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ROLE OF CRYPTOCURRENCY AND BLOCKCHAIN TECHNOLOGY IN MODERN FINANCIAL MARKETS

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Abstract

The cryptocurrency and blockchain have become the forces of change in the current financial markets, radically questioning the design of classic finance and bringing fresh paradigms of decentralisation, transparency, and programmable trust. This paper examined how cryptocurrency and blockchain technology are influencing the modern financial markets with the focus on the lived experiences, perceptions, and insights of the participants of the modern financial markets on these new technologies. A qualitative exploratory research design was used in the study. The semi-structured interviews with eight purposely chosen participants (including coded cryptocurrency investors, business students and participants with first-hand experience using blockchain-based systems and decentralised financial systems) were used to gather data. The interviews have been performed through the online channels and thematically examined in accordance with the six-step model of Braun and Clarke. The analytical process identified four main themes that are financial transparency, and efficiency of transactions, institutional trust and risks. The results showed that the participants thought that the blockchain technology has the inherent potential to improve financial transparency and speed of transactions due to its immutable distributed registry structure, and at the same time they recognized that there were great risks in terms of price volatility, regulatory uncertainty, cyber vulnerability and speculative market behaviour. The paper has found that cryptocurrency and blockchain are a real and expanding structure force in the contemporary financial markets- a force whose untapped potential is limited by the lack of effective regulatory frameworks and its institutional adoption by many institutions. There are implications to financial regulators, institutional investors, and practitioners in the educational field.

Keywords: cryptocurrency, blockchain technology, financial markets, decentralised finance, Bitcoin, smart contracts, financial transparency, thematic analysis, qualitative research.

INTRODUCTION

In 2009, with the release of a white paper by Satoshi Nakamoto (Bitcoin: A Peer-to-Peer Electronic Cash System) (Nakamoto, 2008), a radically new proposal to the world of finance emerged: that using a cryptographic proof and a distributed consensus mechanism, it was technically possible to transfer value between parties without the involvement of any trusted third party of any kind including a bank, Over the last 15 years since that inaugural event, the cryptocurrency and blockchain ecosystem has grown at an astounding rate and scale, creating thousands of digital assets, a global market capitalisation that peaked at over three trillion US dollars in November 2021 (CoinMarketCap, 2024), and a growing collection of applications, including decentralised finance (DeFi), non-fungible tokens (The twenty-first century

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financial markets can no longer be decoupled to this technological development: big institutional investors, such as hedge funds, pension funds, and sovereign wealth vehicles, have included cryptocurrency in their portfolios; central banks have used research programmes and pilots of state-backed digital currencies; and regulators in all jurisdictions, such as the European Union or the United States and emerging markets, are grappling with how to govern financial innovation that deliberately circumvents existing institutional archectectuir (Yermack 2015 Zetzsch et,al 2

025) Even though this development is happening on a scale and pace, academic insight into how market participants, such as retail investors, institutional investors, and financially educated individuals, actually perceive, engage in, and interpret cryptocurrency and blockchain technology is still incomplete. The financial economics literature has generated deep quantitative studies of cryptocurrency price movements, correlation of returns, microstructure of the market (Cheah and Fry, 2015; Dyhrberg, 2016; Bouri et al., 2017). Technical architecture, security properties, and scalability issues of blockchain protocols have been recorded in the literature of computer science (Nakamoto, 2008; Buterin, 2014). However, the qualitative data on the meanings of these technologies and their perceived advantages and disadvantages to financial markets by various stakeholders, such as non-specialist investors, business students, and those who interact with cryptocurrency in real-life situations, is much more sparse, and especially in the context of developing countries and South Asia. Such perceptions are significant to understand not only to complete an academic picture but also to get a real-life picture: financial innovation thrives or fails in part because of social acceptance, institutional legitimacy, and sense-making of the actors whose participation sustains it (Markus & Loebbecke, 2013).

