

## **Decentralized Finance (DeFi) as a Catalyst for SME Resilience**

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*Abstract: SMEs are the foundation of world economies, but have a high financing gap that is estimated at US \$5.7 trillion in emerging markets and developing economies (EMDEs) that will restrict their growth, innovation and their ability to withstand economic shocks. Conventional banking systems compound this difficulty by providing excessive collateral requirements, time-consuming procedures, expensive services and risk aversion that serves to disfavor small or informal enterprises disproportionately. Decentralized Finance (DeFi) is proposed as a disruptive alternative, utilizing blockchain technology, smart contracts, permissionless protocols, asset tokenization (particularly invoices and real-world assets), stablecoins, decentralized lending (e.g., Aave, Compound) and on-chain credit assessment to circumvent intermediaries, lower costs, global access to capital, and access rapid liquidity. The mechanisms increase financial inclusion of SMEs, shock absorption, and operational efficiency, which lead to increased agility and recovery potential in unstable environments. Although the rapid expansion of DeFi is proven by the phenomenal increase in total value locked (TVL) over time, with a negligible amount in 2020 to more than 100 billion in 2025, there are issues, namely market volatility, liquidation risk, scalability, and regulatory uncertainty that remain. An intermediary TradFi-DeFi strategy that is facilitated by policy frameworks that facilitate safe on-ramps, entrenched oversight, and internationalization standards on the real-world asset tokenization is suggested to allow sustainable adoption. DeFi will have the potential to close the credit gap in the SME environment, democratize finance, and create more inclusive and resilient entrepreneurial networks across the globe.*

*Keywords: Asset Tokenization, Blockchain Lending, Decentralized Finance, Finance Gap, Financial Inclusion, SME Resilience.*

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### **1.0 Introduction**

Small and medium-sized enterprises (SMEs) are the backbone of global economic activity. They account for over 90 percent of businesses worldwide, generate most employment opportunities, and contribute significantly to GDP in both developed and developing economies (Enaifoghe, 2024). It is in light of this critical role that SMEs continue to face a strong limitation in the ability to finance themselves, a limitation that affects their ability to develop, innovate and cope with economic shocks (Pu, et al., 2021). According to the March 2025 MSME Finance Gap Report, recent evaluations of the International Finance Corporation (IFC) and World Bank have estimated the formal MSME finance gap in emerging markets and developing economies (EMDEs) to be around US\$5.7 trillion. This value is disproportionate to the 19 percent of GDP and only 20 percent of private sector

credit allocated to SMEs, indicating a structural financing gap. This gap has widened over time, exceeding pre-2020 estimates, leaving many formal MSMEs credit-constrained and highlighting the urgent need for innovative solutions (Alessandri et al., 2022). This is a value, unrelated to the 19 percent of the GDP of these territories and to 20 percent of total credit in the private sector, and indicates a structural lack, which has been growing over the years - growing much more than the estimates made in the past before 2020s - and is why so many MSMEs in formality are credit-bound, and why new innovative solutions should be urgently developed to unlock their potential (Alessandri, et al., 2022).

The traditional banking system exacerbates these difficulties by creating structural obstacles that adversely affect SMEs (Chibueze, 2021). The financial and traditional banking systems contribute to such difficulties by creating structural obstacles that disfavorably impact SMEs (Chibueze, 2021; Ugwo & Chikezie, 2024). The traditional lenders tend to use stringent collateral requirements, lengthy documentation policies, lengthy approval processes, higher interest rates, and risk-averse underwriting, which consider smaller business ventures, especially those with no strong credit history or informal business, as high-risk (Jrad, 2023). Such frictions lead to restricted credit provision, as, in most EMDEs, SMEs will only have a fraction of all bank credit given to them as larger firms, and cycles of undercapitalization, exposure to shocks such as pandemics or supply chain disruption, and limited opportunity to invest in expansion or resiliency provision continue (Wansi & Burrell, 2023).

