



Active Agent Capacity and Liquidity Discipline in Mobile Money Operations: A Business Analytics Perspective

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ABSTRACT

Mobile money has evolved into a business-critical financial technology infrastructure, yet its operating strength cannot be judged from customer scale alone. A platform may report rapid growth in registered accounts, transaction value, or agent coverage while still facing service fragility when active agents do not expand at the same pace as transaction demand. This study develops a business analytics model for evaluating active agent capacity, customer activation, transaction intensity, and liquidity pressure as connected dimensions of mobile money operations. The empirical analysis uses public aggregate indicators from mobile money industry reporting and demand-side financial inclusion indicators from the Global Findex database. The model distinguishes between three managerial questions that are often combined in practice: whether customers are becoming active users, whether agents are becoming productive service points, and whether transaction value places increasing pressure on the active agent base. The results show that transaction value and transaction volume grow more rapidly than customer scale, while registered agent expansion exceeds active agent growth. Scenario analysis indicates that agent reactivation can reduce liquidity pressure, whereas customer activation without corresponding service-capacity expansion increases operational stress. The study contributes a practical measurement lens for FinTech managers, payment providers, investors, and regulators seeking to scale mobile money while maintaining reliable last-mile service capacity.

Keywords: Financial technology ▪ Mobile money ▪ Agent liquidity ▪ Digital payments ▪ Business analytics

1. INTRODUCTION

Mobile money has become one of the most important operating infrastructures in inclusive financial technology. It supports peer-to-peer transfers, cash-in and cash-out, bill payment, merchant acceptance, salary disbursement, remittances, savings links, and digital credit interfaces. As the industry matures, the strategic question changes from whether accounts can be opened at scale to whether a provider can sustain reliable service when more customers transact more frequently and at higher values.

The agent network is central to this question. Agents convert

cash into electronic value, support account use, provide customer assistance, and give mobile money a physical presence in places where formal bank branches are limited. However, the size of the registered agent base can be misleading. A provider may have wide nominal coverage but weak service capacity when a large share of agents are dormant, undercapitalized, or unable to rebalance liquidity. In cash-dependent markets, this distinction can directly affect customer trust and transaction completion.

This study treats active agent capacity as a strategic constraint in mobile money scaling. The approach differs from adoption-focused FinTech analysis that emphasizes account

ownership, first use, or aggregate transaction value. Those measures remain important, but they do not show whether the service network can absorb the liquidity and operational burden created by usage growth. A more business-oriented view must connect customer activation, agent activation, value throughput, and transaction intensity.

The analysis therefore develops a compact operating model for agent liquidity discipline. The model uses public aggregate indicators to construct interpretable metrics: customer activation, agent activation, value throughput per active agent, transaction throughput per active agent, and a relative liquidity pressure index. These metrics are designed to be practical for managers and regulators because they do not require proprietary transaction-level data or individual float balances.

The study makes three contributions. First, it reframes mobile money scale as a balance between demand growth and active service capacity. Second, it translates public aggregate industry indicators into operational metrics that reveal hidden pressure in the agent network. Third, it evaluates strategy scenarios showing how customer activation, agent reactivation, and transaction growth affect liquidity pressure. The resulting framework supports more disciplined growth decisions in mobile money and related FinTech operations.

2. RELATED WORK

Financial inclusion research has established the importance of account ownership and digital payment use for household resilience and participation in formal finance [2]. For mobile money, this demand-side perspective explains why digital channels matter, particularly in markets where conventional banking infrastructure is limited. Nevertheless, account ownership is only the entry point. The practical value of a mobile money account depends on whether users can transact reliably when they need to convert cash, send funds, pay merchants, or receive income.

Mobile money industry reporting provides the complementary supply-side view. GSMA reports track registered accounts, active accounts, agents, transaction volume, and transaction value across providers and markets [1]. These indicators reveal a distinction that is critical for operations: registered scale is not the same as active scale. The difference is particularly important for agent networks, where dormant outlets may inflate apparent coverage without adding real service capacity.

