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# AFFORDABLE DEVICES FOR ALL

INNOVATIVE FINANCING  
SOLUTIONS AND  
POLICY OPTIONS  
TO BRIDGE GLOBAL  
DIGITAL DIVIDES

*Rami Amin and Doyle Gallegos*



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# Abbreviations

<b>ADB</b>	Asian Development Bank
<b>BBVA</b>	Banco Bilbao Vizcaya Argentaria
<b>BNPL</b>	buy now, pay later
<b>BOM</b>	bill of materials
<b>BVN</b>	bank verification number
<b>C&amp;F</b>	cost and freight
<b>CATI</b>	computer-assisted telephone interviewing
<b>CBU</b>	completely built units
<b>CDC</b>	Central Depository Company of Pakistan Limited
<b>CGAP</b>	Consultative Group to Assist the Poor
<b>CIF</b>	cost, insurance, and freight
<b>CKD</b>	completely knocked down
<b>CM</b>	contract manufacturer
<b>CRC</b>	Communications Regulatory Commission of Colombia
<b>DIRBS</b>	Device Identification Registration and Blocking System (Pakistan)
<b>DLC</b>	device lock controller
<b>EMI</b>	e-money issuer
<b>FIU</b>	Financial Intelligence Unit
<b>FLCG</b>	first-loss credit guarantees
<b>FOB</b>	free on board
<b>GSMA</b>	GSM Association
<b>GST</b>	general sales taxes
<b>ICT</b>	information and communications technologies
<b>IFC</b>	International Finance Corporation
<b>IFI</b>	international financial institution
<b>IMF</b>	International Monetary Fund
<b>Indotel</b>	Dominican Institute of Telecommunications
<b>IoT</b>	internet of things
<b>KYC</b>	know your customer

<b>LDC</b>	least developed countries
<b>LoC</b>	letters of credit
<b>MCF</b>	Medical Credit Fund
<b>MCMC</b>	Malaysian Communications and Multimedia Commission
<b>MDM</b>	Mobile device manufacturing
<b>MFB</b>	microfinance bank
<b>MFI</b>	microfinance institution
<b>MNO</b>	mobile network operator
<b>NBFI</b>	non-bank financial institution
<b>NGO</b>	nongovernmental organization
<b>NOC</b>	network operations center
<b>ODM</b>	original design manufacturer
<b>OEM</b>	original equipment manufacturer
<b>OS</b>	operating system
<b>PCG</b>	partial credit guarantee
<b>PPP</b>	public-private partnership
<b>PRG</b>	partial risk guarantee
<b>PTA</b>	Pakistan Telecommunications Authority
<b>R&amp;D</b>	research and development
<b>RD</b>	regulatory duty
<b>SBP</b>	State Bank of Pakistan
<b>SEP</b>	standard essential patents
<b>SKD</b>	semi knocked down
<b>SMIC</b>	Semiconductor Manufacturing International Corporation
<b>TSMC</b>	Taiwan Semiconductor Manufacturing Company
<b>USAF</b>	universal service and access fund
<b>UVT</b>	tax unit values (Colombia)
<b>VAT</b>	value added tax
<b>WTO</b>	World Trade Organization



# Executive Summary

Nearly 2.7 billion people globally are still offline and not using the internet.<sup>1</sup> The majority (94 percent) of unconnected individuals live in low- and middle-income countries, where the cost of internet-enabled mobile devices remains a key connectivity barrier.<sup>2</sup> This report aims to guide the efforts of policy makers and international financial institutions (IFIs) in promoting affordable mobile device ownership and increasing adoption and usage of broadband services, with a focus on these low-income individuals in developing countries often overlooked by previous research.

The report examines the key themes and drivers of costs in the supply and demand for Internet-enabled mobile devices. These themes and cost drivers are then applied to assess four country cases, namely Colombia, Nigeria, Pakistan, and Rwanda (collectively referred to as the “target countries”), focusing specifically on low-income individuals within these markets. The supply and demand analysis identifies determinants of smartphone pricing and factors that impact users’ ability to pay, willingness to pay, and access to credit.

The report also reviews various financing schemes and opportunities for private capital mobilization that could make it possible for low-income individuals to access a smartphone. Finally, the study presents policy recommendations to provide governments and IFIs involved in designing financing programs for smartphone ownership with tools to incorporate and apply the findings of this report.

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1 ITU. 2022. “Measuring Digital Development: Facts and Figures 2022.” <https://www.itu.int/itu-d/reports/statistics/facts-figures-2022/>

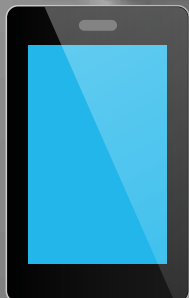
2 GSMA. 2022. “The State of Mobile Internet Connectivity 2022.” p. 5 (October 2022). [https://www.gsma.com/r/wp-content/uploads/2022/10/The-State-of-Mobile-Internet-Connectivity-Report-2022.pdf?utm\\_source=website&utm\\_medium=download-button&utm\\_campaign=somic22](https://www.gsma.com/r/wp-content/uploads/2022/10/The-State-of-Mobile-Internet-Connectivity-Report-2022.pdf?utm_source=website&utm_medium=download-button&utm_campaign=somic22).

## Types of devices covered in this report

This report focuses on entry-level internet-enabled devices which are the most affordable handsets available on the market that offer consumers sufficient capabilities to access meaningful Internet connectivity.<sup>3</sup> For purposes of this report, such devices are defined as low-cost handsets, below the US\$50 retail price<sup>4</sup> threshold, that allow users to obtain internet access and downloadable apps from a universal app store. Two types of devices meet this definition: (i) smart feature phones, and (ii) new or pre-owned low-cost smartphones. This report refers to these devices as “entry-level devices.”



Smart feature phones are a 4G-enabled hybrid of feature phones and smartphones. They look and feel like basic feature phones, have a small screen, and enable access via a 12-button keypad, not a touch screen. However, unlike basic feature phones, smart feature phones connect to the internet and offer access to applications from the KaiOS store (about 500 apps)<sup>5</sup> Overall, these hybrid devices have lower cost structures than entry-level smartphones and are available in the market at lower price points to target lower-income customer segments, particularly in low- and middle-income markets.



Low-cost smartphones have larger touch screens to enable advanced access to internet services and apps. These handsets have the functionalities of higher-end smartphone models, but optimize technical specifications, components, and materials to lower costs, including operating system (OS), memory, batteries, and cameras. These devices can access a large ecosystem of applications predominantly from the Google Play Store,<sup>6</sup> as well as from application stores such as Aptoid or SlideMe.

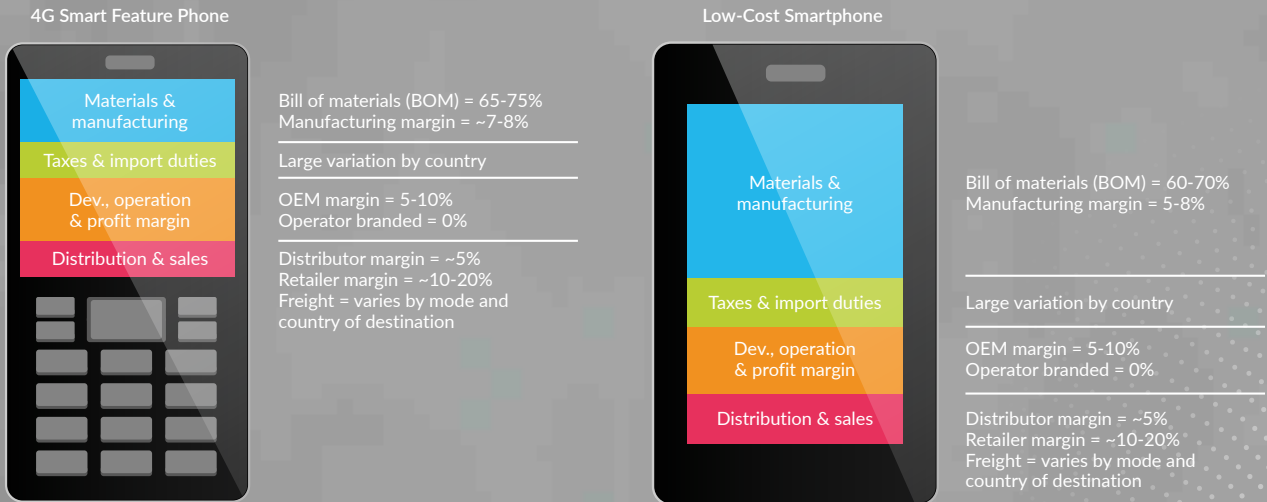
- 
- 3 Meaningful internet connectivity is understood as the possibility for everyone to enjoy a safe, satisfying, enriching, productive, and affordable online experience. See International Telecommunication Union, Aspirational targets for 2030., <https://www.itu.int/itu-d/meetings/statistics/umc2030/#:~:text=Achieving%20universal%20and%20meaningful%20digital%20connectivity%20%E2%80%94the%20possibility%20for%20everyone,meeting%20the%20Sustainable%20Development%20Goals.>
  - 4 Retail price refers to the price an entry-level device is offered to a consumer via a retailer.
  - 5 See <https://www.kaiotech.com/help-center/download-apps-kaios/#:~:text=You%20can%20download%20apps%20from,full%20list%20of%20KaiStore%20apps.>
  - 6 Over 3.55 million applications were available as of October 2022. See Statista, Google Play: number of available apps as of Q3 2022. <https://www.statista.com/statistics/289418/number-of-available-apps-in-the-google-play-store-quarter/#:~:text=Between%20the%20beginning%20of%202019,the%20last%20quarter%20of%202021.>



# Supply-side analysis

Four key components determine the price of a new entry-level device: (i) taxes and import duties; (ii) distribution and sales; (iii) materials and manufacturing; and (iv) development, operation, and profit margins (Figure ES.1).

Figure ES.1. Cost structure of new entry-level devices



Source: TMG/A4AI, 2023.

The results of the research indicate that in many countries considerable supply-side cost savings for entry-level devices may be attainable via reductions in taxes and import duties. Combined, import duties and other national taxes, such as sales tax or value added tax (VAT), can represent close to 30–40 percent of the consumer’s total device cost.

In addition, opportunities still exist to lower the typical cost structure of the distribution and sales component of the value chain. Just-in-time sourcing can reduce the costs of importation, warehousing, and shipping. To achieve large volumes of entry-level device sales, a compelling value proposition for end users

will be critical to increase efficiencies in distribution and sales, allowing for lower sales margins. Overall, optimization of the import, shipping, distribution, and sales of devices may reduce this cost component by 30–40 percent from typical levels—down from about 20 percent of total costs to around 12–14 percent of total cost. These strategies must consider the structure of the retail device sales market to recruit and leverage key players to assist in achieving affordability goals.

**Few opportunities exist to lower materials and manufacturing costs for entry-level devices.** The cost structure of entry-level devices materials and manufacturing is the largest cost driver, ranging from 60 to 75 percent, depending on the type of device (excluding taxes which vary by country) (See Figure ES.1). But our research indicates that costs for entry-level devices have been optimized significantly over the last decade. While bulk purchases can reduce costs, opportunities are limited to significantly reduce this cost component further in the short term.

**Similarly, limited opportunities exist on the development, operation, and profit margins components to further lower total cost of entry-level devices by compressing lead firm margins.** Original equipment manufacturers (OEMs) are known to reduce their margins from 5–10 percent to 1–2 percent of total cost of the device based on commercial incentives, often yielded through movement of large volumes and bulk purchases or strategic promotion of a particular brand or device to penetrate and compete in a market. Some smaller OEMs may even forego margins during start-up phases to establish brand recognition and gain market share. Similar strategies could be applied to entry-level devices to increase sales volumes. Mobile network operator (MNO) margins for entry-level devices, on the other hand, are often set at zero, with MNOs recouping these costs from increased service revenue and other operational efficiency gains. In this scenario, further cost reductions may not be feasible.

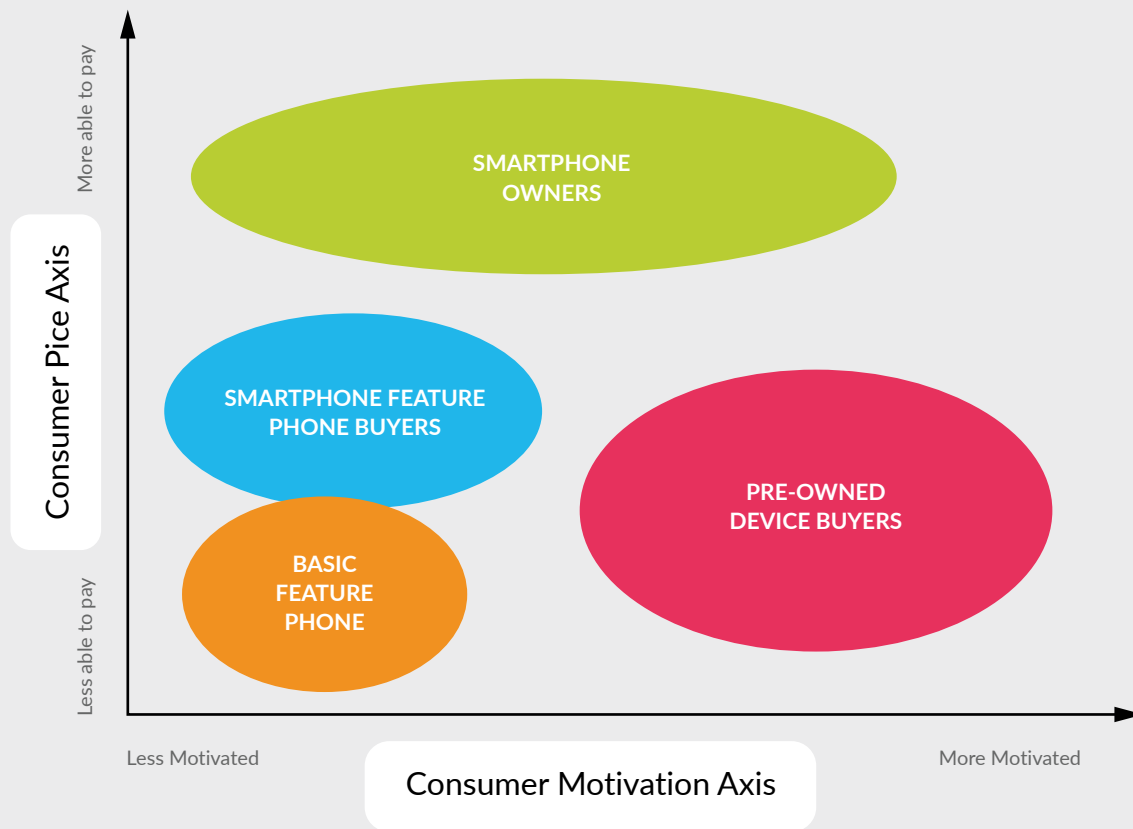
**Beyond the abovementioned four components of new entry-level devices, the pre-owned device market (with a particular focus on refurbished devices) can also provide opportunities to promote entry-level device affordability objectives.** This market is growing internationally, but stakeholder interviews and research revealed that the refurbished device market primarily caters to existing mobile Internet subscribers seeking to upgrade their devices to flagship handsets at lower price points.

## Demand-side analysis

**On the demand side, two of the most significant factors that determine the type of device people purchase are: price and the consumer's motivation level regarding the use of information and communications technologies (ICT)** (Figure ES.2). Commissioned research for this report included two focus group discussions and one mobile phone-based survey (300+ respondents) in each target country and determined that individuals in lower-income brackets were consistently less likely to own a smartphone compared to their peers with higher incomes. Simultaneously, lower-income respondents were disproportionately more likely to own a used or refurbished smartphone.

**Additional characteristics, such as gender, age, geography, nationality, education, and other social factors, can impact the way consumers navigate the mobile device market and influence the kind of device they purchase, if they purchase a device at all.** These different dynamics and motivations that exist in each market must be considered when designing programs for device access.

Figure ES.2. Theoretical consumer price-motivation matrix



Source: TMG/A4AI.

The demand survey revealed that the preferred option to purchase expensive items (such as smartphones) in the target countries is to use personal savings, instead of relying on financing. When drawing from the consumer experience, there are trusted practices and institutions (such as formal retailers or MNOs) that help people afford these major purchases. Incorporating these practices and institutions may lend credibility to new financing strategies from a consumer perspective.

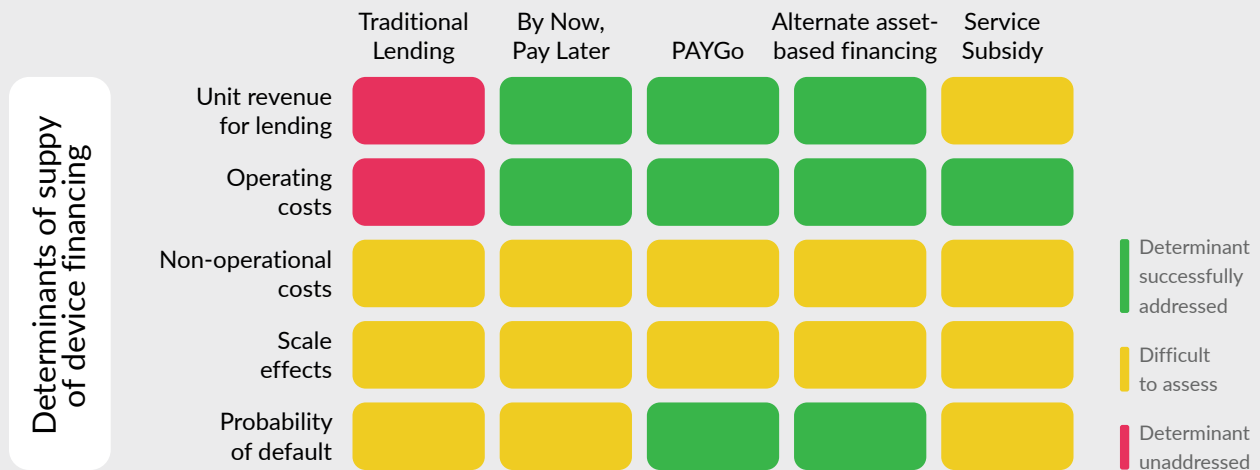
Financing schemes generally have a negative reputation among the target country consumers surveyed. In a purchasing decision highly guided by consumer perceptions of trust, financing schemes introduce an unfamiliar option and potential instability compared to more common methods of personal savings and financial management. In order to be successful, financing schemes must overcome this perception. Consumers must be made to feel that they will benefit from using such a scheme rather than just agreeing to a larger price tag over time.

## Financing schemes and private capital mobilization

The design of financing schemes to facilitate entry-level device ownership by low-income individuals should successfully address most or all determinants of the supply of credit available for device financing. Research and stakeholder interviews identified five types of financing schemes and assessed their ability to address the challenges to the determinants of the supply of financing for devices (Figure ES3).

**Pay-as-you-go (PAYGo), a financing model that allows the user to lease a device with flexible payments tied to use, is generally the most suitable model for low-income individuals.** Among the five financing schemes identified that potentially could be applied to entry-level device financing, PAYGo appropriately addresses three out of five determinants of supply of device financing. It offers lower interest rates than other schemes, has relatively low operational costs, and mitigates the risk of default by incentivizing end-user compliance through other factors (e.g., device locking mechanisms, up-front payments).

**Figure ES.3. Evaluation of financing scheme suitability for low-income individuals—five determinants of supply of device financing**



Source: TMG/A4AI.

