BCG

THE BOSTON CONSULTING GROUP

CICO Economics in Nigeria

Executive Deck and Compendium

DECEMBER 2018

LAGOS BUSINESS SCHOOL

PAN-ATLANTIC UNIVERSITY

Contents

Executive summary

While CICO economics are viable today in urban, peri-urban and rural "oases", we reach the limits to CICO viability as we enter the rural frontier

For providers, economics for an incremental agent point can be favorable in areas with sufficient transaction volume

- Most agents today are found in urban, peri-urban, or rural "oases", where breakeven points are ~5 txn/day
- However, economics challenged if providers choose to invest to improve customer demand / agent viability or enter frontier
- Because most recurring costs are borne by the agent, providers ultimately need to consider agent viability, given higher agent break-even point of ~27 txn/day ("if an agent is viable, a provider will be viable")

Agents similarly face favorable economics in some geographies, but are stressed to the point of unviability at the frontier

- At the frontier, agents expected to experience low transaction volumes below their breakeven points, while at the same time needing to deal with increased liquidity management costs (~13-50% above rural "oases" and >500% above an urban agent)

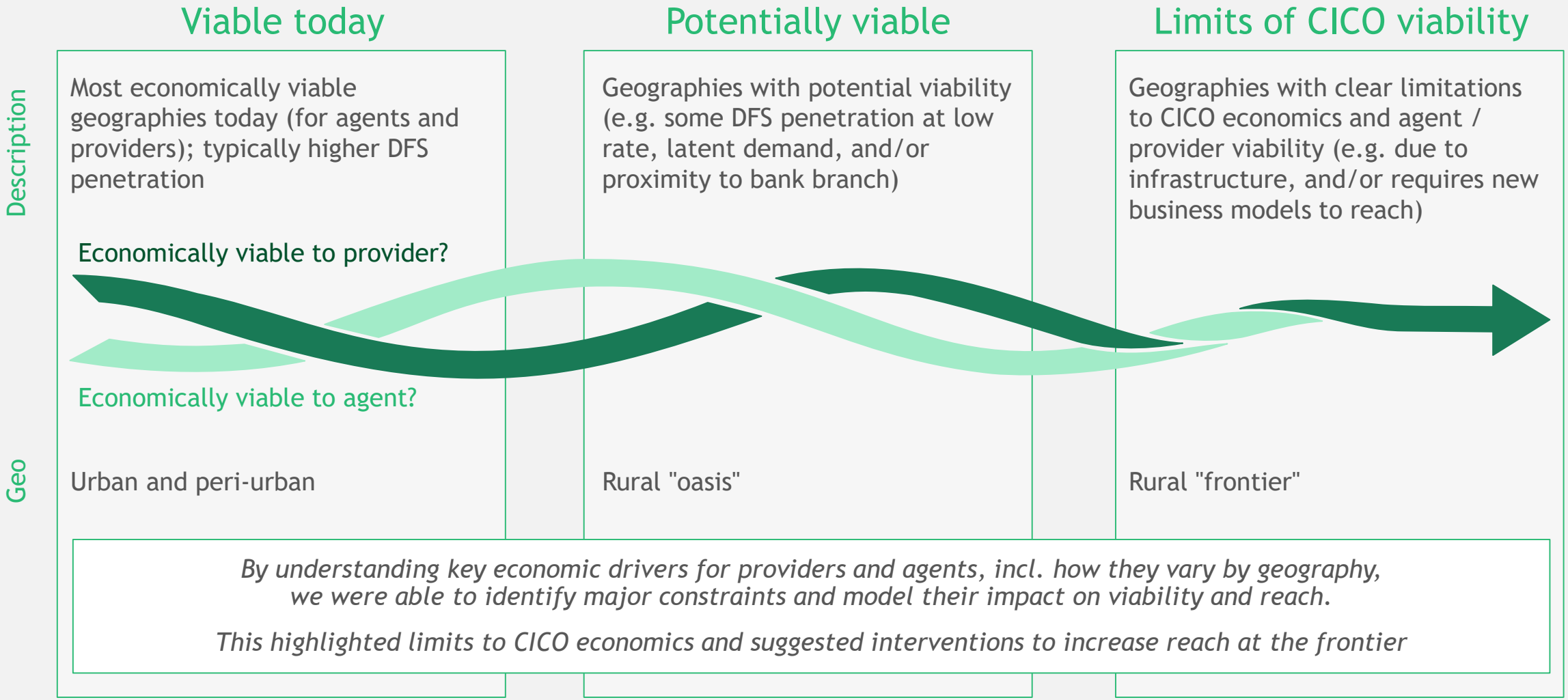
Existing agent model should be able to scale to reach 51% of Nigeria's adult population

- Based on % of Nigeria's population living in location with power, in 5km radius of cell tower, 45 min drive from bank/ATM, and in locations with "sufficient" economic activity (>3,000 adult population)

Further expansion would require intervention… digitization of G2P, agent subsidies, and float runners could have significant impact; however, stakeholder engagement and more robust intervention assessment required to answer open questions

- E.g., digitized G2P payments could have unintended consequence of increased liq. mgmt costs – intervention assessment will require forecasting net impact of any one intervention, how they interact with each other, and requirements to operationalize

CICO economics creates zones of viability



Detail: Most rural expansion to-date seen in "oases", expanding to the frontier involves additional challenges

Rural Oasis (potentially viable)

- Regions of high economic activity in an otherwise low economic "desert"; agents typically located near markets, village centers, busy streets
- Moderate DFS penetration – many customers have bank accounts and are familiar with DFS
- 30-100 transactions/day[1]
- Some existing infrastructure (e.g. bank presence, paved roads, power and mobile connectivity)
- Covered in agent sample; agents present in rural areas today are the ones who are able to make the business work; 85% of rural sample are profitable

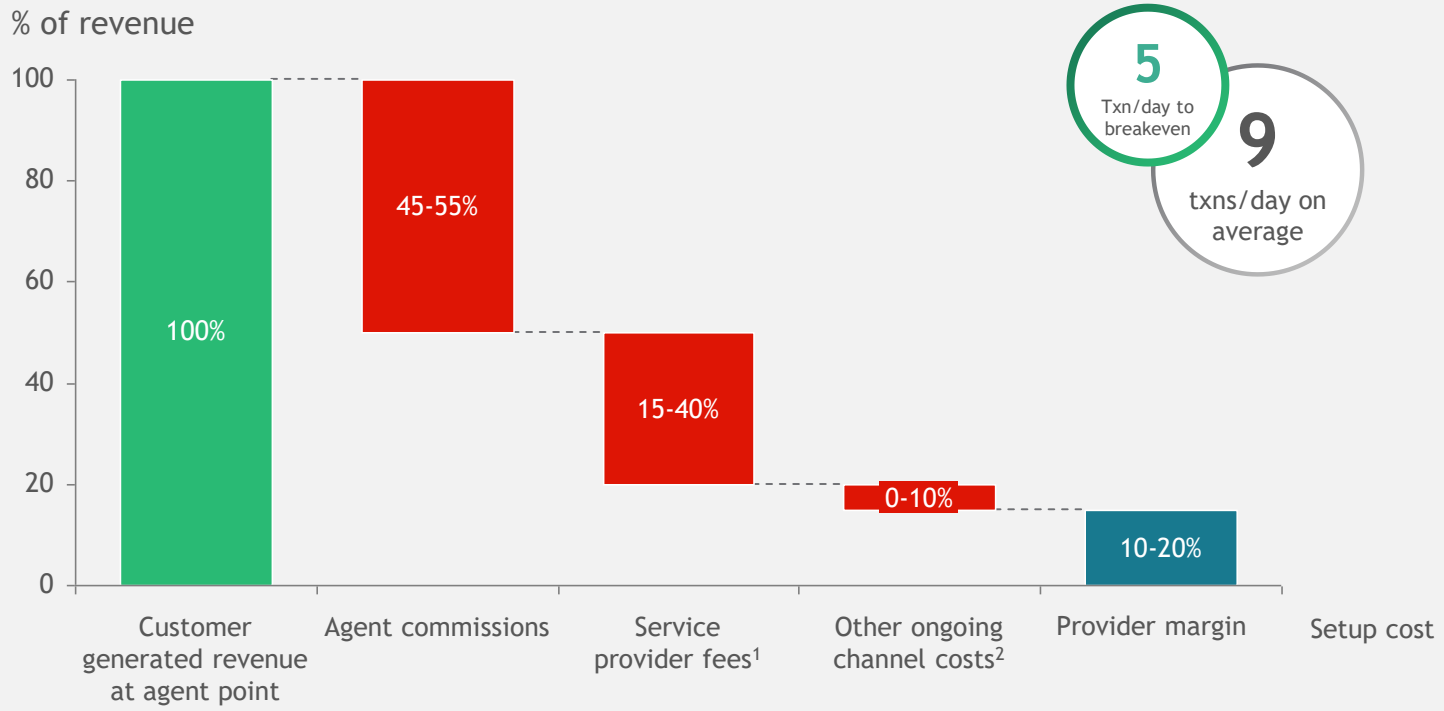
Rural Frontier (limits to CICO economics)

- Remote rural locations with low population size and density, and lower economic activity
- Low DFS penetration – few customers with bank accounts
- <10 transactions/day[2]
- Limited existing infrastructure (e.g. bank presence, paved roads, power and mobile connectivity)
- Not covered by agent sample (due to economic unviability)

1: Range taken from agent interviews
2: Range estimated from assumptions and triangulated with secondary research; see compendium for full details

For providers, agent point economics are favorable in areas with sufficient transactions / revenue…

Average recurring provider margin from single agent point



On average, slim but positive margins at each agent point

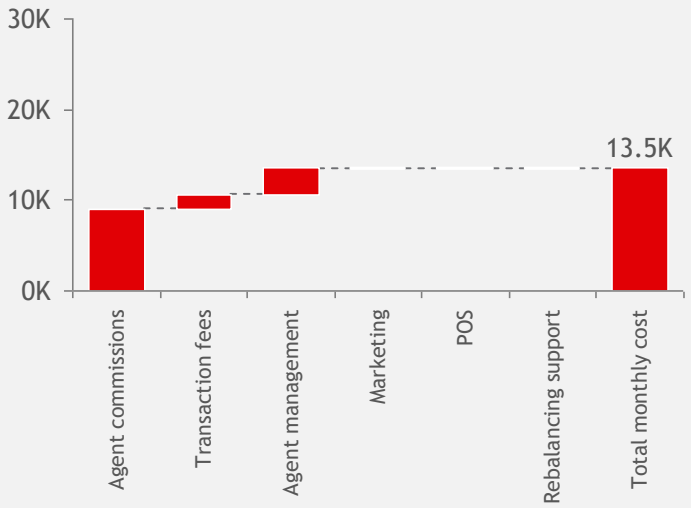
Note: does not include upfront capital investments or corporate overhead costs, as incremental agent point economics are the fundamental driver of network expansion

1: Includes any fees to NIBSS, Telcos, Banks, and Intermediaries; Higher range seen when intermediaries are used
2: Includes recurring costs of agent management, agent training, and marketing/branding at agent point; lower range seen when intermediaries are used
Source: Interviews with providers, 2018

…but cost position impacted (at least in short-term) if they invest in customer demand or agent viability

Minimize costs

Monthly recurring costs (thousand Naira)

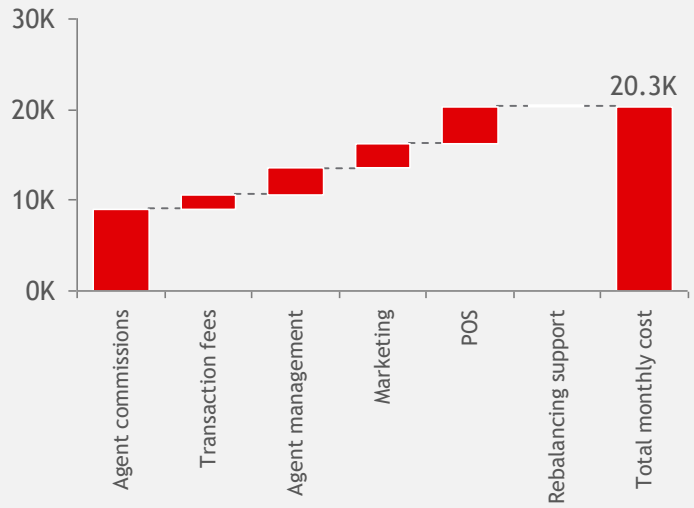


Operational choices:
- Low agent commissions
- No ongoing marketing material
- No POS provided
- No liquidity management support

3 Txn/day to breakeven

Maximize customer demand

Monthly recurring costs (thousand Naira)

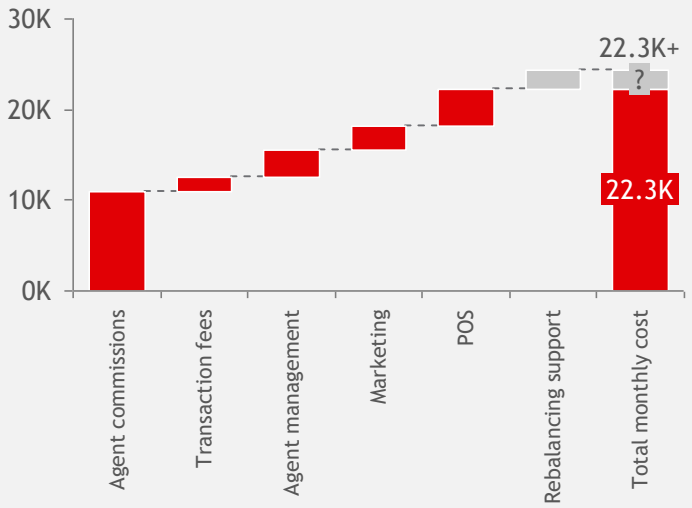


Operational choices:
+ Ongoing marketing material provided
+ POS provided[1,2]

9 Txn/day to breakeven

Maximize agent viability

Monthly recurring costs (thousand Naira)



Operational choices:
+ High agent commissions
+ Liquidity management support

11 Txn/day to breakeven

Providers must believe their investment will increase transaction volume 3-4x and ultimately improve overall ecosystem profitability

Note: Variable cost amounts calculated using average provider revenue per agent point (~20K per month); Incremental cost of operational choices estimated from provider interviews; Breakeven transactions calculated using average customer fee per CICO transaction (~80 NGN)
1: POS typically considered a setup cost for providers; for calculations on this slide, have assumed an amortization of POS value over 24 months
2: Some MMOs limit POS costs by only providing to top agents

…or if they move into the rural frontier

Low txn volumes

Overview:
Despite greater risk to agents, low transaction volume also impacts provider viability at frontier

Direct impact:
Risk of negative margins on recurring monthly basis

Indirect impact:
Low agent viability leads to high agent churn

Higher set-up costs

Overview:
Providers require more time and resources to recruit and onboard new agents

Recruiting/onboarding:
"Although we have some data on the viability of rural locations, we always have to send a team to the field to verify things like latent demand, mobile coverage, and power connectivity"
– Bank in Nigeria

Higher recurring costs

Overview:
Fixed costs of agent network management and marketing can be higher in rural areas for providers

Agent network management:
Lower geographical concentration of agents means it takes more agent managers to support the same number of agents

Marketing:
Low familiarity with national bank brands and digital financial services requires higher marketing spend to create demand

Provider economics are more challenged at an incremental agent point in the rural frontier

For providers to expand agent network into the frontier, they must believe that on a long-term basis these agent points will be profitable

Source: Provider interviews, 2018

Detail: Higher costs to support frontier agents raises breakeven points from 5 to 7 txn/day for providers

Cost to support each agent point expected to increase at the frontier…

~50% higher

Higher marketing costs[1]:

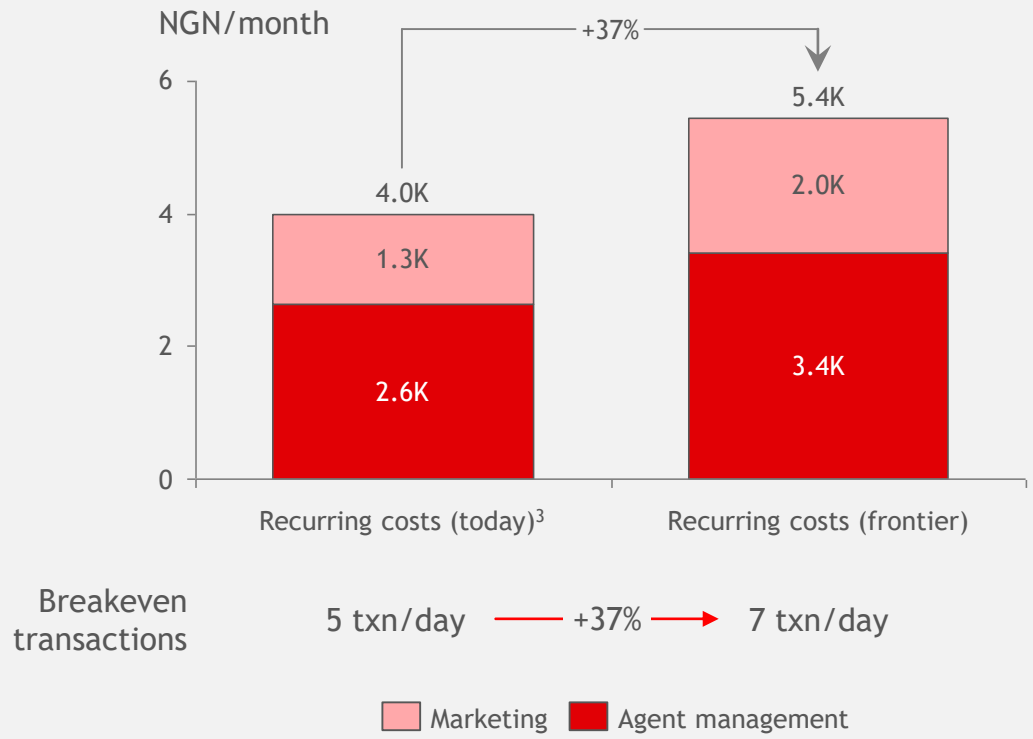
To offset lower brand awareness, lower DFS penetration

~30% higher

Higher agent network management costs[2]:

Due to decreased ratio of agent managers to agents; managers can support less agents when distances increase

…resulting in a higher breakeven threshold for providers



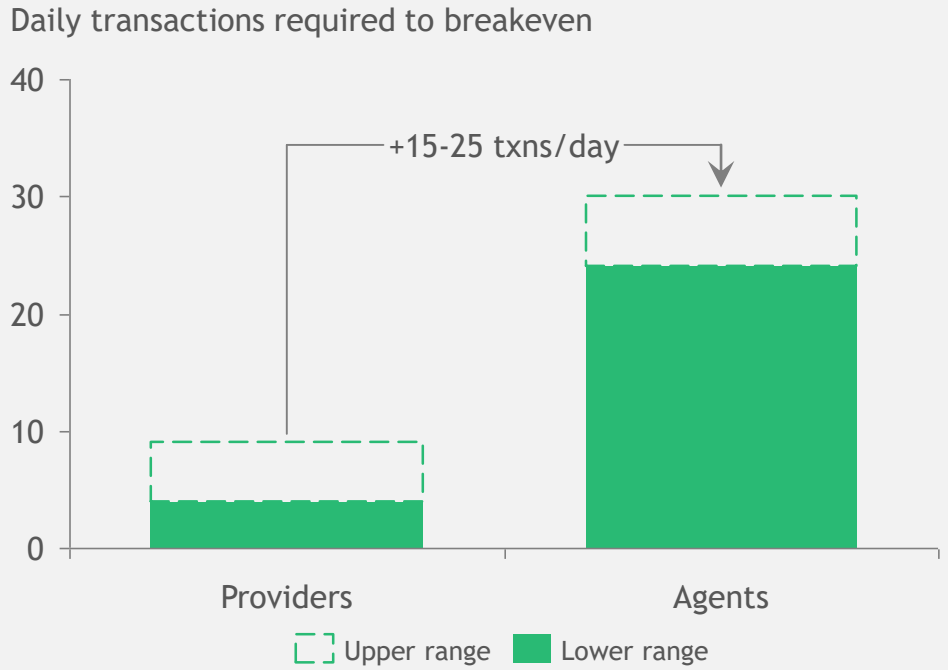
1: Based on qualitative input from providers in interviews; BCG Interviews, 2018
2: *ibid*
3: Average recurring cost based off of BCG provider interviews

Ultimately, providers must help solve for agent viability in order for agent network to stick

In most observed models, agents bear majority of startup and recurring costs…

	Provider	Agent
Startup costs		
• Recruiting	✓	
• Onboarding/training		Varies[1]
• Branding/marketing		Varies[1]
• Technology (mobile/POS device)		Varies[2]
• Real estate (shop setup, security)		✓
• Cash/float capitalization		✓
Recurring costs		
• Training/monitoring	✓	
• Rent		✓
• Utilities		✓
• Internet/data		✓
• Fraud/theft		✓
• Utilities		✓
• Liquidity management		✓

…as a result, average agent breakeven point is significantly higher than provider breakeven point

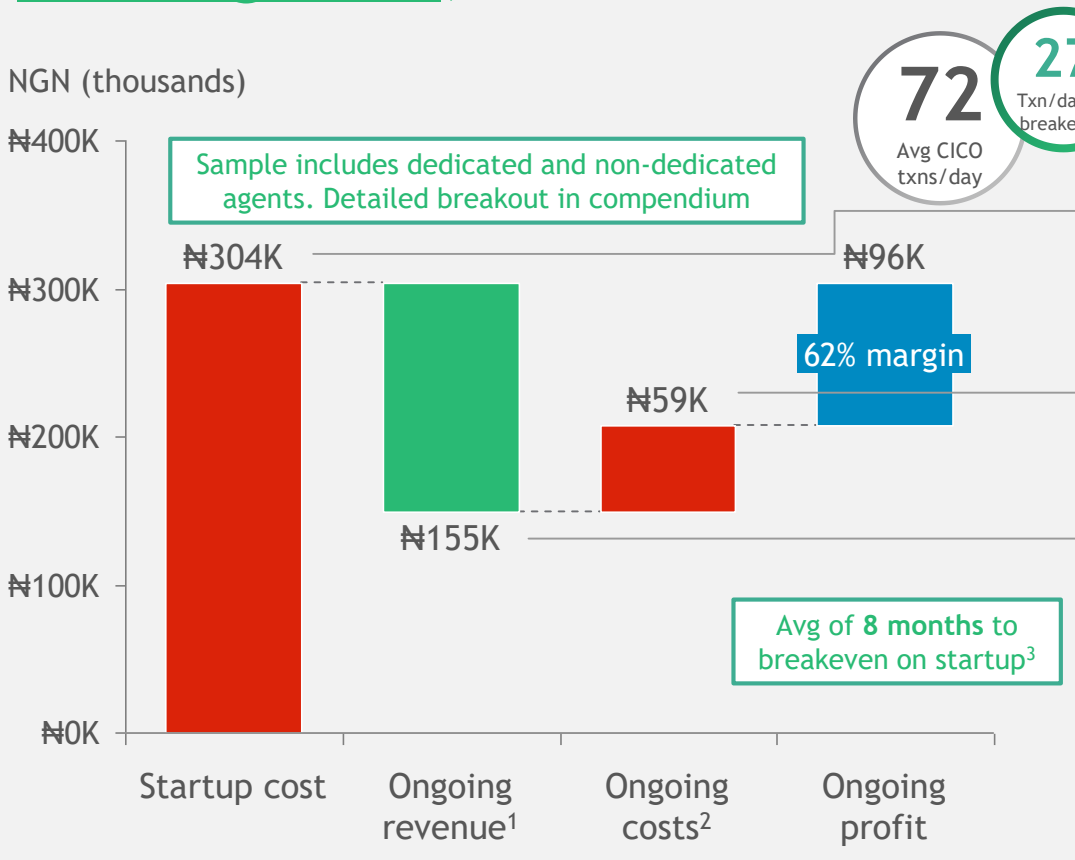


Understanding of CICO economics and agent expansion should therefore focus, as a starting point, on key drivers to agent viability

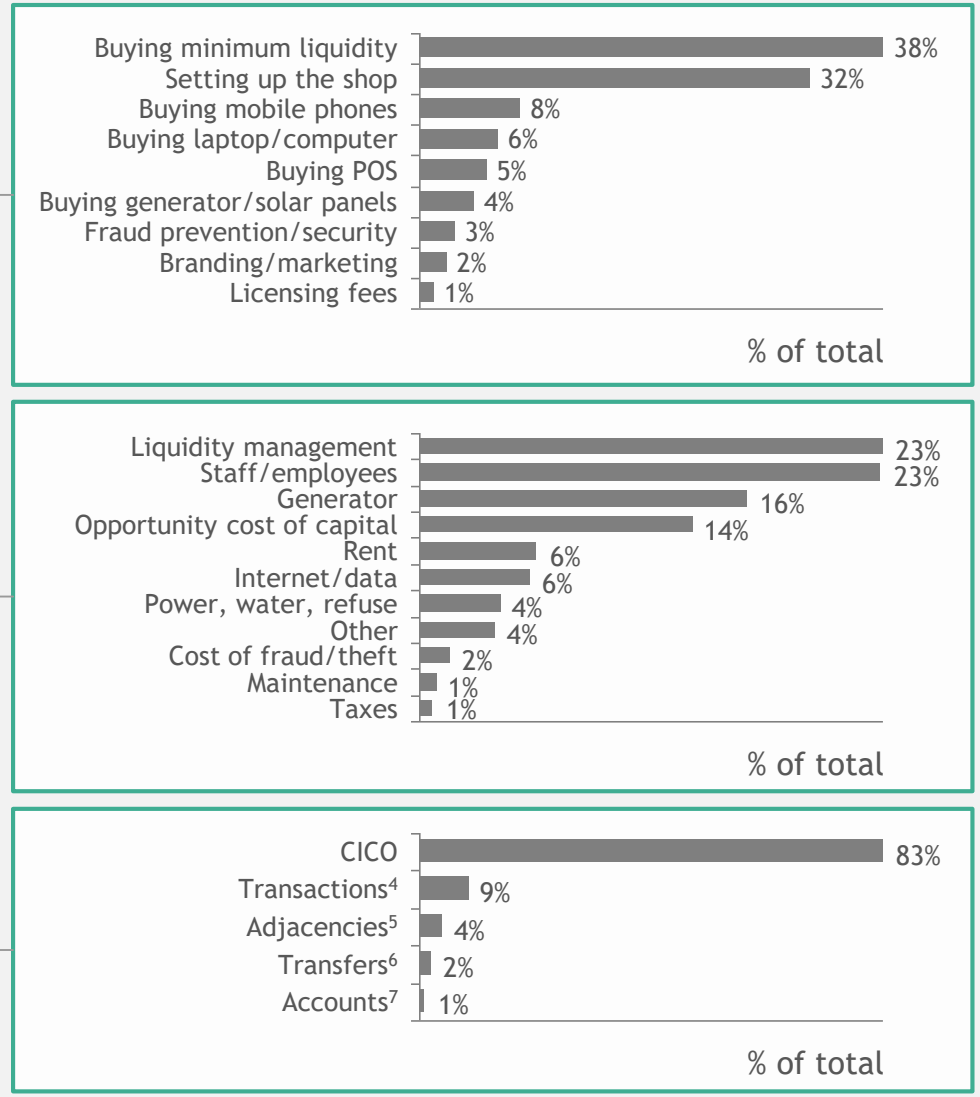
1. Some providers charge agents a licensing/setup fee that helps cover the cost of training, marketing materials
2. Some providers support cost of agent technology (typically POS device), however not representative of typical model

Source: Provider interviews, expert interviews, 2018

For agents, DFS is on average a viable business



	Startup cost	Ongoing revenue[1]	Ongoing costs[2]	Ongoing profit
Urban	475K	109K	41K	68K
Peri-urban	304K	202K	62K	140K
Rural	207K	159K	68K	91K



Source: Agent interviews, 2018
1: Average revenue excludes extra fees (upcharges); 2: Average cost blends dedicated and non-dedicated agents (note: non-dedicated agent costs do not include rent, utilities, generator, or store maintenance); 3: Breakeven calculation assumes 6 month ramp-up to steady state revenue; 4: Bill payments; 5: SIM registrations, SIM replacements, and airtime; 6: P2P transfers (note: many agents did not distinguish between CICO transactions and transfers, which may contribute to the relatively low %); 7: Account openings

Several factors impact an individual agent's viability

	Agent business model	Power reliability	Transaction volumes	Financial infrastructure
Description	• Non-dedicated agents have lower marginal costs (-13% startup and -28% recurring), and breakeven two months faster • As transaction volumes decrease, non-dedicated models are much more viable	• Unreliable connectivity to power grid is consistent across geographies (urban, peri-urban, and rural)	• Most recurring costs are fixed, so agent profitability highly dependent on txn volumes • At the frontier, est. txn volume (<10/day) falls below expected breakeven threshold (~24/day)	• Liquidity management costs are higher for rural vs. urban agents • Because of limited bank/ATM presence, liquidity management costs at the frontier expected to be ~13-50% higher than those at a rural oasis
Mitigating choices	N/A	Reliance on generator • Agents often cope by spending money on generators • Generator fees cost agents an average of ₦12K per month (fuel and maintenance)	Investing in POS • Despite lower costs, no-POS agents take longer to breakeven due to lost revenue from cash outs (12 months vs. 3 months) Charging extra fees • Most agents charge extra fees (80% of agents in sample), providing a 20-25% lift on margins	Reduced rebalancing freq. • Agents offset higher travel costs by taking fewer trips/month: urban/peri-urban (53) vs. rural (26) Alternate rebalancing points • Agents with limited access to financial infrastructure often cope by finding unofficial rebalancing points

Particularly relevant at frontier

Cell infrastructure

- Without cell infrastructure, agents are unable to operate
- No direct economic impact, but a necessary condition for agent viability and reach

Fraud and theft

- Agents currently do not appear to have high theft costs, but qualitative interviews suggest this may become a factor at the frontier, or as the CICO agent market matures

Source: Agent interviews, 2018; See compendium for full details

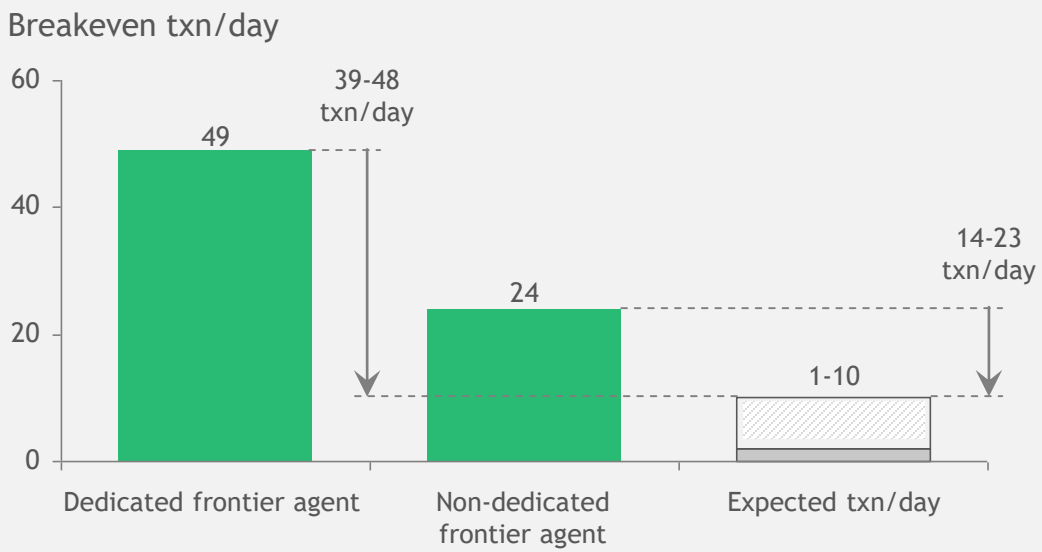
However, agent economics likely unviable at frontier due to low txn volumes & limited financial infrastructure

Transaction volumes

Lower transaction volume in frontier geographies[1]…

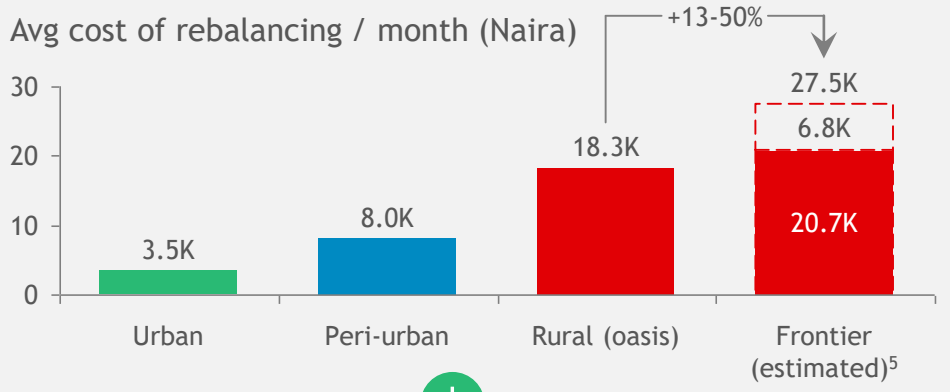
- Transaction volume
- Transaction size
- Non-CICO transactions (e.g. bill pay)

…which falls below required transactions for agents to breakeven[2]



Financial infrastructure

Limited financial infrastructure means frontier agents are often 60+ min from rebalancing point, resulting in increased rebalancing costs[3]

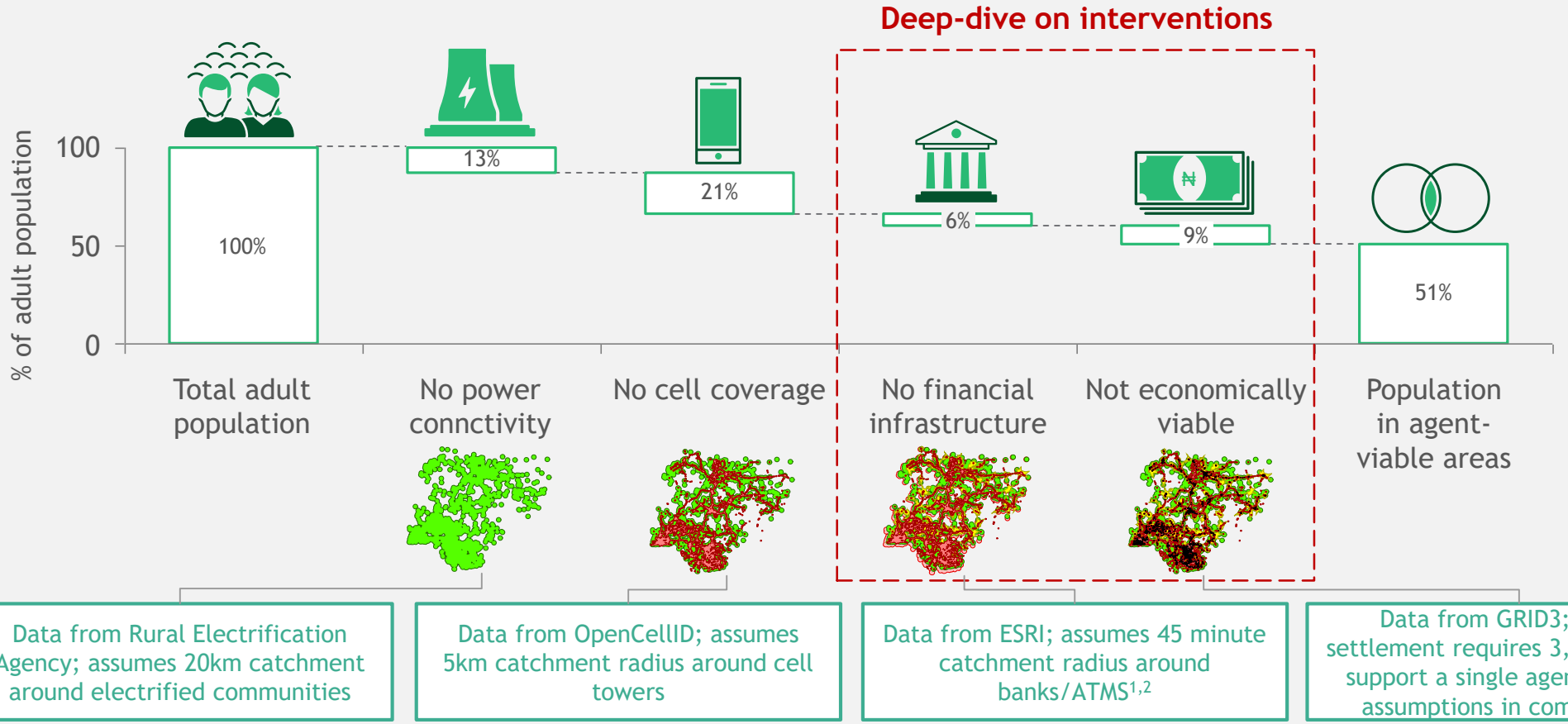


Operational burden also impacts agent viability at frontier. Long rebalancing trips[4]…

- May not be perceived as "worth the hassle" by new agents or non-dedicated agents with alternate income
- May become a bottleneck as rural txn volume grows and need for rebalancing increases
- Result in long periods of store closure, which negatively impact customer experience

1: Expected transactions per day calculated based on assumptions and validated against secondary research, see compendium for full set of assumptions; 2: Required breakeven txns/day calculated using average rural dedicated, non-dedicated agent economics; 3: Frontier estimated rebalancing costs = average rebalancing costs of interviewed agents >60 minutes from a bank; 4: Qualitative input from agent interviews; 5: Upper range includes outlier agent in average, lower range removes outlier agent

Existing agent model likely to reach 51% of Nigeria's adult population



Note: Values in waterfall show incremental percentage of population excluded with each additional filter.