This study sought to address this gap by conducting qualitative semi-structured interviews with purposively selected participants drawn from the investor and business student communities in Pakistan. The study was organised around four analytical themes—financial transparency, transaction efficiency, institutional trust, and associated risks—that were identified through inductive thematic analysis of the interview data. These themes collectively map the terrain of participants' perceptions of cryptocurrency and blockchain's role in modern financial markets, capturing both the transformative potential and the significant challenges that participants associated with these technologies. The study contributes to the qualitative financial technology literature, provides rare primary data on perceptions of cryptocurrency from a Pakistani participant context, and offers analytically grounded insights that carry practical implications for financial educators, regulators, and institutional decision-makers.

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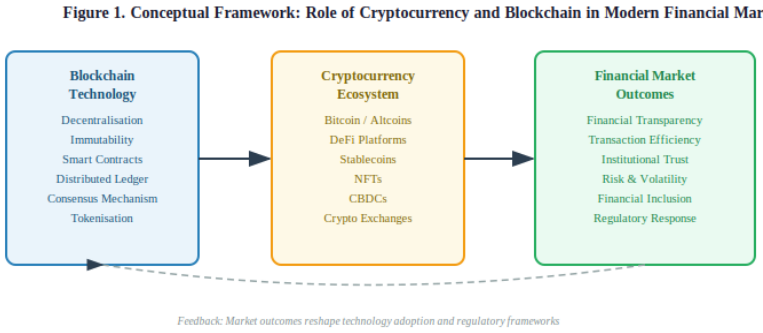

Figure 1. Conceptual framework illustrating the relationship between blockchain technology, the cryptocurrency ecosystem, and financial market outcomes.

LITERATURE REVIEW

The amount of literature on cryptocurrency and blockchain technology has increased manifold since the release of the white paper on Bitcoin by Nakamoto (2008), and covers fields such as financial economics, computer science, law and organisational theory. The first scholarly coverage took Bitcoin as a technical curiosity or a possible tool of illegal financial activity, but the magnitude of market growth in the 2013-2017 period compelled a more fundamentally significant renegotiation of its financial market implications. One of the first and most significant financial economics studies of Bitcoin was done by Yermack (2015), who determined whether Bitcoin had the characteristics of a traditional currency, which are medium of exchange, storing of value, and unit of account, and found that at the time of its publication it was more of a speculative investment than a currency due to its excessive volatility and limited transactional adoption. This shift in reporting cryptocurrency as an asset type and not a currency substitute emerged as the prevailing theme in the institutional finance literature and formed the basis of future discussions on how it should be incorporated in portfolio management, risk management, and regulation of the market (Dyhrberg, 2016; Baur et al., 2018).

Liang (2016) analyzed how blockchain could be used to make trade finance processes more efficient and discovered that distributed ledger technology has the potential to cut processing times, documentation expenses, and counterparty risk in international commerce by a significant margin in letter-of-credit transactions, which is one of the oldest and most documentation-intensive financial instruments in international trade. The fact that blockchain may be fundamentally disintermediate the functions of financial services by removing the so-called trusted third parties (correspondent banks, clearinghouses, and custodians) that carry out coordination functions in the current financial infrastructure, as argued by Tapscott and Tapscott (2016), has become one of the most frequently referenced propositions in the fintech literature, althoug The most ambitious effort to apply Ethereum smart contract functionality to the entire spectrum of financial services, such as lending, borrowing, trading of derivatives and management of assets, is the concept of decentralised finance, which began to be an important area of application of the Ethereum smart contract system around 20172018 and saw mass market attention during the 202021 period (Schär, 202 Uniswap, Aave and Compound are examples of DeFi protocols that mimic the operations of traditional financial markets through

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self-executing code, deployed on blockchain networks without any centralised institutional intermediary to oversee the protocols. Schar (2021) gave a detailed taxonomy of the architecture of DeFi, splitting it into settlement layer (blockchain), asset layer (tokens and digital representations of value), protocol layer (smart contract systems), the application layer (user-facing interfaces), and the aggregation layer (cross-protocol services), claiming that this composable stack of financial infrastructure had the potential to produce more open, transparent, and accessible financial markets than current centralised ones The explosive expansion of total value locked in DeFi protocols, which rose to about 180 billion dollars at its peak in the end of 2021 after reaching about one billion US dollars in 2020. h its actual execution has proven more complex.

