



Algerian vs. Sub-Saharan SMEs: A Comparative Structural Proposal Model of Strategic Adaptation and Firm Performance

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Abstract ;

Research on African SMEs frequently treats the continent as a homogeneous entity, overlooking the influence of diverse national systems on firm performance. Our paper challenges this perspective by providing a comparative analysis of Algeria and Sub-Saharan Africa, drawing from 84 studies. We uncover two distinct behavioral patterns. Sub-Saharan firms cope with weak institutions through fast moves and digital finance—our Constraint-Agility Equilibrium Model (CAEM). Algerian firms, however, live under a State-Insulated Rent Infusion (SIRI) system. The Dialectical Decoupling Matrix (DDM) is utilized as an analytical tool to examine the relationship between macro-environmental constraints and internal micro-absorptive capacities.

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1. Introduction

Research on SMEs in Africa shows a paradox. On one side, most evidence agrees that small and medium-sized enterprises are central to African economies. They form a large part of the business fabric, provide many jobs, and still face repeated barriers linked to finance, management skills, infrastructure, and access to markets. On the other side, the category “African SME” is often used as if it described one single reality. Labeled as 'all the same'—or as researchers would say, African SMEs are a monolith.

Algeria is African, yet the Algerian SME should not be explained through the same model used for more open Sub-Saharan ecosystems. Algeria mixes common African constraints with a rentier political economy. This specificity appears in several characteristics: Hydrocarbon income supports public spending, public banks remain important in formal credit, and many private firms adapt to administrative rules, public procurement, local demand, and cautious opacity. On the other hand, several Sub-Saharan ecosystems, especially in East and West Africa, have been shaped by scarcity, mobile finance, and regional trade pressure.

The gap is not simply that few studies compare Algeria with the rest of Africa. The theoretical enigma goes well beyond a simple empirical observation: current research has not fully unpacked why SMEs, when subjected to similar operational hurdles, adopt such heterogeneous behaviors across borders. Admittedly, structural hurdles such as credit rationing, pervasive informality, digital conversion gaps, and governance deficits represent common denominators across both Algeria and Sub-Saharan Africa. Yet, their ultimate transmission mechanisms onto firm performance diverge substantially. Algeria's rentier macroeconomic dynamics fundamentally alter the competitive landscape, bridging specific institutional voids through state-mediated cushions while simultaneously engineering distinct forms of market rigidity. Consequently, the analytical focus must shift beyond the conventional narrative of institutional weakness; it must be trained on the dialectical tension between prevailing institutional voids and the ubiquitous safety net of state protection.

This paper explores a subtle but critical question: do the structural realities and performance drivers of Algerian SMEs actually fit the dominant narratives found in African entrepreneurship literature? Rather than settling for a standard qualitative summary, we use a Systematic Literature Review (SLR) as a launching pad to synthesize current knowledge, deliberately stretching its boundaries in the final stage. By building an empirical mapping framework directly into the methodology, we move past mere description to forge a highly actionable research agenda. This approach bridges the gap between broad regional trends and Algeria's unique institutional anomalies, ultimately setting the stage for rigorous testing through cross-country macro-panels and firm-level econometrics.

We set out to challenge a lingering, yet fundamentally flawed assumption in the literature: the idea that African SMEs are a monolithic bloc. In reality, vastly different institutional landscapes force these businesses into entirely distinct survival strategies. We argue that while Sub-Saharan firms adapt to institutional voids through what we call the Constraint-Agility Equilibrium Model (CAEM)—surviving on raw market improvisation, mobile fin-tech, and hyper-flexible informal networks—

Algerian PMEs follow a completely different script. Through our State-Insulated Rent Infusion (SIRI) framework, we show how Algeria's hydrocarbon wealth, dominant public banks, and state subsidies act as a protective umbrella, buffering firms from harsh market forces. Yet, this insulation is a double-edged sword; it traps the private sector in a defensive loop of internal self-financing, extreme micro-firm fragmentation, and an inability to break into export markets. To bridge these two opposing operational worlds, we introduce the Dialectical Decoupling Matrix (DDM). This analytical lens demonstrates that a firm's ultimate performance is not merely a passive reaction to external constraints, but a function of how dynamically its internal managerial capabilities interact with—and decouple from—state-enforced rules

This brings us to the core premise of our study: Algerian SMEs are not merely variants of their continental counterparts, but distinct organizational archetypes. We hypothesize that their structural traits, day-to-day operations, institutional ecosystems, strategic choices, and long-term growth trajectories diverge fundamentally from the dominant models observed across the rest of the African continent.

2. Theoretical Framework

2.1. Institutional voids and the African SME problem

We base the analysis on institutional economics and the idea of institutional deficiency or voids. North (1990) explains institutions as the formal and informal rules that guide incentives. Khanna and Palepu (2010) apply this idea to emerging markets: when market-supporting actors are missing or unreliable, firms face higher transaction costs.

Credit registries, business courts, certified accounting, venture capital, information services, logistics platforms, and trusted contract enforcement are not secondary elements; they form the hidden infrastructure that helps small firms grow beyond personal relationships.

For SMEs, institutional voids are often more harmful than for large firms because small firms cannot replace missing institutions by themselves. A large group can create its own legal team, secure better bank access, manage customs delays, and reach public decision makers. A small firm usually works with narrow margins, little collateral, weak accounting resources, and limited bargaining power. In African contexts, this often moves entrepreneurs toward family money, supplier credit, informal rules, and short-term daily business survival.

2.2 Rentier state theory and Algeria

The Algerian case should also be understood through rentier state theory. Beblawi (1987) shows that rentier economies depend on external rents received and redistributed by the state. Auty (1993), and later resource-curse studies, explain that reliance on natural resources can slow diversification, reduce competition, and weaken private-sector development. In Algeria, hydrocarbon rent shapes banks, public procurement, investment decisions, and the administrative treatment of entrepreneurship.

This leads Algerian researcher Koudri (2014) to conclude that the state-owned oil and gas giant, SONATRACH (the National Company for Research, Production, Transport, Transformation, and Marketing of Hydrocarbons), constitutes the true lifeblood of the Algerian economy.

Algerian SMEs do not only deal with weak market institutions. They also operate in a system where the state takes over part of the market's role. Public support can help firms start, but starting does not mean becoming efficient or competitive.

While state support channels like NESDA(National Entrepreneurship Support and Development Agency), CNAC(National Unemployment Insurance Fund), ANGEM(National Microcredit Management Agency), guarantee funds, and public procurement ease early entry barriers for startups, they frequently reward administrative compliance over market performance. Consequently, navigating this extensive bureaucratic paperwork fails to translate into sustainable, long-term growth for these micro-firms.