E.g. 87% (100%-13%) of the adult population has power connectivity, while 66% (100%-13%-21%) of the total population has both power connectivity AND access to cell coverage

Interventions likely needed to increase desired reach for CICO agents

1: Assumed agents located maximum of 30 minutes from bank + customer willingness to travel 15 minutes to agent location
2: Drive times from ESRI likely optimistic, actual road conditions may result in drive times much longer than estimated

Interventions can allow agents to be viable in more challenged locations, leading to an increase in reach

Agents must be able to reach settlements of ~500 adults in order to cover ~80% of the adult population

Population segment	Share of adult population (%)	Cumulative share of adult population (%)
>10,000	47%	47%
8,000 – 9,999	4%	51%
6,000 – 7,999	5%	56%
4,000 – 5,999	5%	62%
2,000 – 3,999	8%	69%
1,000 – 1,999	6%	75%
500 - 999	5%	81%

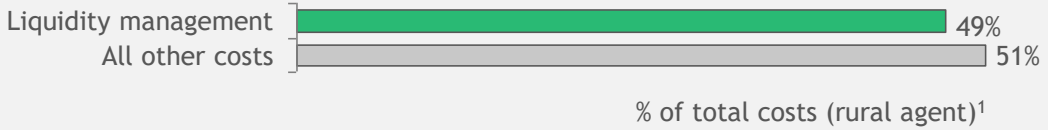
To improve agent viability, consider interventions to address low revenues and high operating costs

Low revenue potential a factor of…

	Potential improvement levers
Low population sizes	• Critical, but taken as a given
Low DFS penetration	• Customer education • Marketing • Bank account registrations • Technology reliability
Low transaction frequency	• Digitizing G2P payments • Creating products with human-centered design

Other potential levers: Offering recurring monthly subsidies, increasing average transaction size, increasing agent commissions

Liquidity management the most significant cost driver…



However, cost of float runners must be borne by provider (or subsidized by a 3rd party, e.g. government or NGO)

Source: Population data from GRID3
1: Avg cost structure of rural agent in sample; includes dedicated and non-dedicated agents; costs of rent, utilities, generator, and maintenance excluded for non-dedicated agents

Detail: Interventions to address low transaction volumes can extend viability at the frontier

Improvement levers can change a location from unviable → viable

Assumptions

Population size = 500 adults

Avg recurring cost = ₦51.2K per month[1]

Avg revenue per transaction = ₦72 per transaction[2]

Transaction frequency (per person, per month)	Agent profit per month	DFS penetration (% of adult population)					
		10%	12%	14%	16%	18%	20%
	1	-₦47.6K	-₦46.9K	-₦46.1K	-₦45.4K	-₦44.7K	-₦44.0K
	2	-₦44.0K	-₦42.5K	-₦41.1K	-₦39.6K	-₦38.2K	-₦36.8K
	3	-₦40.4K	-₦38.2K	-₦36.0K	-₦33.9K	-₦31.7K	-₦29.6K
	4	-₦36.8K	-₦33.9K	-₦31.0K	-₦28.1K	-₦25.2K	-₦22.4K
	5	-₦33.2K	-₦29.6K	-₦26.0K	-₦22.4K	-₦18.7K	-₦15.1K
	6	-₦29.6K	-₦25.2K	-₦20.9K	-₦16.6K	-₦12.3K	-₦7.9K
	7	-₦26.0K	-₦20.9K	-₦15.9K	-₦10.8K	-₦5.8K	-₦0.7K
	8	-₦22.4K	-₦16.6K	-₦10.8K	-₦5.1K	₦0.7K	₦6.5K
	9	-₦18.7K	-₦12.3K	-₦5.8K	₦0.7K	₦7.2K	₦13.7K
	10	-₦15.1K	-₦7.9K	-₦0.7K	₦6.5K	₦13.7K	₦20.9K

Potential levers to increase DFS penetration

- Increased customer education
- Increased marketing
- Increased bank account registrations
- Increased technology reliability

Potential levers to increase transaction frequency

- Digitizing G2P payments
- Creating products through human-centered design

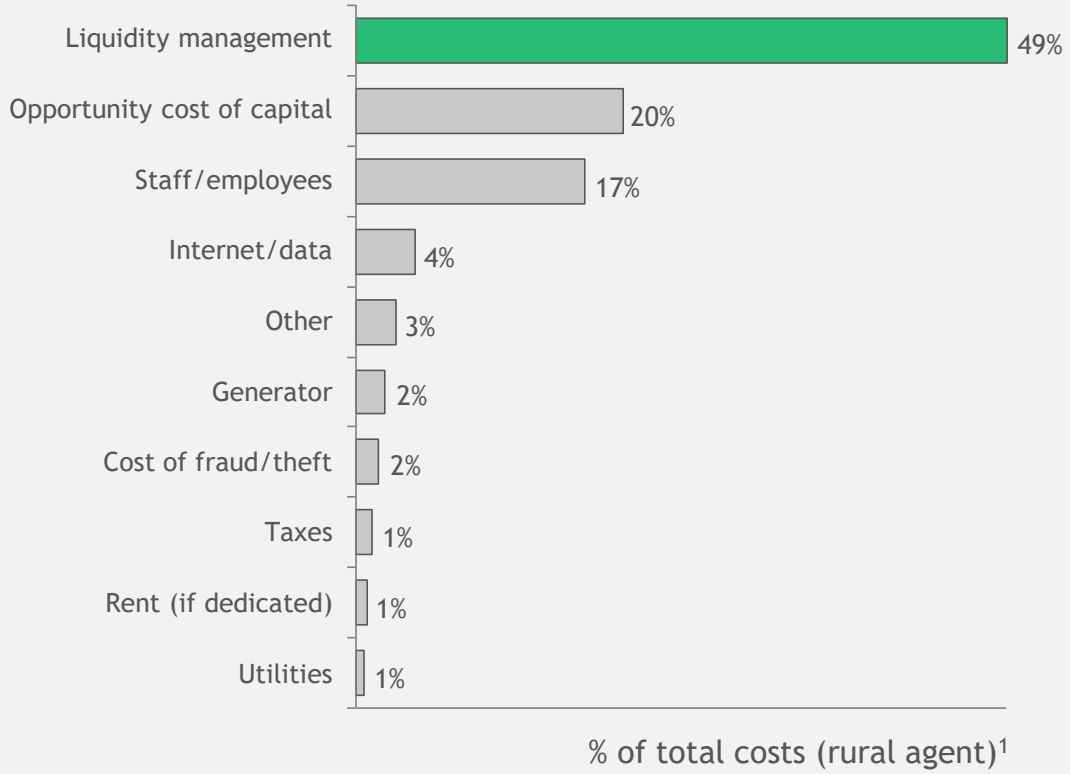
Other levers to address low revenues

- Offering recurring monthly subsidies
- Increasing average transaction size

1: Avg recurring cost of a rural, non-dedicated agent (from agent interviews)
2: Avg revenue per transaction for an agent in sample (from agent interviews)

Detail: Similarly, addressing high liquidity management costs can also improve agent viability

Rural agent operating costs can be decreased by ~50% with float runners



Which could reduce the need to increase revenues or provide subsidies

Assumptions

Population size = 500 adults
Avg revenue per transaction = ₦72 per transaction[2]

Agent viability (*no liquidity management support*)

Txn vol (per person, per month)	Agent profit per month	DFS penetration (% of adult population) 16%	18%	20%
	7	-₦10.8K	-₦5.8K	-₦0.7K
	8	-₦5.1K	₦0.7K	₦6.5K
	9	₦0.7K	₦7.2K	₦13.7K

Agent viability (*float runners*)

Txn vol (per person, per month)	Agent profit per month	DFS penetration (% of adult population) 16%	18%	20%
	7	₦14.0K	₦19.1K	₦24.1K
	8	₦19.8K	₦25.5K	₦31.3K
	9	₦25.5K	₦32.0K	₦38.5K

1: Avg cost structure of rural agent in sample; includes dedicated and non-dedicated agents; costs of rent, utilities, generator, and maintenance excluded for non-dedicated agents
2: Avg revenue per transaction for an agent in sample (from agent interviews)

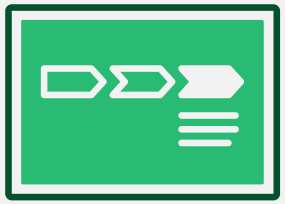
Next steps required include analysis refinement, stakeholder engagement and intervention design

Analysis refinement

- Refresh with latest data (e.g. updates to GRID3; GSMA; refreshed bank/ATM locations)
- Refine estimates of economic activity to reflect movement beyond where people live (e.g. markets)

Stakeholder engagement

- Share preliminary findings with relevant stakeholders (incl. providers, regulators)
- Start (or continue) discussions on critical agent viability drivers such as upcharging



Intervention design

- Develop robust analyses of expected costs, benefits and impact for specific intervention
- …incl. any unintended consequences
- …and how they layer upon / interact with one another

Detail: While potential interventions come to mind, more action needed to explore further

While key drivers of agent viability suggests potential interventions	…several economic and operational factors to consider
Low txn volumes a significant economic driver for frontier agents. Digitizing G2P suggests win-win way to stimulate demand and provide distribution channel for government programs	• How will agents manage increased liq. mgmt needs from G2P payments? • How to ensure this does not become a month-end mass "cash-out" of system (not building DFS ecosystem)?
Extra fees also instrumental to agent profitability, driving ~20-25% of margin on avg (and viability in some agents); Suggests consideration of fee caps required	• How to ensure consumer protection esp. of the most poor and vulnerable? • Is the agent the right point to set market-based pricing, or the provider?
Liquidity management costs are significant – highest of recurring cost items and increasing in frontier, suggesting float runners could have significant impact	• Can float runner model be operational in Nigeria? (sig. less financial infrastructure relative to Bangladesh) • With provider margins stressed at frontier, who would pay for service?

Deep-dive analysis required, as well as stakeholder engagement

Critical to also understand any unintended consequences and how interventions can interact positively or negatively with one another

***Examples only** – not comprehensive list of drivers, interventions or implications*

Compendium Part 0 – Setup

Study aims to understand the economics of the mobile money agent channel plus key barriers to reach

Sustainable and Inclusive Digital Financial Services (SIDFS) at the **Lagos Business School (LBS)** works to further the case for financial inclusion, through focused research as well as active engagement with all stakeholders in the industry.

In 2018, LBS engaged the **Boston Consulting Group (BCG)** to support a deep dive to understand the economics of the leading CICO models – especially mobile money agents – and potential interventions to enhance economic viability and reach of these services to rural populations.

BCG's analysis leverages primary research across Nigeria, as well as findings from our global study

Mobile Money Providers across Nigeria (incl. banks, super agents, and 3rd party providers)

10+

Agent Research through in-depth interviews across Lagos and Kano (both urban and rural)

30

Global insights from similar studies in other focus countries (India, Bangladesh, Kenya, Tanzania)

4

How to navigate this document

Description: This compendium serves as an accompaniment to the Executive deck

Executive deck

High-level summary of report's findings

Compendium

0. Setup
- Table of contents and overview of methodology

1. Zones of viability
- Introduction to viability framework

2. Provider economics
- Deep-dive on provider economics at agent point

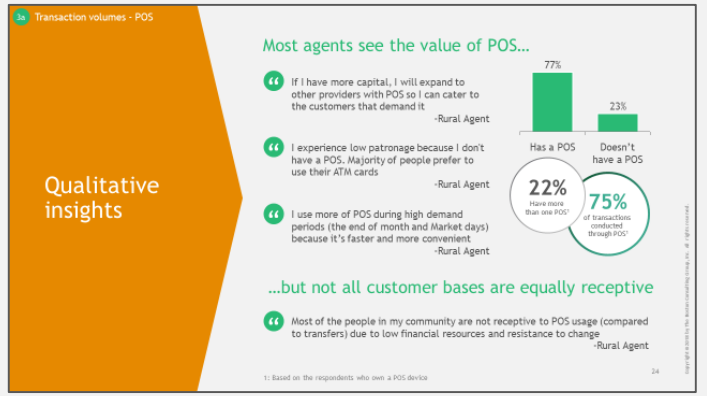
3. Agent economics
- Deep-dive on agent economics

4. Limits within Nigeria
- Geospatial view on reach of current CICO model

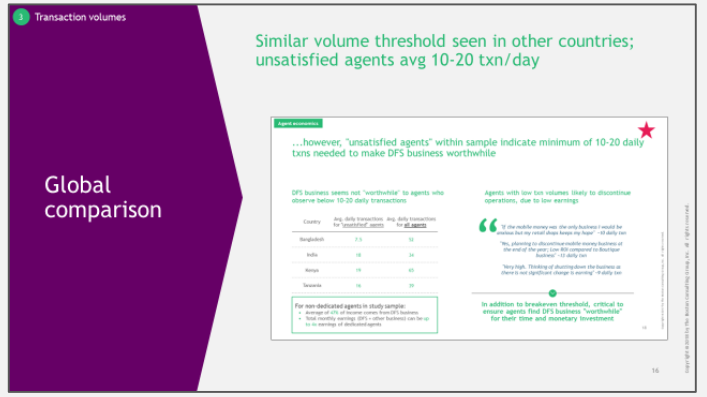
5. Potential interventions
- Initial thoughts on improving viability at frontier

Throughout the compendium, you will frequently see two types of cutaway slides …

Qualitative insights
- Additional qualitative information (e.g., quotes, case studies) from agent and provider interviews



Global comparison
- Evaluation of findings against the global work (India, Bangladesh, Kenya, and Tanzania)



Provider methodology

Overview

Objective to understand economic drivers of providers, incl. key drivers of economic profitability

We focused on incremental agent expansion (vs. end-to-end profitability) given the focus on CICO economics and interest in expanding reach in Nigeria

We engaged 10+ organizations in Nigeria
- FSPs, super agents and others
- Some had been offering services for years, others more recently or about to begin operations

Initial interviews explored strategic objectives, operating model and challenges faced…

…then data from 7 providers helped highlight key factors impacting agent point economics
- Complete data from 3 providers; partial from 4
- Triangulated with findings from global study

What this is not intended to be

- Not intended to provide "definitive benchmark" for provider offering services
- Not assessment of past performance — nearly all providers shared data based on "new" models from the past 6–12 months

What this enables

- Understanding ranges for provider cost and revenue and key differences in model driving differences
- Estimating breakeven volume and profitability for incremental agent points …
- … and how this changes between urban, peri-urban, rural oasis and rural frontier geographies

Agent methodology

Overview

Objective to understand key drivers of agent viability, incl. endogenous and exogenous factors

We conducted in-depth interviews with agents

- 90+ min interviews incl. standardized questions for quantitative analysis, open-ended sections
- Observational study of each interview site to complement feedback from agents

Sample of 30 agents to get cross-section of variables of interest

- Urban, peri-urban and rural in Lagos and Kano, incl. many 60-180 min from nearest bank / ATM
- Mix of bank and 3rd party providers
- Mix of dedicated / non-dedicated
- Efforts to include agents with low transaction volumes (difficult with survivorship bias)

What this is not intended to be

- Not a representative study – sample selected to ensure cross-section for variables of interest
- Rural sample not representative of "frontier" – rural agents interviewed were in "oases" therefore impact of exogenous factors was modeled

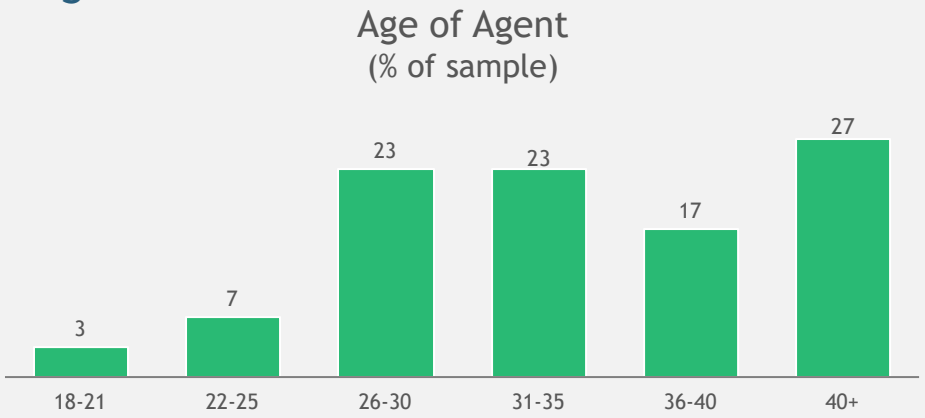
What this enables

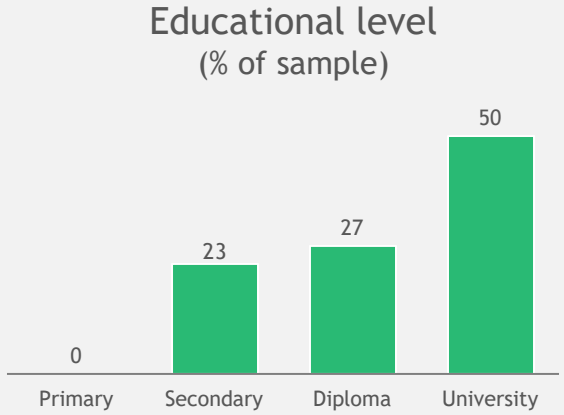
- Sizing of magnitude and direction of impact of exogenous constraints, and the operational choices agents make to mitigate their effects
- Strong understanding of cost (recurring cost esp. had tight variance)
- Understanding of key challenges to CICO economics for agent channel, including estimations for the frontier
- Understanding of linkages between provider operational choices and impact on agent viability

Detail: Overview of agents interviewed (I)

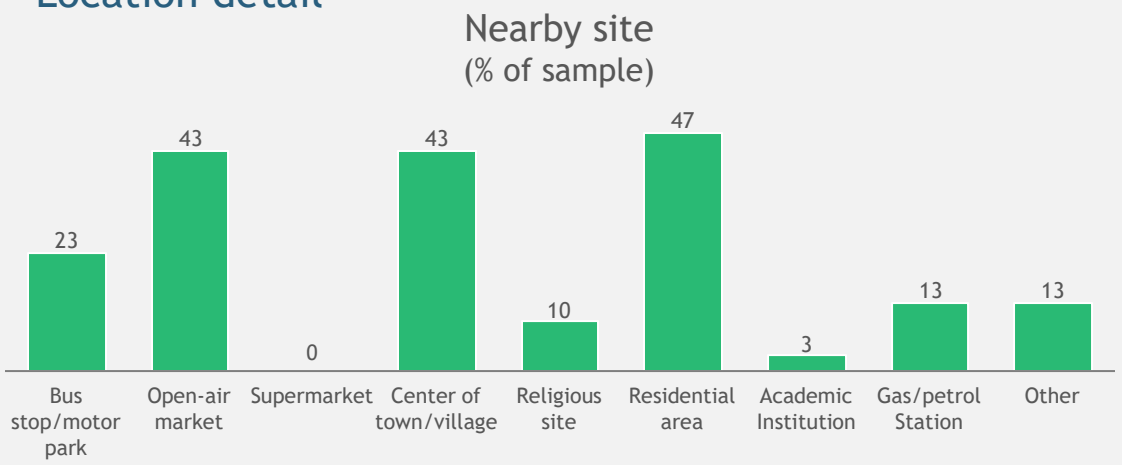
Date visited: August 2018
No. of interviews: 30
Sites visited: Lagos, Agege, Ikorodu, Badagry, Rogo, Fagge, Karaye, Dawanau, Wudil, Kiru
10% female, 90% male

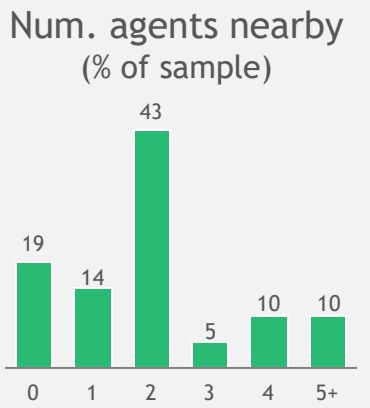
Agent detail





Location detail



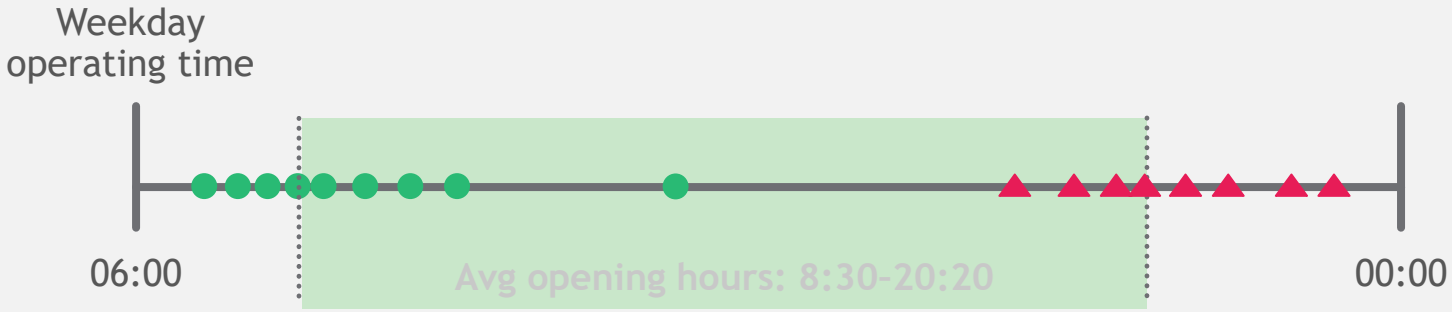


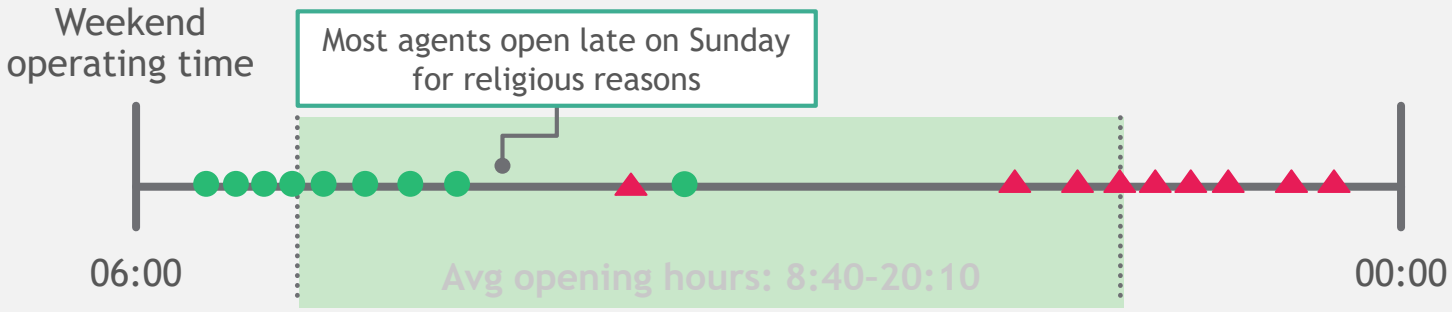
Detail: Overview of agents interviewed (II)

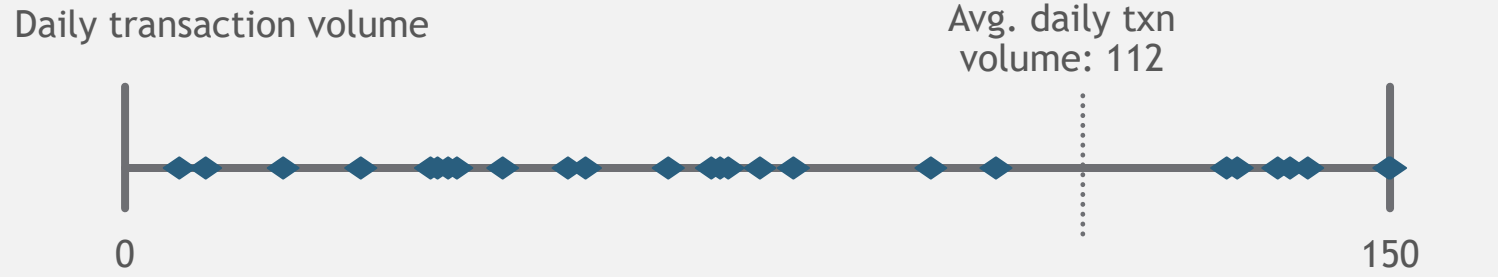
Date visited: August 2018
No. of interviews: 30
Sites visited: Lagos, Agege, Ikorodu, Badagry, Rogo, Fagge, Karaye, Dawanau, Wudil, Kiru
10% female, 90% male

73% of agents work 7 days in a week

2.6 average number of years in operation

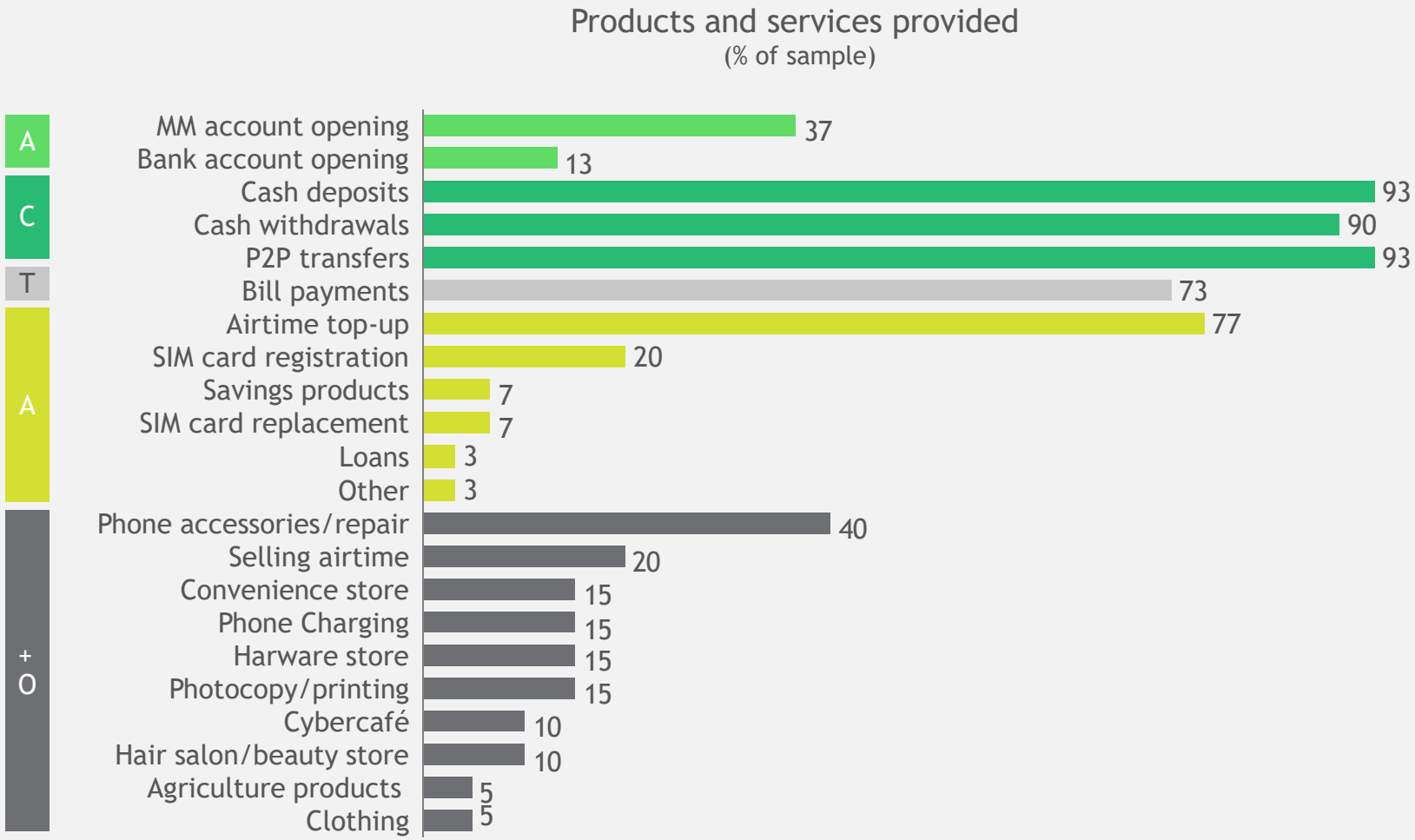






Detail: Overview of agents interviewed (III)

Date visited: August 2018
No. of interviews: 30
Sites visited: Lagos, Agege, Ikorodu, Badagry, Rogo, Fagge, Karaye, Dawanau, Wudil, Kiru
10% female, 90% male



Geospatial methodology

A Data acquisition & processing

B Population based catchment analysis

C Spatial intersection

D ArcGIS online visualizations

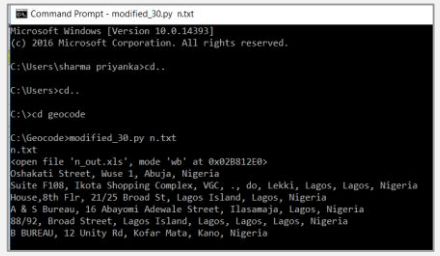
A1 Geocoding of street addresses to get coordinates

A2 Preprocessing of LAT/LON to spatial point locations

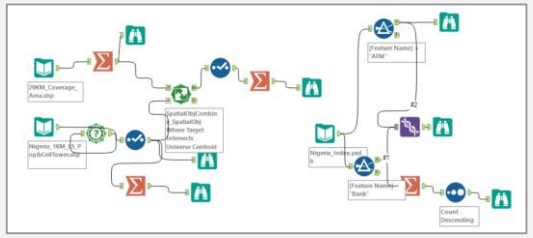
B1 Generated drive time polygons using street n/w dataset – 5,10,15 mins etc.; tools used: ArcGIS and Alteryx

C1 Intersected multiple polygon layers to perform catchment analysis; tools used: Spatial Analyst/Network Analyst

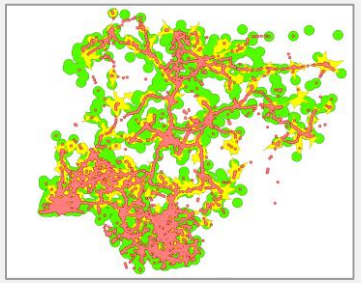
D1 Mapping of layers—Power, cell, population coverage, financial infrastructure etc.

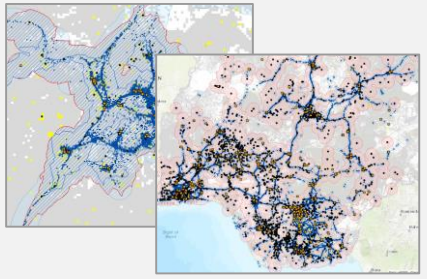


Google API converting addresses to LAT/LON

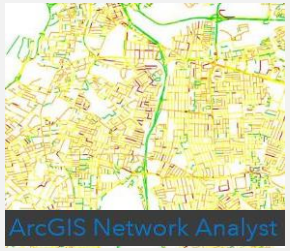


Population based catchment analysis- Alteryx Model





Key data sources and tools



TOMTOM MAPS

LandScan™ Geographic Information Science & Technology

THE SCIENCE OF WHERE

alteryx

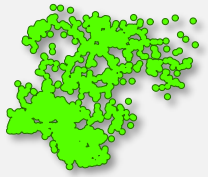
esri

ArcGIS Online

GEOPODE Geographic, Population & Demographic Data

Detail: Geospatial methodology

Financial infrastructure



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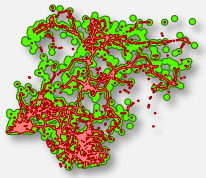
Economic activity



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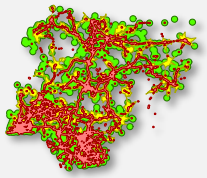
Cell towers



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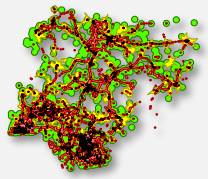
Power connectivity



a Data preparation and preprocessing

- Processed and converted addressed of ~4,000 POIs into LAT/LON
- Prepared data using Alteryx
- Mapped banks, cell locations, power infrastructure, and economic activity POIs

b Population based Catchment Analysis

- Generated drive time polygons across various scenarios—5 mins, 10, 15, 30 mins etc. using street network dataset
- Population catchment summary to achieve 80% of the population

c Spatial Intersection and Funnel Methodology

- Calculated population coverage for individual layer—cell towers, economic, power and financial POIs
- Performed geospatial intersection using geoprocessing tool in ESRI's Spatial Analyst
- Created layers and intermediate report/summary using Alteryx modules

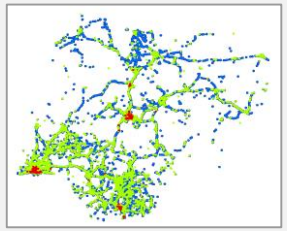
d Visualizations

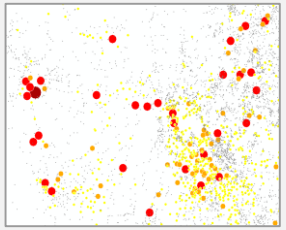
- Visualized multiple layers with their corresponding coverage areas using ESRI's ArcGIS online
- Added dynamic functionality, allowing use to zoom in/out, select layers, and see corresponding details

Single view and spatial framework of multiple layers

Population based catchment analysis summary report

Visualization dashboard—ArcGIS online





Modeling proposed locations/territories on an interactive dashboard

Generated catchment summaries

A	B	C	D	E	F	G	H
Scenarios		Banks		Banks + ATMs		Banks + ATMs + Power/Mobile Connectivity	
No.	Drive time (Mins)	Total Population Covered	Population Coverage (%)	Total Population Covered	Population Coverage (%)	Total Population Covered	Population Coverage (%)
1	5	43,591,548	23%	44,052,530	24%	43,356,363	23%
2	15	79,499,180	43%	79,859,470	43%	77,304,241	42%
3	30	104,986,214	56%	105,377,549	57%	95,149,814	51%
4	45	124,786,740	67%	125,159,839	67%	104,340,443	56%
5	60	139,798,211	75%	140,129,729	75%	108,877,141	58%
6	70	148,012,657	79%	148,229,498	80%	110,715,907	59%
7	72	149,515,568	80%				

Catchment Summary Report

Compendium Part 1 – Zones of Viability

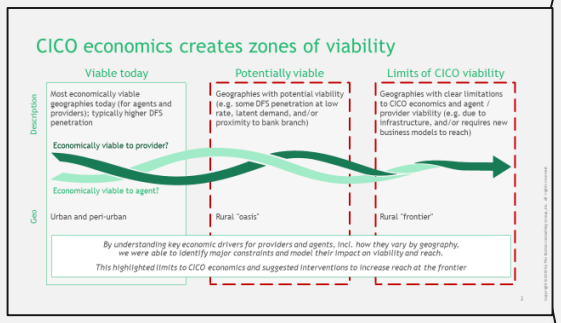
CICO economics creates zones of viability

	Viable today	Potentially viable	Limits of CICO viability
Description	Most economically viable geographies today (for agents and providers); typically higher DFS penetration	Geographies with potential viability (e.g. some DFS penetration at low rate, latent demand, and/or proximity to bank branch)	Geographies with clear limitations to CICO economics and agent / provider viability (e.g. due to infrastructure, and/or requires new business models to reach)
Geo	Urban and peri-urban	Rural "oasis"	Rural "frontier"

By understanding key economic drivers for providers and agents, incl. how they vary by geography, we were able to identify major constraints and model their impact on viability and reach.

