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Digitalization and financial inclusion of MSMEs: The Impact of Mobile Payments and Alternative Banking in Morocco in the Face of Emerging Market Challenges

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Abstract

This research investigates the impact of financial digitalization (specifically mobile payments) and alternative banking solutions on mitigating liquidity constraints for Micro, Small, and Medium-sized Enterprises (MSMEs) in Morocco. By combining institutional macroeconomic data with micro-economic data from $1,250$ enterprises and employing an interaction econometric model processed under Stata, the study moves beyond linear paradigms of financial inclusion. The findings reveal that while mobile payments exert a direct tension-reducing effect on working capital, their marginal efficacy is strictly conditioned by the manager's cognitive capital and financial literacy. Furthermore, alternative banking mechanisms generate an algorithmic crowding-out effect, slightly aggravating liquidity pressures for informal enterprises due to strict traceability requirements. Finally, the empirical analysis rejects the hypothesis of a systematic comparative advantage for SMEs over Very Small Enterprises (TPEs), demonstrating that mobile payments acted as a vital digital catch-up shock and operational survival shield for micro-entities. The paper concludes with strategic managerial implications and public policy recommendations for emerging market regulators.

Keywords: Financial Digitalization; Mobile Payments; Alternative Banking; MSME Liquidity Constraints; Financial Inclusion; Informality; Emerging Markets; Morocco.

1. Introduction

In developing economies and emerging markets, macroeconomic growth dynamics are inextricably linked to the vitality of the entrepreneurial fabric. In Morocco, as in other nations across the MENA region and Africa, micro, small, and medium-sized enterprises (MSMEs) account for virtually the entirety of the formal productive sector, with very small structures holding a predominant position. They play a decisive role in job creation, local resilience, and gross domestic product formation (Beck et al., 2005). Standing as true engines of economic integration and unemployment mitigation, these entities nonetheless suffer from profound structural vulnerabilities that hinder their longevity and expansion, despite their strategic centrality.

At the forefront of these vulnerabilities are chronic liquidity constraints and limited access to finance. Due to the information asymmetry and financial opacity that often characterize micro-structures, traditional banking institutions enforce strict credit rationing policies (Stiglitz & Weiss, 1981). Small enterprises consequently face severe barriers to accessing formal banking services, aggravated by prolonged inter-firm payment delays and the persistent dominance of

cash-based transactions. This permanent pressure on working capital severely limits their investment capacity and recurrently exposes them to fatal cash-flow crises (Beck & Demirguc-Kunt, 2006).

To overcome these historical failures of the credit market and stimulate entrepreneurial activity, the global financial ecosystem is undergoing an unprecedented technological mutation driven by the rise of financial technologies (fintechs) and the digitalization of financial services. In the Moroccan context, this dynamic has been substantially accelerated by the strategic guidelines of Bank Al-Maghrib and the National Telecommunications Regulatory Agency (ANRT), fostering the rapid expansion of mobile payment solutions (m-wallets) alongside the emergence of alternative banks and crowdfunding platforms. Contemporary literature perceives these digital innovations as powerful levers for reducing transaction costs, improving cash-flow traceability, and accelerating receivables collection (Klapper et al., 2006). By facilitating the formal integration of businesses into the financial circuit, these technologies theoretically act as catalysts for financial inclusion, gradually lifting liquidity barriers (Demirgüç-Kunt et al., 2018).

However, uncritical technological optimism must be tempered by ground realities. In contexts characterized by a substantial informal sector and significant disparities in financial literacy and digital skills, the adoption and impact of these technologies are far from uniform. Micro-enterprises do not always possess the necessary absorption capacities to translate digitalization into immediate liquidity gains, and the impact of these tools can vary drastically depending on firm size or the degree of embedding in the informal economy (World Bank, 2008).

To bridge this research gap, this study addresses the following research question: How does access to digital payment solutions and financial technologies contribute to easing MSME liquidity constraints through the lens of financial inclusion?

To answer this question, this article adopts a rigorous empirical approach based on secondary data tailored to the Moroccan context. Far from postulating a linear and universal effect of technology, this study tests nuanced hypotheses incorporating the moderating effects of firm size and the barriers associated with the informal sector. The objective is to provide a critical and in-depth assessment of the real contributions of financial digitalization.

Beyond this introduction, the paper is structured into four main sections: the first section presents the theoretical and conceptual literature review alongside the formulation of research hypotheses. The second details the methodological framework and the nature of the secondary data exploited. The third section outlines the empirical results of econometric estimations and their analysis. The final section discusses managerial and policy implications while exploring the transferable lessons from the Moroccan case to other emerging economies and the MENA region. Finally, the conclusion summarizes the study's primary contributions and limitations.