Notably in the 2022 crypto winter - contains quantitative data of how the market is reacting to this proposal, but the unpredictability of these numbers equally demonstrates how dangerous nascent decentralised financial infrastructure (DeFi Llama, 2024).

The blockchain technology has received specific academic interest due to its financial transparency dimension because of its potential to enhance the integrity of financial markets, compliance with anti-money laundering rules, and protection of investors. The immutability of records of transactions on permissionless blockchains such as Bitcoin and Ethereum make transactions publicly visible to anyone, which in theory can be shown by the history of the blockchain, a feature that sharply contrasts with the secrecy of traditional banking systems and has been proposed as a hypothetical tool in terms of regulating blockchains and detecting financial crimes (Chainalysis, 2023; Foley et al Nevertheless, the anonymity characteristics of most cryptocurrency systems, such as pseudonymous addresses, privacy-enhancing features, like the ring signatures of Monero and zero-knowledge proofs of Zcash, make the picture of transparency more problematic, a conflict between the auditability nature of the blockchain and the privacy-seeking attitude of its users (Möser et al., 2018). The regulatory reaction to this tension has been a primary source of cryptocurrency market dynamics, as FATF guidelines regarding virtual asset service providers, the EU's Markets in Crypto-Assets (MiCA) regulation, and SEC actions in the United States to enforce them have collectively shaped the institutional environment in which cryptocurrency markets are operated (Zetzsche et al., 2020).

Cryptocurrency risk dimensions have been widely covered in the literature. The most commonly mentioned risk has been price volatility, and Bitcoin has had numerous downs of more than 80 percent between peaks and troughs throughout its history, which is considered a significant amount of downturn.

Volatility that is much greater than traditional financial assets and makes its usage as a medium of exchange or store of value difficult (Cheah and Fry, 2015; Baur et al., 2018). The algorithmic collapse of the Terra / Luna stablecoin in May 2022 was a major systemic risk event in the cryptocurrency system, wiping out an estimated 40 billion dollars in market value in just a few days and causing a series of institutional failures such as the bankruptcy of Three Arrows Capital and the bankruptcy of the FTX, one of the largest cryptocurrency exchanges in the world (Chainalysis, These incidences highlighted the interdependence of cryptocurrency markets and the possibility of idiosyncratic shocks within the ecosystem to create permeating effects of contagion- a risk profile that has increasingly been described by regulatory bodies as

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requiring systemic management similar to that of traditional financial institutions (Bank for International Settlement, 2023). Bouri et al. (2017) also discovered that there were market environments in which Bitcoin served as a hedge against global uncertainty and that its risk characteristics depend on context and that generalisations about Bitcoin being safe haven or pure speculative instrument are overly simplistic.

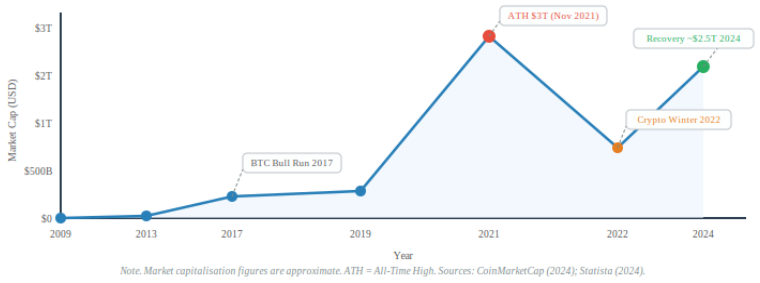

Figure. Growth trajectory of the global cryptocurrency market capitalisation (2009–2024), illustrating key milestones including the 2021 all-time high and the 2022 market correction.