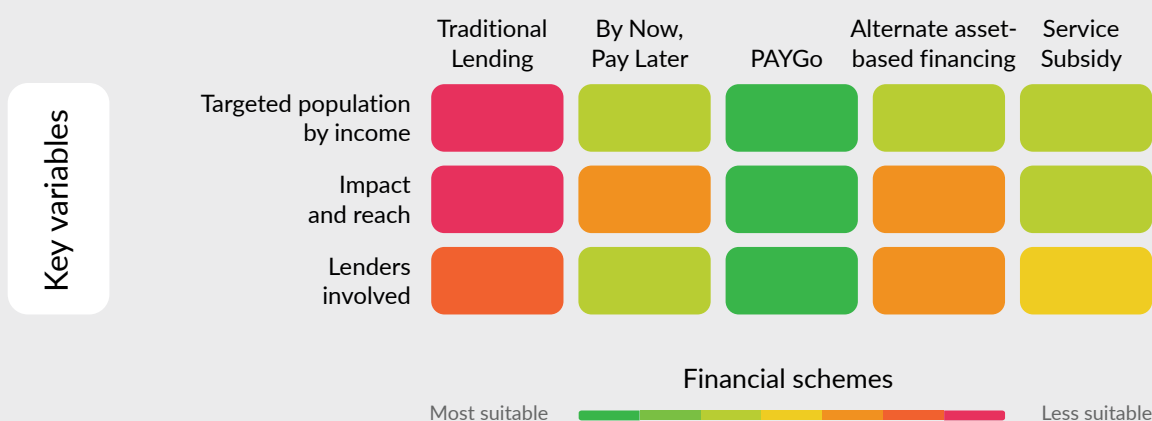
Beyond the determinants of supply, by offering the most flexible conditions to loan recipients, PAYGo is the most accessible financing option for the target population, offering more flexibility than the alternatives in three ways.

- First, PAYGo offers greater flexibility regarding loan repayment. In a PAYGo scheme, installments do not need to be fixed over time. This enables users to vary the amount they repay depending on their cash availability at the time of payment. This is particularly helpful for loan recipients working in the informal sector or engaged in seasonal labor that do not have a fixed monthly salary or generate a steady cash flow.

- Second, PAYGo does not require loan recipients to own assets that can be used as collateral. Users without durable or high-valued assets can be borrowers without any major limitations.
- Third, PAYGo facilitates the financing scheme process for lenders as it eliminates any need to partner with a provider of durable and/or high-valued assets to deploy the scheme. An MNO or a non-bank financial institution (NBFI) can establish the financing scheme without relying on any other lender.

Figure ES.4 summarizes the evaluation of the various financing schemes in terms of target population, impact and reach, and types of lenders involved.

**Figure ES.4. Assessment of financing scheme suitability for low-income individuals—key variables**



Source: TMG/A4AI research.

## Roles for the public sector and international financial institutions

The public sector and IFIs can promote the supply of available device financing solutions for entry-level smartphones for low-income individuals. The report identifies seven initiatives to promote the supply of credit (Table ES.1). The context, as well as the needs and specificities of the desired financing program, are important considerations when looking to implement any of these initiatives.

**Table ES.1. Initiatives that can positively impact determinants of supply of**



## Device financing

#	Initiative type	Supply determinant	How does this look in practice	Pros	Cons
1	Facilitate role that NBFIs (e.g., MNOs and other players within the device value chain) can play in financing	Revenue from lending (traditionally interest rate + other lending fees, but may include other complementary revenue)	<ul style="list-style-type: none"> <li>• More NBFIs are authorized for financial services</li> <li>• Coordination</li> </ul>	Increases lending sources via increase in number of NBFIs	Requires prudential approach to encourage the “right” type of financing
2	Facilitate public sector support for regulatory changes that underlie schemes targeted at low-income and unbanked segments of the market	All	Facilitating initiatives 3–7 (targeted toward PAYGo or certain BNPL schemes) by re-considering restrictions such as device-locking prohibitions, while ensuring rules are in place to protect consumers and competition	Increases probability that target end user is reached	Limits the opportunities for increasing device financing generally
3	Use tax or other subsidies to support financing (not for devices themselves, which is discussed in Chapter 5)	All	Financial activity is given favorable fiscal treatment; Universal Service Fund (USF) injected into device financing	Lowers costs of engaging in financing	Undermines benefits of neutral tax policy; risks distorting market; may be difficult to implement
4	Provide debt funding at favorable interest	Nonoperating costs: debt funding	<ul style="list-style-type: none"> <li>• Loans</li> <li>• Guarantees</li> <li>• Hybrids (blended finance)</li> <li>• Syndication</li> </ul>	Increases balance sheet for financing; covenants may be less intrusive on decision-making than equity holding	May require significant credit history; specific limitations related to type of debt financing
5	Offer equity funding with moderate return thresholds	Nonoperating costs: equity funding	<ul style="list-style-type: none"> <li>• IFI minority holding</li> <li>• PPP</li> </ul>	Increases balance sheet for financing; no debt covenants; reduces financing expense	Profits shared; potential loss of control
6	Kick-start or provide earlier stage support	Scale effects	Grants to implement pilots	Can create virtuous circle of lending	By design limited in scope
7	Set up receivable purchase facility	Scale effects; default risks	IFI buys receivables from MNOs or other retailer	Augments balance sheet, increasing resource for more lending; reduces risk to MNO/retailer after discounting for possible risk in receivables	Initiative remains largely untested in device financing. Not clear whether the scale or discount can be adequately attractive to IFI

Source: TMG/A4AI

## Policy recommendations

Building on the supply and demand analyses, as well as the finance scheme assessment, the report identifies five direct policy interventions that are actively targeted towards promoting affordable entry-level devices. They are typically discrete, measurable initiatives with defined budgets and timelines and a specific policy target that relates to device affordability. The report also includes supplemental recommendations to enhance the affordability of entry-level devices in low- and middle-income countries, depending on the national context. The recommendations aim to foster an adequate enabling environment to support policy implementation and create virtuous cycles to overcome the supply, demand, and financing barriers identified in this report and improve smartphone affordability, as summarized in Table ES.2.

*Table ES.2. Policy recommendations for smartphone affordability*

To address	Supply determinant	How does this look in practice	Pros
<b>Direct interventions</b>	Enabling environment needed	Virtuous cycles	Adequate policies and infrastructure for e-commerce and distribution networks
<b>Demand barriers</b>	Device subsidization (through universal service and access funds or otherwise)	Framework for digital inclusion and disadvantaged populations (e.g., women, rural areas)	Local and relevant content generation
<b>Financing barriers</b>	Credit guarantees Debt and equity funding Financial scheme subsidization	Financial and mobile money regulation Financial consumer protection	

Source: TMG/A4AI.

**Direct interventions use the public sector’s capital or preferential financing to pay for some of the device’s costs in the value chain or to reduce costs by exempting entry-level devices from taxes and deferring revenue collection.** These policies can have the most immediate and measurable impact on the affordability of devices but may have some of the largest challenges with sustainability and scalability.

**The report identifies tax exemptions for entry-level devices as a direct intervention that policy makers designing programs for affordable entry-level devices can consider from a supply-side perspective.** VAT and other similar sales tax exemptions can significantly reduce the cost of an entry-level device when the tax savings are passed along to the consumer. Similarly, customs duty exemptions can reduce the ultimate cost a consumer pays for an entry-level device when that device is imported from abroad, either in parts or as a composite unit for sale. Combined, such tax burdens can be as high as 30–40 percent of the device’s total cost in some countries. Tax regimes towards the higher end of this range can be assessed to determine opportunities for reduction and the impact of any adjustments.



**From the demand perspective, the report proposes the use of targeted subsidy programs to reduce the price consumers pay for their devices and associated services.** However, these types of subsidies are not always feasible or desirable and should be considered as a complement to other direct interventions to target residual demand that cannot be covered with such other interventions (e.g., tax relief, credit guarantees, and other financing mechanisms). The feasibility of these targeted subsidies depends on the market context and certain design preconditions, including financial as well as operational aspects to ensure effectiveness, scalability, and sustainability of subsidies.

**Direct financing interventions such as credit and risk guarantees, debt and equity funding, and financial scheme subsidization are additional initiatives that could reduce financing barriers and promote entry-device affordability in low- and middle-income markets.** Guarantees reduce lenders' default risk of financing mobile devices. With the risk reduced, policy makers can encourage lenders to provide more favorable terms to consumers and/or offer more financing with greater confidence. First-loss credit guarantees (FLCG), for example, could be an effective, resource-multiplying form of assistance that can be relatively simple to implement and adaptable to application in the mobile device market. Where residual requirements exist that cannot be met through guarantees, debt and equity funding can also play a central role in creating the appropriate conditions for mobile device financing. Finally, states, possibly supported by an international financing institution, could provide subsidies or tax benefits to financial intermediaries, including to cover default losses, lower interest rates, or improve terms of financing to the customers borrowing from the MNOs.

**Beyond direct interventions, policy makers designing programs to increase access to entry-level devices should take into consideration broader policies that impact device costs.** Adopting effective policies on the ease of doing business, frameworks to benefit disadvantaged population (e.g., women and rural populations), streamlining financial and mobile money regulation, and fit-for-purpose consumer protection rules will greatly increase the probability a given program succeeds.

**Lastly, relevant stakeholders should be cognizant of the effects of certain policies that do not directly target device affordability but nonetheless affect the device market.** Examples of these policies, which we refer to as virtuous cycles, include programs and infrastructure for e-commerce and distribution networks, the willingness and capacity of the government to create local and relevant online content, and programs related to digital skills training.

**The precise implementation, appropriateness, and feasibility of these recommendations vary, depending on the conditions in each country.** However, these recommendations provide several options policy makers should consider when designing interventions. Decision-makers should develop individual interventions using a comprehensive framework that addresses supply, demand, and financing barriers to ensure consistency and progressive improvement toward the long-term goal of full adoption of entry-level devices by the target populations.





# 1. Introduction

Nearly 2.7 billion people globally are still offline and not using the internet.<sup>7</sup> The majority (94 percent) of unconnected individuals live in low- and middle-income countries, where the cost of internet-enabled mobile devices remains a key connectivity barrier.<sup>8</sup> This report aims to guide the efforts of policy makers and international financial institutions (IFIs) in promoting affordable mobile device ownership and increase adoption and usage of broadband services, with a focus on the lowest-income individuals in developing countries often overlooked by previous research.

The report examines the key themes and drivers of costs in supply and demand for internet-enabled mobile devices. This identifies determinants of device pricing and factors that impact users' ability to pay, willingness to pay and access to credit. Various financing schemes and opportunities for private capital mobilization are assessed to identify those that could increase low-income individuals' ability to access a device. This analysis leads to a series of policy recommendations to provide governments and IFIs involved in designing financing programs for entry-level device ownership with tools to incorporate and apply the findings of this report.

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7 ITU. 2022. "Measuring Digital Development: Facts and Figures 2022." <https://www.itu.int/itu-d/reports/statistics/facts-figures-2022/>

8 GSMA. 2020. "The State of Mobile Internet Connectivity 2022." p. 5 (October 2022). [https://www.gsma.com/r/wp-content/uploads/2022/10/The-State-of-Mobile-Internet-Connectivity-Report-2022.pdf?utm\\_source=website&utm\\_medium=download-button&utm\\_campaign=somic22](https://www.gsma.com/r/wp-content/uploads/2022/10/The-State-of-Mobile-Internet-Connectivity-Report-2022.pdf?utm_source=website&utm_medium=download-button&utm_campaign=somic22).

## 1.1. Global scope, with a focus on four target markets

Upon establishing a framework of supply and demand drivers and indicators, these drivers are then closely explored in four countries, occasionally referred to as ‘target countries’ in this report: Rwanda, Nigeria, Colombia, and Pakistan. These countries were intentionally selected based on a variety of factors, including level of economic development, mobile device ownership and usage, local manufacturing markets, and diversity in taxation and regulatory policies in their telecommunications sectors. These countries have characteristics that are similar to other countries and can be considered in this context; at the same time, every country and telecommunications market has unique features, and so supply and demand assessments ought to be carried out anywhere mobile device financing solutions are being explored, emulating the approach in application for the four aforementioned countries in Africa, South America and Asia.

## 1.2. Types of devices covered by this report

For purposes of this report entry-level internet-enabled devices are understood as low-cost handsets, below the US\$50 retail price<sup>9</sup> threshold, that allow a user to obtain internet access and downloadable apps from a universal app store. Based on interviews conducted and global market developments and trends reviewed, two types of devices meet this definition at this time: (i) smart feature phones, and (ii) low-cost smartphones. These devices are referred to in this report as “entry-level devices,” and they respond to basic requirements and the ability to pay of low-income individuals in low- and middle-income countries.



Smart feature phones are a 4G-enabled hybrid of feature phones and smartphones. They look and feel like basic feature phones, have a small screen, and enable access via a 12-button keypad, not a touch screen. However, unlike basic feature phones, smart feature phones connect to the internet and offer access to applications from the KaiOS store (about 1,200 apps).<sup>10</sup> Overall, these hybrid devices have lower cost structures than entry-level smartphones and are available in the market at lower price points to target lower-income customer segments, particularly in low- and middle-income markets.

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9 Retail price refers to the price an entry-level device is offered to a consumer via a retailer.

10 See <https://www.kaiotech.com/store>. We note that as of March 2023, KaiOS had a significantly lower market share (0.12%) than Android (70.88%) of the worldwide operating system (OS) market. See Statcounter, Mobile Operating System Market Share Worldwide—March 2023. <https://gs.statcounter.com/os-market-share/mobile/worldwide>.



**Low-cost smartphones** have larger touch screens to enable advanced access to internet services and apps. They have the functionalities of higher-end smartphone models, but optimize technical specifications, components, and materials to lower costs, including operating system (OS), memory, batteries, and cameras. These devices can access a large ecosystem of applications, predominantly from the Google Play Store, as well as from application stores such as Aptoid or SlideMe.<sup>11</sup>

Mobile handsets are complex devices with hundreds of components, multiple technical characteristics, and diversified, multinational value chains that impact different models' cost structures. To facilitate comparison across countries, for the purpose of the supply-side cost assessment undertaken in this report, reference entry-level devices have been defined based on a set of technical specifications obtained from the research (Table 1.1).

**Table 1.1. Technical specifications of entry-level Internet capable devices used in this report**

	Supply determinant	How does this look in practice
<b>Predominant Operating system</b>	KaiOS	Android
<b>Screen</b>	2.4" QVGA	5.0" FWVGA
<b>Memory</b>	512MB/4GB	2GB/16GB
<b>Network</b>	LTE CAT4	LTE CAT4
<b>Internet capabilities</b>	Web browsing, apps	Web browsing, apps
<b>Camera</b>	2 Mp + VGA	5 Mp + 2 Mp
<b>Battery</b>	2,000 mAh	4,000 mAh
<b>Total cost range*</b>	US\$25–35	US\$50–85

**Note:** \*Total cost range based on modeling cost structures for devices in the four target markets. Note that this is not the retail price for the device (see definitions in Section 2.2.1.2)

**Source:** TMG/A4AI research.

11 Over 3.55 million applications were available as of October 2022. See Statista, Google Play: number of available apps as of Q3 2022. <https://www.statista.com/statistics/289418/number-of-available-apps-in-the-google-play-store-quarter/#:~:text=Between%20the%20beginning%20of%202019,the%20last%20quarter%20of%202021.>



We recognize that these specifications may not be consistent with consumer preferences and market requirements across all countries at a particular point in time. Instead, they are meant to describe entry-level smart feature phones and smartphones that support a minimum desired functionality to achieve mobile broadband internet access and user experiences over the near term. Entry-level devices will require different functionality and specifications across countries, and these will be dynamic, increasing as markets and consumer needs evolve. Therefore, close cooperation between government and private sector stakeholders will be essential to identify baseline specifications for entry-level devices to guide interventions to achieve handset affordability targets and other policy goals on a country-specific basis. Moreover, private sector stakeholders and mobile operators are also expected to continue playing key roles in transitioning users from entry-level to more advanced handsets capable of supporting enhanced user digital experiences.

It is also worth noting that research undertaken for this report suggests that consumers may perceive smart feature phones to be closer to a basic feature phone than a low-cost smartphone.<sup>12</sup> In such cases, the retail price of basic feature phones exert downward pressure on the retail price of smart feature phones. While this will impact how smart feature phones may be commercialized, due to their lower cost structure, the research suggests that these devices will continue to be a cost-effective option to bridge affordability gaps going forward for certain market segments, particularly in low income countries.

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12 Basic feature phones are a type of mobile device that typically provides voice and text messaging, as well as basic multimedia capabilities. They usually have press-button-based inputs and a small non-touch display, run on an embedded operating system, and have a small and simple graphical user interface. Basic feature phones support more limited functionality compared to the entry-level devices that are the focus of this report.







## 2. Supply-Side Assessment

### 2.1. Introduction

This chapter presents a supply-side assessment for entry-level mobile devices. The objective is to map the value chain and cost structure estimations for reference entry-level devices to identify opportunities for cost reductions that can inform policy actions and programs. Similarly, this chapter discusses initiatives aimed at promoting the local manufacturing and assembly of mobile devices and their potential use to promote affordable entry-level devices. Recent trends in the sale of pre-owned devices, and specifically refurbished devices, are also discussed to assess their potential as supply-side alternatives to lower entry-level device prices and promote increased adoption of internet services.

### 2.2. Supply-side assessment of new entry-level devices

This Section assesses supply-side cost structures and current trends for new entry-level devices in low- and middle-income markets in general, with a particular focus on four countries: Colombia, Nigeria, Pakistan, and Rwanda (the “target countries”). The goal is to map value chains and current market dynamics of new entry-level devices to identify potential opportunities for optimization and cost reductions to improve the affordability. These opportunities will then inform specific policy recommendations and actions aimed at policy makers and international financial institutions (IFIs) described in Chapter 6 to make such devices more affordable to low-income consumers in low- and middle-income markets.

## 2.2.1. New entry-level device value chain and cost structure

Mapping the value chain and cost structure of new entry-level devices can help identify opportunities to target cost-reduction policies and strategies. This analysis is undertaken by grouping the cost components of new entry-level devices into four key categories:

- (i) materials and manufacturing;
- (ii) development, operation, and profit margin;
- (iii) taxes and import duties; and
- (iv) distribution and sales.

As further discussed below, (i) taxation and import duties, and (ii) distribution and sales represent the largest opportunities for cost reductions for entry-level devices in many countries. High tax burdens on mobile devices, including entry-level devices, are imposed in numerous countries. Reducing such burdens is often the single largest potential opportunity for policy makers to lower the total cost of new entry-level devices. Depending on the country and the magnitude of tax reductions, this could decrease total device cost by as much as 30–40 percent, subject to the magnitude of the tax exemptions or reductions on import duties, value added tax (VAT), and so forth (see discussion in Section 2.2.4). Optimization of distribution and sales channels—by reducing both margins and the number of intermediaries within the distribution chain—can also significantly lower total costs. Taking account of country-specific conditions, stakeholders within the value chain have been able to implement actions and strategies to reduce distribution and sales costs by about 40 percent (see discussion in Section 2.2.6).

Beyond these two components, more limited opportunities exist to lower development, operation, and profit margins of lead firms, as those are often already low. Lastly, interviews conducted for this report suggest that, while materials and manufacturing costs of new entry-level devices represent the highest cost component in the value chain, they have been significantly reduced over the last decade, leaving little margin for significant reductions in the near term, even with market forces driving them further down.<sup>13</sup> Notwithstanding this, potential global initiatives aimed at forging partnerships between government and private sector stakeholders within the value chain could be used to identify additional opportunities to further optimize costs of materials and manufacturing, as well as distribution and sales going forward (see discussion in Box 2.5).

