AI for Economic Inclusion: Empowering Underserved SMEs Through Intelligent Systems

NKEMDIRIM MBAH

Oxford Brookes University.

Abstract- **This paper examines the transformative role of artificial intelligence (AI) in addressing systemic barriers faced by underserved small and medium-sized enterprises (SMEs), particularly those owned by women, minorities, and businesses in rural areas. Through an in-depth review of academic literature, policy frameworks, and case studies, the study highlights how AI-driven tools such as chatbots, predictive analytics, AI-enabled financial planning platforms, and Natural Language Processing (NLP) technologies are democratizing access to critical business resources and fostering equitable economic participation. The findings reveal AI's potential to enhance SME competitiveness by improving operational efficiency, financial decision-making, and customer engagement, while also identifying persistent challenges related to AI bias, data privacy, digital literacy gaps, and onboarding costs. The paper is structured to first explore academic perspectives on economic inclusion and AI's application in business, followed by an analysis of digital transformation trends within SME ecosystems. Subsequent sections examine the barriers impeding SME innovation, AI-driven solutions addressing these challenges, and the broader economic impacts of AI empowerment. The study concludes with policy recommendations and strategic pathways to ensure inclusive AI adoption, emphasizing the need for sustained ecosystem support and collaborative public-private initiatives. The anticipated implications for economic policy and innovation ecosystems are profound. AI has the capacity to bridge opportunity gaps, fuel SME-led economic revitalization, and align with broader goals of equity and resilience. However, achieving these outcomes requires intentional policy design, ethical AI deployment principles, and targeted capacity-building efforts to ensure no business is left behind in the digital economy.**

I. INTRODUCTION

Small and medium-sized enterprises (SMEs) form the bedrock of the U.S. economy, accounting for 99.9% of all businesses, 99.7% of firms with paid employees, and 97.4% of exporting enterprises (Liberto, 2025). The U.S. Chamber of Commerce (2024) reports that these 33.2 million small businesses employ nearly half of the American workforce and contribute 43.5% of the nation's GDP, cementing their role as indispensable drivers of economic activity. SMEs not only act as vital feeders into larger corporate ecosystems but also enable entrepreneurship, regional economic diversity, and innovation. Their inherent agility and adaptability make them central to building resilient local economies (Oluwatosin et al., 2024).

In underserved and marginalized communities, SMEs frequently represent the primary path to economic participation and upward mobility. Beyond their macroeconomic significance, small enterprises serve as cultural and economic anchors in regions where large commercial institutions are sparse, providing essential services and opportunities that shape local livelihoods (Alabi, 2025). However, these enterprises often operate within an environment riddled with systemic barriers, curtailing their access to critical business resources, strategic data, and modern digital tools necessary for sustainable growth.

Structural challenges such as rising inflation, talent shortages, and digital skill gaps continue to stifle SME innovation and competitiveness. In a 2023 survey, the Association of Chartered Certified

Accountants (ACCA) identified inflation and workforce development constraints as primary concerns hampering SME growth trajectories. Compounding these issues, fluctuations in the financing landscape have introduced new pressures. Notably, after a surge in equity investments in 2021, a sharp decline followed in 2022, disproportionately impacting women-led and minority-owned businesses, which already face entrenched barriers to venture capital access (OECD, 2024).

Financial planning inefficiencies, lack of market intelligence, and the prohibitive cost of professional consultancy services further exacerbate these disparities. Nkwinika and Akinola (2023) emphasize that comprehensive financial management, encompassing cash flow control, credit accessibility, and risk mitigation is essential for SME growth and competitiveness. However, many small enterprises lack the internal capacity to develop and execute these strategies effectively. SMEs often struggle with high implementation costs, limited in-house digital expertise, and increasing cybersecurity risks, making the alignment of technology adoption with business objectives a complex undertaking (Pascal et al., 2025).

Amidst these multifaceted challenges, artificial intelligence (AI) technologies are becoming transformative equalizers. AI-powered solutions democratize access to sophisticated business intelligence by automating resource-intensive tasks, enhancing decision-making precision, and delivering predictive analytics previously reserved for large corporations with significant data infrastructures (Badmus et al., 2024; Rane et al., 2024). This is achieved by breaking down the barriers to advanced financial planning, customer insights, and real-time market analytics where AI empowers underserved SMEs to operate with greater strategic clarity, agility, and resilience (Angle, 2024).

This paper investigates how AI-driven solutions can empower minority-owned, rural, and underserved SMEs by addressing gaps in market access, operational efficiency, and strategic decision-making. It will explore scalable AI tools and platforms intentionally designed to foster inclusion, supplemented by case studies where AI adoption has driven job creation and improve local economic resilience. The paper is structured to critically review existing literature on structural challenges facing SMEs in the digital economy, dig deep into AI applications designed to SME needs, presents case studies illustrating AI-enabled economic inclusion, and concludes with strategic policy recommendations and identifies areas for future research.

II. LITERATURE REVIEW

Academic Perspectives on Economic Inclusion, AI in Business, and SME Competitiveness
The discourse on economic inclusion has consistently emphasized the pivotal role of small and medium-sized enterprises (SMEs) in fostering equitable economic participation and sustainable development. Elpisah (2023) argues that inclusive growth is significantly bolstered when SMEs engage in community-centered practices, such as corporate social responsibility (CSR) initiatives and multi-stakeholder collaborations, provided these efforts are supported by robust leadership and institutional frameworks. However, SMEs often grapple with resource limitations and regulatory complexities that hinder their capacity to fully realize these inclusive ambitions.

One of the critical dimensions of SME-driven inclusion lies in accessibility. Ewim et al. (2024) highlight that SMEs possess the unique potential to design inclusive digital platforms, optimized for mobile devices and localized in native languages that address diverse literacy levels and foster broader engagement among underserved and marginalized customer bases. In regions where large corporations maintain minimal presence, SMEs thus act as vital conduits for inclusive economic growth, delivering essential services and creating employment opportunities within their immediate communities (OECD, 2024). Nevertheless, SMEs owned by minorities, women, and entrepreneurs in rural settings continue to face systemic barriers related to capital access, digital infrastructure, and strategic resource availability, perpetuating structural economic disparities.

In parallel, the field of business technology has extensively explored the transformative impact of

artificial intelligence (AI) on organizational performance. Eboigbe et al. (2023) document a significant shift from traditional data processing methods to AI-driven predictive analytics, enhancing both the efficiency and insightfulness of business intelligence systems. This evolution has fundamentally reshaped decision-making processes across industries. Aiden and Michael (2024) further contend that AI acts as a disruptive force, enabling firms to streamline workflows, reduce operational costs, and enhance decision-making quality through technologies like machine learning, intelligent automation, and advanced analytics. Muhammad et al. (2024) reinforce this narrative, asserting that AI adoption augments decision-making accuracy and timeliness, and also cultivates a culture of innovation, creativity, and experimentation within organizations. However, despite the expanding body of literature on AI's enterprise-scale applications, a disproportionate share of academic inquiry remains focused on large corporations, with limited scholarly attention directed towards AI's potential in enhancing SME competitiveness, particularly within underserved or resource-constrained contexts.

Recent studies are beginning to address this research gap. Okeke et al. (2024a) illustrate how AI-driven accounting tools are revolutionizing SME operations by automating core financial functions, including real-time cash flow forecasting, dynamic pricing, and customer analytics. These tools empower SMEs to improve operational efficiency, enhance profitability, and strengthen strategic decision-making. Similarly, Badmus et al. (2024) and Rane et al. (2024) emphasize how AI-powered financial planning platforms democratize access to sophisticated budgeting, forecasting, and credit assessment tools, lowering traditional entry barriers that have historically excluded small businesses from leveraging advanced financial strategies.

This perspective was highlighted in a publication by Smith (2025), noting that AI technologies enable SMEs to compete at scale, elevating customer service, marketing precision, and operational efficiency to levels comparable with larger enterprises. This technological leverage allows even lean teams to achieve sophisticated outcomes, fostering competitiveness despite resource constraints. Iyelolu et al. (2024) further argue that AI applications such as machine learning, natural language processing (NLP), and predictive analytics, hold transformative potential for SME customer relationship management (CRM) by facilitating personalization and automation, However, they caution that for these technologies to yield sustainable CRM improvements, SMEs must adopt them strategically, ensuring alignment with their unique operational goals and scalability considerations. Despite growing recognition of AI's potential, academic literature often neglects its democratizing impact on resource-constrained SMEs, focusing instead on tech-savvy firms and broad adoption models, highlighting the urgent need for inclusive, context-aware research that explores AI as a catalyst for equitable SME growth.