This highlighted limits to CICO economics and suggested interventions to increase reach at the frontier

Key concept: Rural oasis vs. frontier



Rural Oasis (potentially viable)

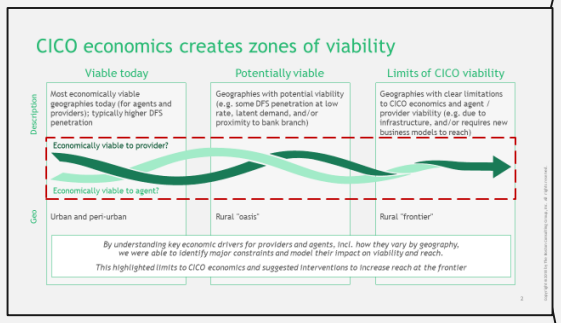
- Regions of high economic activity in an otherwise low economic "desert"; agents typically located near markets, village centers, busy streets
- Moderate DFS penetration – many customers have bank accounts and are familiar with DFS
- 30-100 transactions/day[1]
- Some existing infrastructure (e.g. bank presence, paved roads, power and mobile connectivity)
- Covered in agent sample; agents present in rural areas today are the ones who are able to make the business work; **85%** of rural sample are profitable

Rural Frontier (limits to CICO economics)

- Remote rural locations with low population size and density, and lower economic activity
- Low DFS penetration – few customers with bank accounts
- <10 transactions/day[2]
- Limited existing infrastructure (e.g. bank presence, paved roads, power and mobile connectivity)
- Not covered by agent sample (due to economic unviability)

1: Range taken from agent interviews
2: Range estimated from assumptions and triangulated with secondary research, see Compendium Part 3 – Agent Economics for full details

Key concept: Interdependent viability



In order for a CICO agent point to exist, economics must make sense to both providers and agents

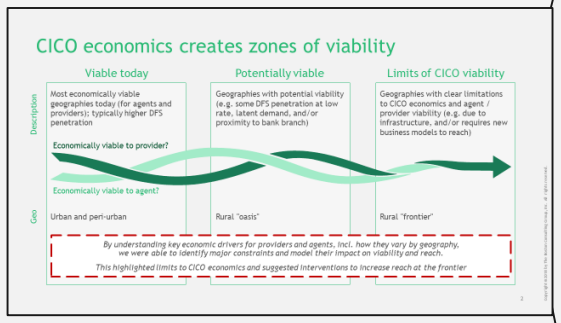
Economically viable to provider?

- Providers must be incentivized to setup and maintain agent points
- Typically think about incremental return; expect each new agent point to be profitable

Economically viable to agent?

- Agents must see DFS as a worthwhile opportunity
- Must be profitable, otherwise risk of inactivity/churn

Key concept: Constraints, choices, and interventions



Several exogenous constraints impact CICO economic viability, particularly at the frontier

Example constraints

- **Power reliability**
- **Transaction volumes**
- **Financial infrastructure**

Providers and agents can make choices to improve their economics

Example choices

- Purchase a generator
- Charge extra fees
- Reduce rebalancing frequency

However, today's mitigating choices may not be enough – new interventions likely needed to reach frontier

Example interventions

- Invest in better power infrastructure
- Digitize G2P payments
- Provide liquidity management support

Compendium Part 2 – Provider Economics

Provider Economics – Executive Summary

Provider economics for their agent networks consists of several direct / indirect revenues and costs - but the fundamental driver of expansion is the incremental economics of a new agent point

- Upfront costs such as investment in technology are already "sunk" for existing providers
- While there are indirect benefits (e.g. branch decongestion, reduced cost to airtime distribution), providers interviewed in Nigeria expect each agent to be profitable (as opposed to taking a portfolio / network view)
- Providers take a long-term view; must believe that investing into agent network will over time generate increased customer demand, which will drive later "returns" on provider investment

Agent point economics are favorable in areas that have sufficient demand (~10-20% margins) given franchisee distribution model where agents incur much of the set-up and recurring cost to operate

- Provider margins drop if they choose to invest in customer demand and agent viability

Provider economics are challenged when pushing to the frontier

- Most agents today are in urban, peri-urban, or rural oasis locations (or agents with unviable margins have become inactive and dropped out); economics for an agent point more challenged as they move into the frontier

Ultimately, providers must help solve for agent viability in order for agent network to stick

- Breakeven transaction volume for providers is lower than for agents given franchisee distribution model
- Agents take a shorter-term view on profitability, whereas providers can afford to have a longer breakeven horizon

Providers incur several costs to offer mobile money…

				Total OpEx (%)
OpEx	Commercial Costs	Customer acquisition costs	Agent commissions, trade, KYC (ecl. ATL and BTL)	70-80
		Agent and merchant AC	Internal or external workforce to onboard agents and merchants	
		Shop and agent mgmt costs	Internal or external workforce to manage agents + direct distribution costs (when not commissions)	
		Marketing	ATL and BTL campaigns to promote service	
	Operating Costs	Personnel	Dedicated mobile money staff, excl. Field marketing staff	20-30
		Technology	Platform maintenance and operating costs, energy, connectivity, license fees	
		Fraud and settlement	Fraud, settlement, revenue assurance	
		General and admin	Procurement and supply chain, finance, management, real estate	
		Customer care	Call center, processing, and back office	
CapEx	Network and IT	Platform	Platform acquisition and evolution, setup with aggregator	$1-3M USD
	Other	Shops and offices	Other CapEx required to setup or improve the business	

Source: Almazan and Vonthron, GSMA, Mobile Money for the Unbanked, 2014; Leishman, GSMA, Is there Really Any Money in Mobile Money?, 2010

Qualitative insights

…as well as several indirect revenues/benefits

Cost optimization model (e.g., branch decongestion)

> Our customer base is growing quickly, and we won't be able to build enough branches to keep up with demand. The agent network is a cheaper way for us to serve our customers.
>
> – Bank in Nigeria

> We're focused more on the cost savings benefit of the agent network, as opposed to the revenue upside.
>
> - Bank in Nigeria

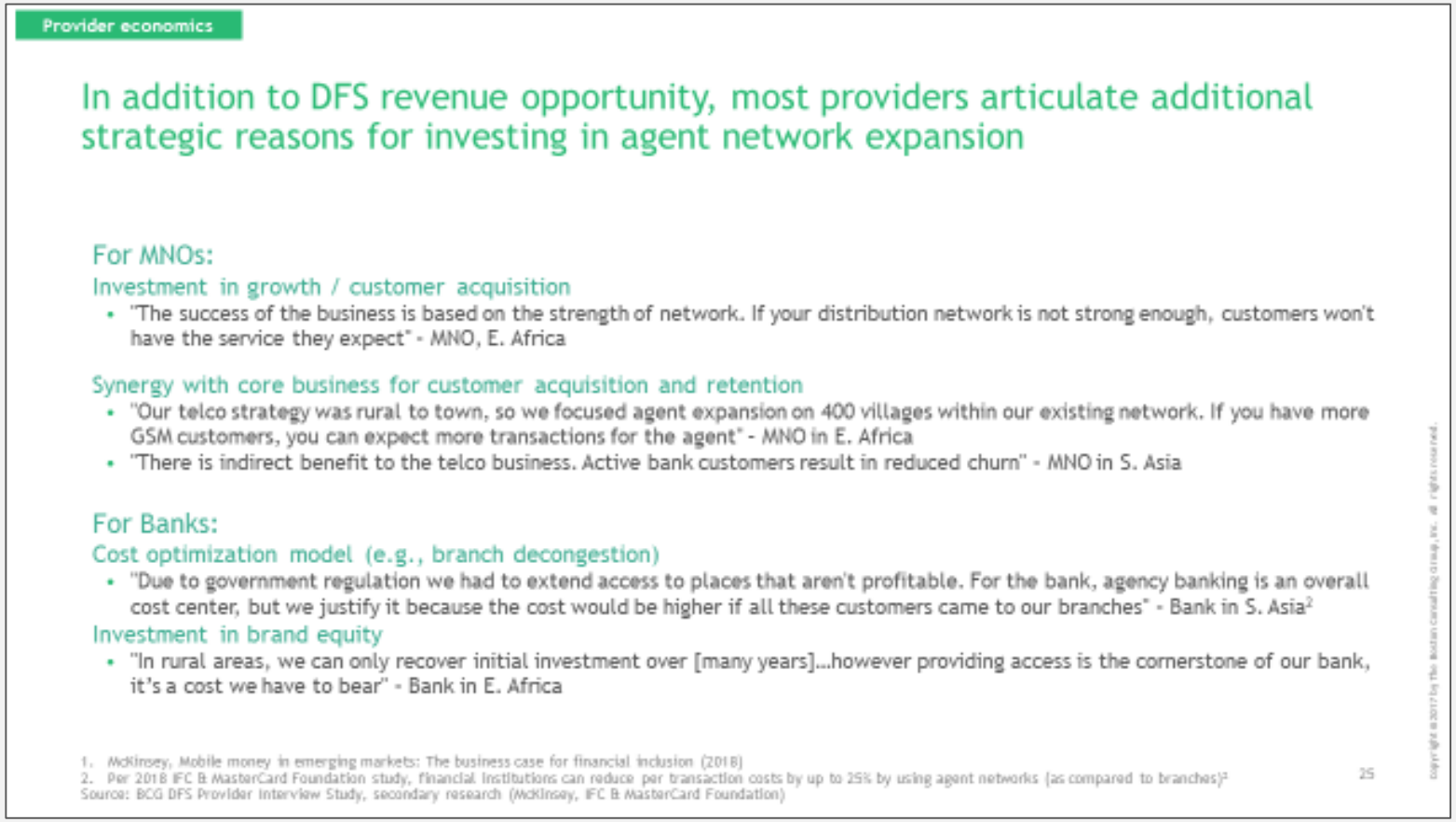
Investment in growth / customer acquisition

> The main purpose of our agent network is to acquire new customers. Our primary KPI is the number of accounts we're able to open each year. Increasing transaction volumes and serving our existing customers are secondary goals.
>
> - Bank in Nigeria

Source: Provider interviews, 2018

Global comparison

Similar indirect benefits to providers observed in other countries



Provider economics

In addition to DFS revenue opportunity, most providers articulate additional strategic reasons for investing in agent network expansion

For MNOs:

Investment in growth / customer acquisition

- "The success of the business is based on the strength of network. If your distribution network is not strong enough, customers won't have the service they expect" - MNO, E. Africa

Synergy with core business for customer acquisition and retention

- "Our telco strategy was rural to town, so we focused agent expansion on 400 villages within our existing network. If you have more GSM customers, you can expect more transactions for the agent" - MNO in E. Africa
- "There is indirect benefit to the telco business. Active bank customers result in reduced churn" - MNO in S. Asia

For Banks:

Cost optimization model (e.g., branch decongestion)

- "Due to government regulation we had to extend access to places that aren't profitable. For the bank, agency banking is an overall cost center, but we justify it because the cost would be higher if all these customers came to our branches" - Bank in S. Asia[2]

Investment in brand equity

- "In rural areas, we can only recover initial investment over [many years]...however providing access is the cornerstone of our bank, it's a cost we have to bear" - Bank in E. Africa

1. McKinsey, Mobile money in emerging markets: The business case for financial inclusion (2018)
2. Per 2018 IFC & MasterCard Foundation study, financial institutions can reduce per transaction costs by up to 25% by using agent networks (as compared to branches)[1]

Source: BCG DFS Provider Interview Study, secondary research (McKinsey, IFC & MasterCard Foundation)

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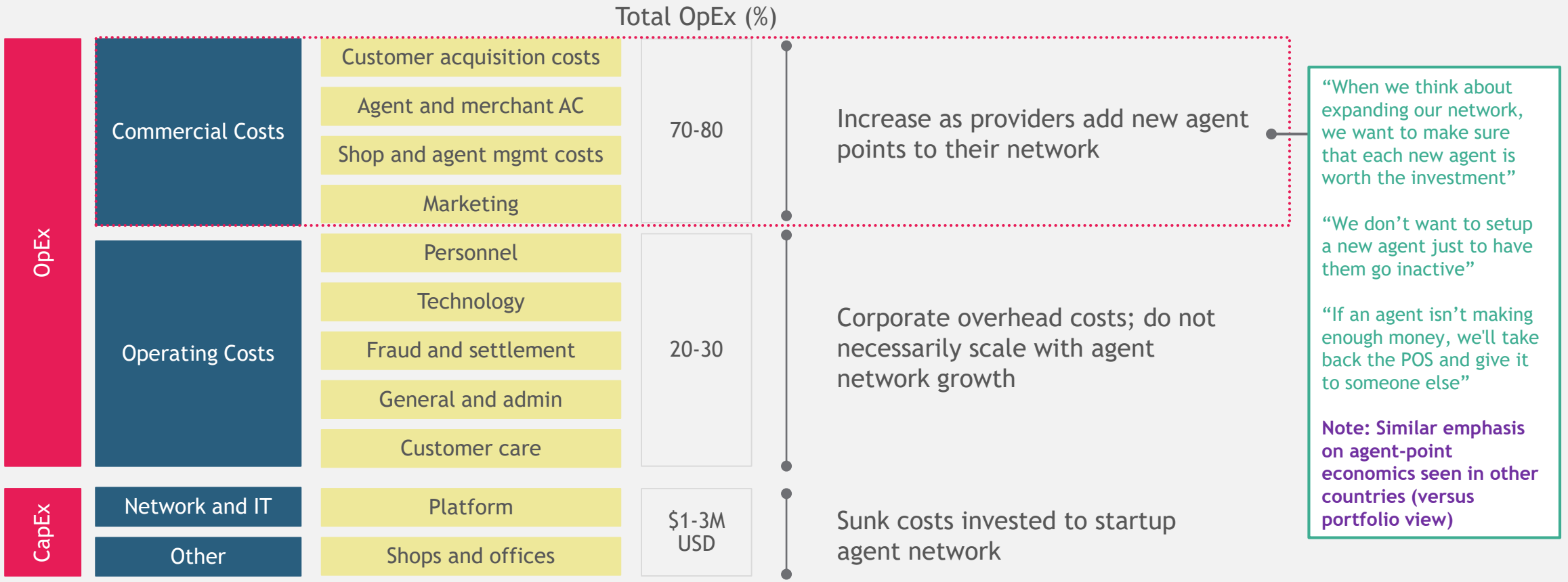
Source: BCG, Global Study of Cash-in / Cash-out Economics, 2018

Fundamental driver of expansion today is incremental economics of a single new agent point

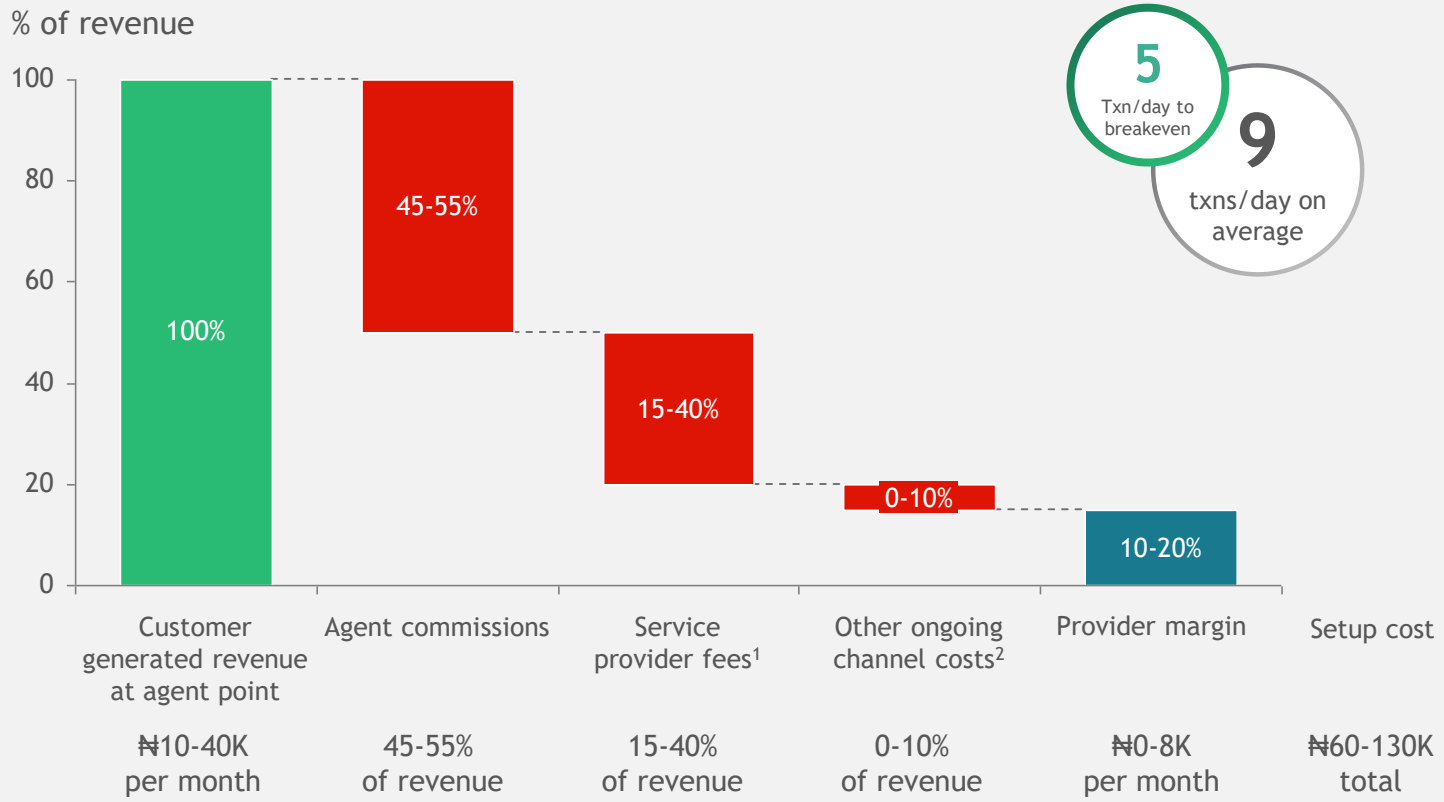


Therefore the focus of our work on CICO economics—what drives **incremental** viability at a single additional agent point

Source: Provider interviews, 2018

For providers, agent point economics are favorable in areas with sufficient transactions / revenue…

Average recurring provider margin from single agent point



On average, slim but positive margins at each agent point

Note: does not include upfront capital investments or corporate overhead costs, as incremental agent point economics are the fundamental driver of network expansion

1: Includes any fees to NIBSS, Telcos, Banks, and Intermediaries; Higher range seen when intermediaries are used
2: Includes recurring costs of agent management, agent training, and marketing/branding at agent point; lower range seen when intermediaries are used
Source: Provider interviews, 2018

…as agents bear most of setup and recurring costs through franchisee distribution model

In most observed models, agents bear majority of startup and capitalization expense …

Startup costs	Provider	Agent
• Recruiting	✓	
• Onboarding/training		Varies[1]
• Branding/marketing		Varies[1]
• Technology (mobile/POS device)		Varies[2]
• Real estate (shop setup, security)		✓
• Cash/float capitalization		✓

… as well as most of the recurring costs

Recurring costs	Provider	Agent
• Training/monitoring	✓	
• Rent		✓
• Utilities		✓
• Internet/data		✓
• Fraud/theft		✓
• Utilities		✓
• Liquidity management		✓

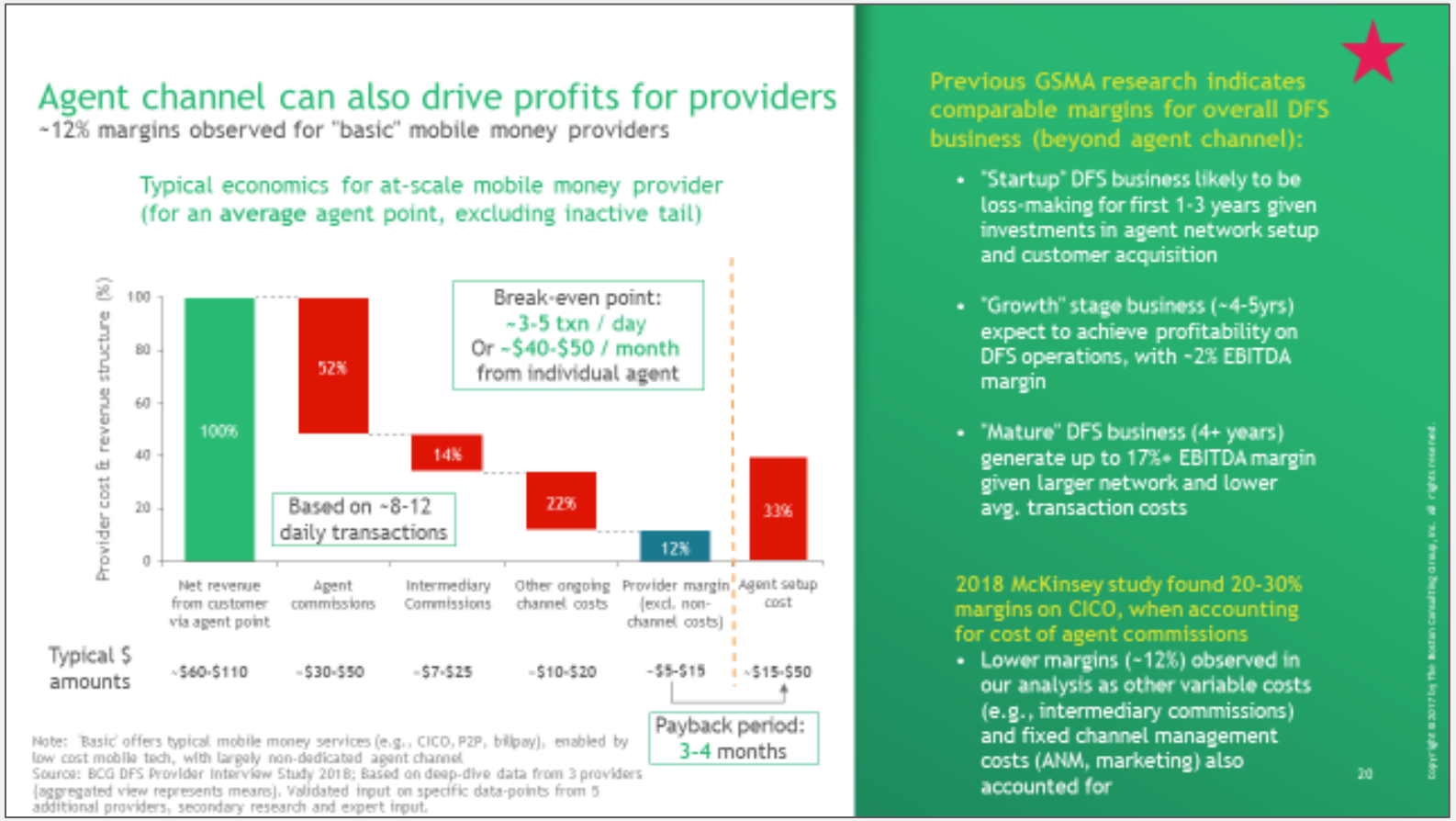
Similar cost burden for agents in other countries (from core global work)

1. Some providers charge agents a licensing/setup fee that helps cover the cost of training, marketing materials
2. Some providers support cost of agent technology (typically POS device), however not representative of typical model

Source: Provider interviews, expert interviews, 2018

Global comparison

Similar margins seen at agent point for providers in mature markets (~10-20% vs. ~12%)



Source: BCG, Global Study of Cash-in / Cash-out Economics, 2018

Global comparison

Nigeria's operating model & margins more similar to "basic" mobile money providers

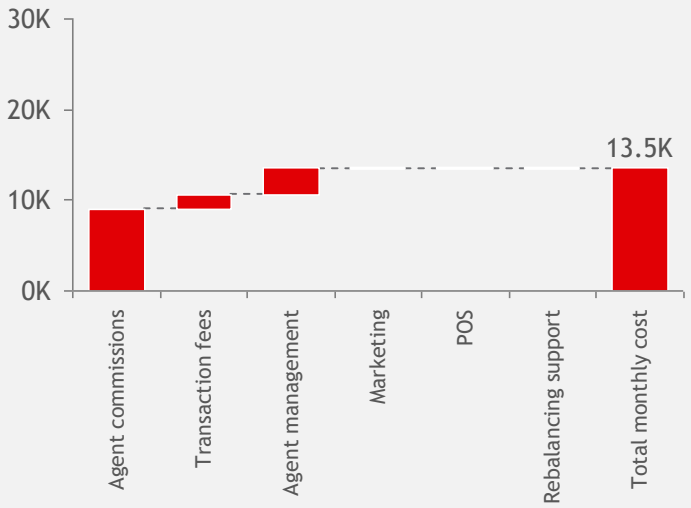
	Agency Banking ("Traditional bank agent", "Business Correspondent")	**Nigeria average**	**Mobile Money** ("Basic mobile money agent")
Description	Highly-branded locations with sophisticated POS device, typically focused on servicing deposit accounts (with potential for full service banking offering)	Mostly non-dedicated agents focused on offering basic DFS services	Network of small business owners/individual entrepreneurs; often non-dedicated; focus on supporting basic DFS (e.g., CICO, assisted P2P, bill pay)
Avg setup costs	~$1400/agent	~$320/agent	~$25/agent
Avg ongoing costs (monthly)	~$120/agent	~$50/agent	~$60-70/agent
Avg margin (monthly)	~35-40% margins ~$70/agent	~10-20% margins ~$8/agent	~8-12% margins ~$6-12/agent

Source: BCG, Global Study of Cash-in / Cash-out Economics, 2018

Provider costs increase if they choose to invest in customer demand and agent viability

Minimize costs

Monthly recurring costs (thousand Naira)

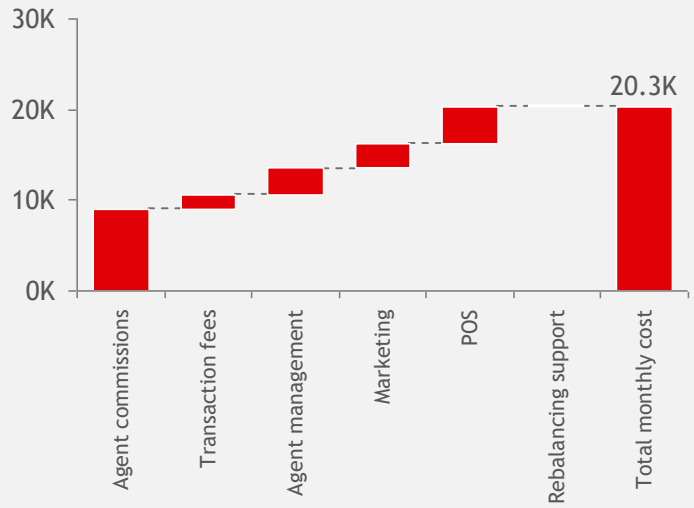


Operational choices:
- Low agent commissions
- No ongoing marketing material
- No POS provided
- No liquidity management support

3 Txn/day to breakeven

Maximize customer demand

Monthly recurring costs (thousand Naira)

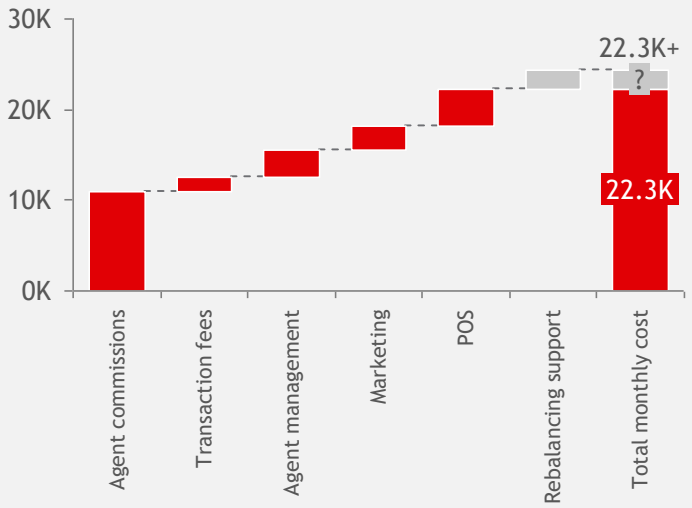


Operational choices:
+ Ongoing marketing material provided
+ POS provided[1,2]

9 Txn/day to breakeven

Maximize agent viability

Monthly recurring costs (thousand Naira)



Operational choices:
+ High agent commissions
+ Liquidity management support

11 Txn/day to breakeven

Providers must believe their investment will increase transaction volume 3-4x and ultimately improve overall ecosystem profitability

Note: Variable cost amounts calculated using average provider revenue per agent point (~20K per month); Incremental cost of operational choices estimated from provider interviews; Breakeven transactions calculated using average customer fee per CICO transaction (~80 NGN)
1: POS typically considered a setup cost for providers; for calculations on this slide, have assumed an amortization of POS value over 24 months
2: Some MMOs limit POS costs by only providing to top agents

Back-up: Operational choices & impact on economics

	Description	Impact on economics (% of revenue)
Revenue share	% of customer fee shared with agent	Maximize revenue/txn: 45% Maximize attractiveness to agents: 55%
Agent mgmt	In-house vs. outsourced recruiting, training, and monitoring	In-house: 15% Outsourced: 30%
Branding	Annual provision of marketing materials to agents	No materials provided: 0% Yearly painting/branding: 10%
POS[1]	Provision of POS to agent	No POS provided: 0% POS provided: 20%
Liq Mgmt	Rebalancing support for agents (e.g. float runners)	Not seen in Nigeria today

1: POS typically considered a setup cost for providers; for calculations on this slide, have assumed an amortization of POS value over 24 months
Source: Provider interviews, 2018

Global learnings

Agent management model often a function of network maturity

As agent network grows, wide range of functions that provider/ intermediary must perform to manage and grow network:

- E.g., agent recruiting, agent selection, agent onboarding, agent compensation, liquidity management, ongoing monitoring and training, reducing impact of fraud/theft, assisting with working capital

Three primary agent management models observed in market today:

Direct Report to Provider	Enables highest degree of control but difficult to scale at low cost	• Common in newer systems, when networks are small and services offered are basic • Common model for traditional banks, which require tight controls over agent network performance and regulatory compliance
Outsourced Management	Can leverage benefits of specialization, but results in increased txn cost	• With specialized services, 3rd party agencies can develop stronger recruitment criteria for agents, manage agent performance more closely, and increase liquidity mgmt support • If deployed well, outsourcing can increase the provider's profitability and increase agent activity & performance
Commission-based master agent	Enables scale to reach frontier regions, but take substantial commission cut	• Master agents select and on-board agents in order to assist with a rollout's speed to scale • Often assist with liquidity management against a cut of the retail agent's commission • Master agents help providers reach "harder to access" areas (e.g., Uganda)

Source: BCG, Global Study of Cash-in / Cash-out Economics, 2018

Provider economics for an agent point also more challenged as they move into the frontier

Low txn volumes

Overview
Despite greater risk to agents, low transaction volume also impacts provider viability at frontier

Direct impact
Risk of negative margins on recurring monthly basis

Indirect impact
Low agent viability leads to high agent churn

Higher set-up costs

Overview
Providers require more time and resources to recruit and onboard new agents

Recruiting/onboarding
"Although we have some data on the viability of rural locations, we always have to send a team to the field to verify things like latent demand, mobile coverage, and power connectivity"

—Bank in Nigeria

Higher recurring costs

Overview
Fixed costs of agent network management and marketing can be higher in rural areas for providers

Agent network management
Lower geographical concentration of agents means it takes more agent managers to support the same number of agents

Marketing
Low familiarity with national bank brands and digital financial services requires higher marketing spend to create demand

Provider economics are more challenged at an incremental agent point in the rural frontier

For providers to expand agent network into the frontier, they must believe that on a long-term basis these agent points will be profitable

Source: Provider interviews, 2018

Expected increase in cost to support frontier agents results in a higher breakeven point (5 vs. 7 txn/day)

Cost to support each agent point expected to increase at the frontier …

~50% higher

Higher marketing costs[1]:

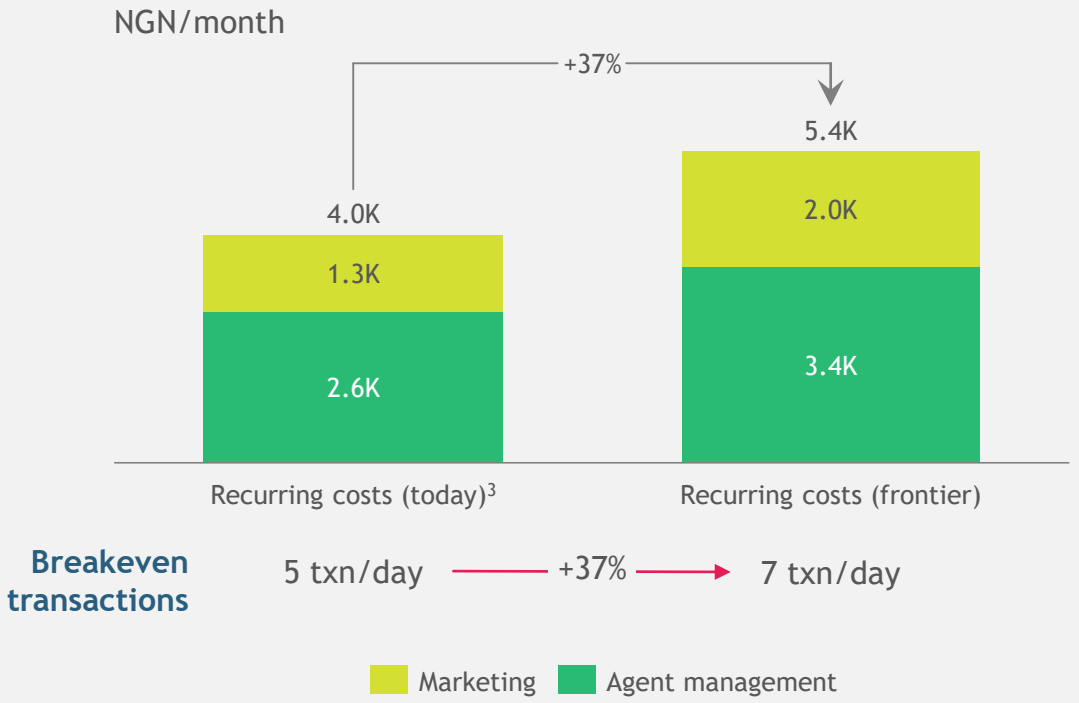
To offset lower brand awareness, DFS penetration

~30% higher

Higher agent network management costs[2]:

Due to decreased ratio of agent managers to agents; managers can support less agents when distances increase

… resulting in a higher breakeven threshold for providers



1. Based on qualitative input from providers in interviews; BCG Interviews, 2018
2. *ibid*
3. Average recurring cost based off of BCG provider interviews