Payment-system research further supports this operating perspective. The payment aspects of financial inclusion framework emphasizes access points, transaction accounts, product design, and infrastructure as connected requirements for safe and efficient payments [3]. In a mobile money system, agents are not peripheral distribution partners; they are part of the access infrastructure. Their ability to remain active and liquid shapes whether customers experience the platform as dependable.

Development and policy evidence has shown that digital financial services can reduce transaction frictions, improve access to payments, and support broader participation in formal economic activity [4,5]. Industry evidence also links mobile money to remittances, merchant payments, savings interfaces, and wider financial inclusion [6]. These findings

explain why mobile money reliability has both commercial and social importance. The present study adds a narrower managerial contribution: it asks how a provider can diagnose whether growth is operationally balanced before service quality deteriorates.

Macroeconomic access data also indicate that digital financial services are becoming more prominent in access and usage patterns [7]. However, market-level growth does not automatically translate into robust operating capacity. The proposed model therefore joins inclusion measurement with business operations by asking whether active agents can support the scale and intensity of transactions generated by active users.

Table 1 shows why the proposed paper is positioned between financial inclusion and business operations. Financial inclusion research explains why access is important, while industry reporting shows how mobile money grows in practice. The distinctive focus here is the operational gap between registered scale and active capacity.

3. DATA AND VARIABLE CONSTRUCTION

The analysis uses two sources of public aggregate evidence. The first source is a mobile money industry indicator extract covering customer accounts, active accounts, transaction value, transaction volume, registered agents, and active agents. The second source is a demand-side financial inclusion indicator set, used to place the industry evidence in a broader market context. Observation periods are labelled sequentially to focus on business development and operational change rather than on calendar presentation.

Table 2. Core industry indicators used in the analysis.

Period	Reg. accounts	Active accounts	Value	Volume	Reg. agents	Active agents
P1	772	166	403	24.0	5.3	2.9
P2	866	206	491	26.8	6.6	3.4
P3	1040	290	690	37.1	7.7	4.5
P4	1210	300	767	49.5	10.4	5.2
P5	1400	346	1000	65.0	12.3	5.8
P6	1600	401	1260	81.8	17.4	7.2

In Table 2, account figures are expressed in millions, transaction value in USD billions, transaction volume in billions of transactions, and agent figures in millions. The table shows strong growth across all dimensions, but it also suggests that growth is not evenly distributed. Registered agents increase sharply, while the active-agent base grows more slowly. This difference motivates the activation and liquidity metrics used in the next section.

Table 3. Demand-side inclusion anchors used for contextual interpretation.

Indicator	Value	Interpretation
Global account ownership	76	Formal entry point
Developing-economy account ownership	71	Market inclusion base
Global adults making or receiving digital payments	64	Digital usage base
Account owners using digital payments	84	Activation among account holders
Sub-Saharan Africa mobile money account ownership	33	Mobile-money depth

Table 3 provides the demand-side boundary conditions. Account ownership and digital-payment use indicate that the customer-side foundation for digital finance is substantial. The final row is especially important because mobile money

Table 1. Research streams informing the agent-liquidity perspective.

Stream	Representative source	Main emphasis	How it is used here
Mobile money industry reporting	GSMA mobile money industry reports [1]	Registered accounts, active accounts, agent scale, transaction value, and transaction volume.	Provides the operational variables for customer activation, agent activation, and throughput analysis.
Financial inclusion measurement	Global Findex database [2]	Account ownership, digital payments, mobile money account ownership, and resilience.	Provides demand-side context for interpreting why mobile money scale matters.
Payment inclusion infrastructure	CPMI and World Bank framework [3]	Access points, transaction accounts, product design, and payment-system infrastructure.	Supports the argument that agent points are part of the inclusion infrastructure.
Digital finance development evidence	World Bank [4]; IFC [5]	Transaction frictions, digital access, payment use, and participation in formal economic activity.	Explains why operational reliability has social and business importance.
Macroeconomic and market evidence	GSMA mobile money adoption evidence [6]; IMF Financial Access Survey [7]	Mobile money diffusion, usage patterns, and access indicators across markets.	Positions agent liquidity as a measurable business capability within broader digital finance development.

is not merely a substitute for bank accounts in some markets; it is the primary channel through which many adults enter regulated digital finance.