A possible paradigm shift is Decentralized Finance (DeFi), created in response to these institutional constraints. DeFi consists of blockchain platforms, smart contracts, and open protocols that do not rely on centralized intermediaries (Singh, 2024). DeFi applications make it possible to participate

permissionlessly, meaning lending, borrowing, and managing assets are conducted on a direct peer-to-peer basis, which is much cheaper in terms of transaction costs, serves as a fast alternative to days or weeks, and expands access to global capital pools (Naikwadi, et al., 2024). With such tools as over-collateralized loans, yield-generating opportunities, and automated risk assessment via on-chain data, DeFi bypasses most of the traditional gatekeeping mechanisms and provides an alternative that is more inclusive, especially in underserved SMEs in areas with underdeveloped banking infrastructure (Bakare, et al., 2024).

The main mechanisms that define the transformative potential of DeFi to SMEs include the following: accessible lending - layers of decentralized protocols reduce entry barriers, allowing individuals to borrow using a variety of collateral, such as invoices, inventory, future receivables, etc.; asset tokenization - the illiquid real-world assets is transformed into a tradable digital token, removing restrictions on institutional lending to national borders and national restrictions (Kaplan, et al., 2023). All of these factors enable SMEs to finance in a more effective way, act swiftly to market prospects or crises, and become overall more financially resilient in a more unstable economic environment (Omowole, et al., 2024).

This conceptual paper argues that DeFi can play a significant role in reducing long-term financing gaps, creating more operational flexibility, and enhancing the capacity of SMEs to survive and recover in case of economic uncertainties, and positively impacting the creation of more inclusive, dynamic, and equitable entrepreneurial systems on a global scale. This study aims to examine how DeFi mechanisms can enhance SME resilience through financial inclusion, operational efficiency, and shock absorption. Understanding these mechanisms is significant for policymakers, SME owners, and financial



innovators seeking sustainable and inclusive growth.

## 1.1 Literature Review & Conceptual Framework

### 1.1.1 Overview of DeFi Primitives

Underlying DeFi is the foundational layer composed of so called primitives, modular and programmable protocols that are used to recreate the functionalities of traditional banking without having any centralized intermediaries (Gogol, *et al.*, 2024). Lending systems (like Aave or Compound) are algorithmic credit markets in which interest rates are set by real-time supply and demand (Castro-Iragorri, *et al.*, 2021). To an SME, these protocols provide permissionless access to capital; as long as the borrower offers adequate digital collateral, *the loan is issued instantly*” for conciseness through a smart contract and do not have to wait several months of manual underwriting that is common with commercial banks.

Additionally, there are Decentralized Exchanges (DEXs) and stablecoins that allow the required liquidity and price stability of business operations (Hägele, 2024). Compared to centralized exchanges Cloud-hosted exchanges vs. decentralized exchanges in cryptocurrency markets: A. DEXs use Automated Market Makers (AMMs) to facilitate the instant exchange of assets, so that SMEs can operate their treasury or transform revenue without the help of a broker (Xu, *et al.*, 2023). Stablecoins, including USDC or DAI, are the mediator between the volatile crypto-economy and the traditional accounting (Al-Afeef, *et al.*, 2024). They enable SMEs to pay in cross-border payments or keep cash reserves on-chain without the risk of being have their price affected by price swings as it happens to assets such as Bitcoin or Ethereum because of their peg to the fiat currency.

### 1.1.2 SME-Specific Applications

In addition to the simple trading, the conceptual framework of SME-DeFi integration aims at

addressing the credit gap, in this case, by tokenizing the invoices. According to this model, accounts receivable of an SME will be turned into Non-Fungible Tokens (NFTs) or digital assets on a blockchain. These tokens are a legal right to cash flow in the future and they could be collateralized in DeFi lending pools (Qin, *et al.*, 2021). This turns stuck liquidity, the money owed by customers, into working capital and to an effect, decentralizes the factoring industry and offers SMEs a pool of potential funders all over the world (Bartoletti, *et al.*, 2021).

