Artificial Intelligence and Economic Resilience: A Review of Predictive Financial Modelling for Post-Pandemic Recovery in the United States SME Sector

Sakera Begum

Abstract: Small and medium-sized enterprises (SMEs) are highly vulnerable to economic crises due to financial constraints and operational instability. The COVID-19 pandemic has exacerbated these vulnerabilities, emphasizing the need for robust financial systems. AI can help enhance resilience and financial sustainability. The purpose of this review study is to investigate how AI-driven predictive financial modelling can enable SMEs in the United States to maintain economic resilience in the aftermath of a pandemic. The findings show that AI adoption leads to considerable gains in financial decision-making, early risk detection, and resource optimization all of which are critical components of resilience. Predictive models may anticipate cash flow, evaluate credit risk, and provide SMEs with timely insights into market trends. However, challenges such as data quality and a lack of digital infrastructure may impede adoption, especially among resource-constrained or low-tech businesses. Therefore, predictive financial modelling powered by AI has transformative potential for increasing the resilience and competitiveness of United States SMEs in a dynamic and constantly developing economy.

How to Cite: Sakera Begum (2025) Artificial Intelligence and Economic Resilience: A Review of Predictive Financial Modelling for Post-Pandemic Recovery in the United States SME Sector. *International Journal of Innovative Science and Research Technology*, 10(7), 3620-3627. https://doi.org/10.38124/ijisrt/25jul1726

I. INTRODUCTION

The global COVID-19 pandemic has led to unprecedented economic crises, exposing vulnerabilities in all sectors and firms; however, the immediate and long-lasting effects affected small and medium-sized enterprises (SMEs) (Shafi et al., 2020; Biyela & Utete, 2024). SMEs are the core of the global economy, increasing productivity, fostering innovation, and sustaining employment in both developed and developing countries (Surya et al., 2021).

According to World Bank estimates, SMEs account for about 90% of all firms and the majority of total employment worldwide. They are important in emerging nations, where they account for up to 40% of GDP and serve as the enabler for inclusive growth, entrepreneurship, and economic diversity (World Bank, 2021). SMEs are frequently more adaptable and regionally integrated than larger businesses, allowing them to adjust rapidly to changing customer needs, explore niche markets, and develop innovative products and services customized to area demands. In the United States, SMEs account for most enterprises and employ most of the private workforce, making them critical drivers of national productivity, innovation, and employment (Faisal et al., 2023). However, small enterprises are more financially

vulnerable and operationally restricted than larger companies. During the pandemic, many SMEs experienced declining revenues, interrupted supply chains, lower customer demand, and limited access to funding.

Generally, as the United States economy began to shift from crisis management to recovery and reconstruction, it became evident that reverting to pre-pandemic business models would not be enough to ensure long-term resilience (Gregurec et al., 2021). Instead, economic recovery for SMEs will necessitate not only financial assistance but also a change towards more intelligent, adaptable, and proactive operating strategies. In this context, Artificial Intelligence (AI) has emerged as a viable mechanism for transformation. AI technologies, particularly those applied in predictive financial modelling, enable SMEs to foresee economic risks, simulate recovery scenarios, optimize resource allocation, and improve real-time decision making (Carayannis et al., 2025). Therefore, these tools can improve financial agility, detect early indicators of disruption, and help businesses prepare more resiliently in turbulent circumstances. While AI adoption has been concentrated in larger corporations with advanced digital infrastructures, recent advances in cloud computing, AI-as-a-service platforms, and user-friendly machine learning interfaces have begun to

democratize these tools, making them more relevant to SMEs (Sjödin et al., 2021).

Predictive financial modelling with AI entails employing data-driven algorithms to forecast future business situations, assess financial health, and simulate the impact of various strategic decisions (Okeke et al., 2024). As such, for SMEs recovering from economic turmoil, such capabilities indicate the difference between proactive risk management and reactive damage control. AI models may analyze complicated, real-time data from internal systems and external market indicators to produce insights previously unavailable to smaller enterprises using existing financial methods. In this regard, an AI-powered system may estimate seasonal cash flow variations, assess the creditworthiness of new consumers, or alert a company to a potential inventory shortage (Adeyeri, 2024). Therefore, these insights enable SMEs to make more informed budgeting, financing, pricing, and investment decisions, all of which are critical components of establishing long-term economic resilience. Furthermore, the versatility of AI allows models to evolve, learning from new data and responding to changing business settings.

