AI, Innovation, and Resilience for the Environment (AIR) Journal
Vol. 1, No. 1, March 2026, pp. 17−24
E-ISSN: xxxx-xxxx | P-ISSN: xxxx-xxxx, DOI:10.34306

Decentralized Finance (DeFi) for Enterprise Treasury Management

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Article Info

Article history:

Submission March 13, 2026
Revised March 13, 2026
Accepted March 14, 2026
Published March 16, 2026

Keywords:

Decentralized Finance
DeFi
Enterprise
Management

ABSTRACT

This study explores the potential of Decentralized Finance (DeFi) as an innovative approach to enterprise treasury management. The Background of this research is rooted in the growing limitations of traditional treasury systems, which are often constrained by centralized control, limited transparency, high transaction costs, and slow settlement processes. The Object of this paper is to analyze how DeFi mechanisms, including smart contracts, decentralized lending, stablecoins, and blockchain-based liquidity management, can be adopted to improve efficiency, transparency, and financial resilience in corporate treasury operations. The Method employed in this study is a qualitative research approach, combining a systematic literature review, conceptual framework analysis, and case-based evaluation of existing DeFi platforms relevant to enterprise financial management. The Result of the analysis indicates that DeFi offers significant advantages for enterprise treasuries, such as real-time settlement, enhanced auditability, reduced reliance on intermediaries, improved liquidity optimization, and greater flexibility in cross-border transactions. However, the findings also highlight critical challenges, including regulatory uncertainty, smart contract risks, cybersecurity threats, and integration issues with existing enterprise systems. The Conclusion of this research emphasizes that while DeFi is not yet a complete replacement for traditional treasury management frameworks, it represents a promising complementary solution. With appropriate governance structures, regulatory clarity, and risk mitigation strategies, DeFi has the potential to transform enterprise treasury management into a more efficient, transparent, and decentralized financial ecosystem.

DOI: https://doi.org/10.34306/air.v1i1.121

1. INTRODUCTION

Treasury management plays a critical role in ensuring the financial stability and operational sustainability of an enterprise. At its core, treasury management is responsible for managing a company's cash flow, maintaining adequate liquidity, and mitigating financial risks arising from market volatility, foreign exchange exposure, interest rate fluctuations, and counterparty default [1]. Effective treasury functions enable organizations to allocate capital efficiently, meet short-term obligations, and support long-term strategic objectives. In

an increasingly globalized and digital business environment, treasury management has evolved beyond basic cash handling to encompass sophisticated financial planning, real-time monitoring, and strategic risk management. As enterprises expand across borders and operate in complex financial ecosystems, the importance of agile, transparent, and resilient treasury systems becomes even more pronounced [2].

Despite its importance, traditional treasury management systems face persistent structural and operational challenges. Conventional treasury operations largely depend on centralized financial institutions, multiple intermediaries, and legacy banking infrastructures. These systems often involve high transaction and compliance costs, particularly in cross-border payments and foreign exchange operations. Settlement processes can be slow, sometimes requiring several business days to complete, which limits cash flow efficiency and reduces the ability of enterprises to respond quickly to changing market conditions. Furthermore, access to global financial instruments is often restricted by regulatory barriers, geographic limitations, and the need for multiple banking relationships, making treasury operations fragmented and less transparent. These inefficiencies become increasingly problematic in a business environment that demands speed, cost efficiency, and real-time financial visibility.

In response to these challenges, Decentralized Finance (DeFi) has emerged as a transformative innovation within the broader financial technology landscape. DeFi refers to a blockchain-based financial ecosystem that enables peer-to-peer financial transactions without relying on centralized intermediaries [3, 4]. By leveraging smart contracts, distributed ledgers, and decentralized protocols, DeFi platforms offer services such as payments, lending, borrowing, asset management, and liquidity provision in a transparent and programmable manner. For enterprise treasury management, DeFi presents new possibilities, including real-time settlement, automated cash management, improved transparency, and access to global liquidity pools [5]. Stablecoins, in particular, offer a mechanism for reducing price volatility while facilitating fast and low-cost transactions across borders. These features position DeFi as a potential alternative or complement to traditional treasury systems, especially for enterprises seeking greater efficiency and flexibility.

