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THE IMPACT OF BLOCKCHAIN ADOPTION ON THE OPERATIONAL AND FINANCIAL PERFORMANCE OF COMMERCIAL BANKS

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Abstract: Blockchain technology has emerged as one of the most significant innovations in financial services. It promises to transform banking operations by providing better transparency, faster transaction processing, lower reconciliation costs and improved record integrity. Commercial banks have increasingly been interested in blockchain-based applications, as they are under increasing pressure to modernise their legacy systems, reduce operational inefficiencies, and remain competitive in digitally evolving financial markets. These include, among others, cross-border payments, trade finance, digital identity verification, compliance systems and settlement infrastructure. Despite the strong claims on the transformative potential of blockchain, the actual relationship between the adoption of blockchain and bank performance remains uncertain. Moreover, much of the existing literature is conceptual, optimistic, or technology-centered. Relatively fewer studies critically evaluate whether blockchain creates measurable operational and financial benefits for commercial banks.

The present thesis examines the effect of blockchain adoption on the operational and financial performance of commercial banks. The thesis argues that although blockchain could improve some aspects of banking performance, particularly in the areas of verification, reconciliation, record management and transaction settlement, the benefits are neither universal nor guaranteed. Their implementation is dependent on the quality of implementation, the readiness of the organisation, the regulatory support, the interoperability with legacy systems and the strategic objectives of the institution adopting them. The thesis takes a critical position and questions whether the adoption of technology necessarily implies better performance at a bank and challenges deterministic assumptions. This paper conceptualises blockchain adoption as a sociotechnical process that depends on institutional, economic, and regulatory conditions. The study is expected to add to the literature by linking innovation adoption more directly to measurable banking outcomes.

Keywords: Blockchain technology; commercial banks; operational performance; financial performance; digital transformation; banking innovation; distributed ledger technology; fintech; banking efficiency; financial services

1. Introduction

Commercial banks are operating in an increasingly complex financial environment, marked by rapid digitalisation, increasing customer expectations, regulatory pressure, and



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intensifying competition from fintech firms and nontraditional financial platforms. In response, banks have invested heavily in digital technologies to improve efficiency, cut operational costs and improve the delivery of services. Of these technologies, blockchain has attracted a lot of attention for its potential to revolutionise how financial transactions are recorded, validated and settled.

Blockchain is often defined as a distributed ledger technology that enables transactions to be recorded in a secure, chronological and tamper-proof manner within a network of participants (Pilkington, 2016). Blockchain systems are designed to reduce duplication, enhance traceability and improve the integrity of shared records as opposed to traditional centralised databases. These characteristics appear particularly relevant for banking, where many processes remain heavily dependent on fragmented databases, reconciliation procedures, manual interventions, and intermediary coordination.

Commercial banks have considered blockchain for a range of applications, including international payments, trade finance, syndicated lending, customer onboarding and regulatory reporting. The blockchain is attractive because it can reduce settlement times, increase transparency, lower administrative costs, and increase transaction security (Peters and Panayi, 2016; Iansiti and Lakhani, 2017). These improvements could potentially lead to better operational and financial performance, in theory. Operationally, banks may discover faster processes, fewer errors and less back-office work. Such changes may result in lower cost-to-income ratios, higher profitability and more efficient deployment of capital.

At the same time, claims that blockchain will bring benefits to banking should be taken with a pinch of salt. Technological enthusiasm tends to obscure the distinction between potential and measurable effects. Technology adoption does not always lead to better institutional performance, and efficiency gains in one process do not always translate into meaningful improvements in broader financial outcomes. Many banking blockchain initiatives remain experimental, incomplete, or stymied by legal, technical, and governance challenges. In addition, large banks usually operate with complex legacy systems, regulatory requirements, and organisational structures that pose challenges to technological transformation and are expensive (Allen, Gu, and Jagtiani, 2022).

This situation gives rise to an important research problem. Although blockchain is often claimed to be a revolutionary solution to banking inefficiency, there is still insufficient critical evidence to suggest that its adoption brings about significant improvements in the operational and financial performance of commercial banks. The literature has tended to emphasise the benefits of theory but has been less likely to distinguish short-term implementation costs from long-term performance outcomes or symbolic innovation from substantive institutional change.

This thesis fills that gap by investigating the extent to which the adoption of blockchain affects the operational and financial performance of commercial banks. The study proceeds from the assumption that blockchain is neither a sure success nor an empty technological hype. Instead, its impact depends on the organisational, institutional, and



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regulatory contexts in which it is implemented. The thesis therefore aims not only to assess whether blockchain matters but also to analyse how and under which conditions it does.