Global learnings

Higher setup costs of ~39% for providers at frontier

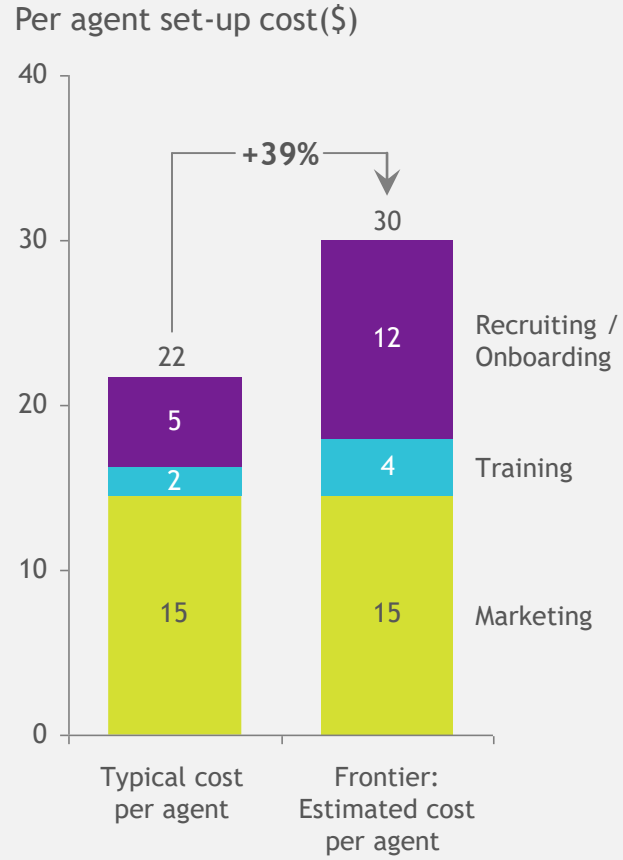
>2x higher recruiting and onboarding costs for frontier agents

- In rural areas, cost / agent increases due to higher need for support and lower geographical concentration of agent locations
  - Single agent network manager can support 0.2-0.4x fewer agents vs. in urban areas due to higher assistance with documentation, recruiting difficulty, and multiple visits needed for onboarding
  - Travel costs also typically higher in rural areas
  - Typical salaries for staff is lower in rural areas relative to urban areas (up to 25% lower), however does not offset the increased time required

~2x higher training costs for frontier agents

- Frontier agents less familiar with technology and basic principles of mobile money services, require additional visits and time for training
- Provider may incur additional training cost via travel allowances to agents in remote areas (to attend training events)

Providers expected to incur ~40% higher agent setup costs in frontier regions

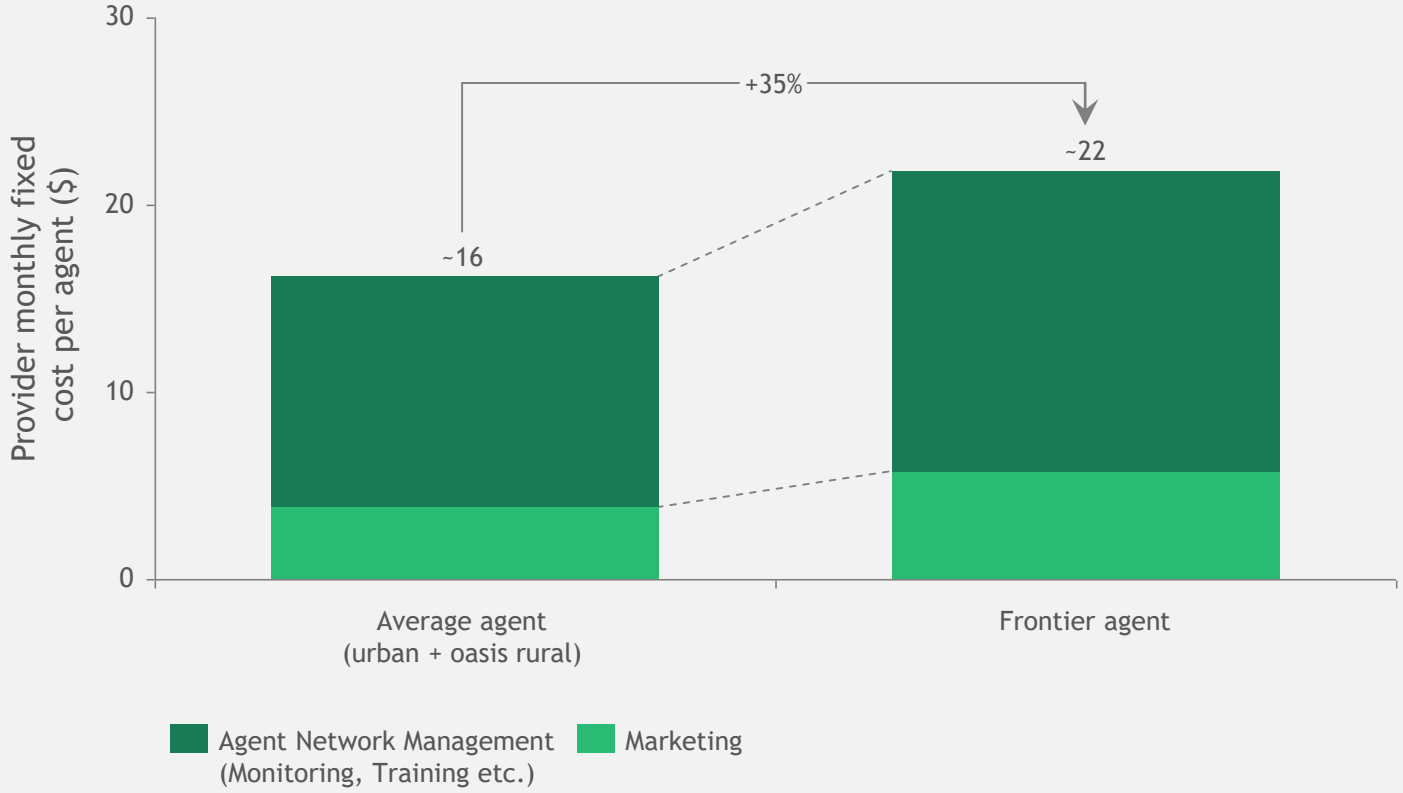


Source: BCG, Global Study of Cash-in / Cash-out Economics, 2018

Global learnings

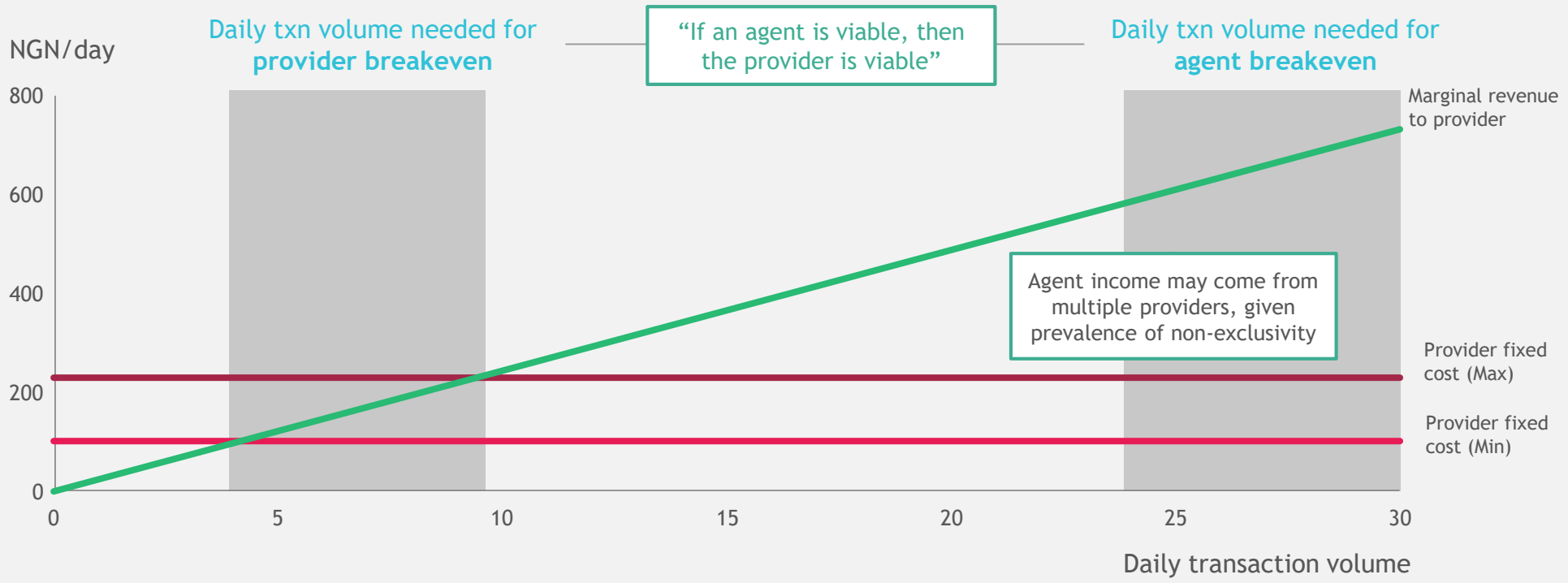
Higher recurring costs of ~35% for providers at frontier

Fixed cost of agent management and marketing can be higher at frontier, if they provide the same level of agent support



Source: BCG, Global Study of Cash-in / Cash-out Economics, 2018

Ultimately, providers must help solve for agent viability in order for agent network to stick



Understanding of CICO economics and agent expansion should therefore focus, as a starting point, on key drivers to agent viability

1: Provider min and max fixed costs per day taken from provider interviews; total fixed costs per month / 30 days per month
2: Avg marginal revenue to provider taken from provider interviews: average customer fee – (agent commissions + transaction fees)
3: Daily txn volume needed for agent breakeven calculated off of agent interviews; min = non-dedicated agent, max = dedicated agent

Global comparison

Agent viability is similarly constraining in other geographies

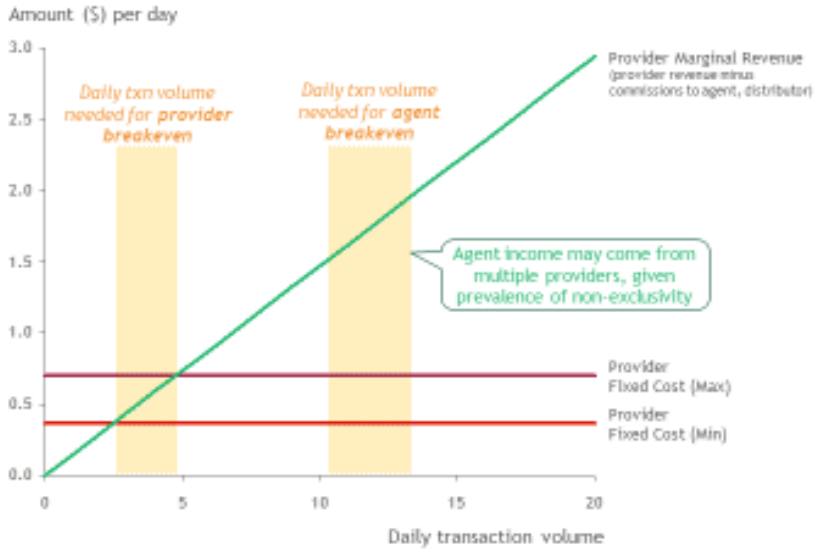
"When agents are liquid and profitable, we do well. When they are not, we don't do well either"

"Potential agent earnings is our key consideration for a new agent location"

"We care about deploying enough to serve customers but more…are agents making money, how can the business be sticky for them"

"If an agent is viable, the provider is viable"

Breakeven analysis: minimum agent Tx volume > minimum provider Tx volume



Note: Fixed monthly costs for provider ~$11 - $21. Average per transaction earnings from customer charge ~$0.4. Average per agent earnings per transaction is $0.22. Average distributor commissions per transaction $0.03. NEED TO EXPLAIN METHODOLOGY

Source: BCG DFS Agent Interview Study 2018, BCG DFS Provider Interview Study 2018, BCG Analysis

20

Source: BCG, Global Study of Cash-in / Cash-out Economics, 2018

Compendium Part 2 - Appendix

At agent point, cost to serve for telcos unlikely to be significantly different from existing model

	Bank economics at agent point (% of revenue)	Telco economics at agent point[1] (% of revenue)
Agent commissions	45-55%	Telcos likely to share same amount with agents as today's FSPs do
Transaction fees[2]	15-40%	Telcos subject to paying the same intermediary fees (incl. USSD fees to parent company)
Agent management costs	0-10%	Salary of agent managers and ratio of managers:agents likely unchanged
Agent marketing costs	0-10%	At agent point, telcos likely to spend same amount on marketing materials (e.g. signage)

Any significant economic advantages for telcos likely to be seen in overhead operating costs (e.g., corp mktg) or capital investments (e.g., tech platform)

1: Telco economics at agent point estimated based off of interviews with Nigerian MNOs; 2018
2: Includes fees to NIBSS, banks, telcos, and super agents as applicable

Compendium Part 3 – Agent Economics

Agent Economics - Executive Summary

For agents interviewed, DFS is a profitable business with take-home of ~₦100K/month, which is comparable to other wage-earning jobs in Nigeria - *however, this does not include agents at "frontier"*

- Agent in sample averaged 72 CICO transactions a day, well above breakeven point of 27 transactions…resulting in 62% margin and 8-months to break even

Agent economics are impacted by a variety of exogenous constraints

- Including business model, power infrastructure, transaction volumes, financial infrastructure, cell infrastructure, and fraud/theft

Agents take several mitigating actions which either positively or negatively impact their economics

- Most agents faced daily outages, spending ~₦12K/month on generator costs – even in urban, peri-urban geos
- Extra fees of ~100N/txn were key to profitability for some agents, increasing margins by ~22% for avg agent
- Even if purchased by agent, high demand for debit card cash-outs means POS purchase improved profitability
- Agents offset higher travel costs by taking fewer rebalancing trips/month: urban/peri-urban (53) vs. rural (26)
- Agents with limited access to financial infrastructure often cope by finding unofficial rebalancing points

As we move into frontier, we expect agent economics to be stressed to the point of unviability due to reduced economic activity (therefore lower transaction volumes) and escalating liquidity management costs

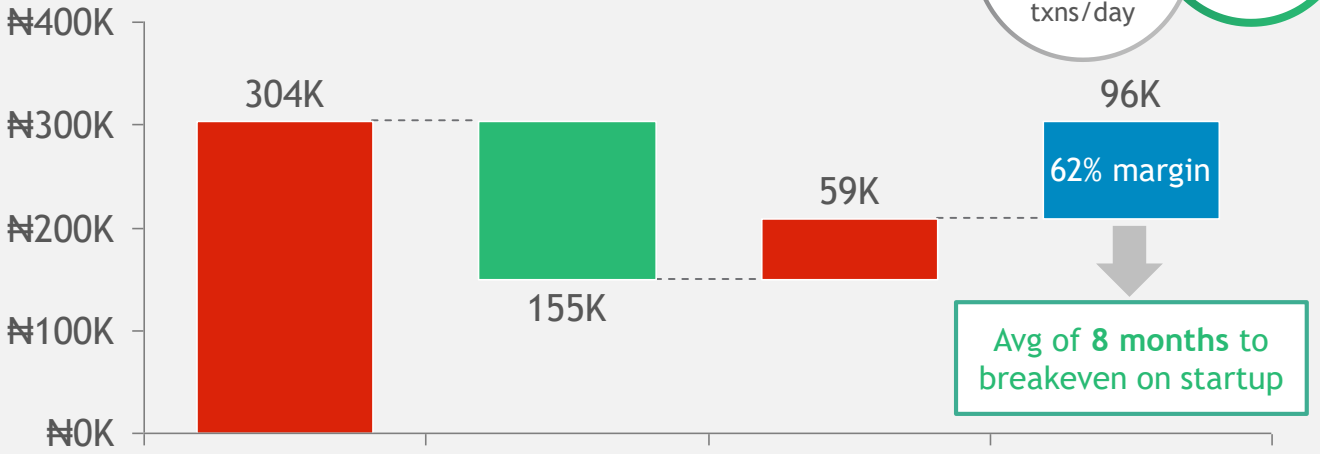
- Transaction volumes fall to <10 txn/day at frontier, well below a frontier agent's breakeven of 24 txns…
- …furthermore, agents in frontier may spend up to ~₦28K/month on rebalancing, ~13-50% more than even rural oasis agents

On average, DFS is a viable business model for agents

Sample includes dedicated and non-dedicated agents

72 Avg CICO txns/day

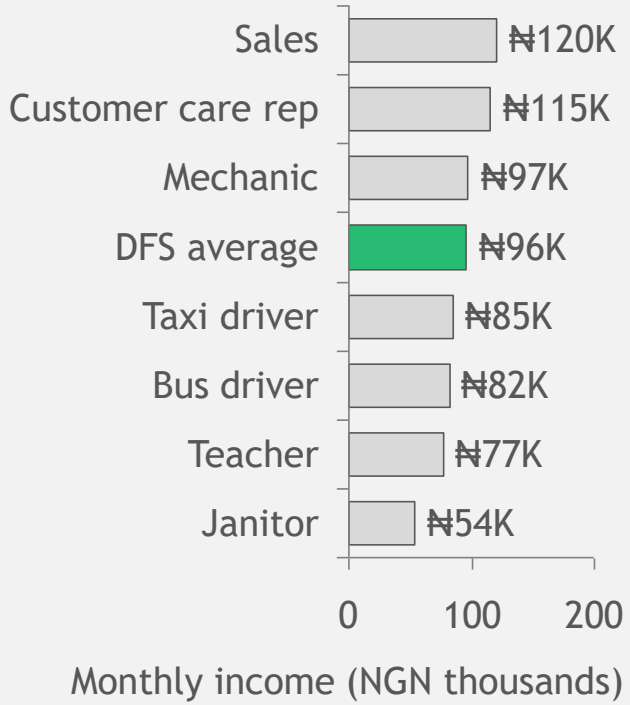
27 Txn/day to breakeven



	Startup cost	Recurring revenue	Recurring costs	Ongoing profit
Urban	475K	109K	41K	68K
Peri-urban	304K	202K	62K	140K
Rural	207K	159K	68K	91K

Revenue is not consistent day-to-day, varies within weeks (market days), months (salary days), and sometimes seasons (rainy vs. dry)

Monthly income of DFS agents in sample is comparable to other wage earning jobs

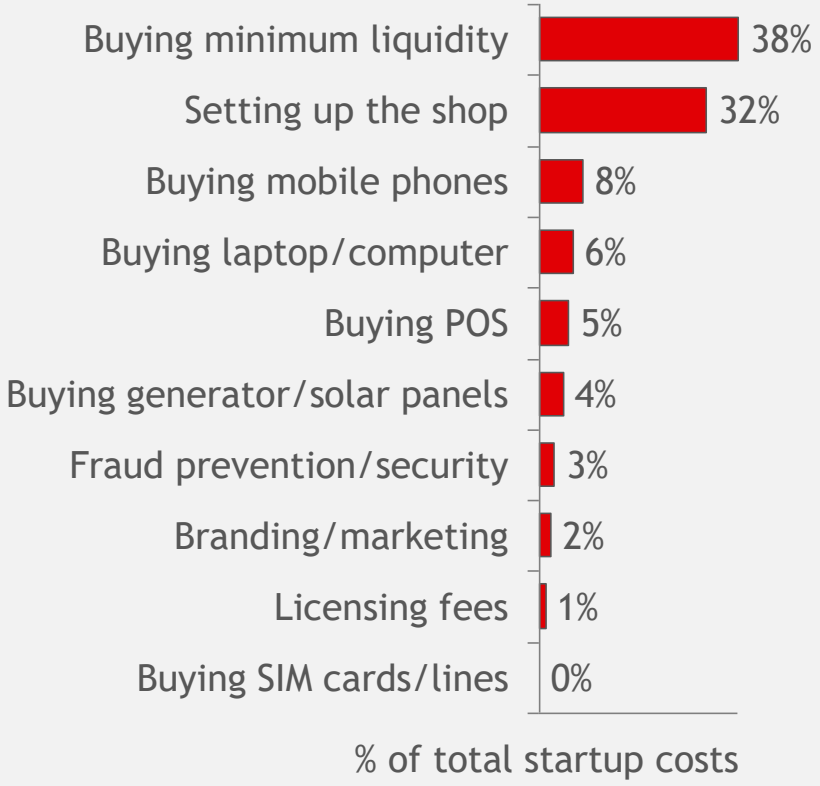


Source: Agent interviews, 2018

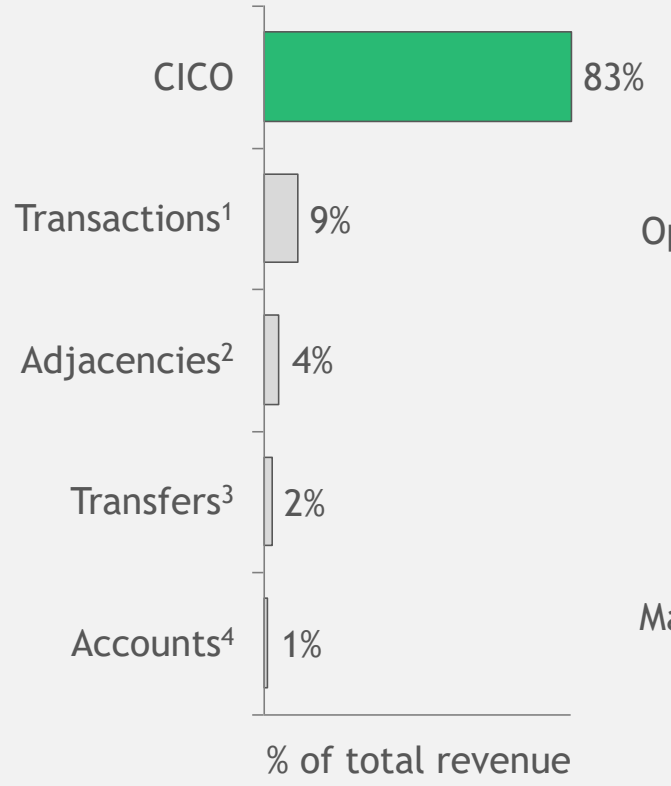
Average revenue excludes extra fees (upcharges); Average cost blends dedicated and non-dedicated agents (note: Non-dedicated costs do not include rent, utilities, generator, or store maintenance); Breakeven calculation assumes 6 month ramp-up to steady state revenue; Income information from mysalaryscale.com, jobsandsalaryabroad.com

An agent's profitability is a function of several cost and revenue drivers…

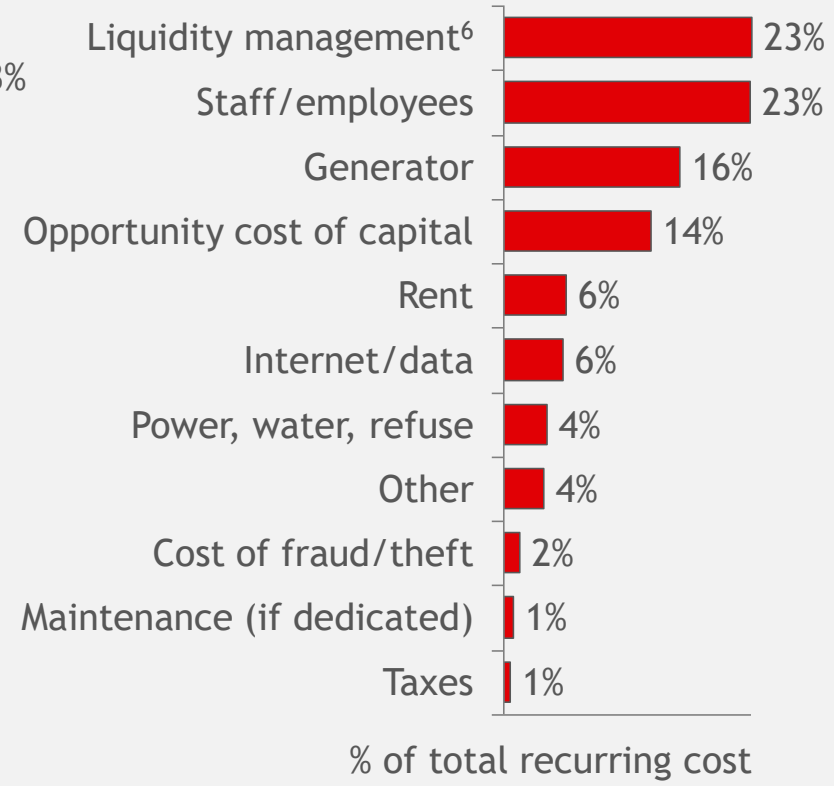
Startup costs



Recurring revenue



Recurring costs[5]



Source: Agent interviews, 2018
1: Bill payments; 2: SIM registrations, SIM replacements, and airtime; 3: P2P transfers (note: many agents did not distinguish between CICO transactions and transfers, which may contribute to the relatively low %); 4: Account openings; 5: Recurring cost includes rent, utilities, generator, and maintenance for all agents (incl. non-dedicated agents); 6: Liquidity management includes direct costs only, does not take opportunity cost into account

…which vary based on the constraints faced by individual agents, and the choices they make to mitigate them

	1 Agent business model	2 Power reliability	3 Transaction volumes	4 Financial infrastructure
Description	• Non-dedicated agents have lower marginal costs (-13% startup and -28% recurring), and breakeven two months faster • As transaction volumes decrease, non-dedicated models are much more viable	• Unreliable connectivity to power grid is consistent across geographies (urban, peri-urban, and rural) • Agents often cope by spending money on generators	• Most recurring costs are fixed, so agent profitability highly dependent on txn volumes • At the frontier, est. txn volume (<10/day) falls below expected breakeven threshold (~24/day)	• Liquidity management costs are higher for rural vs. urban agents • Because of limited bank/ATM presence, liquidity management costs at the frontier expected to be ~13-50% higher than those at a rural oasis
Mitigating choices	N/A	Reliance on generator • Generator fees cost agents an average of ₦12K per month (fuel and maintenance)	3a Investing in POS • Despite lower costs, no-POS agents take longer to breakeven due to lost revenue from cash outs (12 months vs. 3 months) 3b Charging extra fees • Most agents charge extra fees (80% of agents in sample), providing a 20-25% lift on margins	Reduced rebalancing freq. • Agents offset higher travel costs by taking fewer trips/month: urban/peri-urban (53) vs. rural (26) Alternate rebalancing points • Agents with limited access to financial infrastructure often cope by finding unofficial rebalancing points

Particularly relevant at frontier

Cell infrastructure

- Without cell infrastructure, agents are unable to operate
- No direct economic impact, but a necessary condition for agent viability and reach

Fraud and theft

- Agents currently do not appear to have high theft costs, but qualitative interviews suggests this may be a factor at the frontier

Mitigating choice improves economics
Mitigating choice worsens economics

1- Agent business model

	1 Agent business model	2 Power reliability	3 Transaction volumes	4 Financial infrastructure	Cell infrastructure	Fraud and theft
Description	• Non-dedicated agents have lower marginal costs (-13% startup and -28% recurring), and breakeven two months faster • As transaction volumes decrease, non-dedicated models are much more viable	• Unreliable connectivity to power grid is consistent across geographies (urban, peri-urban, and rural) • Agents often cope by spending money on generators	• Most recurring costs are fixed, so agent profitability highly dependent on txn volumes • At the frontier, est. txn volume (<10/day) falls below expected breakeven threshold (~24/day)	• Liquidity management costs are higher for rural vs. urban agents • Because of limited bank/ATM presence, liquidity management costs at the frontier expected to be ~13-50% higher than those at a rural oasis	• Without cell infrastructure, agents are unable to operate • No direct economic impact, but a necessary condition for agent viability	• Current agents do not appear to have high theft costs, but qualitative interviews suggests this may be a factor at the frontier
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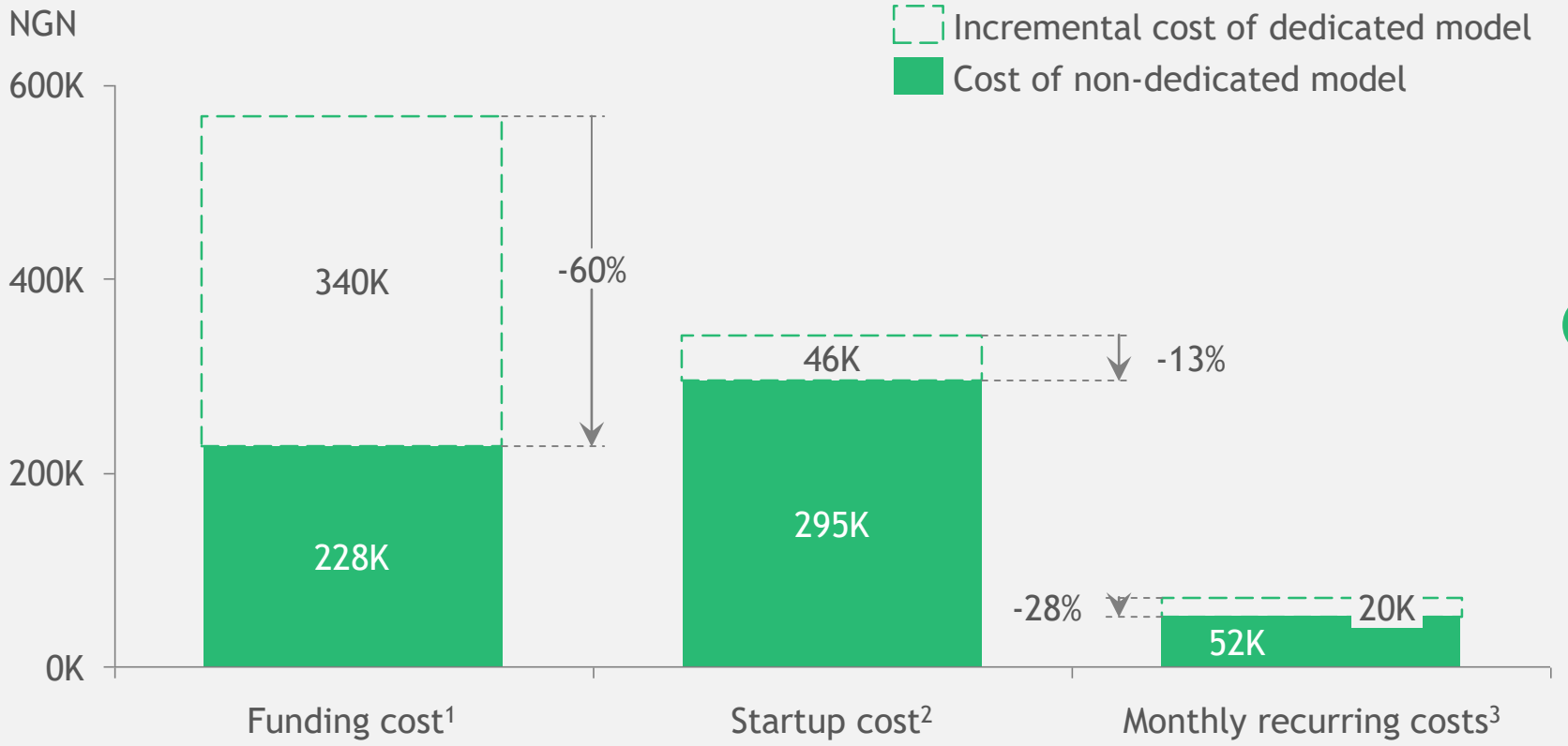
Particularly relevant at frontier

Non-dedicated agents can leverage their existing businesses to offer mobile money at a lower cost

	Dedicated agent	Non-dedicated agent
Description	Agent that does not provide any services beyond mobile money transactions	Agent that provides digital financial services in addition to another business Common businesses include[1] : • Mobile phone accessories (35%) • Airtime (20%) • Photocopying/printing (20%)
Implication	Inability to borrow capital from existing till → higher funding costs Increased spend on marketing and technology → higher startup costs Need to pay rent, utilities, and maintenance → higher recurring costs	Ability to borrow capital from existing till → lower funding costs Ability to leverage existing customer base and technology → lower startup costs No incremental costs of rent, utilities, or maintenance → lower recurring costs

1: Percent of non-dedicated agents offering the service

Incremental costs increase breakeven time from 7 to 9 months for dedicated agents (holding revenue constant)



Breakeven time

Non-Dedicated	Dedicated
7 months	9 months

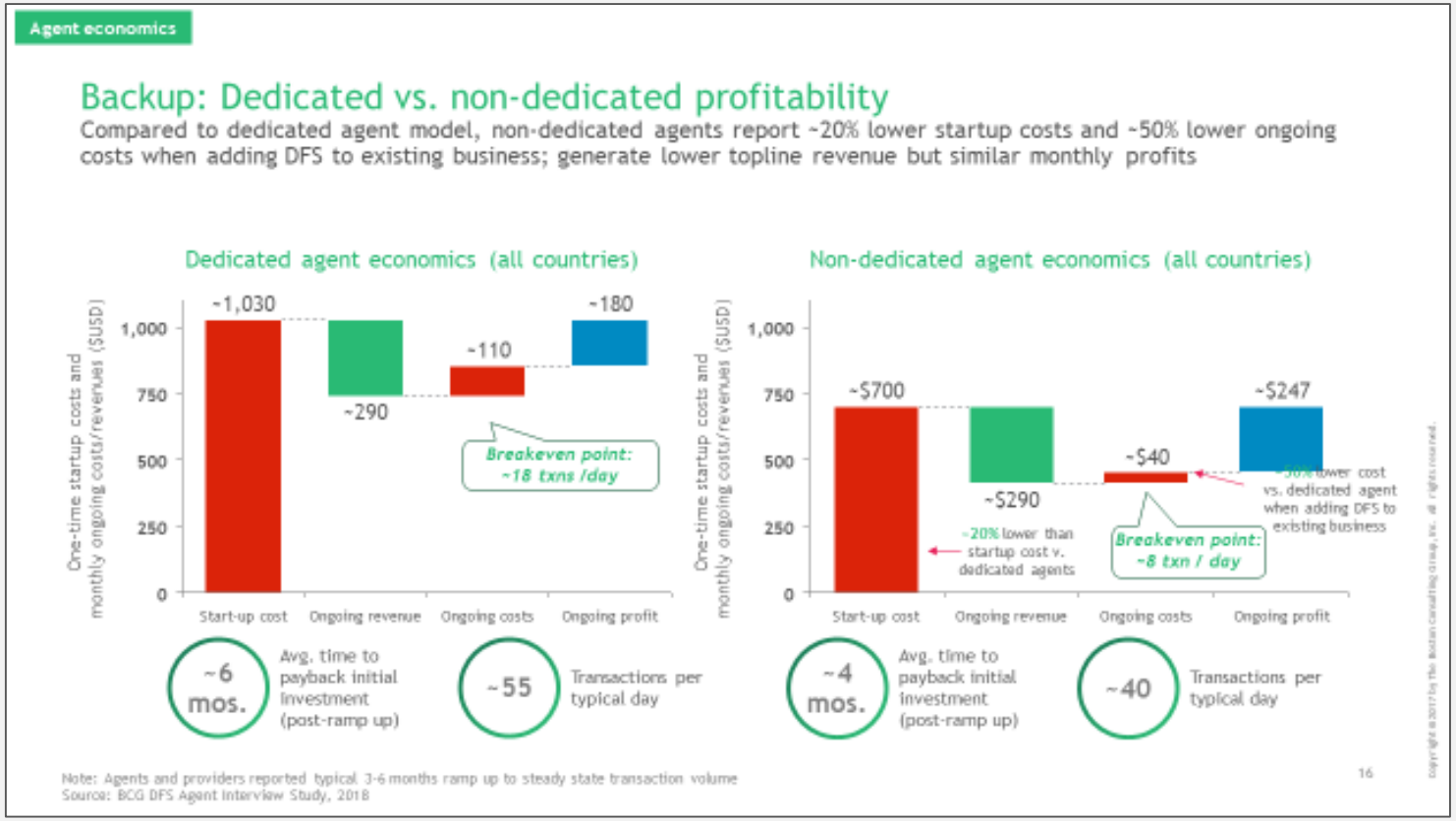
If holding revenues constant across both models

Dedicated agents also lack supplementary income, making their longer breakeven time even more risky

Source: Agent interviews, 2018
1: Additional funding cost for dedicated agents due to inability to borrow capital from existing till
2: Additional startup cost for dedicated agents driven by marketing and technology spend
3: Additional recurring cost for dedicates agents due to spend on rent, utilities, generator, and maintenance
Breakeven calculation assumes 6 month ramp-up to steady state revenue (without extra fees)

Global comparison

Similar change in breakeven time between dedicated and non-dedicated agents globally



Change in startup cost	-32%
Change in recurring cost	-63%
Change in breakeven months	6→4

Source: BCG, Global Study of Cash-in / Cash-out Economics, 2018

Qualitative insights

Increased economic viability also recognized by agents

Many non-dedicated agents consider the DFS business to be “cost-free” if added to another pre-existing business...