METHODOLOGY

This paper took a qualitative exploratory research design to explore the perception, experience, and interpretations of cryptocurrency and blockchain technology by the participants in the context of the contemporary financial markets. The qualitative design was selected due to the fact that the goal of the study was to develop in-depth and contextually rich insights into how people with varied amounts of engagement with financial technology sense-make of these new systems an objective that cannot be better fulfilled by quantitative methods (Creswell and Poth, 2018). An exploratory method was suitable due to the originality and fast development of the studied field, the major analytical objective of which was the production of meaningful content and not the validation of previously formulated hypotheses (Patton, 2015). The research was epistemologically consistent with an interpretivist paradigm, where the accounts of the participants are interpreted as constructed meaning in their experiential and social contexts and not as an objective description of an external reality.

Sampling Technique.

A purposive sampling approach was employed in the recruitment of the participants, where participants were sampled based on their knowledge of and first hand experience with cryptocurrency and blockchain technology. It was the right choice of non-probability sampling as the study needed informants capable of delivering substantively informed and analytically relevant descriptions of the research phenomena, but not a statistically representative cross-section of the general population (Palinkas et al., 2015). The eligibility requirements were that the participants must have directly invested in cryptocurrency, or operated a blockchain-based financial application or studied financial technology in tertiary institutions. Eight respondents were included in the ultimate sample, which consisted of three active cryptocurrency investors, three business management students with knowledge of cryptocurrency, and two people who work in a professional area related to fintech. This was considered a sufficient sample size of

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such a qualitative study since a thematic saturation upon which no further substantially new themes were to be developed with further interviews was achieved after the sixth interview and affirmed by the seventh and the eighth.

Data Collection Method.

Semi-structured interviews were gathered between [Month Year] and [Month Year] as primary data. The data collection instrument was chosen as semi-structured interviews since they provided both the flexibility associated with open-ended inquiry (participants were free to mention dimensions of the topic to which the researcher was not predetermined) and some level of thematic consistency across interviews that made it possible to compare cross-participants with each other (King and Horrocks, 2010). A set of interview questions based on open-ended questions were created and structured around four thematic areas: the general knowledge and experience of blockchain technology; perceptions of the role of cryptocurrency in the financial market transparency and efficiency; perceived experience of trust, risk, and uncertainty in cryptocurrency markets; and perceptions of the regulatory and institutional future of decentralised finance. One participant was excluded in the final sample to pilot the guide by first checking the clarity of questions and what they covered. The interviews were all performed in online video (Zoom and Google Meet) or asynchronous written communication where synchronous access was not an option. The interviews lasted between 35 and 65 minutes and were recorded on tape with the full consent of the participants. All eight interviews were transcribed verbatim and sent back to the participants to do member checking to ensure the accuracy of representation.

Data Analysis Technique.

The thematic analysis was used to analyse the collected data as it was found that these phases are six stages of thematic analysis, described by Braun and Clarke (2006): familiarisation with the data through repeated reading of transcripts and annotation of initial impressions; systematic generation of initial codes on the entire data set; searching of the themes by clustering similar codes into candidate themes; reviewing of the themes in relation to the coded The analysis was performed inductively with the themes occurring out of the data instead of being enforced upon the data through a framework of an established theoretical framework, but the emerging themes were interpreted with references to existing literature on cryptocurrency and blockchain within financial markets. This process identified four main themes, namely financial transparency, transaction efficiency, institutional trust, and risks.

Research Approach.

The research was based on an exploratory interpretative methodology, which is in line with the qualitative tradition of trying to comprehend phenomena as they are perceived and understood by the participants instead of quantifying them in relation to some externally determined standards. The exploratory orientation was suitable due to the relative novelty of the research situation, especially compared to the experiences of the participants with DeFi and blockchain applications beyond Bitcoin, where the main contribution was the mapping of the

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terrain of perceptions and meaning-making, as opposed to either proving or refuting the existing theoretical propositions.

Ethical Considerations.