4. ANALYTICAL MODEL

The proposed analytics model is built on the premise that mobile money scale should be interpreted through both usage and service capacity. Let R_t be registered accounts, A_t active accounts, G_t registered agents, H_t active agents, V_t annual transaction value, and N_t annual transaction volume for period t . Customer activation is defined as

$$C_t = 100 \frac{A_t}{R_t}. \quad (1)$$

Agent activation is defined as

$$L_t = 100 \frac{H_t}{G_t}. \quad (2)$$

The value throughput per active agent is

$$Q_t = \frac{V_t}{H_t}, \quad (3)$$

where value and active agents are measured consistently. The transaction throughput per active agent is

$$T_t = \frac{N_t}{H_t}. \quad (4)$$

Finally, the liquidity pressure index is expressed relative to the first observation period:

$$P_t = 100 \frac{Q_t}{Q_1}. \quad (5)$$

The model is intentionally parsimonious. It does not require proprietary transaction-level data, float-balance information, or customer-level records. It converts aggregate data into business signals that can be monitored by mobile money operators, investors, ecosystem partners, and regulators.

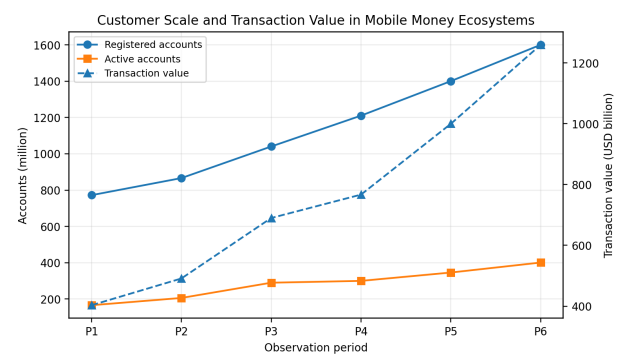
Table 4. Operational interpretation of the proposed metrics.

Metric	Business meaning	Managerial risk if ignored
Customer activation	Share of registered customers that use the service in a recent period.	Overstating market depth from inactive accounts.
Agent activation	Share of registered agents that are operationally active.	Overstating service capacity from dormant outlets.
Value per active agent	Monetary throughput that active agents must absorb.	Underestimating float and liquidity pressure.
Transactions per active agent	Operational workload per active service point.	Underestimating queuing, service time, and error risk.
Activation balance	Relation between customer usage and agent activation.	Scaling usage without sufficient physical-digital capacity.

Table 4 clarifies why the proposed variables are business indicators rather than purely descriptive statistics. Customer growth is valuable only when it converts into active usage. Agent scale is valuable only when it converts into active capacity. The key strategic question is therefore whether customer activation and transaction intensity are matched by agent activation.

5. EMPIRICAL RESULTS

Figure 1 compares the growth of registered accounts, active accounts, and transaction value. The visual pattern indicates that the monetary value of transactions rises faster than the active account base. This is a positive revenue signal, but it also means that each active customer and each active agent may handle more value over time.

**Figure 1.** Customer scale and transaction value in mobile money ecosystems.

The distinction between scale and active use is visible in Table 5. Transaction value expands from 403 to 1260, while transaction volume increases from 24.0 to 81.8. The annu-

alized growth rates for transaction value and volume exceed the growth rate of registered accounts. This difference suggests that the ecosystem is not only adding users; it is also intensifying usage.

Table 5. Growth summary of customer, transaction, and agent indicators.

Indicator	Initial	Latest	Change	CAGR
Registered accounts	772.0	1600.0	828.0	15.7
Active accounts	166.0	401.0	235.0	19.3
Transaction value	403.0	1260.0	857.0	25.6
Transaction volume	24.0	81.8	57.8	27.8
Registered agents	5.3	17.4	12.1	26.8
Active agents	2.9	7.2	4.3	20.0

Table 5 identifies the central operational issue. Registered agents grow rapidly, but active agents do not grow at the same pace. This means that network coverage can look stronger than actual service capacity. For a business that depends on agent liquidity, the registered-agent count alone is therefore an insufficient performance indicator.