- “I make more money from my other business which helps to cover my expenses
- “I don't feel stressed because my other business supports and pays for the bulk of my running costs
- “There’s a lot of demand for my other business and I make enough to cover all my charges

...however they do have minimum expectations that make it 'worthwhile' business

- “I'm spending less energy on MM these days; this why I have diversified into the salon business because competition is getting too much and there is no regulation and no support from providers
- “I became an agent to add another means of income to my existing business but now realized it isn't as high generating as I had thought
- “I have to charge extra and I have other business where I deduct the bulk of my expenses from
- “It is only when I make dresses that I am comfortable as this is where I make the most profit and cover my expenses with this

Source: Agent interviews, 2018

2 - Power reliability

	1 Agent business model	2 Power reliability	3 Transaction volumes	4 Financial infrastructure
Description	• Non-dedicated agents have lower marginal costs (-13% startup and -28% recurring), and breakeven two months faster • As transaction volumes decrease, non-dedicated models are much more viable	• Unreliable connectivity to power grid is consistent across geographies (urban, peri-urban, and rural) • Agents often cope by spending money on generators	• Most recurring costs are fixed, so agent profitability highly dependent on txn volumes • At the frontier, est. txn volume (<10/day) falls below expected breakeven threshold (~24/day)	• Liquidity management costs are higher for rural vs. urban agents • Because of limited bank/ATM presence, liquidity management costs at the frontier expected to be ~13-50% higher than those at a rural oasis
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Particularly relevant at frontier

Cell infrastructure

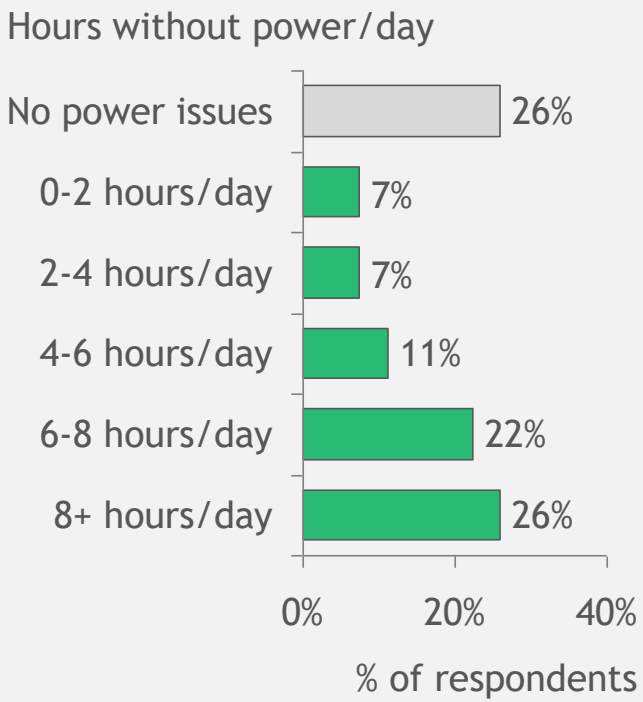
- Without cell infrastructure, agents are unable to operate
- No direct economic impact, but a necessary condition for agent viability

Fraud and theft

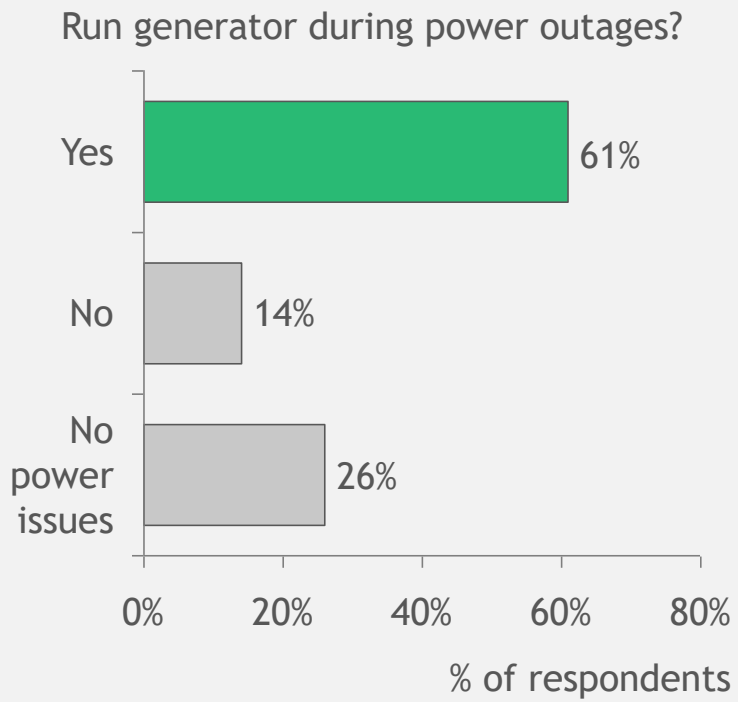
- Current agents do not appear to have high theft costs, but qualitative interviews suggests this may be a factor at the frontier

Power grid failure is consistent across geos; avg agent spends 8% of revenue on generator to run their business

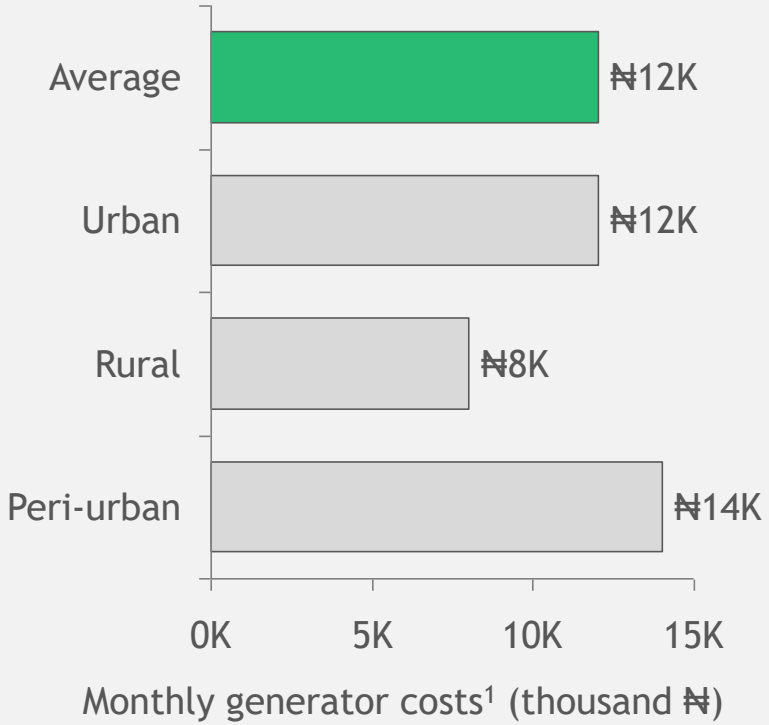
Frequent power failure due to unreliable grid…



…so most agents operate a generator to stay open



Costs are relatively consistent across geographies



Source: Agent interviews, 2018
1: Recurring cost of generator = monthly cost of fuel + maintenance; excludes initial investment in purchasing generator; average of all agents (not just ones using generator)

Mitigating choice improves economics
Mitigating choice worsens economics

3 – Transaction volumes

	1 Agent business model	2 Power reliability	3 Transaction volumes	4 Financial infrastructure
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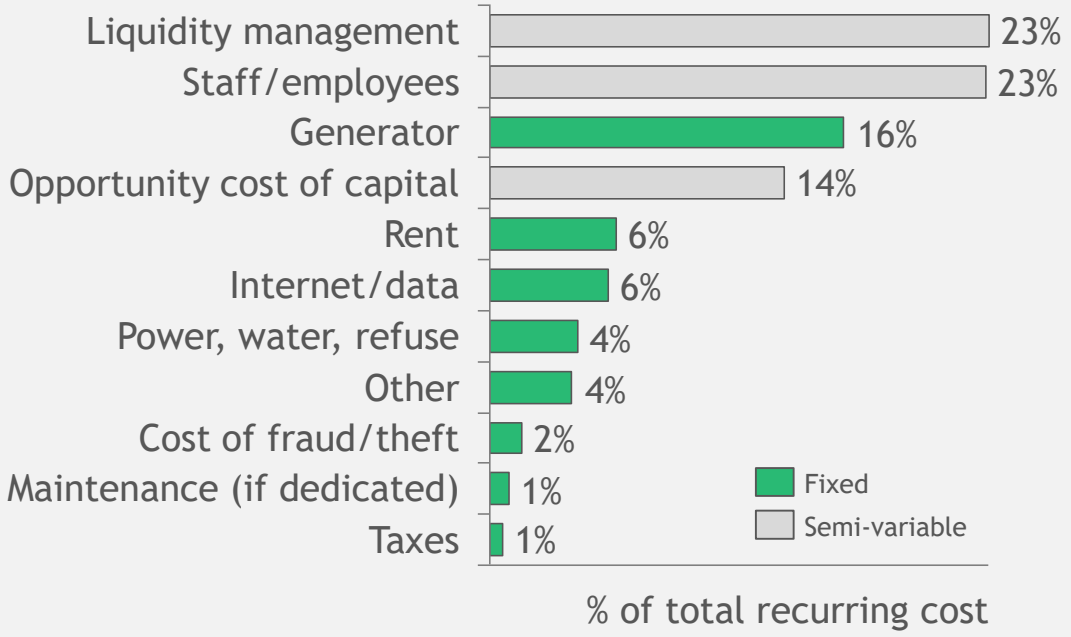
Particularly relevant at frontier

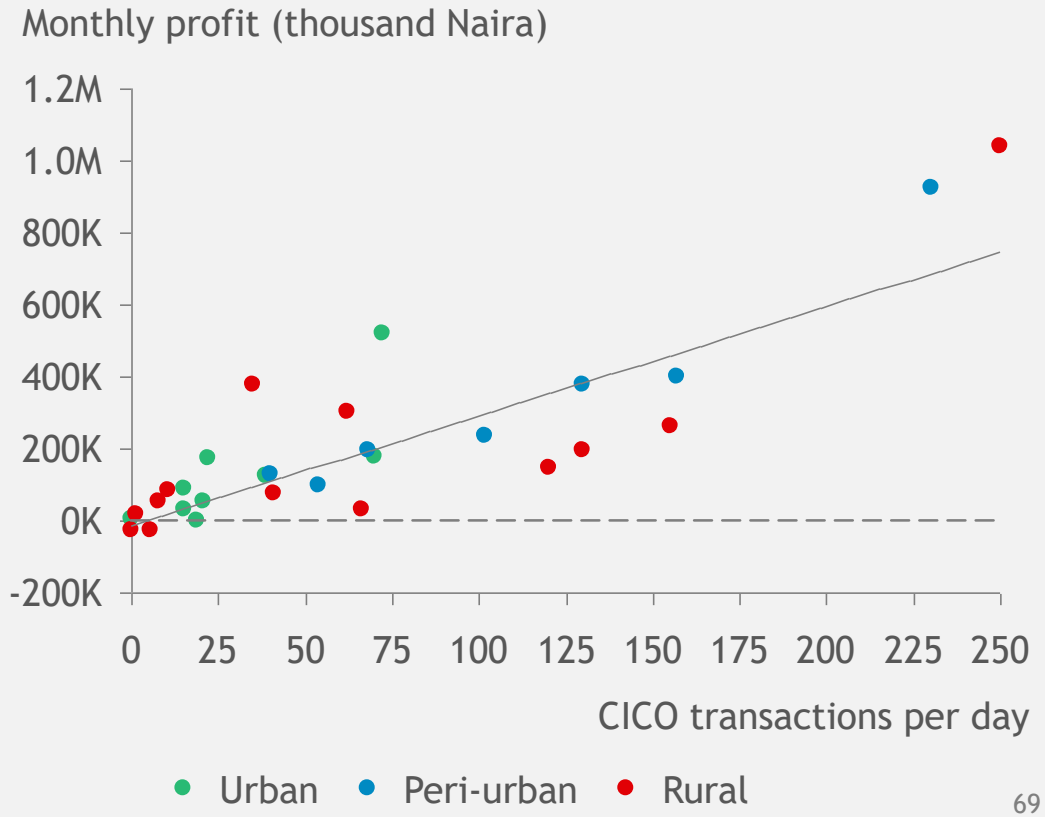
	Cell infrastructure	Fraud and theft
Description	• Without cell infrastructure, agents are unable to operate • No direct economic impact, but a necessary condition for agent viability	• Current agents do not appear to have high theft costs, but qualitative interviews suggests this may be a factor at the frontier

Because much of an agent's costs are fixed, profitability is highly dependent on an agent's transaction volume

40% of agent recurring costs are fixed



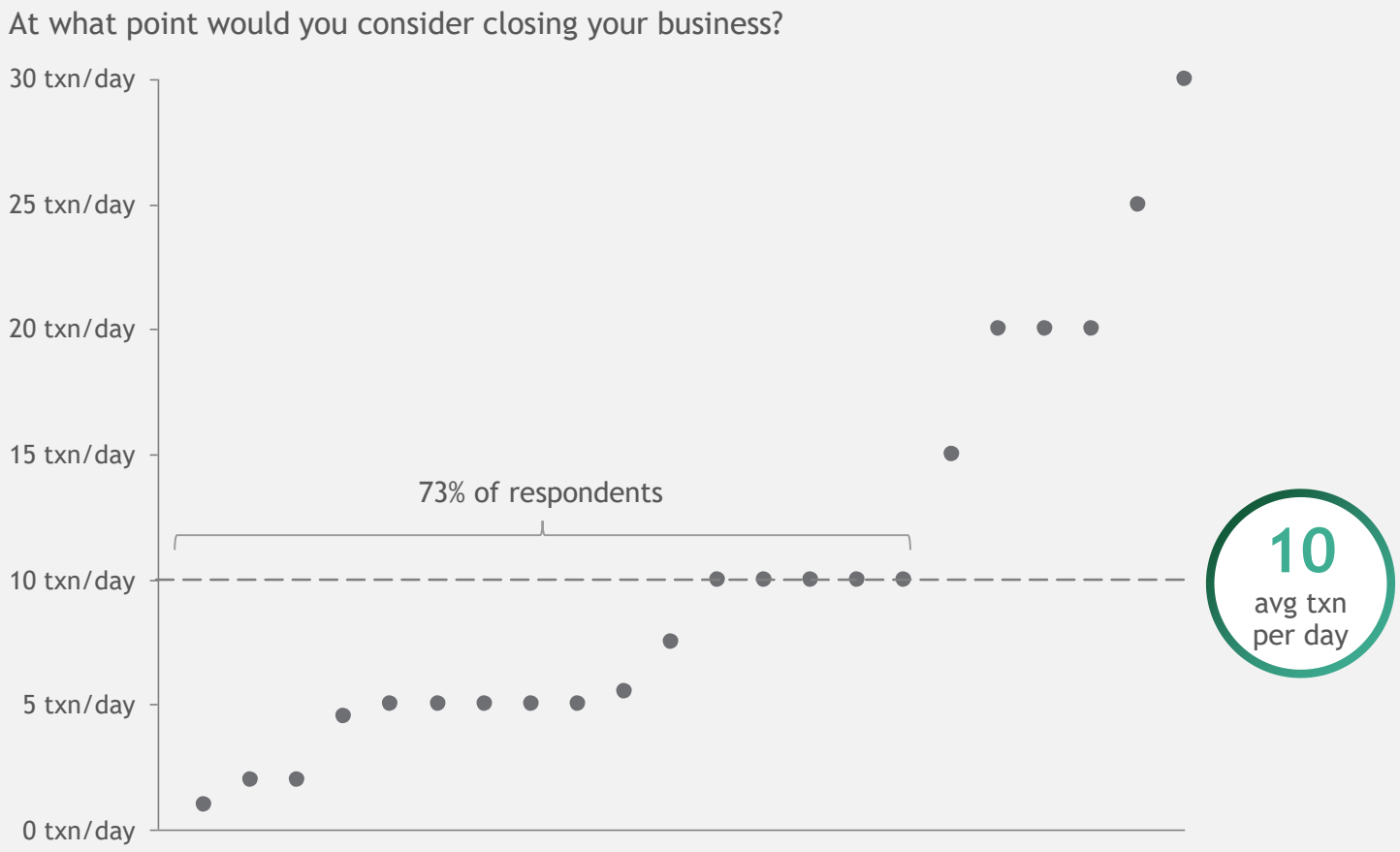
As a result, agent margins closely correlated with transaction volumes



Source: Agent interviews, 2018

Qualitative insights

DFS business no longer worthwhile to agents once volume falls below 10 transactions per day



Source: Agent interviews, 2018

Global comparison

Similar volume threshold seen in other countries; unsatisfied agents avg 10-20 txn/day

Agent economics

...however, "unsatisfied agents" within sample indicate minimum of 10-20 daily txns needed to make DFS business worthwhile

DFS business seems not "worthwhile" to agents who observe below 10-20 daily transactions

Country	Avg. daily transactions for "unsatisfied" agents	Avg. daily transactions for all agents
Bangladesh	7.5	52
India	18	34
Kenya	19	65
Tanzania	16	39

For non-dedicated agents in study sample:
- Average of 47% of income comes from DFS business
- Total monthly earnings (DFS + other business) can be up to 4x earnings of dedicated agents

Agents with low txn volumes likely to discontinue operations, due to low earnings

"If the mobile money was the only business I would be anxious but my retail shops keeps my hope" ~10 daily txn

"Yes, planning to discontinue mobile money business at the end of the year; Low ROI compared to Boutique business" ~13 daily txn

"Very high. Thinking of shutting down the business as there is not significant change is earning" ~9 daily txn

In addition to breakeven threshold, critical to ensure agents find DFS business "worthwhile" for their time and monetary investment

18

Source: BCG, Global Study of Cash-in / Cash-out Economics, 2018

Recall: Most rural expansion to-date seen in "oases", expanding to the frontier involves additional challenges

Rural Oasis (potentially viable)

- Regions of high economic activity in an otherwise low economic "desert"; agents typically located near markets, village centers, busy streets
- Moderate DFS penetration – many customers have bank accounts and are familiar with DFS
- 30-100 transactions/day[1]
- Some existing infrastructure (e.g. bank presence, paved roads, power and mobile connectivity)
- Covered in agent sample; agents present in rural areas today are the ones who are able to make the business work; **85%** of rural sample are profitable

Rural Frontier (limits to CICO economics)

- Remote rural locations with low population size and density, and lower economic activity
- Low DFS penetration – few customers with bank accounts
- <10 transactions/day[2]
- Limited existing infrastructure (e.g. bank presence, paved roads, power and mobile connectivity)
- Not covered by agent sample (due to economic unviability)

1: Range taken from agent interviews
2: Range estimated from assumptions and triangulated with secondary research; see compendium for full details

Analysis done in global work

At the frontier, transaction volume expected to fall below viability threshold

Transaction volume expected to decline further at the frontier[1]…

<10 txn/day

Transaction volume:

~70% less than in 'oasis' rural areas; reflects lower pop. size, limited DFS use cases

₦3000

Transaction size:

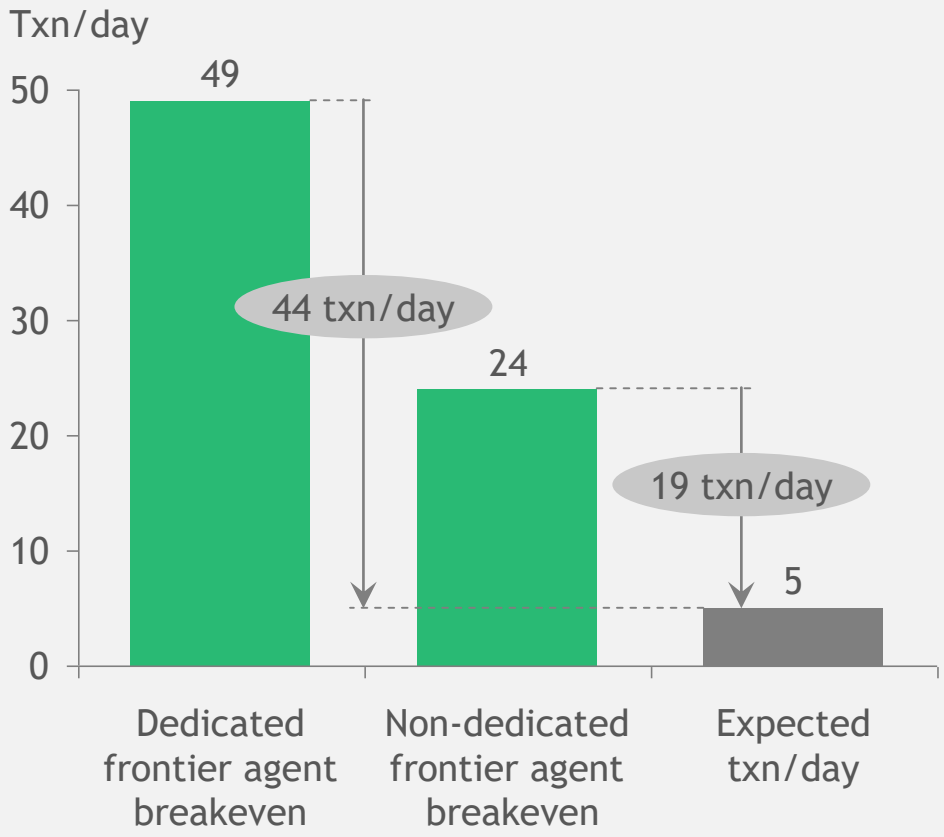
30% lower than amounts observed in rural oasis locations

Mostly CICO

Expected transaction mix:

90% CICO vs. 10% other (e.g. bill pay)

…which falls below required transactions for agents to breakeven

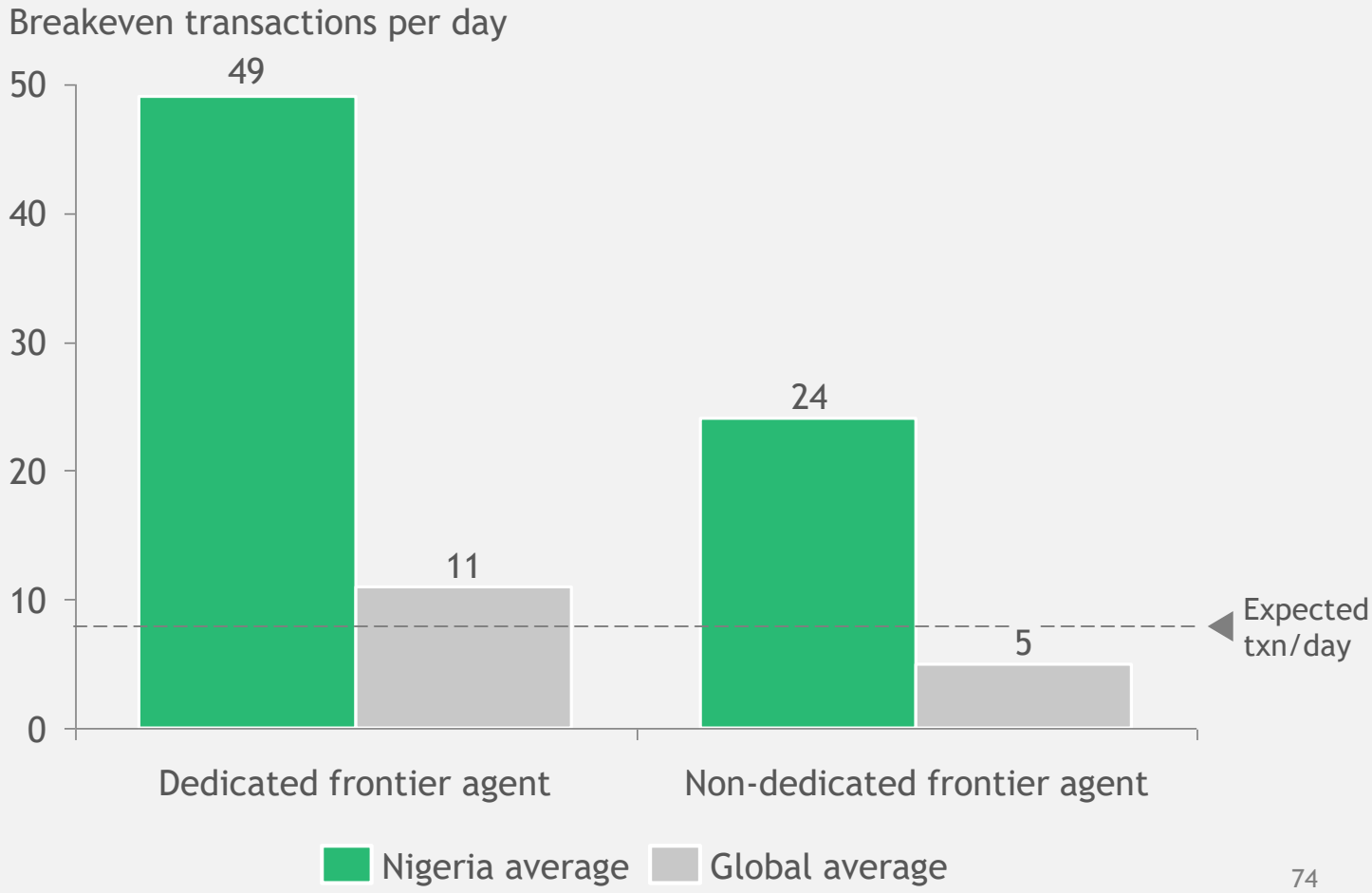


1: Assumptions based on expert interviews, observed patterns in global work
2: Breakeven transactions per day calculated from rural agents in sample

Global comparison

Frontier breakeven transactions higher in Nigeria vs. global average; likely driven by liquidity mgmt costs

Liquidity management cost comparison included later in deck



Source: BCG, Global Study of Cash-in / Cash-out Economics, 2018

Analysis done in global work

Backup: Estimated frontier transaction volumes are consistent with findings from secondary research

In village of 5000 people → If 30% are potential customers → Who do 2-3 txn/ month → 10% DFS penetration rate would imply 12.5 txn/day

Population Size	Expected DFS customers	Monthly txns/ agent	Daily txns/ agent
5000	~150	~375	~12.5
4000	~120	~300	~10
3000	~90	~225	~7.5
<2000	<60	<150	<5

- **1 agent** in entire geography (no competition)
- **30% of population are potential DFS customers**, after accounting for age group, gender and household size
- **2.5 txn / customer/month** per provider interviews and IFC/MasterCard Foundation study benchmarks
- **10% DFS penetration** (i.e., ~50% mobile network penetration, of which 20% are active mobile money customers)

Secondary research (as triangulation)

- EFinA – 3.3 median txns/day
- LBS DFS 2016 DFS Report – 1.37 rural txns/day

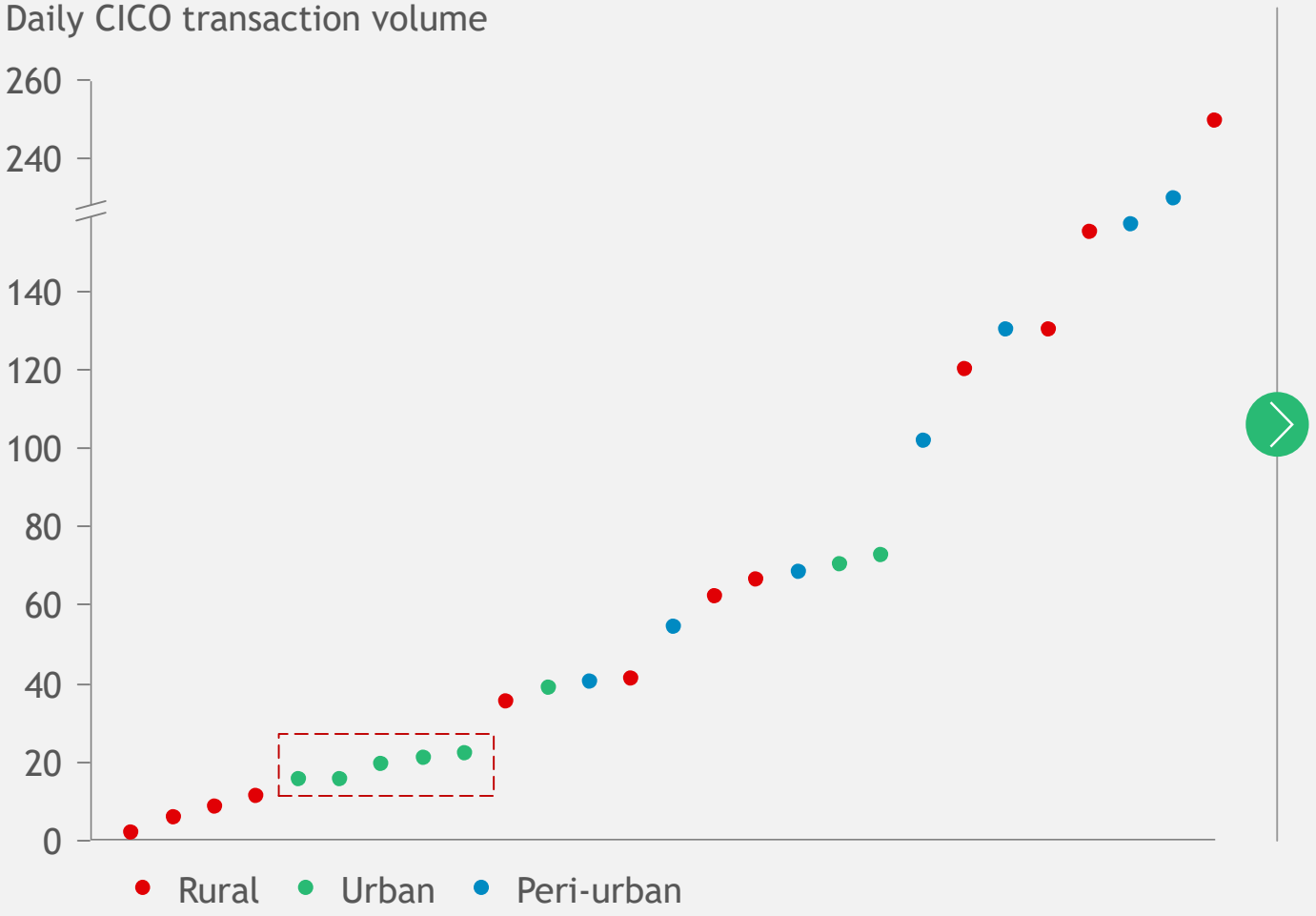
Secondary research from other countries

- In Kenya, 12% of agents did <20 txn/day (2013)
- In Tanzania, 27% of agents did <20 txn/day (2013)
- In Bangladesh: Rural median is 12 txn/day (2016)
- In Pakistan – 50% of rural agents did <20/day (2018)

Source: BCG, Global Study of Cash-in / Cash-out Economics, 2018

Analysis done in global work

Backup: While lowest transaction volumes occur in rural locations, urban agents can also be impacted



37% of agents mention lack of transactions as primary cause of low earnings

13% of agents may stop offering DFS services due to low customer demand

> There's low demand in the community

> Lack of awareness and low trust levels for digital services is predominant in the community. Customers prefer physical tangible services that they can touch

Source: Agent interviews, 2018

Mitigating choice improves economics
Mitigating choice worsens economics

3a – Transaction volumes - POS

	1 Agent business model	2 Power reliability	3 Transaction volumes	4 Financial infrastructure
Description	• Non-dedicated agents have lower marginal costs (-13% startup and -28% recurring), and breakeven two months faster • As transaction volumes decrease, non-dedicated models are much more viable	• Unreliable connectivity to power grid is consistent across geographies (urban, peri-urban, and rural) • Agents often cope by spending money on generators	• Most recurring costs are fixed, so agent profitability highly dependent on txn volumes • At the frontier, est. txn volume (<10/day) falls below expected breakeven threshold (~24/day)	• Liquidity management costs are higher for rural vs. urban agents • Because of limited bank/ATM presence, liquidity management costs at the frontier expected to be ~13-50% higher than those at a rural oasis
Mitigating choices	N/A	Reliance on generator • Generator fees cost agents an average of ₦12K per month (fuel and maintenance)	3a Investing in POS • Despite lower costs, no-POS agents take longer to breakeven due to lost revenue from cash outs (12 months vs. 3 months) 3b Charging extra fees • Most agents charge extra fees (80% of agents in sample), providing a 20-25% lift on margins	Reduced rebalancing freq. • Agents offset higher travel costs by taking fewer trips/month: urban/peri-urban (53) vs. rural (26) Alternate rebalancing points • Agents with limited access to financial infrastructure often cope by finding unofficial rebalancing points

Particularly relevant at frontier

	Cell infrastructure	Fraud and theft
Description	• Without cell infrastructure, agents are unable to operate • No direct economic impact, but a necessary condition for agent viability	• Current agents do not appear to have high theft costs, but qualitative interviews suggests this may be a factor at the frontier

Three POS models typically seen in Nigeria, each with a unique impact on agent economics

No-POS model

Description:
Provider does not offer (or agent chooses not to purchase) POS device

Revenue potential limited by inability to easily perform cash withdrawals for banked customers

Economic implications:
- ➖ Funding cost (value of cash held)
- ➖ Startup cost (cost of POS)
- ➖ Recurring cost (POS fee)
- ⬇ Revenue (cash out commissions)

POS model *(FSP provided)*

Description:
Provider supplies agent with a POS, free-of-charge

Gives agent the ability to perform cash withdrawals for banked customers

Economic implications:
- ⬆ Funding cost (value of cash held)
- ➖ Startup cost (cost of POS)
- ➖ Recurring cost (POS fee)
- ⬆ Revenue (cash out commissions)

