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# Effects Of Innovation on Entrepreneurial Performance among SMES in Malawi: Evidence from Selected Telecommunication Industries

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## Abstract

Innovation remains critical for SME competitive viability in developing countries, yet empirical evidence on innovation effects within resources-constrained African telecommunications remains limited. This study examined innovation effects on entrepreneurial performance among Malawi's telecommunication SMEs. This study was guided by three objectives, which were to assess innovation effects on entrepreneurial performance and examine challenges affecting innovation implementation. The research employed a convergent parallel mixed-methods design combining quantitative and qualitative approaches. Data were collected from 121 survey respondents and 10 interview participants operating in Lilongwe and Blantyre during November-December 2025. Quantitative analysis employed descriptive statistics, Pearson correlation, hierarchical multiple regression with comprehensive assumptions testing, Baron and Kenny moderation analysis, and Bonferroni-adjusted hypothesis testing. Qualitative analysis followed Braun and Clarke's thematic framework. Findings were integrated around five themes: conceptualizing innovation in SMEs, innovation practices in the telecommunication industry, entrepreneurial performance, and challenges affecting innovation implementation. Results revealed comprehensive innovation adoption across product, process, marketing, and organizational dimensions (M = 3.61 - 3.72) through bundled strategies. Performance proved moderate (M = 3.55) with customer satisfaction as the strongest dimension. Innovation demonstrated significant positive effects on performance (r = .400, B = .520, p = .001), explaining 16% variance beyond control variables. Implementation challenges registered moderate-high severity (M = 5.15 - 5.32) but not moderate innovation effectiveness (B = -.042, p = .502), operating as adoption barriers rather than effectiveness moderators. This study concludes that telecommunications SMEs posses genuine innovation capability, generating measurable performance benefits despite severe implementation challenges. Recommendations target financial instrument innovation and regulatory differentiation. skills, pipeline expansion, infrastructure prioritization, and evidence-based innovation promotion emphasizing realistic incremental benefits. Findings advance Schumpeterian theory by documenting necessity-driven innovation logic and contribute practical guidance for innovation ecosystem development in resource-constrained contexts.

**Keywords:** Innovation, SMEs, Performance, Telecommunication, Malawi

## 1. Introduction

Innovation has emerged as a defining characteristic of contemporary entrepreneurship, fundamentally reshaping how businesses create value, compete for market share, and sustain operations in increasingly dynamic economic environments. Globally, innovation encompasses not merely technological advancement but also strategic reconfiguration of products, processes, marketing approaches, and organizational structures through which firms pursue competitive advantages (OECD, 2021). This multidimensional conceptualization reflects recognition that successful entrepreneurship in the twenty-first century demands continuous adaptation to shifting customer preferences, technological disruptions, and competitive pressures that render yesterday's business models obsolete. The globalization of markets, acceleration of technological change, and proliferation of digital platforms have collectively intensified innovation imperatives for enterprises regardless of size or sector, though small and medium enterprises face distinctive challenges in mobilizing resources for innovation investment while simultaneously managing operational demands.

The global innovation landscape reveals substantial geographical disparities in both innovation capacity and performance outcomes. Advanced economies in North America, Europe, and East Asia dominate international innovation rankings, characterized by robust research and development ecosystems, sophisticated intellectual property frameworks, and deep financial markets channelling capital toward innovative ventures (World Bank, 2023). These economies benefit from decades of cumulative investment in education systems producing technically skilled workforces, regulatory environments balancing innovation incentives with consumer protection, and cultural contexts valuing experimentation and risk-taking. The Global Innovation Index consistently documents those high-income countries maintain substantial leads over middle and low-income nations across metrics encompassing research intensity, patent applications, technological sophistication, and knowledge diffusion (Cornell University et al., 2023). However, recent evidence suggests these gaps may be narrowing in specific domains, particularly digital service innovation where mobile technology proliferation enables developing country entrepreneurs to leapfrog traditional infrastructure constraints.

Statistical evidence underscores innovation's contribution to enterprise performance across international contexts. Meta-analyses synthesizing hundreds of empirical studies document consistent positive associations between innovation adoption and multiple performance dimensions including revenue growth, profitability, market share expansion, and operational efficiency improvements (Rosenbusch et al., 2019). Effect magnitudes vary considerably across contexts, with innovation's performance impact moderated by factors including industry characteristics, firm size, resource endowments, institutional quality, and competitive intensity. Nevertheless, the preponderance of evidence supports theoretical propositions that innovation constitutes a genuine performance driver rather than merely correlating with success due to confounding factors. Longitudinal studies tracking firms over extended periods reveal that sustained innovation investment predicts superior long-term performance more reliably than one-time innovations, suggesting cumulative capability building rather than isolated breakthroughs drives competitive advantages (Coad et al., 2016). These patterns hold across manufacturing and services sectors, though specific innovation types demonstrating strongest performance effects differ between industrial categories.

Legal and regulatory frameworks governing innovation vary substantially across jurisdictions, reflecting different philosophical approaches to balancing innovation encouragement against consumer protection, competitive fairness, and social welfare objectives. Intellectual property regimes constitute perhaps the most consequential regulatory dimension, with patent, copyright, and trademark systems designed to provide temporary monopolistic protections incentivizing innovation investment while eventually enabling knowledge diffusion benefiting society broadly (WIPO, 2022). However, intellectual property frameworks designed for large corporations in advanced economies often prove ill-suited for small enterprises in developing countries, where enforcement capacity remains limited and registration costs prohibitive relative to firm resources. Competition policies represent another critical regulatory domain, as authorities balance permitting innovation-driven temporary market dominance against preventing anti-competitive practices suppressing entrepreneurial entry. Data protection regulations have emerged as increasingly significant innovation determinants, particularly for digital service providers whose business models depend on customer information collection and analysis.

Within Africa, innovation dynamics reflect the continent's distinctive economic structures, institutional contexts, and developmental challenges. African economies remain characterized by large informal sectors, limited infrastructure penetration, shallow financial markets, and regulatory frameworks often designed for traditional industries rather than emerging digital sectors (African Development Bank, 2022). Small and medium enterprises dominate African business landscapes, collectively accounting for more than eighty percent of enterprises and contributing substantially to employment and GDP generation (Yahaya and Nadarajah, 2023). However, SME survival rates remain concerningly low, with majority failing within their first five operational years due to multifaceted challenges including inadequate financing, management capability deficits, infrastructure unreliability, and market access difficulties. Innovation represents both imperative and constraint for African SMEs: imperative because competitive intensity and customer expectations demand continuous improvement, yet constrained because resource limitations, skills gaps, and institutional weaknesses impede innovation implementation.

Recent developments suggest African innovation ecosystems may be strengthening, particularly within technology and telecommunications sectors benefiting from mobile platform proliferation. Mobile telephony penetration has increased dramatically across Africa over the past two decades, reaching seventy-eight percent of the population by 2021 and enabling communication, financial services, and information access previously unavailable to millions (GSMA, 2022). This mobile revolution has catalyzed entrepreneurial innovation, with thousands of startups developing mobile-based services spanning agriculture, healthcare, education, and commerce. Regional innovation hubs have emerged in cities including Nairobi, Lagos, Cape Town, and Accra, attracting venture capital investment and demonstrating African entrepreneurial capacity when enabling conditions exist. However, these success stories remain geographically concentrated and sectorally limited, with innovation intensity outside technology hotspots remaining modest compared to international benchmarks.