In addition, DeFi brings about decentralized credit rating, which deals with the deficiency of formal credit history regularly experienced by SMEs of the emerging markets. Rather than depending on traditional bank statements, these systems consolidate on-chain information, e.g. transaction volume, repayment history in DeFi protocols, as well as supply chain data. The lenders will be able to check the health and solvency of a business in real-time by utilizing zero-knowledge proofs and smart contracts that are powered by artificial intelligence (AI) (Adebowale and Akinnagbe, 2021). This helps lessen information asymmetry, enabling the SMEs to establish a verifiable global credit image, which is not contingent on local banking prejudice (Kumar, *et al.*, 2023).

### 1.1.3 Resilience Dimensions

The three dimensions on which resilience framework of DeFi-enabled SMEs are rooted are financial inclusion, shock absorption and operational efficiency. The financial inclusion is achieved by making the entry more readily available; due to the fact that DeFi is permissionless and borderless the SMEs of the regions with a poor banking infrastructure can still access the capital markets equal to the ones in the developed economies (Ali, *et al.*, 2024). It is a democratization of finance, which means that small businesses will not experience a systemic impact of the collapse of local banks or the restraining national credit policy (McCarthy, 2019).



In terms of shock absorption, as well as operational effectiveness, DeFi is the buffer of external crisis and internal bottlenecks (Owolabi, *et al.*, 2024). The liquidity pools will be on-chain to allow the just-in-time financing in case the market becomes volatile such that an abrupt credit crunch in the conventional sphere does not halt the operations of the SMEs. Operationally, smart contracts can automate middle-office financial operations, including reconciliations, interest payments, and collateral management, reducing administrative overheads by up to 40%. This kind of a leaner business model allows SMEs to reallocate their resources back to growth to establish long-term organizational resilience (Otokiti, *et al.*, 2022).

**2.0 DeFi Growth Trajectory and SME Relevance**

The growth trajectory of decentralized finance (DeFi) has been characterized by rapid expansion, episodic market corrections, and progressive institutional integration. These developments have significantly influenced the accessibility of alternative financing mechanisms for small and medium enterprises (SMEs). The evolution of DeFi metrics

between 2020 and 2024 demonstrates how decentralized financial infrastructures are increasingly shaping the global financial ecosystem.

Table 1 presents the evolution of key DeFi indicators, particularly the Total Value Locked (TVL), between 2020 and 2024, alongside the associated implications for SME financing. The data show that the DeFi ecosystem expanded rapidly from approximately USD 0.6 billion to about USD 25 billion in 2020, a period commonly referred to as the “DeFi Summer,” during which decentralized lending protocols and liquidity pools began to gain widespread adoption. This phase marked the early emergence of decentralized lending infrastructures capable of supporting digital asset collateralization for financing activities.

The ecosystem experienced a substantial surge in 2021, when TVL peaked between USD 180 billion and USD 250 billion, driven largely by the proliferation of yield farming strategies and decentralized exchanges. This expansion significantly increased market liquidity and created opportunities for asset tokenization, thereby enabling SMEs to potentially access alternative financing mechanisms through blockchain-based platforms.

**Table 1: Key DeFi Metrics Evolution (2020–2024)- Total Value Locked (TVL) Growth and SME Implications (2020–2024).**

Year	Total Value Locked (TVL, USD Billion)	Approximate Growth Notes	SME-Relevant Implications
2020	~0.6–25	Early "DeFi Summer" surge	Initial lending protocols emerge
2021	Peak ~180–250	Yield farming boom	Increased liquidity for tokenization
2022	Decline to ~40–50	Market correction (e.g., post-FTX)	Volatility highlights risks
2023	Recovery ~50–100	Institutional interest rises	Stablecoins aid cross-border SME payments
2024	~55–120+	Steady recovery & diversification	Lending protocols gain ~21% TVL share

*Evolution of DeFi TVL (2020–2024), showing rapid adoption phases and implications for SME access to finance and operational resilience (Exploding Topics 2024).*



However, 2022 witnessed a notable contraction in TVL to approximately USD 40–50 billion, primarily due to market corrections and major industry disruptions such as the collapse of centralized crypto exchanges. This period highlighted the volatility inherent in emerging decentralized financial systems and underscored the need for risk management mechanisms for SMEs engaging with DeFi-based financial services.

