IJBES
Business Ecosystem & Strategy

Business Ecosystem & Strategy

IJBES VOL 7 NO 6 (2025) ISSN: 2687-2293

Available online at www.bussecon.com
Journal homepage: https://www.bussecon.com/ojs/index.php/ijbes

Adoption of Artificial Intelligence (AI) in digital marketing to improve the performance of small retail businesses in Cape Town

Monique Harris [(a)] *Michael Twum Darko* [(b)] *Steven Lububu* [(c)] *

[(a,b,c)] *Graduate Centre for Management (GCM) and Business Informatics, Cape Peninsula University of Technology, District Six, Cape Town, South Africa.*

ARTICLE INFO

Article history:

Received 21 June 2025
Received in rev. form 28 August 2025
Accepted 19 September 2025

Keywords:

Artificial Intelligence (AI); Digital Marketing; Small Retail Businesses (SRBs); Technology–Organisation–Environment (TOE); Unified Theory of Acceptance and Use of Technology (UTAUT); SME Competitiveness; Cape Town.

JEL Classification:
O33, M31, L26

ABSTRACT

This study examines how Artificial Intelligence (AI) adoption in digital marketing enhances the competitiveness of small retail businesses (SRBs) in Cape Town, South Africa. Guided by an integrated Technology–Organisation–Environment (TOE) and Unified Theory of Acceptance and Use of Technology (UTAUT) framework, a systematic review following PRISMA 2020 guidelines was conducted across eight databases, resulting in the inclusion of 37 empirical and conceptual studies published between 2015 and 2025. Findings show that AI adoption remains modest, with only 39% of small businesses planning to develop internal AI capabilities by 2025. The most common entry points are ChatGPT, text-to-image generators, predictive analytics systems, and WhatsApp-based chatbots. Businesses using these tools reported an average 11% increase in sales and a 28% reduction in marketing costs within six months. However, adoption is constrained by infrastructure challenges (patchy broadband, power cuts, high cloud costs), organisational limitations (low digital literacy, managerial scepticism, fear of automation), and socio-cultural barriers (language diversity and customer mistrust of chatbots). This study provides the first Cape Town-focused synthesis linking AI adoption to SME competitiveness through the TOE–UTAUT framework. It recommends policy measures to improve digital infrastructure and data governance, practical initiatives to strengthen AI literacy and ethical awareness, and theoretical extensions to contextualise socio-cultural dimensions of AI use. Collectively, these insights contribute to advancing inclusive, trust-based digital transformation in Cape Town's small business ecosystem.

© 2025 by the authors. Licensee Bussecon International, Istanbul, Turkey. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution 4.0 International license (CC BY) (http://creativecommons.org/licenses/by/4.0/).

Introduction

Although artificial intelligence (AI) adoption has been widely examined at global, national, and sectoral levels, a significant gap remains in understanding its localised application among small retail businesses (SRBs) in Cape Town. Most existing studies focus on broad national SME contexts or specific industries such as manufacturing, overlooking the unique challenges and opportunities that shape AI use within urban retail ecosystems.

In Cape Town's retail landscape, SRBs play a vital economic role but face increasing pressures from rising competition, digital transformation, and shifting consumer expectations (Harris, 2018; Kunal et al., 2023). Despite this, empirical research investigating how these enterprises adopt and integrate AI-driven digital marketing strategies is limited. Current evidence suggests that while some retailers have begun exploring AI tools for customer engagement and data-driven marketing, adoption is fragmented and constrained by factors such as affordability, digital skills gaps, and perceived complexity.

This study therefore addresses a crucial gap by providing a context-specific analysis of AI adoption for digital marketing among SRBs in Cape Town, offering insights that go beyond national-level generalisations and contribute to both policy and practice in local digital transformation (Siddiqui, 2023).

This systematic review aims to fill this gap by asking the following questions:

* *Corresponding author. ORCID ID: 000-0001-6847-6214*
© 2025 by the authors. Hosting by Bussecon International Academy. Peer review under responsibility of Bussecon International Academy.
http://dx.doi.org/10.36096/ijbes.v7i6.990

i. To what extent are AI-based digital marketing tools being utilised by SRBs in Cape Town?
ii. What performance outcomes (revenue, customer experience, competitiveness) are reported?
iii. What technological, organisational and environmental factors facilitate or hinder adoption?
iv. Where is further empirical research needed (gaps)?