However, the integration of DeFi into enterprise treasury management is not without challenges. While DeFi promises operational efficiency and financial innovation, it also introduces new risks and uncertainties. Regulatory frameworks for DeFi remain fragmented and evolving across jurisdictions, creating compliance and legal risks for enterprises. Smart contract vulnerabilities, cybersecurity threats, and the potential for protocol failures raise concerns about operational and financial safety. Additionally, integrating decentralized systems with existing enterprise resource planning (ERP) and treasury management systems requires careful design, governance, and technological adaptation. These factors highlight the need for systematic academic inquiry into how DeFi can be responsibly and effectively adopted within corporate treasury functions, rather than being viewed solely as a speculative or experimental financial innovation.

Therefore, the objective of this research is to examine how Decentralized Finance can be integrated into enterprise treasury management and to analyze the key opportunities and risks associated with its adoption. The main research questions guiding this study are: how can DeFi mechanisms be incorporated into enterprise treasury operations, and what are the primary benefits and risks that enterprises must consider? By addressing these questions, this research aims to contribute to the growing literature on digital finance and decentralized financial systems while providing practical insights for treasury professionals and corporate decision-makers. The significance of this study lies in its dual contribution: academically, it expands the understanding of DeFi beyond retail and speculative use cases into enterprise-level financial management; practically, it offers a conceptual foundation for organizations seeking to explore innovative treasury solutions in an increasingly decentralized financial landscape.

2. LITERATURE REVIEW

2.1. Definition and Development of Decentralized Finance (DeFi)

Decentralized Finance (DeFi) refers to a blockchain-based financial system that enables financial services to operate without centralized intermediaries such as banks, brokers, or clearing houses [6]. DeFi applications are typically built on public blockchains, most notably Ethereum, and utilize smart contracts to automate financial transactions. These protocols allow users to engage in activities such as payments, lending, borrowing, trading, and asset management in a permissionless and transparent manner. The development of DeFi gained momentum after the introduction of smart contract platforms, which enabled programmable financial logic to be executed autonomously on distributed ledgers. Over time, DeFi has evolved from simple peer-

to-peer transactions into a complex ecosystem involving decentralized exchanges, liquidity pools, stablecoins, and automated market makers. This evolution reflects a broader shift toward open financial infrastructure that emphasizes transparency, efficiency, and global accessibility.

2.2. Enterprise Treasury Management: Roles, Challenges, and Liquidity Needs

Enterprise treasury management is a strategic function responsible for managing an organization's financial resources, including cash flow, liquidity, funding, and financial risk [7]. The primary roles of treasury management include ensuring sufficient liquidity to meet operational needs, optimizing working capital, managing short-term and long-term investments, and mitigating risks related to interest rates, foreign exchange, and credit exposure. In modern enterprises, treasury functions must also support cross-border operations, multiple currencies, and complex regulatory requirements [8]. However, treasury managers face persistent challenges such as fragmented banking relationships, limited real-time visibility of cash positions, high transaction costs, and delayed settlement times. Liquidity management remains a critical concern, as inefficient liquidity allocation can lead to idle cash or increased borrowing costs. These challenges highlight the need for more agile, transparent, and integrated treasury solutions capable of supporting dynamic business environments.

2.3. Previous Studies on DeFi in Corporate Finance

Existing academic and industry literature on DeFi has primarily focused on its applications in retail finance, decentralized trading, and speculative investment activities [9]. Several studies examine DeFi as an alternative to traditional financial intermediaries, emphasizing its potential to reduce costs, increase transparency, and enhance financial inclusion. In the context of corporate finance, prior research has explored the use of blockchain technology for payments, supply chain finance, and trade finance, but only a limited number of studies explicitly address DeFi as a tool for enterprise treasury management. Some conceptual studies suggest that smart contracts and decentralized lending protocols could improve capital efficiency and reduce dependency on banks. However, empirical evidence and enterprise-focused frameworks remain scarce. This indicates that while DeFi has been acknowledged as a disruptive financial innovation, its relevance to structured corporate treasury operations has not been sufficiently explored.

2.4. Advantages of DeFi: Automated Liquidity, Yield Farming, and Programmable Money

One of the key advantages of DeFi for enterprise treasury management lies in its ability to automate liquidity management through smart contracts [10]. Automated liquidity pools enable continuous access to capital without reliance on traditional banking schedules or intermediaries. Yield farming mechanisms allow treasury assets to be allocated dynamically across decentralized protocols to generate returns, potentially enhancing capital efficiency compared to conventional short-term investments. Additionally, the concept of programmable money enables enterprises to define predefined rules for payments, cash allocation, and compliance directly within smart contracts. This programmability can reduce manual intervention, minimize operational errors, and improve transparency. Stablecoins further enhance these benefits by providing price-stable digital assets suitable for treasury operations, including cross-border settlements and internal fund transfers. Collectively, these features position DeFi as a technologically advanced framework that aligns with the evolving needs of enterprise financial management.