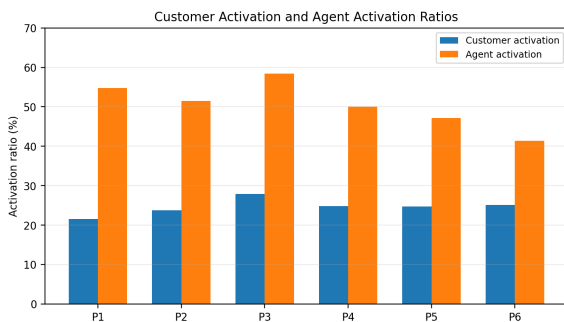


Figure 2. Customer activation and agent activation ratios.

Figure 2 shows that the customer activation ratio gradually improves, while the agent activation ratio declines toward the end of the observation sequence. This does not imply that agent networks are shrinking in absolute terms. It means that registered agent expansion is outpacing active agent participation. The practical consequence is that business strategy should focus not only on recruiting agents but on keeping agents operational, liquid, and commercially motivated.

6. AGENT LIQUIDITY AND THROUGHPUT

A key operating pressure is captured by value throughput per active agent. If the average active agent must process more value, the provider may need stronger float management, rebalancing channels, credit lines, or agent monitoring.

Table 6. Liquidity and transaction-intensity indicators.

Period	Cust. act.	Agent act.	Value/account	Txn/account	Value/agent	Pressure
P1	21.5	54.7	2428	144.6	138966	100.0
P2	23.8	51.5	2384	130.1	144412	103.9
P3	27.9	58.4	2379	127.9	153333	110.3
P4	24.8	50.0	2557	165.0	147500	106.1
P5	24.7	47.2	2890	187.9	172414	124.1
P6	25.1	41.4	3142	204.0	175000	125.9

Table 6 shows that value per active account rises from 2428 to 3142, while transactions per active account rise from 144.6 to 204.0. More importantly, value per active agent rises from 138,966 to 175,000. The liquidity pressure index therefore

increases to 125.9. In business terms, the active agent network is processing more value per active service point, which can improve productivity but also raises liquidity management requirements.

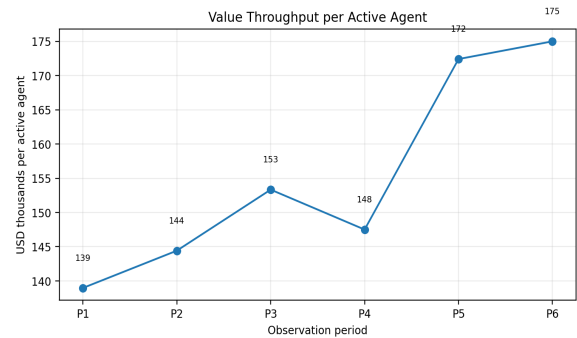


Figure 3. Value throughput per active agent.

Figure 3 reinforces the same conclusion. The rise is not perfectly linear, but the later periods sit above the earlier periods. The strongest managerial reading is that agent profitability and agent liquidity should be analysed together. Higher throughput may make agents more commercially viable, yet it also means that cash and e-money rebalancing failures can affect more customers.

7. OPERATIONAL SEGMENTATION

The proposed model classifies ecosystem periods into operational segments according to customer activation, agent activation, and liquidity pressure. The objective is not to rank periods as good or bad, but to identify which managerial problem dominates.

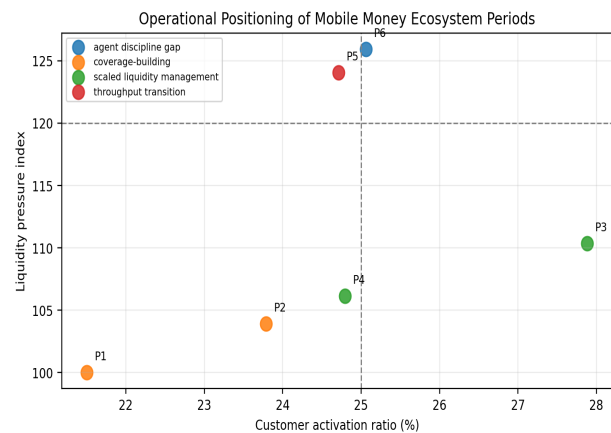


Figure 4. Operational positioning of mobile money ecosystem periods.