2. Background of the Study

Historically, the banking sector has been relying on centralised information systems, intermediary verification and multi-step transaction processing. These systems have helped in maintaining financial stability and regulatory control but have also created big operational burdens. Payment processing, settlement, customer verification and compliance functions often require coordination between multiple internal and external actors. It results in delays, reconciliation issues, documentation overloads and higher operating costs.

Blockchain technology was developed in the area of cryptocurrencies (such as Bitcoin), but the ledger architecture was soon recognised to have applications other than virtual currencies (Nakamoto, 2008). It is not so much the public cryptocurrency models that have interested financial institutions but permissioned blockchain systems that can support secure and auditable transactions in regulated settings. On the contrary, permissioned systems enable access control, institutional oversight, and compliance alignment and thus are more suitable for banking environments than open public blockchains (Catalini and Gans, 2020).

The strategic interest of commercial banks in blockchain is driven by structural challenges. Firstly, banks are under constant pressure to cut operating costs and modernise ageing infrastructure. Second, cross-border payments and trade finance are still relatively expensive and slow in many contexts. Thirdly, regulatory compliance and audit requirements require increasingly robust, transparent and traceable record systems. Blockchain is attractive because it can help improve data consistency, reduce transaction cycles and lower reconciliation burdens across those areas.

But the banking universe also shows how hamstrung blockchain is. Unlike technology firms, banks cannot just launch new systems because they are able to. They have to operate within strict legal, prudential and supervisory frameworks. A system that is technically efficient but legally uncertain or operationally fragile is unlikely to be deployed at scale. In addition, many banking processes are based on not only data transfer but also legal finality, governance arrangements and risk allocation. These institutional features mean that the adoption of blockchain in banking has to be considered a bigger transformation challenge and not just a technical upgrade.

Consequently, the context for this thesis is one of a tension between the promise of technology and the reality of the institutional setting. Blockchain could provide real performance benefits, but its adoption happens in a banking sector that is complex, path-dependent, and regulated. This makes it necessary to assess blockchain critically rather than to assume that innovation alone brings improvement.

3. Research Problem

The main research problem that this dissertation attempts to address is the absence of clear and critical evidence regarding the extent to which the implementation of



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blockchain enhances the operational and financial performance of commercial banks. Much of the literature stresses the potential benefits, such as cost reduction, increased transparency, better transaction speeds, and reduced settlement risk. However, these claims tend to stay conceptual or technologically deterministic. They do not always assess if the adoption of blockchain leads to measurable improvement in banking outcomes like profitability, efficiency ratios, transaction performance or operational resilience.

Given the amount of resources banks are dedicating to digital innovation, this is a serious problem. If blockchain is transformational, then we should expect to see measurable improvements in relevant operational and financial measures. If not, its role may be more limited, symbolic, or dependent on very specific use cases. Absent such critical empirical and conceptual assessment, banks run the risk of adopting technology based on industry expectation rather than performance logic.

The research problem is also a consequence of the gap between the process-level gains and the institution-level outcomes. A bank can improve one function, say payment settlement, with not much change in overall profitability or cost structure. But even where long-term operational benefits appear later, implementation costs may be high in the short term. Thus, the link between adoption and performance is likely to be contingent, uneven and mediated by organisational and environmental variables.

4. Research Aim

To evaluate the impact of blockchain adoption on the operational and financial performance of commercial banks.

5. Research Objectives

1. To analyse how blockchain adoption influences operational efficiency in commercial banks.
2. To assess the effect of blockchain adoption on selected indicators of financial performance.
3. To evaluate the organisational, technological and regulatory factors that shape successful blockchain implementation in banking.
4. To identify the main risks, limitations and barriers associated with blockchain adoption in commercial banks.
5. To develop a critical understanding of whether blockchain constitutes substantive banking transformation or only selective process improvement.

6. Research Questions

1. How does blockchain adoption affect the operational efficiency of commercial banks?
2. What impact does blockchain adoption have on the financial performance of commercial banks?
3. Which organisational and environmental factors influence the success or failure of blockchain implementation in banking?
4. What barriers and risks limit the performance benefits associated with blockchain adoption?



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5. To what extent does blockchain represent a strategic transformation rather than a narrow technological enhancement in commercial banking?