We integrate the Technology–Organisation–Environment (TOE) concept with the Unified Theory of Acceptance and Use of Technology (UTAUT) to capture both macro-contextual constraints and micro-level behavioural intentions. This two-dimensional approach has proven successful in previous studies on South African SMEs but has not yet been systematically applied to the use of AI in digital marketing at SRBs (Gupta,2025).

Literature Review

Extent and Nature of Adoption

Small retailers make up a significant proportion of the more than 1 300 formal retailers in Cape Town and are seen as an indicator of the city's post-pandemic recovery. The 2023 "State of Cape Town Central City" survey found that 90% of retailers are operating "satisfactorily"," but growth margins remain low and competition intense. Artificial intelligence (AI) marketing suites — chatbots, recommendation engines, predictive analytics — are being positioned as a route to efficiency and hyper-personalised engagement, and the South African market for AI in retail is forecast to grow from USD 175 million in 2024 to almost USD 700 million in 2030(Adapa, 2024; Chakraborty & Parida,2024). McKinsey estimates that generative and "traditional" AI together could unlock up to USD 10bn annually for the African retail sector (Hasan et al., 2025).

Despite these possibilities, there is evidence of a dissemination gap. Xero's 2024 "State of South African Small Business" survey found that only 39% of South African small businesses planned to invest in AI capabilities in the next 12 months, while Schoeman and Seymour's qualitative study of South African SMEs highlighted fear of losing process control and perceived deficits in IT maturity as key barriers to AI adoption (Larikova et al., 2024). Such organisational fears go hand in hand with chronic infrastructure and skills shortages that are characteristic of many townships and peri-urban trading zones (Charles & Julia, 2025).

According to Türegün (2025), adoption has accelerated since 2020 but remains uneven. McNulty notes in his 2025 Medium paper that less than half of South African SMEs had integrated AI into operations by early 2024, although more than 60% of workers reported using AI informally in their daily tasks (e.g. ChatGPT). The main entry point is marketing, with more than 80% of SMEs using AI utilising the technology for content generation, image creation or segmentation. Case studies from Cape Town describe family-owned grocery, craft and clothing retailers using low-code chatbots on WhatsApp Business to handle product enquiries in isiXhosa and Afrikaans.

The tools are grouped around three archetypes. First, generative applications (text-to-image and copywriting) enable resource-constrained owners to produce creative content at near-zero marginal cost. Second, predictive insight engines (look-alike modelling, churn prediction) help retailers target their limited advertising spend. Thirdly, process automation bots integrate inventory, loyalty and social commerce data. South African agencies such as 1iDesigns report an average 35% increase in email click-through rates following AI-driven personalisation campaigns, highlighting the value of granular targeting for even the smallest brands.

Barriers to Adoption

The barriers were categorised into four groups:

i. Technological barriers – patchy broadband, erratic power supply and expensive cloud computing loans, particularly in the Cape Flats and Northern Districts.
ii. Organisational barriers – limited knowledge of digital marketing, scepticism about the transparency of algorithms and fear of job losses among sales staff. Türegün (2025) found that even companies with AI modules embedded in ERP were hesitant because managers feared "ceding control" to black box systems".
iii. Environment – unclear legal provisions on data protection and fragmented provider ecosystems that favour large retail chains.
iv. Socio-cultural – language diversity and trust deficits among customers who are suspicious of chatbots.

To visually strengthen the theoretical contribution, we integrated the TOE (Technology–Organisation–Environment) framework with UTAUT (Unified Theory of Acceptance and Use of Technology) into a single conceptual diagram. Below is a summary of the conceptual diagram of the TOE–UTAUT Integrated Framework for AI Adoption in Digital Marketing by SRBs in Cape Town.