Despite these opportunities, incorporating AI into SME operations is not devoid obstacles. Barriers to wider adoption include limited technical capacity, insufficient data infrastructure, high perceived costs, and ethical and privacy issues (Schönberger M., 2023). Furthermore, the return on investment for AI solutions is not necessarily instantaneous or linear, making it difficult for SMEs, particularly those in financial recovery, to prioritize technology adoption in circumstances of conflicting demands (Okeke et al., 2024). Thereby, these issues suggest the relevance of critically analyzing how AI is being used in SME financial modelling, the gaps that exist, and solutions that can promote inclusive and effective adoption. This review, therefore, investigates the interaction of AI, financial resilience, and post-pandemic recovery in the context of United States SMEs.

II. ECONOMIC RESILIENCE OF THE SME SECTOR

Economic resilience in the context of SMEs refers to the ability of a company to predict, absorb, adapt to, and recover from adverse shocks while preserving or quickly recovering its core operations and long-term sustainability (Saad et al., 2021). Unlike large firms, which frequently benefit from diverse revenue streams, comprehensive risk management systems, and access to capital reserves, SMEs typically operate on tighter margins, fewer teams, and less formalized planning processes. This renders individuals more vulnerable to exogenous shocks, whether economic, environmental, political, or health-related (Okeke et al., 2024b). Resilience for SMEs is thus more than just survival during a crisis; it also includes the ability to turn problems into opportunities, retain employees, protect important assets, and reposition for development under changing conditions.

The COVID-19 epidemic highlighted the importance of economic resilience among SMEs. It demonstrated how unexpected interruptions may quickly weaken financial stability, disrupt supply chains, and damage client bases (Hossain et al., 2022). Resilient SMEs were frequently those that could pivot operations, adopting digital tools, transitioning to e-commerce, changing product lines, or reconfiguring supplier networks. Economic resilience includes the strategic ability to plan for unpredictability, such as through scenario analysis, risk assessments, and liquidity forecasting (Rakibul et al., 2024). This level of agility and forward planning is widely recognized as critical, not only for crisis response but also for long-term competitiveness in a global market impacted by digital revolution, climate risk, and geopolitical volatility.

A. AI and Predictive Financial Modelling

Artificial intelligence is a set of computer technologies that allows robots to simulate cognitive capabilities like learning, reasoning, problem solving, and decision making. AI in financial management includes techniques such as machine learning (ML), deep learning, natural language processing (NLP), and intelligent automation, all of which enable systems to process large amounts of structured and unstructured data in order to detect patterns, forecast outcomes, and optimize decisions (Soori et al., 2023). Predictive financial modelling, a key AI application in this field, uses historical data and real-time factors to forecast future financial outcomes. Therefore, it exceeds standard static forecasting methods by constantly updating its models using new data, making it more adaptable and accurate in rapidly changing contexts (Hussain, 2023).

Predictive financial modelling provides significant value to SME organizations by providing insights that were previously only available to large enterprises with dedicated data science teams. These AI-powered models can estimate cash flow, predict sales patterns, discover cost-reducing potential, analyze credit risk, and quantify the financial effect of strategic decisions (Ugbebor et al., 2024). Particularly, a predictive model may analyze seasonal demand fluctuations and recommend changes to inventory or employment levels, or it may predict revenue shortfalls based on changing customer behaviour and macroeconomic indicators. The real-time nature of AI systems enables SMEs to adapt more rapidly to market volatility, making them more resilient to disruption and proactive in financial planning (Alonge et al., 2023). As AI technologies evolve and become more available via cloud-based platforms, predictive financial modelling is increasingly viewed as a revolutionary tool for enabling SMEs in unpredictable economic environments.

B. Intersection of AI and Financial Decision Making

The convergence of artificial intelligence and financial decision-making is changing the way SMEs manage resources, assess risks, and plan for the future. Previously, financial decisions of SMEs were mainly reliant on manual processes, historical records, intuition, or static financial instruments such as spreadsheets (Okeke et al., 2024a). These procedures, while common, are generally time-

consuming, error-prone, and have limited ability to account for complexity or volatility. AI profoundly disrupts this paradigm by allowing for data-driven, forward-thinking financial decision-making that can dynamically adapt to changing internal and external variables. With AI, financial analysis becomes continuous and intelligent, translating raw data into predicted insights and automating difficult tasks that would otherwise require time and skill (Adeyelu et al., 2024).

Specifically, AI facilitates financial decision-making through a variety of applications. AI systems may create real-time dashboards that highlight critical financial data, identify abnormalities or emerging hazards, and make strategic suggestions based on predictive analytics (Joni & Graepel, 2024). Machine learning algorithms can also assess consumer behaviour to improve credit offerings or payment plans, whereas NLP technologies can scan financial papers for important data and patterns to analyze. In this manner, AI supports rather than replaces human judgement, allowing SMEs to make more precise, informed, and swift decisions (Nayak, 2022). Importantly, this technology democratizes financial intelligence by providing user-friendly interfaces and plug-and-play solutions, lowering the entrance barrier for non-experts. As AI becomes more integrated into corporate ecosystems, its role in financial decision-making will potentially expand, establishing it as a critical enabler of SME resilience, particularly in instances where agility and data responsiveness are becoming competitive requirements (Akanfe et al., 2025).