2.3. Institutional crowding-out and defensive internal finance

Few structural bottlenecks across emerging markets are as persistent as the African banking paradox. However, looking at the continent as a uniform space misses a deeper truth: the institutional dynamics resolving this crisis are profoundly polarized. If we observe Sub-Saharan Africa, we see an ecosystem actively turning chronic banking deficits into a launchpad for grassroots financial innovation, effectively transforming institutional voids into thriving hubs for mobile networks and digital finance (Demirgüç-Kunt et al., 2022). Algeria, however, forces us to look through an entirely different lens. Bound by a deeply centralized, state-dominated financial matrix, local small and medium enterprises rarely step foot inside formal credit circuits. Instead, they operate on a closed loop, relying almost exclusively on their own internal cash reserves and retained earnings to stay afloat (IMF, 2024).

This pronounced funding gap is far more than a straightforward scarcity of liquid capital; it is the direct byproduct of an institutional crowding-out effect that runs incredibly deep (Abbas et al., 2022). State-owned commercial banks naturally gravitate toward large, collateral-heavy public enterprises—a structural preference that systematically leaves smaller, informationally complex micro-firms locked out of formal lending streams (World Bank, 2025). Yet, what makes the Algerian case truly compelling is that this isolation operates from the bottom up as well. Faced with heavy bureaucratic friction, high tax visibility, and restrictive regulatory oversight, Algerian owner-managers make a conscious, defensive choice to retreat. They willingly accept tighter capital constraints as a logical trade-off to safeguard their operational freedom. Ultimately, while this state-insulated arrangement successfully cushions domestic firms from raw market shocks, the systemic costs are undeniable—stifling corporate professionalization, capping export ambitions, and locking the private sector into informal survival routines as a permanent state of equilibrium (IMF, 2024).

2.4. Dynamic capabilities and the relational view

Institutional theory helps us see the main structural constraints (North, 1990), but it does not fully explain how firms react, learn, and survive in difficult environments. To fill this gap, the analysis also uses dynamic capabilities and the relational view (Donada et al., 2015; Gulati, 1998). Dynamic capabilities focus on how a firm notices opportunities, uses them, and changes its resources when uncertainty is high. The relational view adds another idea: cooperation between firms can create shared value that a single firm cannot build alone (Donada et al., 2015). These two perspectives are useful for studying African and Algerian small and medium enterprises (SMEs). These firms do not simply suffer from institutional voids. They also create local ways to cope with them. Still, their strategies are not the same.

Across diverse Sub-Saharan landscapes, business adaptation is primarily market-led, leveraging digital solutions, external relationships, and fluid alliances to navigate formal institutional voids (Kansheba et al., 2025). Conversely, Algerian smaller firms adopt a far more protective stance. Navigating deep systemic unpredictable shifts, these entrepreneurs anchor their operations within kinship structures and close-knit personal circles. This strategic retreat into localized social safety nets serves a clear human purpose: it shields their decision-making sovereignty, keeping both immediate operational choices and long-term vision independent from outside institutional pressures (Beztouh, 2021).

3. Research Methodology

3.1. Integrated SLR

This article combines multiple types of evidence. First, it draws on a systematic literature review, rigorously conducted in line with the standards set by Tranfield et al. (2003). This involves well-defined search strategies, strict inclusion criteria, quality control of sources, and an in-depth thematic synthesis. Second, the study incorporates a proposed framework for bibliometric mapping. Far from being reduced to a simple count of articles, this approach aims to uncover the very architecture of the research field. To achieve this, it also proposes a method for successfully conducting an analysis of co-occurrence and co-citation networks, generates thematic maps, and evaluates the productivity of scientific journals as well as the impact of authors, to support the future development of this research.

Third, the article transforms the traditional econometric analysis into a proposed model, specifically designed to make the results more robust and serve as a solid foundation for future studies. This three-step design is highly relevant given the fragmented nature of the available data. While Algeria is strongly represented in local and Francophone literature, research on Sub-Saharan SMEs is more prevalent in international databases. Relying on a single source would introduce a major bias. By combining indexed research with the richness of local empirical details, this integrated design paves the way for future confirmation, offering a potential reinforcement of these studies.

3.2. Search protocol and PRISMA flow

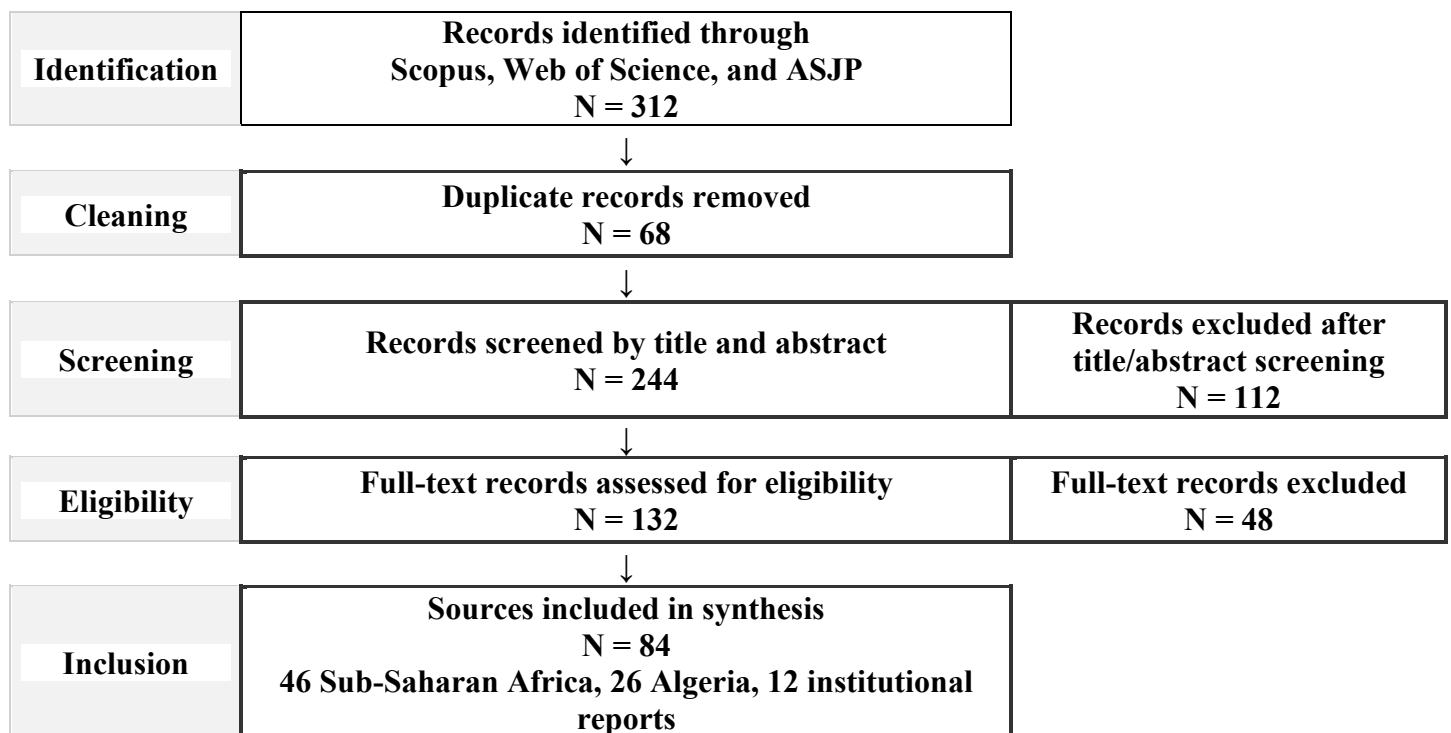
The SLR section of this article uses three clear search tracks: an Algerian core track, a continental comparison track, and a triangulation track linking Algeria with African SMEs. The corpus covers 2015-2024 for the SLR synthesis. The PRISMA flow reports 312 records identified, 68 duplicates removed, 244 records screened, 112 excluded after title and abstract review, 132 full texts assessed, 48 full texts excluded, and 84 sources finally included.