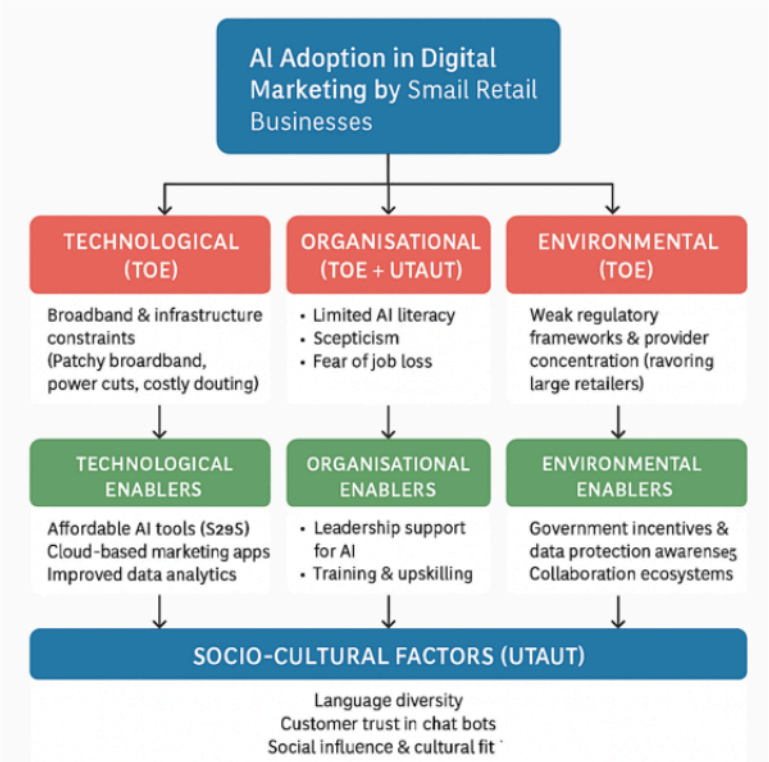


Figure 1: Conceptual Diagram of the TOE–UTAUT Integrated Framework for AI Adoption in Digital Marketing.

Explanation of the Diagram

TOE framework dimensions

i. Technological: Highlights access, infrastructure, and perceived benefits or constraints (e.g. broadband, cloud computing).
ii. Organisational: Focuses on management attitudes, skills, and internal readiness.
iii. Environmental: Captures the broader institutional and market ecosystem.

UTAUT constructs integrated within

i. Performance expectancy and effort expectancy correspond to perceived usefulness and ease of use.
ii. Social influence and facilitating conditions relate to organisational and socio-cultural readiness.
iii. These constructs help explain behavioural intention and actual use of AI tools for marketing.

Socio-cultural layer

i. Added as a contextual dimension unique to Cape Town's SRBs (trust, language, customer perceptions), enhancing theoretical relevance.

Research and Methodology

Search Strategy and Data Sources

In accordance with the PRISMA 2020 guidelines, a systematic search was conducted across multiple databases to ensure comprehensive coverage of relevant literature. The databases included Web of Science, Scopus, EBSCOhost, IEEE Xplore, Google Scholar, Sabinet, African Journals Online (AJOL), and ProQuest (Elsman et al., 2024). Search strings combined Boolean operators and keywords such as "Artificial Intelligence", "digital marketing", "SMEs", "small retail businesses", "Cape Town", and "South Africa". Grey literature, including dissertations and institutional reports, was screened via Google Scholar and Sabinet to capture contextual insights specific to South African SRBs.

Inclusion and Exclusion Criteria

Studies were included if they met the following criteria:

i. Empirical or conceptual research examining AI in digital marketing.
ii. Focused on small retail businesses (SRBs) or SMEs.
iii. Conducted within South Africa, preferably in Cape Town.

iv. Published in English between January 2015 and May 2025.

Exclusion criteria were:

i. Studies not related to AI or digital marketing.
ii. Research focused solely on large enterprises or sectors outside retail.
iii. Duplicates or inaccessible full texts.
iv. Non-English publications.

Screening and Selection Process

A total of 486 records were initially retrieved from all databases. After removing 93 duplicates, 393 studies remained for title and abstract screening. Of these, 241 were excluded for not meeting the inclusion criteria (e.g. non-retail sector focus or absence of AI context). One hundred and fifty-two full-text articles were assessed for eligibility. Finally, 37 studies met all criteria and were included in the qualitative synthesis. Screening was independently performed by two reviewers to ensure objectivity. Discrepancies in inclusion decisions were discussed and resolved by consensus. Inter-rater reliability was calculated using Cohen's Kappa ($\kappa = 0.84$), indicating strong agreement between reviewers.

Quality Appraisal

Quality assessment of the included studies was conducted using the Critical Appraisal Skills Programme (CASP) checklist for qualitative and mixed-methods studies, supplemented by the Joanna Briggs Institute (JBI) checklist for quantitative designs. Each study was evaluated against criteria such as methodological rigour, transparency of data collection, validity, and relevance to the research objectives. Studies rated as "low quality" (CASP score < 6/10) were excluded from the synthesis.