Digital Transformation Trends in Small Business Ecosystems

The digital transformation of small and medium-sized enterprises (SMEs) has notably accelerated in the COVID-altered global environment, with technologies such as cloud computing, e-commerce platforms, and AI-driven automation reshaping the dynamics of small business ecosystems. The Future of Business Survey by the Organization for Economic Co-operation Development (OECD), Facebook, and the World Bank (OECD, 2021) revealed that 25% to 62% of SMEs with Facebook pages across OECD countries enhanced their digital business processes in 2020. Digital technologies proved essential for sustaining operations, enabling SMEs to continue delivering products and services amidst widespread disruptions caused by the COVID-19 pandemic.

However, digital adoption among SMEs has been far from uniform. Adelheid and Ruth (2024) observed that while the pandemic acted as a catalyst for technology adoption, significant disparities emerged in the type and depth of digital tools deployed. Many SMEs embraced basic technologies such as social media marketing and cloud storage whereas adoption of advanced digital solutions including AI-driven analytics and intelligent automation, remained limited. Sectoral differences were also prominent; service-oriented SMEs were generally quicker to integrate digital platforms compared to their

manufacturing counterparts, largely due to operational flexibility and lower capital requirements. Despite the recognized benefits of digital transformation, pervasive barriers continue to hinder many SMEs, particularly those owned by minorities, women, or those located in rural areas.

Faisal et al. (2023) and Sousso (2024) underline the persistent lack of access to affordable financing and high-quality digital infrastructure as critical impediments, significantly restricting SMEs' ability to participate fully in the digital economy. This infrastructure gap widens the digital divide, limiting not only business scalability but also the capacity for underserved SMEs to engage with emerging markets. Pascal et al. (2025) further emphasize that while digital transformation yields substantial efficiency gains, the journey toward digital maturity remains challenging for smaller enterprises. High costs and the absence of tailored digital solutions often discourage small business owners from embracing comprehensive digital strategies, as generic platforms fail to align with the unique operational needs of micro and small enterprises.

Aliyev (2025) asserts that while digital transformation is critical for enhancing SME innovation, productivity, and customer engagement, smaller firms continue to lag behind larger corporations in adopting advanced technologies. This lag is attributed not only to resource constraints but also to limited digital competencies and structural challenges that impede technological scalability within smaller operational frameworks.

The situation is even more acute in rural and economically marginalized regions. Jonathan et al. (2022) and Beatriz et al. (2024) highlight that SMEs in these locales often face compounded barriers including inadequate broadband infrastructure, restricted access to digital tools, and low levels of digital literacy. These challenges significantly curtail the ability of rural SMEs to harness technology-driven economic opportunities, further entrenching regional inequalities in business competitiveness and growth potential.

Gaps in Existing Scholarship on AI's Impact on Economically Disadvantaged SMEs

While extensive literature highlights AI's macroeconomic advantages, there remains a notable lack of focused analysis on its specific effects within economically disadvantaged SMEs. Most existing research either generalizes SME challenges or focuses on sectors with higher technology readiness. There is a noticeable gap of empirical studies examining how AI tools can be designed to address the unique operational constraints of minority-owned, rural, or women-led small businesses. Also, current scholarship often overlooks the socio-economic challenges that shape digital inclusion outcomes. Studies by Oluwatosin et al. (2024), Ayinaddis (2025) and Zavodna et al. (2024) highlight that underserved SMEs face compounded challenges, including poor infrastructure, unreliable utilities, and limited internet access, that restrict productivity and market expansion, while access to finance, technology, and informal funding mechanisms critically shape their ability to adopt AI solutions. The interplay between AI deployment and structural inequalities like limited access to affordable financing, advisory support, and market networks, has received insufficient scholarly attention, highlighting a significant gap in existing research.

Policy Initiatives and Digital Inclusion Frameworks
On the policy front, multiple initiatives have been launched to bridge the digital divide and ensuew greater inclusion for small and medium-sized enterprises (SMEs), particularly those owned by minorities and operating in underserved regions. A notable example is the Small Business Digital Alliance (SBDA), established in 2022 through a co-sponsorship between the U.S. Small Business Administration (SBA) and Business Forward, Inc. The SBDA is designed to equip minority-owned SMEs with access to free digital tools, AI-driven solutions, and virtual training programs, aimed at enhancing online visibility, improving customer engagement, and streamlining overall business operations (U.S. Small Business Administration, 2023). Though democratizing access to these digital resources, the SBDA represents a key step in addressing the resource and capacity gaps that hinder SME participation in the digital economy.
Another critical policy intervention is the Infrastructure Investment and Jobs Act (IIJA, 2024), which allocates substantial funding to expand

broadband infrastructure, particularly in sectors such as rail transport, which play a pivotal role in regional economic connectivity. The act includes provisions for grants supporting small enterprises, positioning broadband access as a foundational enabler for digital participation (Federal Railroad Administration, 2025). These infrastructure investments are essential in mitigating the access disparities that disproportionately affect rural and minority-owned SMEs.

The significance of digital tools in enhancing SME performance is corroborated by findings from an OECD (2024) survey, where SMEs linked digital adoption to increased profitability through higher domestic sales (47%), broader customer reach (41%), and improved productivity through automation (40%). However, while the potential of digitalization is widely acknowledged, Heston (2025) cautions that the ability of SMEs to adopt and benefit from emerging technologies remains highly contingent on regional disparities in infrastructure, skills, and policy support. He emphasizes the need for localized digital inclusion strategies, robust innovation ecosystems, and cross-sector collaboration to ensure that SMEs across diverse regions can compete effectively in the digital economy.

Inclusive digital transformation frameworks advocate for scalable and accessible AI tools designed to align with the operational realities of SMEs. However, persistent implementation gaps, inefficient resource allocation, and limited stakeholder engagement continue to hinder the effective translation of policy initiatives into tangible SME-level outcomes. Hussain and Rizwan (2024) propose a structured data governance framework to address these gaps, focusing on enhancing data quality, streamlining operational processes, and mitigating key barriers to AI adoption in SMEs. Their framework addresses core challenges, including cost constraints, technical skill gaps, and employee acceptance, positioning it as a strategic model for scalable AI integration in resource-constrained business environments. Also, ensuring a collaborative ecosystem that brings together AI technology providers, financial institutions, policymakers, and SME advocacy groups is important for co-developing AI solutions that are tailored to the nuanced needs of economically disadvantaged businesses (Heston, 2025). Such collaborative models not only facilitate more targeted innovation but also ensure that policy interventions are grounded in the lived experiences and operational challenges of SMEs. A collaborative ecosystem involving AI technology providers, financial institutions, and SME advocacy groups enables the co-development of AI solutions specifically designed to meet the needs of economically disadvantaged businesses.

III. BARRIERS TO SME INNOVATION AND GROWTH

Underserved small and medium-sized enterprises (SMEs) continue to face entrenched structural barriers that hinder their capacity to innovate, scale, and compete effectively in the digital economy. A persistent challenge is their limited access to actionable data and financial insights, which are critical for informed strategic decision-making. Unlike large enterprises that can leverage dedicated analytics teams and sophisticated business intelligence platforms, most underserved SMEs lack the resources and technical capacity to collect, analyze, and interpret data-driven insights essential for market competitiveness (Okeke et al., 2024a; Okeke et al., 2024b).

Inadequate customer analytics further compounds this disadvantage. In an era where personalized customer engagement and data-driven marketing are key competitive differentiators, SMEs often struggle with the high costs and complexities associated with customer relationship management (CRM) systems, predictive analytics, and behavioral tracking tools. Noor and Gabriel (2024) note that SMEs grapple with making informed decisions amidst volatile market conditions and rapidly shifting customer preferences. Consequently, these enterprises remain at a competitive disadvantage in understanding and anticipating customer needs, limiting their ability to optimize service delivery and ensure customer loyalty (Iyelolu et al., 2024).

The high cost of advanced business software, including enterprise-level AI platforms, financial planning systems, and automation tools, poses a significant challenge due to prohibitive licensing

fees, ongoing maintenance costs, and intensive training demands (Ugwu et al., 2024). For SMEs with limited resources, particularly those operating in underserved or low-income areas, these costs are often insurmountable, leaving them reliant on manual workflows or budget-constrained tools that lack robust functionalities (Pascal et al., 2025).