Statistical evidence on innovation adoption among African SMEs reveals mixed patterns. Surveys conducted across multiple African countries document that while many SMEs report engaging in some innovation activities, depth and sophistication often remain limited compared to international counterparts (World Bank, 2021). Product and process innovations tend to concentrate in incremental improvements rather than radical breakthroughs, reflecting resource constraints limiting experimental capacity. Marketing and organizational innovations appear more widespread, possibly because these innovation types demand less capital investment than product or process transformations. Sectoral variation proves substantial, with telecommunications, financial services, and technology firms demonstrating higher innovation intensity

than agriculture, manufacturing, or traditional retail. Empirical research examining innovation-performance relationships in African contexts yields results broadly consistent with international patterns: firms engaging more intensively in innovation report superior performance across multiple dimensions, though effect magnitudes often prove more modest than observed in advanced economies (Mwangi and Wanjau, 2018).

Regulatory environments governing innovation across African countries exhibit considerable heterogeneity, with some jurisdictions implementing progressive frameworks encouraging entrepreneurship while others maintain restrictive regimes inherited from colonial or post-independence eras. Telecommunications sectors have experienced substantial liberalization across much of the continent, with monopolistic state-owned enterprises facing competition from private operators driving service improvements and price reductions (Adegbite et al., 2019). However, licensing requirements, spectrum allocation processes, and infrastructure sharing regulations vary considerably across countries, creating different competitive dynamics and innovation incentives. Intellectual property frameworks theoretically exist across African nations as signatories to international treaties, yet enforcement capacity remains limited in many contexts, potentially reducing innovation incentives while simultaneously lowering barriers to knowledge diffusion. Entrepreneurship-related regulations including business registration procedures, taxation systems, and labour laws significantly affect SME innovation capacity by determining resource availability for innovation investment versus regulatory compliance.

Within Malawi specifically, the SME sector plays a critical economic role despite the country's status among the world's least developed nations. SMEs account for an estimated eighty-five percent of businesses and contribute substantially to employment generation, particularly in urban centres where formal sector opportunities remain scarce (Government of Malawi, 2020). However, Malawian SMEs face formidable challenges including limited access to finance with credit markets dominated by commercial banks demanding collateral most small enterprises cannot provide, infrastructure deficits encompassing unreliable electricity and internet connectivity undermining digital service delivery, and skills gaps reflecting educational system weaknesses (Reserve Bank of Malawi, 2021). Innovation capacity among Malawian SMEs remains underdeveloped relative to regional peers, with most firms focusing on survival rather than growth-oriented strategies requiring innovation investment.

The telecommunications sector represents an exceptional case within Malawi's broader economic landscape, demonstrating dynamism and growth contrasting sharply with stagnation characterizing many traditional industries. Mobile network operators have invested substantially in infrastructure expansion over the past fifteen years, increasing population coverage from thirty percent in 2008 to ninety-two percent by 2022, thereby enabling connectivity reaching even rural areas (MACRA, 2022). Mobile money services have achieved remarkable penetration, with transaction values exceeding forty percent of GDP and providing millions of Malawians access to financial services previously unavailable (World Bank, 2023). This telecommunications transformation has created entrepreneurial opportunities for SMEs operating as mobile service distributors, value-added service providers, and digital platform developers. However, the sector faces challenges including intense competition compressing profit margins, regulatory requirements imposing compliance costs, and technological change demanding continuous capability upgrading.

Statistical data on Malawi's telecommunications sector illustrates both achievements and persistent challenges. Mobile subscriptions reached approximately ten million in 2022, representing sixty percent penetration rate given the country's population of approximately nineteen million (MACRA, 2022). Internet penetration remains lower at thirty-eight percent, though growing rapidly as smartphone affordability improves and data prices decline. The sector generates approximately eight percent of GDP and employs thousands directly while supporting many more through indirect channels including airtime distribution networks and mobile money agents. However, geographic disparities persist, with urban areas enjoying substantially better connectivity and service quality than rural regions where infrastructure investment remains limited by low revenue potential.

Regulatory frameworks governing Malawi's telecommunications sector have evolved considerably since liberalization commenced in the late 1990s. The Malawi Communications Regulatory Authority (MACRA) established in 1998 licenses operators, allocates spectrum, enforces service quality standards, and mediates competitive disputes (MACRA, 2022). Recent regulatory initiatives have emphasized consumer protection through measures including mandatory service quality standards, transparent pricing requirements, and complaint resolution mechanisms. However, SME perspectives suggest regulatory frameworks sometimes impose disproportionate compliance burdens on smaller operators lacking large enterprises dedicated regulatory affairs departments. Licensing fees, insurance requirements, and audit obligations collectively absorb resources otherwise available for innovation investment, potentially constraining the very dynamism policymakers seek to encourage.

The relevance of investigating innovation's effects on SME performance within Malawi's telecommunications sector emerges from multiple considerations. First, telecommunications represent rare growth sector within Malawi's otherwise struggling economy, offering potential template for innovation-driven development in other domains. Understanding how innovation contributes to SME success in telecommunications could inform strategies applicable to agriculture, healthcare, education, and other sectors requiring modernization. Second, telecommunications SMEs face distinctive challenges and opportunities compared to traditional enterprises, operating in technically sophisticated environments demanding continuous learning while encountering intense competitive pressures from both domestic rivals and multinational corporations. Innovation may prove particularly critical for survival and growth in such contexts, making telecommunications SMEs ideal sites for examining innovation dynamics. Third, despite telecommunications' economic significance and rapid evolution, systematic empirical research on SME innovation in this sector remains scarce, with existing literature focusing predominantly on large

network operators or examining SME performance without isolating innovation's specific contribution (Phiri, 2021). This knowledge gap constrains evidence-based policymaking and leaves SME operators navigating innovation decisions without research-grounded guidance.

Finally, the study's timing proves opportune given recent technological and regulatory developments reshaping Malawi's telecommunications landscape. Mobile money services continue maturing, creating opportunities for innovative value-added services spanning insurance, credit, savings, and payments beyond basic money transfer. Internet penetration increases enable digital business models previously unviable, from e-commerce platforms to online education services. Regulatory reforms emphasizing competition and consumer protection alter strategic landscapes within which SMEs operate, potentially opening opportunities while imposing new constraints. Understanding how innovation affects entrepreneurial performance in this dynamic environment generates insights immediately relevant to practitioners, policymakers, and scholars seeking to strengthen SME contributions to Malawian development.

### 1.2 Statement of the Problem

Small and medium enterprises constitute a critical component of Malawi's economic architecture, accounting for approximately eighty-five percent of all businesses, contributing forty percent to national GDP, and generating over seventy percent of employment opportunities outside subsistence agriculture (Government of Malawi, 2020; World Bank, 2021). Within the telecommunications sector, SMEs operate as mobile service distributors, airtime vendors, mobile money agents, and value-added service providers, forming essential intermediary networks connecting telecommunications operators with customers. The sector has demonstrated remarkable growth, with mobile penetration reaching sixty percent of the population, mobile money transaction values exceeding eight billion USD annually, and telecommunications contributing approximately eight percent to national GDP (MACRA, 2022).

Despite these favourable macro-level trends, micro-level realities reveal persistent performance challenges. Approximately sixty-five percent of Malawian SMEs fail within five years, with telecommunications SMEs experiencing similar attrition rates despite operating in a growth sector (Reserve Bank of Malawi, 2021). Performance metrics demonstrate concerning patterns: profitability margins average below fifteen percent, substantially lower than the twenty-five to thirty percent considered necessary for sustainable operations (Phiri, 2021). Market penetration remains geographically concentrated, with seventy-eight percent of telecommunications SMEs operating exclusively in urban centres despite rural areas representing sixty-eight percent of the population (National Statistical Office, 2021). Customer retention rates average fifty-five percent annually, indicating service quality or competitive positioning weaknesses (MACRA, 2020). These performance deficits suggest internal capability limitations rather than unfavourable market conditions constrain enterprise success.