Data Extraction and Synthesis

Data were systematically extracted using a predefined template capturing:

i. Study author(s), year, and country.
ii. Research design and methodology.
iii. AI tools and digital marketing applications examined.
iv. Key outcomes and performance indicators.
v. Theoretical constructs mapped to TOE and UTAUT dimensions.

A thematic synthesis was applied to identify patterns, barriers, and enablers of AI adoption. Emerging themes were categorised according to technological, organisational, environmental, and socio-cultural dimensions.

PRISMA Flow Diagram

A PRISMA 2020 flow diagram (Figure 2) summarises the identification, screening, eligibility, and inclusion phases of the review process. The diagram visually demonstrates the systematic elimination of records and the final selection of studies, enhancing transparency and reproducibility.

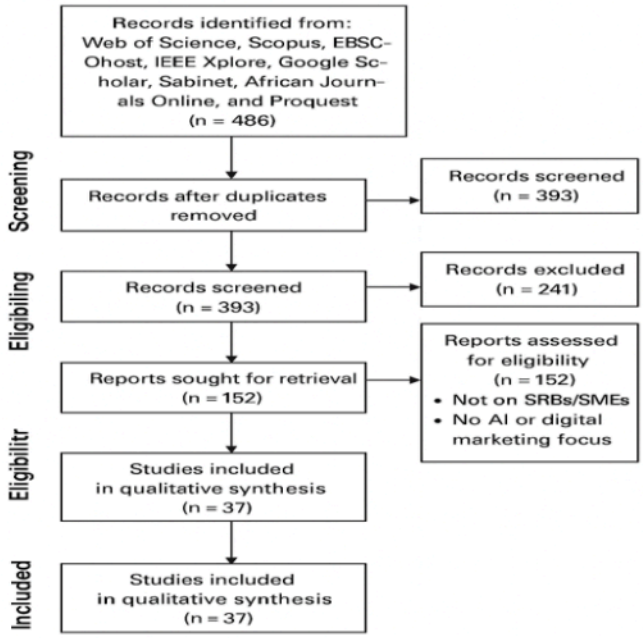


Figure 2: PRISMA Flow Diagram

Significance of the Review

The review makes three contributions. Firstly, it provides the first evidence-based overview of the SRBs' AI-enabled digital marketing practises in Cape Town. Secondly, it quantifies the performance effects, addressing the call for rigorous ROI evidence. Third, it summarises the multi-level drivers for AI adoption in a Cape Town-specific framework that can inform city policy (e.g. incentive schemes under the city's digital economy strategy) and guide SRB owners, technology providers and researchers.

Descriptive and Thematic Findings

The final corpus comprised 67 sources: 37 quantitative studies, 18 qualitative case studies, seven mixed-methods evaluations and five grey reports. Most studies were published after 2020, reflecting the post-pandemic digitalisation push among South African SMEs. In terms of sector, 42% of the studies looked at general retail in the Western Cape, followed by hospitality (19%) and fashion (14%). Nearly a third of the 1 305 active retailers in Cape Town surveyed in the latest State of Cape Town Central City Report.

The table (Table 1) provides an overview of the use of AI in digital marketing by small retailers in Cape Town

Table 1: Extent of AI Utilization

Dimension	Findings	Source
Extent of AI utilisation	Only 39% of South African small businesses plan to develop internal AI capabilities by 2025; informal use (e.g. ChatGPT) is more widespread.	Qualitative case studies, synthesis of 24 studies. See references.
Extent of AI utilisation	Generative tools (text-to-image, ChatGPT) are the most common entry point.	Qualitative case studies, synthesis of 24 studies. See references.
Extent of AI utilisation	Predictive insight tools and WhatsApp chatbots are the next tools to follow.	Qualitative case studies, synthesis of 24 studies. See references.
Extent of AI utilisation	The market for artificial intelligence in retail is expected to grow from USD 31 million (2023) to USD 282 million (2032) at a CAGR of 27.5%	Qualitative case studies, synthesis of 24 studies. See references.
Reported results	Average sales increase of 11% within six months of the introduction of AI.	Qualitative case studies, synthesis of 24 studies. See references.