### 2.2.1.1. Value chain of new entry-level devices

The value chain of new mobile devices is complex, involving multiple key players or categories of players active in every link across multiple countries. These include owners of essential patents; semiconductor foundries and suppliers of other materials and components; manufacturers that assemble devices; vendors and designers; and importers, distributors, and retailers. The mobile device value chain is depicted in Box 2.1. Each supplier in the chain buys inputs and then adds value, which then become inputs and part of the cost structure of the next stage of production. The sum of these values equals the cost of the entry-level devices, which in turn impacts the retail price ultimately offered to consumers.

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<sup>13</sup> TMG interviews with Vodacom, (June 30, 2022, and July 14, 2022); TMG interview with KaiOS, (June 20, 2022).

### Box 2.1. Proposed framework for assessing the smartphone value chain



Moving from left to right, the Figure above highlights the smartphone value chain.

- A first stage relates to **standard essential patents (SEP)** that are licensed to device makers to enable every device with core technologies to connect to network infrastructure and other devices.<sup>14</sup>
- Mobile devices contain numerous **components** of different types and prices. Multiple firms supply these components. High-value components, such as chipsets, screens, or cameras, may have their own multinational supply chains as well, which require multiple iterations of importing and manufacturing components, and typically represent a large share of the total value added.
- The **assembly** of these components into the device has multiple stages and is often outsourced to contract manufacturers (CMs) and original design manufacturers (ODMs).
- A **lead firm** that outsources manufacturing adds its brand name, market knowledge, intellectual property, product design, system integration, and cost management skills, among other factors. These are typically original equipment manufacturers (OEMs) or mobile network operators (MNOs) that may sell own-branded devices.
- **Distributors**, which engage in international transport, import, and national distribution as well as **retailers** (both online and offline) form the final links in the chain to reach the **consumer**.

*Source:* TMG/A4AI analysis based on Greg Linden, et al. 2008. "Who Captures Value in a Global Innovation Network? The case of Apple's iPod."

While Box 2.1 may imply that suppliers are only active in one part of the value chain, this is not often the case. Vertical integration across various links is a common practice to increase efficiency and reduce cost. This is the case, for example, with Transsion, a Chinese-based original equipment manufacturer (OEM), which is the largest seller of smartphones in Africa. Its brands Tecno, Itel, and Infinix accounted for 43 percent of

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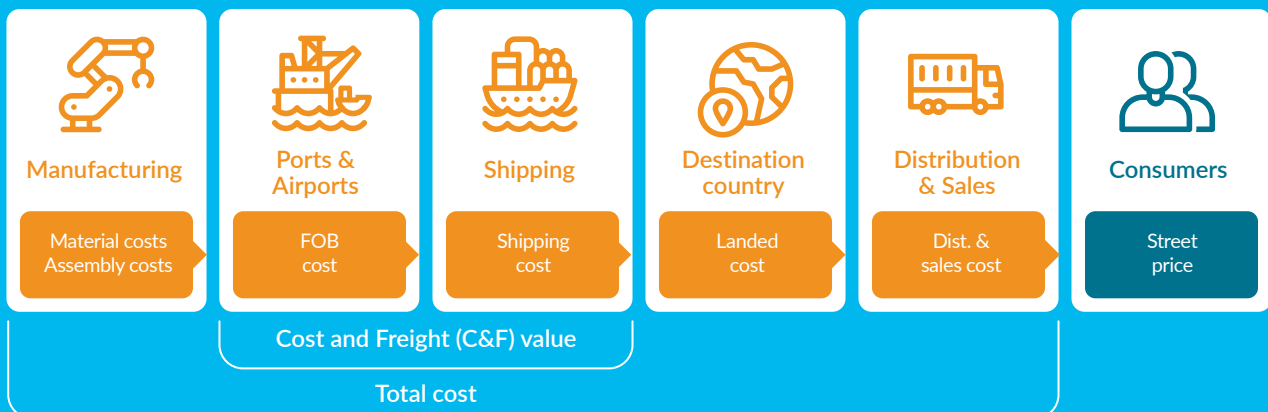
14 See in general, Alexander Galetovic, Stephen Haber, and Lew Zaretzki. 2018. "An estimate of the average cumulative royalty yield in the world mobile phone industry: Theory, measurement and results." *Telecommunications Policy* 42. 263–276 (estimating that the average cumulative royalty yield on a smartphone does not exceed 5.6 percent of the selling price).

smartphone shipments in Africa during Q1 2022.<sup>15</sup> The company has deployed a factory to assemble devices in Ethiopia; works closely with importers and distributors in countries where its devices are sold; and in countries such as Rwanda, is closely involved in the distribution, marketing, and sales of its devices (embedding its own agents and promoters in retail outlets). Similarly, mobile network operators (MNOs) such as MTN in Nigeria and Rwanda, Jazz in Pakistan, or Vodacom in South Africa, among many others, often commercialize their own branded devices to target customers in their home markets, directly procuring devices from original design manufacturers (ODMs). In many countries, like in Colombia, MNOs also import, distribute, and sell (via their own online or offline stores) a significant proportion of mobile devices. Vertical integration also occurs between the component supplier and OEM. For example, Huawei, a Chinese-based technology company that manufactures smartphones, among other telecommunications equipment, is vertically integrated into the fabless microchip market via its wholly owned subsidiary HiSilicon. As discussed below, these vertical integration strategies are aimed at optimizing cost structures, promoting compatibility and improved functionality of devices, and improving the affordability of devices, among others.

### 2.2.1.2. Key costing terminology for new entry-level devices

The supply chains of new entry-level internet-enabled devices are complex and multinational in scope. Mapping their cost structures requires using a set of key costing terms that apply at various points during the manufacturing, shipping, distribution, and sales process of these devices. The terms defined in Box 2.2 are used throughout this chapter to aid the reader in identifying the distinct cost components that drive the total cost of entry-level devices.

#### Box 2.22. Key costing terms used in this report



15 IDC. 2022. "Africa's Smartphone Market Declines for Third Successive Quarter as Supply Chain Constraints Continue to Bite." (June 1, 2022).

- **Manufacturing**

Assembly cost—The costs to assemble knocked down devices imported into a country. The costs vary depending on whether all the parts are imported and assembled in the destination country, referred to as completely knocked down (CKD), or when partially built devices and separate parts are imported into the destination country, referred to as semi knocked down (SKD) condition.

- **Ports & airports**

Free on board (FOB) cost—The cost of the entry-level device (export good) delivered by the seller at the port of shipment. This price excludes shipping costs, insurance, or import taxes applicable to an entry-level device.

- **Shipping**

Shipping cost—Most new entry-level devices available in low- and middle-income markets are manufactured in China and then shipped and imported to the country of destination. Shipping costs of entry-level devices are dependent on geography and location of country of destination and means of transport. This typically includes air and/or sea freight.

Cost and freight (C&F) value—The cost of a mobile device that includes FOB cost plus shipping costs.

Cost, insurance, and freight (CIF)—The cost of a mobile device that includes FOB cost plus insurance and shipping costs.

- **Destination country**

Landed cost—The cost that includes the sum of expenses associated with international shipping, import duties, and fees applicable to an entry-level device.

- **Distribution & sales**

Distribution and marketing cost—These costs include two components. First, the margins charged by the various distributors and retailers involved in taking devices from the factory to the consumer. This typically involves multiple intermediaries responsible for shipping, importing, warehousing, distributing, and selling devices. Second, the marketing and promotion costs incurred to sell devices.

Total cost—Combined cost of an entry-level device, including landed costs, plus development costs, operations and profit margins of the lead firm, distribution and marketing costs, and any other sales or similar taxes that may apply.

- **Consumers**

Retail price (sometimes referred to as street price) —This is the price that an entry-level device is offered to a consumer via a retailer (online or offline). Observable retail prices are impacted by multiple factors beyond actual costs of the device, including supplier subsidies, marketing discounts and promotions, and other commercial strategies, among others.

*Source:* TMG/A4AI research, Incoterms, 2020.

### 2.2.1.3. Framework to assess cost structure for new entry-level devices

To map the cost structure of entry-level devices, the cost components associated with the various links in the value chain are grouped along four broad categories, as shown in Box 2.3.

#### Box 2.3. Cost structure for entry-level devices

Cost component	Description	Impact
 Materials and manufacturing	<p>This category covers the bill of materials (BOM), with the main components being screen, chipset, memory, battery, and operating system (OS), and the costs of manufacturing devices. Standard Essential Patent (SEP) licensing is also included as an input here. These costs are reflected as FOB, which represents the market value of the goods before shipping costs and taxation. As discussed below, supply chain disruptions linked to the COVID-19 pandemic and other shocks impact the availability of materials and components and hence their cost.</p>	International value chain component
 Taxes and Duties	<p>This category is a major cost component of entry-level devices in some markets. Fiscal policy is the key driver of this cost component and hence varies from country to country. This report focuses on import duties, value added taxes (VAT), general sales taxes (GST), and excise taxes, and other similar national taxes that often apply to mobile devices. Monetary policies aimed at controlling access to foreign currency needed to import devices also impact the overall cost structure and are considered within this category. Since fiscal and monetary policies are under the direct control of the government, this is the most direct lever available to governments to impact total cost of entry-level devices.</p>	National value chain component
 Development costs, operations and profit margins	<p>This cost category compensates the lead firm involved in bringing the device to market. These include intellectual property rights attached to the design and development of the device. The use of reference designs, for example by MNO-branded devices, may be a way to reduce development costs of entry-level devices. Operations refer to the administrative costs of the lead provider, including its profit margin. Competition, market size, and other incentives may help reduce this margin.</p>	International and national value chain component
 Distribution and marketing	<p>This category represents a significant cost component and depends on the country where the device is sold. This component may include large importers of devices, multiple intermediate distributors, and retailers. Similarly, marketing costs and promotions also generate costs, impacting the total device cost. Shipping cost and insurance are also included in this component, which is driven by international market conditions. As further discussed in this chapter, supply chain disruptions linked to the COVID-19 pandemic and other shocks impacted the availability of containers and fuel cost, and hence shipping costs.</p>	International and national value chain component

Source: TMG/A4AI research.



This approach provides visibility into the major cost drivers that impact the retail price of a reference low-cost smartphone and a reference smart feature phone with the specifications presented in Section 1.2—not those of a particular brand or model. More importantly, presenting cost information in this manner facilitates flagging opportunities for cost reductions, especially those that may be implemented by national governments.

An initial observation is that these cost component categories can be further grouped into those driven by international or national supply chain factors. For example, entry-level devices, as well as other electronic equipment, are largely manufactured in China and then exported around the world. In 2020, 68 percent of mobile devices were manufactured in China.<sup>16</sup> The international scope of the value chain structure means that the costs of materials and manufacturing are typically not driven by market conditions in the country of destination (i.e., where the device is sold).

Conversely, other cost components of entry-level devices are directly impacted by country-specific factors that can widely vary. These may include OEM margins in some cases, international freight, national taxation, and distribution and retail margins. This distinction has significant policy implications, as the potential levers available to national policy makers and other key national stakeholders to lower total costs and promote entry-level device affordability will be better suited to target national cost drivers within the value chain. Conversely, the international scope of certain segments opens opportunities for global or multinational partnerships to address affordability goals, as discussed in Box 2.5.

## 2.2.2. Cost structure assessment for new entry-level devices

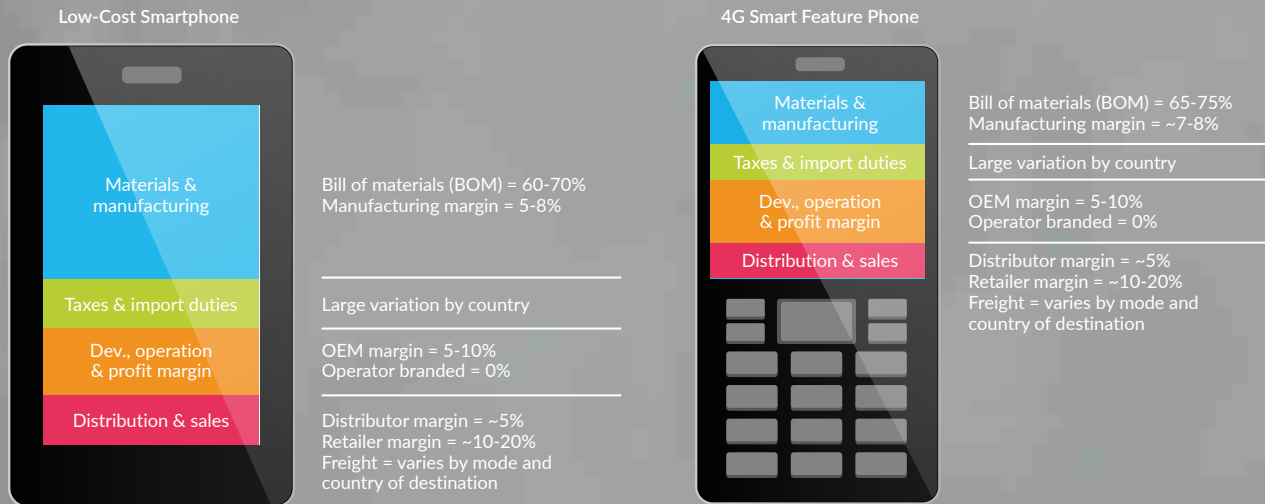
This Section presents disaggregated costs for two reference entry-level devices in the target markets.<sup>17</sup> As shown in Figure 2.1, each cost component is relatively consistent between both types of entry-level devices reviewed. However, materials and manufacturing account for a higher percentage of costs for smart feature phones than for low-cost smartphones. This is mainly driven by national policies such as taxation and import duties (Section 2.2.4). Government policies and commercial strategies aimed at making entry-level devices affordable should seek to optimize different links in the value chain so that materials and manufacturing represent a higher proportion of the total cost of the entry-level device.

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16 Counterpoint Research. 2021. "China Handset Production Stops Shrinking for Now." (May 3, 2021). <https://www.counterpointresearch.com/china-handset-production-stops-shrinking-now/>.

17 Cost information presented is based on desk research and multiple interviews conducted for this report.

Figure 2.1. Cost structure of entry-level devices



Source: TMG/A4AI, research.

### 2.2.2.1. Estimation of total cost of new entry-level devices in target countries

Focusing on the target countries reviewed, the total cost of both types of devices is estimated below by calculating the cost components and applying the specific national regulations and available shipping cost information. This estimation is based on a bottom-up approach, which builds from materials and manufacturing costs to present free on board (FOB) cost and then adds costs based on target country specific drivers for the various steps along the value chain. Landed costs are then obtained by adding country-specific freight and import duties to FOB costs. It is assumed that the development, operation, and profit margin are waived in target countries where the sale of MNO-branded devices is an ongoing practice (Colombia is thus excluded). Distribution and sales costs are then added based on typical industry margins, and sales tax is estimated based on country-specific tax rates. This leads to the total cost estimate presented below.

As shown in Table 2.1, the total estimated cost of a low-cost smartphone ranges from US\$48.50 in Rwanda to US\$84.27 in Pakistan.<sup>18</sup> Taxation is the key factor driving this large variation. Import duties and sales

<sup>18</sup> Note that this cost estimate covers a low-cost smartphone imported in a “completely built” condition into the Pakistani market (instead of importing parts for local assembly). As discussed further in Sections 2.2.4 and 2.3.2, Pakistan has implemented fiscal policies to disincentivize importation of completely built devices and promote local manufacturing and assembly of mobile devices. As such, under the current framework it is unlikely that a low-cost smartphone described in this Section would be imported as a completely built unit into Pakistan instead of being assembled locally. However, for the purpose of comparison between the four target markets, prices in this Section refer to imported devices to take account of the impact of import duties and other taxes.

tax levied on mobile devices with a cost and freight (C&F) value over US\$30 in Pakistan represent about 34 percent of the estimated total cost of the proposed entry-level device. This is attributable to a national industrial policy to promote the local assembly of mobile devices in the country that discourages imports (see further discussion in Section 2.3.2).

**Table 2.1. Estimated cost structure of a low-cost smartphone in target countries (US\$, June 2022)**

	Colombia		Nigeria		Pakistan		Rwanda	
	US\$	%	US\$	%	US\$	%	US\$	%
Materials	35.48	66%	35.48	62%	35.48	42%	35.48	73%
Manufacturing margin	3.90	7%	3.90	7%	3.90	5%	3.90	8%
<b>FOB costs</b>	<b>39.38</b>	<b>73%</b>	<b>39.38</b>	<b>69%</b>	<b>39.38</b>	<b>47%</b>	<b>39.38</b>	<b>81%</b>
Shipping	2.08	4%	1.24	2%	1.17	1%	1.04	2%
Import duties	0	0%	3.94	7%	28.89	34%	0	0%
<b>Landed costs</b>	<b>41.46</b>	<b>77%</b>	<b>44.55</b>	<b>78%</b>	<b>69.43</b>	<b>82%</b>	<b>40.42</b>	<b>83%</b>
Dev.& profit margin	3.32	6%	0	0%	0	0%	0	0%
Distribution & sales	8.95	17%	8.91	16%	13.89	16%	8.08	17%
VAT/GST	0	0%	4.01	7%	0.95	1%	0	0%
<b>Total cost</b>	<b>53.73</b>	<b>100%</b>	<b>57.48</b>	<b>100%</b>	<b>84.27</b>	<b>100%</b>	<b>48.50</b>	<b>100%</b>

**Note:** Estimation assumes (i) distribution and profit margin of 0 percent (i.e., an MNO-branded device), except for Colombia where operator-branded phones were not being offered and an 8 percent OEM margin is used; (ii) a sales and distribution margin of 20 percent; and (iii) air freight based on average published fares for a device weighing 0.16 kg. Estimates do not assume any type of subsidy to defray the consumer's device cost.

**Source:** TMG/A4AI research.

Table 2.2 presents an estimated cost structure for smart feature phones in the target countries. A lower variation (~18 percent) is observed among the countries, with total cost estimates ranging from US\$26.99 in Rwanda to US\$31.99 in Nigeria. In Pakistan, lower import duties applicable to devices with a C&F value below US\$30 account for a reduction in the cost difference between target countries as compared to low-cost smartphones. However, taxation is also the driver for increased costs in Nigeria. Note that these costs are significantly above the average retail price of basic feature phones (US\$8–12), often making smart feature phones a less attractive proposition for entry-level consumers.

**Table 2.2. Estimated cost structure of a smart feature phone in target countries (US\$, June 2022)**

	Colombia		Nigeria		Pakistan		Rwanda	
	US\$	%	US\$	%	US\$	%	US\$	%
Materials	20.14	67%	20.14	63%	20.14	64%	20.14	75%
Manufacturing margin	1.70	6%	1.70	5%	1.70	5%	1.70	6%
<b>FOB costs</b>	<b>21.84</b>	<b>73%</b>	<b>21.84</b>	<b>68%</b>	<b>21.84</b>	<b>69%</b>	<b>21.84</b>	<b>81%</b>
Shipping	1.30	4%	0.77	2%	0.73	2%	0.65	2%
Import duties	0	0%	2.18	7%	3.41	11%	0	0%
<b>Landed costs</b>	<b>23.14</b>	<b>77%</b>	<b>24.80</b>	<b>78%</b>	<b>25.98</b>	<b>82%</b>	<b>22.49</b>	<b>83%</b>
Dev.& profit margin	1.85	6%	0	0%	0	0%	0	0%
Distribution & sales	5.00	17%	4.96	16%	5.20	16%	4.50	17%
VAT/GST	0	0%	2.23	7%	0.49	2%	0	0%
<b>Total cost</b>	<b>29.99</b>	<b>100%</b>	<b>31.99</b>	<b>100%</b>	<b>31.67</b>	<b>100%</b>	<b>26.99</b>	<b>100%</b>

**Note:** Estimation assumes (i) distribution and profit margin of 0 percent (i.e., an MNO-branded device), except for Colombia where operator-branded phones were not being offered and an 8 percent OEM margin is used; (ii) a sales and distribution margin of 20 percent; and (iii) air freight based on average published fares for a device weighing 0.1 kg. Estimates do not assume any type of subsidy to defray the consumer's device costs.