Innovation has been established internationally as a fundamental determinant of entrepreneurial performance, enabling firms to differentiate offerings, improve efficiency, enhance customer satisfaction, and achieve competitive advantages (OECD, 2021; Rosenbusch et al., 2019). Meta-analyses report that innovation explains between fifteen and thirty percent of performance variance among SMEs, establishing it as among the most influential performance determinants (Rosenbusch et al., 2019). The Oslo Manual's framework categorizing innovation into product, process, marketing, and organizational dimensions has enabled investigations revealing that different innovation types generate distinct performance effects (OECD, 2018).

However, substantial knowledge gaps persist regarding how innovation influences entrepreneurial performance among telecommunications SMEs within Malawi's distinctive environment. Existing innovation research concentrates heavily on large corporations in advanced economies, with SME-focused research predominantly examining manufacturing firms in Asia and Latin America (Kahveci, 2025). Sub-Saharan African contexts remain severely underrepresented, with sectoral focus skewing toward manufacturing and agriculture rather than telecommunications despite growing economic significance (Mwangi and Wanjau, 2018; Adegbite et al., 2019). Malawi-specific innovation research proves particularly scarce, with fewer than five peer-reviewed studies examining innovation among Malawian enterprises, and none focusing specifically on telecommunications SMEs (Phiri, 2021; Banda, 2019).

This knowledge deficit creates problematic implications. Policymakers designing SME support programs lack evidence-grounded guidance on whether innovation investments merit priority, which innovation types generate strongest returns, and what challenges require interventions. Telecommunications SME operators make strategic decisions without research-derived insights on expected performance impacts or effective challenge mitigation strategies. Development agencies cannot design evidence-based interventions when empirical foundations remain absent.

This study therefore addresses the problem of insufficient empirical knowledge on how innovation affects entrepreneurial performance among SMEs operating within Malawi's telecommunication industry. By examining innovation adoption patterns, quantifying innovation-performance relationships, and identifying implementation challenges, the research generates context-specific evidence filling critical knowledge gaps and responding to calls for expanding innovation research beyond current geographical, sectoral, and size-based concentrations (World Bank, 2023; African Development Bank, 2022).

## 2. Literature Review

### 2.1 Previous Studies

#### Global Perspectives on Innovation Types

Innovation scholarship has evolved from narrow technological conceptualizations toward multidimensional frameworks recognizing diverse forms through which enterprises create value and competitive advantages. The Oslo Manual, representing international consensus among statisticians, policymakers, and researchers, categorizes innovation into four principal types: product innovation involving new or improved goods and services, process innovation encompassing production or delivery method improvements, marketing innovation including significant changes in product design, packaging, promotion, or pricing, and organizational innovation involving business practice, workplace organization, or external relation modifications (OECD, 2018). This taxonomic framework, refined through multiple iterations since initial publication in 1992, reflects recognition that innovation transcends research laboratories to encompass strategic, commercial, and organizational domains equally critical for competitive success.

Empirical evidence from advanced economies documents that SMEs engage with all four innovation types, though adoption patterns vary considerably across sectors, firm sizes, and competitive contexts. Manufacturing SMEs traditionally concentrated on product and process innovations, with surveys across European Union member states revealing that approximately sixty-five percent of manufacturing firms report product innovation activities while fifty-eight percent engage in process innovation during typical three-year observation periods (Eurostat, 2020). However, service sector SMEs demonstrate different patterns, with marketing and organizational innovations assuming greater prominence relative to product innovations that prove difficult to distinguish in intangible service contexts (Djellal and Gallouj, 2018). Financial services, professional services, and hospitality sectors report organizational innovation rates exceeding seventy percent, reflecting competitive dynamics where service delivery efficiency and customer experience differentiation depend critically on organizational capabilities rather than tangible product attributes (Galindo-Martín et al., 2019).

Technology-intensive sectors including information technology, telecommunications, and biotechnology exhibit distinctive innovation profiles characterized by simultaneous engagement across multiple innovation types. Research examining Silicon Valley technology startups documented that successful firms typically deploy bundled innovations combining novel products with innovative marketing approaches, streamlined processes, and flexible organizational structures enabling rapid adaptation to market feedback (Colombo et al., 2017). This innovation bundling strategy reflects competitive imperatives in fast-moving sectors where isolated innovations in single domains prove insufficient for establishing defensible market positions against well-resourced incumbents and numerous entrepreneurial entrants. The complementarity among innovation types suggests that performance effects emerge not from individual innovations but from integrated innovation systems where different innovation dimensions reinforce one another synergistically.

The relationship between innovation and entrepreneurial performance represents one of the most extensively researched questions in entrepreneurship and innovation scholarship, generating voluminous empirical literature spanning multiple decades, disciplines, and methodological approaches. Theoretical foundations for expecting positive innovation-performance relationships derive from multiple frameworks including Schumpeter's creative destruction theory emphasizing innovation's role in generating competitive advantages, the Resource-Based View positioning innovation capabilities as valuable strategic resources, and dynamic capabilities theory highlighting innovation as mechanism for adapting to environmental change (Schumpeter, 1934; Barney, 1991; Teece et al., 1997). These theoretical perspectives converge on propositions that innovation enables firms to differentiate offerings, improve operational efficiency, enhance customer satisfaction, and achieve sustainable competitive positions, thereby translating into superior performance across multiple dimensions.

Empirical evidence broadly supports these theoretical expectations while revealing substantial complexity and conditionality in innovation-performance relationships. Meta-analyses synthesizing findings from hundreds of individual studies report positive associations between innovation and performance measures including sales growth, profitability, market share, and survival probability, with innovation explaining between fifteen and thirty percent of performance variance on average (Rosenbusch et al., 2011). However, effect magnitudes vary considerably across contexts, with moderator analyses revealing that innovation-performance relationships strengthen under conditions including high environmental dynamism creating opportunities for innovative differentiation, strong intellectual property protection enabling innovation returns appropriation, and mature firm ages providing resources and capabilities for effective innovation implementation (Rosenbusch et al., 2011). Conversely, innovation-performance relationships weaken in hypercompetitive environments where rapid imitation erodes innovation advantages, institutional contexts lacking innovation support infrastructure, and young firms struggling with liability of newness constraints.

### African Perspectives on Innovation Types

Innovation dynamics across African contexts exhibit both similarities with and departures from patterns documented in advanced economies, reflecting the continent's distinctive economic structures, institutional environments, and developmental stages. Comprehensive surveys conducted across multiple African countries reveal that SME innovation adoption rates lag significantly behind developed-country benchmarks, with approximately thirty-five to forty-five percent of African SMEs reporting any innovation activity during three-year observation windows compared to sixty-five to seventy-five percent in European contexts (African Development Bank, 2019). However, these aggregate statistics mask substantial variation across countries, sectors, and innovation types, with innovation-intensive clusters emerging in telecommunications, financial services, and technology sectors contrasting sharply with innovation-scarce traditional manufacturing and retail domains.

Product innovation adoption among African SMEs concentrates predominantly in incremental improvements to existing

offerings rather than radical new product development, reflecting resource constraints limiting experimental capacity and market risks deterring major innovation investments without assured demand (Robson et al., 2020). Telecommunications SMEs exemplify this incremental innovation pattern, with firms introducing service bundles combining voice, data, and mobile money in novel configurations while rarely developing fundamentally new communication technologies requiring substantial research investments. Agricultural processing SMEs similarly engage in product innovation through packaging modifications, quality enhancements, and value addition to primary commodities, yet seldom undertake breakthrough innovations demanding technical expertise and capital unavailable to most African enterprises (Mwambi et al., 2016). These patterns suggest that innovation conceptualizations derived from high-technology contexts may inadequately characterize innovation realities in developing country settings where adaptation and incremental improvement constitute predominant innovation modes.