III. THE POST-PANDEMIC SITUATION FOR THE UNITED STATES SMES

The COVID-19 pandemic caused a systemic shock to the United States economy, with small and medium-sized firms (SMEs) at the centre of the upheaval. Due to their smaller size, fewer cash reserves, and limited ability to change operations quickly, SMEs were disproportionately affected by mandatory shutdowns, social distancing measures, and decreased consumer purchases (Belitski et al., 2021). Businesses, particularly those in hospitality, food service, travel, and retail, experienced sudden income declines, leading many to lay off employees, postpone rent payments, or shut down operations (Wiatt et al., 2024). Therefore, unlike major firms, SMEs lack the diversity and financial cushioning required to withstand extended economic shocks, making them extremely sensitive to sudden changes in market conditions.

The post-pandemic recovery presented a new set of structural issues, such that while government stimulus initiatives served to mitigate the immediate impact of the crisis, many SMEs emerged from the epidemic significantly in debt, operationally drained, and technologically behind (Satpathy et al., 2024). The unpredictability of virus outbreaks, new variations, and regulatory changes caused constant instability, making long-term planning difficult. Furthermore, ongoing personnel shortages, particularly in service-based industries, hampered operations. Inflationary pressures drove up input costs, reducing already low profits.

Many SMEs were forced to completely restructure their business models, transitioning from in-person sales to e-commerce, retooling physical locations to meet health rules, and implementing digital technologies for communication, logistics, and payments (Guo et al., 2024). These changes, while important, required tremendous financial and strategic effort, leaving some SMEs in a constant state of reactive adaptation.

A. Changes in Consumer Behaviour, Supply Chains, and Capital Access

The pandemic fundamentally altered consumer behaviour, supply chain dynamics, and financial ecosystems, compelling SMEs to innovate quickly or risk obsolescence. A seismic shift happened in how consumers interacted with businesses: digital channels took precedence, contactless payments skyrocketed, and demands for ease, personalization, and social responsibility increased (Das et al., 2022; Smith, 2024). Many consumers have permanently switched to online purchasing, remote employment, and virtual services, causing SMEs with limited digital infrastructure to lose market share to more technologically advanced competitors. This digital transformation was not limited to retail; professional services, education, and health-related SMEs all needed to digitize swiftly to meet client expectations and maintain continuity (Sharabati et al., 2024). Even after in-person encounters resumed, the demand for seamless digital experiences persisted, making omnichannel capabilities critical for post-pandemic competitiveness.

Simultaneously, global and domestic supply networks were disrupted. Therefore, raw material shortages, shipping delays, price volatility, and logistical constraints revealed the fragility of SMEs' just-in-time inventory systems. Many small businesses struggled with inventory shortages or unsustainable cost rises due to a lack of bargaining leverage and supplier diversification (Celestin & Sujatha, 2024). These challenges not only hampered short-term operations, but also forced a larger rethinking of procurement tactics, inventory management, and supplier relationships. SMEs began to investigate regional and local sourcing, vendor network diversification, and investment in supply chain visibility measures that necessitated strategy reorientation and capital expenditures (Bak et al., 2020).

Emergency financing schemes, such as the Paycheque Protection Program, temporarily increased liquidity, but many businesses, particularly minority-owned, rural, or newly founded organizations, struggled to traverse complex application systems or had the necessary financial data to qualify (Humphries et al., 2020). After the crisis, as conventional financial institutions implemented more conservative credit policies, SMEs faced stricter lending conditions. Subsequently, fintech platforms emerged as alternative funding sources, providing quicker, data-driven loan decisions (Pellegrino & Abe, 2022). However, SMEs' inconsistent digital adoption hindered their capacity to fully profit from these new financial tools. As a result, capital limitations slowed recovery, innovation, and investment in

resilience-building technologies such as AI and cloud infrastructure.

IV. APPLICATIONS OF PREDICTIVE FINANCIAL MODELLING IN SMES

Predictive financial modelling has emerged as a transformational tool for SMEs, allowing them to make data-driven financial choices with previously unattainable accuracy, foresight, and agility. Predictive financial modelling is fundamentally based on machine learning algorithms and statistical approaches that analyze historical and real-time financial data, detect patterns, and forecast future trends (Oni, 2025). These estimates can help SMEs plan strategically, allocate resources more effectively, and boost their resilience to financial shocks and market volatility. Unlike static financial statements or manually created estimates, AI-driven predictive models are dynamic, self-improving systems that constantly learn from new data inputs, making them especially useful in today's unpredictable and fast-changing corporate environment (Okeke et al., 2024a).