2.5. Challenges of DeFi: Regulation, Security, and Crypto Asset Volatility

Despite its advantages, DeFi presents significant challenges that must be carefully considered before enterprise adoption [11]. Regulatory uncertainty remains one of the most critical issues, as DeFi operates across jurisdictions with varying legal frameworks and compliance requirements. Enterprises must address concerns related to anti-money laundering, taxation, and financial reporting when interacting with decentralized protocols. Security is another major challenge, as smart contract vulnerabilities, hacking incidents, and protocol failures can result in substantial financial losses. Unlike traditional systems, DeFi often lacks centralized recourse mechanisms, increasing risk exposure for corporate users. Furthermore, the volatility of crypto assets poses a challenge for treasury stability, as price fluctuations can affect liquidity value and risk profiles. While stablecoins mitigate some volatility risks, they introduce additional concerns related to reserve transparency and issuer reliability. These challenges underscore the importance of robust governance, risk management, and regulatory alignment in DeFi adoption.

2.6. Research Gap: Limited Studies on Enterprise-Scale DeFi Adoption

Based on the existing literature, a clear research gap emerges regarding the application of DeFi at the enterprise treasury level. Most studies focus on technical aspects, retail adoption, or theoretical implications of decentralized finance, with limited attention given to structured corporate use cases. There is a lack of comprehensive frameworks that address how DeFi can be integrated into enterprise treasury systems while balancing efficiency, risk, and compliance. Moreover, empirical research examining real-world enterprise adoption remains minimal. This gap highlights the need for academic research that bridges decentralized financial innovation with traditional corporate finance principles. Addressing this gap is essential to understanding whether DeFi can transition from an experimental ecosystem into a viable component of enterprise treasury management [12].

3. METHOD

3.1. Research Approach

This study adopts a qualitative research approach based on conceptual analysis and comparative analysis. The conceptual approach is used to develop a structured understanding of how Decentralized Finance (DeFi) mechanisms can be applied within enterprise treasury management frameworks. This approach enables the integration of theories from digital finance, blockchain technology, and corporate treasury practices to construct a comprehensive analytical model [13, 14]. Meanwhile, comparative analysis is employed to compare traditional treasury management systems with DeFi-based treasury solutions across multiple dimensions, including cost efficiency, liquidity management, transparency, operational risk, and legal compliance. This combined approach is suitable for exploratory research, particularly in areas where empirical enterprise-level adoption of DeFi remains limited.

3.2. Data Sources

The data used in this research are secondary data obtained from multiple credible sources to ensure analytical robustness and relevance. Industry reports published by professional service firms such as PwC and Deloitte provide insights into enterprise treasury trends, financial digitization, and risk management practices. Blockchain analytics reports from Chainalysis contribute data related to DeFi growth, transaction patterns, and security risks [15]. In addition, regulatory documents from financial authorities are reviewed to understand the legal and compliance landscape surrounding DeFi adoption. Academic literature, including peer-reviewed journal articles, conference papers, and books, is used to establish theoretical foundations and identify existing research gaps. The triangulation of these sources enhances the validity of the conceptual and comparative analysis conducted in this study.

3.3. Unit of Analysis

The unit of analysis in this research focuses on the integration of DeFi tools into enterprise treasury functions [16]. Specifically, the study examines how key DeFi mechanisms—such as staking, decentralized lending and borrowing, and automated market makers (AMMs)—can support treasury activities including liquidity management, short-term investment, cash allocation, and risk mitigation [17]. Each DeFi tool is analyzed in relation to its functional alignment with treasury objectives, operational processes, and governance requirements. This unit of analysis allows the research to move beyond theoretical discussion and evaluate DeFi as a functional component of enterprise financial management.

Table 1. DeFi Tools and their Relevant Treasury Functions

DeFi Tool	Description	Relevant Treasury Function
Staking	Locking digital assets to support network operations and earn rewards	Short-term investment and yield optimization
Decentralized Lending	Peer-to-peer lending through smart contracts	Liquidity management and working capital
Automated Market Makers (AMMs)	Algorithm-based liquidity pools for asset exchange	Cash conversion and liquidity access
Stablecoins	Blockchain-based assets with price stability	Cross-border payments and cash settlement

3.4. Criteria of Analysis

To evaluate the feasibility and effectiveness of DeFi in enterprise treasury management, this research applies five main analytical criteria. Cost efficiency assesses the potential reduction in transaction fees, intermediary costs, and operational overhead compared to traditional treasury systems. Liquidity evaluates the ability of DeFi mechanisms to provide real-time access to funds and optimize cash utilization. Transparency examines the extent to which blockchain-based systems enhance auditability, traceability, and real-time financial visibility. Operational risk focuses on smart contract vulnerabilities, cybersecurity threats, and system reliability. Legal and regulatory compliance assesses alignment with existing financial regulations, reporting requirements, and governance standards. These criteria form the basis for the comparative analysis between traditional and DeFi-based treasury models.