Figure 4 separates coverage-building periods from later periods of higher liquidity pressure. The movement toward the upper-right area indicates that customer activation and value throughput are both rising. The final point is categorized as an agent discipline gap because customer activation remains relatively strong while the active-agent ratio is weaker. This is the type of ecosystem position in which agent management matters as much as customer acquisition.

Table 7. Operational segments produced by the business analytics model.

Segment	Periods	Cust. act.	Agent act.	Pressure
Agent discipline gap	1	25.1	41.4	125.9
Coverage-building	2	22.6	53.1	102.0
Scaled liquidity management	2	26.3	54.2	108.2
Throughput transition	1	24.7	47.2	124.1

Table 7 gives the numerical profile of each segment. Coverage-building periods have lower customer activation and lower liquidity pressure. Scaled liquidity-management periods have stronger customer activation without extreme pressure. The throughput transition and agent discipline gap segments show the more difficult business condition: value intensity is rising while active agent participation weakens.

8. SCENARIO ANALYSIS

Scenario analysis is used to test how business decisions affect pressure on active agents. The scenarios are not forecasts. They are structured sensitivity tests that show how the same transaction growth may be sustainable or risky depending on whether active agent capacity expands at the same time.

Table 8 shows that customer activation without agent capacity raises pressure, while agent reactivation reduces pressure even when value continues to grow. The balanced expansion scenario is particularly instructive: increasing active accounts and active agents together keeps pressure nearly stable. This supports a practical managerial rule: campaigns that stimulate customer transactions should be paired with agent reactivation, float support, or liquidity planning.

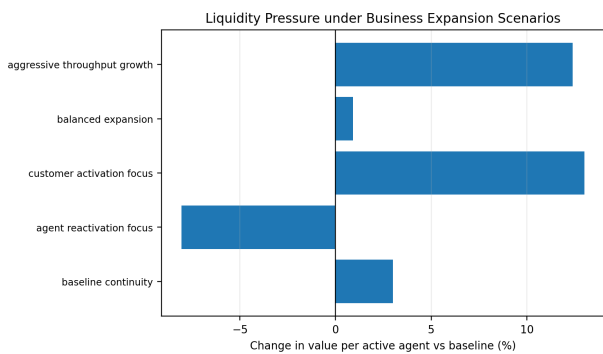


Figure 5. Liquidity pressure under business expansion scenarios.

Figure 5 visualizes the scenario outcome. Customer activation and aggressive throughput scenarios increase pressure on active agents, while the agent reactivation scenario reduces it. The message is that volume growth is not automatically a sign of operational health. It becomes healthy when the physical-digital service network grows in usable capacity.

9. STRATEGIC IMPLICATIONS FOR FINTECH MANAGERS

The analysis points to three practical implications. First, mobile money providers should report active agent ratios alongside registered agent counts. A registered agent count is a coverage indicator, while an active agent count is a service-capacity indicator. Business dashboards should not confuse the two.

Second, liquidity planning should be integrated with customer activation campaigns. Promotions, merchant onboarding, bill-payment expansion, and remittance campaigns can raise transaction volume quickly. If agent float and rebalancing capacity do not expand, customers may face failed cash-outs, longer waiting times, or lower trust in the service.

Third, agent reactivation can be a lower-risk growth lever than pure agent recruitment. Recruiting additional agents expands coverage, but reactivating dormant or semi-active agents can increase usable capacity more directly. The scenario results suggest that improving active agent capacity reduces pressure even when the transaction base remains large.

Table 9. Managerial interpretation of observed patterns.

