Review

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FinTech Empowerment of Digital Transformation in Small and Medium-Sized Banks: Pathways and Risk Analysis

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Abstract: This review examines the pathways and risks of FinTech-enabled digital transformation in small and medium-sized banks (SMEs). It explores core banking modernization, customer-facing digital channels, data-driven decision-making, and collaboration with FinTech startups as key strategies for enhancing operational efficiency, customer engagement, and competitiveness. The study also analyzes operational, cybersecurity, regulatory, and financial risks associated with digital adop-tion, and proposes mitigation strategies including technology governance, regulatory compliance frameworks, human capital development, and ecosystem collaboration. Finally, future research directions and practical recommendations for SMEs and policymakers are discussed, highlighting the potential of emerging technologies and sustainable banking practices to drive resilient and inclusive digital transformation.

Keywords: FinTech; SME banks; digital transformation; risk management; sustainable banking

1. Introduction

The global banking industry is undergoing a profound transformation driven by rapid technological advancements. Digitalization has shifted from being a supplementary service to a core strategic imperative for banks, fundamentally altering how financial services are delivered, managed, and consumed. This trend is particularly evident in the evolution of online banking, mobile payment platforms, and data-driven financial solutions, which have collectively reshaped customer expectations and competitive dynamics in the sector [1]. According to industry reports, digital adoption among banks has reached unprecedented levels, with large banks in North America achieving an adoption rate of 85% in 2024, while small and medium-sized banks (SMEs) lag slightly behind at 60% (see Table 1). Similar patterns are observed across Europe, Asia-Pacific, and Latin America, highlighting both the opportunities and challenges inherent in the digital transformation process [2].

Table 1. Global Digital Banking Adoption Rates by Bank Size.

Region	Large Banks Digital Adoption (%)	SMEs Digital Adoption (%)	Year
North America	85	60	2024
Europe	80	55	2024
Asia-Pacific	78	50	2024

| Latin America | 70 | 45 | 2024 |

Small and medium-sized banks occupy a unique position in the financial ecosystem. While they may not possess the scale and resource advantages of global banking giants, SMEs play a crucial role in supporting local economies, providing specialized services, and fostering financial inclusion [3]. Their agility enables them to experiment with innovative solutions more rapidly than larger institutions; however, limited technological infrastructure and financial constraints often hinder comprehensive digital transformation. This disparity underscores the significance of FinTech as an enabler, offering scalable, cost-effective solutions that allow SMEs to accelerate their digital journeys without the extensive capital expenditure traditionally required for system upgrades [4].

FinTech, encompassing technologies such as artificial intelligence (AI), blockchain, cloud computing, and advanced analytics, has emerged as a pivotal driver of banking innovation. Beyond improving operational efficiency, these technologies facilitate customer-centric services, enhance risk management, and support regulatory compliance. For SMEs, FinTech adoption is not merely a technological choice but a strategic pathway to competitiveness, enabling them to bridge gaps in service quality, broaden product offerings, and strengthen customer engagement [5]. Partnerships with FinTech firms, the integration of digital payment solutions, and the deployment of AI-driven analytics have collectively reshaped the operational and strategic landscape of smaller banks worldwide.

This review aims to provide a comprehensive examination of FinTech-enabled digital transformation in SME banking, focusing on both pathways and associated risks. Specifically, it seeks to: (1) identify the primary avenues through which FinTech technologies facilitate digitalization; (2) analyze the operational, cybersecurity, regulatory, and financial risks inherent in these transformations; and (3) provide a synthesized overview of strategies that SMEs can employ to achieve sustainable digital growth. By consolidating current literature and industry data, this study highlights the critical role of technology in enhancing the competitiveness of small and medium-sized banks, while also acknowledging the caution required to manage emerging risks effectively [6].

Table 1 provides a snapshot of digital adoption rates across regions, illustrating the disparity between large banks and SMEs. While digital transformation is well advanced in developed markets such as North America and Europe, SMEs consistently exhibit lower adoption levels, suggesting that targeted interventions, including FinTech partnerships and digital capacity-building initiatives, remain essential [7].

