of energy, a process that is not environmentally friendly (Ying, Jia & Du, 2018· Vranken, 2017· de Vries, 2018), with long-term negative impacts (Senjaya & Simanjuntak, 2022· Stoll, et al., 2019).

A study by Cambridge on the global crypto assets industry highlights the enormous amounts of electricity required annually and their negative environmental footprint (de Vries et al., 2022), ranking the Bitcoin network among the top 30 global consumers, with increasing terawatt-hours (TWh) per year (Blandin, et al., 2020). The number of Bitcoin users grew exponentially from 5 million in 2016 to 35 million in 2018. It later surpassed 100 million, with the majority of users being individuals, leaving companies and institutions with a small share. This trend is expected to continue with the expansion of regulatory interventions and regulatory clarity in the crypto assets market (Blandin et al., 2020). Bitcoin also negatively impacts climate change (Mora, et al., 2018), and the adverse effects of its energy and environmental footprint extend to other cryptocurrencies beyond Bitcoin (Gallersdörfer, Klaaßen & Stoll, 2019).

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The environmental impacts of cryptocurrency mining, as recorded in relevant scientific studies, raise serious ethical issues. These practices, in a way, constitute 'the rape and distortion of the natural world […] under the pressure of overconsumption and ruthless economic interests' (Nikolaidis, 2014, p. 93). They are in direct opposition to the Orthodox view of responsible and prudent management of the gifts of creation, which is grounded in love for God, for our fellow human beings, and for nature. According to Orthodox Christian theology, creation is a divine gift to humanity, not for uncontrolled exploitation, but for responsible use that ensures the harmonious coexistence of nature with human development. The excessive exploitation of natural resources has serious consequences, including environmental crises and the disruption of the relationship between humans and creation (Bartholomew, 2002).

As noted by Ecumenical Patriarch Bartholomew, the Orthodox Church incorporates the concept of "applied ecology," emphasizing that environmental protection and solidarity with our fellow human beings are inseparable principles. In order to address the ecological crisis, a combination of spiritual renewal, educational initiatives, and ecological consciousness is required, placing the integrity of creation above economic exploitation (Bartholomew, 2023).

The ecological crisis, as emphasized by Mantzaridis (2020a, p. 278), "emerged with rapid economic development, made possible by modern science and technology. The economy favored the ecological crisis." This observation strengthens the understanding that modern technologies, such as cryptocurrency mining, although incorporating technological progress, are often intertwined with the economic logic of overexploitation of nature. The capitalist philosophy that characterizes these practices focuses exclusively on economic maximization, disregarding the harmonious coexistence of humans and the environment. Rather than serving the responsible use of natural resources, it intensifies the degradation of creation, standing in complete opposition to the fundamental principles of Orthodox Christian Ethics.

Orthodox Ethics, in the relationship between man and nature, emphasizes the importance of responsibility and respect in action. The concept of "cultivating and keeping the earth" (Genesis 2:15) is a fundamental ethical principle of Orthodox Christian Ethics, calling on humans to take responsible action in managing the environment. This principle is not limited to a theoretical understanding but requires practical application through the protection and care of the natural world. Furthermore, it promotes the maintenance of ecological balance, discouraging the overexploitation of nature for personal or economic gain. Respect for the divinely granted rights of nature is a prerequisite for maintaining balance and sustainability (Bartholomew, 2002), encouraging daily actions such as responsible consumption, protection of natural resources, and the enhancement of environmental awareness.

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Practices that degrade the natural environment and the quality of human life violate the fundamental values of care and self-restraint advocated by the Orthodox Church. The misuse of knowledge for selfish purposes can cause severe and irreversible environmental destruction, undermining the natural balance (Bartholomew, 2002).

Economic structures and technological applications that aim to maximize profit without considering the sustainability of creation undermine the fundamental principles of responsibility and self-restraint. Cryptocurrency mining, although presented as decentralized and independent, is closely linked to the capitalist logic that prioritizes profit, maximizing returns, and accumulating wealth, while disregarding the value of creation for future generations. "Man thus forces nature not to function as a mirror where man will behold God and Creator, but as a mirror where he will see himself as an eternal Narcissus" (Nikolaidis, 2002, p. 161). The environmental impacts of cryptocurrency mining are difficult to align with Orthodox Christian Ethics, which places man at the center of creation based on spirit and reason, aiming for ecological balance and a sustainable future for the coming generations.

6. Conclusions

The study of the relationship between decentralized finance (DeFi) and the fundamental principles of Orthodox Christian Ethics has highlighted multifaceted ethical challenges and social implications. Cryptocurrencies and blockchain technologies, despite their promise of decentralization, economic freedom, and transparency, reveal a complex reality where the concentration of power, inequality, and ethical contradictions remain critical issues.

a) The instrumental rationality that shapes modern cryptoeconomics promotes a notion of efficiency and profit, often independent of ethical and social values. DeFi platforms and cryptocurrencies extend this logic, creating new forms of financial activity where human judgment is replaced by algorithmic functions. On the other hand, the Orthodox Christian perspective emphasizes the importance of ethical responsibility and social justice, rejecting any financial practice that alienates humanity from its spiritual nature and its neighbor.

b) The principle of decentralization as a system of transparency without banks or other intermediaries is called into question, as control and power over cryptocurrencies are now exercised by a new sphere of influence, composed of mining companies, central exchanges, large holders, and system developers. This new form of centralization contradicts the fundamental principles of equality, freedom, and collectivity, making the decentralization of cryptocurrencies a questionable concept. Against any centralization, Orthodoxy, viewing the community as a gathering of free and unique individuals, aligns with policies that promote truth, freedom, and social cohesion.

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c) The anonymity of transactions in cryptocurrencies protects personal freedom, but at the same time, it may trigger moral hazards and facilitate illegal activities. Orthodox ethics proposes a value framework of responsibility, integrity, and discernment that ensures technological innovations will not become a vehicle for illegal and exploitative practices.

d) Financial innovation attracts investors with the main incentive of quick profit. The extreme volatility of cryptocurrencies and the lack of regulatory mechanisms enhance phenomena of overvaluation (asset bubbles), creating conditions for excessive speculation and instability. In Orthodox teaching, economic activity gains value only when it serves the common good and solidarity, preventing the unchecked accumulation of wealth at the expense of social cohesion.

e) The energy-intensive process of cryptocurrency mining causes serious environmental impacts, increasing electricity consumption and the negative ecological footprint. Orthodox Christian theology emphasizes the importance of environmental responsibility and the management of natural resources with respect, rejecting any practice that undermines the sustainability of creation and the well-being of future generations.

7. Suggestions for Further Research

In the enrichment and expansion of the interdisciplinary dialogue surrounding the value framework and ethical principles that govern the operation and development of cryptocurrencies, the following areas could be explored:

a) The integration of ethical values in the design of financial strategies, focusing on the relationship between technology, ethical responsibility, and social accountability.

b) The relationship between speculative investment practices in cryptocurrencies and the widening of socio-economic inequalities, with an emphasis on wealth concentration and unequal access to financial markets.

c) The potential utilization of blockchain technology for charitable and social purposes, viewed through the lens of Orthodox Christian ethics.

d) A comparative study of the ethical approaches of the three major Christian traditions (Orthodoxy, Catholicism, Protestantism) towards cryptocurrencies and decentralized financial practices (DeFi).

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