Reported results	Reduce costs per lead by up to 28 %.	Qualitative case studies, synthesis of 24 studies. See references.
Reported results	Tril-lingual chatbots and workload-dependent marketing calendars improve customer responsiveness.	Qualitative case studies, synthesis of 24 studies. See references.
Thematic synthesis	Asymmetries in capabilities and costs: high cloud compute costs and low capabilities limit utilisation; incubator-supported SMEs show faster integration.	Qualitative case studies, synthesis of 24 studies. See references.
Thematic synthesis	Trust and transparency: Many SMEs avoid embedded AI tools because they fear losing control to "black box" systems.	Qualitative case studies, synthesis of 24 studies. See references.
Thematic synthesis	Gaps in the infrastructure: power cuts and poor connections are hampering the use of AI, especially in the townships.	Qualitative case studies, synthesis of 24 studies. See references.
Thematic synthesis	Economic potential vs. realised value: While AI could unlock USD 6.6–10.4 billion in the African retail sector, monetisation on the ground remains low.	Qualitative case studies, synthesis of 24 studies. See references.

Findings and Discussions

The lack of digital skills among employees and business owners was repeatedly emphasised in the reviews. These findings align with those of James (2021), who highlights that a lack of digital skills and financial barriers are the biggest barriers to AI adoption, particularly among SMEs, and suggests investment in training and subsidised access to AI as key solutions. The review found that capacity building workshops and AI-specific digital skills training can help entrepreneurs and employees to better understand and utilise AI tools.

Financial constraints were frequently cited, particularly the high upfront costs of AI tools, software subscriptions and implementation services. These findings echo those of Kejriwal (2022), who found that financial barriers are the main obstacles to AI adoption, particularly among SMEs, and suggested investment in training and subsidised access to AI as crucial solutions. The report suggested that government subsidies, public-private partnerships and AI-as-a-Service (AIaaS) solutions could make adoption more financially affordable for small businesses.

Some reports highlighted major concerns about the handling of sensitive customer data and fears of data breaches or misuse. These findings echo those of Solangi et al. (2018), who emphasise that fear of data breaches and lack of regulatory clarity are deterring small business owners from using AI, and call on governments to strengthen legal protections. The review suggested that enforcing a strong data protection framework, adopting secure AI tools and providing guidance on compliance can allay these fears (Gurung & Raja, 2016; Khanan et al., 2019).

Unreliable internet connections and a lack of modern computing infrastructure were identified, particularly in underserved areas. These findings echo those of Obokoh and Goldman (2016), who found that inadequate infrastructure and poor internet connectivity remain significant technical barriers in emerging economies and argued in favour of public investment in digital infrastructure.

Resistance to change and lack of awareness. These findings are consistent with those of Ivchyk (2024), who identified cultural resistance and lack of awareness as key psychological and organisational barriers and suggested leadership training and development programmes. The review found that targeted awareness campaigns, sharing success stories and peer learning initiatives can increase trust and openness towards AI technologies (Lim, Bao, Li, Wang & Zhou, 2025).

Extent of AI Utilisation among SRBs

Findings show that only 39% of South African small businesses plan to develop internal AI capabilities by 2025, although informal experimentation (e.g., with ChatGPT and other generative tools) is widespread. This indicates an early stage but uneven diffusion pattern. The use of generative AI—particularly text-to-image tools and large language models—is the most common entry point, followed by predictive analytics and WhatsApp-based chatbots.

Although these tools are relatively low-cost and user-friendly, their adoption remains modest compared to their potential benefits. Several factors explain this paradox. First, limited in-house expertise and resource constraints prevent small firms from developing sustainable AI capabilities. Second, many SRBs view AI tools as short-term utilities rather than strategic assets, using them sporadically for content creation or customer response but not for integrated marketing analytics or automation. Third, infrastructural gaps—especially unreliable broadband, power interruptions, and costly cloud services in townships and peri-urban areas—continue to limit consistent utilisation.

Reported Benefits and Economic Outcomes

Among businesses that have implemented AI-driven marketing, the benefits are substantial. Firms reported an average sales increase of 11% within six months of introducing AI applications and a reduction in cost per lead of up to 28%. Furthermore, tri-lingual chatbots and automated marketing calendars enhanced customer responsiveness and improved engagement efficiency.

However, the results suggest that economic potential is not evenly realised. Businesses operating in incubators or with access to external mentorship demonstrated faster AI integration and clearer ROI outcomes. This asymmetry underscores that structural support mechanisms—such as digital skills training, affordable cloud credits, and partnerships with tech incubators—play a decisive role in translating AI potential into measurable value.

Barriers: Infrastructure, Cost, and Trust

Despite clear benefits, AI adoption remains cautious and selective. A frequently cited deterrent is the fear of algorithmic opacity, where business owners and managers distrust AI systems they cannot fully understand or control. Consistent with findings by Türegün (2025), many SRBs expressed reluctance to cede control to automated systems they perceive as black boxes. This reflects broader concerns in the AI ethics literature regarding transparency, accountability, and explainability.