Table 1. PRISMA flow and corpus composition used

Stage	Count	Interpretation
Records identified	312	Scopus, Web of Science, ASJP and institutional sources before deduplication
Duplicates removed	68	Records removed before screening
Title/abstract screened	244	Initial relevance assessment
Excluded after screening	112	Records outside SME, performance, finance, governance, digitalization or comparison logic
Full-text assessed	132	Detailed eligibility and quality assessment
Full-text excluded	48	Weak method, missing SME definition, purely descriptive or off-topic studies
Included in synthesis	84	46 Sub-Saharan studies, 26 Algerian studies, 12 institutional reports

Source: prepared by the researcher

Figure 1. PRISMA 2020 Flow Diagram for the Declared SLR Corpus



Source: prepared by the researcher

Figure 1 summarizes the PRISMA 2020 selection process used to build the declared SLR corpus. The search first identified 312 records through Scopus, Web of Science, and ASJP. After removing 68 duplicates, 244 records were screened by title and abstract. At this stage, 112 records were excluded because they did not fit the scope of the review. The remaining 132 full-text records were assessed for eligibility, and 48 were excluded after detailed reading. The final corpus includes 84 sources: 46 on Sub-Saharan Africa, 26 on Algeria, and 12 institutional reports.

4. Common African SMEs and the Constraint-Agility Equilibrium Model

The reviewed studies show five common traits among African SMEs: economic importance, limited finance, strong owner control, small firm size, and weak export activity. This does not mean every country is identical. For example, Kenya is not Cameroon. Nigeria is not Senegal. South Africa is not Niger. Yet, one clear rule exists: when rules are weak, businesses adapt, save money, build trust, and stay rigid.

4.1. Macroeconomic centrality with necessity-driven creation

Small businesses create most jobs in Africa (ILO, 2019). They play a huge social role, especially since the government cannot hire all young people. But this growth happens out of need, not choice (African Development Bank [AfDB], 2015). Most small businesses just do basic work like trading, fixing things, local transport, and simple making. They help people survive, but they rarely boost real daily productivity or grow into much bigger companies.

4.2. Credit rationing and information asymmetry

In this systematic literature review SLR, finance is easily the most persistent headache for small businesses. Traditional banks usually walk away because these firms have thin financial records, no clear property rights for collateral, and cost too much to track. This drives a brutal reality: banks do not just raise interest rates—they simply say no, creating strict credit rationing. Every entrepreneur faces this hurdle, but their escape route depends on their local ecosystem. Where mobile money and digital tracking are booming, owners easily bypass old-fashioned banks. But where these networks fail, managers must fall back on family loans, personal savings, and informal community funds.

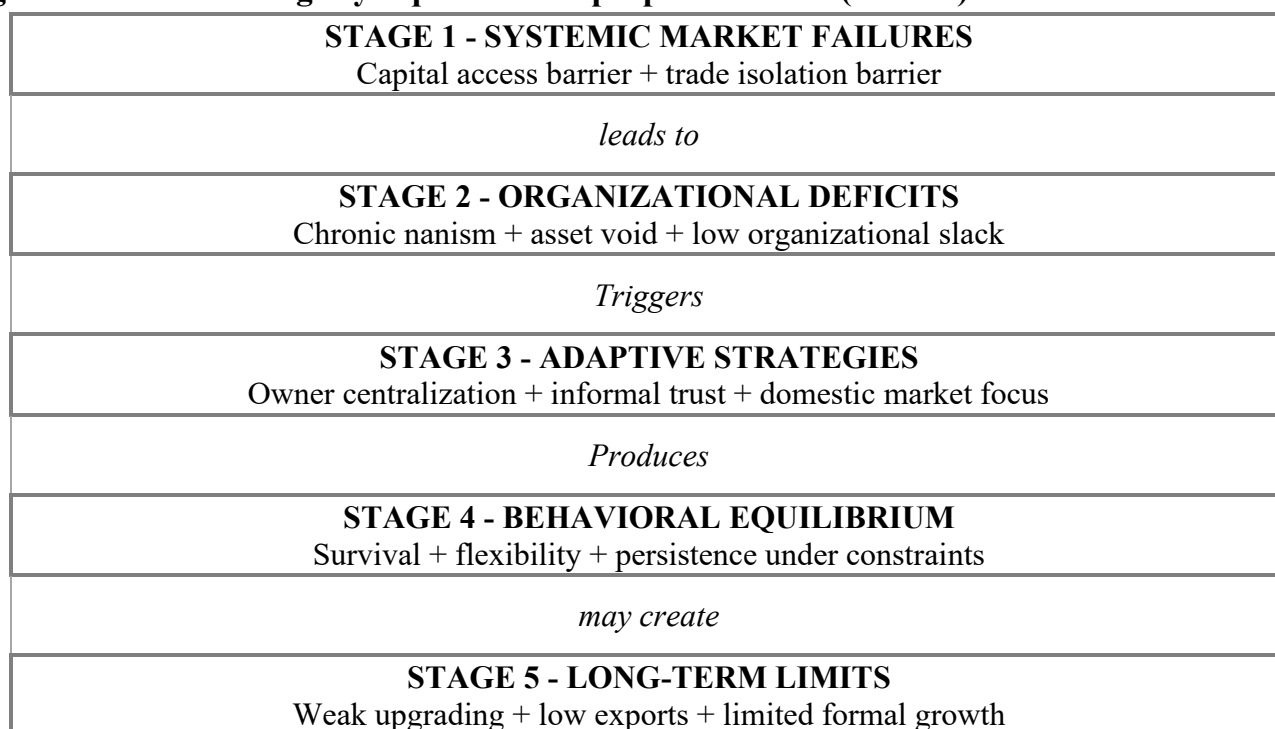
4.3. Hyper-centralized governance and low organizational slack