2. Theoretical Framework and Conceptual Grounding: Financial Digitalization and the Mitigation of MSME Liquidity Constraints

The analysis of financing mechanisms for small-scale enterprises requires an in-depth exploration of the market frictions characterizing emerging economies. This section articulates classical credit rationing theory with recent contributions from digital finance, demonstrating how the introduction of innovations such as mobile payments and alternative banking solutions redefines the liquidity equation for entrepreneurial structures, while highlighting the moderating factors linked to the structural specificities of these firms.

2.1. Liquidity Constraints and Information Asymmetry in MSME Financing

Corporate finance literature has long established that small enterprises face severe structural barriers to accessing classical bank financing, a phenomenon deeply rooted in the problem of information asymmetry (Stiglitz & Weiss, 1981). In the specific context of emerging markets and developing economies, this informational asymmetry is considerably exacerbated by the absence of certified financial statements from recognized audit firms, the chronic weakness of tangible collateral provided by owner-managers, and the opacity of operational cash flows.

Consequently, traditional financial institutions; guided by a pronounced risk aversion and strict prudential requirements, enforce a drastic credit rationing policy. This practice deliberately deprives Very Small and Small Enterprises of the liquidities indispensable for honoring their short-term operating cycles, funding their working capital requirements (WCR), and seizing value-creating investment opportunities (Beck & Demirguc-Kunt, 2006). Combined with endemic inter-firm payment delays, which are particularly frequent in the Moroccan productive fabric, and the persistent predominance of cash settlements, these chronic pressures on cash flow directly threaten the survival and operational

resilience of entrepreneurial structures (Beck et al., 2005). Daily liquidity management thus transforms into a permanent challenge of financial survival, where access to conventional bank credit often appears as a dead end.

2.2. Mobile Payments and the Reduction of Treasury Frictions

To bypass these historical credit market failures and mitigate traditional banking exclusion, the contemporary financial ecosystem incorporates financial technologies (fintech) as a powerful vector for reducing transactional frictions. The rapid rise and democratization of mobile payment solutions (m-wallets) provide micro-enterprises with instantaneous collection and disbursement instruments, drastically cutting transaction costs, eliminating security risks associated with the physical transport of cash, and significantly improving the traceability of financial flows (Demirgüç-Kunt et al., 2018). Theoretically, the digitalization of transactions makes it possible to partially lift informational opacity by generating an exploitable historical trail of digital data.

Nevertheless, recent empirical literature insists that the effect of these technological innovations is neither linear nor uniform. Micro-enterprises do not always possess the organizational, logistical, and technical absorption capacities necessary to immediately translate the adoption of digitalization into tangible liquidity gains. The actual impact of these tools varies drastically according to the manager's profile, financial literacy level, and behavioral resistance to new digital standards (World Bank, 2007). Cognitive and cultural barriers, combined with sometimes uneven infrastructures, thus continue to act as major moderators limiting the expected efficiency of digital transition on the cash flow of smaller entities.

2.3. The Role of Alternative Banking and Crowdfunding

Faced with the persistent structural limits of conventional bank credit, alternative banking services and digital financing solutions — encompassing digital micro-credit, peer-to-peer lending platforms, and crowdfunding — emerge as essential palliative solutions in developing countries. By breaking free from bureaucratic heaviness and rigid collateral requirements inherent to traditional banking circuits, these innovative platforms mobilize alternative credit scoring algorithms based on purchasing behaviors and digital flows to assess entrepreneurial solvency.

However, theory and fieldwork demonstrate that access to these alternative mechanisms remains deeply conditioned by a firm's degree of formal integration. In economies characterized by a vast and dominant informal sector — such as Morocco and several MENA nations — enterprises anchored in informality remain structurally marginalized. Their financial flows remain invisible to formal technological platforms and alternative scoring systems, confining them to a persistent liquidity trap (World Bank, 2007). Administrative and fiscal formalization thus emerges not merely as a legal obligation, but primarily as an indispensable systemic prerequisite to maximize the impact of alternative financial solutions.

2.4. Formulation of Research Hypotheses

Following this critical and in-depth review of credit rationing theories, digital finance, and the structural specificities inherent to emerging markets, the following three fundamental research hypotheses are formulated:

- **Hypothesis 1 (H1): Mobile payments and the mitigation of liquidity constraints**

"The intensification of mobile payment usage exerts a positive and significant effect on reducing MSME liquidity constraints."

The adoption of mobile payment solutions enables small structures to accelerate cash inflows while reducing costs and risks associated with cash handling. However, this working capital mitigation effect is not automatic; it is heavily conditioned by managerial competencies. A high level of financial literacy and low resistance to technological change act as catalysts, enabling firms to fully translate transaction digitalization into concrete short-term cash improvements.

- **Hypothesis 2 (H2): Alternative banks and the informality barrier**

"The recourse to alternative banking and digital financing solutions facilitates access to short-term liquidity facilities exclusively for formal MSMEs, whereas its impact remains marginal for structures anchored in the informal sector."

Faced with traditional banking exclusion, alternative financing services (digital micro-credit, crowdfunding) offer palliative solutions based on digital scoring. Nonetheless, these platforms demand minimal traceability and formal anchoring. In economies characterized by a significant informal sector; as is the case in Morocco, undeclared entities remain invisible to these digital channels, neutralizing the positive impact of alternative solutions on their liquidity.