**Source:** TMG/A4AI research.

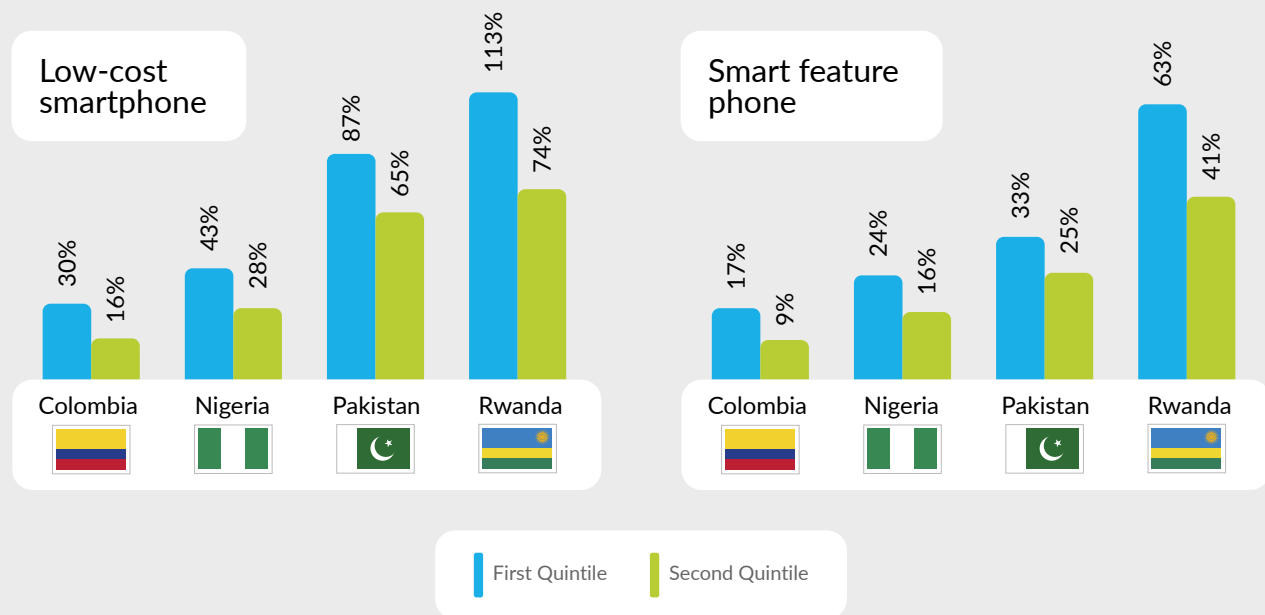
### 2.2.2.2. Affordability assessment of new entry-level devices in target countries

Comparing these total cost estimates with monthly income levels of the bottom two quintiles of the population in the target countries indicates that the up-front purchase of an entry-level device would still represent a significant proportion of their average earnings (Figure 2.2). This is particularly pronounced in Rwanda, due to its lower-income level. For example, despite having the lowest estimated total cost for an entry-level smartphone among the target countries (at approximately US\$48.50), this would still represent on average more than an entire month's income for the poorest 20 percent of Rwandans.<sup>19</sup> Conversely, the

<sup>19</sup> Note that this discussion focuses on total cost and not the retail price of devices.

same device would represent about 30 percent of the monthly income of the lowest quintile of Colombians. Even for the second quintile, the total cost of a low-cost smartphone would represent between 16 percent to 74 percent of monthly income in the target countries. While the total cost of smart feature phones is lower, it is still estimated to represent between 17 percent to 63 percent of monthly income of the bottom quintile in the target countries.

**Figure 2.2.** Estimated total cost as a percentage of monthly income in target countries, 2022



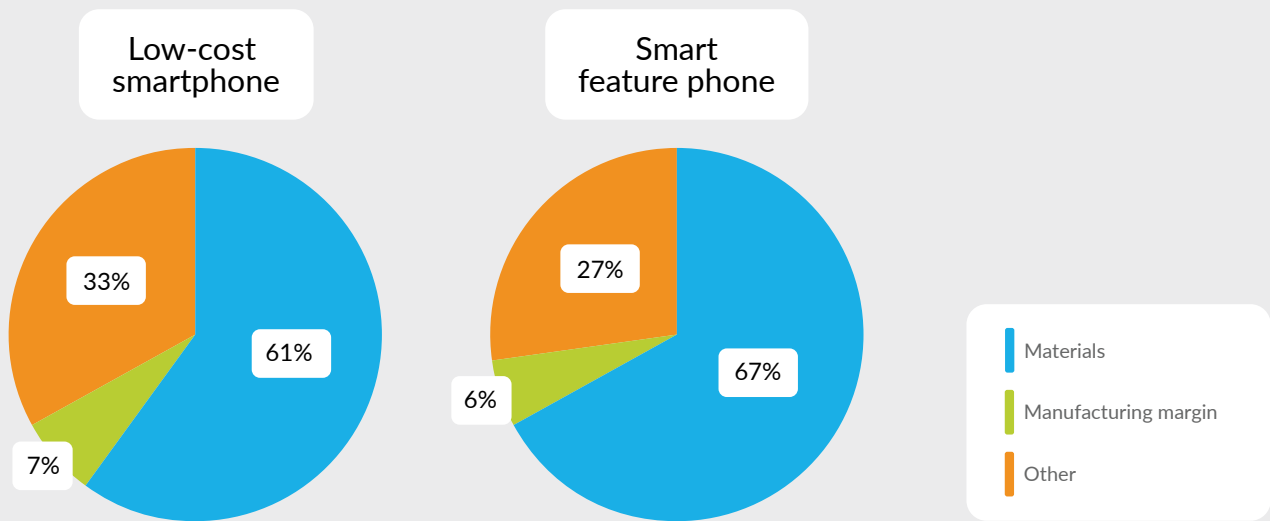
*Source:* TMG/A4AI analysis based on World Bank data.

The preceding analysis indicates that further cost optimization is needed to reach retail prices that are affordable for the lowest-income segments of the population in the target countries. The following Sections discuss the cost components of the value chain with the aim of identifying key supply-side factors that impact the total cost of entry-level devices that can be optimized to achieve affordability targets.

## 2.2.3. Materials and manufacturing costs of new entry-level devices

Materials and manufacturing combined represent the highest cost components of entry-level devices. In the target countries, for example, FOB costs are estimated to account, on average, for around 68 percent of low-cost smartphone costs and 73 percent of smart feature phone costs (Figure 2.2).

Figure 2.2. Estimated total cost as a percentage of monthly income in target countries, 2022



Source: TMG/A4AI analysis based on World Bank data.

### 2.2.3.1. Smartphones depend on a complex ecosystem of suppliers and manufacturers

Smartphone manufacturing brings together a complex ecosystem of suppliers of materials, components, and testing equipment. Manufacturers leverage these supplier networks to source components and materials needed to assemble devices, passing on efficiency gains to the next link in the value chain in the form of lower FOB costs. A robust ecosystem that supports the manufacturing process of entry-level devices is



therefore a prerequisite to reduce costs and achieve affordability targets (Box 2.4). As further discussed in Section 2.3, achieving scale and robustness in the materials and components supply ecosystem is a key challenge for promoting a scalable homegrown smartphone manufacturing industry.

### Box 2.4. Manufacturing ecosystem—China

In 2021, China accounted for almost one-half of mobile device exports globally based on dollar amounts, over three times the exports of the next two exporters, Vietnam and Hong Kong SAR, China.<sup>20</sup> In particular, the city of Shenzhen, where a large portion of smartphones are manufactured in China, has been coined the “Chinese Silicon Valley.”<sup>21</sup> Shenzhen is home to Xiaomi and Huawei, as well as Tencent, the maker of the WeChat app.<sup>22</sup> China’s largest chipmaker, Semiconductor Manufacturing International Corporation (SMIC), brought into production its Shenzhen fab by the end of 2022.<sup>23</sup> This clustering of suppliers and manufacturers increases supply chain efficiencies, reducing manufacturing and assembly costs for mobile devices.

However, U.S.-China tensions have repercussions on the global supply chain, leading in particular to the proliferation of government controls on sales of chips to China, the world’s largest semiconductor market.<sup>24</sup> China imports semiconductors that are then assembled into tech products, including mobile handsets, to be re-exported or sold in the domestic market for final consumption. Going forward, such restrictions could further disrupt the mobile device value chain, potentially impacting availability and costs of Chinese-made entry-level devices.

*Source:* TMG/A4AI research.

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20 Daniel Workman. “Cellphone Exports by Country,” <https://www.worldstopexports.com/cellphone-exports-by-country/>.

21 Dan Wang. 2019. “How smartphones made Shenzhen China’s innovation capital.” Vox, (November 4, 2019). <https://www.vox.com/new-money/2016/11/4/13498504/shenzhen-smartphone-innovation-capital>.

22 Dan Wang. 2019. “How smartphones made Shenzhen China’s innovation capital.” Vox, (November 4, 2019). <https://www.vox.com/new-money/2016/11/4/13498504/shenzhen-smartphone-innovation-capital>.

23 SMIC. 2023. “Unaudited Results For The Three Months Ended December 31, 2022.” (Feb. 9, 2023). [https://www.smics.com/en/site/company\\_financialSummary?year=2022#page\\_slide\\_0](https://www.smics.com/en/site/company_financialSummary?year=2022#page_slide_0).

24 Semiconductor Industry Association, State of the U.S. Semiconductor Industry (2022). [https://www.semiconductors.org/wp-content/uploads/2022/11/SIA\\_State-of-Industry-Report\\_Nov-2022.pdf](https://www.semiconductors.org/wp-content/uploads/2022/11/SIA_State-of-Industry-Report_Nov-2022.pdf).

### 2.2.3.2. Significant efficiencies have been achieved in entry-level device manufacturing

Because entry-level devices are intended for first-time mobile internet users with limited purchasing power, they are manufactured with less advanced, lower-cost components, including more limited memory, less powerful hardware, lower storage capacity, and optimized versions of operating system (OS), in cases free or open source. Over the last decade, stakeholders within the value chain have worked to achieve significant optimization in the costs of materials and manufacturing of mobile devices.

Notably, economies of scale are critical to achieve lower costs in materials and manufacturing. Large purchasers can leverage their scale to obtain better pricing terms than smaller volume purchasers, including local manufacturers (see discussion in Section 2.3.1). The total cost of entry-level devices estimated in Table 2.1 and Table 2.2 incorporates cost efficiencies achieved by large purchasers in current market conditions. While large-scale purchasing programs and other global partnerships could potentially bring costs down further (Box 2.5), the research and interviews undertaken for this report suggest that limited opportunities currently exist to significantly reduce this cost component.



### 2.2.3.3. Supply chain disruptions increase materials and manufacturing costs

Supply chain disruptions can have a direct impact on the availability and price of key components and material for entry-level devices (e.g., 3G/4G chipsets). External shocks directly affect prices of components and material. For example, during the COVID-19 pandemic, chipset prices increased by about 40–50 percent due to supply shortages resulting from the lockdowns. These prices have since returned to pre-pandemic levels but could still face upward pressure from continued lockdowns<sup>25</sup> or from geopolitical tensions. Similarly, when suppliers shift their production to more advanced, higher margin 5G and automotive (CV2x) semiconductors, pressure is put on the availability and pricing of entry-level device components (Box 2.5). These market trends have the potential to increase the costs of key inputs of entry-level devices (e.g., 3G/4G chipsets), creating challenges to meet affordability targets in the long run.

Supply chains are dynamic, and disruptions also affect firms' decisions regarding manufacturing locations. Geopolitical tensions coupled with COVID-19 disruptions have induced some companies to shift smartphone production to new markets. Notably, Apple and Google have moved some of their smartphone production outside China.<sup>26</sup> A portion of Apple's new iPhones and Google's new Pixel smartphones will be produced in India and Vietnam, respectively, rather than in China.<sup>27</sup> The U.S.-China trade war and mounting tensions between the U.S. and China regarding Taiwan, China have increased the perceived risk of Chinese-based supply chains for U.S. companies.<sup>28</sup> Similarly, Chinese companies like Huawei have also implemented strategies to cope with U.S. sanctions, including re-writing code (due to restrictions on access to Android OS) and redesigning specifications to minimize the impact of export controls.<sup>29</sup> As a result, long-term uncertainty in trade policy impacts global value chains, as firms tend to shift investment to more expensive, stable markets.<sup>30</sup> These shifts could potentially increase labor costs for manufacturing devices, thereby creating further challenges to meet affordability targets.

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- 25 Note that China still imposed lockdowns and restrictions due to COVID-19 during the last quarter of 2022. See Nectar Gan. 2.22. "China's manufacturing hub Guangzhou locks down millions as Covid outbreak widens." CNN, (November 9, 2022). <https://www.cnn.com/2022/11/09/china/china-covid-guangzhou-lockdown-intl-hnk/index.html>.
- 26 Daisuke Wakabayashi, and Tripp Mickle. 2022. "Tech Companies Slowly Shift Production Away from China." New York Times, (September 1, 2022). <https://www.nytimes.com/2022/09/01/business/tech-companies-china.html>.
- 27 Daisuke Wakabayashi, and Tripp Mickle. 2022. "Tech Companies Slowly Shift Production Away from China." New York Times, (September 1, 2022). <https://www.nytimes.com/2022/09/01/business/tech-companies-china.html>.
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- 29 Alex Capri. 2020. "Semiconductors at the Heart of the US-China Tech War: How a New Era of Techno-Nationalism Is Shaking up Semiconductor Value Chains, Hinrich Foundation, (Jan. 2020), p. 64. <http://www.industrialpolicy.us/resources/China%20tech%20war%20and%20semiconductors.pdf>.
- 30 The World Bank Group. 2020. "Trading for Development in the Age of Global Value Chains." pp. 114–115. <https://www.worldbank.org/en/publication/wdr2020>.

## Box 2.5. Impact of COVID-19 on mobile device manufacturing supply chain



The increased demand for smartphones and laptops during the COVID-19 pandemic, combined with disruptions in manufacturing as a consequence of lockdowns and reduced overall economic activity globally, created a supply shock and global chipset shortage.<sup>31</sup> As a consequence, semiconductor manufacturers refocused a large part of their supply from low-end products toward more profitable, high-end segments.<sup>32</sup> For example, Taiwan Semiconductor Manufacturing Company (TSMC), the world's leading semiconductor foundry, experienced market growth between 2020 and 2021 that was primarily driven by the expansion of 5G and high performance computing-related applications.<sup>33</sup> Prices of chipsets and other components for entry-level devices substantially increased during the pandemic due to lower supply (up to 40–50 percent),<sup>34</sup> but these prices have since returned to pre-pandemic levels.

Relatedly, semiconductor suppliers are also refocusing their production output. As seen in Figure 2.3, at year-end 2021, two manufacturers, MediaTek and UNISOC, covered almost 90 percent of the smartphone market under US\$99. Other suppliers, such as Qualcomm, HI Silicon, and Samsung are focused on the mid-range and higher-end device segments.<sup>35</sup> These trends have the potential of limiting the supply of key entry-level device components, ultimately exerting upward pressure on the total cost of these devices.

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31 Ian King, Debby Wu, and Demetrios Poghas. 2021. "How a Chip Shortage Snarled Everything from Phones to Cars." Bloomberg, (March 29, 2021). <https://www.bloomberg.com/graphics/2021-semiconductors-chips-shortage/>.

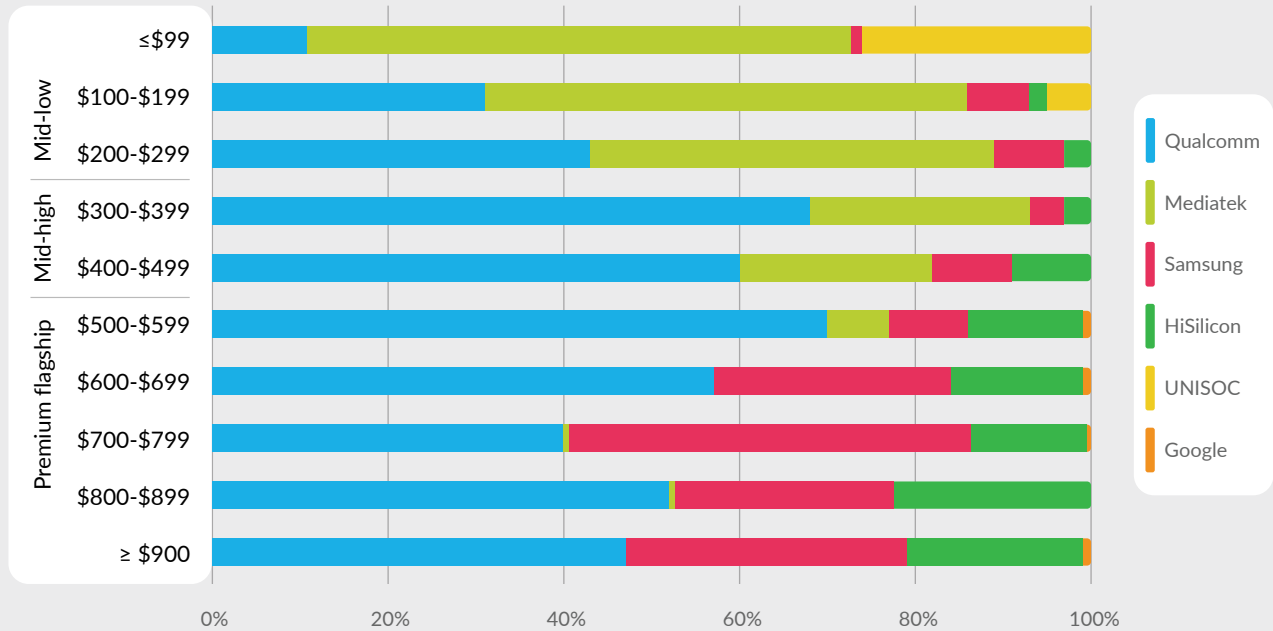
32 TMG interview with KaiOS, (June 20, 2022).

33 TSMC, TSMC Annual Report 2021 (I), p. 4 (March 12, 2022). [https://investor.tsmc.com/sites/ir/annual-report/2021/2021%20Annual%20Report\\_E.pdf](https://investor.tsmc.com/sites/ir/annual-report/2021/2021%20Annual%20Report_E.pdf).

34 TMG interview with KaiOS, (June 20, 2022).

35 Shivani Parashar. 2022. "Android Smartphone SoC Market: MediaTek Leads in Low-Mid Tiers, Qualcomm in Upper." Counterpoint, (March 11, 2022). <https://www.counterpointresearch.com/android-smartphone-soc-market-2021/>.

Figure 2.3. Global Android smartphone AP chipset volume share by wholesale price band, 2021



Source: TMG/A4AI research, Counterpoint Research.

**Key finding 2.1. Cost reduction opportunities in material and manufacturing**

Key Finding: Materials and manufacturing costs have been optimized significantly for entry-level devices over the last decade. This presents a limited opportunity to significantly reduce this cost component further in the short term, and major cost savings should likely target other links in the value chain. However, global partnerships can be implemented to further promote efficiencies in manufacturing and bring down costs of entry-level devices.