In 2023, the DeFi ecosystem began to stabilize and recover, with TVL increasing to roughly USD 50–100 billion. This recovery was accompanied by growing institutional participation and increased utilization of stablecoins for cross-border financial transactions. For SMEs, stablecoins offered improved transaction efficiency, reduced foreign exchange exposure, and enhanced access to global payment networks.

By 2024, DeFi markets demonstrated further stabilization and diversification, with TVL ranging between USD 55 billion and over USD 120 billion. Lending protocols accounted for an increasing share of the ecosystem’s value, reinforcing their relevance as decentralized credit channels that could potentially support SME borrowing through collateralized lending models.

The growth pattern described in Fig. 1 further illustrates the overall upward trajectory of global DeFi TVL between 2020 and 2024. The figure shows a steep acceleration in locked capital beginning in 2021, followed by a correction phase and subsequent recovery. Despite the volatility observed during the market adjustment period, the long-term trend indicates a more than fivefold expansion in DeFi liquidity, highlighting the increasing maturity of decentralized financial markets and their potential to broaden financing access for SMEs (Exploding Topics, 2024).

Additionally, Fig. 2 presents the composition of DeFi TVL by protocol type in 2024. The distribution shows that lending and borrowing protocols constitute the largest share, accounting for approximately 35% of total locked value, followed by stablecoins (25%), other protocol categories such as asset management and derivatives (22%), and decentralized exchanges and related services (approximately 18%). The dominance of lending platforms is particularly significant for SMEs, as it reflects the expanding role of decentralized credit markets in facilitating collateralized financing and liquidity provision.

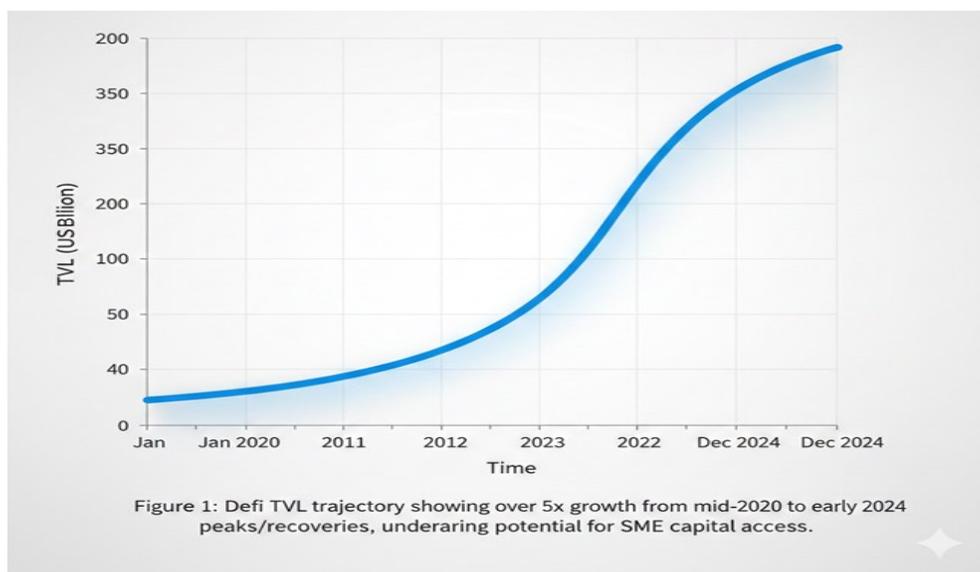
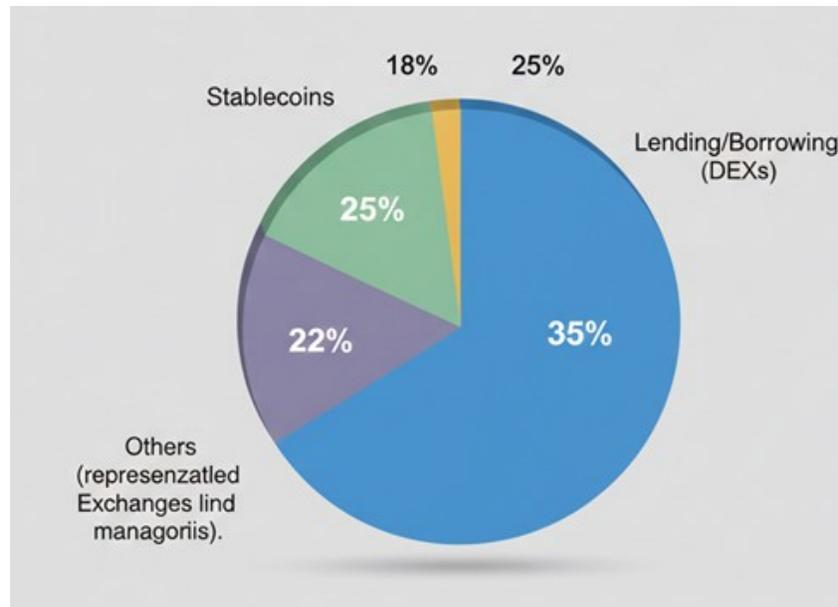