In most African SMEs, the founder-owner runs everything, making every single operational, financial, and strategic decision alone. This centralization works both ways. It speeds up short-term changes because choices are instant, but it completely stops professional growth because the business depends entirely on one person's ideas, contacts, and risk choices. Since these firms have no financial backup, even small everyday problems are dangerous. A late payment, power cut, border delay, or price hike can easily shut down the whole company.

4.4. Peripheral export integration

Most small businesses only sell locally. Selling to other countries requires meeting strict quality rules, better packaging, understanding customs, organizing shipping, having enough cash, and knowing foreign markets. These resources are very hard to find. While the AfCFTA (African Continental Free Trade Area) agreement opens up new political possibilities, its real effect on the ground depends on whether small firms can turn legal rules into real business. Our systematic literature review shows that only a very small number of firms have the size, money, and management skills needed to grow across borders.

Figure 2. Constraint-Agility Equilibrium - proposal Model (CAEM).



Source: prepared by the researcher

The conceptual flow diagram presents CAEM as a clear chain of causes. Market failures first place strong pressure on SMEs externally. This pressure creates internal limits, such as small size, weak resources, and little room to adjust. To continue operating, firms rely on survival choices: strong owner control, informal trust, and close focus on local customers. These choices help businesses keep going in the short term, but they can also keep informality alive and slow deeper change. CAEM shows that African SMEs survive by adjusting to constraints, rather than by formal growth, exporting, or productivity gains.

5. Algerian Specificities and the State-Insulated Rent Infusion Model

Although Algerian SMEs confront challenges broadly similar to those of other African firms, their underlying institutional architecture is fundamentally distinct. Our systematic literature review (SLR) and the accompanying comparative study isolate five defining structural features: a sovereign rentier framework, micro-enterprise hypertrophy, the public-bank paradox, an inward-looking domestic

focus, and atomized cooperation. Ultimately, these dimensions position Algeria not merely as a standard proxy within a pan-African sample, but as a highly idiosyncratic empirical case.

5.1. Rentier architecture and state-mediated demand

Oil and gas revenues allow the government to fund new roads, public jobs, financial help, and support programs. This spending creates plenty of business for private firms, especially in construction, services, transport, and trade. However, it also traps small businesses inside public spending cycles. When state oil money flows, firms can easily avoid the pressure of open market competition. But when oil revenues drop, the total lack of real private demand suddenly becomes clear.

5.2. Micro-enterprise hypertrophy and the missing middle

Algeria claims to have more than 1.3 million small firms (Ministry of Industry, 2023), but that headline number is a trap. The problem isn't the total count of registered businesses; it's how tiny they actually are (Chadlia, 2023). Almost all of them are tiny micro-firms. This means people start businesses but can never grow them. A strong industrial economy needs a "missing middle"—medium companies that can work with suppliers, invest in quality, use new technology, and buy from smaller firms. Without this middle layer, the whole private sector stays broken into isolated pieces.

5.3. Banking paradox and institutional crowding-out

This situation reveals an intriguing structural puzzle within the Algerian market: although the country possesses a domestic banking framework that looks remarkably well-developed on paper compared to its continental neighbors, its smaller enterprises are left standing on the periphery of formal financial channels. What we see here is a compelling economic paradox, where deep pools of state-backed public liquidity exist right alongside a chronic, frontline credit drought for local businesses. This severe disconnect is constantly reinforced by rigid collateral thresholds, heavy bureaucratic friction, and a deeply ingrained institutional aversion to risk. Together, these barriers make conventional banking models completely out of step with the organic, fast-paced operational realities of an agile firm. Caught in this systemic bind, owner-managers make a highly calculated, human choice to look inward. By turning self-financing into a vital strategic shield, they actively protect their managerial autonomy while keeping intrusive administrative oversight and tax exposure at a safe distance. Yet, this absolute reliance on internal cash reserves comes with a steep price tag—it acts as a structural ceiling that stunts company scaling and leaves these businesses poorly equipped to upgrade their technologies, secure global quality benchmarks, or confidently step into competitive export markets.

5.4. Domestic focus and export atrophy

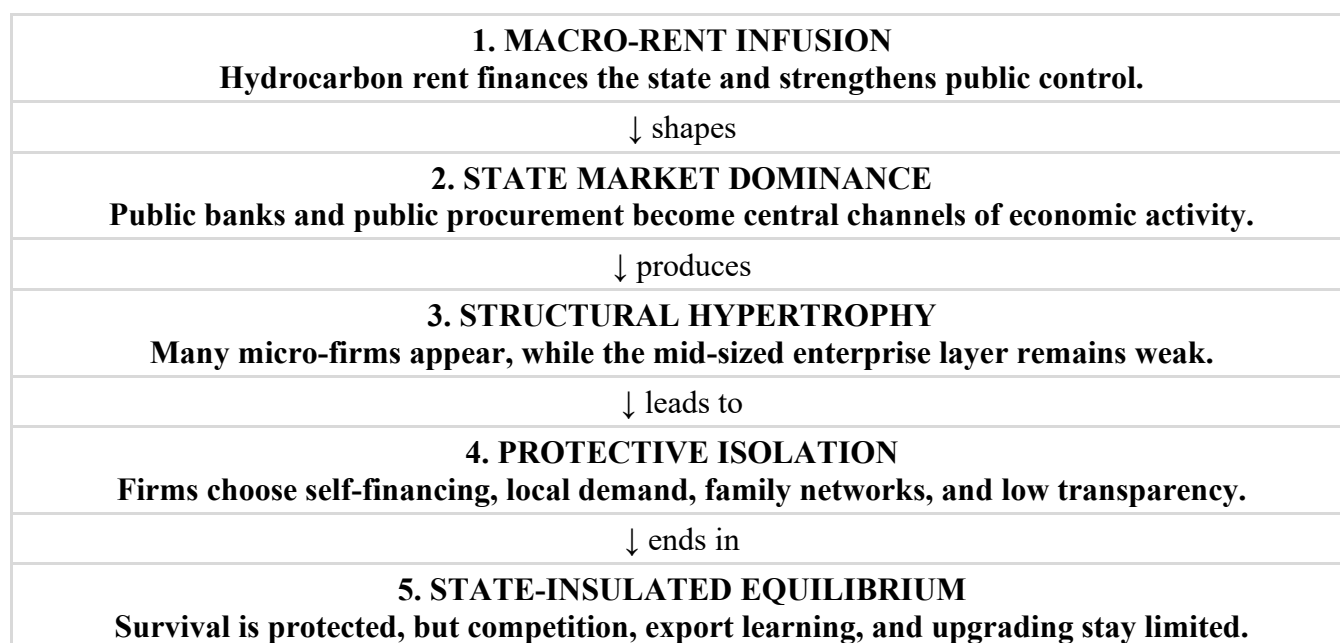
For the vast majority of Algerian smaller enterprises, staying anchored within the domestic market is not just a passive habit—it is a highly calculated economic choice. The reality of navigating rigid foreign exchange controls, heavy bureaucratic customs friction, fragmented regional trade corridors, and a historically inward-looking business culture makes venturing abroad prohibitively expensive.