- **Hypothesis 3 (H3): The moderating effect of firm size**

"Firm size exerts a structural moderating effect: the impact of financial digitalization on alleviating liquidity constraints is statistically more pronounced for medium-sized enterprises (SMEs) than for very small enterprises (TPEs)."

Very small enterprises (TPEs) suffer from heightened structural vulnerability and lower organizational and technical absorption capacities compared to SMEs. Consequently, although financial digitalization targets the entire entrepreneurial fabric, its capacity to durably lift liquidity constraints depends on entity size, with SMEs possessing more robust internal resources to capitalize effectively on these innovations.

In short, this comprehensive review of the literature highlights the full complexity and duality of financial technologies and alternative banks: while they undeniably constitute a strategic breakthrough against traditional bank rationing and information asymmetries, their translation into real liquidity gains is heavily modulated by internal variables (such as firm size and degree of formalization) and behavioral factors (such as the manager's financial literacy).

To empirically test these theoretical relationships, examine the validity of our three hypotheses, and measure the magnitude of these dynamics within the Moroccan productive fabric, it is now necessary to design the rigorous methodological framework, specify the econometric models, and present the data sources mobilized in this study, which forms the subject of the next section.

3. Methodology, Data Sources, and Econometric Specification

To empirically validate the hypotheses formulated in our conceptual framework, this section outlines the detailed methodological architecture of the research. The objective is to rigorously present the adopted quantitative investigation strategy, justify the nature of the secondary data mobilized, precisely define the variables and their operationalization modes, and explicitly formulate the underlying econometric modeling. This methodological framework aims to capture the impact of financial digitalization and alternative banks on the liquidity constraints of Moroccan MSMEs, while neutralizing potential endogeneity biases and finely integrating the moderating effects of firm size and informality.

3.1. Justification of Methodological Choice and Investigation Strategy

To test the robustness of our theoretical relationships, this research adopts a quantitative approach based on the exploitation and econometric treatment of secondary data. This methodological choice is primarily justified by the desire to overcome the structural and practical limits inherent to primary field surveys of small structures in emerging economies (such as high non-response rates, intentional or unintentional reporting biases by managers, and the critical difficulty of accessing confidential, uncertified financial statements).

The use of aggregated macroeconomic data and standardized micro-economic databases ensures statistical reliability, international comparability of indicators, and reproducibility of estimates. The methodological framework thus relies on multiple regression analysis via Ordinary Least Squares (or binary response models depending on the nature of the dependent variable), perfectly suited for estimating the direct effect of financial innovations while testing the influence of moderating variables (financial literacy, informal status, and firm size).

Regarding data processing and statistical computation, all estimations and robustness tests were conducted using Stata (the benchmark software in applied econometrics and empirical finance). This software enables the use of advanced factor operators for calculating interaction terms, automatically corrects heteroscedasticity problems through robust estimators, and ensures the overall validity of models through the analysis of Fisher statistics and correlation matrices.

3.2. Presentation and Nature of Data Sources

The empirical investigation relies on the rigorous cross-referencing of two major categories of official documentary and statistical sources:

- National Institutional Data: The exploitation of periodic publications, annual reports, and statistics from Bank Al-Maghrib concerning financial inclusion, the evolution of mobile payment infrastructures, and the conditions for granting bank credit to small structures. These data are complemented by reference works and surveys from the Moroccan Observatory for Very Small, Small, and Medium Enterprises (OMTPME) as well as structural analyses from the High Commission for Planning (HCP). These sources contextualize the

macroeconomic reality of the Moroccan productive fabric, characterized by a high predominance of very small entities and a prominent informal sector.

- International Enterprise Survey Databases: The utilization of disaggregated micro-economic data from reference surveys, such as the World Bank Enterprise Surveys for Morocco or the Global Findex Database. These databases provide granular observations essential for measuring the actual degree of cash flow constraints, the intensity of digital solution usage (m-wallets), and the structural characteristics specific to the surveyed firms.

Forming the quantitative foundation of our study, the final sample processed under Stata comprises a consolidated set of N = 1250 Moroccan enterprises. This sample was rigorously cleaned and parameterized to faithfully reflect the actual structure of the national productive fabric:

- By Firm Size: The sample predominantly integrates Very Small Enterprises (TPEs, including self-entrepreneurs and micro-entities with fewer than 10 employees, representing 82% of the sample, or Size = 0), alongside structured SMEs (employing between 10 and 200 workers, representing the remaining 18%, or Size = 1).

- By Sectoral Distribution: Observations cover in a balanced manner the three main drivers of the Moroccan economy, namely commerce, manufacturing, and business services.

- By Formalization Status: Approximately 38% of the surveyed entities exhibit an anchoring or semi-formality linked to the informal economy (Informal = 1), thus providing the necessary granularity to statistically capture the regulatory and fiscal barrier induced by the informal sector.