Observed pattern	Business interpretation	Recommended response
High registered growth with modest active growth	Customer acquisition may exceed recurrent usage.	Shift from onboarding to engagement and retention.
High registered-agent growth with falling active-agent ratio	Coverage growth may overstate service capacity.	Reactivate dormant agents and improve agent economics.
Rising value per active agent	Agent productivity improves but liquidity burden increases.	Strengthen float forecasting and rebalancing channels.
Rising transactions per active account	Customers are using the service more intensively.	Protect reliability before expanding use cases further.
High demand-side digital payment base	Market readiness exists for deeper FinTech services.	Expand adjacent services only after operational capacity is stable.

Table 9 translates the empirical findings into managerial rules. The main implication is that FinTech scaling requires a balance between usage demand and service capacity. A platform may look healthy at the customer level but fragile at the agent-liquidity level.

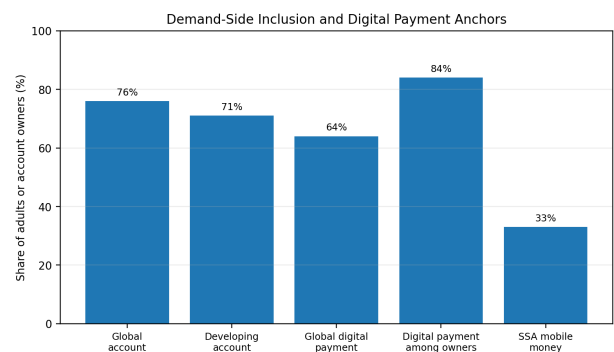


Figure 6. Demand-side inclusion and digital payment anchors.

Figure 6 reminds the reader that mobile money is part of a broader financial inclusion environment. Account ownership and digital-payment usage create the opportunity for expanded services, but operational sustainability depends on the ability of providers and agents to support transactions reliably.

10. LIMITATIONS AND FURTHER WORK

The analysis uses public aggregate data, which is suitable for business-level interpretation but not for causal inference at the consumer or agent level. The model cannot observe individual liquidity shortages, float rebalancing costs, agent commissions, geography, rural-urban variation, or provider-level commercial strategy. These factors matter, and future work should integrate provider microdata where available.

A second limitation is that the pressure index is relative. It is useful for comparing changes over time, but it is not a direct

Table 8. Scenario stress test of customer activation and agent reactivation strategies.

Scenario	Active accounts	Active agents	Value	Pressure change	Agent signal
Baseline continuity	401.0	7.20	1297.8	3.0	manageable
Agent reactivation focus	401.0	8.06	1297.8	-8.0	manageable
Customer activation focus	441.1	7.20	1423.8	13.0	high
Balanced expansion	433.1	7.92	1398.6	0.9	manageable
Aggressive throughput growth	461.2	7.56	1486.8	12.4	high

measure of float adequacy. A high pressure index may be sustainable in a well-managed market with strong bank-agent rebalancing links, while a lower pressure index may still be problematic in remote areas. The index should therefore be interpreted as a screening metric rather than a final diagnostic.

A third limitation concerns the use of global aggregate figures. Regional differences are substantial. Some markets rely heavily on cash-in/cash-out agents, while others increasingly use merchant payments, bank transfers, and app-based services. Future work should apply the same model to regional and country-level data to identify market-specific capacity constraints.

11. CONCLUSION

This study introduced an agent-liquidity business analytics model for mobile money ecosystems. The analysis shows that customer scale, transaction intensity, and agent capacity should be analysed together rather than separately. Mobile money growth is strategically attractive when active customer usage expands, but it becomes operationally demanding when transaction value rises faster than active agent capacity.

The results show that transaction value and volume grow faster than the active customer base, while registered agents grow faster than active agents. This combination creates a business risk: headline network expansion may hide a thinner active service layer. Scenario analysis shows that balanced expansion and agent reactivation reduce liquidity pressure, whereas customer activation without corresponding agent capacity increases it.

For FinTech managers, the practical implication is clear. The next stage of mobile money scaling should not be measured only by registered accounts, transaction value, or the number of agents on paper. It should be measured by the ability of active agents to support active customers reliably. Agent liquidity, activation discipline, and throughput intensity should therefore become core indicators in mobile money strategy and FinTech operations governance.

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