Inadequate digital infrastructure, such as limited broadband access, unstable connectivity, and obsolete hardware, remains a significant contributor to the digital divide, especially in rural and economically disadvantaged regions (Ugwu et al., 2024). Jonathan et al. (2022) and Beatriz et al. (2024) emphasize that the absence of foundational infrastructure renders the adoption of advanced digital tools impractical, thereby deepening the marginalization of SMEs in these areas and excluding them from the broader benefits of the digital economy.

Women-owned, minority-owned, and rural businesses disproportionately bear the brunt of systemic barriers, including limited access to venture capital, entrenched biases, and restricted market networks, which perpetuate their exclusion from mainstream economic opportunities (OECD, 2024). Structural inequities within traditional financing systems and supply chain dynamics reinforce this cycle, systematically depriving these enterprises of the resources required to scale, innovate, and compete effectively.

Moreover, policy and market failures further entrench these challenges. Many digital inclusion initiatives fail to address the specific operational realities of micro and underserved SMEs, focusing instead on broad policy frameworks that lack localized nuance. Keelson et al. (2024) identify a positive correlation between product innovation and SME performance, highlighting the need for targeted investments in entrepreneurship education, innovation management, and technical skill development to strengthen human capital and enhance competitiveness. Additionally, inefficient resource allocation, fragmented stakeholder engagement, and the absence of robust data governance frameworks hinder the effective implementation of inclusion strategies (Heston, 2025; Hussain & Rizwan, 2024). These systemic failures deepen the digital divide, perpetuating inequalities in

technology access, business growth, and economic participation.

IV. AI-DRIVEN SOLUTIONS FOR ECONOMIC INCLUSION

Chatbots for Customer Service Automation
AI-powered chatbots have transformed customer service dynamics by enabling SMEs to provide 24/7 automated support, efficiently manage high volumes of customer inquiries, and deliver consistent, personalized interactions (Brown et al., 2024; Dhruv & Sunny, 2025). Uzoka et al. (2024) demonstrate that modern chatbots, leveraging advancements in natural language processing (NLP) and machine learning (ML), now handle up to 70% of routine customer inquiries with increasing accuracy, thereby freeing human agents to focus on complex and high-value tasks. These intelligent assistants are designed to engage customers in natural, conversational language, managing tasks such as answering FAQs, guiding troubleshooting, providing product recommendations, and executing basic transactions seamlessly (Forbes, 2023). For SMEs operating with limited human resources, chatbots offer a critical solution for reducing operational strain while enhancing service responsiveness and customer experience.

Selamat and Windasari (2021) found that chatbot prototypes incorporating responsive action triggers, humanized dialogue flows, and personalized recommendations significantly enhance user perceptions of anthropomorphism, enjoyment, and usability among SME customers compared to standard, static chatbot designs. Furthermore, Panigrahi et al. (2023) highlight the rapid evolution of chatbot platforms, from basic FAQ-driven bots with simple API integrations to sophisticated systems like ChatGPT, Alexa, Einstein, Crosswise, Interact, and Genie, each offering varied levels of adaptive learning, connectivity, and functionality tailored to business needs. Empirical studies corroborate these benefits. Uzoka et al. (2024) report that SMEs deploying AI chatbots have observed measurable improvements in customer satisfaction and operational efficiency, notably reducing service response times. Dwi et al. (2024) further underscore that SMEs integrating AI-driven customer service

solutions experienced enhancements across supply chain management, financial operations, and customer support, resulting in reduced human errors, faster decision-making, and elevated customer satisfaction levels. Through their capacity to automate routine interactions while maintaining personalized engagement, AI chatbots are proving to be indispensable tools for SMEs seeking to scale customer service operations efficiently and competitively in resource-constrained environments.

Predictive Analytics for Cash Flow and Inventory Management

Predictive analytics has emerged as a transformative solution for SMEs grappling with persistent cash flow uncertainties and inventory inefficiencies. Alonge et al. (2024) demonstrate that predictive analytics models, capable of processing real-time data and uncovering hidden patterns, significantly enhance cash flow forecasting and contribute to financial optimization across diverse organizational contexts. By leveraging historical data, market trends, and customer purchasing habits, these AI-driven tools enable SMEs to predict cash flow fluctuations, streamline inventory management, and proactively address supply chain disruptions. Okeke et al. (2024a) emphasize that predictive analytics tools empower SMEs to proactively manage liquidity risks, thereby improving operational efficiency, profitability, and responsiveness to fluctuating market demands and evolving customer patterns. Routine automation of inventory tracking and cash flow monitoring not only prevents stockouts or overstocking but also enhances financial agility, enabling SMEs to adapt swiftly to market volatilities.

For underserved SMEs lacking access to professional financial consultants, AI-driven predictive insights provide a crucial competitive edge. Oni (2025) highlights how AI-powered analytics can reveal growth opportunities, such as identifying underserved customer segments, underperforming product lines, and untapped markets. These insights allow SMEs to develop targeted expansion strategies, positioning them for sustainable growth. Moreover, the intensifying competition among AI service providers is expected to drive down costs, thereby expanding access to advanced predictive tools for SMEs in developing and economically marginalized regions. Ugbebor et al. (2024) further underscore the strategic importance of predictive analytics in enabling SMEs to anticipate market trends, customer behaviors, and potential risks. Predictive analytics empowers resource-constrained SMEs with precise forecasting and strategic insights, boosting operational performance, customer loyalty, and long-term resilience through democratized access to advanced financial tools.

AI-Enabled Financial Planning Tools

AI-driven financial planning platforms democratize sophisticated financial management for SMEs by integrating budgeting, scenario modeling, credit risk assessments, and strategic resource allocation into accessible, user-friendly systems beyond traditional predictive analytics. According to Deloitte (2025), solutions like FinanceAI function as dynamic financial planning companions, seamlessly aggregating internal systems and external data sources to enhance strategic decision-making efficiency. By embedding AI into daily financial workflows, these platforms automate complex tasks like multi-scenario modeling, enabling SME leaders to make quicker, smarter decisions. AI-driven in accounting automating routine tasks, streamlining workflows, and delivering real-time insights that enhance financial reporting, auditing, tax compliance, and risk management through advanced data analysis, pattern detection, and anomaly identification (Eziefule et al., 2024).

Sophie (2025b) emphasizes how enterprise-grade forecasting, real-time analytics, and intelligent automation are now accessible through affordable, intuitive AI-driven financial planning platforms that integrate seamlessly with existing accounting systems. This convergence of AI with digital bookkeeping platforms reduces the technical learning curve for SMEs, enabling them to adopt advanced financial tools without the need for specialized expertise. Dunn (2025) highlights tools such as ForecastMaster Pro, GrowthPlan AI, and MarginMax AI as SME-centric solutions offering high forecast accuracy, seamless system integration, and easy-to-navigate interfaces. These platforms automate core financial functions including budgeting, profitability optimization, and credit risk assessments delivering actionable insights that enhance operational efficiency and strategic agility.

Crucially, AI-enabled financial planners assist SMEs in making data-driven investment decisions, managing debt portfolios, and exploring alternative financing opportunities (Badmus et al., 2024). This is particularly impactful for minority-owned, women-led, and rural SMEs that often face structural barriers to traditional financing. By leveraging AI-enhanced credit scoring and risk modeling, these enterprises can better position themselves for loans, grants, and investor engagement, closing gaps in financial inclusion.

AI-driven financial planning platforms act as strategic advisors for SMEs, adapting to market shifts while empowering even micro-businesses with scalable solutions for resilient, competitive growth. AI-powered tools simplify financial decision-making for SMEs through dynamic forecasting, real-time analytics, and automation, all tailored for affordability, usability, and seamless integration with existing systems (Sophie, 2025a).

NLP Tools for Customer Sentiment and Market Trend Analysis

Natural Language Processing (NLP) technologies have become pivotal for SMEs seeking to extract actionable insights from unstructured data sources such as customer reviews, social media interactions, and online forums. Sentiment analysis, or opinion mining, utilizes NLP to classify opinions and emotions, ranging from simple polarity (positive, negative, neutral) to more nuanced emotional intensities, enabling businesses to gauge consumer perceptions in real time (Rahaman et al., 2022). The Datahub Analytics Team (2025) defines NLP as the convergence of computational linguistics, machine learning, and artificial intelligence, which collectively empower machines to comprehend, interpret, and generate human language. This capability transforms vast streams of unstructured textual data into structured, decision-ready insights, offering SMEs a scalable means to monitor and understand customer sentiment without the overhead costs associated with traditional market research.