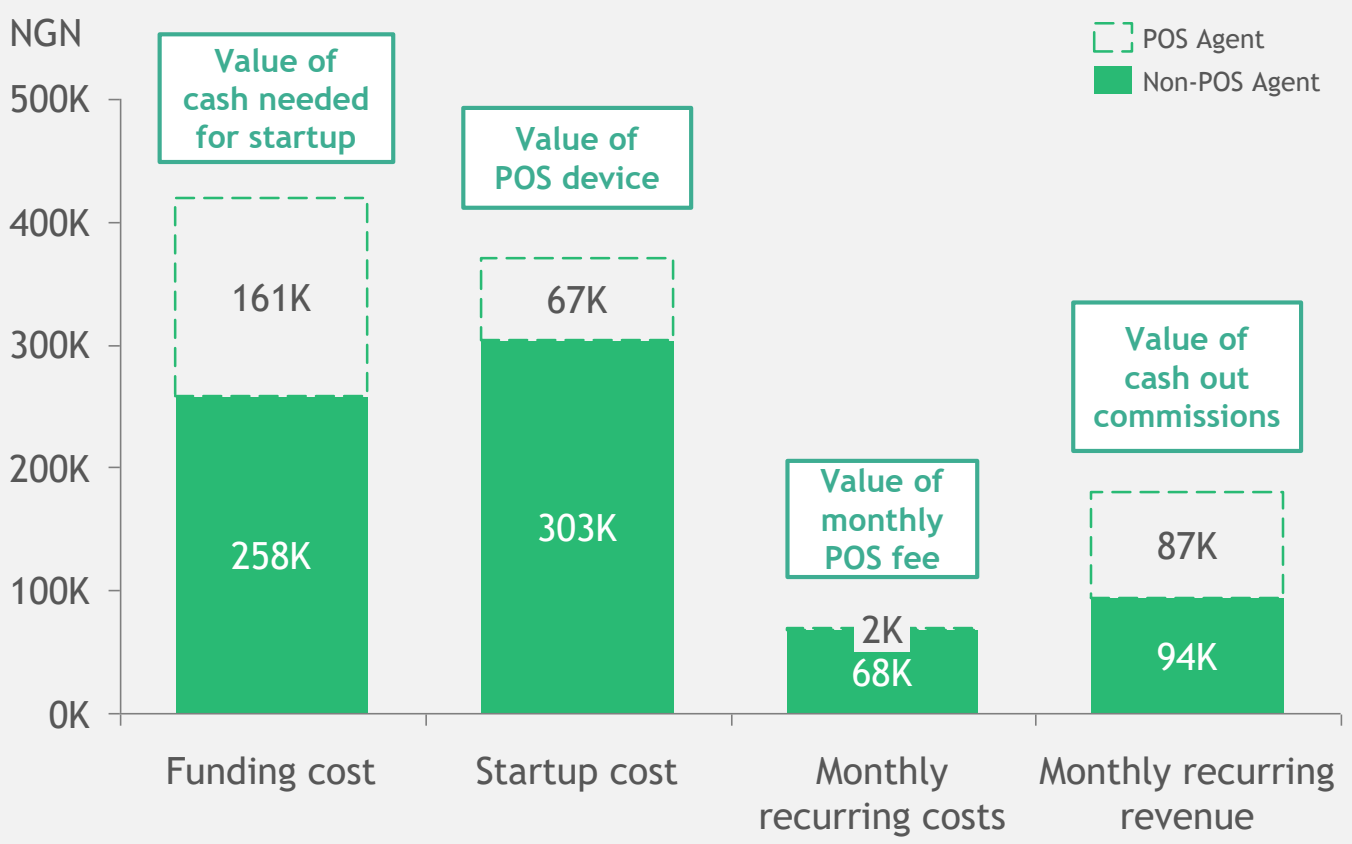
POS model *(agent purchased)*

Description:
Agent purchases POS device from provider

Gives agent the ability to perform cash withdrawals for banked customers

Economic implications:
- ⬆ Funding cost (value of cash held)
- ⬆ Startup cost (cost of POS)
- ⬆ Recurring cost (POS fee)
- ⬆ Revenue (cash out commissions)

Despite lower costs, non-POS agents take longer to breakeven due to lost revenue from cash outs



	Margin %	Breakeven Months
POS Agent (Agent purchased)	61.4%	3
POS Agent (FSP provided)	62.3%	3
Non-POS Agent	27.8%	12

Funding Cost: Assumed agents w/o POS would not need to carry cash
Startup Cost: Removed average cost of POS from average agent startup cost
Recurring Cost: Removed average POS fee from average agent recurring cost
Revenue: Removed average cash out revenue from average total revenue of agents with POS; calculated without extra fees
Note: Sample consists of dedicated and non-dedicated agents

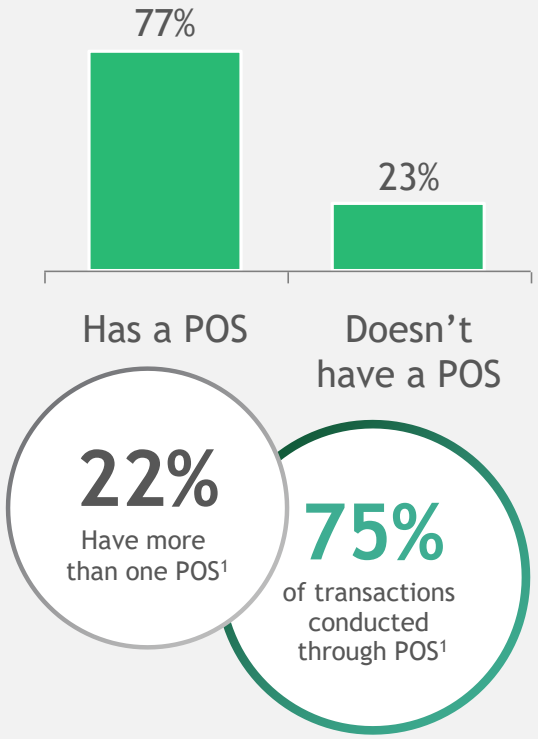
Qualitative insights

Most agents see the value of POS…

> If I have more capital, I will expand to other providers with POS so I can cater to the customers that demand it
>
> -Rural Agent

> I experience low patronage because I don't have a POS. Majority of people prefer to use their ATM cards
>
> -Rural Agent

> I use more of POS during high demand periods (the end of month and Market days) because it's faster and more convenient
>
> -Rural Agent



…but not all customer bases are equally receptive

> Most of the people in my community are not receptive to POS usage (compared to transfers) due to low financial resources and resistance to change
>
> -Rural Agent

1: Based on the respondents who own a POS device

Mitigating choice improves economics
Mitigating choice worsens economics

3b – Transaction volumes – Extra fees

Agent business model

Description

- Non-dedicated agents have lower marginal costs (-13% startup and -28% recurring), and breakeven two months faster
- As transaction volumes decrease, non-dedicated models are much more viable

Mitigating choices

N/A

Power reliability

Description

- Unreliable connectivity to power grid is consistent across geographies (urban, peri-urban, and rural)
- Agents often cope by spending money on generators

Mitigating choices

Reliance on generator

- Generator fees cost agents an average of ₦12K per month (fuel and maintenance)

Transaction volumes

Description

- Most recurring costs are fixed, so agent profitability highly dependent on txn volumes
- At the frontier, est. txn volume (<10/day) falls below expected breakeven threshold (~24/day)

Mitigating choices

3a Investing in POS

- Despite lower costs, no-POS agents take longer to breakeven due to lost revenue from cash outs (12 months vs. 3 months)

3b Charging extra fees

- Most agents charge extra fees (80% of agents in sample), providing a 20-25% lift on margins

Financial infrastructure

Description

- Liquidity management costs are higher for rural vs. urban agents
- Because of limited bank/ATM presence, liquidity management costs at the frontier expected to be ~13-50% higher than those at a rural oasis

Mitigating choices

Reduced rebalancing freq.

- Agents offset higher travel costs by taking fewer trips/month: urban/peri-urban (53) vs. rural (26)

Alternate rebalancing points

- Agents with limited access to financial infrastructure often cope by finding unofficial rebalancing points

Particularly relevant at frontier

Cell infrastructure

Description

- Without cell infrastructure, agents are unable to operate
- No direct economic impact, but a necessary condition for agent viability

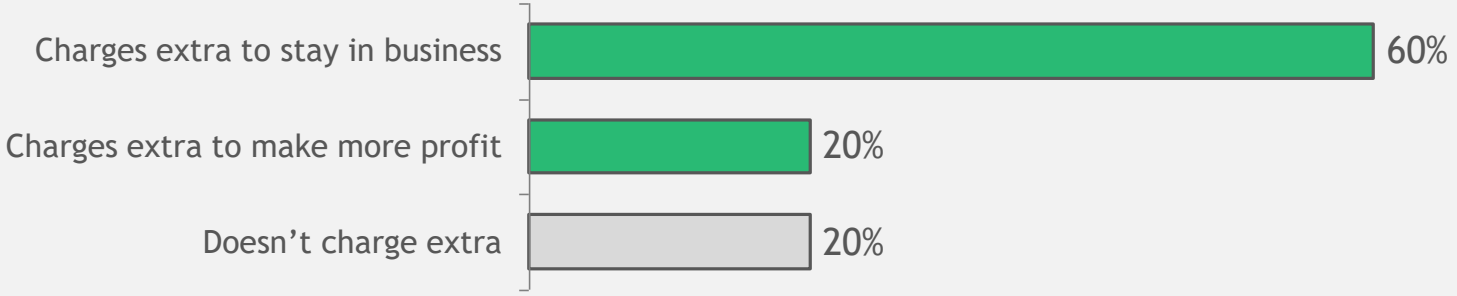
Fraud and theft

Description

- Current agents do not appear to have high theft costs, but qualitative interviews suggests this may be a factor at the frontier

Despite fee caps, majority of agents continue to upcharge their customers

Why do agents charge extra fees?



> "I mostly charge extra fees when the network is down. That way I pass on the bank charges to the customer"
>
> -Peri-Urban Agent

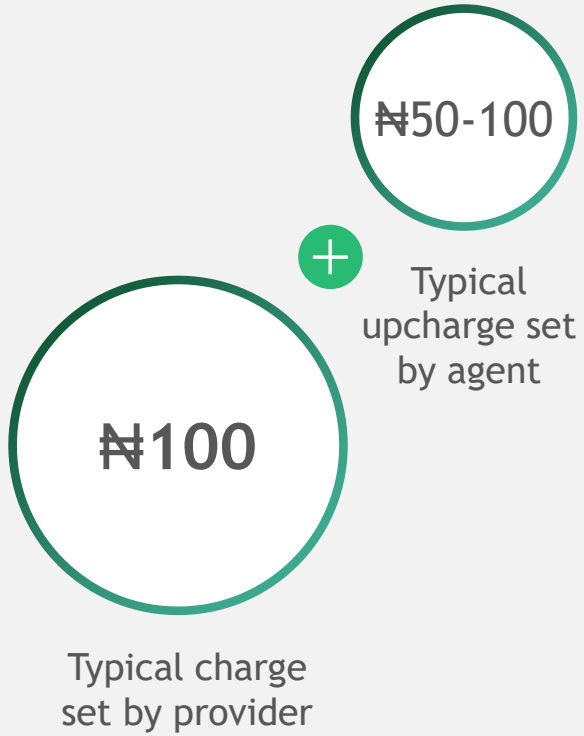
> "I have to buy data/internet and pay my staff. These charges help me cover my expenses
>
> -Peri-urban Agent

> "The commissions from the provider aren't paid until the end of the month. I'm without money to run the business day to day if I don't charge the extra money
>
> -Urban Agent

> "I usually charge even more when banks are closed (like on long holidays)
>
> -Rural Agent

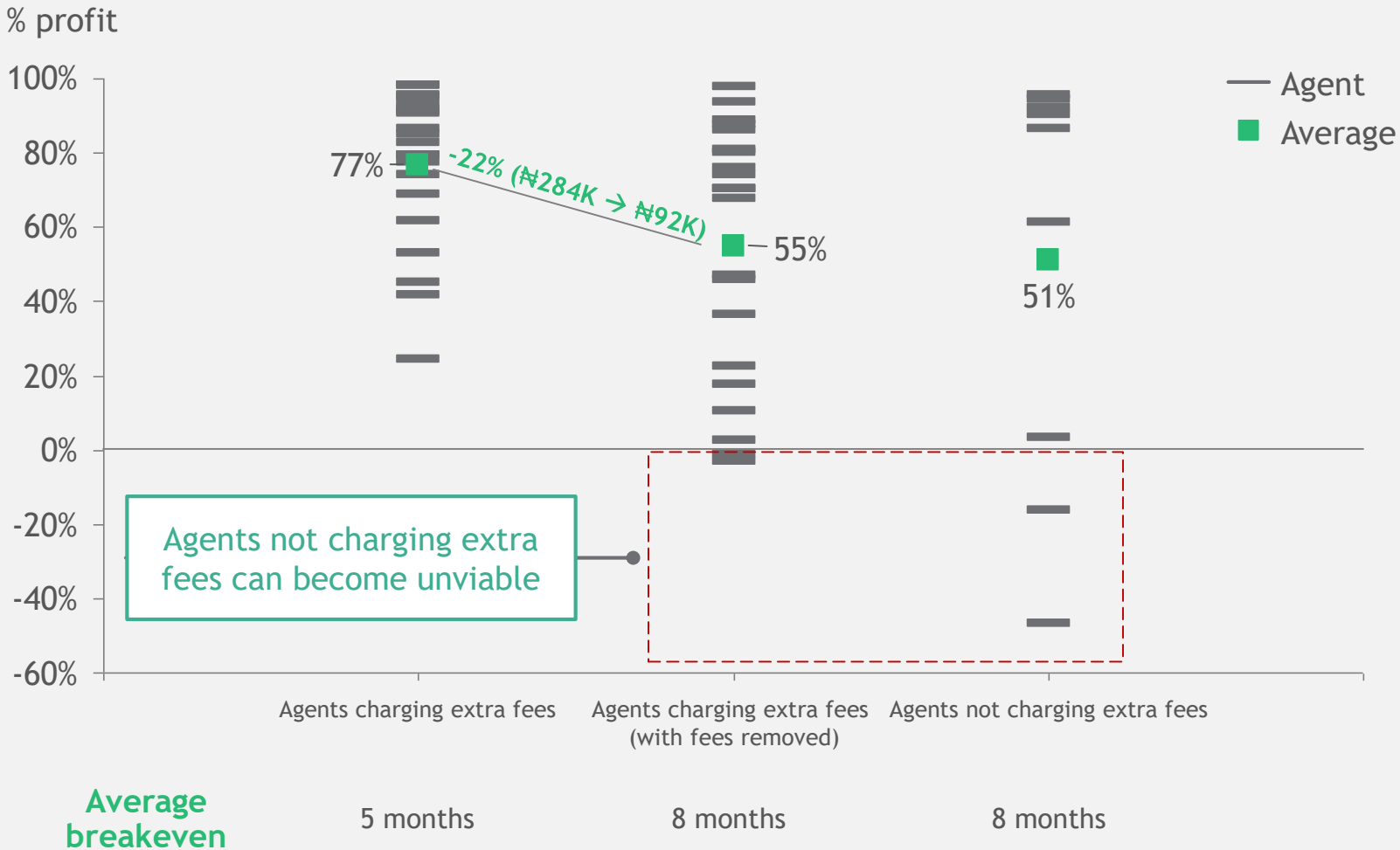
How much do they charge?

For a ₦5,000 transaction…



Source: Agent interviews, 2018

Extra fees are instrumental to agent profitability, resulting in a 22% margin lift



Note: Important to consider agent viability with and without extra fees.

As agent concentration increases, competition likely to bring down prices.

As a result, extra fees can be viewed as the highest potential market price…

…and fee caps can be taken as the lowest potential price…

…with market-pricing likely to fall in the middle

Source: Agent interviews, 2018
Breakeven calculation assumes 6 month ramp-up to steady state revenue

Qualitative insights:

Case study

For some agents, charging extra fees is the difference between making money and going out of business

Ahmed is a non-dedicated agent operating in rural Kano.

Ahmed originally owned a convenience store, but he began offering mobile money services about a year ago. His town is over an hour from the nearest bank, so he realized this would be a great opportunity to make more money.

> *Here we don't have banks. There's only one ATM, which can't meet the needs of the community*

However, Ahmed's operating costs are high. He has to go to the bank in Kano once a day to rebalance, which costs him ₦3500-6000 per trip.

As a result, Ahmed must charge his customers extra fees in order to cover his expenses.

> *Because of the expenses incurred when I travel to get cash, I have to charge extra*

₦100
Extra charge per cash withdrawal

₦160K
Total monthly profit with extra fees

-₦6K
Total monthly profit without extra fees

Source: Agent interviews, 2018

Mitigating choice improves economics
Mitigating choice worsens economics

4 – Financial infrastructure

Agent business model

Description

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- As transaction volumes decrease, non-dedicated models are much more viable

Mitigating choices

N/A

Power reliability

- Unreliable connectivity to power grid is consistent across geographies (urban, peri-urban, and rural)
- Agents often cope by spending money on generators

Reliance on generator

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Transaction volumes

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Reduced rebalancing freq.

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Alternate rebalancing points

- Agents with limited access to financial infrastructure often cope by finding unofficial rebalancing points

Particularly relevant at frontier

Cell infrastructure

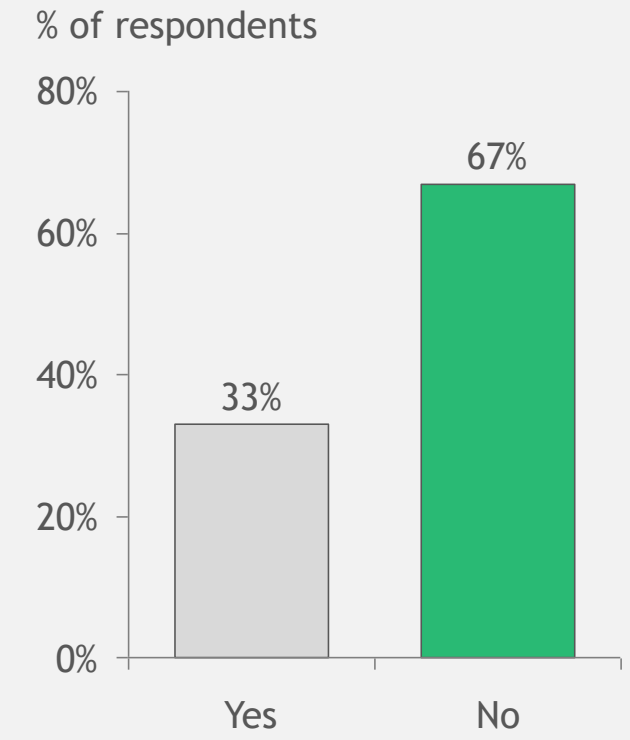
- Without cell infrastructure, agents are unable to operate
- No direct economic impact, but a necessary condition for agent viability

Fraud and theft

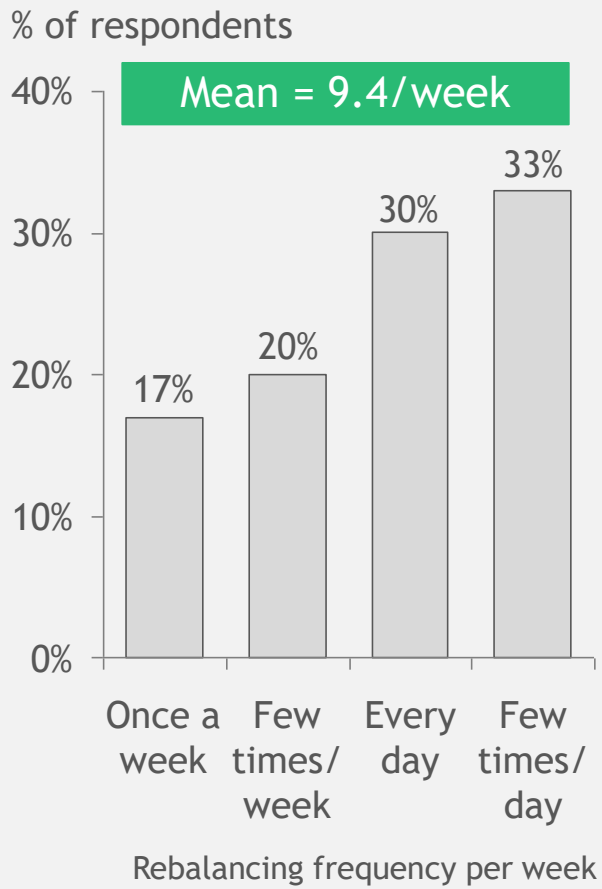
- Current agents do not appear to have high theft costs, but qualitative interviews suggests this may be a factor at the frontier

Liquidity management is a challenge for most agents, and is their largest operating cost

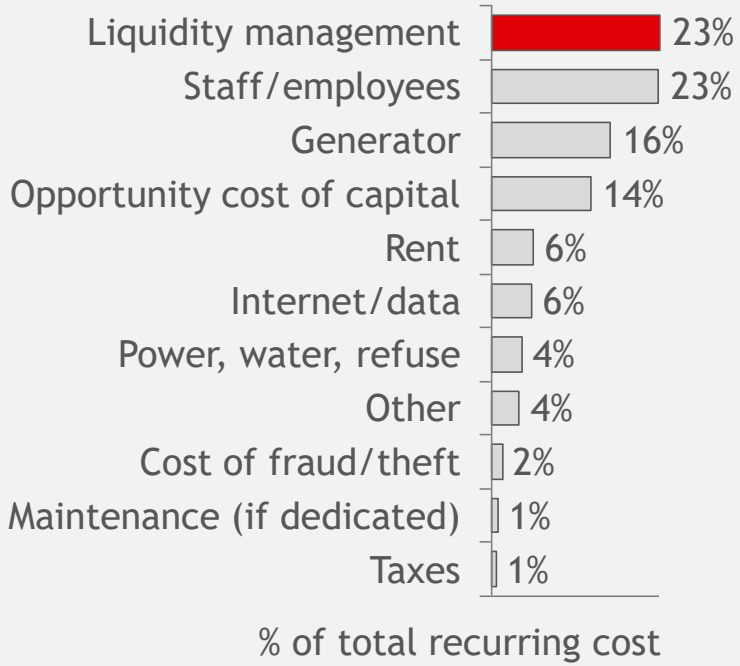
Most agents feel that managing liquidity is a challenge



Agents must make frequent trips to manage their cash and float



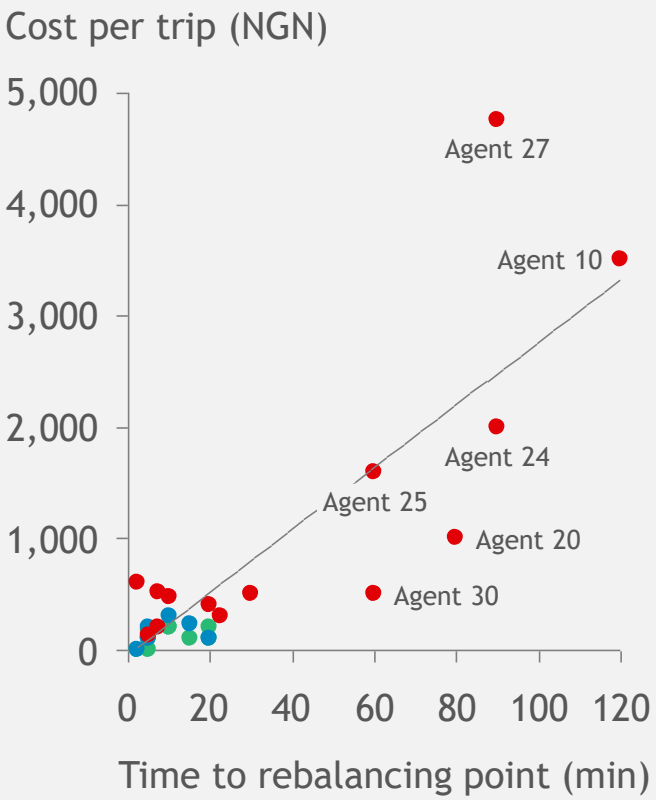
As a result, liquidity management often their highest operational cost



Source: Agent interviews, 2018

However, liquidity management costs don't scale linearly with distance from rebalancing point

Cost per rebalancing trip increases with distance



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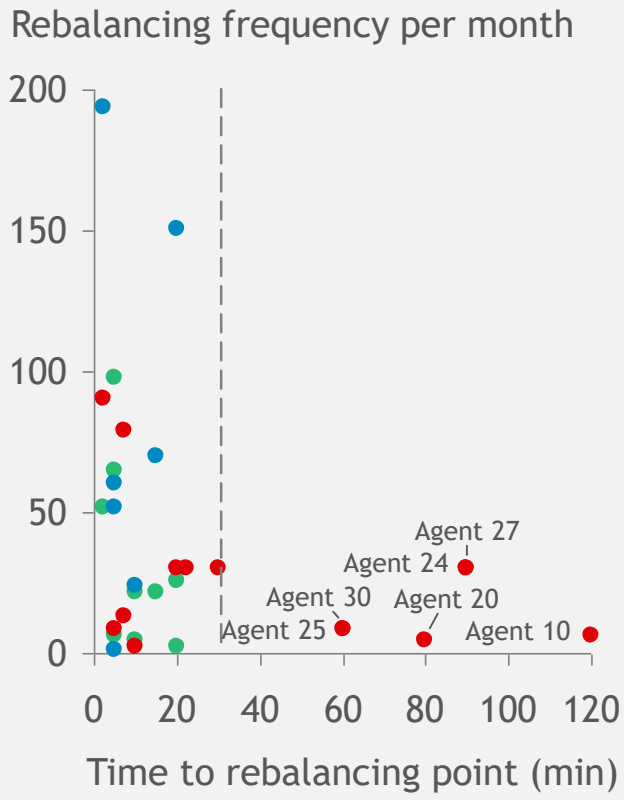
Agents in remote locations offset travel costs by taking fewer trips



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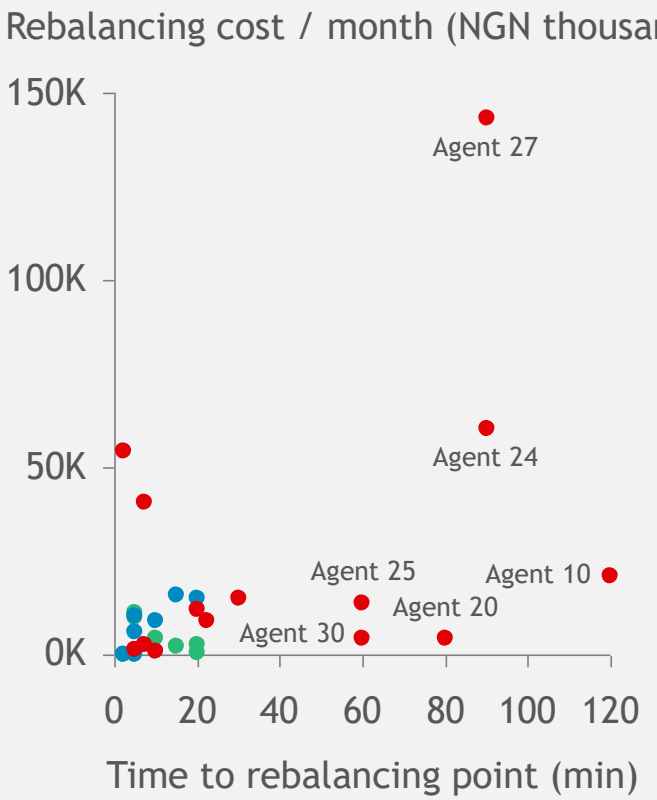
As a result, rebalancing costs don't increase linearly with distance



Source: Agent interviews, 2018

Qualitative insights:

Case study

Agents also manage by finding alternative points to rebalance at

Shamsudeen is a non-dedicated agent operating in rural Kano.

Shamsudeen became an agent because he wanted to provide a service to his community, and he also saw this as an opportunity to make additional money.

> *Before this business, I used to travel far to get my salary in cash at my previous job as a teacher. There was definitely a need in the community…*

However, being far from a bank also means his rebalancing costs are quite high. The nearest bank is about two hours away, and it costs him ~₦3500 to make the trip.

2 hrs
away from the nearest bank

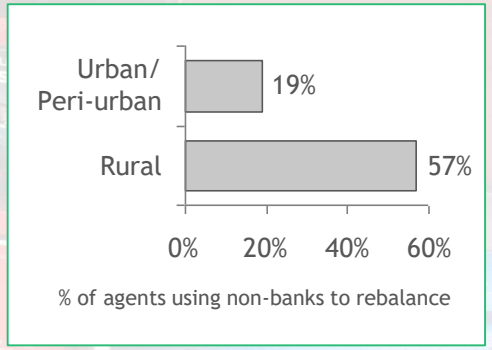
₦3500
per rebalancing trip

₦21K
monthly spend on rebalancing

In order to keep his costs manageable, Shamsudeen has found informal channels to rebalance.

> *I believe my costs are manageable because I don't have to go to Kano often. The other shop owners around me give me cash/float favors, and I pay them back at the end of the day. We help each other.*

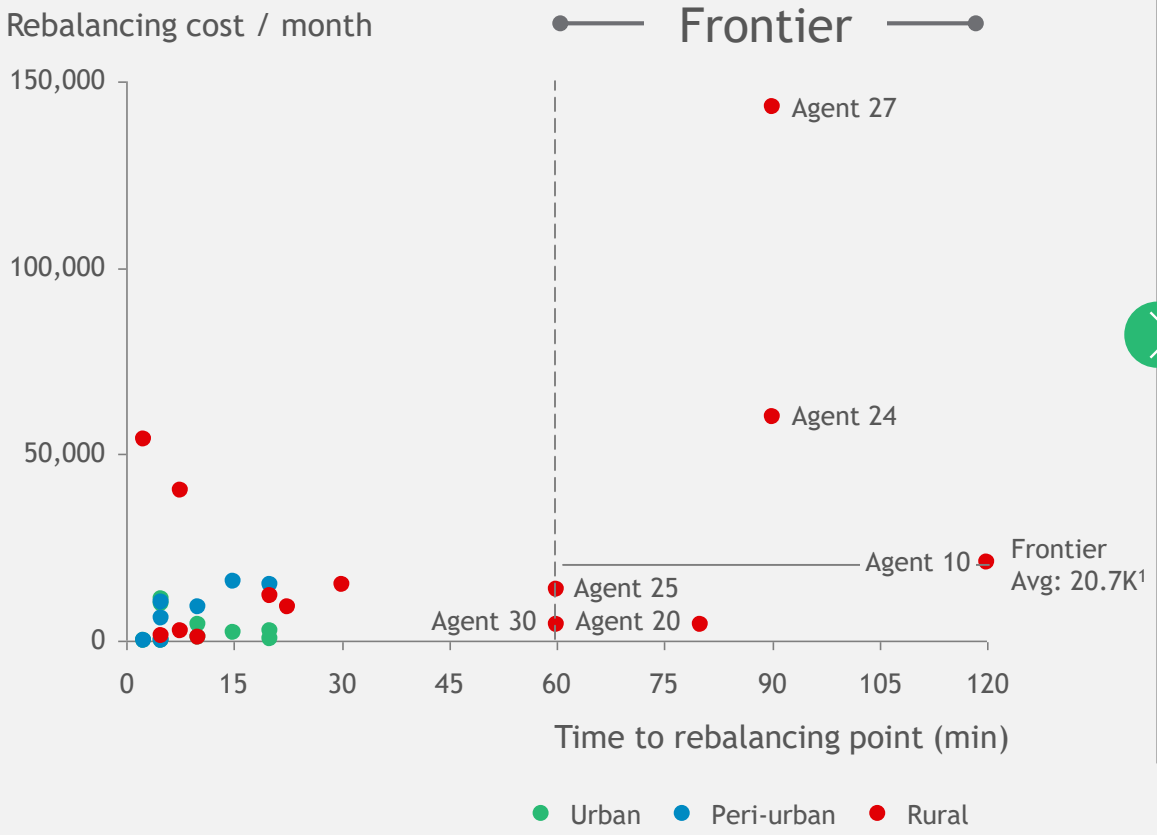
> *My uncle also has a gas station, and I sometimes get cash from him.*



Source: Agent interviews, 2018

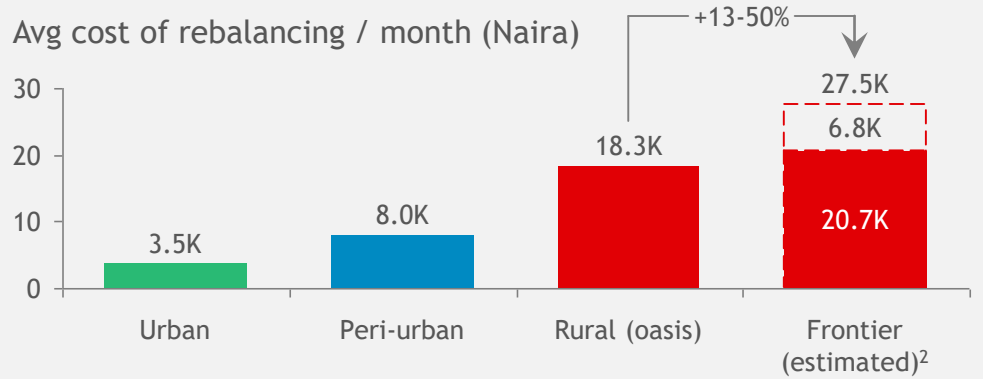
At the frontier, limited financial infrastructure further increases economic cost and operational burden

Because of limited financial infrastructure, frontier agents often 60 min+ from rebalancing point…



…resulting in increased costs associated with liquidity management…

50% increase when including outlier



…and an increased operational burden

Long rebalancing trips:

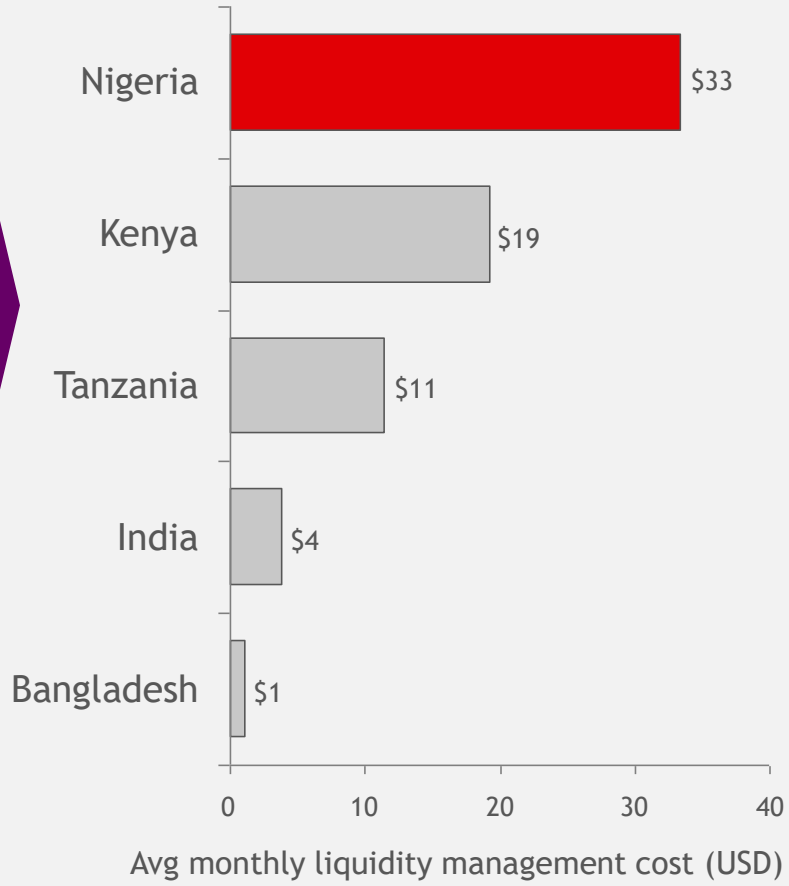
- May not be perceived as "worth the hassle" by new agents or non-dedicated agents with alternate income
- May become a bottleneck as rural txn volume grows and need for rebalancing increases
- Result in long periods of store closure, which negatively impact customer experience

Source: Agent interviews, 2018
1: Average liquidity management cost calculations exclude Agent 27 as an outlier
2: Lower range excludes outlier agent, upper range includes outlier agent

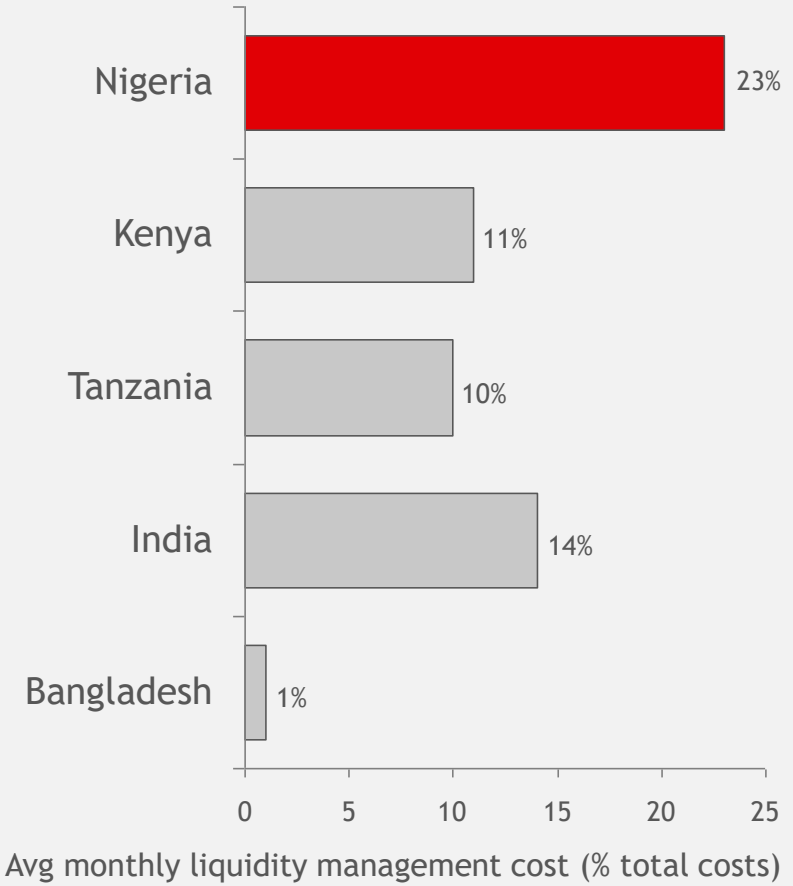
Global comparison

Rebalancing costs particularly high in Nigeria; FSPs in other countries often provide more support