**2.2.4. Taxation and import duties**

Taxation can be a major cost driver for entry-level devices in many markets. Mobile devices are often subject to indirect taxes, such as import duties, value added tax (VAT), general sales tax (GST), or excise tax, among others. These indirect taxes are levied through a consumption channel rather than directly on the income of an individual or firm. And typically, they are collected by the seller from the buyer on the supply of goods or services.

### 2.2.4.1. Common government objectives pursued by taxing mobile devices

The impact of taxation on the total cost of entry-level devices varies between countries based on the goals of national fiscal policies. Governments pursue different objectives when taxing mobile devices. Some may seek to use fiscal policy to incentivize digital services adoption by exempting or reducing taxations of handsets, particularly entry-level devices. Others use taxation of mobile devices as a means of generating revenue for fiscal coffers. Taxation can also be used as a vehicle to promote local manufacturing or assembly of mobile devices by increasing the cost of imported ones (Box 2.6). These objectives are not exhaustive, and some countries may pursue a combination of these (and potentially other) objectives.

#### Box 2.6. Key costing terms used in this report

**Promotion of digital service adoption**—Fiscal policies can be used to promote the take-up of digital services and devices, including smartphones. The goal is to reduce tax burdens on such devices, thus bringing the total cost and the retail prices down to achieve affordability targets. This is particularly relevant for entry-level devices focused on the lowest-income segments of the population. A tiered approach is often used to implement these tax exemptions, with rates increasing as the cost of the device exceeds certain thresholds set forth in the tax code. Countries like Colombia (tiered approach) and Rwanda (blanket exemption) have used tax exemptions to promote digital service adoption.

**Revenue generation**—In some jurisdictions, mobile service is still seen as a luxury and mobile handsets (smartphones in particular) as sumptuary goods. This often triggers significant tax burdens, both for the importation of devices as well as for their sale. In some countries, like the Democratic Republic of Congo, this can represent upward of 50 percent of the total cost of the device. While taxation is a legitimate policy tool to generate fiscal revenues, especially in low- and middle-income countries, increased tax burdens can lead to the higher cost of mobile devices that are then passed on to consumers. Moreover, these policies often unintentionally fuel grey market activities. These grey market transactions are outside manufacturers' distribution networks and can include the trade in counterfeit or smuggled devices and tax evasion in the sale of devices.

**Promotion of local manufacturing/assembly**—Fiscal policies can also be wielded to promote the local production of mobile devices. Increased import and sales taxes are used as part of broader industrial policies to develop national manufacturing facilities, create jobs, and support the local electronics industry by making it more expensive to import foreign-made devices. This approach has been used in countries such as Pakistan or India, among others, to encourage local manufacturing or assembly of mobile devices (see further discussion in Box 2.7 and Section 2.3).

*Source:* TMG/A4AI research.



## 2.2.4.2. Taxation of entry-level devices varies widely between countries

A large variation exists between countries regarding the way they tax entry-level devices, including in the target countries. Colombia and Rwanda have used tax exemptions on import duties and VAT to reduce the cost of mobile devices and promote digital services adoption. In Colombia, VAT exemptions apply to devices costing less than US\$200,<sup>36</sup> and no import duties apply to mobile devices.<sup>37</sup> Rwanda has adopted a broader approach, exempting all mobile device sales from import duties<sup>38</sup> and VAT.<sup>39</sup> Nigeria, on the other hand, has opted for a revenue generation approach, levying VAT<sup>40</sup> and import duties<sup>41</sup> on all mobile handsets, including entry-level devices. In the aggregate, these taxes represent an estimated 14 percent of the total cost of an entry-level device in Nigeria.

Pakistan uses taxation of mobile devices to support a broader industrial policy aimed at promoting local assembly of devices in the country (Box 2.7). Sales tax and import duties vary depending on the C&F value of the device, but disproportionately impact devices valued above US\$30, including certain classes of entry-level devices. Because of this threshold, for example, a low-cost smartphone with C&F value of around US\$40 (as shown in Table 2.1, by adding FOB and freight costs) is subject to a combined tax burden (sales tax plus import duties and fees) that is almost eight times higher than a smart feature phone with a C&F value of US\$22 (see Table 2.2). These types of tax policies would appear to incentivize the import and sale of less advanced devices, such as basic feature phones. In addition, the results of industrial policies to promote local manufacturing and assembly of mobile devices appear to be mixed in Pakistan, resulting mostly in the assembly of basic feature phones (see discussion in Section 2.3.2).

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- 36 Basic feature phones and smartphones with retail prices under COP 836,008 (~US\$200) are exempted from VAT. See Ministry of Finance and Public Credit, Bulletin No. 180: Excluding VAT for mobile devices and computers, Colombian households saved \$891 billion (August 30, 2017). [https://www.minhacienda.gov.co/webcenter/content/conn/ConexionContent/path/Enterprise%20Libraries/Minhacienda/saladeprensa/Boletines/2017/Boletin\\_180\\_Exclusi%C3%B3n\\_IVA\\_celulares\\_tabletas\\_computadores\\_TIC\\_30\\_08\\_2017.pdf](https://www.minhacienda.gov.co/webcenter/content/conn/ConexionContent/path/Enterprise%20Libraries/Minhacienda/saladeprensa/Boletines/2017/Boletin_180_Exclusi%C3%B3n_IVA_celulares_tabletas_computadores_TIC_30_08_2017.pdf). According to Article 1.3.1.12.10 of Decree 1625 of 2016 on Tax Matters, smart mobile devices (tablets or cell phones) are exempted from VAT, provided the price of the device does not exceed 22 Tax Unit Values (UVT). See Government of Colombia, Decree 1625 of 2016 (integrated version with its modifications), (February 3, 2022). <https://www.funcionpublica.gov.co/eva/gestornormativo/norma.php?i=83233#1.3.1.12.10>. In 2022, the National Directorate of Taxes and Customs (DIAN) set the UVT at COP 38,004 (around US\$9.74). See DIAN, UVT applicable for the year 2022, p. 1 (November 2021). <https://www.dian.gov.co/normatividad/Proyectosnormas/Proyecto%20Resoluci%C3%B3n%20000000%20de%2008-11-2021.pdf>.
- 37 See DIAN. 2022. "Tariff inquiries: merchandise profile 8517.13.00.00." (January 1, 2022). <https://muisca.dian.gov.co/WebArancel/DefResultadoConsNomenclaturas.faces>.
- 38 As part of the East African Community (EAC) Customs Union, Rwanda does not charge an import duty for telephones for cellular or wireless networks. See RRA, East African Community Common External Tariff 2017 Version, p. 249 (2017). [https://www.rra.gov.rw/fileadmin/user\\_upload/eac\\_cet\\_2017.pdf](https://www.rra.gov.rw/fileadmin/user_upload/eac_cet_2017.pdf).
- 39 In Rwanda mobile telephones are exempt from VAT pursuant to article 6 of Law N°37/2012 of 09/11/2012. See RRA, LAW N°37/2012 OF 09/11/2012 Law Establishing the Value Added Tax, p. 21 (May 2, 2013). [https://www.rra.gov.rw/fileadmin/user\\_upload/new\\_vat\\_law\\_2013\\_law\\_no\\_37.pdf](https://www.rra.gov.rw/fileadmin/user_upload/new_vat_law_2013_law_no_37.pdf)
- 40 The normal VAT rate in Nigeria is 7.5 percent, which applies to all goods and services. No exception for entry-level devices has been granted in Nigeria. See Federal Inland Revenue Service, (June 3, 2021). <https://www.firs.gov.ng/wp-content/uploads/2021/06/CLARIFICATION-ON-THE-IMPLEMENTATION-OF-THE-VALUE-ADDED-TAX-VAT-ACT.pdf>.
- 41 Nigeria charges an import duty of 10 percent on smartphones and other telephones for cellular or wireless networks. See Nigerian Customs Service, CET Tariff Chapter 85, p. 13. <https://customs.gov.ng/wp-content/uploads/2022/05/Chapter-85.pdf>.

Table 2.3 summarizes the taxes imposed on mobile devices in the target countries.

**Table 2.3. Overview of applicable taxes on entry-level devices in target markets**

Country	Sales tax or VAT for mobile devices	Import duty for mobile devices	Policy objective
<b>Colombia</b>	19%, smartphones less than 22 Tax Units (UVT), or COP 836,008 (US\$201.02) are exempted.	0%	Digital service adoption
<b>Nigeria</b>	7.5%	10%	Revenue generation
<b>Pakistan</b>	Ranges from PKR 100 (US\$0.48) to PKR 16,000 (US\$77.14) based on the cost and freight (C&F) value of the mobile phone.	Yes (amount depends on several factors as discussed in Box 2.7).	Promote local assembly
<b>Rwanda</b>	Exempt	0%	Digital service adoption

Source: TMG/A4AI research

### Box 2.7. The use of import duties on mobile devices to support local assembly in Pakistan

Tax policies levied on mobile devices in Pakistan are aimed at supporting a broader industrial policy to promote local manufacturing and the assembly of mobile devices.<sup>42</sup> This is evidenced by the duties imposed on imported mobile devices and exemptions applied for smartphone and mobile phone inputs imported by a manufacturer certified/approved by the Pakistan Telecommunications Authority (PTA). Tax policies on smartphones and other handsets that seek to support local industry, however, may not be the most beneficial for consumers (see Section 2.3.2).

Table 2.7.1 presents import duties levied on mobile devices in Pakistan. A first observation is that, while these apply to all mobile handsets based on price ranges, they affect entry-level devices disproportionately. Import duties are over six times higher for entry-devices valued above the US\$30 threshold, particularly low-cost smartphones with C&F values between US\$30–50.

42 See Government of Pakistan, Mobile Device Manufacturing Policy 2020, p. 16. [https://invest.gov.pk/sites/default/files/in-line-files/Mobile-Device-Manufacturing-Policy\\_0.pdf](https://invest.gov.pk/sites/default/files/in-line-files/Mobile-Device-Manufacturing-Policy_0.pdf).

**Table 2.7.1. Rate of duty and taxes on mobile phones in Pakistan (2021–22)**

**Rate of duty and taxes on mobile phones (2021–22)—with passport applied within 60 days of arrival in Pakistan**

S.No.	Mobile phones having C&F value (US\$)	Fixed rate (amount in Pak RS)
1	Up to 30	430
2	Above 30 and up to 100	3200
3	Above 100 and up to 200	9580
4	Above 200 and up to 350	12,200 + 17% sales tax ad valorem
5	Above 350 and up to 500	17,800 + 17% sales tax ad valorem
6	Above 500	27,600 + 17% sales tax ad valorem

**Rate of duty and taxes on mobile phones (2021–22)—applied with computerized national identity card (CNIC)**

S.No.	Mobile phones having C&F value (US\$)	Fixed rate (amount in Pak RS)
1	Up to 30	550
2	Above 30 and up to 100	4,323
3	Above 100 and up to 200	11,561
4	Above 200 and up to 350	14,661 + 17% sales tax ad valorem
5	Above 350 and up to 500	23,420 + 17% sales tax ad valorem
6	Above 500	37,007 + 17% sales tax ad valorem

**Source:** Federal Board of Revenue.

However, as a measure to support local manufacturing and assembly of mobile devices, the Fifth Schedule of the Customs Act exempts raw materials/inputs for smartphones and cellular mobile phones from customs duty.<sup>43</sup> Furthermore, there is no customs duty for inputs for smartphones and cellular mobile phones in a CKD/SKD condition if:

- (i) Imported by local assemblers/manufacturers duty certified by Pakistan Telecommunication Authority (PTA) subject to quota determination by the Input Output Co-efficient Organization (IOCO).

<sup>43</sup> Federal Board of Revenue, Pakistan Customs Act 1969: Fifth Schedule, pp. 66–67, (June 30, 2022). <https://download1.fbr.gov.pk/Docs/2022711272031370FifthScheduletotheCustomsAct,1969.pdf>.

- (ii) Imports shall be subject to production of type approval certificate from the PTA.
- (iii) Local assemblers/manufacturers shall furnish a consignment-wise network operations center (NOC) from the PTA.<sup>44</sup>

Pakistan also imposes a sales tax and income tax withholding on mobile phones, with certain exceptions. The Finance Act of 2022 outlines the sales tax for mobile phones based on the C&F value of the device.<sup>45</sup> The sales tax ranges from PKR 100 (US\$0.48) to PKR 16,000 (US\$77.14), as outlined in Table 2.7.2.<sup>46</sup> The Income Tax Ordinance sets forth the income tax withholding applicable to the importation of completely built units (CBU) or CKD/SKD units.<sup>47</sup> The income tax ranges from PKR 70 (USD 0.33) to PKR 11,500 (USD 55,44), as shown in Table 2.7.3. While the nominal amount of these taxes is not as significant as import duties, low-cost smartphones with a C&F value above US\$30 are again taxed at higher rates than other entry-level devices valued below such a threshold.

**Table 2.7.2. Sales tax for mobile phones in Pakistan**

Mobile phones having C&F Value (US\$)	Rate of levy per set in PKR
Up to 30	100
Above 30 and up to 100	200
Above 101 and up to 200	600
Above 201 and up to 350	1,800
Above 351 and up to 500	4,000
Above 501 and up to 700	8,000
Above 701 and above	16,000

**Source:** Finance Act 2022.

44 Federal Board of Revenue, Pakistan Customs Act 1969: Fifth Schedule, pp. 66–67, (June 30, 2022). <https://download1.fbr.gov.pk/Docs/2022711272031370FifthScheduletotheCustomsAct,1969.pdf>.

45 Federal Board of Revenue, Pakistan Customs Act 1969: Fifth Schedule, p. 110, (June 30, 2022). <https://download1.fbr.gov.pk/Docs/2022711272031370FifthScheduletotheCustomsAct,1969.pdf>.

46 Federal Board of Revenue, Pakistan Customs Act 1969: Fifth Schedule, pp. 66–67, (June 30, 2022). <https://download1.fbr.gov.pk/Docs/2022711272031370FifthScheduletotheCustomsAct,1969.pdf>.

47 Federal Board of Revenue, Income Tax Ordinance, 2001, (updated up to June 30, 2022), p. 473. <https://download1.fbr.gov.pk/Docs/20227141271849173IncomeTaxOrdinance2001Amendedupto30june2022.pdf>.

**Table 2.7.3. Income tax for mobile phones in Pakistan**

S.No.	C&F value of mobile phone (US\$)	Tax (in Rs.)	
		In CBU condition PCT Heading 8517.1219	IN CKD/SKD condition under PCT Heading 8517.1211
1	Up to 30 except smart phones	100	0
2	Exceeding 30 and up to 100 and smart phones up to 100	200	0
3	Exceeding 100 and up to 200	600	0
4	Exceeding 200 and up to 350	1,800	0
5	Exceeding 350 and up to 500	4,000	3,000
6	Exceeding 500	8,000	2,500

**Source:** Income Tax Ordinance (updated to 2022).

Lastly, Pakistan levies a regulatory duty (RD) on the import of mobile devices.<sup>48</sup> As shown in Table 2.7.4, this represents a significant burden on devices in CBU condition imported into the country, including entry-level devices with a C&F value above US\$30 but below US\$50, which are subject to an RD equal to PKR 3,000 (US\$14.46).

**Table 2.7.4. Regulatory duty for mobile phones in Pakistan**

S.No.	C&F value of mobile phone (US\$)	Tax (in Rs.)	
		In CBU condition	In CKD/SKD
1	Up to 30 except smart phones	300	5
2	Exceeding 30 and up to 100 and smart phones up to 100	3,000	5
3	Exceeding 100 and up to 200	7,500	5
4	Exceeding 200 and up to 350	11,000	5
5	Exceeding 350 and up to 500	15,000	5
6	Exceeding 500	22,000	5

**Source:** Ministry of Finance and Revenue, S.R.O 966(I)/2022.

48 See Ministry of Finance and Revenue, S.R.O 966(I)/2022, (June 30, 2022).

### 2.2.4.3. Tax reductions present an opportunity to make mobile devices more affordable

Taken together, taxes and duties often represent a high percentage of the total cost of mobile devices. In some countries, the combined tax burden can be as high as 30–40 percent of the device's total cost. Tax reductions therefore can provide an opportunity to lower the total cost to make entry-level devices more affordable. This of course represents a trade-off between the potential reduction of fiscal revenues (at least in the short term) derived for lowering tax burdens on entry-level devices on the one hand and economic and social benefits of promoting access to digital services and devices on the other (Box 2.8).

#### Box 2.8. Assessment of tax reductions for entry-level devices

Proposals to reduce or exempt taxes and import duties are often met with understandable resistance as they can negatively impact fiscal revenue targets. However, while taxes on mobile devices provide short-term revenue gains, they also increase the cost of entry-level device ownership and can negatively impact achievement of government policies supporting digital transformation and inclusion.

Evidence indicates that reductions in taxes lead to increased penetration of internet-enabled devices, which in turn can translate into increased consumption of digital services and other services accessible through digital platforms. Increased connectivity generates revenue for the government through higher economic activities and taxes levied. For example, the 2009 exemption of 16 percent VAT on mobile handsets in Kenya has been estimated to have resulted in over a 200 percent increase in the sale of mobile devices and increased subscriber penetration, from 29 percent to about 40 percent in the following three years.<sup>49</sup>

When considering these options, policy makers should thus assess the potential short- and long-term economic and social benefits of reducing taxes and import duties on mobile devices, including the economic benefits of the increased use of e-government and e-commerce services, weighed against revenue impacts.

*Source:* Based on ITU Broadband Commission, GSMA.

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<sup>49</sup> See also GSMA. 2017. "Taxing mobile connectivity in Sub-Saharan Africa. A review of mobile sector taxation and its impact on digital inclusion", p. 24. [https://www.gsma.com/publicpolicy/wp-content/uploads/2017/10/Taxing-mobile-connectivity-in-Sub-Saharan-Africa\\_2017.pdf](https://www.gsma.com/publicpolicy/wp-content/uploads/2017/10/Taxing-mobile-connectivity-in-Sub-Saharan-Africa_2017.pdf).

Many countries have recently chosen to reduce taxes and duties on mobile devices to promote the increased penetration of digital services and devices. For example, Chad had one of the highest combined tax burdens on mobile devices, including a 30 percent import duty and an 18 percent VAT on the sale of mobile devices.<sup>50</sup> In January 2022, however, the Ministry of Finance and Budget exempted mobile devices from import duties for a five-year period. This was done with the aim of promoting digital transformation of the economy and fostering internet adoption.<sup>51</sup> Similarly, countries such as Lesotho, Malawi, and Togo have also exempted mobile devices from import duties. By contrast, other countries appear to be reinstating levies on imports of mobile devices, such as Kenya where a 10 percent excise levy on the importation of mobile devices was imposed in June 2022 (although the proposed Finance Bill 2022 did not include this new tax).<sup>52</sup>

#### 2.2.4.4. Monetary policy and foreign exchange rate fluctuations can also impact entry-level device costs

Monetary policy can also have an impact on the total cost of devices. First, limitations or controls on access to foreign currency can impact retail prices of entry-level devices and stall local assembly and manufacturing. As noted, entry-level devices, or parts and components used to repair, manufacture, or assemble such devices locally, are typically imported into the destination market. To do so, importers require unencumbered access to foreign currency to pay international suppliers. Because devices are sold in local currency, stakeholders within the distribution value chain need to convert that local currency into foreign currency to continue importing devices to meet demand. Foreign currency restrictions constrain imports, and hence the supply of imported devices, thus putting upward pressure on prices. Similarly, limited access to foreign currency can stifle the local manufacturing and assembly of mobile devices, starving the industry of the parts and components it needs to operate their businesses. This effect played out in Pakistan during 2022, as further discussed in Section 2.3.2.