Process innovation demonstrates higher adoption rates relative to product innovation across African SME populations, potentially because process improvements often require modest capital outlays while generating measurable efficiency gains enhancing competitiveness (Goedhuys et al., 2016). Manufacturing SMEs report process innovations including improved production layouts, enhanced quality control procedures, and waste reduction practices that collectively improve operational efficiency despite limited technological sophistication. Service sector SMEs engage process innovation through customer service protocol standardization, appointment scheduling systems, and payment collection procedures streamlining operations and improving customer experiences. The prominence of process innovation may reflect competitive dynamics in price-sensitive African markets where cost efficiency determines survival given limited opportunities for premium pricing strategies available in affluent markets (Mwangi and Wanjau, 2018). Alternatively, process innovation may prove more accessible because it builds on existing operational knowledge rather than requiring external technological expertise or market research capabilities many African SMEs lack.

Research examining innovation-performance relationships within African contexts remains substantially less developed compared to European and North American literatures, yet accumulating evidence suggests both similarities and distinctions from patterns documented in advanced economies. The broadly positive innovation-performance association observed internationally appears to hold across African contexts, with multiple studies documenting that innovative African SMEs achieve superior performance compared to non-innovative counterparts across diverse sectors and countries (Goedhuys et al., 2014; Mwangi and Wanjau, 2018). However, effect magnitudes often prove more modest in African settings, with innovation explaining smaller performance variance proportions compared to international benchmarks, suggesting that contextual constraints may attenuate innovation's performance contributions (Robson et al., 2020).

Kenyan research examining innovation among ICT SMEs documented significant positive relationships between innovation intensity and multiple performance dimensions including profitability, customer satisfaction, and market growth (Mwangi and Wanjau, 2018). The study revealed that product and process innovations demonstrated strongest performance associations, with firms introducing new services or improving operational efficiency achieving measurably superior performance compared to firms maintaining status quo operations. However, innovation explained only sixteen percent of performance variance, with factors including access to finance, management capability, and market conditions exerting substantial independent performance influences. This modest explanatory power suggests that while innovation contributes meaningfully to SME success in Kenyan contexts, it operates as one among multiple critical performance determinants rather than as dominant driver.

South African studies examining innovation among manufacturing SMEs yielded broadly similar conclusions, documenting positive innovation-performance associations alongside evidence that contextual factors moderate relationship strength (Krause and Schutte, 2016). The research revealed that innovation-performance relationships strengthened among SMEs accessing formal financing, participating in business networks, and operating in competitive markets, while weakening among resource-constrained firms in monopolistic or oligopolistic environments. These patterns suggest that complementary resources and competitive pressures jointly shape innovation's effectiveness, with innovation proving most valuable when firms possess capabilities for effective implementation and face market conditions rewarding differentiation.

### Malawian Perspectives on Innovation Types

Empirical research specifically examining innovation adoption among Malawian SMEs remains limited, with comprehensive literature searches identifying fewer than five peer-reviewed studies systematically documenting innovation patterns across representative enterprise samples. Available evidence suggests Malawian SMEs demonstrate innovation adoption rates comparable to or slightly below regional African averages, with approximately thirty to forty percent reporting innovation activities during typical observation periods (Banda, 2019). However, innovation adoption concentrates heavily in specific sectors and geographic areas, with urban SMEs and technology-adjacent industries demonstrating substantially higher innovation intensity than rural enterprises and traditional sectors.

Banda's (2019) study examining innovation among Malawian service sector SMEs documented that product and marketing innovations proved most prevalent, with fifty-two percent of surveyed firms reporting product improvements and forty-eight percent engaging marketing innovation activities. Process and organizational innovations registered lower adoption at thirty-five and thirty-one percent respectively, suggesting Malawian SMEs prioritize customer-facing innovations enhancing market appeal over internal operational improvements. This pattern diverges from some African evidence showing process innovation prominence, potentially reflecting Malawi's service sector concentration where

tangible process improvements prove less visible to customers than product or marketing enhancements. Qualitative evidence from the study revealed that product innovations predominantly involved incremental service improvements rather than fundamentally new offerings, with enterprises introducing convenience features, extended operating hours, or customer-requested modifications to existing services.

Phiri's (2021) investigation focusing specifically on telecommunications SMEs in Malawi provided sector-specific insights particularly relevant to the present study. The research documented that telecommunications SMEs engaged all four innovation types, with adoption rates ranging from fifty-eight percent for product innovation to forty-two percent for organizational innovation. Mobile app development emerged as prominent product innovation, enabling self-service capabilities reducing operational costs while improving customer convenience. Process innovations concentrated on transaction efficiency improvements, with digital record-keeping replacing manual procedures and automated service delivery reducing processing times. Marketing innovations emphasized social media utilization for customer communication, with WhatsApp Business and Facebook pages becoming standard customer engagement channels. Organizational innovations included staff training programs and commission structure modifications incentivizing performance. These findings suggest telecommunications SMEs demonstrate higher innovation intensity and greater diversity across innovation types compared to Malawian SMEs generally, potentially reflecting sector-specific competitive pressures and technical opportunities.

However, both Banda (2019) and Phiri (2021) acknowledged significant methodological limitations constraining confidence in their findings and limiting generalizability. Small sample sizes of thirty-eight and forty-five firms respectively preclude robust statistical inference, while geographic concentration in Lilongwe and Blantyre excludes rural SME experiences potentially differing substantially from urban patterns. Reliance on self-reported innovation measures introduces social desirability bias risks, with respondents potentially overstating innovation engagement to project progressive business identities. Neither study employed longitudinal designs enabling observation of innovation trajectories over time, instead capturing innovation adoption at single time points potentially mischaracterizing dynamic processes. These methodological constraints underscore the need for more rigorous empirical research systematically documenting innovation patterns among Malawian SMEs.

Empirical research specifically examining innovation-performance relationships among Malawian SMEs remains extremely limited, with the present literature search identifying only two published studies systematically investigating this question. This paucity of evidence creates significant knowledge gaps regarding whether innovation-performance relationships documented internationally and regionally apply within Malawi's specific economic, institutional, and infrastructural context, thereby justifying the current investigation's focus.

Kambewa's (2020) study examining Malawian ICT SMEs provides the most directly relevant prior evidence. The research surveyed sixty-three ICT enterprises across Lilongwe and Blantyre, documenting that innovation adoption correlated positively with customer satisfaction and operational efficiency but demonstrated weak association with profitability. Correlation analyses revealed that product and marketing innovations showed statistically significant relationships with customer satisfaction ($r=.42$ and $r=.38$ respectively, $p<.05$), while process innovation correlated with operational efficiency ($r=.46$, $p<.01$). However, profitability associations proved non-significant across all innovation types, leading the researcher to conclude that innovation improves service quality without translating into financial returns given intense price competition and low customer willingness to pay premiums for superior service. These findings suggest innovation-performance relationships may operate differently across performance dimensions, with customer-focused outcomes responding more strongly than financial metrics.

Banda's (2019) research examining service sector SMEs more broadly corroborated some of Kambewa's findings while introducing additional complexity. The study documented positive associations between innovation and sales growth ($r=.34$, $p<.05$) but weak relationships with profitability, paralleling Kambewa's conclusions. However, Banda also examined business sustainability as performance dimension, finding that innovative firms demonstrated higher survival rates over three-year observation periods compared to non-innovative counterparts, suggesting innovation contributes to longevity even if immediate profitability impacts remain modest. Qualitative interviews revealed that entrepreneurs viewed innovation as survival necessity rather than profit maximization strategy, with innovation adoption driven primarily by competitive threats and customer expectations rather than growth ambitions.