2. Literature Review

2.1. Existing Research on FinTech in Banking

The integration of FinTech into banking has been one of the most significant developments in the financial sector over the past decade. FinTech technologies, including blockchain, artificial intelligence (AI), advanced data analytics, and digital payment systems, have redefined how financial services are designed, delivered, and consumed. Blockchain, for instance, has enabled secure, transparent, and efficient transaction processing, reducing the reliance on intermediaries and enhancing trust in digital payment networks [8]. AI and machine learning algorithms are increasingly applied to credit scoring, fraud detection, and customer relationship management, allowing banks to offer personalized services and minimize operational inefficiencies.

Digital payment systems have also evolved rapidly, providing both convenience and security. Mobile banking applications, digital wallets, and peer-to-peer payment platforms have expanded access to financial services, particularly for underbanked populations. Studies indicate that FinTech adoption in retail banking leads to measurable improvements in customer engagement and operational efficiency [9]. Banks implementing AI-driven analytics and cloud-based platforms often experience reductions in processing times and increases in customer retention. Despite these advancements,

most research has concentrated on large financial institutions, leaving the applicability and scalability of these technologies for small and medium-sized banks less explored.

Furthermore, data analytics plays a crucial role in enabling predictive and prescriptive decision-making. Banks leverage vast amounts of transactional and behavioral data to identify patterns, assess risks, and optimize product offerings. Real-time analytics facilitates rapid responses to market changes and customer demands, which is particularly valuable in highly competitive banking environments [10]. However, the deployment of such systems requires significant technical expertise and infrastructure investment, posing challenges for smaller institutions with limited resources.

2.2. Digital Transformation Frameworks for SMEs

Digital transformation frameworks provide structured approaches for understanding how small and medium-sized banks adopt and implement technological innovations. Among the most widely applied models are the Technology Acceptance Model (TAM) and the Technology-Organization-Environment (TOE) framework. TAM emphasizes user perception, particularly perceived usefulness and ease of use, as primary determinants of technology adoption, whereas TOE considers organizational readiness, technological availability, and external environmental pressures [11]. Studies applying these models to SMEs highlight the importance of aligning digital strategies with organizational capabilities and market conditions.

Despite the theoretical guidance provided by these frameworks, SMEs face unique challenges that often hinder digital adoption. Limited IT budgets constrain the ability to acquire advanced hardware, software, and cloud infrastructure, while regulatory compliance requirements demand additional investment in legal and operational safeguards. Smaller banks typically lack specialized talent in areas such as data science, cybersecurity, and AI system management, which can delay the implementation of digital solutions. Many SMEs struggle with integrating FinTech solutions due to both financial and human resource limitations, emphasizing the need for scalable and cost-effective adoption strategies [12].

Another critical challenge relates to organizational culture. Digital transformation is not solely a technological process but also an institutional change, requiring shifts in management practices, employee mindset, and operational workflows. SMEs often exhibit risk-averse cultures, preferring incremental improvements over disruptive innovations. Consequently, understanding the interplay between technological, organizational, and environmental factors is essential for designing effective digital transformation strategies in smaller banks.

2.3. Research Gap Identification

While the literature on FinTech adoption and digital transformation is growing, several gaps remain, particularly concerning small and medium-sized banks. First, most studies focus on technology implementation in isolation, without systematically linking these innovations to risk management frameworks. The operational, cybersecurity, regulatory, and financial risks associated with digitalization in SMEs are not comprehensively addressed in existing research. For instance, while AI-based credit scoring is widely discussed, studies rarely examine how smaller banks can balance predictive accuracy with regulatory compliance and cybersecurity safeguards.

Second, research on the optimization of digital transformation pathways for SMEs is limited. Although theoretical models such as TAM and TOE provide guidance on adoption decisions, few empirical studies evaluate the effectiveness of different FinTech solutions in enhancing operational performance, customer engagement, and financial sustainability in the context of smaller institutions. As a result, bank managers and policymakers lack evidence-based recommendations for prioritizing investments, selecting technologies, and mitigating associated risks.