7. Significance of the Study

This study is important in many ways. First, it adds to the financial and banking literature by considering blockchain not as a technological change but as an organisational phenomenon related to performance. While many studies deal with the potential of blockchain, few critically connect its adoption to measurable outcomes in commercial banks. This thesis, therefore, bridges the gap between innovation discourse and performance analysis.

Second, the study is important for banking practice. Digital investment, infrastructure modernisation and technology strategy are tough calls for commercial banks. Grasping the effect blockchain will have on operations and financial gains can help you make more rational investment decisions. Banks want to see evidence of where blockchain is really adding value and where the gains could be inflated, not just as an inevitable innovation trend.

Third, the study is policy-relevant. Regulators and policymakers are facing more and more questions about the impact of new digital infrastructures on financial stability, compliance, transparency and competition. By critically analysing the adoption of blockchain, the thesis may help clarify whether the regulatory support for blockchain innovation should be broadly transformation-oriented or rather focused on more narrow use cases.

Finally, the study is academically important as it challenges technological determinism. It does not assume that innovation will automatically result in performance improvement. Instead, it analyses blockchain through the interplay between technological capacity, organisational readiness, and institutional context. This provides a more realistic framework to understand digital transformation in banking.

8. Literature Review

8.1 Blockchain and banking transformation

The literature on blockchain in banking often starts with the proposition that distributed ledger technology can revolutionise financial intermediation by reducing reliance on fragmented databases and intermediary reconciliations. The main benefits of blockchain are generally acknowledged to be immutability, transparency, automation and decentralised validation (Pilkington, 2016; Treleaven, Brown and Yang, 2017). These features are often associated with applications in banking such as payment systems, trade finance, know-your-customer processes, syndicated loans and securities settlement.

As noted by Iansiti and Lakhani (2017), blockchain can alter the architecture of transactions by allowing institutions to share records and avoid duplication. Peters and Panayi (2016) also propose that blockchain could be transformative for modern banking ledgers, especially for record synchronisation and post-trade friction. This type of analysis treats blockchain as an infrastructure-level innovation.

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However, a more careful reading reveals much of this literature to be still anticipatory. Many studies discuss what blockchain could do, not what it has demonstrably done in regulated banking environments. This creates a disparity between the technical possibilities and the demonstrable impact on institutions. The literature consequently calls for greater focus on measurable outcomes rather than just conceptual promise.

8.2 Operational efficiency and banking performance

Banks expect blockchain to significantly impact operational efficiency, one of its most promising areas. Common banking operations include document verification, reconciliation, settlement processes, compliance checks, and organised data management across multiple systems. Blockchain can improve these processes through redundant data processing reduction, shared access to validated information, and automation of selected functions via programmable logic (Cong and He, 2019).

From an efficiency point of view, these improvements can lead to fewer processing delays, lower manual error rates and better transaction traceability. These benefits are especially salient in the context of trade finance and cross-border payments, where the complexity of documentation and coordination across intermediaries have historically been a source of high friction (Aggarwal and Goodell, 2023). If you reduce these frictions with blockchain, you could achieve better operational performance.

But operational efficiency means more than faster processing. Institutional problems like compliance review, credit control, and risk management often plague existing banking systems. Faster systems are not always better if they increase liquidity pressures, weaken control points or create new operational vulnerabilities. The gains in efficiency must be critically evaluated, not simply inferred from faster processes.

8.3 Financial performance and the problem of measurement

A major challenge in the literature is to link blockchain adoption to financial performance. In commercial banking, financial performance is generally measured by metrics such as return on assets, return on equity, cost-to-income ratio, non-interest expense ratios and revenue growth. The argument for blockchain is that operational improvements should ultimately translate into better financial outcomes.

But the relationship is not simple. First, the implementation of blockchain often requires a significant upfront investment in infrastructure, training, legal adaptation and systems integration. In the short term these costs can drag performance down even if long-term efficiencies emerge later. Secondly, not all operational improvements are significant enough to affect institution-wide profitability. A bank may upgrade one process without significantly changing its overall financial ratios. Thirdly, the influence of blockchain on financial results could be overshadowed by wider market and macroeconomic factors

This suggests that research on blockchain and financial performance should distinguish between process-level improvements and enterprise-level impacts. The literature indicates a direct link between innovation and profitability. In reality, however, the relationship is likely to be mediated, delayed and contextual.

8.4 Organisational and institutional constraints



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The success of blockchain adoption in banking depends on more than the technology itself. Implementation outcomes are influenced by organisational readiness, strategic commitment, managerial capability and integration capacity. Banks vary greatly in their level of technological maturity, size, risk appetite and innovation strategy. Such variability means the same technology might produce different outcomes at different institutions.