### Challenges Faced by SMEs in Implementing Innovation

Innovation implementation confronts SMEs with multifaceted challenges spanning resource, capability, institutional, and competitive domains, with extensive international literature documenting barriers constraining innovation adoption, effectiveness, and sustainability. The OECD's innovation surveys across member countries consistently identify financial constraints as most frequently cited innovation barrier, with approximately forty-five percent of SMEs reporting innovation financing difficulties (OECD, 2021). Innovation activities require upfront investments preceding uncertain returns, creating cash flow challenges particularly acute for small enterprises lacking internal resources for sustained experimentation and unable to access external finance due to information asymmetries, collateral requirements, and risk aversion among conventional lenders (Hall and Lerner, 2010). This financing gap proves especially severe for intangible innovations including organizational and marketing improvements that generate no physical assets serving as loan collateral despite potentially substantial performance contributions.

Knowledge and skills deficits represent equally significant innovation barriers, with SMEs reporting difficulties recruiting

qualified personnel, insufficient in-house expertise for innovation development, and limited awareness of external knowledge sources (De Jong and Marsili, 2006). Innovation increasingly requires specialized competencies spanning technical domains, market intelligence, intellectual property management, and regulatory compliance that collectively exceed individual entrepreneurs' or small teams' capabilities. University education systems in many countries emphasize theoretical knowledge over practical innovation skills, creating mismatches between graduate capabilities and SME innovation needs (Muscio and Ramaciotti, 2019). The tacit nature of much innovation-relevant knowledge hinders codification and transfer, with SMEs struggling to absorb sophisticated technologies or management practices without sustained interaction with knowledge sources possessing practical implementation experience.

Innovation challenges confronting African SMEs encompass universal barriers documented internationally alongside continent-specific constraints reflecting Africa's developmental stage, institutional characteristics, and infrastructure realities. Financial constraints assume heightened severity in African contexts, with credit-to-GDP ratios averaging below thirty percent compared to exceeding one hundred percent in developed economies, reflecting shallow financial sector development limiting SME financing availability (African Development Bank, 2020). Commercial banks' lending practices emphasize collateral requirements, short repayment periods, and high interest rates poorly suited for innovation financing requiring patient capital tolerating uncertainty and longer return horizons. Alternative financing mechanisms including venture capital, angel investors, and government innovation grants remain nascent across most African countries, with these funding sources concentrated in technology hubs serving tiny fractions of SME populations (Herrington and Coduras, 2019).

Infrastructure deficits create distinctive innovation implementation challenges absent or less severe in developed economies. Unreliable electricity supply affecting majority of African businesses undermines process innovations dependent on continuous operation, forcing costly backup generation reducing profitability from efficiency improvements (Foster and Briceño-Garmendia, 2010). Limited internet connectivity constrains digital innovation adoption, with less than thirty percent of sub-Saharan African population accessing internet regularly despite growing mobile phone penetration (ITU, 2021). Poor road networks impede market access for innovative products, with distribution costs often exceeding production costs in rural areas lacking paved infrastructure. These infrastructure constraints fundamentally shape innovation feasibility, steering entrepreneurs toward innovations minimally dependent on reliable utilities and connectivity.

Research documenting innovation challenges specifically confronting Malawian SMEs remains extremely limited, with most available evidence coming from anecdotal reports, practitioner assessments, and limited academic investigations rather than systematic empirical studies. Phiri's (2021) qualitative research examining telecommunications SMEs in Malawi provides the most detailed documentation of sector-specific innovation barriers. The study identified financial constraints as most severe challenge, with respondents describing inability to access bank credit for innovation investments, high interest rates when credit was available (averaging thirty-five percent annually), and collateral requirements demanding property or equipment titles most SMEs could not provide. Participants emphasized that innovation activities required upfront expenditures for technology acquisition, staff training, and marketing before revenue generation commenced, creating cash flow pressures that many enterprises could not sustain without external financing.

Regulatory challenges emerged as second major constraint category, with MACRA licensing fees, insurance requirements, and compliance audits consuming substantial resources. SME operators reported that regulatory processes designed for large telecommunications companies imposed disproportionate burdens on smaller enterprises lacking dedicated regulatory compliance personnel. Annual licensing fees ranging from $5,000 to $15,000 USD represented significant proportions of SME revenues, absorbing resources otherwise available for innovation investment. However, some respondents acknowledged regulatory frameworks provided consumer protection and competitive fairness benefits justifying costs despite constraining innovation capacity.

## Research Gap

The literature review reveals substantial knowledge gaps justifying the present investigation's focus and approach. First, existing innovation research demonstrates pronounced geographic concentration in advanced economies, with sub-Saharan African contexts receiving minimal attention despite the region's economic significance and distinctive institutional environments potentially shaping innovation dynamics differently from developed-country patterns (Mwangi and Wanjau, 2018; Robson et al., 2020). Within the limited African innovation literature, sectoral coverage skews heavily toward manufacturing with service sectors including telecommunications remaining underexamined despite growing economic contributions and potentially distinctive innovation characteristics (Adegbite et al., 2019). This geographic and sectoral imbalance creates theoretical uncertainty about innovation framework generalizability and practical knowledge deficits constraining evidence-based policymaking in understudied contexts.

Second, Malawi-specific innovation research remains exceptionally scarce, with comprehensive literature searches identifying fewer than five peer-reviewed empirical studies examining innovation among Malawian enterprises across all sectors (Banda, 2019; Kambewa, 2020; Phiri, 2021). This paucity of evidence creates multiple problems: theoretical frameworks developed from non-Malawian contexts may mis specify relationships when applied locally without empirical validation; policy interventions transplanted from other contexts risk ineffectiveness or unintended consequences without understanding Malawian specificities; SME operators make strategic decisions without research guidance on innovation

adoption patterns, performance expectations, or challenge mitigation approaches applicable to their operational contexts. The absence of baseline Malawian data precludes comparative analyses revealing whether local patterns align with or diverge from regional and international benchmarks.

Third, existing Malawian innovation research suffers from methodological limitations constraining confidence and generalizability. Studies employ small convenience samples (typically thirty to sixty firms) precluding robust statistical inference or population-level conclusions (Banda, 2019; Phiri, 2021). Cross-sectional designs capture innovation and performance at single time points, potentially missing temporal dynamics including lags between innovation investments and performance realization or cumulative effects of sustained innovation over time. Self-reported measures introduce measurement error risks and social desirability bias possibilities, with no studies employing objective performance verification through financial statement audits or third-party assessments. Monomethod approaches relying exclusively on either quantitative surveys or qualitative interviews prevent triangulation enabling confidence that findings reflect genuine patterns rather than method artifacts.

Fourth, telecommunications sector innovation dynamics remain incompletely understood even in well-researched contexts, with most innovation scholarship focusing on manufacturing firms or examining services generically without attending to sector-specific characteristics (Galindo-Martín et al., 2019). Telecommunications SMEs operating as intermediaries between large network operators and end customers occupy distinctive positions involving technological sophistication yet resource constraints, regulatory oversight yet competitive intensity, and digital service delivery yet infrastructure dependencies. These characteristics potentially generate innovation patterns, performance relationships, and implementation challenges differing from both manufacturing SMEs and other service sectors, yet sector-specific research remains limited.

Fifth, innovation-performance relationship mechanisms remain inadequately understood, with most research documenting associations without thoroughly investigating causal pathways explaining how innovation translates into performance improvements (Rosenbusch et al., 2011). African research particularly lacks process-oriented investigations examining implementation dynamics, with studies typically measuring innovation adoption and performance outcomes without exploring intervening mechanisms (Goedhuys et al., 2014). This mechanism deficit constrains both theoretical development and practical guidance, as understanding what links innovation to performance proves essential for identifying enhancement opportunities and addressing implementation obstacles.

Sixth, moderating factors shaping innovation-performance relationship strength remain incompletely specified, particularly regarding challenges' roles. While extensive literature documents innovation barriers, remarkably little research tests whether these challenges moderate innovation effectiveness (Madrid-Guijarro et al., 2009). The present study addresses this gap by explicitly examining whether implementation challenges attenuate innovation-performance relationships, testing propositions that barriers constrain not merely innovation adoption but also innovation's performance contributions among firms successfully implementing innovations.