Fig. 1: Line Graph – DeFi TVL Growth (2020–2024) (De Meijer, 2024)





**Fig. 2: Pie or Bar Chart – DeFi Protocol Composition by TVL Share (Binance Research, 2024)**

Evidences from Table 1, Fig. 1, and Fig.2 indicates that the DeFi ecosystem has evolved from an experimental financial niche into a rapidly expanding digital financial infrastructure. As the market continues to mature, decentralized lending, tokenization, and stablecoin-based transactions are increasingly positioned to enhance financial inclusion and provide SMEs with alternative channels for capital access, payment settlement, and liquidity management in a globally interconnected financial landscape (Exploding Topics, 2024).

### 3.0 Mechanisms: How DeFi Enhances SME Resilience

#### 3.1 Lower Costs and Removal of Intermediaries

The first way that DeFi provides resilience is through the significant reduction in transaction costs (Alamsyah, *et al.*, 2024). In conventional banking, SMEs are prone to often face substantial overhead costs, including loan processing fees as well as the cost of the “intermediation by correspondent banks. DeFi protocols do not need these human intermediaries but use smart contracts to substitute them with self-executing code that

verifies and settles financial agreements automatically. This transformation shifts high fixed costs to lower variable costs and even micro-enterprises may in conventional way utilize credit without being pushed out by administrative charges (Prijadi, *et al.*, 2020).

Moreover, the character of the middlemen is also removed to eliminate the risk of the gatekeeper. In times of bank crises or credit crunch, the conventional lenders tend to withdraw their lending to SMEs to safeguard their balance sheets (Duarte, *et al.*, 2018). DeFi protocols are algorithmic and permissionless, and therefore lack such discretionary bias. As long as an SME meets the mathematical parameters of the protocol (e.g., collateralization ratios), liquidity is available (Rambaid, *et al.*, 2022). This 24/7 access provides a critical safety net such that the operations of the business are not held ransom by the solvency or the risk appetite of one centralized institution. Collectively, lower transaction costs and reduced intermediation strengthen SMEs’ capacity to maintain liquidity during periods of financial stress

#### 3.2 Tokenization of Assets and Invoices

DeFi brings in the concept of asset tokenization, which is a process in which



illiquid physical or paper-based assets are converted into digital tokens (Baltais, *et al.*, 2024). In the case of SMEs, such on-chain assets can be described as the previously illiquid working capital so-called i. e. unpaid invoices, inventory or equipment. These tokens are very divisible and transferable, which means that a business can sell a part of its future receivables to an international pool of investors rather than waiting for client payment cycles of up to 90 days (Rohr and Wright, 2018). This builds up a more dynamic type of working capital management that is more resilient to cash flow shocks.