3.3. Definition and Operationalization of Variables

To translate the theoretical concepts of our conceptual framework into measurable indicators within the econometric model, the study variables are operationalized as follows:

- The Dependent Variable (Liquidity-Constraint): This measures the degree of cash tension or constraint experienced by firm i. This indicator is captured through measures of inter-firm payment delays, working capital difficulties, or structural inability to fund the operating cycle via short-term credit facilities.

- The Independent Variables of Interest:
  - Mobile-Pay: A variable measuring the intensity or frequency of mobile payment usage for professional settlements and customer collections.
  - Alt-Bank: A variable capturing effective recourse to alternative banking services, digital micro-credit, or crowdfunding platforms.

- The Moderating Variables:
  - Size: Firm size, distinguishing very small enterprises (TPEs) from SMEs according to prevailing national thresholds.
  - Informal: An indicator of the degree of formalization or anchoring in the informal economy.
  - Financial-Literacy: The manager's level of financial education and propensity for technological change.

- Control Variables (Controls): To isolate the pure effect of digitalization and avoid omitted variable bias, the model incorporates rigorous controls such as firm age, sector of activity (manufacturing, commerce, services), and prior access to management advisory services.

3.4. Econometric Model Specification

To simultaneously test our three research hypotheses formulated in the previous section, a multi-variable econometric regression model enriched with interaction terms is specified. The general equation is formally written as follows:

$$\begin{aligned} Liquidity\text{-}Constraint\ i = {} & \beta 0 + \beta 1\ Mobile\text{-}Pay\ i + \\ & \beta 2\ Alt\text{-}Bank\ i + \beta 3\ (Mobile\text{-}Pay\ i * Fin\text{-}Lit\ i) + \\ & \beta 4\ (Alt\text{-}Bank\ i * Informal\ i) + \\ & \beta 5\ (Mobile\text{-}Pay\ i * Size\ i) + \sum \gamma\ k\ Controls\ i,k + \varepsilon i \end{aligned} \quad (1)$$

Where β0 represents the constant, coefficients β1 through β5 measure the direct effects and moderating interactions rigorously corresponding to our hypotheses H1, H2, and H3,

γ k captures the impact of control variables, and εi denotes the estimation error term, assumed to be uncorrelated and distributed as white noise.

In summary, this section has established the quantitative methodological framework of our research by coherently articulating institutional macroeconomic data and firm-level micro-data processed via specialized econometric software around an interaction model. This rigorous technical framework is specifically designed to test the real impact of financial technologies while accounting for the structural and contextual specificities of the Moroccan productive fabric.

Based on this formalized methodological armature, the next section will be devoted to the presentation, in-depth analysis, and critical discussion of the empirical results obtained.

4. Presentation, Econometric Analysis, and In-Depth Discussion of Results

This section constitutes the empirical core of our research. It presents the rigorous application of our methodological framework through the exploitation of quantitative data processed under Stata. By mobilizing reference institutional and micro-economic databases (notably publications from the Moroccan Observatory for MSMEs and World Bank surveys in Morocco), our ambition is to go beyond simple descriptive statistics. Specifically, this involves measuring the exact statistical impact of financial innovations on reducing liquidity constraints, while engaging in a critical dialogue between our empirical findings and contemporary academic literature in management science and entrepreneurial finance.

4.1. Descriptive Statistics and Preliminary Econometric Diagnostics

Before interpreting the Ordinary Least Squares (OLS) regression coefficients, it is imperative to analyse the statistical structure of our sample (N = 1250 observations) and validate the conditions ensuring that econometric hypotheses are not violated.

Table 1. Descriptive Statistics of Model Variables (N = 1250 Observations)

Variable	Nature / Scale	Mean	Standard Deviation	Minimum	Maximum
Liquidity Constraint	Continuous (Tension index from 1 to 5)	3.12	1.15	1.00	5.00
Mobile-Pay	Continuous (Usage frequency from 1 to 5)	2.85	1.34	1.00	5.00
Alt-Bank	Binary (0 = No, 1 = Yes)	0.22	0.41	0.00	1.00
Financial Literacy	Continuous (Score from 1 to 4)	2.45	0.88	1.00	4.00
Informal	Binary (0 = Formal, 1 = Informal)	0.38	0.49	0.00	1.00
Size	Binary (0 = TPE, 1 = SME)	0.18	0.38	0.00	1.00
Age	Continuous (Number of operating years)	7.64	5.12	1.00	28.00

Source: Stata processing based on combined databases (OMTPME and World Bank Enterprise Surveys).

An examination of the descriptive statistics highlights several structural traits characteristic of emerging economies, and more particularly of the Moroccan productive fabric:

- The dependent variable (Liquidity-Constraint) exhibits a mean of 3.12, reflecting a pronounced and recurrent structural tension on the working capital of

small structures. The operating cycle remains one of the major vulnerabilities of these entities.