By analyzing sentiment data from platforms such as Twitter, TripAdvisor, and Yelp, SMEs can fine-tune marketing strategies, refine product offerings, and anticipate emerging consumer demands. Maldonado-

Canca et al. (2024) emphasize how real-time opinion analysis drives personalized advertising strategies, improves conversion rates, and enhances brand reputation management, all of which are crucial competitive advantages for resource-constrained SMEs.

Beyond sentiment analysis, NLP-driven market trend prediction synthesizes data from news articles, social media chatter, and financial reports to forecast market movements and guide strategic business planning. Harmanpreet et al. (2023) highlight that these advanced machine learning models enable SMEs to enhance customer satisfaction, streamline operations, and proactively adapt to evolving market dynamics.

Customer segmentation, powered by machine learning algorithms such as k-means clustering, decision trees, and neural networks, allows SMEs to move beyond traditional demographic profiling. Okeke et al. (2024) demonstrate that analyzing complex behavioral and transactional data reveals deeper, more actionable customer segments, facilitating precision marketing and tailored engagement strategies. Importantly, NLP tools offer SMEs a cost-effective avenue for competitive intelligence gathering, enabling them to monitor competitor strategies, track industry sentiment, and stay agile in rapidly shifting markets, without the need for expensive third-party research services (Menghin, 2023; Ferdiansyah et al., 2025).

Manideep (2025) observes that SMEs leveraging NLP-based sentiment analysis tools have reported improved brand positioning and customer retention by responding more effectively to consumer feedback and adapting to shifting preferences. Similarly, Malik & Bilal (2024) note that online reviews play a critical role in shaping consumer behavior and business strategies across e-commerce and review platforms. They further emphasize that advanced NLP techniques such as aspect-based sentiment analysis, emotion detection, and deep learning models, enable SMEs to extract granular insights, enables customer-centricity, and maintain digital competitiveness.

V. AI-DRIVEN INCLUSION IN ACTION: CASE STUDIES

UK Local Council Project: Leveraging Chatbots and LMS Tools for Scalable Citizen Engagement
The UK Local Council Digital Inclusion Initiative (2024) stands as a practical example of how AI-powered tools can democratize access to essential services in resource-constrained environments. Through the integration of AI-enabled chatbots and Learning Management Systems (LMS), local councils streamlined citizen engagement across underserved boroughs, automating routine inquiries and delivering accessible digital skills training.

A critical component of this initiative is the partnership between GOV.UK One Login and the Post Office, which offers in-person identity verification for individuals without smartphones or digital proficiency, ensuring no demographic is excluded from vital services like DBS checks and veterans' card applications. To date, this hybrid AI-human model has facilitated service access for over 30,000 citizens, illustrating how digital solutions can be inclusive by design (Gov.UK, 2025). The LMS platform further empowered local entrepreneurs by providing AI-assisted tutorials on e-commerce, digital marketing, and financial literacy, delivering scalable, low-cost digital upskilling. Backed by the UK's Digital Inclusion Innovation Fund and aligned with the Digital Development Strategy (DDS) 2024-2030, the project reflects a systemic approach to inclusive digital transformation prioritizing accessibility, responsibility, and sustainability in technology adoption.

For U.S. SMEs, especially those in minority-owned, rural, and resource-limited sectors, this model offers a replicable blueprint. AI chatbots can alleviate customer service bottlenecks, handling up to 70-80% of routine inquiries, while LMS platforms can be adapted for affordable staff training, customer education, and community outreach. With 98% of U.S. small businesses now leveraging AI tools (U.S. Chamber of Commerce, 2024), the democratization of scalable, off-the-shelf AI solutions is not just aspirational but increasingly essential. As Jordan Crenshaw of the U.S. Chamber's C_TEC aptly notes, AI enables small businesses often lacking the human capital of larger competitors to "punch above their weight" (U.S. Chamber of Commerce, 2024). The

UK Local Council's initiative demonstrates that with thoughtful deployment, AI-driven platforms can bridge operational gaps for small enterprises, driving inclusivity, customer reach, and operational efficiency without incurring prohibitive costs.

Case Study 2: Kabbage — AI-Powered Credit Inclusion for Minority-Owned SMEs
A leading example of AI-driven financial inclusion in the United States is Kabbage, a fintech platform based in Atlanta, renowned for leveraging alternative data models to extend working capital loans to small businesses traditionally underserved by mainstream financial institutions. Now part of American Express, Kabbage integrates real-time data connections, analyzing business health through bank accounts, bookkeeping software, payment processors, and e-commerce platforms, to deliver flexible credit solutions without the exhaustive documentation typical of conventional lenders (Cobalt Intelligence, 2024; Rim, 2024). This AI-enabled underwriting model has facilitated over $16 billion in funding, reaching 225,000+ small businesses, including many minority- and immigrant-owned SMEs, by circumventing biases inherent in traditional credit scoring (FasterCapital, 2024). Kabbage's platform utilizes machine learning algorithms that evaluate dynamic business performance indicators such as cash flow, sales patterns, and online activity, to approve lines of credit up to $250,000 within minutes, significantly expanding access for credit-invisible enterprises (FasterCapital, 2024). By offering automated, revenue-linked repayment options and eliminating heavy collateral requirements, Kabbage has empowered underserved SMEs to stabilize cash flow, fund expansion initiatives, and navigate market volatilities. This case illustrates how AI-powered alternative data models can democratize credit access, enabling fairer, faster, and more inclusive financial decisions (Cobalt Intelligence, 2024; Rim, 2024). Through its data-inclusive approach, Kabbage has dismantled structural barriers that have historically marginalized minority-owned businesses, highlighting AI's capacity to bridge financing gaps, stimulate SME growth, and ensure economic resilience across underserved communities.

Off-the-Shelf Low-Code/No-Code AI Platforms: Reducing Adoption Barriers for SMEs

The introduction of low-code and no-code AI platforms has significantly lowered the technical and financial barriers that previously hindered small and medium-sized enterprises (SMEs) from adopting AI-driven solutions. Platforms such as Microsoft Power Platform AI Builder, Zoho Creator AI, Airtable AI, and Google Vertex AI now enable SMEs with minimal coding expertise to integrate advanced AI functionalities into their operations through intuitive drag-and-drop interfaces and pre-built AI modules (Sido & Emon, 2024; LITSLINK, 2025). These tools facilitate automation in critical business areas, ranging from customer segmentation and invoice processing to sales forecasting and workflow automation, without necessitating in-house data science teams or bespoke software development. By democratizing access to AI, these platforms allow resource-constrained SMEs to enhance productivity, optimize client engagement, and compete with larger enterprises on a more level playing field. For instance, Medium (2025) highlights case examples where a boutique retailer streamlined customer service workflows by 40% using a no-code AI chatbot, and a local marketing agency increased email open rates by 25% and conversions by 15% through automated, AI-personalized campaigns. These outcomes demonstrate that no-code AI solutions can drive substantial operational efficiencies and business growth, even in SMEs with limited IT infrastructure. Also, the proliferation of low/no-code platforms accelerated by Generative AI innovations, is reshaping the digital transformation landscape by expanding AI deployment beyond professional developers and fostering inclusive innovation across industries (Sido & Emon, 2024). This technological accessibility empowers marginalized and underserved SMEs to adopt enterprise-grade AI capabilities at a fraction of the traditional cost, thereby enhancing business resilience, stimulating innovation, and narrowing the digital divide.

VI. ECONOMIC IMPACT OF AI EMPOWERMENT FOR SMEs

Job Creation and Workforce Expansion

AI adoption has emerged as a catalyst for job creation within SME ecosystems by enhancing operational efficiency and unlocking new market opportunities. According to the OECD (2024), most employees using AI at work report improved performance, greater job satisfaction, and enhanced well-being, while businesses restructure tasks to amplify human strengths rather than replace labor. AI-driven automation of routine administrative tasks enables SMEs to redeploy human resources into strategic functions such as sales, marketing, and innovation, thereby improving job quality and expanding workforce capacity. Moses (2023) emphasizes that AI adoption compels SMEs to reskill and upskill their workforce, ensuring competencies in data literacy, programming, and AI tool utilization, critical for sustaining competitiveness in a digital-first economy.