- Another key application is sales and revenue forecasting, in which predictive models use consumer behaviour, market variables, and past sales data to forecast future profitability. This is especially important for SMEs in the retail, manufacturing, and service industries, where demand is influenced by seasonal trends, promotional cycles, or consumer attitudes (Ugbebor et al., 2024). SMEs can use AI-enabled Predictive financial modelling solutions to optimize production schedules, workforce numbers, and marketing spend based on projected sales quantities. Other businesses, for example, may utilize predictive models to estimate peak shopping periods, adjust inventory purchases accordingly, and minimize overstocking and missed sales (Okeke et al., 2024a). Similarly, service companies can better plan labour allocation to meet predicted client demand, increasing operational efficiency and profitability.

- Predictive financial modelling is becoming increasingly significant in credit risk assessment and financial planning. SMEs frequently struggle to obtain affordable finance due to poor financial records or perceived risk by lenders (Nwaimo et al., 2024). AI-powered predictive algorithms can evaluate a borrower's creditworthiness by analyzing unusual data sources such as transaction history, supplier payment behaviour, and even social media indicators, resulting in a more comprehensive picture of financial health. This not only increases SMEs' ability to negotiate improved funding conditions but also allows them to assess the credit risk of their customers and partners, lowering the likelihood of bad debts or defaults. SMEs can also simulate various financial scenarios, such as new product launches, market expansions, or capital expenditures, by modelling their possible effects on profitability, solvency, and return on investment (Modina et al., 2023). This capacity facilitates long-term strategy planning by enabling businesses to make evidence-based decisions.

- Cash flow forecasting is one of the most common applications of predictive financial modelling in SMEs, and it is crucial for enterprises with thin liquidity margins and limited loan access (Okeke et al., 2024a). Cash flow issues are one of the primary causes of SME failure, and business owners are frequently unaware of how short-term swings in receivables, payables, and operational costs affect their liquidity runway. Predictive models can estimate cash inflows and outflows in the short-, medium-, and long-term using client payment histories, seasonal trends, forthcoming obligations, and macroeconomic indicators (Sophie, 2025a). This allows SMEs to proactively manage their working capital, anticipate possible shortfalls, and take corrective actions such as renegotiating payment terms, reducing inventory levels, or obtaining bridging financing before a crisis occurs.

V. AI-ADOPTION FOR ECONOMIC RESILIENCE

The implementation of AI provides an important opportunity for SMEs to strengthen their economic resilience in more complex and uncertain business environments. As SMEs deal with the long-term repercussions of COVID-19 and broader economic shocks, AI provides advanced capabilities, allowing for smarter financial decision-making, early risk detection, better access to financing, and increased operational efficiency (Drydakis, 2022). The advantages of AI adoption necessary for economic resilience are presented in *Table 1*.

Table 1. Benefits of SME AI Adoption for Economic Resilience

Benefit	Description	Impact on Economic Resilience	References
Operational efficiency	AI automates tedious processes, optimizes resource allocation, and streamlines inventory and logistics management.	Reduces operational expenses, boosts productivity, and improves profitability.	Thenmozhi & Krisknakumari (2024); Boussalham & Ejjami (2024).
Improved financial decision-making	AI-powered predictive modelling uses historical and real-time financial data to inform budgeting, forecasting, and investing decisions.	Enables data-driven, proactive financial solutions to decrease uncertainty and improve outcomes.	Adelakun, (2023); Avickson et al., (2024).
Improved access to capital and investment planning	AI-powered credit assessment and financial profiles leverage a variety of data sources to improve loan eligibility and capital allocation.	Increases funding opportunities and promotes educated investing strategies.	Zhu et al., (2024); Umeaduma & Adedapo I, (2025).

Early risk detection and mitigation	AI systems monitor operational and external data to detect financial abnormalities, market hazards, and supply chain weaknesses.	Allows SMEs to foresee disturbances and respond quickly.	Islam T. et al., (2024); Balan et al., (2025)

VI. FUTURE DIRECTIONS

As AI advances, its future applications in improving financial resilience for SMEs are expected to become increasingly advanced and context-aware. Emerging approaches, including deep reinforcement learning and explainable AI (XAI), are poised to revolutionize financial forecasting, risk management, and business optimization in the SME sector (Černevičienė & Kabašinskas 2024). Deep reinforcement learning, for example, can simulate and adapt to complex economic settings, allowing financial strategies to evolve dynamically in response to changing inputs such as interest rate fluctuations, inflationary pressures, or alterations in consumer demand. These techniques go beyond static forecasting to allow self-optimizing models to constantly update their strategy for the best financial outcomes (Zhong et al., 2024). Therefore, these next-generation AI techniques increase SMEs' access to modern financial tools, while enabling more transparent, ethical, and flexible financial institutions in an era of uncertainty and digital acceleration.