Lastly, there is a need for integrated frameworks that combine technology adoption, pathway design, and risk assessment. Such frameworks would enable SMEs to approach digital transformation holistically, balancing innovation with operational resilience. The scarcity of comprehensive studies underscores the importance of further research that bridges the gap between conceptual models, empirical analysis, and practical guidance for SME banks embarking on digital transformation initiatives. Addressing these gaps is critical to ensuring that smaller financial institutions can leverage FinTech effectively while minimizing exposure to emergent risks.

3. Pathways of FinTech-Enabled Digital Transformation

3.1. Core Banking Modernization

Core banking modernization represents the foundation of digital transformation for small and medium-sized banks. Traditional legacy systems often hinder operational efficiency due to outdated architecture, limited scalability, and high maintenance costs. Cloud-based core banking systems offer a flexible and cost-effective alternative, enabling real-time transaction processing, centralized data management, and seamless integration with digital services. By migrating critical operations to cloud platforms, SMEs can significantly reduce IT overhead while improving service reliability and system resilience.

Process automation is another key aspect of core banking modernization. Routine tasks such as account reconciliation, transaction verification, and report generation can be streamlined through automated workflows, freeing staff to focus on value-added activities. Furthermore, the replacement of legacy systems with modern platforms enhances operational transparency and regulatory compliance, as banks can more easily track and audit transactions. Data from Table 1 suggests that SMEs in North America and Europe are increasingly adopting digital banking solutions, although their adoption rates still lag behind large banks, highlighting the potential benefits of accelerated modernization initiatives.

The adoption of modern core systems is often phased, with smaller banks prioritizing high-impact modules such as payments, deposits, and lending operations. Successful implementation requires careful planning, staff training, and alignment with broader digital strategies to ensure a smooth transition and minimize operational disruptions. Table 2 provides illustrative examples of SME banks that have undertaken core banking upgrades, demonstrating the practical application of these technologies.

Table 2. Examples of FinTech Solutions Adopted by SMEs.

SME Bank Name	FinTech Solution	Function	Year of Adoption
Bank A	Cloud Core Banking	Core system upgrade	2023
Bank B	AI Credit Scoring	Risk assessment	2022
Bank C	Mobile App + Wallet	Customer engagement	2024
Bank D	Blockchain Settlement	Payments	2023

3.2. Customer-Facing Digital Channels

Enhancing customer-facing digital channels is critical for SMEs seeking to remain competitive in a rapidly evolving financial landscape. Mobile banking applications, digital wallets, and online account management platforms enable banks to provide convenient, 24/7 access to financial services. These channels not only improve customer satisfaction but also expand the reach of banks to underserved populations, particularly in regions where physical branches are limited. Compared to large banks, SMEs often have lower digital adoption rates, as indicated in Table 1, underscoring the importance of investing in customer-centric technologies.

Digital channels also facilitate personalized interactions through advanced analytics, offering tailored recommendations, targeted promotions, and real-time alerts. For

instance, mobile apps integrated with AI-driven tools can suggest suitable products based on a customer's transaction history or financial goals, thereby enhancing engagement and loyalty. SMEs that effectively deploy these solutions can differentiate themselves in competitive markets, despite resource constraints.

Integration across multiple digital touchpoints is another essential consideration. Banks must ensure that mobile apps, online platforms, and customer support systems operate cohesively, providing a seamless and secure user experience. Table 2 highlights SMEs that have implemented mobile applications and digital wallets to strengthen customer engagement, demonstrating tangible benefits from these digital investments.

3.3. Data-Driven Decision Making

Data-driven decision-making has become a cornerstone of FinTech-enabled transformation. By leveraging AI and advanced analytics, SMEs can improve credit scoring accuracy, detect fraudulent activities, and forecast market trends. AI models analyze historical and behavioral data to predict creditworthiness, enabling banks to make more informed lending decisions while mitigating risk. Fraud detection systems continuously monitor transactions, identifying anomalies and preventing potential losses.