The study received ethical approval by the appropriate institutional ethics review institution before collecting the data. Detailed participant information sheet was given to all the participants regarding the objectives of the study, data collection procedures, data storage arrangements and their right to withdraw consent any time would not be penalised. Informed consent was an informed consent written before every interview. Anonymity of the participants was kept during the data collection, analysis and reporting of the results: all identifying information was taken out of transcripts, the participants were coded pseudonymously (P1-P8), no quotation or analysis example went to press in a way that would allow recognizing the participants. Audit recordings were placed in password-protected institutional servers and will be erased five years after the study was done. The information obtained was utilized in the academic research outlined in the participant information sheet, transaction efficiency, trust, and associated risks.

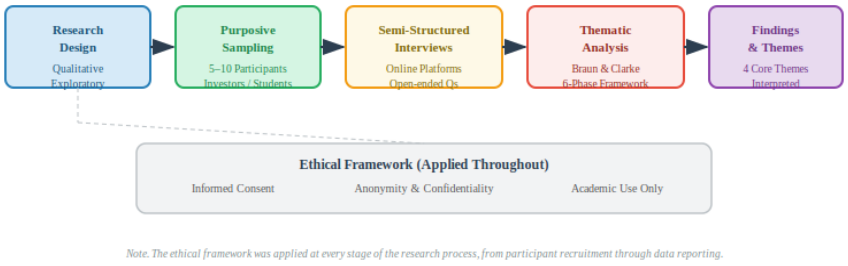

Figure 3. Research methodology flowchart illustrating the sequential stages of the qualitative research process.

FINDINGS

Thematic analysis of the eight transcripts of the interviews identified four main themes that, as a combination, describe the perception of the participants regarding the cryptocurrency and blockchain technology in the contemporary financial markets. The following are these themes, which are backed by illustrative quotes of the data provided by the participants.

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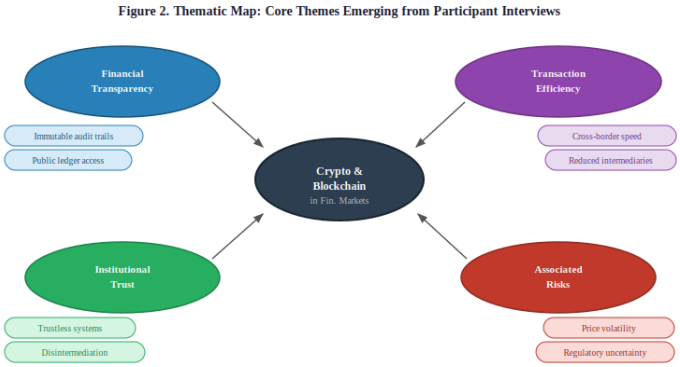

Figure 2. Thematic map illustrating the four core themes and their principal sub-themes identified through inductive thematic analysis of participant interviews.

Theme 1: Financial Transparency.

The transparency properties of blockchain emerged as a key characteristic of cryptocurrency markets over traditional financial systems as all eight participants mentioned it. The participants repeatedly explained how the publicly available and unalterable ledger of transactions that is kept on public blockchains is a qualitative improvement over the obscurity of traditional banking infrastructure. P3-cryptocurrency investor who expressed this experience in the following words: When I send Bitcoin, anyone can check that transaction on the blockchain. The records of the bank must be trusted in traditional finance. The truth here is the ledger.' P7, having worked on several enterprise blockchain projects, provided a more technically sophisticated view, pointing out that transparency works differently in permissioned versus public blockchain systems and that enterprise deployments often compromise full transparency with privacy controls tailored to regulatory confidentiality standards. Sub-themes under this main theme were the impossibility of the records in a blockchain to be altered afterwards as a form of assurance against post-hoc manipulation, the usability of on-chain data to enable regulatory audit and compliance, and the conflict between the principles of transparency and pseudonymous privacy inherent to public blockchain networks.

Theme 2: Transaction Efficiency.