This stands in sharp contrast to the operational landscape across much of Sub-Saharan Africa, where thin domestic markets frequently force firms to export early just to reach viable economies of scale. In Algeria, the macroeconomic environment tells a very different story: domestic firms can easily maintain steady, predictable revenue streams simply by serving local consumers or capturing protected public procurement contracts. However, this comfort zone creates a profound structural paradox—what we term a domestic low-learning trap. While a purely local focus successfully insulates these businesses from global volatility, it simultaneously removes the hyper-competitive pressures of international trade. Without this vital external friction, the internal drive for technological upgrading, organizational learning, and deep productivity growth simply stalls.

5.5. Atomized collaboration and closed networks

We cannot deny that Algerian smaller firms actively cooperate; however, a closer look reveals that these interactions are almost entirely informal and defensive in nature. Instead of drafting legally binding contracts or building structured strategic alliances, business owners rely on a tightly woven mesh of personal, face-to-face relationships (Beztouh, 2021). This collaborative behavior thrives within the comfort of family networks, local geographic proximity, personal trust, and reciprocal handshakes. While these deeply human, relational safety nets do an excellent job of keeping bad faith and opportunistic behavior at bay in the short run, they hit a hard structural ceiling. They simply lack the institutional muscle to generate the powerful agglomeration economies, localized knowledge spillovers, and shared innovation that define mature industrial clusters. If we want formal, strategic cooperation to genuinely take root, the market demands an entirely different institutional landscape—one anchored by enforceable legal frameworks, transparent data sharing, a reliable judiciary, and predictable regulatory enforcement. On the ground today, these formal pillars remain far too fragile.

Figure 3. State-Insulated Rent Infusion- proposal Model (SIRI).



Source: prepared by the researcher

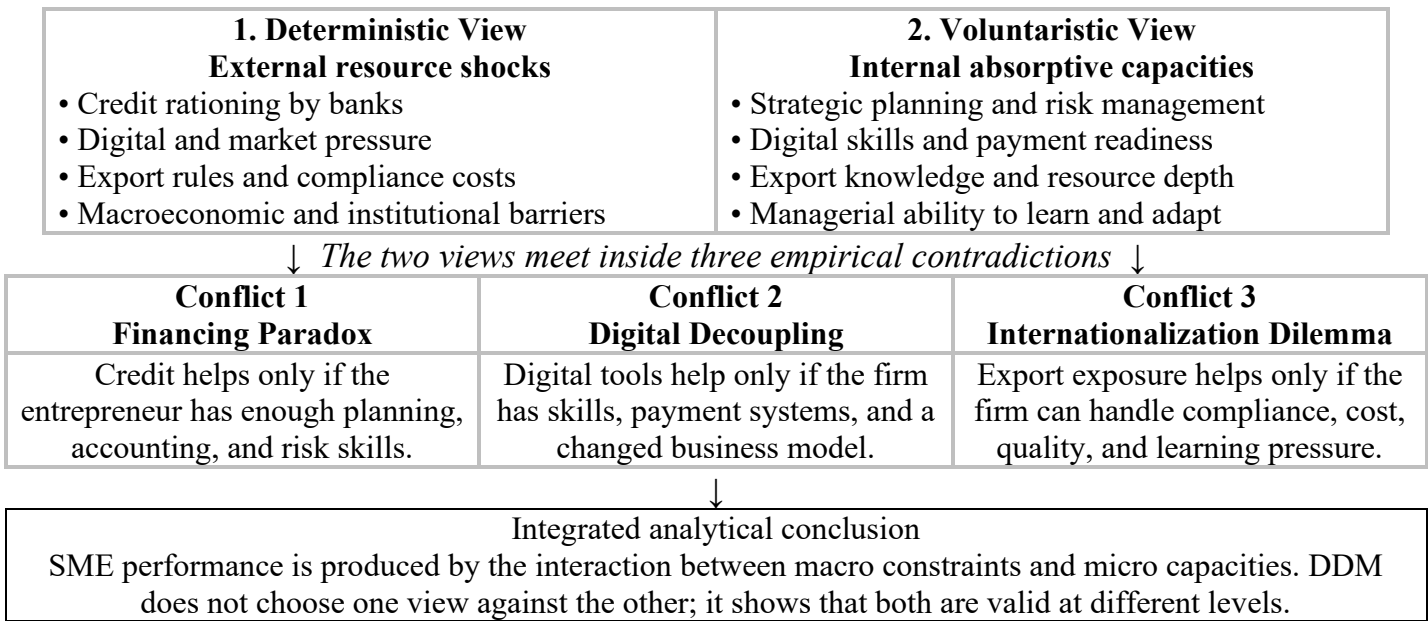
The SIRI model explains how Algerian SMEs develop inside a rent-based economic system. It starts with hydrocarbon revenues, which give the state strong financial power. Through public banks, subsidies, and public procurement, the state becomes a major source of funding and demand. This support helps many micro-enterprises appear, but it also weakens market pressure and limits natural growth. As a result, Algeria faces a “missing middle”: many very small firms, but few medium-sized firms able to grow, export, and innovate. To survive, SMEs often choose internal financing, local markets, and small family networks. These choices protect autonomy, but they also reduce transparency, cooperation, and long-term competitiveness. The model therefore links state rent, firm structure, and behavior in a causal way.