The future of SME resilience is inextricably linked to the larger evolution of a resilient digital financial ecosystem, with AI serving as the foundation for interconnected, intelligent, and inclusive financial services. This ecosystem proposes the seamless integration of AI-powered platforms, digital payment infrastructures, alternative finance instruments, and policy frameworks to assist SMEs' agility and stability (Nwoke, 2024). In such an environment, digital financial services would not be siloed or limited to large corporations, but would be integrated into SMEs' daily operations, allowing them to access real-time credit, manage risk portfolios, engage with fintech platforms, and participate in global markets irrespective of size or location (Omowole et al., 2024).

Ultimately, developing this ecosystem necessitates coordination among governments, financial institutions, technology providers, and SMEs. Regulatory sandboxes, open banking frameworks, and digital public infrastructure (national digital IDs, e-invoicing systems) can foster innovation while ensuring financial integrity. AI-powered financial literacy tools can democratize understanding and assist SMEs in making informed decisions without having extensive technical knowledge (Vijayagopal et al., 2024). Importantly, this ecosystem must be inclusive, ensuring that marginalized and digitally underserved SMEs do not miss out on the benefits of greater resilience through AI. Investment in digital infrastructure, skill building, and localized technology adoption strategies will be critical to ensure that all SMEs can play a meaningful role in the future financial system.

VII. CONCLUSION

The COVID-19 pandemic indicated basic vulnerabilities in the United States SME sector, emphasizing the critical need for more adaptable, forward-thinking, and data-driven approaches to financial resilience. Following major disruptions, many SMEs faced not just operational shutdowns and declining revenues, but also limited access to funding, supply chain instability, and changing consumer behaviours.

The capacity of AI to process large and complicated data sets in real-time, predict future financial situations, and deliver actionable insights provides SMEs a level of strategic foresight that conventional approaches may not offer. From precise cash flow forecasting and demand prediction to improved credit risk assessments and operational efficiency, AI enables SMEs to anticipate issues, optimize resources, and make informed decisions. Furthermore, emerging AI approaches like as deep learning and explainable AI have the potential to further democratize access to advanced financial tools, closing the digital gap and lowering obstacles to innovation for resource-constrained businesses.

REFERENCES

[1]. Adelakun, B. (2023). AI-driven Financial Forecasting: Innovations and Implications for Accounting Practices. ResearchGate; Fair East Publishers. https://www.researchgate.net/publication/381465681_AI-driven_financial_forecasting_innovations_and_implications_for_accounting_practices

[2]. Adeyelu O. O., Ugochukwu C. E., & Shonibare M. (2024). The Impact of Artificial Intelligence on Accounting Practices: Advancements, Challenges, and Opportunities. ResearchGate; Fair East Publishers. https://www.researchgate.net/publication/379921141_the_impact_of_artificial_intelligence_on_accounting_practices_advancements_challenges_and_opportunities

[3]. Adeyeri, T. B. (2024). Economic Impacts of AI-Driven Automation in Financial Services. *Valley International Journal Digital Library*, *12*(7), 6779–6791. https://doi.org/10.18535/ijsrm/v12i07.em07

[4]. Akanfe, O., Bhatt, P., & Lawong, D. A. (2025). Technology Advancements Shaping the Financial Inclusion Landscape: Present Interventions, Emergence of Artificial Intelligence and Future Directions. *Information Systems Frontiers*. https://doi.org/10.1007/s10796-025-10597-z

[5]. Alonge, E. O., Nsisong, L., Eyo-Udo, Ubanadu B. C., & Ogunsola K. O. (2023). The Role of Predictive Analytics in Enhancing Customer Experience and Retention. *The Role of Predictive Analytics in Enhancing Customer Experience and Retention*. https://www.researchgate.net/publication/390111346 _The_Role_of_Predictive_Analytics_in_Enhancing_ Customer_Experience_and_Retention

[6]. Avickson, E. K., Nyonyoh, N., & Ampaw-Asiedu, D. (2024). Financial Forecasting and Planning: Predictive Models that Support Agile Financial Planning by Adjusting Forecasts Based on Emerging Trends and Macroeconomic Factors. *International Journal of Research Publication and Reviews*, *5*(11), 301–319. https://doi.org/10.55248/gengpi.5.1124.3115

[7]. Bak, O., Shaw, S., Colicchia, C., & Kumar, V. (2020). A Systematic Literature Review of Supply Chain Resilience in Small–Medium Enterprises (SMEs): A Call for Further Research. *IEEE Transactions on Engineering Management*, *70*(1), 1–14.