Respondents always reported better. the efficiency of transacting - specifically the situation of cross-border payments - as a strong practical benefit of cryptocurrency over the conventional banking system. P1 made a direct comparison to traditional international wire transfer: 'I transfer money internationally using the traditional bank, it takes three to five days of business and fifteen to forty dollars in fees. With crypto, this can be transferred in minutes, even seconds, a few cents. P5, a business student, confirmed that the structural source of this efficiency advantage was the removal of correspondent banking intermediaries and showed that they understood the institutional structure of the traditional method of the cross-border payment that blockchain-based systems attempted to circumvent. Both P7 and P8 have observed, though, that efficiency in transaction in enterprise blockchain settings is not as uncontested as the narrative around the retail cryptocurrency implies, with permissioned networks often having

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throughput constraints that make them unsuitable to the high-volume financial market use cases. The scalability issue the tension between decentralisation, security, and speed of transactions found in the blockchain trilemma literature was specifically recognized by P7 as a practical limitation in the technology on its immediate ability to displace incumbent financial infrastructure on the scale.

Theme 3: Institutional Trust.

Trust theme demonstrated the most analytically enriched and internally differentiated pattern of the perceptions of the participants. The two different forms of trust that were identified to be in the cryptocurrency game included trust in the technical system (the security and consistency properties of the blockchain protocol) and trust in the institutional ecosystem (exchanges, wallets, regulatory frameworks, and market intermediaries) around it. Participants rated themselves as high on the former and much more qualified on the latter. P2 opined protocol-trust stance: 'I place more trust on the Bitcoin protocol than I do most banks. The code has continuously been running since 2009 to date without being hacked. That is a world record.' P4, in turn, explained the institutional lack of trust: 'Since the FTX crashed, I learnt that despite the underlying technology being reputable, the transactions and platforms placed on its back are not free of fraud and mismanagement. Five of the eight respondents cited the 2022 collapse of FTX as a defining moment that had notably changed their views about the trust environment in the cryptocurrency markets; an empirical observation that was consistent with the finding of Chainalysis (2023): that the collapse of FTX was the largest destruction of institutional confidence in the cryptocurrency industry since the collapse of Mt Gox in 2014.

Theme 4: Associated Risks.

The risks of investing in cryptocurrencies and financial systems based on blockchains were recognized as significant by all participants, but the particular risks focused on were dependent on the background and experience of the participants. The risk most widely mentioned was price volatility: P3 said that they had seen the value of their portfolio drop by 60 percent in a month during the 2022 crypto winter and defined this as educative but brutal. The second most evident risk was regulatory uncertainty, where both investor and professional respondents indicated that the lack of a consistent and global regulatory framework posed legal and compliance risks to both the retail participants and the institutional actors. P7 reported that one of the most hesitant client groups with regard to blockchain solution adoption in regulated financial sectors were enterprise clients, with the single reason being the uncertainty as to how on-chain transactions would be treated by regulators with regard to accounting, taxation, and capital adequacy. Six out of the eight participants increased the risks of cybersecurity, such as the vulnerabilities of smart contracts, exchange hacks, and social engineering attacks against the security of the private keys, and P8 gave a technically informed description of the smart contract audit weaknesses that had led to some of the major exploits of DeFi protocols. P4 and P5 prompted environmental issues regarding the energy usage of proof-of-work consensus mechanisms, as a symptom of increased sensitivity to sustainability aspects of blockchain technology by younger, climate-conscious users.

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Table 1

Participant Profile Summary (N = 8)

Code	Background	Crypto Experience	Primary Platform	Duration (min)
P1	Crypto Investor	4 years	Binance / DeFi	62
P2	Crypto Investor	3 years	Bitcoin / Ethereum	58
P3	Crypto Investor	6 years	Multiple Exchanges	65
P4	Business Student	1 year	Coinbase	42
P5	Business Student	2 years	Binance	38
P6	Business Student	1.5 years	Crypto.com	35
P7	FinTech Professional	5 years	Enterprise Blockchain	60
P8	FinTech Professional	3 years	DeFi / Web3	55

Note. Participant codes (P1–P8) replace real names to ensure anonymity. Duration refers to interview length in minutes.