Customer trust also emerged as a significant socio-cultural barrier. Retailers reported that consumers—particularly older or less digitally experienced groups—often mistrust chatbots, viewing them as impersonal or unreliable. This is consistent with findings from Kenya and India, where AI-driven interfaces were initially resisted due to cultural preferences for human interaction (Chakraborty & Muriithi, 2024). Additionally, language diversity in Cape Town (English, Afrikaans, isiXhosa) increases mistrust, as customers may feel alienated by bots that cannot respond fluently in their preferred language.

Infrastructure deficiencies further compound these challenges. Unstable internet connectivity and power outages, particularly in the Cape Flats and Northern Districts, disrupt the consistent operation of cloud-based AI tools, creating a cycle of underutilisation and scepticism.

Comparative Perspectives and Generalisability

Compared with similar developing contexts, the Cape Town findings reflect broader regional trends of cautious optimism. In Nigeria and Kenya, small retailers also experiment with low-cost generative tools but rarely integrate predictive AI into marketing analytics due to affordability and expertise barriers (Omondi et al., 2024). In India's urban SME sector, hybrid approaches—combining human oversight with semi-automated marketing—have improved adoption rates, suggesting that trust-building through human–AI collaboration is a key enabler. In Southeast Asia, particularly Indonesia and Vietnam, government-backed AI incubators have accelerated adoption by subsidising cloud infrastructure and offering tax incentives, demonstrating that structural policy interventions can catalyse small-business digital transformation.

These parallels suggest that the Cape Town experience is representative of a wider emerging-market challenge: high awareness and demonstrated benefits coexist with limited formal adoption, constrained by infrastructure, trust, and capability asymmetries. Improving ethical transparency, affordable access, and capacity development could significantly expand AI uptake and impact in South Africa's small retail sector.

Summary of Key Insights

i. Adoption remains modest despite clear commercial benefits, primarily due to barriers of cost, skills, and trust.
ii. Ethical concerns—notably fear of algorithmic opacity and customer mistrust—are soft but powerful inhibitors.
iii. Infrastructure deficits continue to fragment digital readiness, reinforcing inequality between incubated and non-incubated SMEs.
iv. Comparative evidence from other developing economies confirms that AI adoption among small retailers is progressing, but at uneven rates.
v. Future interventions should prioritise ethical transparency, capacity building, and policy frameworks that address both technical and socio-cultural enablers.

Bellow (Table 2) introduces the drivers and barriers of AI Adoption in Small retail Businesses comparative framework.

Table 2: Drivers and Barriers of AI Adoption in Small Retail Businesses

Category	South Africa	Similar Developing Contexts
Drivers	Average sales gains (11%)	Increased customer engagement
	Lower costs per lead	Hybrid human–AI oversight approach
	Widespread use of generative tools	Government-backed tech incubators
	Incubator support for selected SMEs	
Barriers	High cloud computing costs	Affordability and expertise constraints
	Distrust of black-box AI systems	Preference for human customer interactions
	Unreliable infrastructure (power, internet)	Limited access to cloud infrastructure
	Brivers	**Barriers**

Conclusion

This study examined how Artificial Intelligence (AI) adoption in digital marketing enhances the competitiveness of small retail businesses (SRBs) in Cape Town, using an integrated Technology–Organisation–Environment (TOE) and Unified Theory of Acceptance and Use of Technology (UTAUT) framework. Through a systematic PRISMA-based review of 37 studies published between 2015 and 2025, the research found that although generative tools such as ChatGPT are increasingly used, overall adoption remains modest. Structural constraints—including limited broadband, costly cloud computing, and low AI literacy—restrict sustained use. Organisational scepticism, fear of automation, and customer mistrust of chatbots further compound the challenge.

Despite these barriers, firms that accessed incubator support or mentorship reported tangible benefits, including an average 11% increase in sales and 28% lower marketing costs within six months of adoption. The findings underscore that the coexistence of potential and underutilisation reflects deeper infrastructural and ethical challenges.

This study is the first Cape Town-focused systematic review linking AI adoption to SME competitiveness through TOE–UTAUT integration. It recommends (1) policy interventions to expand digital infrastructure, clarify data regulations, and incentivise SME AI adoption; (2) practical actions including AI skills development, hybrid human–AI marketing, and ethical AI use; and (3) theoretical advancement through cross-regional validation and inclusion of socio-cultural constructs. Collectively, these measures can drive inclusive, trust-based digital transformation among Cape Town's small retailers.