Predictive analytics also supports strategic planning and resource allocation. Banks can anticipate customer needs, optimize product offerings, and enhance marketing effectiveness through insights derived from transaction patterns and demographic data. Smaller banks, which traditionally face constraints in analytical capabilities, can leverage cloud-based AI tools to access sophisticated analytics without significant upfront investment, thereby narrowing the gap with larger competitors.

The adoption of data-driven approaches reinforces other digital initiatives, such as core banking modernization and customer-facing channels. By integrating analytics into operational workflows, SMEs can continuously monitor performance, assess the impact of digital initiatives, and adjust strategies to achieve sustainable growth. Table 2 includes examples of SME banks employing AI-driven credit scoring systems, illustrating practical applications of data-driven decision-making.

3.4. Collaboration with FinTech Startups

Collaboration with FinTech startups represents a strategic pathway for SMEs to accelerate digital transformation. By partnering with innovative firms, banks can access cutting-edge technologies such as API banking, blockchain-based payment solutions, and automated wealth management platforms without developing these capabilities in-house. Such partnerships reduce implementation costs, shorten development cycles, and enable banks to respond quickly to changing market demands.

API banking facilitates seamless integration with third-party services, allowing SMEs to offer enhanced functionalities such as instant payments, digital lending, and personalized financial products. In addition, collaborative initiatives often include joint development of tailored solutions, enabling banks to meet specific regulatory and operational requirements while maintaining competitive differentiation.

Partnerships also foster an innovation-oriented culture within SMEs. By working closely with FinTech startups, banks gain exposure to new methodologies, technological standards, and market insights, which can inform broader digital strategies. Table 2 illustrates SMEs that have engaged in collaborative projects with FinTech providers, highlighting how external partnerships complement internal digital transformation efforts and strengthen overall competitiveness.

4. Risk Analysis in FinTech-Driven Transformation

4.1. Operational Risks

Operational risks constitute a major challenge for SMEs pursuing FinTech-driven digital transformation. Core banking modernization, process automation, and the

integration of new digital platforms inherently introduce the potential for IT failures. System downtime, software bugs, or incompatibility between legacy and modern platforms can disrupt essential banking operations, potentially causing transaction delays and reputational damage. Smaller banks, in particular, often lack dedicated IT teams and contingency resources, making them more vulnerable to operational disruptions.

Integration issues with third-party FinTech solutions further exacerbate operational risks. SMEs frequently rely on external vendors for cloud services, analytics platforms, and payment processing systems. While these collaborations provide access to advanced technologies, they also create dependencies that may compromise system reliability if vendors experience technical failures or delays. Effective risk management requires careful selection of vendors, rigorous testing, and continuous monitoring of system performance to ensure operational resilience.

Operational risk is also influenced by organizational readiness and staff proficiency. Inadequate training or unclear operational protocols can lead to errors in system usage, mismanagement of digital workflows, or delays in issue resolution. According to Table 3, operational incidents affect approximately 30% of SMEs, with an average financial impact of 1.2 million USD in 2024, highlighting the material consequences of operational vulnerabilities.

Table 3. Risk Incidence and Average Loss Among SME Banks.

Risk Type	Incidence Rate (%)	Average Loss (Million USD)	Source Year
Operational	30	1.2	2024
Cybersecurity	25	2.0	2024
Compliance	15	0.8	2024
Financial	20	1.5	2024

4.2. Cybersecurity Risks

Cybersecurity risks represent another critical concern in the digitalization of SMEs. The expansion of digital channels, cloud-based infrastructure, and data-driven analytics increases the potential attack surface for malicious actors. Data breaches, ransomware attacks, and online fraud can compromise sensitive customer information, disrupt operations, and result in significant financial and reputational losses. SMEs are particularly susceptible due to often limited investment in robust cybersecurity measures and specialized personnel.