Analysis Criteria	Traditional Treasury Systems	DeFi-Based Treasury Systems
Cost Efficiency	High fees and intermediary dependence	Lower fees through disintermediation
Liquidity	Limited to banking hours and processes	Real-time and automated liquidity
Transparency	Periodic reporting and reconciliation	On-chain, real-time visibility
Operational Risk	Centralized system failure risk	Smart contract and cyber risk
Legal Compliance	Well-established frameworks	Evolving and fragmented regulation

Table 2. Comparison of Traditional vs DeFi-Based Treasury Systems

3.5. Research Framework and Analytical Process

The analytical process of this research follows a structured framework that begins with the identification of enterprise treasury challenges, followed by mapping these challenges to relevant DeFi tools. The framework then evaluates each DeFi mechanism based on the predefined analysis criteria and compares the outcomes with traditional treasury practices. The results of this comparison are synthesized to assess opportunities, risks, and integration feasibility. This process ensures a systematic and replicable method for evaluating DeFi adoption at the enterprise level.

3.6. Methodological Limitations

This research is primarily conceptual and relies on secondary data, which limits the ability to generalize findings across all enterprise contexts. The absence of empirical case studies or primary data from corporate treasury departments may restrict practical validation. However, this limitation is consistent with the exploratory nature of the study and reflects the current stage of DeFi adoption at the enterprise level. Future research may extend this methodology through empirical analysis or case-based validation.

4. RESULT AND DISCUSSION

4.1. Overview of Research Findings

This chapter presents the results of the research based on the conceptual and comparative analysis of DeFi integration into enterprise treasury management. The findings are derived from the evaluation of selected DeFi tools—staking, decentralized lending protocols, and automated market makers—against traditional treasury systems using predefined analytical criteria, including cost efficiency, liquidity, transparency, operational risk, and legal compliance. The results demonstrate that DeFi offers meaningful operational and financial benefits for enterprise treasury functions, particularly in improving liquidity management and transaction efficiency. However, these benefits are accompanied by significant risks and constraints that limit full-scale enterprise adoption. Overall, the findings indicate that DeFi is best positioned as a complementary treasury solution rather than a complete replacement for traditional systems at the current stage of development.

4.2. Integration of DeFi into Enterprise Treasury Functions

The analysis shows that DeFi tools can be integrated into specific enterprise treasury functions with varying levels of effectiveness. Decentralized lending and borrowing protocols enable enterprises to deploy

excess liquidity or access short-term funding without relying on traditional banking intermediaries. This integration enhances capital efficiency by reducing idle cash and enabling real-time liquidity access. Staking mechanisms provide opportunities for treasury departments to generate returns on dormant digital assets, functioning similarly to short-term money market instruments. Automated market makers (AMMs) support real-time asset conversion and liquidity provision, which can improve cross-border payment efficiency. The results indicate that partial and selective integration—focusing on non-core or surplus liquidity—is more feasible and less risky than full treasury decentralization.

4.3. Comparative Analysis of Traditional and DeFi-Based Treasury Systems

The comparative analysis reveals distinct differences between traditional treasury systems and DeFi-based mechanisms. In terms of cost efficiency, DeFi generally offers lower transaction fees due to the elimination of intermediaries, particularly for international transfers. Regarding liquidity, DeFi enables near-instant settlement and continuous market access, outperforming traditional systems that rely on banking hours and batch processing. Transparency is significantly higher in DeFi environments due to the immutable and auditable nature of blockchain transactions. However, when evaluated against operational risk and legal compliance criteria, traditional systems demonstrate greater stability and regulatory clarity. This comparison confirms that while DeFi excels in efficiency and transparency, it underperforms in governance maturity and risk mitigation.

4.4. Evaluation of Opportunities and Risks

The research results identify several key opportunities associated with DeFi adoption in enterprise treasury management. These include automated liquidity optimization, improved cash flow visibility, reduced operational costs, and enhanced flexibility in asset management. DeFi also enables programmable financial logic, allowing treasury operations to be automated through smart contracts. Conversely, the analysis highlights critical risks, such as smart contract vulnerabilities, cybersecurity threats, regulatory ambiguity, and crypto asset volatility. Even when stablecoins are used, counterparty and systemic risks remain. These findings answer the research question concerning opportunities and risks by demonstrating that the potential benefits of DeFi are substantial but must be balanced against a complex risk landscape.