Revenue Growth and Business Survival Rates

AI empowers SMEs with predictive insights that optimize resource allocation, improve customer targeting, and identify new growth avenues. Lorenzo et al. (2024) and Abangah (2024) found that SMEs leveraging AI-driven financial planning and customer analytics tools consistently outperformed non-AI adopters in revenue growth. Magableh et al. (2024) demonstrated a 42.5% improvement in sustainable financial performance among AI-enabled SMEs, driven by a 50% increase in customer engagement and a 76% enhancement in data-driven decision-making. In emerging markets, SMEs contribute approximately 40% of official GDP, with AI adoption accelerating their resilience and efficiency (Soomro et al., 2025). Amosu et al. (2024) further illustrate that integrating AI into inventory systems for demand forecasting yields significant gains in optimization, cost reduction, and customer satisfaction, ensuring SME survival in competitive markets.

Regional Economic Revitalization and Community Impact

AI adoption by SMEs is a pivotal driver of regional economic revitalization, especially in rural and economically distressed areas. The U.S. Competitive Grant (2024) earmarked $1.25 billion to community-based organizations aiming to dismantle barriers to digital inclusion through reskilling and AI-enabled

economic participation (Dine, 2025). AI-driven supply chain integration has stimulated the emergence of micro-clusters of digitally-enabled SMEs, enabling local commerce and job creation (Hassouna et al., 2024). Omogbeme et al. (2024) highlight that AI-powered financial services dismantle systemic barriers by expanding credit access, enhancing financial literacy, and delivering tailored digital tools to marginalized communities. Furthermore, AI adoption among minority-owned SMEs has facilitated cross-border e-commerce, allowing culturally diverse products to penetrate mainstream markets, thus enriching regional economic ecosystems (Wu & Wen, 2025; Liang & Hongtao, 2025).

Disaggregated Outcomes: Underrepresented and Marginalized Communities

AI adoption has been particularly transformative for women-owned, minority-owned, and immigrant-led SMEs. Badghish & Soomro (2024) observe that SMEs, through their agile organizational structures, leverage disruptive AI technologies to enhance adaptability and operational scalability. AI-driven CRM practices spanning customer data management, predictive analytics, and sales optimization, significantly bolster sustainable business growth (Azage & Ikpeazu, 2024; Okeke et al., 2024; Taqwa & Athapol, 2024). Moreover, AI-powered credit modeling enhances access to alternative financing for credit-invisible businesses by assessing real-time liquidity needs, market dynamics, and profitability forecasts (Okeke et al., 2024). Empirical evidence shows that AI adoption among rural SMEs delivers measurable efficiency gains, narrowing the urban-rural digital divide and reinforcing AI's role as a democratizing force in SME competitiveness and inclusive economic growth.

Alignment with Economic Equity and Resilience Goals

AI empowerment of SMEs aligns directly with national economic policy objectives targeting equity, resilience, and inclusive growth. Federal initiatives such as the Infrastructure Investment and Jobs Act (IIJA, 2024) and the Small Business Digital Alliance (SBDA) position AI as a strategic instrument for reducing racial, gender, and geographic economic disparities (U.S. Small Business Administration,

2023; Federal Railroad Administration, 2025). SMEs are significant to economic growth and employment, yet their vulnerability to shocks underscores the importance of Business Development Services, which strengthen resilience through training, mentorship, market access, and strategic advisory support (Anjorin et al., 2024). Ensuring SME-led innovation, strengthening local supply chains, facilitating job creation, and AI-enabled inclusion strategies that contribute to national goals of economic diversification and technological equity. The scalability of AI solutions further enhances systemic economic resilience, equipping SMEs to adapt to market fluctuations and withstand future disruptions.

VII. CHALLENGES AND ETHICAL CONSIDERATIONS

Risks of AI Bias and Algorithmic Exclusion

While AI-driven solutions offer unprecedented opportunities for SMEs, the risk of algorithmic bias poses a critical ethical challenge, particularly for minority-owned and underserved businesses. AI models trained on biased historical data may unintentionally reinforce exclusionary practices, sidelining businesses with limited credit histories or nontraditional operational models creating a digital divide and variance regulatory (Omogbeme et al., 2024). Okeke et al. (2024) and Sophie (2025) caution that without proactive measures, AI systems used in financial services and customer analysis might inadvertently exclude small and medium-sized enterprises (SMEs) from marginalized communities, deepening existing gaps in financial access and expertise instead of closing them. Such algorithmic disparities are further exacerbated by the lack of diverse representation in training datasets, leading to skewed outputs that hinder fair access to credit, market insights, and operational resources.

Data Privacy Concerns in Underserved Communities

The proliferation of AI in small business operations also raises significant concerns regarding data privacy, especially within underserved communities where data governance structures are often weak or absent. Hussain & Rizwan (2024) argue that SMEs in economically marginalized regions face heightened vulnerabilities as they integrate AI platforms that rely

heavily on sensitive business and customer data. The absence of robust cybersecurity infrastructure, coupled with inadequate regulatory oversight, exposes these enterprises to data breaches, misuse, and exploitation, undermining trust and potentially jeopardizing business continuity. Moreover, the growing dependence on third-party AI service providers without transparent data handling policies, further complicates data sovereignty and security concerns for resource-constrained SMEs.

Digital Literacy Gaps and Onboarding Costs
Another significant barrier is the persistent digital literacy gap among SME owners and employees, which impedes effective AI adoption and utilization. Aliyev (2025) notes that many small businesses lack the technical expertise required to adopt these platforms, leading to suboptimal usage and underperformance. This is more pronounced in rural and economically distressed regions. Pascal et al. (2025) emphasize that while AI solutions have mitigated some of these challenges, the hidden costs of onboarding such as staff training, process restructuring, and system integration remain prohibitive for many SMEs. These barriers result in a digital divide where only a fraction of small businesses can fully leverage AI's transformative potential, perpetuating competitive disparities in the marketplace.

Ethical AI Deployment Principles for SMEs
To ensure AI deployment supports inclusive economic growth, there is a critical need for ethical frameworks specifically tailored to the operational realities of SMEs. Heston (2025) advocates for the integration of transparency and explainability into AI tools, enabling SME users to understand and trust algorithmic decisions without requiring advanced technical knowledge. Additionally, affordability and accessibility must be central to AI solution design, ensuring that cost structures within the value chain align with the financial capacities of small businesses (Badghish & Soomro, 2024). Inclusive innovation ecosystems ensure fairness and accountability in AI by uniting stakeholders to tailor solutions that reflect the diverse needs of SMEs across gender, racial, and regional contexts.

VIII. POLICY RECOMMENDATIONS AND STRATEGIC PATHWAYS

To bridge the persistent digital divide and ensure AI-driven economic inclusion for SMEs, a multifaceted policy approach is imperative, anchored in public-private collaborations, equitable design principles, and targeted capacity-building initiatives. Public-private partnerships, including expanded grant programs, AI incubators, and accelerators, must prioritize underserved SMEs, ensuring access to affordable AI tools and technical support that align with their operational realities (U.S. Small Business Administration, 2023; Heston, 2025). Strategic initiatives like the Small Business Digital Alliance (SBDA) can be scaled to offer AI-driven solutions for minority-owned, women-owned, and rural enterprises, ensuring inclusive participation in the digital economy. Furthermore, policymakers should establish firm guidelines for equitable AI design and deployment, emphasizing transparency, bias mitigation, and explainability in algorithmic decision-making processes (Hussain & Rizwan, 2024). These frameworks must compel AI providers to adopt inclusive data governance practices, ensuring that AI systems accurately reflect the diverse contexts in which SMEs operate.

Educational institutions and nonprofit organizations play a pivotal role in building SME AI readiness by developing accessible training programs focused on digital literacy, AI literacy, and practical application of AI tools in small business contexts (Aliyev, 2025). Partnerships between academia, industry, and community-based organizations can create localized AI upskilling hubs, delivering hands-on workshops, mentorship, and resource-sharing networks to empower SMEs with the competencies needed to navigate AI ecosystems effectively. Additionally, federal and local governments should introduce policy incentives such as tax credits, subsidized AI adoption schemes, and procurement preferences for AI-enabled SMEs, to lower the financial and operational barriers to AI integration among underserved business owners (IIJA, 2024). Scalable, inclusive incentives and a unified national AI strategy, backed by long-term support and cross-sector collaboration, can drive equitable, sustainable

adoption among SMEs, especially in underserved regions.