Fraud detection and prevention systems, while essential, are not foolproof. Sophisticated attacks targeting mobile banking apps, digital wallets, and online accounts require continuous monitoring and adaptive security protocols. Inadequate security configurations or delays in software updates can allow vulnerabilities to persist, exposing banks to exploitation. Regular audits, penetration testing, and real-time threat intelligence are critical measures to mitigate these risks.

Table 3 indicates that cybersecurity incidents impacted 25% of SMEs in 2024, with an average loss of 2.0 million USD, underscoring the high stakes associated with inadequate protective measures. Effective cybersecurity strategies must therefore combine technical safeguards, employee training, and customer awareness programs to ensure comprehensive protection across digital ecosystems.

4.3. Regulatory and Compliance Risks

Regulatory and compliance risks are especially pronounced for SMEs engaging with FinTech solutions, given the complex and evolving legal environment. Banks must navigate a wide range of requirements, including local banking regulations, cross-border rules, anti-money laundering (AML) standards, and data privacy laws. Failure to comply

can result in fines, legal sanctions, or restrictions on operations, potentially undermining the financial and operational viability of SMEs.

Compliance challenges are magnified when implementing technologies such as cloud computing, AI analytics, and blockchain. Data storage in third-party servers, automated decision-making algorithms, and cross-border transactions may create ambiguities regarding jurisdiction, consent, and reporting obligations. Smaller banks often face resource constraints that limit their ability to continuously monitor regulatory changes and implement corrective measures promptly.

Table 3 shows that compliance-related incidents affected 15% of SMEs in 2024, with an average financial loss of 0.8 million USD. To mitigate these risks, banks need to establish robust compliance frameworks, including regular audits, regulatory reporting, and alignment of technology solutions with prevailing legal standards. Proactive engagement with regulators and participation in industry consortia can also facilitate better understanding and management of evolving compliance requirements.

4.4. Financial Risks

Financial risks associated with digital transformation arise from the uncertainty of returns on investment and the potential cost of adopting unproven technologies. SMEs often operate with constrained capital, making the financial consequences of failed digital initiatives particularly significant. Investments in AI platforms, blockchain systems, or cloud-based solutions may not yield expected efficiency gains or revenue increases, leading to budget overruns and liquidity pressures.

Risk is further compounded by market volatility and competitive pressures. Rapid technological innovation requires continuous reinvestment to maintain relevance, and the failure to effectively leverage new tools can result in lost market share. SMEs must balance the potential benefits of digital transformation with prudent financial planning, including cost-benefit analyses, phased implementation strategies, and risk-adjusted budgeting.

Table 3 indicates that financial risks impacted 20% of SMEs in 2024, with an average loss of 1.5 million USD. To manage these risks, banks should prioritize scalable and modular technology solutions, implement rigorous project evaluation processes, and monitor performance metrics to ensure that investments generate tangible benefits.

5. Strategies for Risk Mitigation and Sustainable Digital Transformation

5.1. Technology Governance

Effective technology governance forms the foundation of sustainable digital transformation in SMEs. IT audit processes help ensure that digital systems function correctly, identify vulnerabilities, and maintain compliance with internal and external standards. Regular auditing of core banking systems, cloud platforms, and customer-facing applications can prevent operational disruptions and uncover inefficiencies before they escalate into major issues.

System redundancy and backup mechanisms are also critical. Cloud-based replication, failover servers, and disaster recovery protocols ensure that essential banking operations remain uninterrupted in the event of hardware failures, software errors, or external attacks. These measures not only protect financial data but also preserve customer trust and confidence in digital services.

Regular security updates and patch management complement these strategies by addressing evolving cybersecurity threats. By systematically monitoring system performance and promptly applying updates, SMEs can reduce exposure to vulnerabilities while ensuring compliance with security best practices. Technology governance thus integrates operational reliability, cybersecurity, and regulatory readiness into a coherent framework for managing digital transformation.