In particular, the tokenization of invoices solves the long-standing problem of the so-called credit gap in supply chain finance. Tokenizing an invoice into a Non-Fungible Token (NFT), an SME will be able to use it as a collateral in a decentralized lending pool (Nguyen, *et al.*, 2024). Since the blockchain provides an immutable record of the validity and payment of the invoice, the information asymmetry that tends to cause banks to fear small business debt is considerably decreased. This transparency makes it possible to have real-time underwriting, in which the price of borrowing is determined by the health of the trade itself, as opposed to a fixed, traditional credit ratings that may not reflect real-time performance (Nguyen & Ngo, 2021). By converting receivables into programmable financial assets, tokenization directly enhances SME liquidity management and resilience to delayed payments.

### 3.3 Global Reach for Underbanked SMEs

In the case of SMEs in the developing world, weak local financial infrastructure often undermines SME resilience (Chibueze, 2024). DeFi functions as an alternative liquidity layer which allows underbanked corporations to be directly linked to international capital markets (Goel, *et al.*, 2024). Because DeFi applications are built on public blockchains, such as Ethereum or Solana, an SME in an area with high inflation or a poor banking system can

save its reserves in USD-pegged stablecoins and borrow funds by investors in Europe or North America. This is an effective hedge against economic instability in the domestic market due to the diversification of funding sources (Kim, *et al.*, 2020).

Decentralized credit scoring models are decentralized to facilitate this global reach. As compared to traditional scoring which incorporates years of local bank history, a DeFi credit system is able to scan on-chain activity to evaluate a company's record on making payments in a trade protocol on time or the volume of transactions made on a decentralized exchange (Schuler, *et al.*, 2024). DeFi enables SMEs to create a portable and global credit identity, meaning that their performance is what defines their capability to grow instead of their place of origin or the restrictions of their local financial regulator (Ikponmwoba, *et al.*, 2022). This portability of credit identity enhances long-term resilience by reducing dependence on geographically constrained financial systems.

### 3.4 Case Examples (2024 Synthesis)

Several leading protocols of the Real-World Asset (RWA) category showed these mechanisms in practice by early 2024 (Chen, *et al.*, 2024). To illustrate, digital freight invoice aggregation platforms such as Centrifuge have empowered SMEs to finance millions of dollars of freight invoices and trade in agriculture by entering into DeFi liquidity pools such as MakerDAO (Harvey and Rabetti, 2024). The so-called DeFi-SME bridge, in such instances, enabled the businesses in the logistics industry to obtain capital at much lower rates than what the local shadow lenders were offering, which directly translated to their profit margins and survival rates in the times of fuel price volatility.

The other consolidated example is micro-lending that has been decentralized in Southeast Asia and Africa (Hugo Hoffmann, 2021). Through platforms utilizing stablecoins, associations of small-scale retailers have



started using community-led liquidity pools to finance the purchase of inventory. Additionally, by circumventing the conventional banks (which frequently demand 150 percent of physical security) these companies relied on tokenized inventory and peer-vouched credit rating to take loans. These practical applications reveal that DeFi is no longer confined to speculative cryptocurrency trading but a toolkit of SME resilience, a decentralized plan B to the current financial structure (Makarov & Schoar, 2022).