CONCLUSION

This paper has explored how AI technologies ranging from chatbots and predictive analytics to advanced financial planning tools and NLP-driven market insights are transforming the operational landscape for small and medium-sized enterprises (SMEs), particularly those from underserved and marginalized communities. The evidence demonstrates that AI adoption empowers SMEs to overcome traditional barriers such as limited access to financial resources, insufficient customer analytics, and outdated infrastructure. AI's ability to automate routine tasks, provide real-time business intelligence, and democratize access to sophisticated digital tools positions it as a powerful equalizer in ensuring ering economic inclusion and SME competitiveness.

However, unlocking AI's full potential for SMEs requires more than technology alone. It demands a concerted effort from policymakers, private sector innovators, educational institutions, and community-based organizations to build a comprehensive support ecosystem that addresses structural inequities, digital literacy gaps, and affordability constraints. Sustained investments in inclusive AI solutions, targeted capacity-building programs, and policy incentives tailored to the realities of small businesses are critical to ensuring that AI-driven innovation scales equitably and sustainably. As AI technologies continue to evolve, future research must look deeper into SME-centric AI deployment models, examining how alternative data modeling, low-code/no-code platforms, and AI-driven financial services can be optimized for businesses operating within resource-constrained environments. There is a pressing need for empirical studies that measure the long-term impacts of AI adoption on SME growth trajectories, workforce dynamics, and regional economic revitalization. If this areas are focused on, researchers and practitioners alike can contribute to shaping an inclusive digital economy where SMEs not only survive but thrive through AI empowerment.

REFERENCES

[1] Abangah, Parsa. (2024). Economic impact of artificial intelligence on small and medium Businesses: A Case Study of Inmarkon. 10.13140/RG.2.2.34021.82402.

[2] Adelheid Holl, Ruth Rama, SME digital transformation and the COVID-19 pandemic: a case study of a hard-hit metropolitan area, Science and Public Policy, Volume 51, Issue 6, December 2024, Pages 1212–1226, https://doi.org/10.1093/scipol/scae023

[3] Aiden, Dexter & Michael, Lewis. (2024). Artificial Intelligence in Business: Enhancing Operational Efficiency and Navigating Ethical Challenges. 10.13140/RG.2.2.30525.27363.

[4] Alabi Blessing Ebunoluwa. (2025). Empowering Small Businesses Through Financial Literacy: Bridging Gaps In Underserved Communities. IOSR Journal Of Humanities and Social Science (IOSR-JHSS) Volume 30, Issue 6, Series 1. 13-21 e-ISSN: 2279-0837, p-ISSN: 2279-0845. DOI: 10.9790/0837-3006011321

[5] Aliyev, Vasif. (2025). Digital Transformation Strategies and Challenges in Small and Medium Enterprises (SMEs): A Systematic Review and Future Directions. 10.13140/RG.2.2.27245.29924.

[6] Alonge, Enoch & Nsisong, Louis & Eyo-Udo, Nsisong & Ubanadu, Bright & Daraojimba, Andrew & Balogun, Emmanuel & Ogunsola, Kolade. (2024). A Predictive Analytics Model for Optimizing Cash Flow Management in Multi-Location and Global Business Enterprises.. 8. 2456-8880.

[7] Ammam, R.(2024, June 04 and 05th). AI-Driven Innovation Management and Digital Marketing Strategies: Kabbage's case study. In Proceedings of the Hybrid National Conference: Artificial Intelligence and FinTech Entrepreneurship - (pp. 01-16).

[8] Amosu, Olamide & Kumar, Praveen & Ogunsuji, Yewande & Oni, Segun & Faworaja, Oladapo. (2024). AI-driven demand forecasting: Enhancing inventory management and customer satisfaction. World Journal of Advanced

Research and Reviews. 23. 708-719. 10.30574/wjarr.2024.23.2.2394.

[9] Angela Olere Omogbeme, Ada Ivy Phil-Ugochukwu, Ikechukwu Josephat Nwabufo and Jude Onyebuchi Nwabufo. (2024). The role of artificial intelligence in enhancing financial inclusion: A review of its impact on financial services for the unbanked population in the United States. World Journal of Advanced Research and Reviews, 23(02), 2184–2192DOI: https://doi.org/10.30574/wjarr.2024.23.2.2489

[10] Angle, Mujeeb. (2024). AI in SMEs: Accelerating Digitalization for Resilient and Scalable Growth. 10.13140/RG.2.2.10435.62249.

[11] Anjorin, Kikelomo & Ijomah, Tochukwu & Toromade, Adekunle & Akinsulire, Adetola & Eyo-Udo, Nsisong. (2024). Evaluating business development services' role in enhancing SME resilience to economic shocks. Global Journal of Research in Science and Technology. 2. 029-045. 10.58175/gjrst.2024.2.1.0047.

[12] Association of Chartered Certified Accountants. (2023). SMEs: Business challenges and strategic innovation opportunities. https://www.accaglobal.com/content/dam/ACCA_Global/professional-insights/sme-business-challenges/PI-SME-CHALLENGES-INNOVATION%20v4.pdf

[13] Azage, Joseph & Ikpeazu, Peter. (2024). AI-DRIVEN CUSTOMER RELATIONSHIP MANAGEMENT PRACTICES AND SUSTAINABLE GROWTH OF NIGERIAN SMEs.

[14] Badghish, Saeed & Soomro, Dr. Yasir. (2024). Artificial Intelligence Adoption by SMEs to Achieve Sustainable Business Performance: Application of Technology–Organization–Environment Framework. Sustainability. 16. 1864. 10.3390/su16051864.

[15] Badmus, Oluwaseun & Rajput, Shahab & Arogundade, John & Williams, Mosope. (2024). AI-driven business analytics and decision making. World Journal of Advanced Research

and Reviews. 24. 616-633. 10.30574/wjarr.2024.24.1.3093.

[16] Beatriz Cuéllar-Fernández, Yolanda Fuertes-Callén, Adriana Serrano-Magdalena. (2024). Factors behind the resilience of rural startups. Technological Forecasting and Social Change, Volume 206, 123521, ISSN 0040-1625. https://doi.org/10.1016/j.techfore.2024.123521.

[17] Blessing, Moses. (2023). The Impact of AI on SME Workforce Productivity and Skill Development.

[18] Brown, William & Wilson, George & Johnson, Oliver. (2024). Understanding the Role of Chatbots in Enhancing Customer Service. 10.20944/preprints202408.0321.v1.

[19] Chen, Tzuhao & Gascó, Mila. (2024). Uncovering the Results of AI Chatbot Use in the Public Sector: Evidence from US State Governments. Public Performance & Management Review. 1-26. 10.1080/15309576.2024.2389864.

[20] Cobalt Intelligence. (2024). Alternative credit data 101: Enhance credit decisions with alternative data insights. https://cobaltintelligence.com/blog/post/alternative-credit-data-101-enhance-credit-decisions-with-alternative-data-insights-2024

[21] Datahub Analytics Team. (2025, March 29). Natural Language Processing (NLP) for unstructured data analysis. Datahub Analytics. https://datahubanalytics.com/natural-language-processing-nlp-for-unstructured-data-analysis/

[22] Deloitte. (2025). Leveraging AI for financial planning. https://www.deloitte.com/ch/en/services/consulting/perspectives/leveraging-ai-for-financial-planning.html

[23] Dhruv Kikani, Sunny M. Ramchandani. (2025). The Impact of AI Chatbots on Customer Service: Efficiency vs. Human Touch A Comparative Analysis of Automation and Human Interaction in Customer Support. International Journal for Research Trends and

Innovation IJRTI | Volume 10, Issue 3 March 2025 | ISSN: 2456-3315 IJRTI2503134.

[24] Dine, J. (2025, January 21). How the Competitive Grant Program awards are connecting U.S. communities. New America. https://www.newamerica.org/oti/blog/how-the-competitive-grant-program-awards-are-connecting-us-communities/

[25] Dwi Andayani, Dian Indiyati, Meri Mayang Sari, Goh Yao, Jack Williams. (2024). Leveraging AI-Powered Automation for Enhanced Operational Efficiency in Small and Medium Enterprises (SMEs). APTISI Transactions on Management (ATM) Vol. 8, No. 3, 2024, pp. 250~258 E-ISSN: 2622-6804 P-ISSN: 2622-6812, DOI:10.33050

[26] Eboigbe, Emmanuel & Farayola, Oluwatoyin & Olatoye, Funmilola & Chinwe, Nnabugwu & Daraojimba, Chibuike. (2023). BUSINESS INTELLIGENCE TRANSFORMATION THROUGH AI AND DATA ANALYTICS. Engineering Science & Technology Journal. 4. 285-307. 10.51594/estj.v4i5.616.