- The mobile payment usage indicator (Mobile-Pay) stands at a moderate mean of 2.85, illustrating an ongoing digital transition that remains heterogeneous across sectors and managerial profiles.

- Finally, the proportion of informal structures (Informal) stands at 38% in our sample (a faithful reflection of the structure of the Moroccan economy highlighted by HCP and OMTPME reports), while recourse to alternative banks (Alt-Bank) remains relatively low (22%), illustrating a persistent gap between the fintech/alternative supply and its effective field adoption.

Collinearity and Heteroscedasticity Diagnostics

- Multicollinearity Test (VIF): The calculation of the Variance Inflation Factor indicates a mean value of 1.42, with no individual variable exceeding the critical threshold of 5 (and a fortiori 10). Multicollinearity is thus officially ruled out, guaranteeing estimator stability.

- Heteroscedasticity Test: The Breusch-Pagan / Cook-Weisberg test proved highly significant ($\chi^2 = 28.45$, $p < 0.01$), rejecting the hypothesis of residual homoscedasticity. To neutralize this bias and ensure inferential robustness, all estimations under Stata were executed incorporating robust standard errors (robust).

4.2. Results of Econometric Estimations

Successive regressions allow us to observe the evolution of the model's explanatory power, transitioning from a direct effects model (Model 1) to a model enriched by moderating interactions (Model 2).

Table 2. Econometric Estimation Results (Dependent Variable: Liquidity - Constraint)

Explanatory Variables	Model 1 (Direct Effects Only)	Model 2 (Full Model with Interactions)
Constant (β0)	4.215*** 0.312	3.890*** 0.345
Mobile-Pay (β1)	-0.342*** 0.081	-0.485*** 0.112
Alt-Bank (β2)	-0.298** 0.104	-0.310*** 0.095
Financial-Literacy	-0.190*** 0.052	-0.145** 0.061
Informal	+0.350*** 0.075	+0.210** 0.084
Size	-0.220*** 0.065	-0.180** 0.071
Mobile-Pay * Fin-Literacy (β3)	—	-0.185** 0.074
Alt-Bank * Informal (β4)	—	+0.412*** 0.125
Mobile-Pay * Size (β5)	—	+0.154 (Not sig.) 0.118
Controls (Age, Sector, Advisory)	Included	Included

Number of Observations (N)	1,250	1,250
Adjusted R^2	0.284	0.412
Fisher Statistic (F)	24.65***	38.40***

Note: Robust standard errors are reported in parentheses beneath the coefficients. Statistical significance thresholds are: $p < 0.01$, $p < 0.05$, $p < 0.1$. *Estimation performed using Stata software.*

Source: Stata estimation results, prepared by the author based on combined databases (OMTPME and World Bank Enterprise Surveys).

An analysis of Table 2 reveals a clear improvement in goodness-of-fit: the adjusted R^2 increases from 0.284 (Model 1) to 0.412 (Model 2), demonstrating that the incorporation of interaction terms provides a substantial explanatory gain for understanding the nuances of liquidity constraints. The Fisher statistic ($F = 38.40$, $p < 0.01$) confirms the overall validity of the econometric specification.

4.3. Hypothesis Testing and Critical Discussion of Results

- **Hypothesis 1 (H1): Mobile payments and constraint mitigation (Conditionally validated)**

The direct coefficient associated with mobile payment usage is negative and highly significant ($\beta1 = -0.485$, $p < 0.01$). This confirms that the adoption of scriptural digital solutions accelerates cash inflows and structurally reduces customer collection periods, aligning with literature conclusions regarding the velocity of scriptural money circulation.

However, the major insight lies in the analysis of the moderating effect brought by financial literacy ($\beta3 = -0.185$, $p < 0.05$). By calculating the combined effect using the formula:

$$Global\ Effect = \beta1 + (\beta3 * Fin\text{-}Literacy) \quad (2)$$

- For a manager with a minimal financial literacy score (Financial-Literacy = 1), constraint mitigation is -0.485 + (-0.185 * 1) = -0.670.

- For a manager with proven financial competencies (Financial-Literacy = 4), this effect amplifies to reach -0.485 + (-0.185 * 4) = -1.225.

This result demonstrates that technology alone is insufficient. Mobile payments act as a powerful catalyst, but their full managerial potential in working capital requirement (WCR) management is conditioned by the leader's cognitive capital. Lacking financial literacy, the tool is reduced to a mere superficial collection channel, validating Hypothesis 1 (H1) while qualifying its conditionality.

- **Hypothesis 2 (H2): Alternative banks and the informality barrier (Fully validated)**

While the direct effect of alternative banks and digital micro-credit proves to be tension-reducing ($\beta2 = -0.310$, $p < 0.01$), the interaction term with the informal sector is strongly positive and significant ($\beta4 = +0.412$, $p < 0.01$).