**4.0 Challenges and Risks**

**4.1 Volatility, Regulatory Gaps, Scalability**

Although DeFi is a viable alternative to conventional funding of SMEs, it entails a distinctive set of technological and market risks that may pose a threat to the stability of a firm (Adisa, *et al.*, 2024). The most significant risk is market volatility; even so-called stable assets sometimes undergo de-pegging, and due to the extreme variability of the underlying collateral values (such as Ethereum) an SME loan can be liquidated automatically with minimal notice. Moreover, the scalability of many other blockchains is limited, which can lead to spikes

in transaction (gas) fees (Butler and Crane, 2023). In the case of a small business, an abrupt increase in the transaction cost of two dollars to fifty dollars can effectively paralyze any effort to deal with a tokenized invoice or to pay a micro-loan and transform a digital advantage into a liquidity trap.

The second layer of risk concerns regulatory complexity (Shandilya *et al.*, 2024). By 2026, it appears there is still a lot of jurisdiction lagging to the decentralized nature of these protocols, resulting in a grey zone that exposes SMEs to abrupt enforcement efforts or change in their tax treatment. This implies that in case the smart contract of a protocol is used or hacked, there is no centralized lender of last resort or deposit insurance that can be used to recover lost business capital, as this is a common risk in the ecosystem (Gudgeon, *et al.*, 2020). In the absence of unified frameworks such as MiCA ( Markets in Crypto-Assets ) being adopted worldwide, the across-border SMEs will encounter a disjointed compliance environment potentially making it grow instead of reducing administrative burden (Shmyhov, 2024).

**Table 2: Comparison of Barriers: Traditional Finance vs. DeFi (up to 2024)**

Barrier	Traditional Finance	DeFi (up to 2024)	Impact on SME Resilience
Access Requirements	Collateral/credit history	Permissionless/smart contracts	Higher inclusion
Costs	High fees/intermediaries	Gas fees (variable)	Potential savings
Speed	Days/weeks	Minutes (on-chain)	Faster liquidity in crises
Risks	Centralized failure	Smart contract exploits/volatility	New vulnerabilities

**5.0. Discussion & Policy Recommendations**

**5.1 Integration Strategies for SMEs**

A hybrid approach, often described as TradFi–DeFi integration, may provide a practical pathway to successful integration of SMEs into the DeFi ecosystem. SMEs should also not

replace traditional banking, but instead apply DeFi to the very narrow needs of the business, including high-cost cross-border payments –to make a cross-border payment or short-term credit unavailability (Saka, 2024). One of the standard techniques is to resort to controlled



on-ramps, i.e. service providers who accept fiat income and issue it as a stablecoin within a legal framework (Schumacher, 2024). When on-chain, businesses can put idle treasury funds in lending protocols to earn yields that can often be higher than conventional savings rates, or use tokenized receivables to obtain near-instant working capital.

Also, the technical and operational preparedness of SMEs should be considered by implementing solutions of middlewares. (Jayasuriya & Sims, 2023). Automating the process of transferring on-chain transactions into regular financial statements will allow businesses to retain the transparency needed by tax regulators and other conventional partners but with the efficiency of DeFi (Morton & Curran, 2023). Pilot programs - using small-scale invoice tokenization or payroll in stablecoins can enable firms to be exposed to the new volatility of the sector without having to risk their entire balance sheet.

### 5.2 Future Outlook: The Path to 2030

The institutionalization of DeFi will, presumably, be the direction to take as we approach 2030. Emissioned DeFi pools are likely to emerge, where users are required to pass some form of KYC (Know Your Customer) and AML (Anti-Money Laundering) criteria before they can participate (Kirimhan, 2023; Tiamiyu & Ndibe, 2024). The efficiency of smart contracts and the safety of a regulated environment will enable DeFi to be more appealing to risk-averse SMEs and their institutional lenders, in a clean-room environment. The blockchain-based technology of the future will make the underlying equipment more or less visible infrastructure in the same way that the TCP/IP protocol is to the contemporary internet (Zarrin, *et al.*, 2021). Moreover, AI and DeFi convergence will manifest creditworthiness in a new way. AI-based autonomous agents may have the capability to run the entire treasury of an SME by automatically directing capital where it will get the best yield after risk