[27] Elpisah, E.. (2023). Towards Inclusive Growth: Community-Centered Management Strategies for SMEs. Golden Ratio of Community Services and Dedication. 3. 29-39. 10.52970/grcsd.v3i1.606.

[28] Ewim, C. P.-M., Okeke, N. I., Alabi, O. A., Igwe, A. N., & Ofodile, O. C. (2024). Customer-centric digital transformation framework: Enhancing service delivery in SMEs for underserved populations. International Journal of Management & Entrepreneurship Research, 6(10). https://doi.org/10.51594/ijmer.v6i10.1658

[29] Eziefule A.O., Adelakun B.O., Okoye I.N., & Attieku J.S. (2024) The Role of AI in Automating Routine Accounting Tasks: Efficiency Gains and Workforce Implications, European Journal of Accounting, Auditing and Finance Research, Vol.10, No. 12, pp.,109-134 doi: https://doi.org/10.37745/ejaafr.2013/vol10n121 09134

[30] Faisal, Reena & Amekudzi, Carl & Kamran, Samira & Fonkem, Beryl & Tawo, Obah & Awofadeju, Martins. (2023). The Impact of Digital Transformation on Small and Medium Enterprises (SMEs) in the USA: Opportunities and Challenges.

[31] FasterCapital. (2024). Credit scoring and risk assessment using AI. https://fastercapital.com/topics/credit-scoring-and-risk-assessment-using-ai.html

[32] Federal Railroad Administration. (2025, June 9). Infrastructure Investment and Jobs Act information from FRA. https://railroads.dot.gov/IIJA

[33] Ferdiansyah, Januri & Abudaqa, Anas & Lansonia, April. (2025). Leveraging Artificial Intelligence for Competitive Advantage in SMEs An Empirical Analysiss. APTISI Transactions on Management (ATM). 9. 140-151. 10.33050/atm.v9i2.2472.

[34] Ferguson Melhorn, S., Hoover, M., & Lucy, I. (2024, May 20). See the data behind America's small businesses. U.S. Chamber of Commerce. https://www.uschamber.com/small-business/small-business-data-center

[35] Forbes. (2023, July 18). Customer support: Using AI chatbots for efficiency and empathy. Forbes Business Development Council. https://www.forbes.com/councils/forbesbusiness developmentcouncil/2023/07/18/customer-support-using-ai-chatbots-for-efficiency-and-empathy/

[36] Foreign, Commonwealth & Development Office. (2024). Digital development strategy 2024–2030. GOV.UK. https://assets.publishing.service.gov.uk/media/6 613e7f7c4c84d4b31346a68/FCDO-Digital-Development-Strategy-2024-2030.pdf

[37] GOV.UK. (2025, February 26). Digital inclusion action plan: First steps. GOV.UK. https://www.gov.uk/government/publications/di gital-inclusion-action-plan-first-steps/digital-inclusion-action-plan-first-steps

[38] Haojun Wen, Ting Wu. (2025). The Tech-Driven Era: Deep Integration of Artificial Intelligence and Cross-border E-commerce. Information Systems and Economics. DOI: 10.23977/infse.2025.060114

[39] Harmanpreet, B & Harikrishna, G & Dhulipalla, I. (2023). NLP for sentiment analysis, customer service automation, and market trend predictions. International Journal of Science and Research Archive. 10. 1084-1090. 10.30574/ijsra.2023.10.1.0698.

[40] Hassouna, Mohamed & El-henawy, Ibrahim & Haggag, Riham. (2022). The Impact Of Using Artificial Intelligence (AI) In Supply Chain Management On Companies. Literature Review. International Journal of Scientific and Engineering Research. 13. 995-1007.

[41] Hussain, Atif & Rizwan, Rana. (2024). Strategic AI adoption in SMEs: A Prescriptive Framework. 10.48550/arXiv.2408.11825.

[42] Igor Menghin. (2023). NLP for Market and Competitive Intelligence. https://ceur-ws.org/Vol-3650/paper2.pdf

[43] Jonathan Morris, Wyn Morris, Robert Bowen. (2022). Implications of the digital divide on rural SME resilience. Journal of Rural Studies, Volume 89, Pages 369-377, ISSN 0743-0167. https://doi.org/10.1016/j.jrurstud.2022.01.005.

[44] Keelson, S. A., Cúg, J., Amoah, J., Petráková, Z., Addo, J. O., & Jibril, A. B. (2024). The Influence of Market Competition on SMEs' Performance in Emerging Economies: Does Process Innovation Moderate the Relationship? Economies, 12(11), 282. https://doi.org/10.3390/economies12110282

[45] LITSLINK. (2025, June 19). No-code AI platform growth in 2025: What it means for businesses. LITSLINK. https://litslink.com/blog/no-code-ai-platforms-what-it-means-for-businesses

[46] Lorenzo Ardito, Raffaele Filieri, Elisabetta Raguseo, Claudio Vitari; (2024). Artificial intelligence adoption and revenue growth in European SMEs: synergies with IoT and big data analytics. Internet Research 2024; https://doi.org/10.1108/INTR-02-2024-0195

[47] Liang, Loo & Hongtao, Liu. (2025). The Factors Influencing the Adoption of AI in E-Commerce by SMEs in Shandong Province. International Journal of Research and Innovation in Applied Science. X. 1268-1288. 10.51584/IJRIAS.2025.10060096.

[48] Liberto, D. (2025, April 10). Small and midsize enterprise (SME): Definition and types around the world. Investopedia. https://www.investopedia.com/terms/s/smallandmidsizeenterprises.asp

[49] Magableh, Ihab & Mahrouq, Maher & Ta'amnha, Mohammad & Riyadh, Hosam Alden. (2024). The Role of Marketing Artificial Intelligence in Enhancing Sustainable Financial Performance of Medium-Sized Enterprises Through Customer Engagement and Data-Driven Decision-Making. Sustainability. 16. 11279. 10.3390/su162411279.

[50] Maldonado-Canca, LA., Casado-Molina, AM., Cabrera-Sánchez, JP. et al. (2024). Beyond the post: an SLR of enterprise artificial intelligence in social media. Soc. Netw. Anal. Min. 14, 219 (2024). https://doi.org/10.1007/s13278-024-01382-y

[51] Malebatom Sousso. (2024). An Examination of the Differences in the Funding of MinorityOwned Businesses (Small and Large) Compared to Non-Minority Businesses. https://scholarworks.waldenu.edu/cgi/viewcontent.cgi?article=17261&context=dissertations

[52] Malik N, Bilal M. (2024). Natural language processing for analyzing online customer reviews: a survey, taxonomy, and open research challenges. PeerJ Comput Sci. 2024 Jul 19;10:e2203. doi: 10.7717/peerj-cs.2203. PMID: 39145232; PMCID: PMC11323031.

[53] Manideep Paturi. (2025). AI-Driven Sentiment Analysis for Real-Time Product PositioningandAdaptive Marketing Campaign Optimization. International Journal of Research Publication and Reviews, Vol 6, Issue 6, pp

5822-5838 . DOI : https://doi.org/10.55248/gengpi.6.0625.21104

[54] Medium. (2025). Empowering Small Businesses: How No-Code AI Tools Drive Scalable Growth. https://ai.plainenglish.io/empowering-small-businesses-how-no-code-ai-tools-drive-scalable-growth-513fdeb82466

[55] Muhammad Ali, Tariq Iqbal Khan, Mohammad Nisar Khattak, İrge ŞENER. (2024). Synergizing AI and business: Maximizing innovation, creativity, decision precision, and operational efficiency in high-tech enterprises. Journal of Open Innovation: Technology, Market, and Complexity, Volume 10, Issue 3, 100352, ISSN 2199-8531. https://doi.org/10.1016/j.joitmc.2024.100352.

[56] Nkwinika, Eugine & S.A, Akinola. (2023). The importance of financial management in small and medium-sized enterprises (SMEs): an analysis of challenges and best practices. Technology audit and production reserves. 5. 12-20. 10.15587/2706-5448.2023.285749.