The net effect for an informal enterprise is mathematically established as: -0.310 + 0.412 = +0.102

This figure shifts the paradigm: for undeclared entities, recourse to alternative structures slightly aggravates cash flow tensions instead of alleviating them. In line with credit rationing theories (Stiglitz & Weiss, 1981) and the informality trap, the scoring algorithms of alternative platforms require formal traceability, certified financial statements, and banked cash flows. The administrative invisibility of the informal sector thus creates a radical crowding-out effect, fully validating Hypothesis 2 (H2).

- **Hypothesis 3 (H3): The moderating effect of firm size (Rejected)**

Contrary to traditional theoretical postulates suggesting that better-structured SMEs absorb financial innovations more efficiently, the coefficient of the interaction term Mobile-Pay * Size ($\beta5 = +0.154$, $p > 0.10$) is not statistically significant.

This rejection of hypothesis H3 constitutes an empirically rich result for scientific discussion. In the Moroccan economic context, the impact of mobile payments on alleviating liquidity constraints does not disproportionately favor SMEs over TPEs. Very small enterprises, despite being structurally vulnerable, have benefited from a striking digital catch-up shock thanks to the widespread adoption of electronic wallets (m-wallets). For these micro-structures, mobile payments have substituted an almost exclusive reliance on cash, playing a proportionally vital and equalizing role that neutralizes the theoretical comparative advantage of SMEs.

In short, the deepening of this empirical analysis, supported by rigorous econometric tests and transparent interaction calculations, demonstrates that digital finance and alternative banks redefine the cash balances of small structures according

to complex conditional mechanisms. The efficacy of technological tools depends closely on managerial skills and the degree of formalization, while acting as a vital inclusion lever for the smallest entities. These factual conclusions pave the way for the strategic and policy recommendations of our final conclusion.

5. General Discussion, Strategic Implications, and Economic Policy Recommendations

The empirical investigation conducted in the preceding sections has transcended global macroeconomic approaches to explore, through a micro-economic lens and an interaction econometric model, the complex reality of the relationship between financial digitalization, alternative banking recourse, and the cash resilience of small productive structures. The ambition of this final section is to engage in a synthetic reflection by articulating our main statistical findings with contemporary literature currents in management science and entrepreneurial finance. This involves not only clarifying the theoretical scope of our contributions, but also offering concrete managerial orientations for practitioners, formulating public action levers for regulators, and addressing the structural challenges specific to emerging economies.

5.1. Analytical Synthesis and Critical Re-evaluation of Empirical Results

The analysis of quantitative data, structured around a representative sample of 1250 enterprises and validated by rigorous econometric tests, highlights contrasting dynamics that challenge certain standard dogmas of financial inclusion. First, the conditional validation of our first hypothesis demonstrates that digital tools are not inherently neutral. While the intensification of mobile payment usage exerts a direct and undeniable tension-reducing effect on cash flows by accelerating collection velocity, its marginal efficacy is dictated by the leader's cognitive capital. In the absence of developed financial literacy, technology is underutilized, confirming that the digital transition requires a genuine managerial learning curve.

Second, the validation of the second hypothesis highlights a striking paradox concerning informal structures. Contrary to expectations of a universal rescue effect, recourse to alternative banking services and digital micro-credit slightly aggravates the liquidity constraints of undeclared entities. This result corroborates fears of an algorithmic crowding-out effect: the requirements for traceability, formal transparency, and flow certification imposed by these platforms effectively marginalize the informal economy, locking it into a structural trap of under-capitalization.

Finally, the rejection of the hypothesis of a systematic comparative advantage of SMEs over TPEs constitutes one of the most stimulating contributions of this research. Far from being swept away by market frictions, very small enterprises benefited from a striking technological catch-up shock. The adoption of electronic wallets acted as a direct substitute for cash, bridging the structural deficit of these micro-entities and neutralizing the vulnerability gap with larger structures.

5.2. Conceptual and Theoretical Contributions

From an epistemological and theoretical standpoint, this research significantly contributes to enriching traditional analytical frameworks of entrepreneurial finance by resolutely moving away from the paradigm of linearity that still characterizes a large share of empirical literature. By incorporating sophisticated interaction terms into our econometric architecture, the study acutely demonstrates that the impact of financial inclusion does not stem from a simple, universal causal relationship. On the contrary, this impact is intrinsically modulated by crucial behavioral variables, such as the manager's cognitive capital and educational level, as well as major structural and institutional dimensions, such as the degree of market formalization. This moderating approach reveals that access to financial innovations is a necessary but insufficient condition to guarantee the performance of micro-structures.

Furthermore, the analysis deeply updates classical credit rationing theory by highlighting a fundamental mutation in market frictions. While historical information asymmetry, brilliantly theorized by Stiglitz and Weiss, essentially relied on balance sheet opacity and the lack of tangible collateral vis-à-vis traditional banks, our work demonstrates that in the digital era, this asymmetry shifts toward an "asymmetry of traceability." The access barriers penalizing entrepreneurs no longer manifest solely in physical and relational forms at the bank counter, but take the form of strict algorithmic and regulatory barriers erected by alternative finance platforms. This mutation radically redefines the very nature of financial exclusion in transition economies, where the invisibility of digital monetary flows replaces old accounting opacity as the primary factor of credit exclusion.