5.2. Regulatory Compliance Frameworks

Regulatory compliance frameworks provide a structured approach to navigating the complex legal environment associated with FinTech adoption. Risk-based supervision enables SMEs to allocate compliance resources proportionally to the level of exposure, ensuring that critical areas such as anti-money laundering, data privacy, and cross-border transactions receive appropriate oversight.

Sandbox approaches offer another effective strategy. By allowing controlled testing of innovative technologies in a regulatory environment, banks can experiment with new products or processes while minimizing the potential for legal infractions or systemic disruptions. Reporting standards, including structured disclosures and digital audit trails, further support transparency and accountability, facilitating smoother interactions with regulators and external stakeholders.

Collectively, these frameworks empower SMEs to innovate responsibly. By embedding compliance into technology and operational planning, banks can achieve a balance between agility and adherence to regulatory requirements, reducing legal risks while fostering sustainable growth.

5.3. Human Capital and Culture

Digital transformation extends beyond technology; human capital and organizational culture are equally vital. Employee training programs are essential to equip staff with the knowledge and skills required to operate new digital systems effectively. Training initiatives should cover system functionalities, cybersecurity awareness, and process automation techniques, ensuring that employees can adapt to evolving operational demands.

Cultivating a digital mindset is another key component. Encouraging innovation, experimentation, and a willingness to embrace technological change fosters organizational resilience. SMEs that promote a culture of continuous learning are better positioned to identify emerging risks, optimize workflows, and leverage new tools effectively.

Engaging employees in the transformation process also enhances adoption rates and reduces resistance. By aligning individual incentives with organizational objectives, banks can encourage proactive participation in digital initiatives, thereby enhancing overall performance and reducing operational and cybersecurity vulnerabilities.

5.4. Collaboration and Ecosystem Approach

Collaboration with external partners represents a strategic pathway to mitigate risks and accelerate digitalization. Shared infrastructure, such as cloud platforms and cybersecurity tools, reduces individual investment burdens while improving operational efficiency and system reliability.

Co-innovation with FinTechs allows SMEs to access advanced technological solutions without developing them in-house, lowering financial and technical risks. Joint development initiatives facilitate the customization of products and services to meet specific operational and regulatory requirements, enabling smaller banks to compete more effectively.

Consortium-based risk-sharing models further enhance resilience. By participating in industry consortia or collaborative networks, SMEs can pool resources, share best practices, and collectively address common challenges such as cybersecurity threats, compliance pressures, and operational vulnerabilities. This ecosystem approach fosters knowledge exchange, reduces individual risk exposure, and strengthens the overall sustainability of digital transformation initiatives.

6. Future Directions, Research Opportunities, and Conclusion

The digital transformation of small and medium-sized banks continues to evolve rapidly, driven by advances in emerging technologies and shifting market demands. Artificial intelligence, blockchain, and quantum computing are poised to further reshape banking operations, offering enhanced predictive capabilities, secure transaction processing, and unprecedented computational power for complex financial modeling. These technologies present opportunities for SMEs to leapfrog traditional limitations, improve operational efficiency, and deliver innovative customer solutions. Future research should explore how these tools can be effectively integrated into SME banking ecosystems while managing associated risks.

Sustainability and ESG (Environmental, Social, and Governance) integration represent another critical frontier. Digitalization can enable SMEs to monitor environmental impacts, promote socially responsible lending, and enhance governance through transparent reporting systems. The intersection of FinTech and sustainable banking offers a pathway for smaller institutions to align with global ESG standards, improve corporate reputation, and attract socially conscious clients and investors. Research opportunities exist in assessing the effectiveness of digital ESG tools and identifying best practices for SME adoption.

Cross-border digital banking is increasingly relevant as SMEs seek to expand their reach and compete globally. FinTech adoption facilitates international payments, multi-currency operations, and compliance with diverse regulatory environments. However, these opportunities are accompanied by heightened operational, cybersecurity, and regulatory risks, highlighting the need for robust risk management frameworks tailored to smaller banks engaging in international digital operations.