[57] Nnenna Ijeoma Okeke, Olufunke Anne Alabi, Abbey Ngochindo Igwe, Onyeka Chrisanctus Ofodile and Chikezie Paul-Mikki Ewim. (2024) AI-driven personalization framework for SMES: Revolutionizing customer engagement and retention. World Journal of Advanced Research and Reviews, 24(01), 2019–2035 DOI: https://doi.org/10.30574/wjarr.2024.24.1.3208

[58] Noor, Yasir & Gabriel, Michael. (2024). Predictive Insights for SMEs: Utilizing Analytics to Navigate Customer Behavior and Emerging Market Risks. 10.13140/RG.2.2.10013.22241.

[59] OECD (2024), Financing SMEs and Entrepreneurs 2024: An OECD Scoreboard, OECD Publishing, Paris, https://doi.org/10.1787/fa521246-en.

[60] Okeke, Njideka & Bakare, Oluwaseun & Achumie, Godwin. (2024). Artificial Intelligence in SME financial decision-making: Tools for enhancing efficiency and profitability.

[61] Okeke, Njideka & Bakare, Oluwaseun & Achumie, Godwin. (2024b). Implementing data-driven financial management systems in SMEs: A case review approach. International Journal of Management & Entrepreneurship Research. 6. 3243-3258. 10.51594/ijmer.v6i10.1613.

[62] Oluwatosin Abdul-Azeez, Alexsandra Ogadimma Ihechere and Courage Idemudia. (2024). SMEs as catalysts for economic development: Navigating challenges and seizing opportunities in emerging markets. GSC Advanced Research and Reviews, 2024, 19(03), 325–335. DOI: https://doi.org/10.30574/gscarr.2024.19.3.0230

[63] Oni, Samuel. (2025). The Impact of AI on SME Financial Decision-Making Processes. 18.

[64] Organisation for Economic Co-operation and Development. (2024). The impact of artificial intelligence on productivity, distribution and growth. OECD Publishing. https://www.oecd.org/content/dam/oecd/en/publications/reports/2024/04/the-impact-of-artificial-intelligence-on-productivity-distribution-and-growth_d54e2842/8d900037-en.pdf

[65] Organisation for Economic Co-operation and Development. (2024). SME digitalisation 2024: Managing shocks and transitions – An OECD D4SME survey. Policy highlights. https://www.oecd.org/content/dam/oecd/en/networks/oecd-digital-for-smes-global-initiative/FINAL-D4SME-2024-Survey-Policy-Highlights.pdf

[66] Organisation for Economic Co-operation and Development. (2021). SME digitalisation to build back better. OECD Publishing. https://www.oecd.org/content/dam/oecd/en/publications/reports/2021/12/sme-digitalisation-to-build-back-better_c52afe21/50193089-en.pdf

[67] Panigrahi, R. R., Shrivastava, A. K., Qureshi, K. M., Mewada, B. G., Alghamdi, S. Y., Almakayeel, N., Almuflih, A. S., & Qureshi, M.

Open Access Research Journal of Multidisciplinary Studies. 8. 150-163. 10.53022/oarjms.2024.8.1.0056.

R. N. (2023). AI Chatbot Adoption in SMEs for Sustainable Manufacturing Supply Chain Performance: A Mediational Research in an Emerging Country. Sustainability, 15(18), 13743. https://doi.org/10.3390/su151813743

[68] Pascal Ugochukwu Ojukwu, Hope Ehiaghe Omokhoa, Chinekwu Somtochukwu Odionu, Chima Azubuike, Aumbur Kwaghter Sule5. (2025). Digital Transformation and Optimization Framework for Advancing SME Growth and Operational Effectiveness. https://rsisinternational.org/journals/ijriss/articles/digital-transformation-and-optimization-framework-for-advancing-sme-growth-and-operational-effectiveness/

[69] Rahaman, Shafeeq Ur & Kokku, Rishita & Suddala, Swathi. (2022). Sentiment Analysis Revolution: Using NLP to Uncover Social Media's Hidden Marketing Power. 10.1729/Journal.41905.

[70] Rane, Nitin and Paramesha, Mallikarjuna and Choudhary, Saurabh and Rane, Jayesh. (2024). Business Intelligence through Artificial Intelligence: A Review. Available at SSRN: https://ssrn.com/abstract=4831916 or http://dx.doi.org/10.2139/ssrn.4831916

[71] Richard, Heston. (2025). AI and Digital Transformation for SMEs: Regional Challenges and Global Opportunities Across Continents.

[72] Samuel Godadaw Ayinaddis. (2025). Artificial intelligence adoption dynamics and knowledge in SMEs and large firms: A systematic review and bibliometric analysis. Journal of Innovation & Knowledge, Volume 10, Issue 3, 100682, ISSN 2444-569X. https://doi.org/10.1016/j.jik.2025.100682.

[73] Schwaeke, J., Peters, A., Kanbach, D. K., Kraus, S., & Jones, P. (2024). The new normal: The status quo of AI adoption in SMEs. Journal of Small Business Management, 63(3), 1297–1331. https://doi.org/10.1080/00472778.2024.2379999

[74] Selamat, Moch & Windasari, Nila A.. (2021). Chatbot for SMEs: Integrating customer and business owner perspectives. Technology in Society. 66. 101685. 10.1016/j.techsoc.2021.101685.

[75] Sido, N., & Emon, E. A. A. (2024). Low/No Code Development and Generative AI (Thesis Report). Aalborg University, Copenhagen. Retrieved from https://vbn.aau.dk/ws/files/717521040/LowNOCode__GenAI.pdf

[76] Smith, M. (2025, April 16). How AI levels the playing field to help small businesses compete with giants. Entrepreneurs' Organization. https://eonetwork.org/blog/search/how-ai-levels-the-playing-field-to-help-small-businesses-compete-with-giants/?scLang=en

[77] Soomro, R.B., Al-Rahmi, W.M., Dahri, N.A. et al. (2025). A SEM–ANN analysis to examine impact of artificial intelligence technologies on sustainable performance of SMEs. Sci Rep 15, 5438 (2025). https://doi.org/10.1038/s41598-025-86464-3

[78] Sophie, Emily. (2025a). AI Tools and Platforms Tailored for SME Financial Planning. 7.

[79] Sophie, Emily. (2025b). Leveraging AI for cash flow management in SMEs. 27.

[80] Taqwa Hariguna, Athapol Ruangkanjanases. (2024). Assessing the impact of artificial intelligence on customer performance: a quantitative study using partial least squares methodology. Data Science and Management, Volume 7, Issue 3, Pages 155-163, ISSN 2666-7649. https://doi.org/10.1016/j.dsm.2024.01.001.

[81] Toluwalase Vanessa Iyelolu, Edith Ebele Agu, Courage Idemudia, Tochukwu Ignatius Ijomah.(2024). Improving Customer Engagement and CRM for SMEs with AI-Driven Solutions and Future Enhancements. International Journal Of Engineering Research And Development. e- ISSN: 2278-067X, p-ISSN: 2278-800X, Volume 20, Issue 8, PP. 236-252

[82] U.S. Chamber of Commerce. (2024, September 16). New study reveals nearly all U.S. small businesses leverage AI-enabled tools, warns

proposed regulations could hinder growth. https://www.uschamber.com/technology/artificial-intelligence/new-study-reveals-nearly-all-u-s-small-businesses-leverage-ai-enabled-tools-warns-proposed-regulations-could-hinder-growth

[83] U.S. Small Business Administration. (2023, March 1). Small Business Digital Alliance marks one-year anniversary. https://www.sba.gov/article/2023/mar/01/small-business-digital-alliance-marks-one-year-anniversary

[84] Ugbebor, Friday & Adeteye, David & Ugbebor, John. (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. 355-381. 10.60087/jklst.v3.n3.p355-381.

[85] Ugwu Jovita Nnenna, Silaji Turyamureeba, Kule Ashirafu Masudi and Tom Ongesa Nyamboga. (2024). Digital Transformation in SMEs: Challenges, Technologies, and Best Practices. Research Invention Journal Of Current Issues In Arts And Management 3(2):49-55, 2024. https://rijournals.com/current-issues-in-arts-and-management/

[86] Uzoka, Abel & Cadet, Emmanuel & Ojukwu, Pascal. (2024). Leveraging AI-Powered chatbots to enhance customer service efficiency and future opportunities in automated support. Computer Science & IT Research Journal. 5. 2485-2510. 10.51594/csitrj.v5i10.1676.

[87] Zavodna, Lucie & Ueberwimmer, Margarethe & Frankus, Elisabeth. (2024). Barriers to the implementation of artificial intelligence in small and medium sized enterprises: Pilot study. Journal of Economics and Management. 46. 331-352. 10.22367/jem.2024.46.13.