Institutional pressures matter too. Banking is highly regulated, and legal uncertainty with regard to digital records, interoperability, compliance obligations and data governance could act as a brake on adoption (Allen, Gu and Jagtiani, 2022). Banks also often use legacy systems that are expensive and difficult to replace. In these environments, blockchain may not be a clean transformation but an additional layer that needs to co-exist with older infrastructure.

This brings us to an important theoretical point – the adoption of blockchain in banking is not only a technical matter. It is organisational. It is institutional. Its effects cannot therefore be understood without an exploration of the surrounding environment within which adoption takes place.

8.5 Critical gap in the literature

The major gap in the literature is the absence of studies that critically link blockchain adoption with measurable operational and financial outcomes in commercial banks. Many discussions are either promotional or conceptually broad. Their strength lies in technological features but not in institutional performance. Limited distinction between experimental adoption, partial implementation and large-scale integration is also observed.

This thesis fills this void by treating blockchain adoption as a contingent process, where its value must be demonstrated through banking performance and critically evaluated in its organisational context rather than as an inherently beneficial innovation.

9. Theoretical Framework

This study will be guided by three theoretical perspectives: the Technology-Organisation-Environment framework, Diffusion of Innovation theory and Institutional Theory.

9.1 Technology-Organisation-Environment (TOE) framework

In the TOE framework, technology adoption is explained in three dimensions, namely the technological context, the organisational context and the environmental context (Tornatzky and Fleischer, 1990). This thesis is ideal for this purpose, as banks' adoption of blockchain is influenced by the technology's perceived usefulness, the banks' internal readiness, and external pressures.

The technological dimension consists of relative advantage, complexity, compatibility and security. The organisational dimension includes size, resources, management support and digital capability. The environmental aspect covers regulation, competitive pressure and industry expectations. This framework is helpful in that it does not boil adoption down to a purely technical decision.

9.2 Diffusion of Innovation theory



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Diffusion of Innovation theory explains how and why new technologies are adopted by institutions over time (Rogers, 2003). The adoption of blockchain in banking is likely to be driven by the perceived advantage, compatibility with existing systems, complexity of implementation and observability of successful outcomes. This theory helps explain why some banks adopted it earlier, more aggressively, or more successfully than others.

However, diffusion theory can sometimes suggest that successful adoption is more a function of innovation attributes. It is therefore useful, but not enough by itself. It needs to be complemented by theories that better reflect institutional and regulatory pressures.

9.3 Institutional Theory

Institutional Theory highlights that organisations adopt structures and practices not only for efficiency reasons but also for legitimacy, compliance and alignment with external norms. This is very relevant to banking, where regulation, supervision, and reputational credibility count a lot. Banks may pursue blockchain in part because it is perceived as strategically necessary or industry-legitimate even where direct efficiency gains are not yet clear.

Institutional Theory is therefore useful to explain why the adoption of blockchain may be both a reflection of performance logic and legitimacy-seeking behaviour. This underlines the criticality of the thesis that not all adoption should be seen as economically rational in the narrow sense.

10. Research Methodology

10.1 Research approach

The thesis will be deductive in the research approach. It will start with established theories of innovation adoption and institutional performance. It will then investigate how blockchain adoption relates to banking outcomes in the light of these frameworks. A deductive research approach is suitable since the study seeks to test and apply theoretical insights to a specific current problem in finance.

10.2 Research design

Mixed methods are most suitable for the design of this study. The quantitative dimension will focus on financial and operational performance indicators for which data are available. Case-based examination of blockchain use in commercial banking will add depth of interpretation to the qualitative dimension. This two-pronged approach is necessary because the impact of blockchain cannot be fully quantified in numbers; the organisational and regulatory contexts are also important.

10.3 Data sources

The study may rely primarily on secondary data, including:

- annual reports of selected commercial banks
- industry and consultancy reports
- central bank and regulatory publications
- published case studies of blockchain initiatives
- academic journal articles on blockchain and banking performance



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The study may include a comparison of banks that have taken visible blockchain initiatives to those of similar size that have not significantly adopted blockchain, if possible.

10.4 Variables and indicators

Operational performance may be examined using indicators such as:

- transaction processing speed
- settlement efficiency
- error reduction
- reconciliation burden
- compliance process efficiency
- digital transaction volume

Financial performance may be examined using:

- return on assets
- return on equity
- cost-to-income ratio
- non-interest expense ratio
- operating margin
- revenue efficiency measures

The thesis will critically assess whether observable improvements in these indicators can reasonably be linked to blockchain adoption, while acknowledging that causality may be difficult to establish in a clean manner.