adjustment, or the lowest cost of borrowing, to any protocol. Predictive analytics will mean proactive financing, in which a protocol will detect an SME about its future cash flow shortfall and provide an already tokenized loan in advance of the crisis occurring (Wei and Wu, 2024). This development will see the SMEs being the passive consumers of financial services evolve into active, automated users of a global, programmable economy (Balboa, *et al.*, 2024).

### 5.3 Policy Recommendations

To realize this potential, policymakers should adopt outcomes-based regulation instead of attempting to adopt the so-called decentralized protocols into the old banking definitions (Adenuga and Okolo, 2021). This implies that regulators should focus instead to the concept of embedded supervision where regulators leverage the transparency of the blockchain to observe systemic risk in real-time. Governments can also offer the legal assurance SMEs require to use these tools by certifying the use of particular blue-chip smart contracts or protocols as being enterprise-grade. This safe harbor model would enable innovation to flourish with little harm to small businesses of the aftermath of experimentation or unsafe code (Werbach, 2018).

Lastly, it is imperative to collaborate internationally in order to avoid a disjointed regulatory environment (Burci & Negri, 2020). DeFi is a borderless concept and on this basis, global benchmarks to tokenize assets of Real-World Assets (RWA) and standards for stablecoins are needed so that the tokenized invoice of an SME in a particular country will be considered as valid collateral in a different country. Raising awareness in policy formulation should also boost the creation of digital identity systems that enable SMEs to transfer their credit records to various protocols and jurisdictions (Igbinenikaro & Adewusi, 2024). By making DeFi interoperable and legally enforceable, position DeFi as a mainstream driver of global SME resilience.



These risks highlight the importance of risk management strategies and regulatory clarity in ensuring that DeFi contributes to resilience rather than instability.

Fig. 3 summarizes the mechanisms through which DeFi enhances SME resilience, linking cost reduction, liquidity access, tokenization, and global credit portability to financial inclusion and shock absorption outcomes.

## 5.0 Conclusion

The integration of Decentralized Finance (DeFi) into the Small and Medium-sized Enterprise (SME) sector represents a structural evolution in financial intermediation, moving from centralized, institution-dependent systems toward modular and programmable financial infrastructures. Through mechanisms such as automated lending protocols, stablecoins, and real-world asset tokenization, DeFi reduces transaction costs, expands access to credit, and mitigates geographic and institutional constraints that have historically limited SME financing. Beyond serving as a digital alternative, DeFi has the potential to function as a resilience layer—supporting liquidity continuity and operational stability during periods of banking disruption or restricted financial access.

However, widespread adoption remains constrained by technological volatility, governance risks, and regulatory uncertainty. Addressing these challenges will require hybrid integration models in which SMEs, financial institutions, and policymakers collaborate to establish secure and interoperable on-ramps. Emerging regulatory frameworks such as the Markets in Crypto-Assets Regulation (MiCA) illustrate efforts to enhance legal clarity while preserving innovation. If supported by robust smart contract infrastructure and coherent regulatory oversight, blockchain-based financial systems may become increasingly embedded—yet largely invisible—within mainstream SME finance.

Ultimately, DeFi should be understood not as a replacement for traditional finance, but as an adaptive financial architecture capable of strengthening SME resilience, enhancing credit accessibility, and supporting more globally integrated and financially autonomous enterprises over the coming decade.

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EW conceived the study, designed the conceptual framework, and coordinated the manuscript preparation. VE conducted the literature review and contributed to the development of the theoretical arguments. LA performed the analytical interpretation of DeFi mechanisms and SME financing dynamics. Aniedi Ojo contributed to data interpretation, manuscript structuring, and critical revisions for intellectual content and coherence.