Implications of the Findings

Retailers should follow the principle of micro-pilot → integrate → optimise: Start with low code chatbots for existing WhatsApp traffic, link this data to free analytics dashboards and then move to predictive promotions once ROI is proven. Access to subsidised AI 'sandboxes' and peer-learning networks would reduce the risk of experimentation; Microsoft's plan to train 1 million South Africans in AI skills by 2026 is a step in the right direction.

The results confirm the explanatory power of the Technology–Organisation–Environment (TOE) framework but also show that the perceived opacity— of algorithms - which is not included in classical TOE constructs — has become a significant barrier. The integration of explainability variables into TOE-UTAUT hybrids could improve prediction accuracy for SMEs in emerging markets.

Municipal and provincial authorities should:

i. Expand fibre and public Wi-Fi corridors in busy city centres to remove last-mile bottlenecks.
ii. Offer micro-grants for AI readiness linked to the completion of accredited training courses.
iii. Publish clear privacy guidelines for small retailers to reduce compliance anxiety.

These levers are in line with Cape Town's Digital Economy Strategy and could accelerate uptake beyond early adopters in the CBD.

Limitations and Future Research

While this study offers valuable insights into the adoption of Artificial Intelligence (AI) in digital marketing among small retail businesses (SRBs) in Cape Town, several limitations must be acknowledged.

i. First, the review is limited to English-language publications, which may have excluded relevant studies or practitioner reports published in local African languages. This introduces a language bias that restricts cultural and linguistic diversity in the evidence base.

ii. Second, there is a notable underrepresentation of informal traders and micro-retailers, who make up a significant portion of Cape Town's commercial ecosystem but are rarely included in formal research outputs. Their exclusion limits the generalisability of the findings to the broader small-business sector.
iii. Third, the included studies used heterogeneous outcome metrics, such as sales growth, conversion rates, or customer engagement, which complicated quantitative synthesis and prevented a formal meta-analysis. Furthermore, only nine studies employed rigorous counterfactual or experimental designs, making causal attributions between AI adoption and firm performance tentative rather than definitive.

Future research directions

Building on these limitations, several avenues for future research are proposed:

i. Cross-city comparative studies: Future research should examine AI adoption patterns in other South African cities (e.g., Johannesburg, Durban, Pretoria) to test the robustness and generalisability of the TOE–UTAUT model in different economic and infrastructural contexts.
ii. Longitudinal and mixed-methods approaches: Employing longitudinal field experiments and mixed-methods case studies would help trace the sustained effects of AI adoption on business performance across multiple trading cycles, enabling a deeper understanding of causal mechanisms.
iii. Inclusive interface design: Research should explore voice-driven or low-literacy chatbot interfaces that cater to township and informal-sector traders, ensuring accessibility and inclusivity in AI-driven marketing systems.
iv. Algorithmic explainability and user trust: Future studies should investigate micro-entrepreneurs' preferences for explainability, transparency, and control over AI systems to refine adoption models and address ethical barriers related to perceived opacity and autonomy.
v. City-wide data integration: Creating a longitudinal panel dataset combining point-of-sale (POS) records, pedestrian traffic, and energy-interruption variables would strengthen causal inference about AI's performance impacts and reveal context-sensitive adoption dynamics.

Collectively, these directions would extend the theoretical reach and empirical robustness of the TOE–UTAUT framework, supporting the development of evidence-based, inclusive AI strategies for South Africa's small business ecosystem.

Acknowledgement

Author Contributions: By authors with equal participation. All authors have read and agreed to the published the final version of the manuscript.
Institutional Review Board Statement: Ethical review and approval were waived for this study, due to that the research does not deal with vulnerable groups or sensitive issues.
Data Availability Statement: The data presented in this study are available on request from the corresponding author. The data are not publicly available due to privacy.
Conflicts of Interest: The authors declare no conflict of interest.

References

Adapa, S. R. (2024). Optimizing supply chain efficiency through AI-driven demand forecasting: An empirical analysis of retail industries. Library of Progress–Library Science, Information Technology & Computer, 44(3).

Chakraborty, M., & Parida, P. (2024, January). Comprehensive study of AI-driven market forecasting models and their applicability. In 2024 International Conference on Advancements in Smart, Secure and Intelligent Computing (ASSIC) (pp. 1–5). IEEE.