Rebalancing cost (USD)



Rebalancing cost (% total cost)

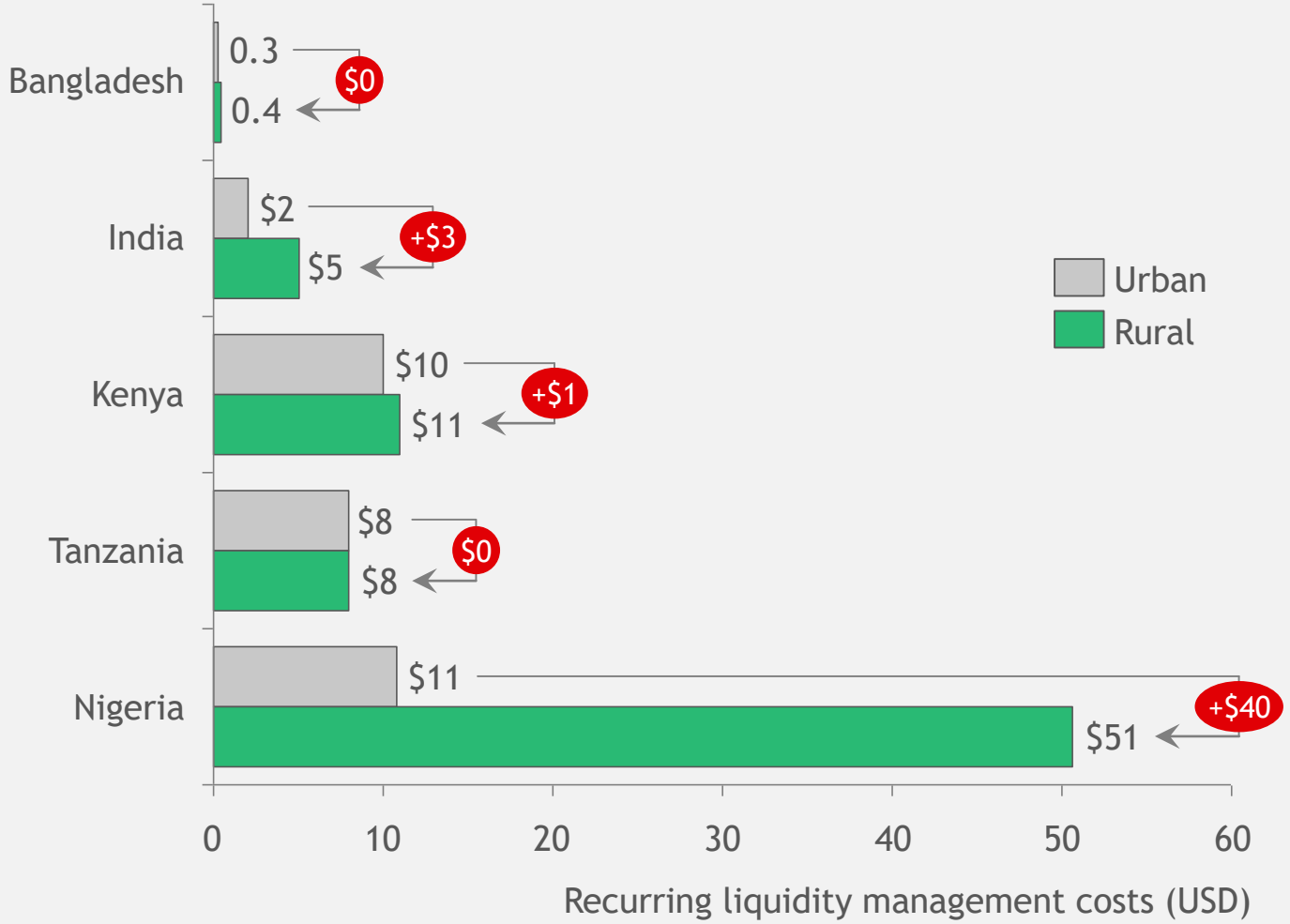


BCG, Global Study of Cash-in / Cash-out Economics, 2018; Agent interviews, 2018
1. Non-dedicated agents do not consider rent, utilities, or maintenance as part of DFS cost, but these costs have been included in chart on right hand side to control for different mixes in dedicated, non-dedicated across countries

Global comparison

Rebalancing is even more of a challenge for agents in rural Nigeria than in other markets

Dollars spent on liquidity management across geographies



Source: BCG, Global Study of Cash-in / Cash-out Economics, 2018; Agent interviews, 2018

Global comparison

How do these findings compare with the global work?

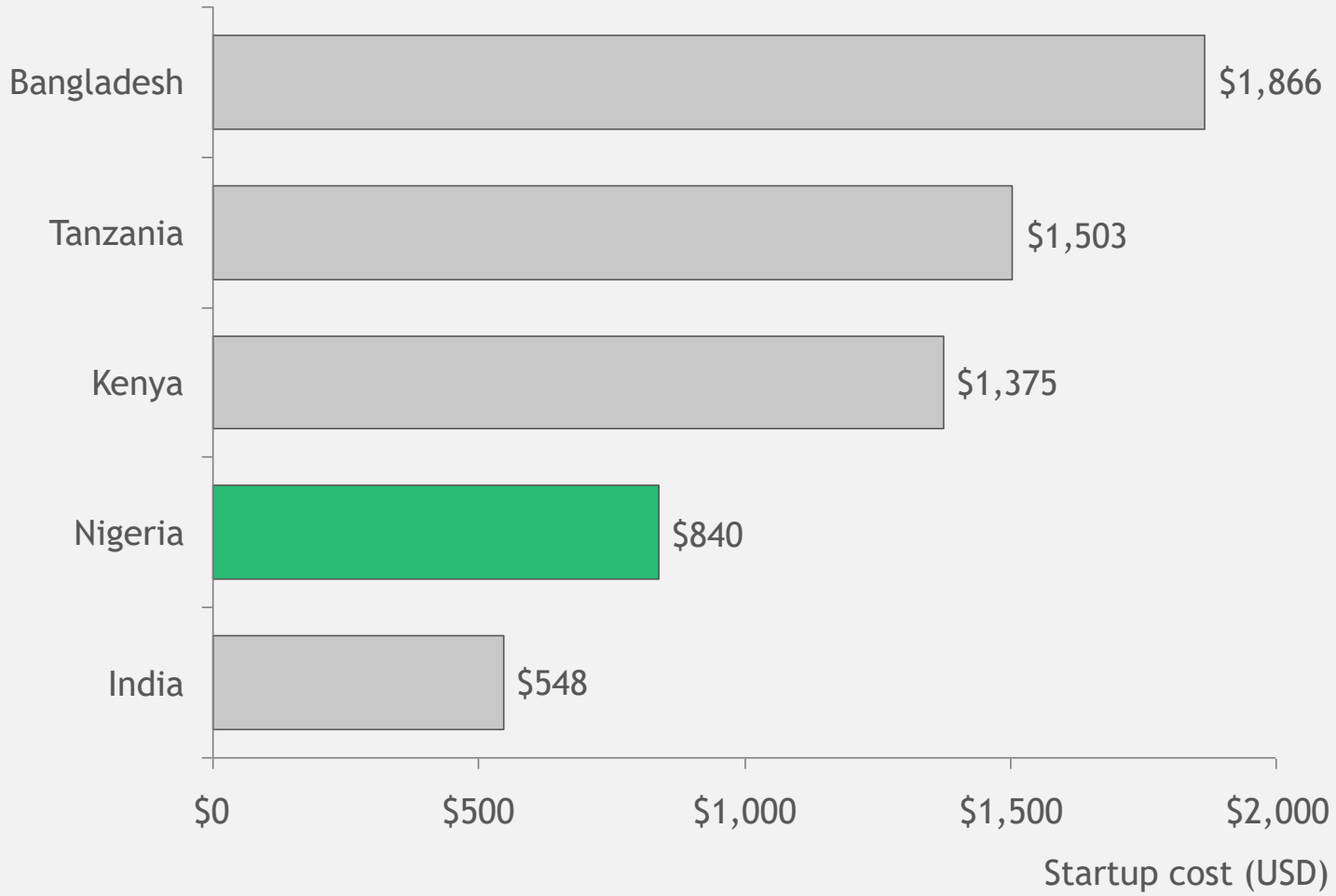
Agent business model	• Similar increase in viability when comparing dedicated to non-dedicated agent models (additional 2 months to breakeven for dedicated agents)
Power reliability	• Not a relevant driver in other countries
Transaction volumes	• Similar agent cost structures (majority fixed) means that transaction volume is critical to agent viability in all countries • However, cost structure in Nigeria results in a higher breakeven point (24 vs. 5 txn/day for a non-dedicated agent)
Financial infrastructure	• Higher impact in Nigeria – FSPs in other countries often provider more liquidity management support, reducing the cost burden on agents • Rebalancing costs make up 23% of total agent cost in Nigeria vs. average of 9% in other countries
Cell infrastructure	• Not investigated in other countries
Production find icon **Fraud and theft**	• Not as relevant in Nigeria vs. other countries in agent sample, but may increase as agent networks expand to frontier (particularly in northern states)
Production find icon **Startup costs**	• Not as relevant in Nigeria vs. other countries in agent sample

Deep-dive

Source: BCG, Global Study of Cash-in / Cash-out Economics, 2018; Agent interviews, 2018

Global comparison

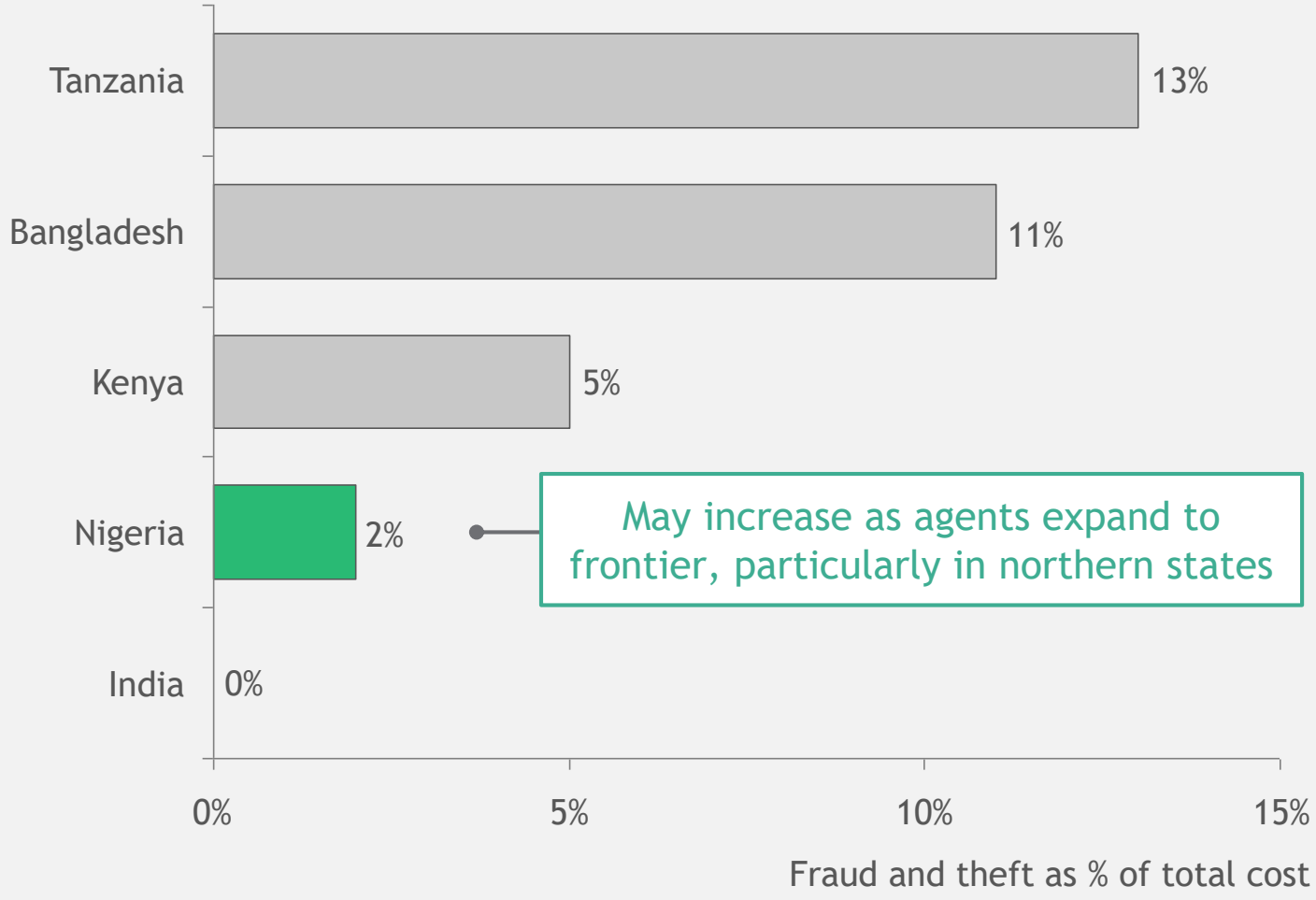
Backup: Startup costs less of a barrier in Nigeria vs. other countries



Note: Values include cost of buying minimum liquidity
Source: BCG, Global Study of Cash-in / Cash-out Economics, 2018; Agent interviews, 2018

Global comparison

Backup: Costs of fraud and theft also less significant among Nigerian agents interviewed (vs. others countries)



Monthly cost of fraud and theft calculated by allocating total cost of fraud/theft across number of months agent has operated for
Source: BCG, Global Study of Cash-in / Cash-out Economics, 2018; Agent interviews, 2018

Compendium Part 3 - Appendix

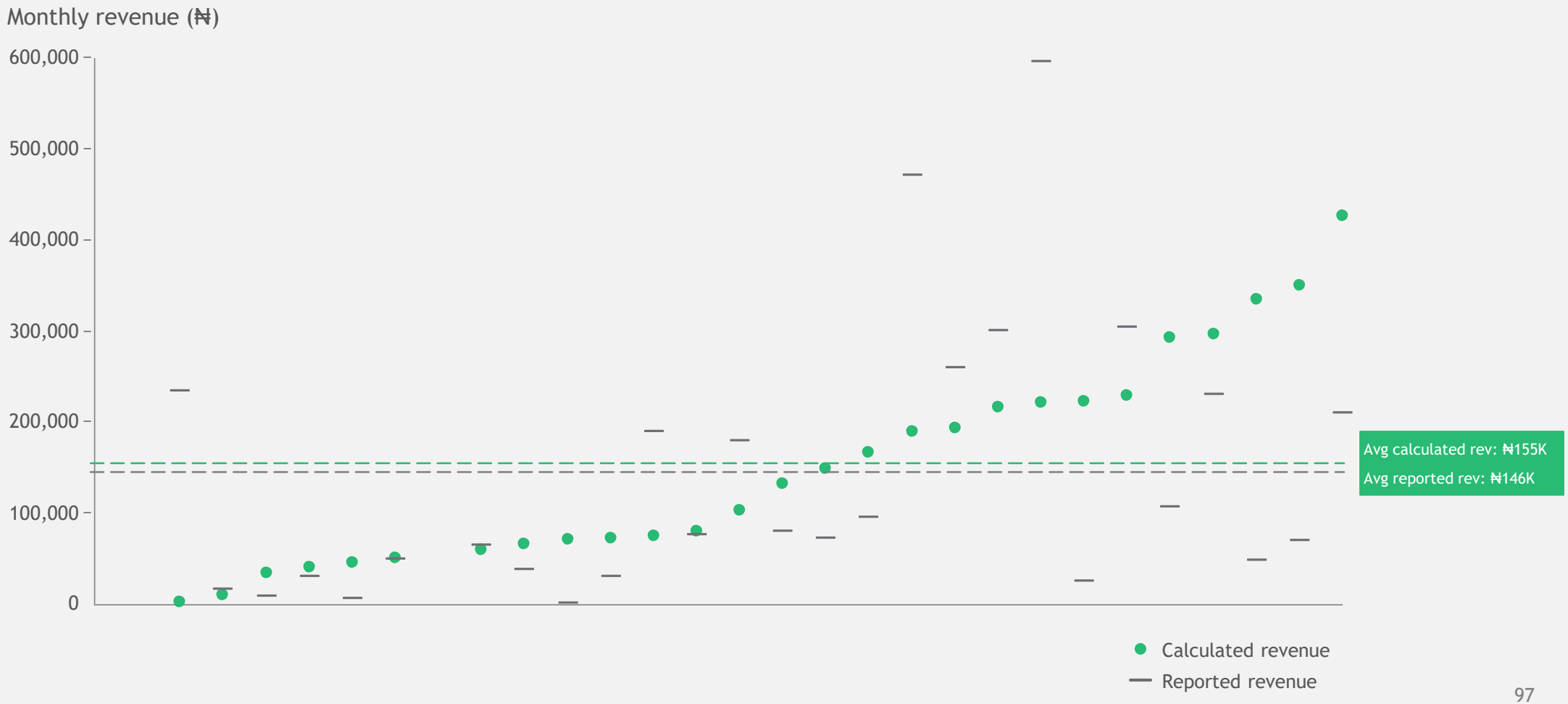
Backup: Taxonomy of an agent's economics

Startup costs	Cost to start up as a new DFS agent
Setting up the shop	Includes real estate, furniture, legal fees, new business taxes, etc.
Buying min. liquidity	Amount of cash/float needed to operate as a mobile money agent
Buying laptop/computer	Cost of laptop/computer to conduct transactions
Buying POS	Cost to buy POS from provider; Sometimes given for free
Buying mobile phones	Cost of mobile phone to conduct transactions
Security	Includes locks, safes
Branding/marketing	Signage, posters; Sometimes given for free
Licensing fees	Fee to provider to register as agent; Often covers cost of training

Recurring costs	Monthly costs to stay in business
Rent	Cost of rent for store; currently assumed as 0 for non-dedicated agents
Maintenance	Cost to maintain store (e.g. repaint); currently assumed as 0 for non-dedicated agents
Staff	Salary of employees
Utilities	Includes power, garbage, water
Generator	Fuel and maintenance for backup generator
Internet/data	Cost of internet, airtime, or SMS
POS fee	Monthly fee to provider for POS; Not always applicable
Fraud/Theft	Total value of amount stolen allocated on a monthly basis
Cost of capital	Opportunity cost of cash/float set aside to operate. Assumed 1.2% monthly (return of 91-day NTB)

Revenues	Sources of revenue at agent point
CICO	Withdrawals, deposits
Bill pay	E.g. utility bills, electronic bills
Airtime	New SIM, SIM replacement, and airtime top-ups
Account openings	Revenue from new account openings; Typically low
Transfers	P2P transfers
Other	Savings products, loans, insurance, etc.; Not common

Backup: Difference of ₦11K/month between calculated revenue vs. agent reported revenue



Source: Agent interviews, 2018

Perception of providers from agents

Commissions perceived as low, and are often late	• “Over the last year, I haven't been paid any commission despite conducting transactions” • “[Provider] is not serious. They don't pay commissions regularly” • “The commissions from the provider aren't paid until the end of the month. I'm without money to run the business day to day"
Networks are perceived as unreliable	• “There's no perfect network in this country. I swap between multiple providers to maintain high reliability’’ • “Provider network cannot be 100% in this country. Had to add a second provider three months ago as a back-up to avoid losing customers" • “Network on POS terminals is unreliable and I have to constantly use backup"
Technology limitations are a frustration	• “If a customer comes with a Visa, I have to use [Provider 1] as [Provider 2] is not compatible with Visa, only Mastercard and Verve" • “[Provider 1] doesn't issue physical receipts while [Provider 2] does, which makes issue resolution easier” • “Thumbprint and camera options on [Provider] are not functional, making issue resolution longer"
Issue resolution perceived as slow and inefficient	• “The resolution process is not smooth and calls to customer service aren't answered/responded to" • "I'm not using [Provider] often because they don't have any physical office in Kano and it takes a long time to resolve issues" • "Slow response time to transaction delays especially inter-bank transactions"

Source: Agent interviews, 2018

Four key themes observed across countries

1. Time taken to break even
2. Working capital shortages
3. Liquidity management
4. Electricity and network disruptions

Nigeria specific

Themes observed across agents

Concerns over time taken to break even

- Agents struggle with the concept of break even
  - Self-reported break even is ~10 months on average
- Agents are burdened with the high cost of setting up shop, particularly in urban areas
  - High setup costs can significantly impact the break even point

Struggle to maintain working capital

- Most agents view working capital management as one of the main barriers to additional profits
  - Agents sometimes unable to complete transactions due to insufficient working capital
  - Agents turn away large transactions during high-demand periods
  - Agents use their secondary business as a complementary source of cash

Challenges with liquidity management

- Many agents experience liquidity management challenges due to the distance from rebalancing points
  - Some agents have to close shop when rebalancing, due to the distance travelled
  - Some agents swap liquidity across providers to serve their clients

Network and electricity outages

- Agents experience electricity losses on a daily basis
  - On average, agents have to go ~6 hours daily without electricity
- Network availability is also impacted by the electricity outages
- Many agents have to run a generator to maintain operations, which increases their costs

Source: Agent interviews, 2018

Deep-dive: Concerns over time to break even

Agents feel the capital needs of the business are high

- Agents report that holding a lot of capital provides a significant competitive edge over competitors
- The lack of capital is perceived by many agents to be the main obstacle to making additional profits
- “ In this business, the size of capital determines the profit you make. The higher the capital you operate with, the higher your profits ”

Earnings are perceived as relatively low

- Many agents complain about their low earnings from the DFS business
- “ I'm unable to pay my staff sometimes because there's no money”

Agents growing worried over high competition

- Many agents are worried about the growing competition between providers in their locality, which drains customers away from their shops
- On average, each agent has ~2 competing agents nearby
- Some agents prefer to choose their provider based on their competitor’s offering nearby
- “ This is why I prefer [Provider], they regulate the agent penetration in the area and tend not to have too many agents in a cluster/neighborhood ”

Source: Agent interviews, 2018

Deep-dive: Concerns over working capital management

Agents feel capital-constrained

- “ I lose a number of transactions because I don't have sufficient capital to match the current demand ”
- “ If I had more access to capital, I'll try to create more awareness in the community to deepen trust in DFS ”
- “ If I have more capital, I will make more profit […] If you have capital, you have everything ”
- “ Due to lack of capital. The loans I give out tend to eat into my capital which is insufficient in the first instance ”

Reliance of a secondary business’ cash flow is common

- “ It is only when I make dresses that I am comfortable as this is where I make the most profit and cover my expenses with this”
- “ I make more money from my other business which helps to cover my expenses ”
- “ My other business supports and pays for the bulk of running expenses ”

Source: Agent interviews, 2018

Deep-dive: Concerns over liquidity management

Rebalancing difficulties impact available liquidity

- Most agents report difficulties with rebalancing due to the distance (particularly in rural areas) and the high costs associated with it

> " Transportation costs and time spent to rebalance at the bank impact my profit levels "

> " During month end, have to travel as far as 100km to get cash "

> " I'm unable to provide large amounts of float, leading to a loss in earning at the end of the day "

Some agents refrain from keeping large sums in-shop

> " Due to security issues, I tend not to keep much cash in my shop "

> " Security risks increase with frequent cash withdrawals and higher withdrawal values "

Specific to agents conducting large transactions

Slow issue resolution drains available liquidity

> " Errors/mistakes… take months to resolve [so] salaries have to be paid out of pocket "

> " Over the last 4 months, I have about 600,000N stuck due to errors yet to be reversed "

Source: Agent interviews, 2018

Deep-dive: Concerns over electricity and network unreliability

Agents are at the mercy of network availability

- “ Overall, the business is profitable when the network is reliable ”
- “ When network on [Provider 1's] POS is unreliable, I have to use [Provider 2] as back-up. But the transactions and commissions on that are limited ”
- “ There was a time I borrowed from my brother and about 679,000N was stuck due to network unreliability ”
- “ I've had up to 500,000N stuck and yet to be recovered because of network unreliability ”

Agents have to cope with regular electricity cuts

- On average, agents face ~6 hours of power outages daily
- Most agents have to use a power generator to stay open, but costs of running and maintenance can be high

Some agents opt for power storage as a solution

- “I am not as impacted because the POS has battery; and keeps a power bank charged ”

Source: Agent interviews, 2018

Compendium Part 4 – Limits within Nigeria

Limits within Nigeria – Executive Summary

Agent viability is impacted by several exogenous factors tied to their geographic location

- Cellular network is a prerequisite; then needs to be situated where there is sufficient economic activity, decent power reliability, and proximity to bank / ATM rebalancing points

Shifting to the rural frontier, reduced economic activity and longer distances to banks/ATMs increasingly stress CICO economics for agents to point of unviability

51% of Nigeria's adult population today lives in agent-viable areas; covering 80% of population will require agent networks to extend much further into the frontier

- 71% of Nigeria's population is located 45 min from a bank / ATM; in order to reach 80%, agents would need to be able to serve customers up to 60 min away
- 65% of Nigeria's adult population lives in villages with more than 3,000 adults; to reach 80%, agents would need to serve villages with 500 adults

Current estimates are conservative and only take into account where people live, not where people regularly travel to

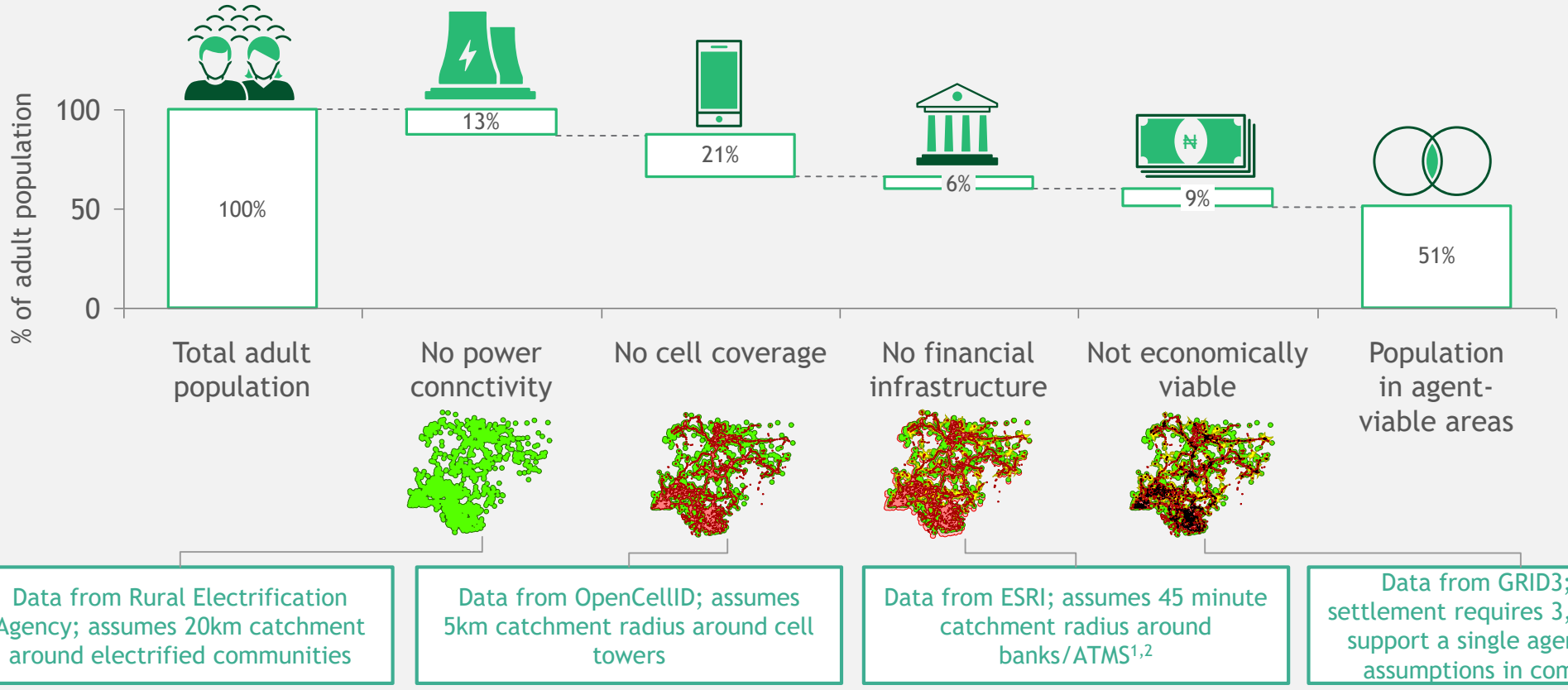
- Looking ahead, future models should look to more accurately identify locations of economic activity; reaching 80% of the population does not necessarily require an agent to be in every village

The limiting factors of an agent's viability are further stressed at the frontier

	Power connectivity	Cell connectivity	Financial infrastructure	Economic activity
At frontier…	Less connectivity to power grid; increased generator costs (fuel and maintenance)	Less connectivity to mobile network; a requirement to conduct mobile money transactions	Increased distance from banks/ATMs; higher rebalancing costs (both economic and operational)	Smaller populations, lower incomes, and decreased DFS penetration; lower revenue potential
% of total population…	87%	67%	71%	65%
	…with power connectivity[1]	…with 2G connectivity[2]	…with financial infrastructure[3]	…with min. economic activity[4]

Source: BCG analysis, 2018
1: Data from Rural Electrification Agency, assumes 20km catchment radius around electrified communities; 2: Data from OpenCellID, assumes 5km catchment radius around cell towers; 3: Data from ESRI, assumes 45 minutes catchment radius around banks/ATMS (agents located maximum of 30 minutes from bank + customer willingness to travel 15 minutes to agent location). Note: drive times from ESRI likely optimistic, actual road conditions may result in drive times much longer than estimated; 4: Data from GRID3, assumes settlement requires 3,000 adults to support a single agent (see appendix for full assumptions)

Existing agent model likely to reach 51% of Nigeria's adult population



Note: Values in waterfall show incremental percentage of population excluded with each additional filter.

E.g. 87% (100%-13%) of the adult population has power connectivity, while 66% (100%-13%-21%) of the total population has both power connectivity AND access to cell coverage

Interventions likely needed to increase desired reach for CICO agents

Source: BCG analysis, 2018
1: Assumed agents located maximum of 30 minutes from bank + customer willingness to travel 15 minutes to agent location
2: Drive times from ESRI likely optimistic, actual road conditions may result in drive times much longer than estimated

Further refinements needed to more accurately model economic activity

Current estimates are conservative

Populations are not static, and people at the frontier are likely to travel to economic "oases" on a regular basis

As a result, agents may not need to be located in every village

Identifying oasis locations critical to increasing reach effectively

Looking ahead…

To more accurately measure economic activity (and therefore expected txn volumes), future models should look to include:

- Methods of identifying oases (incl. locations of markets, cell towers, fueling stations, etc.)
- Measures of population income
- Updated DFS penetration assumptions
- Updated DFS usage assumptions

Compendium Part 4 - Appendix

Visualization - Power connectivity constraint

Power connectivity

Data sources

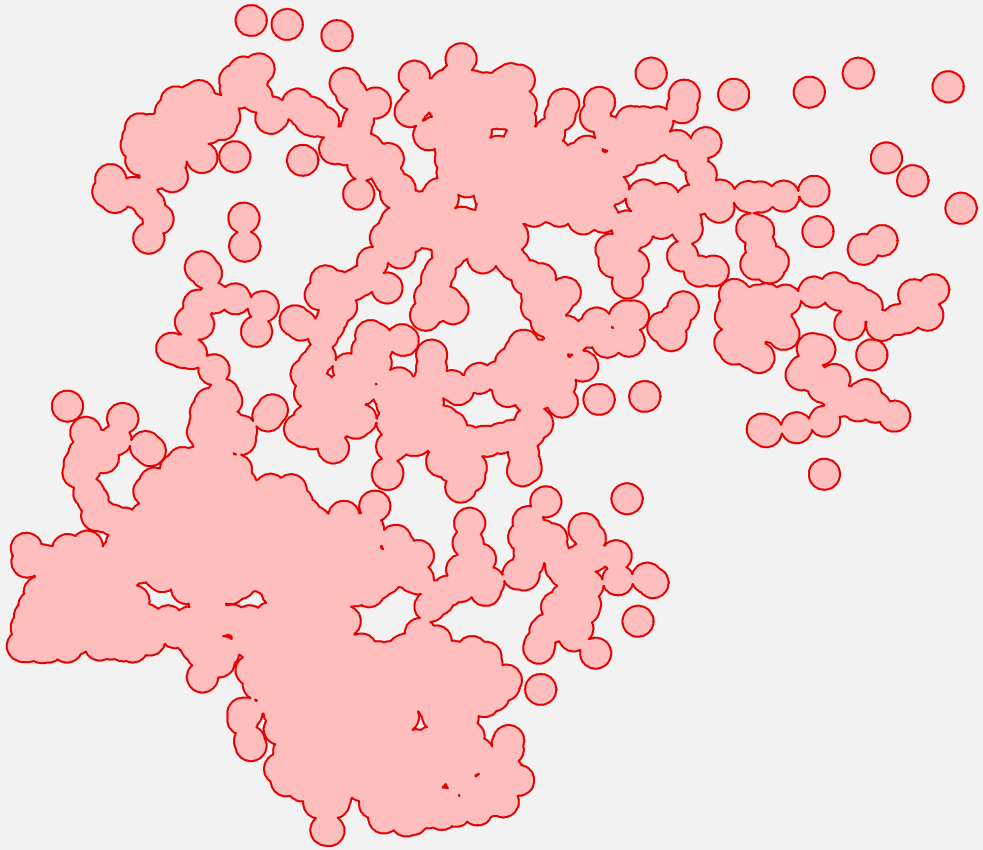
Electrified communities – Rural Electrification Agency

Assumptions

20km catchment range around an electrified community

Improvements to consider

- Verify electrification and factor in reliability



% of total population...