Second, large exchange rate fluctuations also impact retail prices of entry-level devices. In low- and middle-income markets local currency is often volatile and depreciates against the U.S. dollar quickly. Since devices are imported, old stock may be sold at the old exchange rate (although importers will likely factor in depreciation), but the price of new stock in local currency must be adjusted upward. This may lead to a reduction in imports and an increase in the average prices of imported devices. Because incomes do not increase proportionately, this iterative process of price adjustments in local currency can also affect the affordability of entry-level devices for low-income consumers.

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50 GSMA. 2017. "Taxing mobile connectivity in Sub-Saharan Africa. A review of mobile sector taxation and its impact on digital inclusion", p. 14. [https://www.gsma.com/publicpolicy/wp-content/uploads/2017/10/Taxing-mobile-connectivity-in-Sub-Saharan-Africa\\_2017.pdf](https://www.gsma.com/publicpolicy/wp-content/uploads/2017/10/Taxing-mobile-connectivity-in-Sub-Saharan-Africa_2017.pdf).

51 See Ministry of Finance and Budget, Arrete No. 017/PCMT/PMT/MFB/SG/DGSDDI/2022, (Jan. 22, 2022). <https://finances.gouv.td/index.php/component/k2/item/640-arrete-n-017-pcmt-pmt-mfb-sg-dgsddi-2022-portant-exoneration-des-droits-et-taxes-a-l-importation-des-telephones-pour-reseaux-cellulaires-sans-fil-telephones-portables-et-smartphones-de-tout-type-et-les-machines-automatiques-de-traitement-de-l-info>.

52 Finance Act 2022 Section 35(d)(2)(7), (June 23, 2022). <https://kra.go.ke/images/publications/Finance--Act-2022.pdf>.



### **Key finding 2.2. Cost reduction opportunities in taxes and duties**

Key Finding: In many countries, significant opportunities exist to reduce the total cost of entry-level devices by lowering tax burdens. Combined import duties and other national taxes, such as sales tax or VAT, can represent a percentage close to 30–40 percent of the total cost of devices. However, given how critical tax cashflows can be for many governments in developing countries and emerging markets, any tax cuts to stimulate increased mobile handset adoption should be thoroughly investigated to first estimate overall impact on both revenue through increased adoption and broader digital inclusion objectives.

In addition, ensuring access to foreign currency is critical to facilitate the supply of entry-level devices and control cost structures. Similarly, exchange rate stability can contribute to limiting fluctuations in retail prices of entry-level devices.

## **2.2.5. Development costs, operations, and profit margins**

Development costs, operations, and profit margins compensate the lead firm responsible for designing and bringing entry-level devices to the market. Two types of suppliers primarily act as lead firms: (i) OEMs and (ii) MNOs.

OEMs such as Transsion, Xiaomi, Vivo, and Oppo, among others, develop, design, and sell entry-level devices through their various brands. These are made available across multiple low- and middle-income markets in Africa, Asia, and Latin America, often having regional or even global footprints. The research and development (R&D) process may involve various degrees of product customization to target market segments or regions with specifications that local consumers value (e.g., cameras, pre-installed applications). In the case of entry-level devices, such customization targets the needs of first-time internet users, including basic functionalities and a suite of relevant applications, and must be scalable to achieve cost efficiencies. Otherwise, overcustomization may, in the aggregate, further increase the costs of these types of devices.

OEM margins vary between companies and from country to country and even among the devices/brands an OEM may sell within a market. Their business model requires that these development costs, overhead, and profit margins be recouped primarily from the sale of devices. OEM development, costs, operations, and profit margins can range from 5–10 percent of the total cost of the device. Large OEMs may compress operational and profit margins down to 1–2 percent when they have strong incentives to move large volumes or promote a particular brand or device to penetrate and compete in a market (Box 2.10). Some smaller OEMs may even forego margins during start-up phases to establish brand recognition and gain market share (see Section 2.3.1).

MNOs also develop and commercialize own-branded devices in the markets where they are active. This is a common practice by MNOs in low- and middle-income markets in regions such as Asia and Africa.

MNOs have different incentives than OEMs, often launching own-branded phones to increase take-up, and hence service consumption on their networks. To do so, in many cases MNOs bundle own-branded devices (and OEM devices) with connectivity packages or data allowances for a promotional period. In the case of entry-level devices, this strategy has the added benefit of further reducing the recurring service costs for first-time internet users, with the aim of phasing in service consumption and payment streams for MNOs.

In addition, MNOs can leverage own-branded devices, and the adoption of smartphones in general, as part of a strategy to promote technology evolution by migrating subscribers to more advanced mobile data services. These commercial policies, often underpinned by trade-in incentives of old devices, deferred payment plans, and other similar incentives, help MNOs transition their user base (e.g., from 2G to 3G to 4G services and beyond), facilitating the shutdown of less efficient networks and the refarming of valuable spectrum resources.<sup>53</sup> This process will be particularly relevant in countries like Rwanda where until recently only KT Rwanda Networks (KTRN) was allowed to deploy 4G networks, creating disincentives for MNOs to promote mobile technology upgrades and also smartphone adoption. The recent termination of KTRN's exclusivity is expected to drive MNOs to incentivize technology and device transition among their user bases.

To achieve these goals, MNOs often forgo development costs, and operations and profits margins on own-branded devices. These subsidies (as well as other MNO device subsidies) are used in low average revenue per user (ARPU) markets to reduce costs of devices and increase smartphone penetration. Recent examples include the JioPhone Next smartphone in India,<sup>54</sup> the Jazz Digit 4G smart feature phone in Pakistan,<sup>55</sup> Vodacom's Smart Kicka 2 phone in South Africa, Lesotho, and Mozambique,<sup>56</sup> and Orange's Sanza Touch smartphone sold in multiple African markets (Box 2.9).

The ability to set the margin for this cost component at zero, and granting other subsidies on devices they sell, pivots on the MNOs' ability to recoup these costs from expected increased service revenue and other operational efficiency gains. These strategies vary based on an MNO's commercial strategy for a particular market and its projected ability to recover such up-front costs within a particular timeframe in a timely manner (often between 6–12 months).

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53 Vodacom. 2021. "A lifeline, not a luxury Accelerating 4G access in Sub-Saharan Africa." p. 21. <https://www.vodafone.com/about-vodafone/how-we-operate/public-policy/africa-connected>.

54 The JioPhone Next is a 4G smartphone was launched in 2021 by Jio (an Indian MNO) in partnership with Google. See <https://www.jio.com/next>.

55 This KaiOS-enabled smart feature phone was launched in 2020 by Jazz (the largest MNO by subscribers in Pakistan) and Swift Biz Solutions (Digit) a local technology company. See <https://jazz.com.pk/digit4g>.

56 The Smart Kicka 2 phone was launched in 2016 by Vodacom Group. See [www.vodafone.com/sites/default/files/2021-09/Vodafone\\_Africa\\_Access\\_Paper.pdf](http://www.vodafone.com/sites/default/files/2021-09/Vodafone_Africa_Access_Paper.pdf).

## Box 2.9. Assessment of retail prices of Orange’s Sanza Touch in Africa

In October 2020, Orange launched the Sanza Touch smartphone in partnership with Google with the goal of “driving digital inclusion and providing more people access to the mobile internet.”<sup>57</sup> Targeting an initial retail price of around US\$30 (with a bundled service plan in certain markets), the Sanza Touch was offered by Orange as an ultra-affordable option for first-time Internet users in its African markets.

Almost two years after the launch, significant variation can be observed between the retail prices of Sanza Touch devices across the 11 markets where it is still available. As of June 2022, in four of these markets the device was being sold at or below the US\$30 reference price while in six countries it was offered through a service bundle or with a credit bonus (Table 2.9.1). However, retail prices of the Orange Sanza Touch range widely—with the lowest price published online by Orange being one-third of the highest price (US\$21.33 in Sierra Leone vs. USD 67.54 in Guinea).

Table 2.9.1. Retail prices of Sanza Touch in select African markets, June 2022

	Retail price (US\$)	Add-on offer
Sierra Leone	21.33	N/A
Guinea Bissau*	25.55	N/A
Mali	28.75	Includes 2 GB of mobile data for 3 weeks
Senegal*	30.19	Includes 3 GB of mobile data
Liberia	32.00	N/A
Cameroon	36.58	N/A
Morocco**	43.38	Includes 10 GB of mobile data
Central African Republic	46.16	Includes 500 F bonus credit (USD 0.8)
Burkina Faso	46.32	Includes 20 GB (10GB per month for 2 months)
Madagascar**	50.49	N/A
Guinea	67.54	Include 1 GB for 15 days

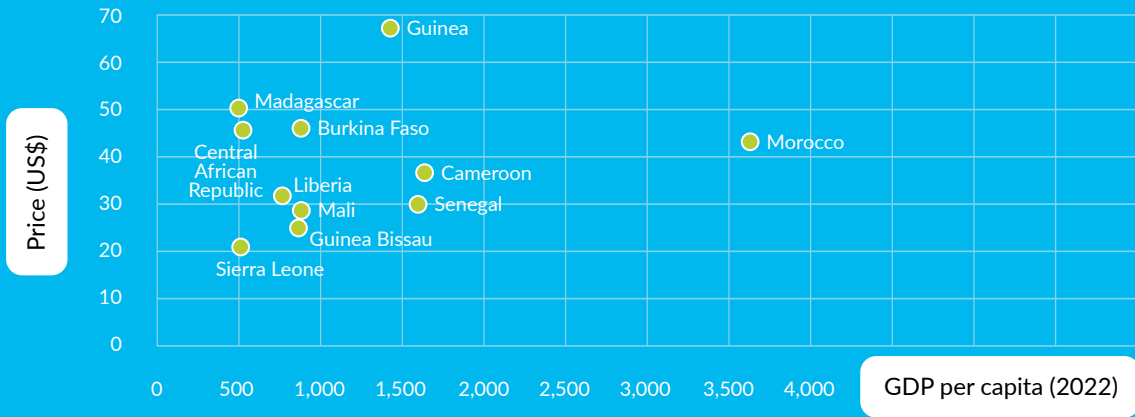
**Note:** \*No VAT or sales tax applies in Guinea Bissau and Senegal. \*\*Published retail prices in Madagascar and Morocco were increased to include an applicable 20 percent VAT. In all the other countries, prices published by Orange indicate that they include all applicable taxes.

**Source:** TMG/A4AI based on Orange online pricing data and Oanda exchange rates.

57 See Orange improves access to mobile Internet in Africa supported by Google, Press Release, Sept. 29, 2020. <https://orange.africa-newsroom.com/press/orange-improves-access-to-mobile-internet-in-africa-supported-by-google?lang=en>.

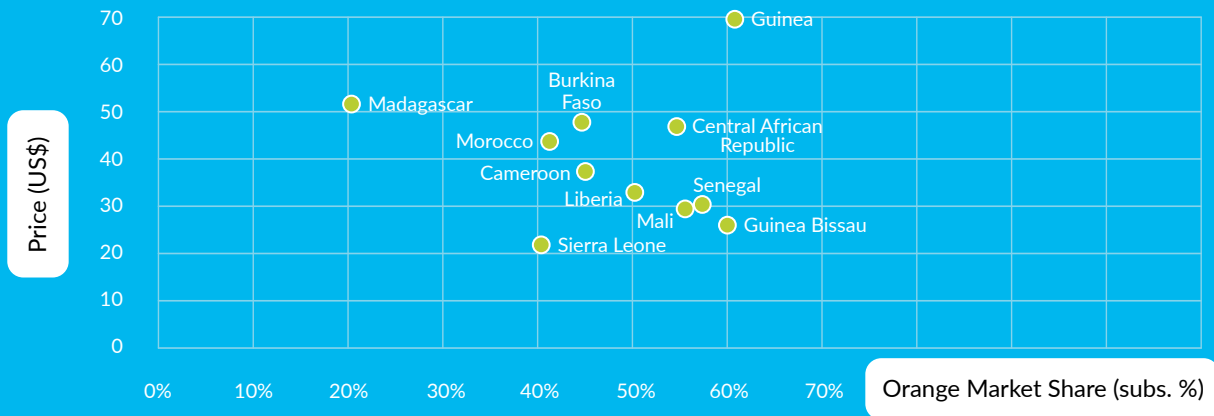
The large variation observed is not explained by underlying cost structure as it is the same device, distributed by the same lead firm. Taxation also does not appear to be at the root of these differences. For example, while taxes on devices in Guinea are indeed high (10 percent import duty and 18 percent VAT), tax burdens are also high in Sierra Leone (5 percent import duty and 15 percent VAT). Income differences among countries do not explain the large variation in retail prices either, as higher prices are not being charged in countries with relatively higher incomes (Figure 2.9.1). Similarly, the level of competition, proxied by Orange’s relative market share in each country, also does not seem to be behind the differences in retail prices (Figure 2.9.2).

**Box 2.9.1. GDP per capita (2022) and Sanza Touch retail prices in selected countries**



Source: TMG/A4AI based on IMF and GSMA data.

**Box 2.9.2. Orange market share (subs) and Sanza Touch retail prices in selected countries**



Source: TMG/A4AI based on IMF and GSMA data.

Commercial strategies and an interest in moving existing inventories of available devices likely determine retail price differences among the 11 markets observed. Orange’s pricing decisions demonstrate its control over the cost structure and inventories of the Sanza Touch and highlight MNO’s ability to impact affordability thresholds of own-branded devices by subsidizing costs when this aligns with its broader commercial objectives, even in low ARPU markets.

Table 2.4 summarizes the key approaches to development cost, operation and profit margins by OEMs and MNOs.

**Table 2.4. Comparison of approach to development, cost, operation, and profit margin by lead firm**

	OEM	MNO
<b>Examples</b>	Transsion, Xiaomi, Vivo, Oppo	Orange, Vodafone/Vodacom, MTN, Jazz, Reliance
<b>Geographic scope</b>	Can achieve regional/global footprint	Limited to countries where the MNO is active; but MNOs are often active in multiple countries within a specific region
<b>Cost recovery and profit margins</b>	Primarily obtained from the sale of devices	Can be obtained from the sale of connectivity and other services
<b>Lowest observed margin</b>		0%

*Source:* TMG/A4AI research

### **Key finding 2.3. Cost reduction opportunities in lead firm margins**

**Key Finding:** Limited opportunities exist to further lower the total cost of entry-level devices by compressing lead firm margins. OEMs are known to reduce their margins from 5–10 percent to 1–2 percent of total cost of the device based on commercial incentives. Similar strategies could be applied to entry-level devices to increase sales volumes. MNO margins for own-branded entry-level devices, on the other hand, are often set at zero, with MNOs recouping these costs from increased service revenue and other operational efficiency gains. In this scenario, further cost reductions may not be feasible.

## **2.2.6. Distribution and marketing costs**

Distribution and marketing costs compensate firms that import, intermediaries that distribute and retailers that sell devices. Distributor margins amount, on average, to about 5 percent of total cost, while sales and marketing costs range from 10-20 percent of total cost of mobile devices.

### 2.2.6.1. Approaches to reducing distribution costs

Distribution of mobile devices involves bringing the device into the destination market (if not manufactured or assembled locally) and then ensuring consumers can access devices at points of sale of their choosing. This typically requires multiple intermediaries that import devices, warehouse, and then distribute them to retailers. Costs vary depending on country, geography, and location of the retail outlets. For example, distributing devices in remote, rural areas is generally more expensive than in urban areas due to higher transportation costs. While distributors often bundle the costs of distribution of devices within a country into a single price quote independent of destination (rural vs. urban), it can be expected that this cost driver will likely impact policies to promote affordability of entry-level devices, as a significant proportion of devices will likely need to be distributed to remote, rural areas.

Strategies to optimize the distribution and sales chain by engaging in “just-in-time” manufacturing and importation of devices to avoid warehousing costs; reducing the number of intermediaries that import and distribute devices; and negotiations to compress sales margins by achieving high volumes of sales can result in important cost savings. Combined, these strategies have been implemented by large OEMs to decrease distribution and sales costs in some African markets by nearly 50 percent (Box 2.10). That said, supply chain disruptions create risks to these sourcing models that may lead to upward pressure on prices.



## Box 2.10. Transsion distribution and marketing optimization strategies in Africa

Transsion, a mobile phone manufacturer based in Shenzhen, China produces three device brands that are popular in many African and Asian markets: Itel, Tecno, and Infinix. In the first quarter of 2022, Transsion held the largest unit share of the African smartphone market at 42.7 percent, and a 67.6 percent share of the feature phone market.<sup>58</sup> Several factors have played into Transsion's success in African markets, including optimization of its cost structure for distribution and sale of its devices. Interviews undertaken indicate that Transsion has been able to compress distribution, marketing, and sales costs of some of its most popular devices to about 14 percent, below the low end of the margin typically seen in the industry.

Transsion has taken several steps to increase efficiency in the distribution and sale of its devices leading to a decrease in costs. Devices are manufactured based on demand projections in its target markets. Just-in-time manufacturing and importation allows Transsion to ship and sell its devices directly to the target markets, rather than storing them in a warehouse in China, thus reducing costs. Similarly, this approach allows Transsion to procure parts and components for its devices at scale, also reducing manufacturing cost.

Devices are then shipped by sea to the destination market to reduce shipping costs. The company also keeps costs down by controlling the number of agents that import and distribute its devices and the prices these offer to retailers. It typically has one to two agents per brand in each of its destination markets that purchase products in China. For example, in Rwanda, there is one national agent for Techno, two for Itel, and one for Infinix. National agents distribute products to retailers on a weekly basis for fast-moving phones. This dynamic allowed Transsion to negotiate and compress agents' margins to about 4 percent of total cost of the device.

Transsion also limits the costs of marketing and sales to lower retail prices. It dedicates a limited budget to marketing and advertising. Instead, Transsion places promoters at retail locations that sell Transsion products. These promoters provide consumers with information on Transsion devices at the point of sale. Interviews indicate that retailers' margins depend on the device. For example, retailers receive around a 10 percent margin for fast-moving devices.

Transsion's strategy seeks to control costs along the various links of the distribution and sales value chain. Limitation of the number of importers and distributors, as well as embedding promoters into the sales channels of its devices, gives Transsion visibility and control over the cost structure of its devices to offer lower prices to consumers.

*Source:* TMG/A4AI research based on Transsion interview.

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58 IDC. 2022. "Africa's Smartphone Market Declines for Third Successive Quarter as Supply Chain Constraints Continue to Bite." (June 1, 2022). <https://www.idc.com/getdoc.jsp?containerId=prMETA49220122>.





### 2.2.6.2. Relevance of open market sales in many low- and middle-income countries

Mobile devices are typically sold via a combination of two main retail channels: (i) open market sales; and (ii) MNO sales. Open market sales involve the sale of mobile devices via independent sellers, typically small retailers that, in addition to other goods and services, commercialize mobile devices to consumers. In most low- and middle-income markets, these small, local stores are not linked to MNOs or OEMs and sell devices without SIM cards. In parallel, MNOs also control sales channels for devices in many markets. This involves devices sold directly by an MNO via online or offline stores or via networks of authorized representatives or resellers.