10.5 Data analysis

Where data is available, quantitative analysis may include trend comparison and ratio analysis over time, particularly pre- and post-blockchain-related initiatives. Thematic interpretation of case evidence will involve a qualitative analysis of implementation goals, operational outcomes, regulatory barriers, and institutional constraints.

The mixed-method approach is valuable because it enables the study to combine measurable performance trends with a deeper understanding of how adoption actually unfolds in banking practice.

10.6 Research limitations

It is important to note many restrictions. First, adoption of blockchain in banking is typically incomplete, which makes causal attribution problematic. Second, many banks do not provide data in sufficient depth on the direct performance effects of blockchain activities. Third, financial performance may depend on macroeconomic and strategic issues beyond the deployment of technology. The thesis consequently interprets evidence cautiously and avoids overstated causal assertions.

11. Expected Contribution

The thesis will make three important contributions: It will contribute theoretically to the scholarly literature by tying blockchain adoption more directly to the performance of commercial banks. Secondly, it will have a practical contribution by providing a more accurate understanding of where blockchain generates banking value and where its benefits



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are overhyped. Third, it will provide a theoretical contribution by merging the innovation-adoption models with a critical institutional approach to the digital transformation of banking.

12. Proposed Chapter Structure

Chapter 1: Introduction

Chapter 2: Literature Review

Chapter 3: Theoretical Framework

Chapter 4: Research Methodology

Chapter 5: Data Analysis and Findings

Chapter 6: Discussion

Chapter 7: Conclusion and Recommendations

13. Conclusion

Blockchain technology has gained much attention in commercial banking as it seems to overcome long-standing inefficiencies in transaction processing, reconciliation, transparency and record maintenance. But the premise is that its effect is not to be presumed. Adopting blockchain can improve the operational and financial performance of certain banking activities; however, these advantages are conditional, uneven and mediated by institutions. Implementation quality, organisational preparation, regulatory compliance and strategic significance of the use case moderate the relationship between adoption and performance.

The argument consequently takes a critical approach. Blockchain is not a sure transformation or a hollow technology buzzword. The question is whether it can escape the experimental space and deliver real value within the limits of actual banking institutions. This study attempts to investigate such a topic in order to deepen the understanding of digital innovation and performance in commercial banking.

REFERENCES:

- Aggarwal, R. and Goodell, J.W. (2023) 'Blockchain technology and financial services: A review of the empirical literature', *Research in International Business and Finance*, 64, 101847.
- Allen, F., Gu, X. and Jagtiani, J. (2022) 'A survey of fintech research and policy discussion', *Review of Corporate Finance*, 2(3–4), pp. 259–339.
- Catalini, C. and Gans, J.S. (2020) 'Some simple economics of the blockchain', *Communications of the ACM*, 63(7), pp. 80–90.
- Cong, L.W. and He, Z. (2019) 'Blockchain disruption and smart contracts', *The Review of Financial Studies*, 32(5), pp. 1754–1797.
- Iansiti, M. and Lakhani, K.R. (2017) 'The truth about blockchain', *Harvard Business Review*, 95(1), pp. 118–127.
- Nakamoto, S. (2008) *Bitcoin: A peer-to-peer electronic cash system*. Available at: <https://bitcoin.org/bitcoin.pdf> (Accessed: 5 May 2026).



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- Peters, G.W. and Panayi, E. (2016) 'Understanding modern banking ledgers through blockchain technologies: Future of transaction processing and smart contracts on the internet of money', in Chuen, D.L.K. (ed.) *Handbook of blockchain, digital finance, and inclusion, volume 1: Cryptocurrency, FinTech, insurTech, and regulation*. London: Academic Press, pp. 239–278.
- Pilkington, M. (2016) 'Blockchain technology: Principles and applications', in Olleros, F.X. and Zhegu, M. (eds.) *Research handbook on digital transformations*. Cheltenham: Edward Elgar, pp. 225–253.
- Rogers, E.M. (2003) *Diffusion of innovations*. 5th edn. New York: Free Press.
- Tornatzky, L. and Fleischer, M. (1990) *The processes of technological innovation*. Lexington, MA: Lexington Books.
- Treleaven, P., Brown, R.G. and Yang, D. (2017) 'Blockchain technology in finance', *Computer*, 50(9), pp. 14–17.