87%

...with power connectivity

Source: BCG analysis, 2018

Visualization - Cell connectivity constraint

Cell connectivity

Data sources

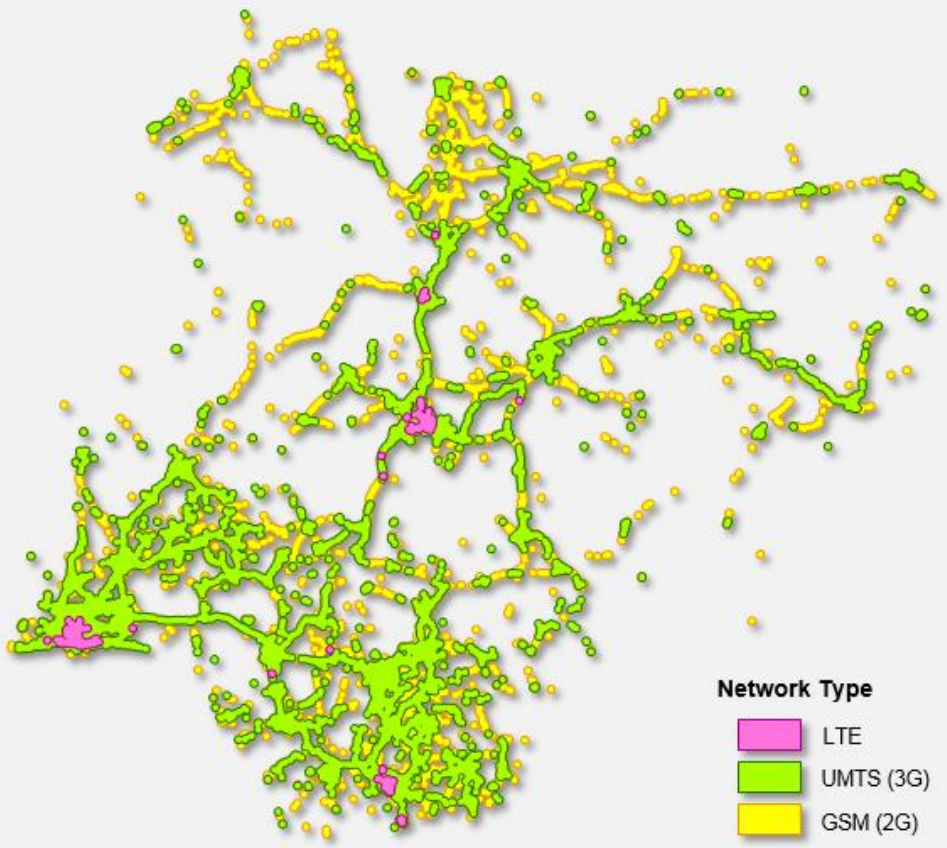
Cell tower locations - OpenCellID

Assumptions

5km catchment range around a cell tower location

Improvements to consider

- Update analysis using datasets from GSMA (mobile coverage map from Connected Society team)



% of total population…

67%

…with 2G connectivity

59%

…with 3G connectivity

7%

…with LTE connectivity

Source: BCG analysis, 2018

Visualization - Financial infrastructure constraint

Financial infrastructure

Data sources

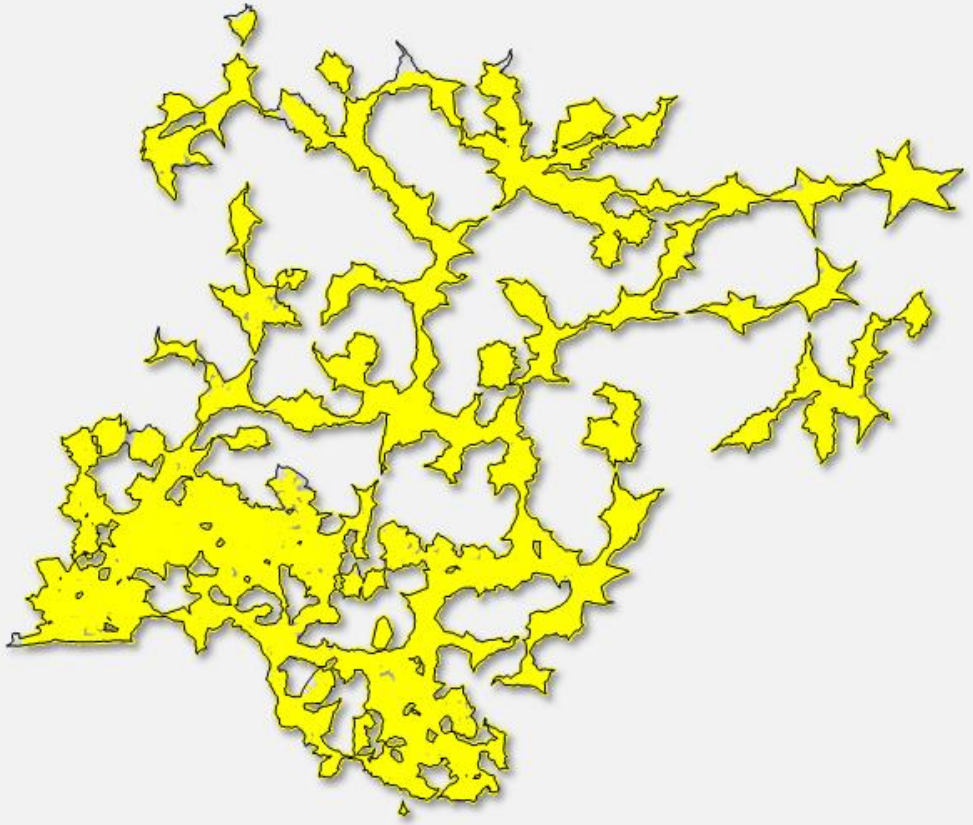
Bank locations – CBN
ATM locations – ESRI Street Map

Assumptions

Under current business model, providers place agents within 30min of an existing bank/ATM; Customers are willing to travel 15min to visit an agent

Improvements to consider

- Explore whether additional data is available on bank branch locations (e.g. from CBN) or ATMs (e.g. from Interswitch)



% of total population…

71%

…with financial infrastructure

Source: BCG analysis, 2018

Backup: To reach ~80% inclusion, agents must be able to service people up to 60 min away from a bank/ATM

Drive time	Cumulative share of adult population (%)
5 minutes	21%
15 minutes	43%
30 minutes	60%
45 minutes	71%
60 minutes	79%

Current viability assumption

Financial inclusion target

Source: BCG analysis, 2018

Visualization - Economic activity constraint

Economic activity

Data sources

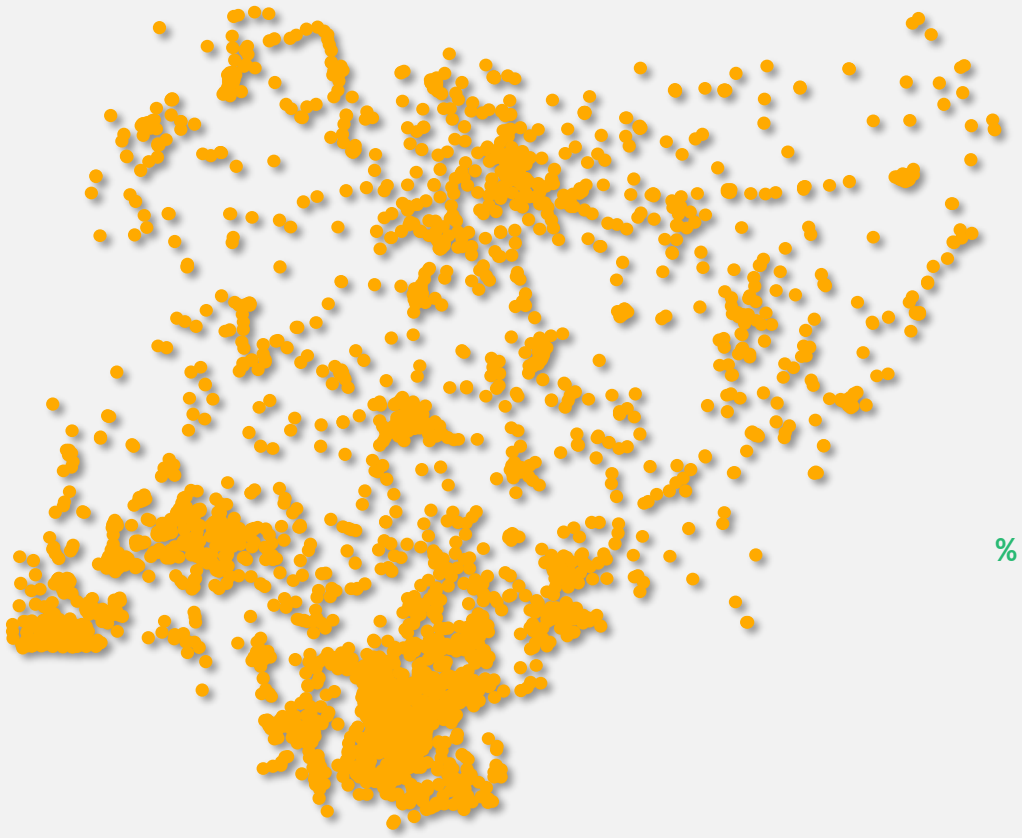
Population data – GRID3 (Sep '18)

Assumptions

Community must have >3,000 adults to support an agent (see next slide for details)

Improvements to consider

- Refresh population data with latest GRID3 updates
- Include measures of income, and updated assumptions on DFS penetration and usage
- Identify rural oases to account for where people transact business



% of total population…

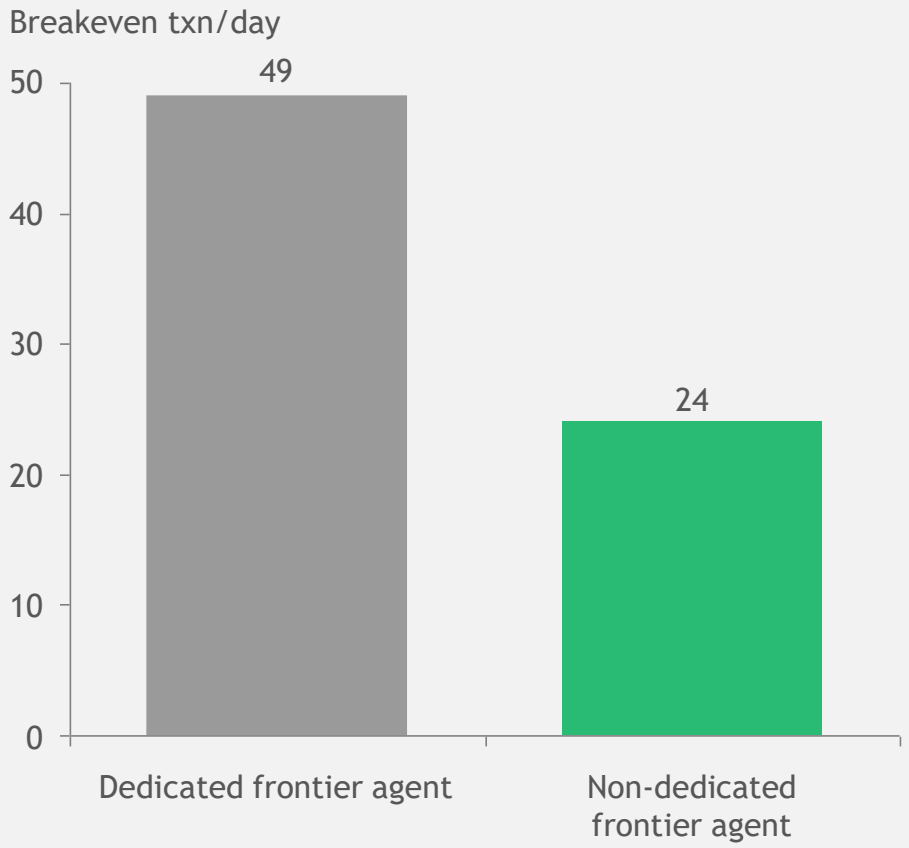
65%

…with min. economic activity

Source: BCG analysis, 2018

Backup: Current economic activity threshold (>3,000 adults) based off of agent interviews

Recall: Estimated 24 txn/day for a frontier agent to breakeven



Assuming that…

- **1 agent** in entire geography (no competition)
- **10% DFS penetration**
- **2.5 txn/customer/month** per provider interviews and IFC/MasterCard Foundation study benchmarks

Population size (adults)	DFS customers	Monthly txns/ agent	Daily txns/ agent
3,000	~300	~750	~25

Min. population of 3,000 adults to support a DFS agent

Source: Agent interviews, 2018; BCG analysis, 2018

Backup: Agents would need to reach communities of ~500 adults in order to cover 80% of the population

Population segment	Share of adult population (%)	Cumulative share of adult population (%)
>10,000	47%	47%
8,000 – 9,999	4%	51%
6,000 – 7,999	5%	56%
4,000 – 5,999	5%	62%
2,000 – 3,999	8%	69%
1,000 – 1,999	6%	75%
500 - 999	5%	81%
200 – 499	6%	87%
<200	13%	100%

Current viability assumption

Financial inclusion target

Source: BCG analysis, 2018

Backup: Potential updates to geospatial analysis data

Power connectivity

- Verify electrification and factor in reliability

Financial infrastructure

- Explore whether additional data is available on bank branch locations (e.g. from CBN) or ATMs (e.g. from Interswitch)

Cell connectivity

- Update analysis using datasets from GSMA (mobile coverage map from Connected Society team)

Economic activity

- Refresh population data with latest GRID3 updates
- Include measures of income, and updated assumptions on DFS penetration and usage
- Identify rural oases to account for where people transact business

Compendium Part 5 – Interventions

Interventions – Executive Summary

Recall: Geospatial mapping suggests limits to CICO economics within Nigeria

Addressing drivers of viability – *therefore unviability* – is critical to accelerate expansion and/or extend reach

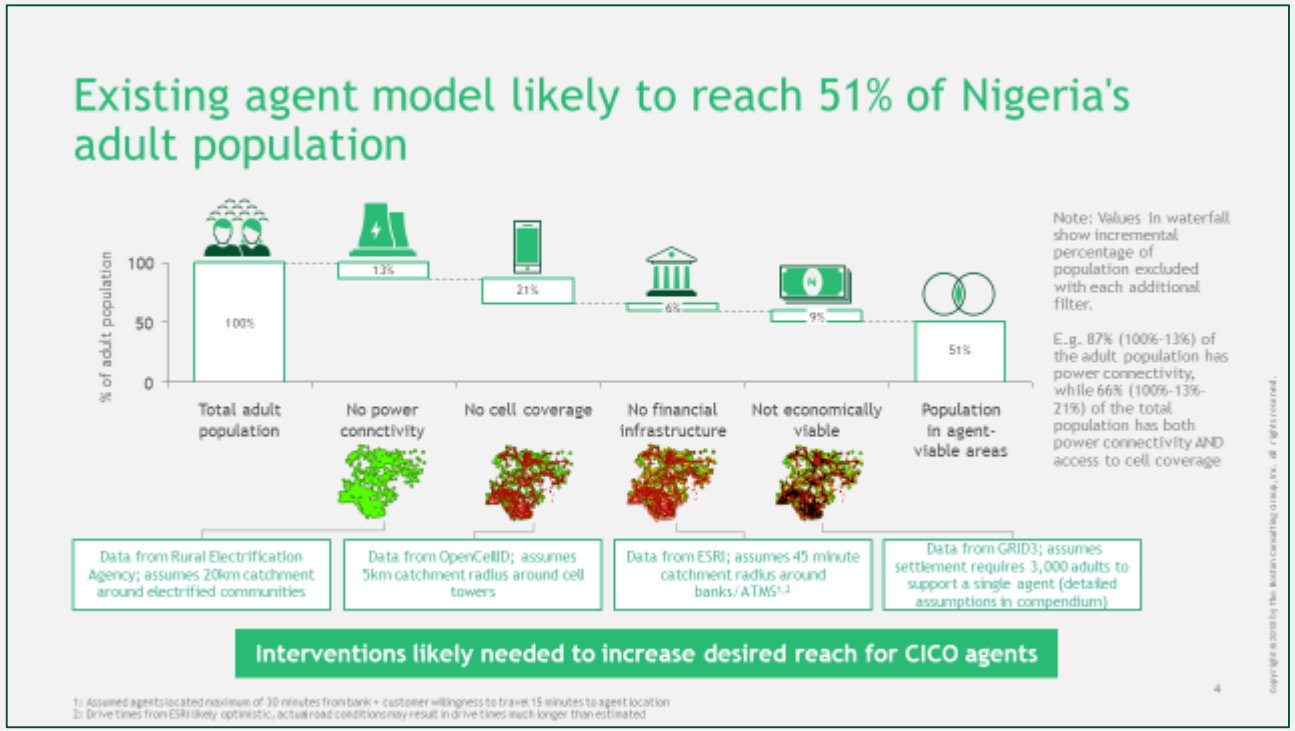
Mitigating threats to agent viability in the rural frontier will require addressing low transaction volumes and high liquidity management costs

- Levers such as digitizing G2P or offering subsidies could help mitigate low transaction volumes, enabling agent viability in smaller villages. If agents can become viable in areas with 500 adults, reach extends to 81% of population
- Float runners help agents by eliminating their liquidity management costs; however, initial expectation would be that providers bear this expense, and they already face stressed economics at the frontier

<u>Above is preliminary thinking only</u> – further efforts, including stakeholder engagement and follow-up analysis, is required to develop deeper understanding of each intervention

- For instance, market-based pricing has ramifications on consumer protection, etc. and further discussion, design, and analysis is required
- Interventions also carry risk of unintended consequences, e.g. increased transaction volumes may lead to higher liquidity management costs

Recall: Geospatial mapping suggests limits to CICO economics within Nigeria



Mapping indicates 51% of adult population lives in current agent-viable areas

In order to cover 80% of the adult population, interventions are likely needed to increase reach of CICO agents

Source: BCG analysis, 2018

Several potential interventions possible to address agent drivers of viability / unviability at the frontier

	Power reliability	Transaction volumes	Financial infrastructure	Cell infrastructure	Fraud and theft
Constraint	Driver of agent economics that impacts all agents, regardless of geo	Agent economics stressed to point of unviability at the frontier by these drivers		No direct economic impact, but necessary condition for viability	Not investigated as a part of this report
Description	• Unreliable connectivity to power grid is consistent across geographies (urban, peri-urban, and rural) • Agents often cope by spending money on generators	• Most recurring costs are fixed, so agent profitability highly dependent on txn volumes • At the frontier, est. txn volume (<10/day) falls below expected breakeven threshold (~24/day)	• Liquidity management costs are higher for rural vs. urban agents • Because of limited bank/ATM presence, liquidity management costs at the frontier expected to be ~13-50% higher than those at a rural oasis	• Without cell infrastructure, agents are unable to operate	• Current agents do not appear to have high theft costs, but qualitative interviews suggests this may be a factor at the frontier

Particularly relevant at frontier

Following section does a double-click on transaction volume and financial infrastructure to explore how these exogenous factors impact limits to reach in Nigeria

Interventions can allow agents to be viable in more challenged locations, leading to an increase in reach

Agents must be able to reach settlements of ~500 adults in order to cover ~80% of the adult population

Population segment	Share of adult population (%)	Cumulative share of adult population (%)
>10,000	47%	47%
8,000 – 9,999	4%	51%
6,000 – 7,999	5%	56%
4,000 – 5,999	5%	62%
2,000 – 3,999	8%	69%
1,000 – 1,999	6%	75%
500 - 999	5%	81%

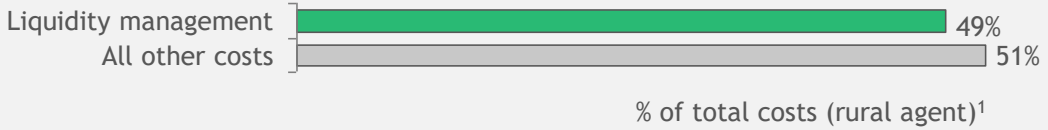
To improve agent viability, consider interventions to address low revenues and high operating costs

Low revenue potential a factor of…

	Potential improvement levers
Low population sizes	• Critical, but taken as a given
Low DFS penetration	• Customer education • Marketing • Bank account registrations • Technology reliability
Low transaction frequency	• Digitizing G2P payments • Creating products with human-centered design

Other potential levers: Offering recurring monthly subsidies, increasing average transaction size, increasing agent commissions

Liquidity management the most significant cost driver…



However, cost of float runners must be borne by provider (or subsidized by a 3rd party, e.g. government or NGO)

Source: Population data from GRID3
1: Avg cost structure of rural agent in sample; includes dedicated and non-dedicated agents; costs of rent, utilities, generator, and maintenance excluded for non-dedicated agents

Revenue-side interventions

Agents must be able to reach settlements of ~500 adults in order to cover ~80% of the adult population

Population segment	Share of adult population (%)	Cumulative share of adult population (%)
>10,000	47%	47%
8,000 – 9,999	4%	51%
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Other potential levers: Offering recurring monthly subsidies, increasing average transaction size, increasing agent commissions

Liquidity management the most significant cost driver…

However, cost of float runners must be borne by provider (or subsidized by a 3rd party, e.g. government or NGO)

Population data from GRID3
1: Avg cost structure of rural agent in sample; includes dedicated and non-dedicated agents; costs of rent, utilities, generator, and maintenance excluded for non-dedicated agents

For a given village, several potential levers to increase agent revenue

Illustrative case study: For a village with 500 adults…

Assumptions

Population size = 500 adults

Avg recurring cost = ₦51.2K per month[1]

Avg revenue per transaction = ₦72 per transaction[2]

Transaction frequency (per person, per month)	Agent profit per month: DFS penetration (% of adult population)	10%	12%	14%	16%	18%	20%
	1	-₦47.6K	-₦46.9K	-₦46.1K	-₦45.4K	-₦44.7K	-₦44.0K
	2	-₦44.0K	-₦42.5K	-₦41.1K	-₦39.6K	-₦38.2K	-₦36.8K
	3	-₦40.4K	-₦38.2K	-₦36.0K	-₦33.9K	-₦31.7K	-₦29.6K
	4	-₦36.8K	-₦33.9K	-₦31.0K	-₦28.1K	-₦25.2K	-₦22.4K
	5	-₦33.2K	-₦29.6K	-₦26.0K	-₦22.4K	-₦18.7K	-₦15.1K
	6	-₦29.6K	-₦25.2K	-₦20.9K	-₦16.6K	-₦12.3K	-₦7.9K
	7	-₦26.0K	-₦20.9K	-₦15.9K	-₦10.8K	-₦5.8K	-₦0.7K
	8	-₦22.4K	-₦16.6K	-₦10.8K	-₦5.1K	₦0.7K	₦6.5K
	9	-₦18.7K	-₦12.3K	-₦5.8K	₦0.7K	₦7.2K	₦13.7K
	10	-₦15.1K	-₦7.9K	-₦0.7K	₦6.5K	₦13.7K	₦20.9K

Potential levers to increase DFS penetration

- Increased customer education
- Increased marketing
- Increased bank account registrations
- Increased technology reliability

Potential levers to increase transaction frequency

- Digitizing G2P payments
- Creating products through human-centered design

Other levers to address low revenues

- Offering recurring monthly subsidies
- Increasing average transaction size

1: Avg recurring cost of a rural, non-dedicated agent (from agent interviews)
2: Avg revenue per transaction for an agent in sample (from agent interviews)

Ex: By increasing transaction frequency, agent viability now possible in smaller village size, expanding reach

Assumptions

Avg recurring cost = ₦51.2K per month[1]

Avg revenue per transaction = ₦72 per transaction[2]

DFS penetration = 10% (assumption for the sake of analysis)

Agent profit per month

Transaction frequency (per person, per month)	Population size (adults) 500	1000	2000	3000	4000	5000
1	-₦47.6K	-₦44.0K	-₦36.8K	-₦29.6K	-₦22.4K	-₦15.1K
2	-₦44.0K	-₦36.8K	-₦22.4K	-₦7.9K	₦6.5K	₦20.9K
3	-₦40.4K	-₦29.6K	-₦7.9K	₦13.7K	₦35.3K	₦56.9K
4	-₦36.8K	-₦22.4K	₦6.5K	₦35.3K	₦64.1K	₦92.9K
5	-₦33.2K	-₦15.1K	₦20.9K	₦56.9K	₦92.9K	₦129.0K
6	-₦29.6K	-₦7.9K	₦35.3K	₦78.5K	₦121.8K	₦165.0K
7	-₦26.0K	-₦0.7K	₦49.7K	₦100.2K	₦150.6K	₦201.0K
8	-₦22.4K	₦6.5K	₦64.1K	₦121.8K	₦179.4K	₦237.1K
9	-₦18.7K	₦13.7K	₦78.5K	₦143.4K	₦208.2K	₦273.1K
10	-₦15.1K	₦20.9K	₦92.9K	₦165.0K	₦237.1K	₦309.1K

Assuming 10% DFS penetration…

- If customers average 2 transactions/ month, agents are only viable in villages of 4,000+ adults
- However, if transaction frequency doubles to 4 transactions/ month, agents are now viable in villages of 2,000+ adults…
- …increasing reach from ~62% → ~69% of population[3]

Population segment	Share of adult population (%)	Cumulative share of adult population (%)
>10,000	47%	47%
8,000 - 9,999	4%	51%
6,000 - 7,999	5%	56%
4,000 - 5,999	5%	62%
2,000 - 3,999	8%	69%
1,000 - 1,999	6%	75%
500 - 999	5%	81%

1: Avg recurring cost of a rural, non-dedicated agent (from agent interviews)
2: Avg revenue per transaction for an agent in sample (from agent interviews)
3: From geospatial analysis using GRID3 data

Cost-side interventions

Agents must be able to reach settlements of ~500 adults in order to cover ~80% of the adult population

Population segment	Share of adult population (%)	Cumulative share of adult population (%)
>10,000	47%	47%
8,000 – 9,999	4%	51%
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500 - 999	5%	81%

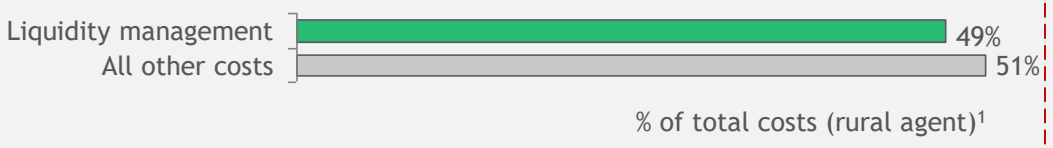
To improve agent viability, consider interventions to address low revenues and high operating costs

Low revenue potential a factor of…

	Potential improvement levers
Low population sizes	• Critical, but taken as a given
Low DFS penetration	• Customer education • Marketing • Bank account registrations • Technology reliability
Low transaction frequency	• Digitizing G2P payments • Creating products with human-centered design

Other potential levers: Offering recurring monthly subsidies, increasing average transaction size, increasing agent commissions

Liquidity management the most significant cost driver…



However, cost of float runners must be borne by provider (or subsidized by a 3rd party, e.g. government or NGO)

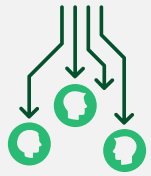
Population data from GRID3
1: Avg cost structure of rural agent in sample; includes dedicated and non-dedicated agents; costs of rent, utilities, generator, and maintenance excluded for non-dedicated agents

Global comparison

In Nigeria today, FSPs rarely provide liquidity management support to agents

Typical model in **Nigeria**

Typical model in **Bangladesh**



	No provider support	Some provider support (master agent/distributors)	Full provider support (float runners)
Description	Minimal provider support (no cost to provider) Agents must travel to nearest Bank/ATM in order to rebalance	Provider establishes official "master agents" or partnerships with retail companies (e.g. fueling stations) that agents can visit to rebalance; reduces distance needed for agents to rebalance	High provider support (high cost to provider) Provider hires (or contracts) float runners, which visit agents on a regular basis to deliver cash/float; eliminates need to travel for rebalancing
At frontier...	Unreliable as distance to re-balancing points increases, providers risk losing network credibility	Frequency of visits likely lower in remote areas, intermediaries tend to provide more support to more productive agents	Single runner can service fewer agents and faces higher travel cost

Deep-dive

Source: BCG, Global Study of Cash-in / Cash-out Economics, 2018

Float runners could improve frontier agent viability by reducing operating costs by ~50%

Illustrative case study: For a village with 500 adults…

Agent viability (no provider support)

Assumptions

Avg recurring cost = ₦51.2K per month[1]
Avg revenue per transaction = ₦72 per transaction[2]
Population size = 500 adults

Transaction volume (per person, per month)	Agent profit per month: DFS penetration (% of adult population)	10%	12%	14%	16%	18%	20%
	1	-₦47.6K	-₦46.9K	-₦46.1K	-₦45.4K	-₦44.7K	-₦44.0K
	2	-₦44.0K	-₦42.5K	-₦41.1K	-₦39.6K	-₦38.2K	-₦36.8K
	3	-₦40.4K	-₦38.2K	-₦36.0K	-₦33.9K	-₦31.7K	-₦29.6K
	4	-₦36.8K	-₦33.9K	-₦31.0K	-₦28.1K	-₦25.2K	-₦22.4K
	5	-₦33.2K	-₦29.6K	-₦26.0K	-₦22.4K	-₦18.7K	-₦15.1K
	6	-₦29.6K	-₦25.2K	-₦20.9K	-₦16.6K	-₦12.3K	-₦7.9K
	7	-₦26.0K	-₦20.9K	-₦15.9K	-₦10.8K	-₦5.8K	-₦0.7K
	8	-₦22.4K	-₦16.6K	-₦10.8K	-₦5.1K	₦0.7K	₦6.5K
	9	-₦18.7K	-₦12.3K	-₦5.8K	₦0.7K	₦7.2K	₦13.7K
	10	-₦15.1K	-₦7.9K	-₦0.7K	₦6.5K	₦13.7K	₦20.9K

Agent viability (float runners)

Assumptions

Avg recurring cost = ₦26.3K per month[3] (removed cost of liq. management)
Avg revenue per transaction = ₦72 per transaction[2]
Population size = 500 adults

Transaction volume (per person, per month)	Agent profit per month: DFS penetration (% of adult population)	10%	12%	14%	16%	18%	20%
	1	-₦22.7K	-₦22.0K	-₦21.3K	-₦20.6K	-₦19.9K	-₦19.1K
	2	-₦19.1K	-₦17.7K	-₦16.3K	-₦14.8K	-₦13.4K	-₦11.9K
	3	-₦15.5K	-₦13.4K	-₦11.2K	-₦9.1K	-₦6.9K	-₦4.7K
	4	-₦11.9K	-₦9.1K	-₦6.2K	-₦3.3K	-₦0.4K	₦2.5K
	5	-₦8.3K	-₦4.7K	-₦1.1K	₦2.5K	₦6.1K	₦9.7K
	6	-₦4.7K	-₦0.4K	₦3.9K	₦8.2K	₦12.6K	₦16.9K
	7	-₦1.1K	₦3.9K	₦9.0K	₦14.0K	₦19.1K	₦24.1K
	8	₦2.5K	₦8.2K	₦14.0K	₦19.8K	₦25.5K	₦31.3K
	9	₦6.1K	₦12.6K	₦19.1K	₦25.5K	₦32.0K	₦38.5K
	10	₦9.7K	₦16.9K	₦24.1K	₦31.3K	₦38.5K	₦45.7K

However, cost of float runners must be borne by provider (or subsidized by a 3rd party, e.g. government or NGO)

1: Avg recurring cost of a rural, non-dedicated agent (from agent interviews)
2: Avg revenue per transaction for an agent in sample (from agent interviews)
3: Liquidity management costs make up ~49% of a rural agents total costs (from agent interviews)

By reducing liquidity mgmt costs, agent viability now possible in smaller village size, expanding reach

Agent viability (no provider support)

Assumptions

Avg recurring cost = ₦51.2K per month[1]
Avg revenue per transaction = ₦72 per transaction[2]
DFS penetration = 10% (assumption for the sake of analysis)

Agent profit per month		Population size (adults)					
		500	1000	2000	3000	4000	5000
Transaction volume (per person, per month)	1	-₦47.6K	-₦44.0K	-₦36.8K	-₦29.6K	-₦22.4K	-₦15.1K
	2	-₦44.0K	-₦36.8K	-₦22.4K	-₦7.9K	₦6.5K	₦20.9K
	3	-₦40.4K	-₦29.6K	-₦7.9K	₦13.7K	₦35.3K	₦56.9K
	4	-₦36.8K	-₦22.4K	₦6.5K	₦35.3K	₦64.1K	₦92.9K
	5	-₦33.2K	-₦15.1K	₦20.9K	₦56.9K	₦92.9K	₦129.0K
	6	-₦29.6K	-₦7.9K	₦35.3K	₦78.5K	₦121.8K	₦165.0K
	7	-₦26.0K	-₦0.7K	₦49.7K	₦100.2K	₦150.6K	₦201.0K
	8	-₦22.4K	₦6.5K	₦64.1K	₦121.8K	₦179.4K	₦237.1K
	9	-₦18.7K	₦13.7K	₦78.5K	₦143.4K	₦208.2K	₦273.1K
	10	-₦15.1K	₦20.9K	₦92.9K	₦165.0K	₦237.1K	₦309.1K

Agent viability (float runners)

Assumptions

Avg recurring cost = ₦26.3K per month[3] (removed cost of liq. management)
Avg revenue per transaction = ₦72 per transaction[2]
DFS penetration = 10% (assumption for the sake of analysis)

Agent profit per month		Population size (adults)					
		500	1000	2000	3000	4000	5000
Transaction volume (per person, per month)	1	-₦22.7K	-₦19.1K	-₦11.9K	-₦4.7K	₦2.5K	₦9.7K
	2	-₦19.1K	-₦11.9K	₦2.5K	₦16.9K	₦31.3K	₦45.7K
	3	-₦15.5K	-₦4.7K	₦16.9K	₦38.5K	₦60.1K	₦81.7K
	4	-₦11.9K	₦2.5K	₦31.3K	₦60.1K	₦88.9K	₦117.8K
	5	-₦8.3K	₦9.7K	₦45.7K	₦81.7K	₦117.8K	₦153.8K
	6	-₦4.7K	₦16.9K	₦60.1K	₦103.4K	₦146.6K	₦189.8K
	7	-₦1.1K	₦24.1K	₦74.5K	₦125.0K	₦175.4K	₦225.9K
	8	₦2.5K	₦31.3K	₦88.9K	₦146.6K	₦204.2K	₦261.9K
	9	₦6.1K	₦38.5K	₦103.4K	₦168.2K	₦233.1K	₦297.9K
	10	₦9.7K	₦45.7K	₦117.8K	₦189.8K	₦261.9K	₦334.0K

1: Avg recurring cost of a rural, non-dedicated agent (from agent interviews)
2: Avg revenue per transaction for an agent in sample (from agent interviews)
3: From geospatial analysis using GRID3 data

While potential interventions come to mind, more action needed to explore further

While key drivers of agent viability suggests potential interventions

…several economic and operational factors to consider

Low txn volumes a significant economic driver for frontier agents. Digitizing G2P suggests win-win way to stimulate demand and provide distribution channel for government programs	• How will agents manage increased liq. mgmt needs from G2P payments? • How to ensure this does not become a month-end mass "cash-out" of system (not building DFS ecosystem)?
Extra fees also instrumental to agent profitability, driving ~22% of margin on avg (and viability in some agents); Suggests consideration of fee caps required	• How to ensure consumer protection esp. of the most poor and vulnerable? • Is the agent the right point to set market-based pricing, or the provider?
Liquidity management costs are significant – highest of recurring cost items and increasing in frontier, suggesting float runners could have significant impact	• Can float runner model be operational in Nigeria? (sig. less financial infrastructure relative to Bangladesh) • With provider margins stressed at frontier, who would pay for service?

Deep-dive analysis required, as well as stakeholder engagement

Critical to also understand any unintended consequences and how interventions can interact positively or negatively with one another

***Examples only** – not comprehensive list of drivers, interventions or implications*

Global comparison

Example: Hurdles to float runner adoption

Why Bangladesh?

Population density
Bangladesh is one of the 10 most densely populated countries in the world, lowering the initial barrier to invest in float runners

- 14.5x more dense than Kenya, 19.5x more than Tanzania, and 2.8x more dense than India

Market dynamics
Once bKash chose to provide float runners, other providers faced pressure to do so to compete for agents and market share

Exogenous factors (Interoperability and float model)
Agents cannot transfer float between providers which increased initial demand for float runners to rebalance

Why not elsewhere?

Provider investment
Float runners are a large upfront investment for providers and the benefits are indirect and may be difficult to measure

- Agent satisfaction / profitability, customer experience, reduced transaction denial rates

Informal solutions
In other geographies, super agents have begun to fill the float runner role, but will likely only do so in the most advantageous environments (e.g., for high performing agents)

Exogenous factors (Theft)
In many countries (esp. in East Africa) risk of theft is a meaningful deterrent from transporting large sums of cash; need for more secure cash in transit solutions and higher insurance requirements would significantly drive up the cost versus the "cash in a backpack" model in Bangladesh

Source: BCG, Global Study of Cash-in / Cash-out Economics, 2018

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