The present investigation addresses these knowledge gaps through research design combining representative sampling enabling generalization, mixed-methods integration providing mechanism insights alongside pattern documentation, telecommunications sector focus attending to sector specificities, and moderation analysis testing whether challenges shape innovation-performance relationship strength. By generating rigorous empirical evidence from Malawi's telecommunications SME sector, the study contributes both scholarly advancement and practical knowledge applicable to policy design and enterprise strategy.

### 2.2 Theoretical Framework

This study is anchored on two major theories. Schumpeter's Theory of Innovation emphasizes innovation as the central driver of entrepreneurship and economic development. Entrepreneurs introduce "new combinations" in products, processes, markets, or organizational structures, which disrupt existing systems and create competitive advantage (Schumpeter, 1934). This theory justifies the study by highlighting how innovation enables SMEs in Malawi's telecommunication industry to differentiate themselves and achieve sustainable growth. The Resource-Based View (RBV) posits that firms achieve superior performance when they possess valuable, rare, inimitable, and non-substitutable resources (Barney, 1991). Innovation is considered a strategic resource that enhances competitiveness by enabling SMEs to exploit opportunities and respond to market changes. For SMEs in Malawi, innovation in digital services, mobile money platforms, and customer engagement strategies can be seen as unique resources that drive entrepreneurial performance. These theories are appropriate because Schumpeter's framework explains the process of innovation as a driver of entrepreneurship, while RBV explains the strategic value of innovation as a resource for performance. Together, they provide a holistic theoretical lens for analysing how innovation impacts SMEs in the telecommunication sector.

### 2.3 Conceptual Framework

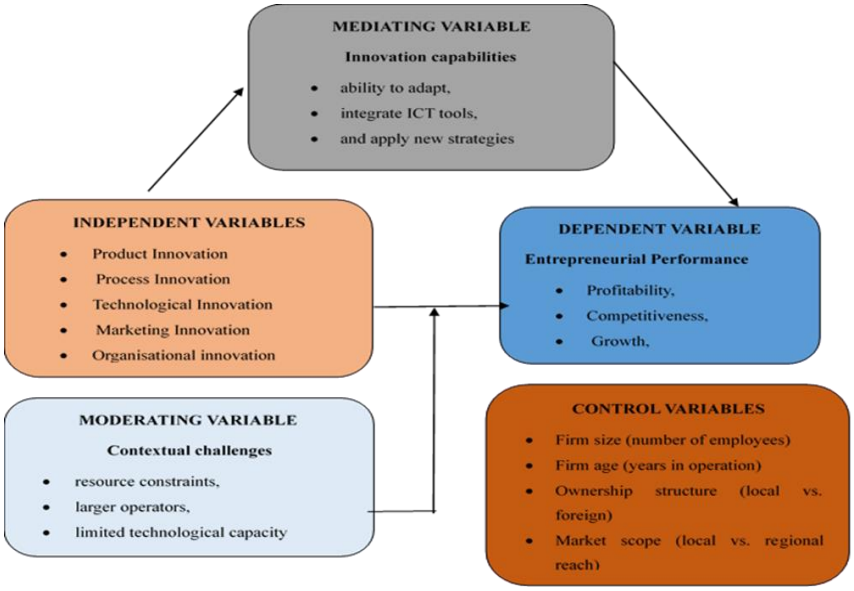


Figure 1 Conceptual Framework

## 3 Research Methodology and Design

A research paradigm constitutes an overarching worldview or belief system that integrates ontological assumptions, epistemological commitments, and methodological preferences into coherent frameworks guiding research practice (Guba & Lincoln, 1994). Paradigms function as disciplinary matrices providing researchers with shared assumptions about reality's nature, legitimate knowledge forms, and appropriate inquiry methods. Major paradigms include positivism, constructivism, critical theory, and pragmatism, each embodying distinctive philosophical positions and methodological implications. This study employed a mixed-methods approach combining quantitative and qualitative inquiry traditions (Creswell & Plano Clark, 2018). This approach was justified on multiple grounds. First, the research questions demanded both breadth and depth: quantitative methods provided breadth by measuring innovation adoption patterns, performance outcomes, and relationship magnitudes across representative SME samples, while qualitative methods supplied depth by exploring contextual nuances, implementation processes, and entrepreneurial perspectives inaccessible through structured measurement. This study adopted a convergent parallel mixed-methods design where quantitative surveys and qualitative interviews proceeded simultaneously with integration occurring during analysis and interpretation stages (Creswell & Plano Clark, 2018). This design was justified for several reasons. First, convergent parallel design proved efficient by enabling concurrent data collection rather than sequential phases that would have extended research timelines beyond available timeframes. Simultaneous deployment of surveys and interviews enabled data gathering during the same temporal window, reducing risks that changing market conditions between sequential phases might introduce confounding temporal effects. The target population comprises the complete set of individuals, organizations, or entities possessing characteristics relevant to the research question and from which study samples are drawn (Saunders et al., 2019). Based on Malawi Communications Regulatory Authority (MACRA, 2023) records, approximately 250 registered SMEs operated in this sector across Lilongwe and Blantyre districts during the data collection period (November-December 2024). This study employed differentiated sampling strategies for quantitative and qualitative components, reflecting distinct objectives and data requirements for each inquiry strand. For quantitative surveys, stratified random sampling was implemented. This study employed Yamane's (1967) formula to calculate the quantitative sample size, a widely recognized approach for determining scientifically valid samples from finite populations in social science research (Israel, 2013). The formula is specified as:

$$n = N / [1 + N(e)^2]$$

Where:

n = required sample size
N = population size
e = margin of error (precision level)
Using N = 250 (registered telecommunications SMEs in Lilongwe and Blantyre per MACRA, 2023) and e = 0.05 (corresponding to 95% confidence level), the calculation proceeded as follows:

$$n = 250 / [1 + 250(0.05)^2]$$
$$n = 250 / [1 + 250(0.0025)]$$
$$n = 250 / [1 + 0.625]$$
$$n = 250 / 1.625$$
$$n = 153.85$$

≈ 154 SMEs

For the qualitative component, the study employed purposive sampling to select 10-12 SME owners and managers for in-depth interviews. The final sample comprised 10 participants, determined by the principle of data saturation whereby additional interviews ceased yielding new themes or insights (Guest et al., 2006). Quantitative data underwent multistage analysis using SPSS Version 27. The analytical sequence proceeded systematically to address each research objective while maintaining statistical rigor through comprehensive diagnostic testing. Qualitative data from 10 interviews underwent thematic analysis following Braun and Clarke's (2006) six-phase framework.

## 4 Results and Discussion

### 4.1 What types of innovation are adopted by SMEs in the Malawian telecommunication industry?

Quantitative data under table 1 revealed high innovation adoption across all four types, with mean scores ranging from 3.61 to 3.72 on five-point scales, indicating above-midpoint adoption levels. Product innovation registered slightly highest (M=3.72), though the minimal 0.11-point spread across types suggested relatively uniform engagement rather than concentration in specific innovation categories. Standard deviations (0.87-1.02) demonstrated moderate variability in adoption intensity across respondents.

Table 1: Descriptive Statistics for Innovation Types

| Innovation Type | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| Product Innovation | 121 | 2.00 | 5.00 | 3.72 | 0.89 |
| Process Innovation | 121 | 1.75 | 5.00 | 3.61 | 0.94 |
| Marketing Innovation | 121 | 2.25 | 5.00 | 3.68 | 0.87 |
| Organizational Innovation | 121 | 1.50 | 5.00 | 3.64 | 1.02 |
| Overall Innovation | 121 | 2.19 | 5.00 | 3.66 | 0.82 |

Source: Author (2026)

### 4.2 What is the relationship between innovation and entrepreneurial performance among SMEs in this sector?

Quantitative data under table 2 revealed moderate performance levels across all dimensions, with means ranging from 3.45 to 3.62 on five-point scales. Customer satisfaction scored marginally highest (M=3.62), while market growth lagged slightly (M=3.45). Overall performance averaged 3.55, indicating above-midpoint but not exceptional performance levels. Standard deviations (0.91-1.04) demonstrated moderate performance variability across SMEs.