[8]. Balan, G. S., Kumar, V. S., & Raj, S. A. (2025). Machine learning and artificial intelligence methods and applications for post-crisis supply chain resiliency and recovery. *Supply Chain Analytics*, *10*, 100121. https://doi.org/10.1016/j.sca.2025.100121

[9]. Belitski, M., Guenther, C., Kritikos, A. S., & Thurik, R. (2021). Economic effects of the COVID-19 pandemic on entrepreneurship and small businesses. *Small Business Economics*, *58*(14630), 593–609. https://doi.org/10.1007/s11187-021-00544-y

[10]. Biyela N. Y., & Utete R. (2024). Agenda for future business resilience and survival avenues in crisis times: A systematic literature review of the effects of COVID-19 on SMEs' productivity in South Africa. *Social Sciences & Humanities Open*, *10*, 100982–100982. https://doi.org/10.1016/j.ssaho.2024.100982

[11]. Boussalham, K., & Ejjami, R. (2024). Optimizing In-Store Logistics: How AI Enhances Inventory Management and Space Utilization. *Journal of Next-Generation Research 5.0 (JNGR 5.0)*, *1*(1). https://doi.org/10.70792/jngr5.0.v1i1.10

[12]. Carayannis, E. G., Dumitrescu, R., Falkowski, T., Papamichail, G., & Zota, N. - R. (2025). Enhancing SME Resilience through Artificial Intelligence and Strategic Foresight: A Framework for Sustainable Competitiveness. *Technology in Society*, *81*, 102835. https://doi.org/10.1016/j.techsoc.2025.102835

[13]. Celestin, M., & Sujatha, S. (2024). Impact of Global Supply Chain Disruptions on Business Resilience: Strategies for Adapting to Pandemics and Geopolitical Conflicts. *Impact of Global Supply Chain Disruptions on Business Resilience: Strategies for Adapting to Pandemics and Geopolitical Conflicts*, *9*(2), 44–53. https://doi.org/10.5281/zenodo.13887198

[14]. Černevičienė J., & Kabašinskas A. (2024). Explainable artificial intelligence (XAI) in finance: a systematic literature review. *Artificial Intelligence Review*, *57*(8). https://doi.org/10.1007/s10462-024-10854-8

[15]. Das, D., Sarkar, A., & Debroy, A. (2022). Impact of COVID-19 on Changing Consumer Behaviour: Lessons from an Emerging Economy. *International Journal of Consumer Studies*, *46*(3), 692–715. wiley. https://doi.org/10.1111/ijcs.12786

[16]. Drydakis, N. (2022). Artificial Intelligence and Reduced SMEs' Business Risks. A Dynamic Capabilities Analysis During the COVID-19 Pandemic. *Information Systems Frontiers*, *24*. springer. https://doi.org/10.1007/s10796-022-10249-6

[17]. Faisal, R., Amekudzi, C. S., Kamran, S., Fonkem, B., & Martins Awofadeju. (2023). The Impact of Digital Transformation on Small and Medium Enterprises (SMEs) in the USA: Opportunities and Challenges. *IRE Journals*, *7*(6). https://www.researchgate.net/publication/387722419 _The_Impact_of_Digital_Transformation_on_Small_ and_Medium_Enterprises_SMEs_in_the_USA_Oppo rtunities_and_Challenges

[18]. Gregurec, I., Tomičić Furjan, M., & Tomičić-Pupek, K. (2021). The Impact of COVID-19 on Sustainable Business Models in SMEs. *Sustainability*, *13*(3), 1098. https://doi.org/10.3390/su13031098

[19]. Guo, Y., Liu, F., Song, J.-S., & Wang, S. (2024). Supply Chain Resilience: a Review from the Inventory Management Perspective. *Fundamental Research*, *5*(2), 1–14. https://doi.org/10.1016/j.fmre.2024.08.002

[20]. Hossain, M. R., Akhter, F., & Sultana, M. M. (2022). SMEs in Covid-19 Crisis and Combating strategies: a Systematic Literature Review (SLR) and a Case from Emerging Economy. *Operations Research Perspectives*, *9*, 100222. ScienceDirect. https://doi.org/10.1016/j.orp.2022.100222

[21]. Humphries, J. E., Neilson, C. A., & Ulyssea, G. (2020). Information frictions and access to the Paycheck Protection Program. *Journal of Public Economics*, *190*, 104244. https://doi.org/10.1016/j.jpubeco.2020.104244

[22]. Hussain, K. (2023). *Harnessing AI for Predictive Accuracy in Financial Forecasting and Risk Assessment*. https://doi.org/10.13140/RG.2.2.17070.73281

[23]. Islam T., Islam, M., Sarkar A., Rahman, O., Paul R., & Bari, S. (2024). Artificial Intelligence in Fraud Detection and Financial Risk Mitigation: Future Directions and Business Applications. *International Journal for Multidisciplinary Research*, *6*(5). https://doi.org/10.36948/ijfmr.2024.v06i05.28496