In Pakistan and Rwanda, between 90–95 percent of devices are sold in the open market.<sup>59</sup> This is a consequence of available distribution channels and the way the distribution market has evolved, with MNOs not focusing on device sales due to challenges associated with an overwhelming pre-paid subscriber base. Conversely, in Colombia up to 60 percent of devices are sold by MNOs (Box 2.11). The composition and structure of the sales channels has a direct impact on the potential strategies available and the number of potential stakeholders that must get involved to lower the total costs of devices.

In countries where devices are mostly sold in the open market, MNOs do not significantly engage in marketing practices to subsidize devices or bundle devices with airtime or data allowances. In these markets, strategies and policies to optimize distribution and sales costs and promote affordability of entry level devices will necessarily involve a more diverse group of stakeholders, including not only MNOs, but also OEMs, large importers, distributors, and sellers. Conversely, where MNOs play a larger role in the sale of mobile devices, they often have direct incentives to subsidize and bundle devices with their mobile service offering. In this scenario, MNOs play a key role in implementing strategies to limit distribution and sales costs and promote affordability of entry-level devices.

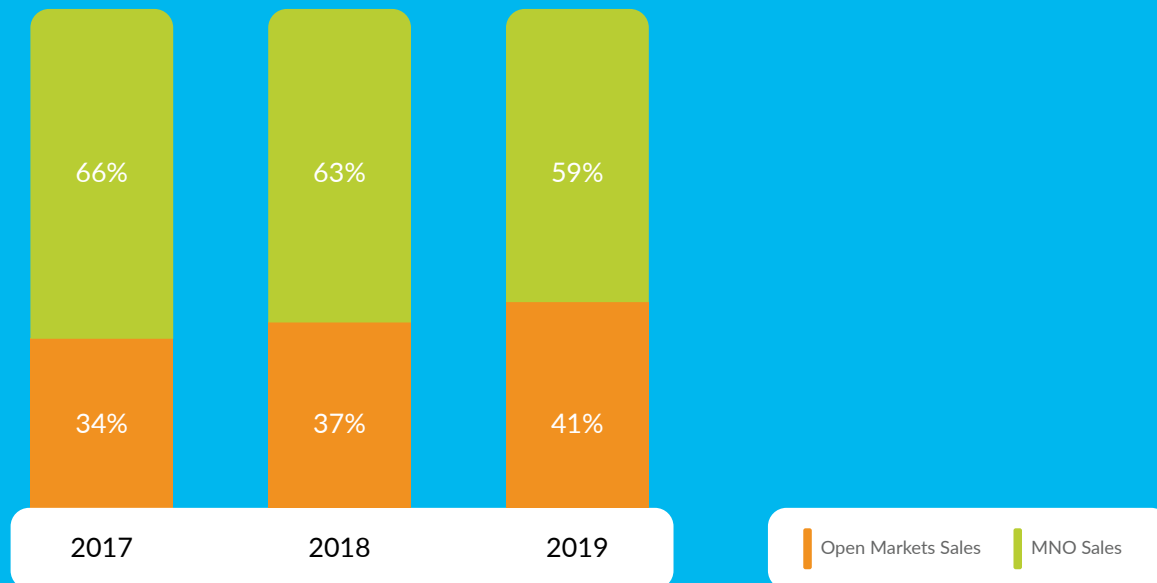
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<sup>59</sup> TMG interviews with Transsion, (June 22, 2022), MTN Rwanda (June 2022); TMG interview with Telenor, (August 29, 2022) and Ufone, (July 20, 2022) for Pakistan.

### Box 2.11. Sales channels for mobile devices in Colombia

In Colombia, the percentage of open market sales—via large chain stores—has increased over the last several years.<sup>60</sup> Diversification of sales channels brings new sellers into the market and benefits consumers with greater options in terms of available devices and financing offers. On average, retail prices of devices sold by MNOs (COP 829,235 or about US\$253) in Colombia were about 18 percent higher than those sold in the open market (COP 702,666 or about US\$214) in 2019.<sup>61</sup> As these price ranges suggest, most devices sold via both channels were mid-range devices (US\$120-230), representing 51 percent of MNO sales and 56 percent of open market sales in 2019 (Figure 2.11.1).

Figure 2.11.1. Market share by sales channel, Colombia



Source: TMG/A4AI research based on CRC data.

60 See CRC. 2021. "Data Flash 2021-004—Sale of Mobile Terminal Equipment." (Jan. 29, 2021). <https://www.postdata.gov.co/dataflash/data-flash-2021-004-venta-de-equipos-terminales-m%C3%B3viles> (Spanish only version).

61 CRC. 2021. "Data Flash 2021-004—Sale of Mobile Terminal Equipment." (Jan. 29, 2021).

### 2.2.6.3. Transportation costs as a cost component of entry-level devices

Transportation of devices into destination markets is a relevant cost component driven by national conditions. Shipping costs vary depending on several factors, including distance, mode of transportation, and volume or weight of the goods being shipped. As shown in Table 2.5 and Table 2.6, maritime shipping is significantly less costly than air freight and is driven by volume of goods shipped. For example, the per kilogram (kg) cost of shipping 22,550 kgs of devices from China to Colombia by air is about 32 times higher than shipping the same volume by sea (US\$0.40 vs. US\$12.97 per kg). Notably, transportation costs are very sensitive to external global shocks. For example, transportation costs increased significantly due to container shortages during the COVID-19 pandemic and increased fuel costs resulting from the Russian invasion of Ukraine (Box 2.12).

**Table 2.5. Example of air freight rates to target market by kilogram, July 2022**

	Route	≥45 kg	≥100 kg	≥300 kg	≥500 kg	≥1,000 kg
<b>Colombia</b>	Shenzhen to Bogota	¥115.5 (US\$17.22)	¥90 (US\$13.42)	¥89.5 (US\$13.34)	¥88.3 (US\$13.16)	¥87 (US\$12.97)
<b>Nigeria</b>	Shenzhen to Lagos	¥100.5 (US\$14.98)	¥55 (US\$8.20)	¥54.5 (US\$8.12)	¥53.3 (US\$7.95)	¥52 (US\$7.75)
<b>Pakistan</b>	Shenzhen to Rawalpindi	¥94.5 (US\$14.09)	¥52 (US\$7.75)	¥51.5 (US\$7.68)	¥50.3 (US\$7.5)	¥49 (US\$7.30)

Source: TMG/A4AI research

**Table 2.6. Examples of maritime shipping container costs from China to target markets, July 2022**

Destination	Origin	20-foot container	40-foot container
<b>Colombia</b>	China		\$8,800-\$9,100
<b>Nigeria</b>	China	\$2,000	\$4,000
<b>Pakistan</b>	China	\$1,000-\$1,250	\$1,500-\$2,000
<b>Rwanda</b>	China	\$3,664-\$6,040	

**Note:** A 20-foot container's unloaded weight is 2,300 kg and can, in theory, be loaded to a maximum weight of 28 tons (25,400 kg); a 40-foot container's empty weight is 3,750 kg and can be loaded to a maximum overall weight of 29 tons (26,300 kg).

Source: TMG/A4AI research

## Box 2.12. Impact of COVID-19 and other shocks on maritime shipping costs

The COVID-19 pandemic upset supply chains and delayed international shipping, which subsequently led to increased shipping costs.<sup>62</sup> According to the International Monetary Fund (IMF), between January 2019 and October 2021, the cost of shipping containers by maritime freight increased by more than 500 percent and the cost to ship bulk commodities by sea increased by 300 percent.<sup>63</sup> Furthermore, the conflict between Russia and Ukraine has led to disruptions in the supply of oil and natural gas, causing global price spikes.<sup>64</sup> Stakeholder interviews indicated that the recent shipping container shortage and increases in global fuel prices have significantly increased the price of moving commodities, including inputs needed for manufacturing mobile devices.<sup>65</sup>

Source: TMG/A4AI research

### Key finding 2.4. Cost reduction opportunities in distribution and sales

Key Finding: Opportunities still exist for stakeholders like OEMs and MNOs to lower the typical cost structure of the distribution and sales component of the value chain. Just-in-time sourcing can reduce the costs of importation, warehousing, and shipping. Achieving large volumes of entry-level device sales by creating a compelling value proposition for end users will be critical to increase efficiencies in distribution and sales, allowing for lower sales margins. Overall, optimization of import, shipping, distribution, and sales of devices may reduce this cost component by 30–40 percent from typical levels —down from about 20 percent of total costs to around 12–14 percent of total cost. These private sector-led strategies must consider the structure of the retail device sales market to recruit and leverage key players to assist in achieving affordability goals.

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62 Carrière-Swallow, et al. 2022. "Shipping Costs and Inflation." IMF, (March 25, 2022). <https://www.imf.org/en/Publications/WP/Issues/2022/03/25/Shipping-Costs-and-Inflation-515144>.

63 Carrière-Swallow, et al. 2022. "Shipping Costs and Inflation." IMF, p. 4, (March 25, 2022). <https://www.imf.org/en/Publications/WP/Issues/2022/03/25/Shipping-Costs-and-Inflation-515144>.

64 Krammer, et al. 2.22. "How War in Ukraine Is Reverberating across the World's Regions." IMF, (March 15, 2022). <https://blogs.imf.org/2022/03/15/how-war-in-ukraine-is-reverberating-across-worlds-regions/>.

65 TMG interview with Maraphone, (June 20, 2022).

## 2.3. Local manufacturing as a strategy to lower costs of entry-level devices

Local manufacturing or local assembly of mobile devices is often seen by national policy makers as a strategy to promote various goals, including:

1. revitalizing the local industrial manufacturing base by supporting new, high-tech manufacturing facilities;
2. promoting high-skilled job creation;
3. reducing the dependence on imports to meet national demand for mobile devices; and
4. promoting affordability and digital inclusion objectives.

Since mobile device manufacturing margins are thin (~5–8 percent of total cost) due to significant competition, manufacturing at scale is critical to achieve economic viability and reduce costs. Reaching such a minimum viable scale can be challenging for newly established manufacturers due to several factors.

1. Manufacturing mobile devices involves complex processes supported by a large network of international suppliers, advanced technology, and sophisticated, high-tech equipment and facilities. This demands large up-front investments in developing manufacturing infrastructure.
2. These technologies develop at a rapid pace, with new trends and manufacturing processes routinely emerging every 3–4 years that require manufacturers to continually invest to upgrade to new processes and equipment.
3. Typically, the capital goods (e.g., high-tech machinery, equipment) required to manufacture mobile devices are not available in the local market and must be imported.
4. Similarly, the manufacturing process requires sourcing parts and materials from multiple suppliers to make device components locally. Most, if not all of these inputs are not produced domestically within low- and middle-income markets and must be imported.
5. Other finished components required for the manufacturing process, but not made locally (e.g., displays, casings, etc.), must also be imported.
6. The absence of a strong local supplier ecosystem places manufacturers in low- and middle-income markets at a disadvantage compared to international competitors.
7. The need for a large internal and nearby addressable market to commercialize locally produced devices can impact a local manufacturer's ability to achieve efficiencies of scale.

Local assembly of smartphones, on the other hand, involves fewer complex processes and machinery. Assemblers set up production lines that bring together all component parts to produce a finished device. However, as in the case of manufacturing, a lack of local supplier ecosystems in most low- and middle-income markets means that assemblers typically also source all components and materials internationally and import them into the country of destination. This constrains the added value that they provide to the economy.

To incentivize local manufacturing and assembly of devices, governments often employ fiscal policies that increase the cost of imported devices (Box 2.6). This typically includes increasing duties on imported devices and providing tax benefits with the aim of encouraging investments in capital goods by local firms. However, as shown by World Trade Organization (WTO) research on the impact of the Information Technology Agreement (ITA) after 20 years of implementation, the elimination of import duties helped drive an increase of 8.5 percent in export of final ITA goods in developing markets other than China – countries referred to as “passive” signatories, that acceded to ITA as part of other trade obligations.<sup>66</sup> Meanwhile, “passive” signatories did not record significant export gains in intermediate goods, which seems to suggest that ITA membership, and the resulting elimination of import duties on ITA goods, has helped them enforce their role in downstream stages of global ITA value chains, such as assembly and manufacturing.<sup>67</sup>

This Section discusses two case studies from Rwanda and Pakistan that highlight some of the challenges of promoting homegrown mobile device manufacturing and assembly.

### 2.3.1. Manufacturing mobile devices in Rwanda—the case of Maraphone

In 2019, the Mara Group created Maraphone, a vertically integrated OEM that designs and develops its own brand of devices and manufactures them at its factory near Kigali, Rwanda. At that time, Maraphone began manufacturing two types of smartphones, the Mara X with a retail price of US\$130 and the Mara Z with a retail price of US\$190, marketed as the first smartphones made in Rwanda. As of 2022, Maraphone had agreements to export its products to 75 countries and advertises the sale of five smartphone models, including the Mara S, its entry-level device (Box 2.13).

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66 WTO. 2016. “20 Years of the Information Technology Agreement. Boosting trade, innovation and digital connectivity.”p.14. [https://www.wto.org/english/res\\_e/booksp\\_e/ita20years\\_2017\\_full\\_e.pdf](https://www.wto.org/english/res_e/booksp_e/ita20years_2017_full_e.pdf).

67 WTO. 2016. “20 Years of the Information Technology Agreement. Boosting trade, innovation and digital connectivity.”p.14. [https://www.wto.org/english/res\\_e/booksp\\_e/ita20years\\_2017\\_full\\_e.pdf](https://www.wto.org/english/res_e/booksp_e/ita20years_2017_full_e.pdf).

### Box 2.13. Mara S—entry-level device cost structure

Maraphone has launched an entry-level device called the Mara S that currently sells for a retail price of US\$45. While this price is within the range of entry-level devices covered in this report, Mara S technical specifications are less advanced than the reference devices described in Section 1.2. As shown in Table 2.13.1, memory, battery, and network capabilities will require upgrading to reach those of the reference entry-level device.

Table 15. Mara S technical specifications

	Mara S
Operating system	Android
Screen	4.95" FWVGA
Memory	1GB/8GB
Network	2G/3G
Internet capabilities	Web browsing, apps
Camera	5 Mp + 2 Mp
Battery	1,850 mAh

Source: Maraphone at <https://maraphones.com/rw/mara-s/>.

Stakeholder interviews reveal that manufacturing and materials account for about 92 percent of the total cost of the Mara S. The manufacturing margin is around 9 percent of total cost to cover operational expenses. Maraphone allocates between 4–8 percent to distribution and marketing within and outside of Rwanda. The company uses any remaining revenue from sales toward overhead.

Notably, Maraphone does not add an OEM margin to the total cost of the Mara S, as the company made an agreement with its investors to forgo such revenues and instead focus on achieving brand recognition and scale for the first four to seven years of operation. In addition, as discussed above, Rwanda does not levy import duties or sales taxes on mobile devices or their parts and components which are imported by Maraphone. As such, no tax burden applies to Mara S devices sold within Rwanda. Table 2.13.2 presents a disaggregated cost structure of the Mara S entry-level device.



Table 2.13.2. Mara S cost structure

	Mara S
Materials	Materials
Manufacturing margin	Manufacturing margin
<b>FOB costs</b>	<b>FOB costs</b>
Freight	Freight
Import duties	Import duties
<b>Landed costs</b>	<b>Landed costs</b>
Development & profit margin	Development & profit margin
Distribution & sales	Distribution & sales
VAT/GST	VAT/GST
<b>Total cost</b>	<b>Total cost</b>

Source: Maraphone at <https://maraphones.com/rw/mara-s/>.

Maraphone was initially funded by private shareholder investments. However, market disruptions associated with the COVID-19 pandemic put significant pressure on the company and led initial investors to sell equity to the Rwandan government in 2021. The government of Rwanda, via its sovereign fund,<sup>68</sup> now holds a controlling stake in Maraphone, while the initial investors retain minority ownership (around 5 percent).<sup>69</sup> Maraphone's financial statements or production volumes are not made publicly available. But interviews for this report suggest that several factors, including COVID-19-related disruptions, have contributed to Maraphone not achieving its production targets.<sup>70</sup>

A significant challenge encountered by Maraphone is the need to increase scale to decrease production costs. In terms of manufacturing, Maraphone produces its motherboard in Rwanda, and the remaining components are manually assembled. Manufacturing does not require a large workforce, but Maraphone employs about 200 workers per shift, five days per week, for assembly.

68 See AGACIRO Development Fund. <https://www.agaciro.rw/>.

69 TMG interview with Maraphone, (June 20, 2022).

70 TMG interview with Maraphone, (June 20, 2022).

Maraphone, like other device manufacturers, has also been impacted by the COVID-19 pandemic. It planned to launch its third generation of phones by the end of July 2022; however, it has been affected by COVID-19–related chipset and shipping container shortages, as well as fuel price spikes, which have significantly increased the price of moving commodities. As a result, Maraphone delayed the launch of new smartphones to negotiate prices based on volume and identify less expensive shipping methods. Sourcing 2G and 3G chipsets was also very difficult for Maraphone at mid-year 2022, as suppliers were unable to guarantee sufficient stock. Additionally, sourcing raw materials at competitive prices poses a challenge, as Maraphone needs to ensure sufficient volumes to negotiate agreements on raw materials that allow it to compete with larger Chinese manufacturers.<sup>71</sup>

Although Maraphone is a local manufacturer, it still needs to source components and raw materials from China, as there is no supplier ecosystem in Rwanda, or the African continent, that produces component parts such as chipsets, screens, batteries, or casings. This creates vulnerability in the supply chain, which could benefit from diversification to avoid disruptions.

Maraphone has not yet been able to overcome these significant challenges and achieve the volume and scale necessary to effectively compete in the African regional smartphone market. Currently, it is unclear if its local manufacturing business model will be viable in the long term without continued government support.

### 2.3.2. Local assembly of mobile devices—the case of Pakistan

In Pakistan, locally assembled mobile devices surpassed commercial imports in 2021.<sup>72</sup> During that year, 24.66 million devices were locally manufactured/assembled, whereas only 10.26 million devices were commercially imported.<sup>73</sup> This follows the government’s implementation of the Device Identification Registration and Blocking System (DIRBS) in 2019, the Mobile Manufacturing Policy in 2020, and the Mobile Device Manufacturing (MDM) Regulations in 2021 that support and encourage local manufacturing.<sup>74</sup> As noted by the Pakistan Telecommunication Authority (PTA), following the implementation of DIRBS, which prevents the illegal importation and use of devices on mobile networks, over 33 local assembly plants for mobile devices were established in Pakistan.<sup>75</sup> Also, as noted in Box 2.7, Pakistan uses high import duties to deter imports of devices and promote local manufacturing and assembly.

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71 TMG interview with Maraphone, (June 20, 2022).

72 PTA. 2021. “Local mobile manufacturing surpasses mobile phone import.” (August 26, 2021). <https://www.pta.gov.pk/en/media-center/single-media/local-mobile-manufacturing-surpasses-mobile-phone-import-260821>.