Table 2: Descriptive Statistics for Performance Outcomes

| Performance Dimension | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| **Profitability** | 121 | 2.00 | 5.00 | 3.59 | 0.96 |
| **Customer Satisfaction** | 121 | 2.25 | 5.00 | 3.62 | 0.91 |
| **Market Growth** | 121 | 1.75 | 5.00 | 3.45 | 1.04 |
| **Business Sustainability** | 121 | 2.00 | 5.00 | 3.55 | 0.98 |
| **Overall Performance** | 121 | 2.13 | 5.00 | 3.55 | 0.87 |

Source: Author (2026)

Table 3 presents Pearson correlation matrix examining bivariate relationships between innovation and performance variables. Correlation analysis revealed significant positive associations between overall innovation and all performance dimensions: profitability (r=.362, p<.01), customer satisfaction (r=.418, p<.01), market growth (r=.298, p<.01), business sustainability (r=.356, p<.01), and overall performance (r=.400, p<.01). Following Cohen's (1988) conventions, these correlations ranged from weak (market growth) to moderate (customer satisfaction, overall performance). Customer satisfaction demonstrated the strongest innovation correlation, while market growth showed the weakest, consistent with qualitative accounts emphasizing customer-focused innovation benefits.

Table 3: Pearson Correlation Matrix

| | Overall Innovation | Profitability | Customer Satisfaction | Market Growth | Business Sustainability | Overall Performance |
|---|---|---|---|---|---|---|
| **Overall Innovation** | 1 | .362** | .418** | .298** | .356** | .400** |
| **Profitability** | .362** | 1 | .546** | .512** | .583** | .785** |
| **Customer Satisfaction** | .418** | .546** | 1 | .478** | .521** | .791** |
| **Market Growth** | .298** | .512** | .478** | 1 | .534** | .738** |
| **Business Sustainability** | .356** | .583** | .521** | .534** | 1 | .802** |
| **Overall Performance** | .400** | .785** | .791** | .738** | .802** | 1 |

**p < .01 (two-tailed)

Source: Author (2026)

### Regression Analysis

Hierarchical multiple regression tested innovation's effect on performance while controlling for demographic variables. Table 4 presents model summary, Table 5 presents ANOVA results, and Table 6 presents coefficients.

Able 4: Model Summary

| Model | R | R Square | Adjusted R Square | Std. Error of Estimate | R Square Change | F Change | df1 | df2 | Sig. F Change |
|---|---|---|---|---|---|---|---|---|---|
| 1 | .287 | .082 | .042 | 0.852 | .082 | 2.053 | 5 | 115 | .076 |
| 2 | .400 | .160 | .123 | 0.816 | .078 | 10.581 | 1 | 114 | .002 |

***Predictors (Model 1): Firm Age, Firm Size, Owner Education, SME Type *Predictors (Model 2): Model 1 + Innovation *Dependent Variable: Overall Performance**

Source: Author (2026)

Model 1 (control variables only) explained 8.2% of performance variance ($R^2$=.082, F=2.053, p=.076), marginally non-significant. Model 2 (adding innovation) explained 16.0% of variance ($R^2$=.160, F=4.318, p<.001), representing significant improvement ($\Delta R^2$=.078, F change=10.581, p=.002). Innovation accounted for an additional 7.8% variance beyond demographic controls.

Table 5: ANOVA

| Model | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| **Model 1** | | | | | |
| **Regression** | 7.451 | 5 | 1.490 | 2.053 | .076 |
| **Residual** | 83.458 | 115 | 0.726 | | |
| **Total** | 90.909 | 120 | | | |
| **Model 2** | | | | | |
| **Regression** | 14.518 | 6 | 2.420 | 3.632 | .003 |
| **Residual** | 76.391 | 114 | 0.670 | | |
| **Total** | 90.909 | 120 | | | |

Source: Author (2026)

ANOVA results confirmed that Model 2 significantly predicted performance (F=3.632, p=.003), validating the regression model's overall statistical significance.

Table 6: Regression Coefficients

| Model | Variable | B | Std. Error | Beta | t | Sig. | 95% CI |
|---|---|---|---|---|---|---|---|
| 1 | (Constant) | 2.876 | 0.421 | | 6.829 | .000 | [2.042, 3.710] |
| | Firm Age | 0.018 | 0.022 | .073 | 0.818 | .415 | [-0.025, 0.061] |
| | Firm Size | 0.009 | 0.009 | .094 | 1.000 | .319 | [-0.009, 0.027] |
| | Owner Education | 0.142 | 0.089 | .148 | 1.596 | .113 | [-0.034, 0.318] |
| | SME Type (D1) | -0.156 | 0.178 | -.086 | -0.876 | .383 | [-0.509, 0.197] |
| | SME Type (D2) | 0.087 | 0.201 | .042 | 0.433 | .666 | [-0.311, 0.485] |
| 2 | (Constant) | 1.234 | 0.512 | | 2.410 | .018 | [0.219, 2.249] |
| | Firm Age | 0.012 | 0.021 | .048 | 0.571 | .569 | [-0.030, 0.054] |
| | Firm Size | 0.006 | 0.009 | .063 | 0.667 | .506 | [-0.012, 0.024] |
| | Owner Education | 0.118 | 0.086 | .123 | 1.372 | .173 | [-0.053, 0.289] |
| | SME Type (D1) | -0.134 | 0.172 | -.074 | -0.779 | .438 | [-0.475, 0.207] |
| | SME Type (D2) | 0.098 | 0.194 | .047 | 0.505 | .615 | [-0.287, 0.483] |
| | Innovation | 0.520 | 0.111 | .437 | 4.673 | .000 | [0.300, 0.740] |

*Dependent Variable: Overall Performance

Source: Author (2026)

Innovation demonstrated significant positive effect on performance (β=.520, t=4.673, p<.001). The standardized coefficient (Beta=.437) indicated that each one standard deviation increases in innovation associated with 0.437 standard deviation increase in performance, holding control variables constant. The confidence interval [0.300, 0.740] excluded zero, confirming effect significance. Control variables remained non-significant even in Model 2, suggesting innovation's effect operated independently of demographic factors.

Table 7: Hierarchical Regression - Moderation Analysis (Baron and Kenny)

| Step | Variable Entered | $R^2$ | $\Delta R^2$ | F | ΔF | β | t | p |
|---|---|---|---|---|---|---|---|---|
| 1 | Control Variables | .082 | .082 | 2.053 | 2.053 | | | .076 |
| 2 | Innovation | .160 | .078 | 3.632 | 10.581 | .437 | 4.673 | .000 |
| 3 | Challenges | .178 | .018 | 3.654 | 2.489 | -.152 | -1.578 | .117 |
| 4 | Innovation × Challenges | .181 | .003 | 3.289 | 0.453 | -.042 | -0.673 | .502 |

Source: Author (2026)

Following Baron and Kenny's four-step procedure:

- Step 1: Control variables explained 8.2% variance (non-significant baseline).
- Step 2: Innovation added significantly ($\Delta R^2$=.078, p<.001), confirming main effect.
- Step 3: Challenges added marginally ($\Delta R^2$=.018, p=.117), showing weak direct effect on performance.
- Step 4: The interaction term (Innovation × Challenges) added non-significantly ($\Delta R^2$=.003, β=-.042, t=-0.673, p=.502), indicating that challenges did not moderate the innovation-performance relationship.