[24]. Joni, R., & Graepel, T. (2024). *Predictive analytics and AI: Driving the next wave of risk management in financial services*. ResearchGate. https://doi.org/10.13140/RG.2.2.16499.75041

[25]. Modina, M., Pietrovito, F., Gallucci, C., & Formisano, V. (2023). Predicting SMEs' default risk: Evidence from bank-firm relationship data. *The Quarterly Review of Economics and Finance*, *89*, 254–268. https://doi.org/10.1016/j.qref.2023.04.008

[26]. Nayak, S. (2022). LEVERAGING NATURAL LANGUAGE PROCESSING (NLP) AND MACHINE LEARNING FOR SENTIMENT ANALYSIS IN FINTECH: ENHANCING CUSTOMER INSIGHTS AND DECISION-MAKING. *International Journal of Applied Engineering and Technology (London)*, *4*(3), 242–260. https://www.researchgate.net/publication/387183296 _LEVERAGING_NATURAL_LANGUAGE_PROC ESSING_NLP_AND_MACHINE_LEARNING_FO R_SENTIMENT_ANALYSIS_IN_FINTECH_ENH ANCING_CUSTOMER_INSIGHTS_AND_DECISI ON-MAKING

[27]. Nwaimo, C. S., Adegbola, A. E., & Adegbola, M. D. (2024). Predictive analytics for financial inclusion: Using machine learning to improve credit access for under banked populations. *Computer Science & IT Research Journal*, *5*(6), 1358–1373. https://doi.org/10.51594/csitrj.v5i6.1201

[28]. Nwoke, J. (2024). Digital Transformation in Financial Services and FinTech: Trends, Innovations and Emerging Technologies. *International Journal of Finance*, *9*(6), 1–24. https://doi.org/10.47941/ijf.2224

[29]. Okeke, N. I., Bakare, O. A., & Achumie, G. O. (2024a). Artificial Intelligence in SME financial decision-making: Tools for enhancing efficiency and profitability. *Open Access Research Journal of Multidisciplinary Studies*, *8*(1), 150–163. https://doi.org/10.53022/oarjms.2024.8.1.0056

[30]. Okeke, N. I., Bakare, O. A., & Achumie, G. O. (2024b). Forecasting financial stability in SMEs: A comprehensive analysis of strategic budgeting and revenue management. *Open Access Research Journal of Multidisciplinary Studies*, *8*(1), 139–149. https://doi.org/10.53022/oarjms.2024.8.1.0055

[31]. Omowole, B. M., Urefe, O., Mokogwu, C., & Ewim, S. E. (2024). Integrating fintech and innovation in microfinance: Transforming credit accessibility for small businesses. *International Journal of Frontline Research and Reviews*, *3*(1), 090-100. https://doi.org/10.56355/ijfrr.2024.3.1.0032

[32]. Oni, S. B. (2025). *Machine Learning Models for Predictive Financial Analysis in SMEs*. Researchgate.net. https://www.researchgate.net/publication/391837095 _Machine_Learning_Models_for_Predictive_Financi al_Analysis_in_SMEs

[33]. Pellegrino, A., & Abe, M. (2022). Digital financing for SMEs' recovery in the post-COVID era: A bibliometric review. *Frontiers in Sustainable Cities*, *4*. https://doi.org/10.3389/frsc.2022.978818

[34]. Rakibul, M., Faraji, M. R., Rashid, M., Bhuyan, M. K., Hossain, R., & Ghose, P. (2024). Digital Transformation in SMEs Emerging Technological Tools and Technologies for Enhancing the SME's

Strategies and Outcomes. *Journal of Ecohumanism*, *3*(4), 211–224. https://doi.org/10.62754/joe.v3i4.3594

[35]. Saad, M. H., Hagelaar, G., van der Velde, G., & Omta, S. W. F. (2021). Conceptualization of SMEs' business resilience: A systematic literature review. *Cogent Business & Management*, *8*(1), 1938347. https://doi.org/10.1080/23311975.2021.1938347

[36]. Satpathy, A. S., Sahoo, S. K., Mohanty, A., & Mohanty, P. P. (2024). Strategies for enhancements of MSME resilience and sustainability in the post-COVID-19 era. *Social Sciences & Humanities Open*, *11*, 101223. https://doi.org/10.1016/j.ssaho.2024.101223

[37]. Schönberger M. (2023). *Artificial Intelligence for Small and Medium-sized Enterprises: Identifying Key Applications and Challenges*. ResearchGate; RISEBA University. https://www.researchgate.net/publication/376409456 _Artificial_Intelligence_for_Small_and_Medium-sized_Enterprises_Identifying_Key_Applications_an d_Challenges