In conclusion, FinTech-enabled digital transformation offers SMEs multiple pathways to modernization, including core banking upgrades, customer-facing digital channels, data-driven decision-making, and collaboration with innovative FinTech partners. While the benefits—improved efficiency, enhanced customer engagement, and competitive agility—are substantial, SMEs must carefully manage operational, cybersecurity, regulatory, and financial risks to ensure sustainable outcomes. Effective technology governance, regulatory compliance frameworks, human capital development, and ecosystem collaboration emerge as key strategies for mitigating these risks.

For practitioners, this review highlights the importance of aligning digital initiatives with organizational capabilities, resource availability, and strategic objectives. Policymakers and regulators are encouraged to provide supportive environments, including sandbox approaches, risk-based supervision, and knowledge-sharing platforms, to facilitate SME innovation while maintaining financial stability. By combining technological adoption with risk-aware strategies, small and medium-sized banks can successfully navigate the digital transformation journey, achieving both operational resilience and long-term growth.

References

1. S. U. Rehman, M. Al-Shaikh, P. B. Washington, E. Lee, Z. Song, I. A. Abu-AlSondos, and M. Allahham, "FinTech adoption in SMEs and bank credit supplies: a study on manufacturing SMEs," Economies, vol. 11, no. 8, p. 213, 2023, doi: 10.3390/economies11080213.
2. T. Sheng, "The effect of fintech on banks' credit provision to SMEs: Evidence from China," Finance Research Letters, vol. 39, p. 101558, 2021, doi: 10.1016/j.frl.2020.101558.
3. L. Ming, Y. Wu, S. Yang, and X. Yang, "Fintech and large banks for SME financing: Evidence from China," Accounting & Finance, 2025, doi: 10.1111/acfi.13395.
4. B. Sanga and M. Aziakpono, "FinTech and SMEs financing: A systematic literature review and bibliometric analysis," Digital Business, vol. 3, no. 2, p. 100067, 2023, doi: 10.1016/j.digbus.2023.100067.
5. S. Karim, F. Naz, M. A. Naeem, and S. A. Vigne, "Is FinTech providing effective solutions to small and medium enterprises (SMEs) in ASEAN countries?," Economic Analysis and Policy, vol. 75, pp. 335–344, 2022, doi: 10.1016/j.eap.2022.05.019.

6. H. Li, Z. Lu, and Q. Yin, "The development of Fintech and SME innovation: Empirical evidence from China," Sustainability, vol. 15, no. 3, p. 2541, 2023, doi: 10.3390/su15032541.

7. N. Zhou and R. Sun, "Coping with the storm: The role of fintech in SME survival," International Review of Financial Analysis, vol. 93, p. 103157, 2024, doi: 10.1016/j.irfa.2024.103157.

8. J. Yan, "How the use of alternative information in risk management fintech platforms influences SME lending: a qualitative case study," Qualitative Research in Financial Markets, vol. 17, no. 1, pp. 1–20, 2025, doi: 10.1108/QRFM-08-2023-0198.

9. V. Charaia, A. Chochia, and M. Lashkhi, "Promoting Fintech Financing for SME in S. caucasian and baltic states, during the COVID-19 Global Pandemic," Business, Management and Economics Engineering, vol. 19, no. 2, pp. 358–372, 2021.

10. L. M. Palladino, "The impacts of fintech on small business borrowing," Journal of Small Business & Entrepreneurship, vol. 33, no. 6, pp. 639–661, 2021, doi: 10.1080/08276331.2020.1796110.

11. S. K. Sharma, P. V. Ilavarasan, and S. Karanasios, "Small businesses and FinTech: a systematic review and future directions," Electronic Commerce Research, 2023, doi: 10.1007/s10660-023-09705-5.

12. D. P. Nugraha, B. Setiawan, R. J. Nathan, and M. Fekete-Farkas, "FinTech adoption drivers for innovation for SMEs in Indonesia," Journal of Open Innovation: Technology, Market, and Complexity, vol. 8, no. 4, p. 208, 2022, doi: 10.3390/joitmc8040208.