The non-significant interaction coefficient demonstrated that innovation's positive effect on performance remained stable regardless of challenge severity levels. Challenges neither amplified nor attenuated innovation's performance benefits.

### 4.3 What challenges do SMEs face in implementing innovation strategies?

Quantitative data under table 8 revealed moderate challenge severity across all dimensions, with means ranging from 5.15 to 5.32 on seven-point scales. Financial constraints registered marginally highest severity (M=5.32), though the minimal 0.17-point spread indicated relatively uniform challenge experience across dimensions. All means exceeded the midpoint (4.0), confirming that challenges represented genuine barriers rather than minor inconveniences.

Table 8: Descriptive Statistics for Implementation Challenges

| Challenge Dimension | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| **Financial Constraints** | 121 | 3.00 | 7.00 | 5.32 | 1.18 |
| **Regulatory Barriers** | 121 | 2.50 | 7.00 | 5.22 | 1.24 |
| **Digital Skills Gaps** | 121 | 2.00 | 7.00 | 5.21 | 1.31 |
| **Technology Access** | 121 | 3.25 | 7.00 | 5.15 | 1.15 |
| **Overall Challenges** | 121 | 3.19 | 7.00 | 5.23 | 1.09 |

Source: Author (2026)

Table 9: Hypothesis Testing Results with Bonferroni Correction

| Hypothesis | Statistical Test | Test Statistic | Unadjusted p-value | Bonferroni-Adjusted α | Decision (Unadjusted) | Decision (Bonferroni) |
|---|---|---|---|---|---|---|
| **H1: SMEs adopt multiple innovation types (product, process, marketing, organizational) with product and process most prevalent** | Descriptive Statistics; One-sample t-test against midpoint (3.0) | Product: t=8.87<br>Process: t=7.12<br>Marketing: t=8.58<br>Organizational: t=6.87 | All p<.001 | p<.0167 | Partially Supported | Partially Supported |
| **H2: Innovation has a positive and significant effect on entrepreneurial performance** | Multiple Regression (Innovation → Performance) | β=.520<br>t=4.673<br>F=10.581 | p<.001 | p<.0167 | Supported | Supported |
| **H3: Implementation challenges moderate the innovation-performance relationship** | Hierarchical Regression (Interaction Term) | β=-.042<br>t=-0.673<br>ΔF=0.453 | p=.502 | p<.0167 | Not Supported | Not Supported |

Source: Author (2026)

Hypothesis 1 received partial support. All four innovation types demonstrated significantly above-midpoint adoption (all p<.001, surviving Bonferroni correction), confirming broad innovation engagement. However, contrary to the hypothesis predicting product and process dominance, minimal differences emerged across types (M range 3.61-3.72), suggesting relatively uniform rather than selective adoption. The hypothesis was supported regarding breadth but not regarding dominance patterns.

Hypothesis 2 received strong support. Innovation demonstrated significant positive effect on performance (β=.520, p<.001), with the p-value substantially below both unadjusted (p<.05) and Bonferroni-adjusted (p<.0167) thresholds. This robust significance confirmed innovation's genuine performance contribution.

Hypothesis 3 was not supported. The interaction term testing moderation proved non-significant (β=-.042, p=.502), failing to reach either unadjusted or adjusted significance thresholds. Challenges did not moderate the innovation-performance relationship as hypothesized.

### 4.4 Qualitative Results

Qualitative accounts revealed three primary product/service innovation categories: mobile applications enabling customer self-service, service bundling combining airtime with data and mobile money at discounted rates, and value-added services including mobile insurance and bill payment platforms.

Qualitative evidence revealed that SMEs frequently implemented complementary innovations across categories simultaneously rather than sequentially. For example, mobile app introduction (product) accompanied by backend system development (process), social media promotional campaigns (marketing), and staff training on app support (organizational) represented integrated innovation portfolios rather than disconnected initiatives. Respondents explicitly recognized interdependencies: "these innovations worked together," "you can't do one without the others."

Qualitative performance attribution narratives substantiated statistical patterns by describing specific mechanisms linking innovations to outcomes: "profitability improved because the app reduced the number of staff we needed" (cost reduction mechanism), "customer base grew by about forty-five percent in two years" through social media marketing (revenue expansion mechanism), "we survived COVID" through digital service pivots enabling continued operations (resilience mechanism). These accounts revealed that innovation influenced performance through multiple pathways, cost reduction, revenue growth, customer retention, operational resilience, rather than single mechanism, explaining why innovation affected multiple performance dimensions (profitability, satisfaction, growth, sustainability) simultaneously.

Qualitative accounts validated this complementarity interpretation through qualified performance attributions acknowledging multiple factors beyond innovation: "innovation helped performance but wasn't the only factor. We also got better at operations generally" (operational excellence complementing innovation), "market conditions improved somewhat" (environmental factors), "implementation quality matters as much as innovation itself" (execution capability). These acknowledgments revealed sophisticated understanding that innovation constitutes one element within multifaceted performance equation rather than deterministic driver.

The quantitative finding that all challenge dimensions registered means exceeding 5.0 on seven-point scales confirms that telecommunications SMEs confronted genuine substantial barriers rather than minor inconveniences. Qualitative accounts also revealed adaptive strategies enabling innovation despite capital constraints: phased incremental implementation spreading costs over time, free technology substitution (WhatsApp Business rather than expensive CRM systems, open-source software instead of proprietary products), and partnership arrangements pooling resources. These coping mechanisms demonstrated entrepreneurial resourcefulness in overcoming constraints, suggesting financial barriers impose genuine costs through delays, compromises, and suboptimal solutions rather than completely preventing innovation. This nuance matters for intervention design: support programs should address both capital provision and capability building for resource-efficient innovation implementation.

Qualitative evidence supported this interpretation: "challenges made it harder to start innovating but didn't reduce innovation's value after we overcame barriers," "challenges affect who innovates, not whether innovation works for those who manage to innovate." These accounts articulated the selection versus effectiveness distinction, recognizing that while barriers prevented many potential innovators from adopting, successful adopters achieved comparable benefits regardless of struggle intensity.

## 5 Conclusions and Recommendations

The study concludes that innovation conceptualization among resource-constrained telecommunications SMEs fundamentally differs from frameworks derived from developed-country contexts, with necessity-driven survival imperatives superseding growth-oriented opportunity exploitation as dominant cognitive framing.

The study concludes that telecommunications SME innovation manifests as holistic engagement spanning multiple organizational dimensions rather than selective concentration in particular innovation categories, validating Schumpeter's proposition that sustainable competitive advantages emerge from systemic "new combinations" coordinating innovations across products, processes, markets, and organizational forms.

The study concludes that telecommunications SME performance must be evaluated against contextual constraints establishing structural ceilings rather than absolute benchmarks derived from supportive developed-country environments.

The study concludes that Malawian telecommunications SMEs confront severe multidimensional implementation challenges spanning financial constraints (M=5.32), regulatory barriers (M=5.22), digital skills gaps (M=5.21), and technology access limitations (M=5.15), with severity levels exceeding international SME innovation barrier averages while remaining comparable to regional African patterns.

The Ministry of Trade and Industry, in collaboration with SME development agencies and business associations, should develop and disseminate contextually appropriate innovation frameworks explicitly acknowledging survival-oriented innovation logic alongside growth-oriented perspectives in entrepreneurship education and support programs. Business development service providers and entrepreneurship training institutions should employ structured prompting techniques in innovation capability assessments and training programs to elicit comprehensive innovation understanding spanning

technological, organizational, marketing, and process dimensions rather than accepting initial technology-focused responses as complete conceptualizations.

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**Ethical considerations**

The article followed all ethical standards appropriate for this kind of research.

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