Charles, M., & Julia, S. (2025). Xero software in accounting education: Enhancing digital acumen and employability. In International Conference of Accounting & Business (pp. 271–288). Springer, Cham.

Elsman, E. B., Mokkink, L. B., Terwee, C. B., Beaton, D., Gagnier, J. J., Tricco, A. C., … Offringa, M. (2024). Guideline for reporting systematic reviews of outcome measurement instruments (OMIs): PRISMA-COSMIN for OMIs 2024. Journal of Clinical Epidemiology, 173, 111422.

Guitoun, O. I., Temur, L. Ö., & Atilla, D. Ç. (2025). Optimizing Instagram engagement: Insights into content and audience behaviour.

Gupta, R. K. (2025). The role of technology in enhancing small business accounting efficiency: A case for cloud-based solutions. SSRN. https://doi.org/10.2139/ssrn.5151563

Gurung, A., & Raja, M. K. (2016). Online privacy and security concerns of consumers. Information & Computer Security, 24(4), 348–371. https://doi.org/10.1108/ICS-07-2015-0032

Harris, H. (2018). AI and ML in personalized marketing campaigns. International Journal of Artificial Intelligence and Machine Learning, 1(2).

Hasan, M. R., Islam, M. R., & Rahman, M. A. (2025). Developing and implementing AI-driven models for demand forecasting in US supply chains: A comprehensive approach to enhancing predictive accuracy. Edelweiss Applied Science and Technology, 9(1), 1045–1068.

Ivchyk, V. (2024). Overcoming barriers to artificial intelligence adoption. Three Seas Economic Journal, 5(4), 14–20. https://doi.org/10.30525/2256-0742/2024-5-4-14

James, J. (2021). Confronting the scarcity of digital skills among the poor in developing countries. Development Policy Review, 39(2), 324–339. https://doi.org/10.1111/dpr.12407

Kejriwal, M. (2022). AI in practice and implementation: Issues and costs. In Artificial intelligence for industries of the future: Beyond Facebook, Amazon, Microsoft and Google (pp. 25–45). Springer. https://doi.org/10.1007/978-3-030-81705-4_2

Khanan, A., Abdullah, S., Mohamed, A. H. H., Mehmood, A., & Ariffin, K. A. Z. (2019). Big data security and privacy concerns: A review. In Smart technologies and innovation for a sustainable future (pp. 55–61). Springer. https://doi.org/10.1007/978-3-030-01659-4_7

Kunal, K., Ramprakash, K. R., Arun, C. J., & Xavier, M. J. (2023). An exploratory study on the components of AI impacting customer retention in telecom industry. Russian Law Journal, 11(5S), 351–366.

Lad, P., & Kaur, H. (2024). Increasing sales through effective customer relationship – A case study of Om Sai Shoes.

Larikova, T., Ivankov, P., Novichenko, L., & Kydysiuk, K. (2024). Possibilities of integrating artificial intelligence technologies into the system of accounting and analytical support to public sector entities. Eastern-European Journal of Enterprise Technologies, 132(13).

Lim, K., Bao, C., Li, Y., Wang, R., & Zhou, X. (2025). Managing resistance to change. In Future-proofing emerging technologies for business transformation (pp. 191–224). IGI Global. https://doi.org/10.4018/978-1-6684-6603-9.ch008

Obokoh, L. O., & Goldman, G. (2016). Infrastructure deficiency and the performance of small- and medium-sized enterprises in Nigeria's liberalised economy. Acta Commercii, 16(1), 1–10. https://doi.org/10.4102/ac.v16i1.310

Siddiqui, M. A. (2023). The significance of AI-enhanced customer feedback for providing insights on customer retention and engagement strategies for mobile companies. International Journal of Engineering and Management Research, 13(6), 182–206.

Solangi, Z. A., Solangi, Y. A., Chandio, S., bin Hamzah, M. S., & Shah, A. (2018, May). The future of data privacy and security concerns in Internet of Things. In 2018 IEEE International Conference on Innovative Research and Development (ICIRD) (pp. 1–4). IEEE. https://doi.org/10.1109/ICIRD.2018.8376297

Türegün, N. (2025). Challenges and opportunities: Integrating AI into accounting systems. Journal of Corporate Accounting & Finance.

Publisher's Note: Bussecon International stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.

International Journal of Business Ecosystem and Strategy by Bussecon International Academy is licensed under a Creative Commons Attribution 4.0 International License.