6. Dialectical Decoupling Matrix and Hypothesized Comparative Framework

The DDM model helps us understand why studies on Algerian SMEs often produce confusing or different findings. It looks at two ways of seeing things. The first way, which we call deterministic, argues that companies are mostly held back by outside forces. These include poor access to bank loans, weak digital systems, and the high price of selling goods to other countries. The second view, called voluntaristic, argues that internal capacities also matter: management skills, planning, technical knowledge, and the ability to use resources well. The model does not choose one side. It shows that both sides can be true at the same time, but at different levels. External shocks explain the difficult environment, while internal capacities explain why some firms resist better than others. This makes the analysis more balanced, realistic, and useful for SMEs research today.

Purpose of the model : DDM explains why SME outcomes cannot be understood from one side only. External barriers matter, but internal skills and resources also decide whether firms can turn support, technology, or export exposure into real performance.

Figure 4. Dialectical Decoupling Matrix - proposal Model (DDM Conceptual Flow Diagram)



Source: prepared by the researcher

We use the Dialectical Decoupling Matrix (DDM) to make sense of conflicting research. Many studies point to outside roadblocks like poor loans, weak roads, or laws (Firlas & Tessa, 2025). Others point to inside tools like manager skills, web tech, or mindset (Boubakary et al., 2021; Maisonnave & Nziengui Mamboundou, 2020). The DDM proves these factors do not fight each other. They simply rule under different state systems. In Sub-Saharan Africa, market gaps force firms to stay sharp (International Trade Centre, 2022). In Algeria, oil wealth changes the way these same issues behave (Beztouh, 2021).

Figure 5. Conceptual Matrix: External Constraint x Internal Capacity

External institutional constraint		
Internal absorptive capacity (firm skills, learning, management)	Market-led institutional voids weak intermediaries high uncertainty	State-mediated institutional voids state partly fills gaps rent protection
Higher internal capacity learning and adaptation possible	CAEM Necessity agility Voids trigger adaptation Improvisation + informal networks	SIRI Rent insulation Voids partly filled by the state Protection reduces market pressure
Lower internal capacity weak resources and low learning	Fragile survival Low slack Low scale Limited professionalization	Defensive decoupling Internal finance Closed networks Export atrophy

Source: prepared by the researcher

The Dialectical Decoupling Matrix (DDM) explains how different institutional regimes produce different SME responses. It combines two dimensions: external institutional constraints and internal absorptive capacity. In market-led contexts, institutional voids can push SMEs toward CAEM-type agility, where survival depends on improvisation, informal networks, and quick local adaptation. In Algeria, the SIRI logic is different: state rent partly fills market gaps, but this protection can reduce competitive pressure and encourage defensive behavior. When internal absorptive capacity is low, firms may remain trapped in fragile survival or defensive decoupling. Methodologically, the DDM helps the article interpret contradictory findings across studies. These contradictions are not treated as random errors; they are read as signs of different institutional regimes and different firm-level capacities.

7. Empirical Extension and Testable Proposed Framework

This section details the formal empirical agenda designed to structurally evaluate the comparative mechanisms of the CAEM, SIRI, and DDM frameworks developed in the previous sections. To ensure rigorous scientific validation, the proposed empirical architecture transitions from qualitative thematic

synthesis to alternative quantitative testing tracks, shifting systematically across multiple levels of analysis.

7.1. From Conceptual Models to Testable Hypotheses

To operationalize the CAEM, SIRI, and DDM frameworks, we translate their core mechanisms into testable hypotheses. The CAEM model explains how Sub-Saharan SMEs respond to institutional voids through agility and informality. The SIRI model adds the Algerian specificity, demonstrating how hydrocarbon rent and state protection shape defensive behaviors. Finally, the DDM model posits that external constraints and internal capacities must be evaluated jointly.

This table and the paragraph below outline five research axes in a simple academic style. Each axis links a core hypothesis to its expected relationship, theoretical basis, and conceptual model:

Table 2 . Axis Comparative Framework

Axis	Main idea	Expected sign	Conceptual link
Axis 1	Financial constraints reduce African SME performance.	$FIN \rightarrow PERF < 0$	CAEM + institutional voids
Axis 2	The negative finance effect is stronger in Algeria.	$ALG \times FIN < 0$	SIRI + rentier state
Axis 3	Informality creates pressure on formal firms.	$INF \rightarrow PERF < 0$	CAEM + SIRI
Axis 4	Digitalization can improve performance when firms have skills.	$DIG \rightarrow PERF > 0$	DDM + dynamic capabilities
Axis 5	Better institutions make formal finance more useful.	$WGI \times FIN > 0$	DDM + institutional economics

Source: prepared by the researcher

Axis 1: Financial Constraints

The first axis argues that financial constraints reduce the performance of African SMEs ($FIN \rightarrow PERF < 0$). When firms cannot access enough credit, they have more difficulty growing, investing, and improving their activity. This idea is linked to institutional voids and to the CAEM model. It shows that weak institutions and credit rationing can become real barriers to SME development.

Axis 2: The Algerian Rentier Context

The second axis focuses on Algeria. It argues that the negative effect of financial constraints is stronger for Algerian SMEs ($ALG \times FIN < 0$). This is because the Algerian financial system is strongly shaped by the state, public banks, and hydrocarbon rent. This axis is linked to the SIRI model. It shows that finance in Algeria is not only an economic issue, but also an institutional and administrative issue.

Axis 3: Informality Pressures

The third axis studies the effect of informality on formal firms ($INF \rightarrow PERF < 0$). Informal firms often operate with lower costs and fewer controls. This can create unfair competition for formal SMEs. This axis is linked to both CAEM and SIRI. Informality can help some firms survive, but it can also weaken formal firms and reduce their performance.

Axis 4: Digitalization and Capabilities

The fourth axis argues that digitalization can improve SME performance ($DIG \rightarrow PERF > 0$). However, digital tools do not work alone. Firms need skills, good management, and the ability to use these tools in their business model. This axis is linked to the DDM framework. It shows that technology becomes useful only when internal capacities are strong enough.

Axis 5: Institutional Moderation

The fifth axis argues that better institutional quality can improve the relationship between finance and performance ($WGI \times FIN > 0$). When rules are clearer, governance is stronger, and institutions are more reliable, formal finance becomes more useful and less risky for SMEs. This axis is linked to institutional economics and to the DDM matrix.