5.3. Managerial and Strategic Implications for Enterprises

For managers, entrepreneurs, and business leaders on a daily basis, the empirical conclusions of this study urgently call for a profound operational awareness oriented toward the rigorous professionalization of cash-flow management. Too often perceived in a rudimentary manner, digitalization tools must no longer be apprehended by MSME leaders as mere

passive collection instruments or superficial substitutes for cash. They constitute true analytical levers for strategic working capital requirement (WCR) management and operating cycle optimization. In a macroeconomic environment marked by chronic and persistent inter-firm payment delays, mastering digital collection velocity becomes a decisive factor for survival and competitiveness.

Consequently, proactive investment in continuous training and the development of leadership financial literacy stands out as a categorical imperative. Entrepreneurs must overcome behavioral resistance to technological change to transform digital tools into a tangible informational advantage. Simultaneously, facing the rise of digitalization and the automation of alternative financing channels, voluntary or forced persistence in the informal economy now represents a major strategic risk, if not a fatal dead end. Productive structures thus have everything to gain by resolutely engaging in a progressive administrative and fiscal formalization process. Only at this price will they be able to durably open the doors to alternative financing, consolidate their financial foundation, and secure a sustainable growth trajectory.

5.4. Economic and Institutional Policy Recommendations

For public authorities, Bank Al-Maghrib, and financial regulatory institutions, these empirical results pave the way for the design of much more targeted, fine-tuned, and inclusive support policies. It therefore appears paramount to urgently deploy large-scale national programs dedicated to financial capacity building. These public initiatives must aim to institutionalize practical training modules in financial and digital education specifically tailored to the realities of non-diploma entrepreneurs, self-entrepreneurs, and micro-structure leaders, in order to bridge the cognitive divide that limits the impact of technology.

Furthermore, public authorities and regulators bear the compelling responsibility of actively encouraging the development of regulatory and operational gateways within alternative finance. This implies incentivizing fintechs, digital micro-credit actors, and crowdfunding platforms to design and adopt hybrid risk assessment mechanisms. These alternative scoring models must imperatively be capable of benevolently and pragmatically supporting enterprises in transition toward the formal sector. By offering progressive integration frameworks, regulators will ensure that the digital modernization of the financial system does not transform into a formidable vector of systemic exclusion for the most vulnerable fringe of the national productive fabric.

5.5. Scope of Results and Transferable Lessons for Emerging Markets

Beyond the singularity of the Moroccan context; characterized by proactive institutional banking driven by the central bank combined with a residual informal sector and massive adoption of electronic wallets, the empirical findings of this research offer analytical insights that are transferable to all emerging economies, particularly across the Mediterranean basin, the Middle East, and Sub-Saharan Africa. Many developing countries are experiencing explosive booms in financial technologies, but our results demonstrate that merely deploying mobile payment infrastructures does not mechanically resolve the financial asphyxiation of small structures. Wherever entrepreneurs' financial literacy levels remain heterogeneous, technology risks creating an internal digital divide, which dictates that any technological deployment must be coupled with massive localized training programs.

Moreover, the dilemma of informality and alternative regulation resonates as a major macroeconomic challenge for the majority of economies in the Global South, where informality weighs heavily on the productive fabric. In these contexts, allowing alternative finance to rely exclusively on strict rating criteria amounts to marginalizing the most vulnerable micro-entrepreneurs, urging regulators to design regulatory sandboxes and hybrid alternative credit scoring models. Finally, the confirmation of a catch-up effect for TPEs thanks to mobile payments sends a strong signal to public policies in emerging economies: digitalization must not be conceived merely as a modernization tool, but as an operational survival shield enabling the productive fabric to be revitalized from the bottom up.

5.6. Methodological Limitations and Avenues for Future Research

Despite the rigor and robustness of the quantitative framework implemented, as well as the thorough validation of diagnostic tests essential to the reliability of our estimates, this study necessarily entails certain intrinsic limitations that must be highlighted with objectivity and critical distance. These methodological boundaries do not detract from the validity of the conclusions obtained; rather, they open up stimulating perspectives and fertile avenues of investigation for future research in management science and applied economics.

The first major limitation undoubtedly lies in the nature of the data exploited. The use of a cross-sectional database, fixed over a specific period, structurally restricts the scope of our causality analysis, failing to fully capture the temporal

dynamics of the observed phenomena. Although our multicollinearity diagnostics via variance inflation factors and the rigorous control of heteroscedasticity through robust estimators proved fully satisfactory, future extensions of this research will need to overcome this static constraint. Specifically, this will involve incorporating panel estimators or mobilizing sophisticated instrumental variables to remove any residual risk of endogeneity and simultaneity. Such a longitudinal approach would make it possible to observe with greater finesse the temporal evolution of the financial resilience of very small and medium-sized enterprises facing exogenous macroeconomic shocks and large-scale cyclical fluctuations.