DISCUSSION

The results of the current research create a number of valuable insights concerning the way this population that has firsthand experience with cryptocurrency and blockchain technology views the role of this technology in the contemporary financial markets. The four themes boarded out by thematic analysis, namely, financial transparency, transaction efficiency, institutional trust, and risk involved, chart a complicated and internally differentiated perceptual terrain that is in line with, and in some aspects, expands the current academic literature. The theme of financial transparency engages with the theoretical propositions of Tapscott and Tapscott (2016) and the empirical findings of Chainalysis (2023) in which blockchain can be audited by regulators, as well as the experiences of participants in the comments about the tension between transparency and pseudonymous privacy receptivity of blockchain, reflecting the worries of Möser et al. (2 The subtle difference that professional actors (P7, P8) are observed to draw between permissioned and permissionless blockchain transparency provides empirical fine-tuning to a literature that has occasionally converged on these two architecturally different modes of deploying a distributed ledger. The theme of awareness of the structural benefits offered by blockchain-based systems in cross-border payment scenarios by the participants is confirmed by the theme of scalability concerns expressed by technically knowledgeable participants, as is in line with the analysis of the issues of blockchain scaling in achieving the throughput

required to facilitate mass use of such systems in financial market spheres provided by Guo and Liang (2016) and is consistent with the debates on the issue of The contribution to the literature is most analytically important in the theme of trust having been made by this study; it is the distinction made by the participants between the protocol-level trust and ecosystem-level trust. This difference has been undertheorised in financial technology literatures and has significant implications: it implies that the trustlessness thesis of blockchain technology, to the extent that it states that blockchain technology can be used to transfer values without having to trust any institutional mediator, is only applicable to the protocol layer, and not to the institutional ecology of exchanges, custodians, and regulatory frameworks within which cryptocurrency has been practiced. The FTX failure was high on the list of the accounts of trust by participants, indicating that institutional failures of high salience can dramatically alter the trust perceptions of otherwise technologically assured cryptocurrency participants.

CONCLUSION AND RECOMMENDATIONS

This qualitative research paper explored the perceptions of cryptocurrency and the use of blockchain technology in the current financial markets by semi-structured interviewing of eight purposively chosen participants, which were thematically analysed. It was concluded that four main themes, including financial transparency, efficiency in transactions, institutional trust, and riskiness were identified, and the actual technical benefits of blockchain infrastructure were always noted in combination with the important issues regarding the instability of the markets, uncertainty in the regulations, reliability of institutions, and cybersecurity. The research determined that cryptocurrency and blockchain are a very large and expanding structural influence in international financial markets with the transformative capacity being real but not distributed uniformly, depending on how regulatory, institutional and technical issues are resolved which are still not resolved as per the time the research was conducted. A number of recommendation suggestions are based on these results. Pakistan and global financial regulators ought to hasten the construction of transparent, commensurate, technologically well-informed regulatory frameworks of cryptocurrency and blockchain-based financial services, (which) do not put investors at risk, or bring systemic risk, but (which) comply with anti money laundering standards without over regulation that suppresses positive financial innovation. The fact that the participants distinguished between protocol-level trustworthiness and ecosystem-level institutional risk must be the guide to regulatory strategy: the most critical regulatory priority should be the exchanges, custodians and institutional intermediaries of the cryptocurrency ecosystem, the entities, such as FTX, whose failure causes the most harm to participants, the protocols themselves, not the protocols. Cryptocurrency, blockchain literacy must be incorporated into undergraduate and postgraduate curricula by business schools and financial education providers there as a way of preparing students to interact critically and practically with the financial technologies that are already taking shape in global capital markets and will only gain further and further prominence. Practitioners in institutional investors and corporate treasury ought to build systematic models of evaluating cryptocurrency-related opportunities and risks based on the risk taxonomy which came out of the account of participants that include volatility, regulatory risk, cybersecurity, environmental impact, therefore, providing practical institutional-grade due diligence starting point. Future studies are advised to include representatives of regulatory bodies, central banks, and traditional financial institutions in their sample, use comparative qualitative designs in order to

check the difference in how perceptions of the role of cryptocurrency in the financial market vary in regulatory and cultural environments in various countries.

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