[38]. Shafi, M., Liu, J., & Ren, W. (2020). Impact of COVID-19 Pandemic on Micro, Small, and Medium-Sized Enterprises Operating in Pakistan. *Research in Globalization*, *2*(1), 100018. https://doi.org/10.1016/j.resglo.2020.100018

[39]. Sharabati, A.-A. A., Ali, A., Allahham, M. I., Hussein, A. A., Alheet, A. F., & Mohammad, A. S. (2024). The Impact of Digital Marketing on the Performance of SMEs: An Analytical Study in Light of Modern Digital Transformations. *Sustainability*, *16*(19), 8667–8667. MDPI. https://doi.org/10.3390/su16198667

[40]. Sjödin, D., Parida, V., Palmié, M., & Wincent, J. (2021). How AI capabilities enable business model innovation: Scaling AI through co-evolutionary processes and feedback loops. *Journal of Business Research*, *134*(1), 574–587. https://doi.org/10.1016/j.jbusres.2021.05.009

[41]. Smith, H. K. (2024). *The Impact of COVID-19 on Supply Chain Innovation and SME Performance*. https://www.researchgate.net/publication/383947651 _The_Impact_of_COVID-19_on_Supply_Chain_Innovation_and_SME_Perfor mance

[42]. Soori, M., Arezoo, B., & Dastres, R. (2023). Artificial Intelligence, Machine Learning and Deep Learning in Advanced Robotics, A Review. *Cognitive Robotics*, *3*(1), 54–70. sciencedirect. https://doi.org/10.1016/j.cogr.2023.04.001

[43]. Sophie, E. R. (2025a). *Leveraging AI for cash flow management in SMEs*. https://www.researchgate.net/publication/392067014 _Leveraging_AI_for_cash_flow_management_in_S MEs

[44]. Sophie, E. R. (2025b). *"Risk Assessment and Mitigation in SME Budgeting through AI."* https://www.researchgate.net/publication/391851861 _Risk_Assessment_and_Mitigation_in_SME_Budget ing_through_AI

[45]. Surya, B., Menne, F., Sabhan, H., Suriani, S., Abubakar, H., & Idris, M. (2021). Economic Growth, Increasing Productivity of SMEs, and Open Innovation. *Journal of Open Innovation: Technology, Market, and Complexity*, *7*(1), 20. MDPI. https://doi.org/10.3390/joitmc7010020

[46]. Thenmozhi V., & Krisknakumari S. (2024). Artificial Intelligence in Enhancing Operational Efficiency in Logistics and SCM. *International Journal of Scientific Research in Science and Technology*, *11*(5), 316–323. https://doi.org/10.32628/ijsrst24115107

[47]. Ugbebor, F. O., Adeteye, D. A., & Ugbebor, J. O. (2024). PREDICTIVE ANALYTICS MODELS FOR SMES TO FORECAST MARKET TRENDS, CUSTOMER BEHAVIOR, AND POTENTIAL BUSINESS RISKS. *Journal of Knowledge Learning and Science Technology ISSN: 2959-6386 (Online)*, *3*(3), 355–381. https://doi.org/10.60087/jklst.v3.n3.p355-381

[48]. Umeaduma, C. M.-G., & Adedapo I, A. (2025). AI-powered credit scoring models: Ethical considerations, bias reduction, and financial inclusion strategies. *International Journal of Research Publication and Reviews*, *6*(3), 6647–6661. https://doi.org/10.55248/gengpi.6.0325.12106

[49]. Vijayagopal, P., Jain, B., & Viswanathan, S. A. (2024). Regulations and Fintech: A Comparative Study of the Developed and Developing Countries. *Journal of Risk and Financial Management*, *17*(8), 324–324. https://doi.org/10.3390/jrfm17080324

[50]. Wiatt, R., Marshall, M. I., Haynes, G., & Lee, Y. G. (2024). In the depths of despair: Lost income and recovery for small businesses during COVID-19. *International Journal of Disaster Risk Reduction*, *101*, 104251. https://doi.org/10.1016/j.ijdrr.2024.104251

[51]. World Bank. (2021). *Small and Medium Enterprises (SMEs) Finance*. World Bank; www.worldbank.org. https://www.worldbank.org/en/topic/smefinance

[52]. Zhong, X., Wei, J., Li, S., & Xu, Q. (2024). Deep reinforcement learning for dynamic strategy interchange in financial markets. *Applied Intelligence*, *55*(1). https://doi.org/10.1007/s10489-024-05965-2

[53]. Zhu, H., Vigren, O., & Söderberg, I.-L. (2024). Implementing artificial intelligence empowered financial advisory services: A literature review and critical research agenda. *Journal of Business Research*, *174*. https://doi.org/10.1016/j.jbusres.2023.114494