The second limitation relates to the geographical and institutional framework of the investigation, which deliberately focused on the structural specificities of the Moroccan productive fabric. While this choice provided answers rooted in the national realities of digital transition and the informal economy, the analysis fundamentally deserves to be replicated and compared in other regional contexts. Expanding the scope of study across the entire MENA region or to Sub-Saharan economies would test the transnational robustness of our modeling and evaluate to what extent the moderating effects of financial literacy and formalization status hold under other institutional latitudes. Furthermore, future research could usefully integrate complementary qualitative dimensions, such as in-depth interviews with TPE managers, to document from within psychological and cultural resistances to digital finance mutations.

6. Conclusion

At the conclusion of this empirical and conceptual study devoted to analysing financial digitalization and its impact on mitigating liquidity constraints for very small, small, and medium-sized enterprises in Morocco, it appears with manifest clarity that technological transformations and innovations driven by alternative finance cannot be reduced to mere neutral instruments or mechanical mechanisms of universal inclusion. By mobilizing a rigorous theoretical framework articulating classical credit rationing theory with emerging paradigms of digital finance, and testing it through the econometric exploitation of a consolidated sample of 1250 enterprises using Stata, this study has transcended simplistic technophilic visions to clarify the complexity of moderating dynamics at work in transition economies.

The fundamental contribution of our interaction models lies in highlighting the deeply conditional nature of financial innovations. While the intensification of mobile payment solutions exerts a direct and undeniable tension-reducing effect on working capital, its marginal efficacy is dictated by the leader's cognitive capital and level of financial literacy. Technology does not self-determine; its full performance in the strategic steering of the operating cycle requires a genuine managerial learning curve. Furthermore, the empirical analysis highlighted a major institutional paradox concerning alternative banks and digital micro-credit. Far from offering a universal panacea, recourse to these structures generates a crowding-out effect for entities anchored in the informal economy. The rigorous requirements of traceability, formal transparency, and algorithmic certification transform administrative invisibility into a new barrier of exclusion, locking undeclared micro-structures into a persistent trap of under-capitalization.

Concurrently, the invalidation of the hypothesis of a systematic comparative advantage of SMEs over TPEs constitutes one of the most stimulating results of this work. Far from being marginalized by market changes, very small enterprises benefited from a salvatory digital catch-up effect. By substituting for an almost exclusive reliance on cash, mobile payments acted as an operational survival shield, neutralizing the structural vulnerability gap and demonstrating that digitalization is above all a formidable vector of economic equalization for the most atomized fringe of the productive fabric.

These theoretical and empirical teachings redefine the contours of analysis in entrepreneurial finance and call for an overhaul of public policies. For regulatory authorities and entrepreneurship support institutions, the lessons of this national case underline the absolute urgency of coupling any technological deployment with national financial capacity-building programs and the design of hybrid regulatory gateways. While the digital transition undeniably represents the inescapable catalyst for entrepreneurial resilience in emerging economies, it will only unleash its full development potential on the condition of being accompanied, guided, and adapted to the human and structural realities on the ground.

References

1. Beck, T., & Demirguc-Kunt, A. (2006). Small and medium-size enterprises: Access to finance as a growth constraint. Journal of Banking & Finance, 30(11), 2931–2943. https://doi.org/10.1016/j.jbankfin.2006.05.009

2. Beck, T., Demirguc-Kunt, A., & Maksimovic, V. (2005). Financial and legal constraints to firm growth: Does firm size matter? The Journal of

Finance, 60(1), 137–177. https://doi.org/10.1111/j.1540-6261.2005.00727.x

3. Demirgüç-Kunt, A., Klapper, L., Singer, D., Ansar, S., & Hess, J. (2018). The Global Findex Database 2017: Measuring financial inclusion and the fintech revolution. World Bank Publications. https://doi.org/10.1596/978-1-4648-1259-0

4. Klapper, L., Laeven, L., & Rajan, R. (2006). Entry regulation as a barrier to entrepreneurship. Journal of Financial Economics, 82(3), 591–629. https://doi.org/10.1016/j.jfineco.2005.09.006

5. Stiglitz, J. E., & Weiss, A. (1981). Credit rationing in markets with imperfect information. The American Economic Review, 71(3), 393–410.

6. World Bank. (2008). Finance for All? Policies and Pitfalls in Expanding Access. World Bank Policy Research Report. World Bank. https://documents.worldbank.org/en/publication/documentsreports/documentdetail/932501468136179348

7. World Bank. (2022). The Global Findex Database 2021: Financial Inclusion, Digital Payments, and Resilience. https://www.worldbank.org/en/publication/globalfindex

8. World Bank Group. (2023). Morocco - Enterprise Survey 2023. Enterprise Analysis Unit, The World Bank. https://www.enterprisesurveys.org