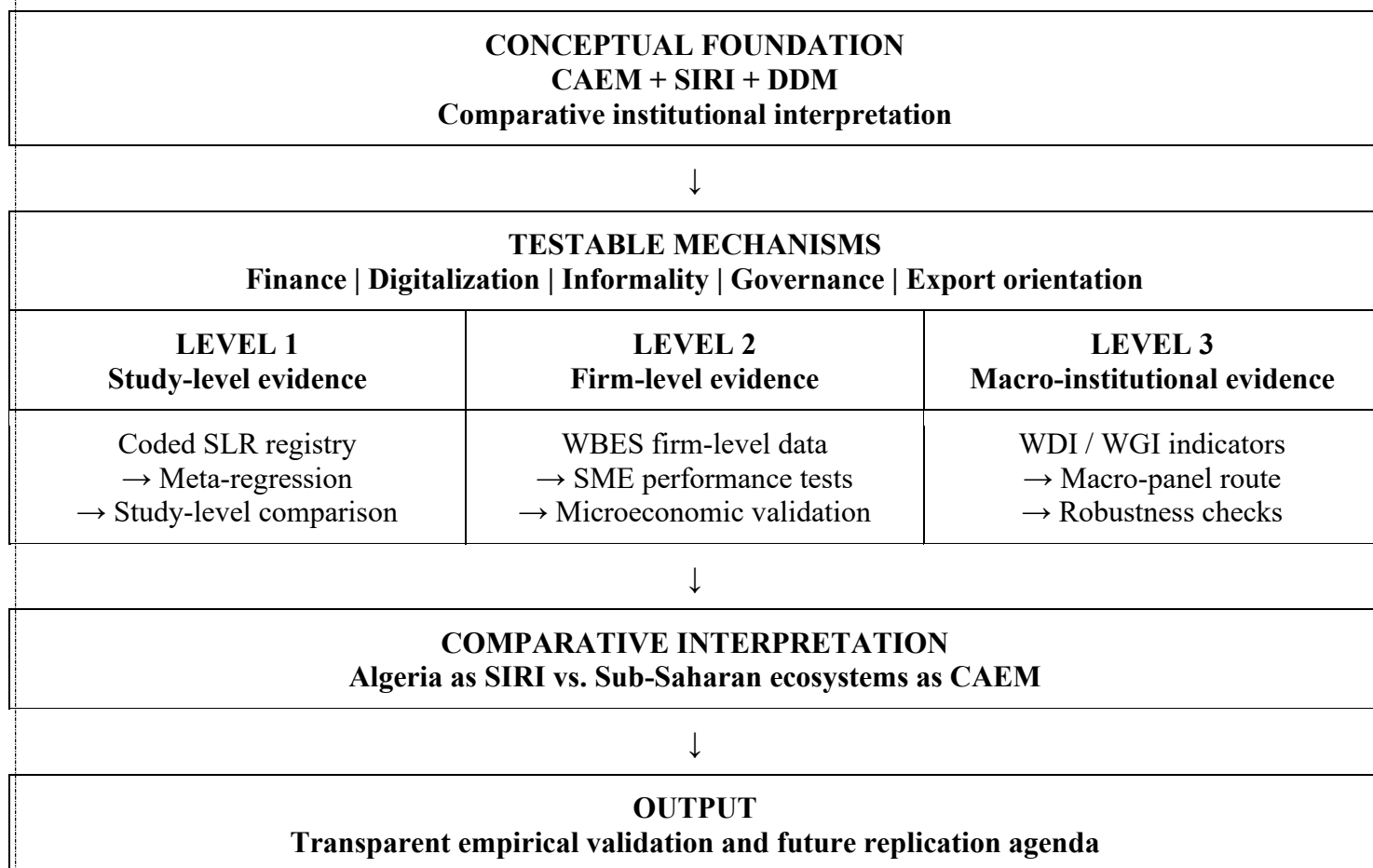
Methodological use

These five axes help transform the conceptual framework into testable hypotheses. CAEM explains the general constraints faced by African SMEs. SIRI explains the Algerian rentier specificity. DDM helps read the results by combining external institutional pressure with internal managerial capacities.

7.2. A Three-Tiered Empirical Strategy

To validate these hypotheses and overcome the fragmented nature of available data, we propose a three-tiered empirical strategy. This design utilizes study-level meta-regressions, firm-level microeconomic data, and country-level macro-panels, ensuring methodological transparency and open replication.

Figure 6. Conceptual Flow Diagram for the Empirical Extension of the CAEM, SIRI, and DDM Framework



Source: prepared by the researcher

7.3. Level 1: Study-Level Extension (Meta-Regression of SLR Evidence)

The first extension consists of converting the final SLR registry into a study-level dataset. Each empirical study can be coded according to its country or region, sample size, method, target variable and reported significance of the finance-performance, digitalization-performance, export-performance or governance-performance relationship. In this design, the unit of observation is not the firm, but the published empirical study. This strategy is appropriate only after the extraction sheet has been completed and independently checked.

A possible dependent variable is SIGNIF_{ij}, coded 1 when study *i* reports a statistically significant positive relationship for variable *j*, and 0 otherwise. A future model may estimate whether Algerian studies systematically report weaker or different effects than Sub-Saharan studies, while controlling for sample size, quantitative design and publication characteristics. The specification can be estimated through logit, probit or a linear probability model with robust standard errors. However, no coefficient should be reported before the registry is fully coded and the replication file is available.

Indicative future specification:

$$Pr(SIGNIF_{ij} = 1) = \Lambda(\beta_0 + \beta_1 ALGERIA_i + \beta_2 LN_SAMPLE_i + \beta_3 QUANT_i + \varepsilon_i)$$

Where:

- $SIGNIF_{ij} = 1$ if study i reports significant positive effect for variable j
- $ALGERIA_i$ = dummy for Algerian context
- LN_SAMPLE_i = natural log of sample size
- $QUANT_i$ = dummy for quantitative methodology
- ε_i = error term

7.4. Level 2: Firm-Level Extension (WBES-Based Comparative Test)

The second extension consists of testing the framework with harmonized firm-level data. The World Bank Enterprise Surveys offer a suitable basis because they include comparable information on firm size, age, sector, performance, access to finance, informal competition, export status and some innovation or digital-use proxies. Once the relevant waves are extracted and cleaned, Algeria can be compared with a selected group of African economies according to data availability and survey comparability.

The core test would focus on the interaction between Algerian location and financial constraint. If the SIRI interpretation is correct, finance should not operate in Algeria exactly as it operates in more market-agile Sub-Saharan ecosystems. The coefficient attached to $ALG \times FIN$ would therefore be the key empirical parameter. A negative and robust interaction would suggest that financial constraints are structurally more damaging, or less growth-enhancing, inside the Algerian rentier-state configuration than in the comparison group.