4.5. Results of Method Application

The application of the conceptual and comparative analysis methods proved effective in assessing DeFi's suitability for enterprise treasury management. The conceptual framework enabled a structured mapping of DeFi tools to treasury functions, while the comparative analysis provided measurable contrasts between decentralized and traditional systems. The use of multiple data sources, including industry reports, regulatory documents, and academic literature, strengthened the reliability of the results through triangulation. The analytical criteria successfully captured both performance and risk dimensions, confirming that DeFi adoption decisions must be context-specific and aligned with enterprise risk tolerance and regulatory environments.

4.6. Implications for Enterprise Treasury Management

The findings suggest that enterprises can benefit from DeFi by adopting a hybrid treasury model that combines traditional systems with selective DeFi integration. Such an approach allows organizations to leverage DeFi's efficiency and liquidity advantages while maintaining compliance and risk control through established financial institutions. The results also imply that treasury managers must develop new competencies in blockchain governance, smart contract evaluation, and digital asset risk management. These implications directly respond to the research objectives by providing practical insights into how DeFi can be integrated into enterprise treasury operations and under what conditions such integration is most effective.

5. MANAGERIAL IMPLICATIONS

The findings of this study suggest that enterprise managers and treasury professionals should adopt a cautious and strategic approach toward integrating Decentralized Finance (DeFi) into treasury operations. Rather than implementing full-scale adoption, organizations are encouraged to utilize DeFi selectively through pilot initiatives that enhance liquidity management, automate financial processes, and improve capital efficiency while maintaining alignment with existing treasury systems. Managers must also strengthen risk governance by addressing regulatory uncertainty, smart contract security, and crypto asset volatility through appropriate monitoring and compliance mechanisms. Additionally, developing organizational capabilities in blockchain and digital finance is essential to support effective implementation. Overall, DeFi should be positioned as a

complementary innovation that enhances operational efficiency and transparency while ensuring prudent risk management and regulatory compliance.

6. CONCLUSION

The findings of this study indicate that Decentralized Finance (DeFi) has significant potential to enhance enterprise treasury management by providing faster settlement, automated liquidity management, and improved transparency. DeFi tools such as staking, decentralized lending protocols, and automated market makers (AMMs) can complement traditional treasury systems, enabling enterprises to optimize cash flow, enhance capital efficiency, and gain access to global liquidity pools. However, the research shows that while DeFi offers operational and financial advantages, full-scale adoption is not yet practical due to existing technological, regulatory, and security constraints.

This study directly addresses the research questions by demonstrating how DeFi mechanisms can be selectively integrated into enterprise treasury functions. The key opportunities include cost reduction, liquidity optimization, and programmable financial automation, while the main risks involve regulatory uncertainty, smart contract vulnerabilities, and crypto asset volatility. The research also identifies limitations in the current study, including its reliance on secondary data and conceptual analysis rather than empirical enterprise adoption cases. These limitations suggest that while the study provides a comprehensive theoretical understanding, practical implementation outcomes may vary across different organizational contexts.

For future research, it is recommended to conduct empirical studies that examine real-world enterprise adoption of DeFi, including pilot implementations and quantitative performance assessments. Further investigation into regulatory frameworks, risk mitigation strategies, and governance models is essential to provide actionable guidance for treasury professionals. Additionally, exploring hybrid models that combine traditional and decentralized treasury systems could offer valuable insights into optimizing both efficiency and compliance in enterprise finance. Such studies will contribute to a deeper understanding of DeFi's role in transforming corporate treasury management and its broader impact on digital finance innovation.

7. DECLARATIONS

7.1. About Authors

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7.2. Author Contributions

Conceptualization: UR; Methodology: AS; Software: M; Validation: BA and UR; Formal Analysis: AS and M; Investigation: BA; Resources: BA; Data Curation: BA; Writing Original Draft Preparation: YS and UR; Writing Review and Editing: YS and UR; Visualization: BA; All authors, BA, UR, AS, and M, have read and agreed to the published version of the manuscript.

7.3. Data Availability Statement

The data presented in this study are available on request from the corresponding author.

7.4. Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

7.5. Declaration of Conflicting Interest

The authors declare that they have no conflicts of interest, known competing financial interests, or personal relationships that could have influenced the work reported in this paper.

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