Indicative future specification:

$$PERF_{icst} = \alpha + \beta_1 FIN_{icst} + \beta_2 DIG_{icst} + \beta_3 INF_{icst} + \beta_4 ALG_c + \beta_5 (ALG_c \times FIN_{icst}) + \gamma X_{icst} + \delta_s + \tau_t + \varepsilon_{icst}$$

Where:

- $PERF_{icst}$ = firm performance (sales growth, productivity, or employment)
- FIN_{icst} = financial constraint dummy or ordinal variable
- DIG_{icst} = digital adoption proxy
- INF_{icst} = informal competition intensity
- ALG_c = dummy for Algeria
- $ALG_c \times FIN_{icst}$ = interaction term (key parameter for H2)
- X_{icst} = control variables (firm size, age, sector)
- δ_s = sector fixed effects
- τ_t = time fixed effects
- ε_{icst} = error term

7.5. Level 3: Macro-Panel Robustness (WDI and WGI)

A third extension may be used if firm-level comparability is limited. In that case, a country-level macro-panel can be constructed from World Development Indicators and Worldwide Governance Indicators. This approach is less precise than WBES because it cannot observe owner-manager behaviour directly. However, it can still test whether institutional quality, credit conditions and resource-rent exposure jointly shape private-sector development outcomes across African economies.

This route should remain secondary. Its purpose is not to replace firm-level analysis, but to check whether the institutional mechanism identified in the SLR also appears at the macro level. Possible dependent variables include domestic credit to the private sector, private-sector value added, non-hydrocarbon diversification indicators, firm density where available, or SME-related proxies. The macro-panel should be presented as a robustness extension rather than as the central empirical test of the article.

8. Discussion

The article advances a more precise argument than a general comparison between Algerian and African SMEs. It shows that institutional voids do not operate in the same way across state regimes. In many Sub-Saharan contexts, weak market institutions can push firms toward constraint-driven agility: informal finance, mobile payments, relational trade, and flexible owner-manager decisions. In Algeria, the rentier state partly cushions market pressures through public finance, procurement, support agencies, and administrative allocation, but this cushioning can also reinforce defensive internal finance, micro-enterprise hypertrophy, domestic orientation, and low transparency.

The theoretical contribution is the combination of CAEM and SIRI. CAEM explains how firms adapt when voids are left open and must be bypassed by market or community mechanisms. SIRI explains how firms behave when voids are partly filled by a state that protects, finances, monitors, and allocates. DDM clarifies that contradictory findings in the SME literature may not be random; they may reflect different levels of the same system: macro constraints, meso institutions, and micro capabilities.

The econometric implication is straightforward. Pooled African SME regressions should not assume homogeneous slopes. At minimum, they should include country or regime fixed effects and interactions between Algeria and finance, digitalization, informality, exports, and cooperation. Without these interactions, the average coefficient may hide the fact that finance, for example, behaves differently in a rentier-state setting than in a mobile-money-driven or informality-substitution ecosystem.

The policy implication is also sharper. More finance is not sufficient if finance is filtered through collateral, paperwork, administrative visibility, and risk-averse public banks. Algeria needs instruments that help promising micro-firms become bankable and scalable: accounting support, transparent credit scoring, partial guarantees linked to productivity, export readiness, supplier-development programs, digital invoicing, and contract-based cooperation. Support programs should

be evaluated by survival, growth, productivity, innovation, export intensity, and transition from micro to small or medium size—not only by the number of firms created.

For managers, the strategic message is equally direct. Self-financing, family trust, and domestic focus can protect autonomy, but they also create a ceiling. The transition from survival to performance requires documented accounting, bankable projects, digital commercial systems, quality certification, formal cooperation, and a gradual move from closed personal networks to contractual partnerships.

Validating the Main Hypothesis-The Specific Reality of Algerian SMEs :

Our work supports the main hypothesis that Algerian small and medium enterprises (SMEs) are not identical to their Sub-Saharan counterparts in their environment, nature, and strategies. African SMEs often face similar problems, such as limited access to credit, strong owner control, and dependence on local markets. However, the main difference is found in the way each national system shapes how firms behave and survive:

a. Environment: CAEM versus SIRI: Sub-Saharan SMEs usually operate in more exposed markets, where institutional voids remain strong. In the Constraint-Agility Equilibrium Model (CAEM), firms respond by improvising, using flexible informal networks, and relying on digital or mobile finance to bypass missing institutions. Algerian SMEs follow another logic. They operate inside a State-Insulated Rent Infusion (SIRI) system. Hydrocarbon revenues, public banks, subsidies, and public procurement protect many firms from direct market pressure and open competition.

b. Nature and growth : This protection creates micro-enterprise hypertrophy and a missing middle. Algeria counts many registered small firms, but most remain very small. They often survive, but they rarely become medium-sized firms able to innovate, export, or scale.

c. Actions and defensive strategies: Because public banks often prefer large public enterprises, smaller firms face institutional crowding-out. Many Algerian owner-managers therefore choose self-financing, family networks, and low transparency to avoid bureaucracy, tax exposure, and administrative control.

d. Performance dilemma: The DDM shows that performance depends on both external structures and internal capacities. In Algeria, short-term protection may create long-term rigidity, weak export learning, and inward-looking growth strategies. This confirms that Algerian SMEs need a specific analytical treatment within African SME research and future empirical testing.

9. Conclusion

This article argues that Algerian SMEs should be studied as African firms operating under a distinct institutional regime. They share core constraints with many African SMEs, including finance barriers, informality, centralized governance, low slack, and weak export integration. However, Algeria's rentier-state architecture changes the meaning and effect of these constraints. Public banks, hydrocarbon-backed state spending, procurement channels, and administrative support partly fill

institutional voids while also creating incentives for defensive finance, domestic insulation, and limited upgrading.

The main theoretical contribution is the CAEM-SIRI-DDM framework. CAEM explains constraint-driven agility in contexts where firms must bypass voids through market, digital, or community mechanisms. SIRI explains rentier-state insulation in Algeria, where protection and control coexist. DDM connects these two models by showing that SME performance depends on the interaction between external institutional constraints and internal absorptive capacities. Taken together, the models suggest that SME behavior is heterogeneous and context-dependent. National institutions, sectoral conditions, firm size, managerial capabilities, and network structures may produce different pathways from survival to growth. The article therefore supports a differentiated analysis of Algerian and Sub-Saharan SMEs rather than a single continental model.

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