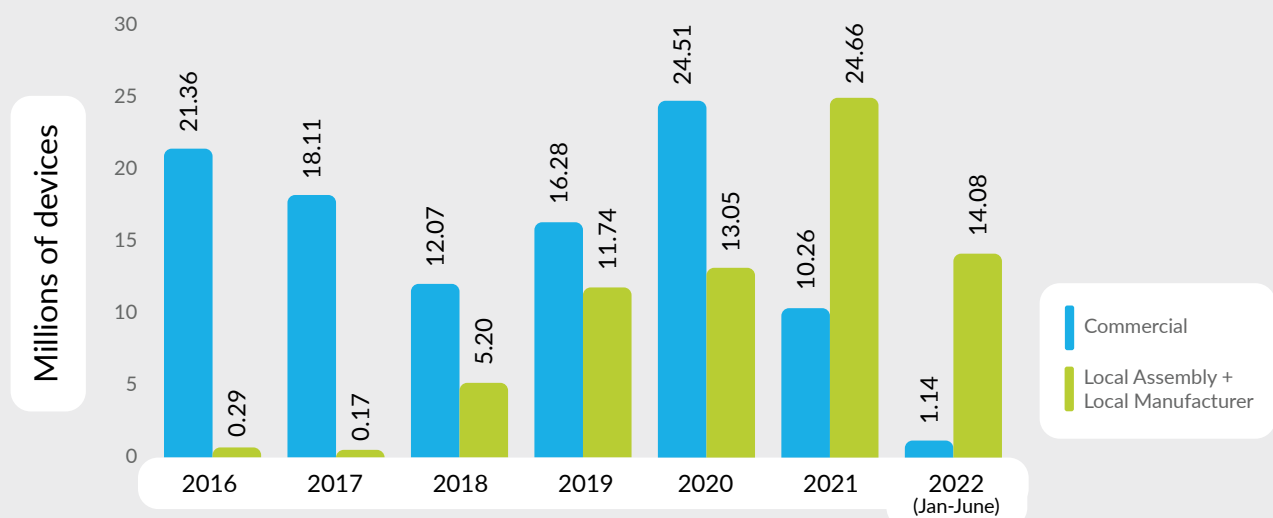
73 PTA, Telecom Indicators: Mobile Device Manufacturing. <https://www.pta.gov.pk/en/telecom-indicators/10>.

74 PTA. 2021. “33 New Local Phone Assembly Plants Established.” (March 3, 2021). <https://www.pta.gov.pk/en/media-center/single-media/33-new-local-mobile-phone-assembly-plants-established-030321>.

75 PTA. 2021. “33 New Local Phone Assembly Plants Established.” (March 3, 2021). <https://www.pta.gov.pk/en/media-center/single-media/33-new-local-mobile-phone-assembly-plants-established-030321>.

The local assembly of mobile devices in Pakistan increased dramatically over the last several years. As shown in Figure 2.4, in the first one-half of 2022, 14.08 million mobile devices were locally assembled and manufactured in Pakistan, compared to 1.14 million devices that were commercially imported. Notably, most of these locally assembled devices were 2G feature phones (8.06 million units), while smartphones accounted for the rest (6.02 million devices).

**Figure 2.4. Commercial import and local manufacturing/assembly of mobile devices (millions)**



Source: PTA, <https://www.pta.gov.pk/en/telecom-indicators/10>.

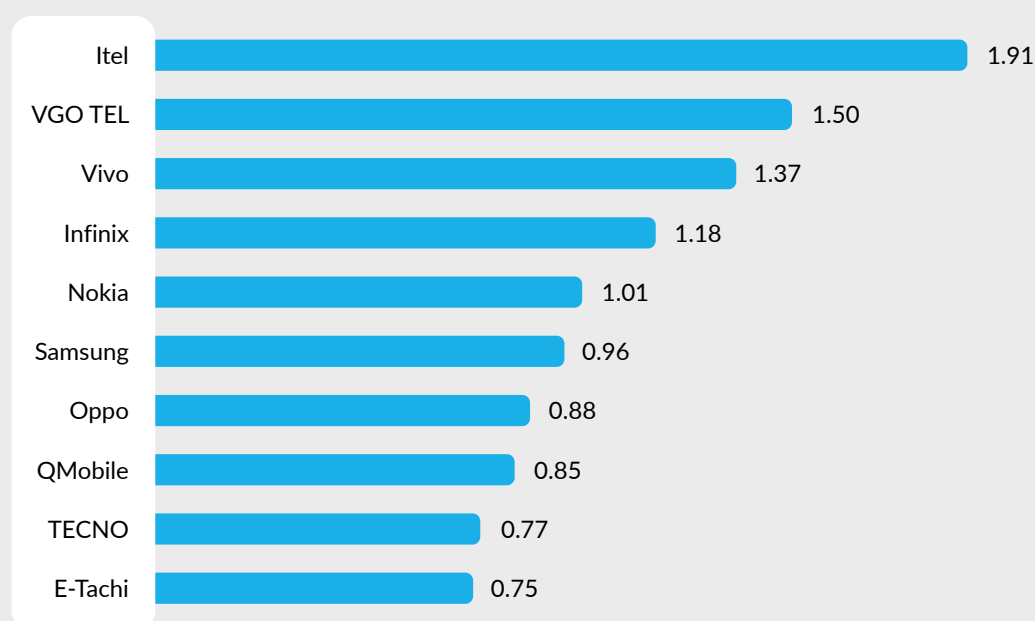
Although fewer smartphones are locally produced relative to feature phones, in January 2022, Energy Minister Hammad Azhar stated that 70 percent of smartphones sold locally are assembled in Pakistan.<sup>76</sup> This seems consistent with the number of companies that have announced local manufacturing and assembly in Pakistan either directly or through third parties.

Transsion currently locally manufactures/assembles its main brands (i.e., Itel, Infinix, and TECNO) sold in Pakistan, followed by VGO Tel and Vivo (Figure 2.5). In 2020, Itel announced the local assembly of its feature

76 Hammad Azhar, (January 26, 2022). [https://twitter.com/Hammad\\_Azhar/status/1486311589846437888?s=20&t=QVZIZ3eCGgqpn-chmBlv-A](https://twitter.com/Hammad_Azhar/status/1486311589846437888?s=20&t=QVZIZ3eCGgqpn-chmBlv-A).

phones in partnership with Bazz Mobile Technologies.<sup>77</sup> Additionally, in 2021, the PTA announced the issuance of a mobile device manufacturing (MDM) authorization to Lucky Motor Corporation to assemble Samsung devices.<sup>78</sup> In January 2022, Samsung debuted its first smartphone assembled in Pakistan.<sup>79</sup> Notably, the PTA also indicated that locally assembled devices will not just be sold within Pakistan but also be exported to other markets.<sup>80</sup>

**Figure 2.5. Volume of locally manufactured/assembled mobile devices by brand, June 2022 (millions)**



Source: PTA, <https://www.pta.gov.pk/en/telecom-indicators/10>.

77 ITEL, Another Step in Non-Stop Success, (November 23, 2020).

<https://www.itel-mobile.com/pk/another-step-in-non-stop-success/>.

78 PTA. 2021. "PTA Authorizes Lucky Motor Corporation to Manufacture Samsung Mobile Devices." –(August 10, 2021).

<https://www.pta.gov.pk/en/media-center/single-media/pta-authorizes-lucky-motor-corporation-to-manufacture-samsung-mobile-devices-100821>.

79 Daily Pakistan, First Samsung Smartphone Assembled in Pakistan Launched, (January 18, 2022).

<https://en.dailypakistan.com.pk/28-Jan-2022/first-samsung-smartphone-assembled-in-pakistan-launched#:~:text=KARACHI%20%2E2%80%93%20First%20smartphone%20assembled%20by,for%20assembling%20smartphones%20in%20Pakistan>.

80 PTA. 2021. "PTA Authorizes Lucky Motor Corporation to Manufacture Samsung Mobile Devices." –(August 10, 2021).

<https://www.pta.gov.pk/en/media-center/single-media/pta-authorizes-lucky-motor-corporation-to-manufacture-samsung-mobile-devices-100821>.

Despite the government's efforts to encourage local assembly and manufacturing of mobile devices, the focus has been on basic feature phones and not internet-enabled devices. In addition, foreign currency limitations on accessing U.S. dollars that began in May 2022 threatened to halt production. As a result of this U.S. dollar shortage, which was linked to import restrictions to avert a balance of payment crisis and stabilize the economy, banks reportedly stopped opening letters of credit (LoCs) for completely knocked down (CKD) mobile phone units.<sup>81</sup> Additionally, OEMs, including Samsung and Transsion, announced closures and layoffs.<sup>82</sup> In July 2022, reports indicated that the State Bank of Pakistan discouraged imports through LoCs, creating challenges for industries that imported raw materials and subsequently faced shortages.<sup>83</sup> Moreover, devastating floods during the 2022 monsoon season affected the country's macroeconomic outlook and will likely hamper growth.<sup>84</sup> These developments illustrate the difficulties faced by government initiatives to increase local manufacturing/assembly, particularly in unstable macroeconomic conditions.



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81 Usman Hanif. 2022. "Mobile phone assembly units may shut down." The Express Tribune, (June 22, 2022). <https://tribune.com.pk/story/2362777/mobile-phone-assembly-units-may-shut-down>.

82 Id.

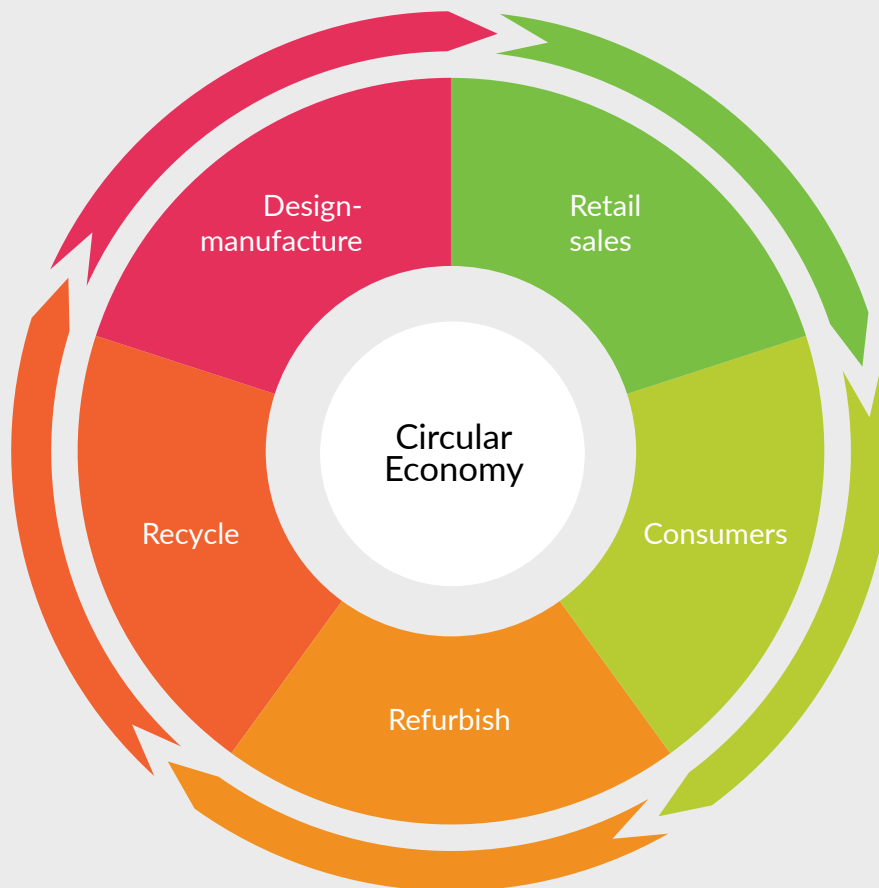
83 Shahbaz Rana. 2022. "SBP restricts outflow of dollars." The Express Tribune, (July 19, 2022). <https://tribune.com.pk/story/2366631/sbp-restricts-outflow-of-dollars>.

84 State Bank of Pakistan, Monetary Policy Statement, p. 1 (October 10, 2022). <https://www.sbp.org.pk/press/2022/Pr-10-Oct-2022.pdf>.

## 2.4. Supply-side assessment of pre-owned devices

The secondary market of pre-owned devices could be a potential supply-side alternative to lower entry-level device prices and promote increased adoption of internet services. This includes the sale of refurbished and used devices. By extending the life of devices, reuse also has significant environmental benefits, promoting a circular economy, as each reused device delays disposal and, in turn, reduces or delays the demand for the manufacture of a new device, saving raw materials, energy, and the environmental impacts of recycling or disposal. Once devices reach the end of useful life, they can be recycled to recover raw materials for reuse (Figure 2.6).

Figure 2.6. Circular economy of mobile devices



Source: TMG/A4AI research.

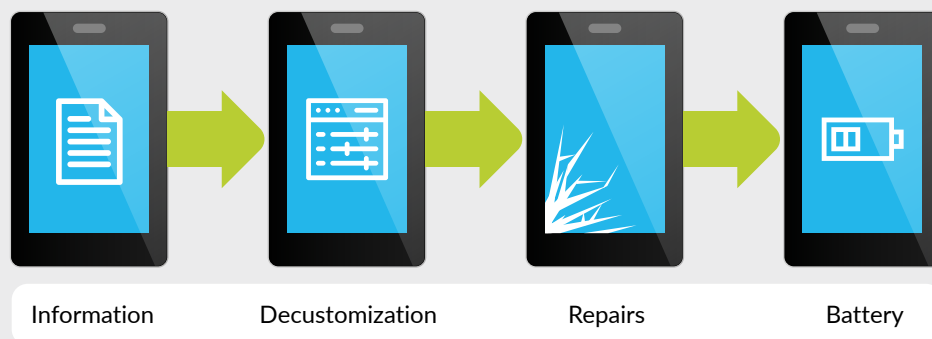
As further discussed in this Section, challenges remain to make the secondary market an effective supply-side alternative for entry-level devices. Responding to consumer demand, secondary markets presently supply mostly higher-end handsets, rather than entry-level devices. While the pre-owned market is growing internationally, it mostly caters to existing mobile internet subscribers that seek to upgrade their devices to flagship handsets at lower price points. The lifecycle of lower-end devices also plays a key role in the pre-owned market, as entry-level devices typically have shorter lifespans.

### 2.4.1. Types of internet-enabled devices sold in the secondary market

Two categories of devices are sold in the pre-owned device market. Refurbished devices typically are those devices previously owned by another person that have been restored or verified to function at their full potential and working condition by the OEM, a refurbisher, or a reseller. During the refurbishment process, the device often undergoes reconditioning to remove defects related to hardware issues, software/OS upgrades, component fixes, battery upgrades, and other issues. Refurbished devices are often sold with either a manufacturer warranty (if refurbished by the manufacturer) or a reseller warranty (if refurbished by a reseller). Products which are under the category of opened box, demo units, production defects, and shipping or exterior damage often are also labeled as refurbished.

The process of refurbishing smartphones varies, but typically includes one or more of the following key phases: (i) wiping information off the phone and restoring it to the original factory settings; (ii) removing any customizations added to the phone; (iii) repairing damaged parts, like cracked screens or dented cases; and (iv) verifying the state of the battery and adding a new battery if it is performing below 80 percent of specification (Figure 2.7).

Figure 2.4. Commercial import and local manufacturing/assembly of mobile devices (millions)



Source: PTA, <https://www.pta.gov.pk/en/telecom-indicators/10>.



Used phones, on the other hand, are sold by a private seller, either in person or online (e.g., using e-commerce sites). They are not subject to a quality assessment process to ensure performance and are instead sold “as-is.” Used phones commonly offer the most substantial discounts but also pose the greatest risk for the purchaser. Buyers must rely on the claims of an individual and generally have little to no recourse in case of problems.

Because of the decentralized and informal nature of most used phone sales, limited market data are available for this part of the secondary market. Further research should be undertaken into these informal markets as well as grey market sales to better assess the impact of used devices on affordability of entry-level devices. Considering these limitations, however, the remainder of this Section focuses on the refurbished device market.

## 2.4.2. Value chain of pre-owned entry-level devices

The value chain for pre-owned devices is presented in Figure 2.8. Refurbished devices are typically collected via a take-back process that offers inducements to current owners (e.g., cash payments or trade-in credit for upgrading to a new device), mostly in developed markets in North America, Europe and Asia. They are refurbished following the steps outlined in Figure 2.8 and then generally shipped to low- and middle-income markets where they are distributed and sold mostly via online and offline stores. While some markets like India also collect and refurbish pre-owned devices locally to meet domestic market demand, large subscriber bases and availability of devices are prerequisites for this to be a viable sourcing strategy at scale. In smaller markets, however, local take-back and refurbishment programs can also be aimed at supporting other objectives, including fostering information technology (IT) skills, local business, and effective e-waste management. Further research should be undertaken to assess the viability of such initiatives to support policy interventions other than affordability.

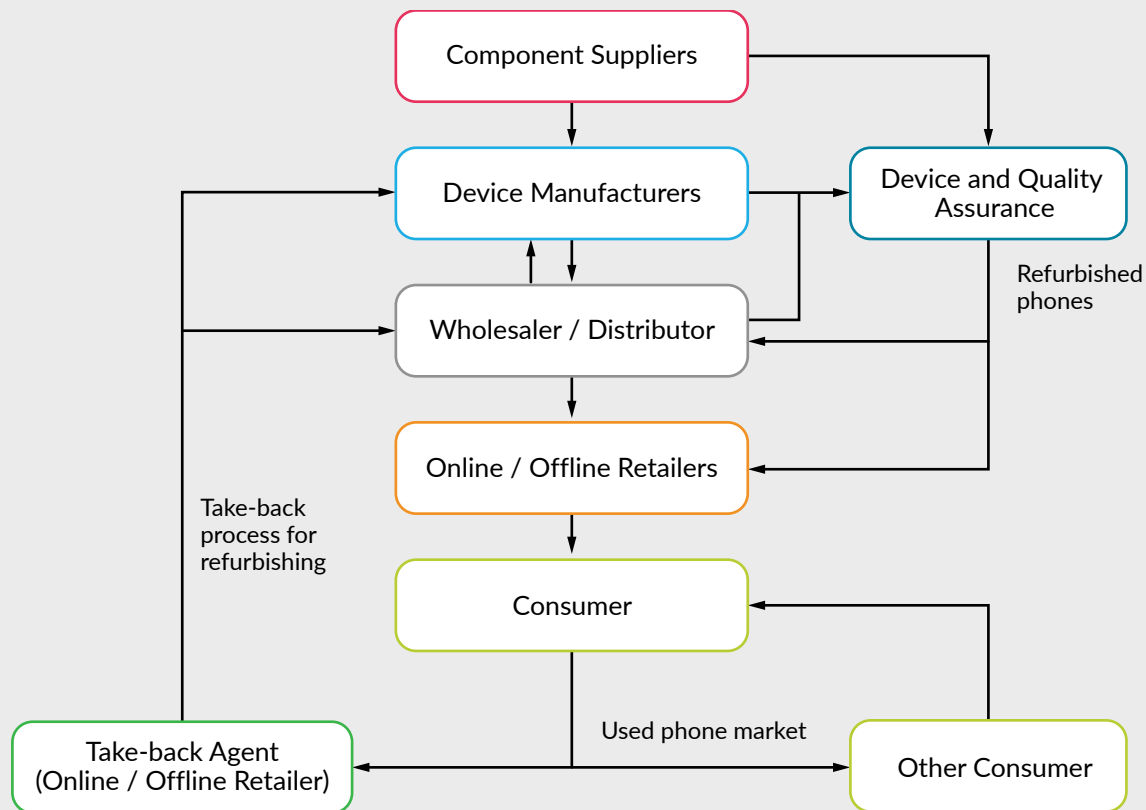
While in mature markets OEMs and MNOs have increasingly engaged in this secondary market over the last several years, most pre-owned devices are sold by independent resellers (in both mature and emerging markets). In low- and middle-income markets, some MNOs are also starting to re-sell refurbished devices. In South Africa, for example, Vodacom launched the “Good as New” program to sell refurbished devices in early 2022.<sup>85</sup> Interviews also suggest many African countries have large markets for used devices.<sup>86</sup> However, as noted above, this generally involves person-to-person transactions as well as sales via informal channels.

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85 As of July 2022, high-end devices were being sold under this program with an average price of around US\$330. See <https://www.vodacom.co.za/shopping/products?range=83&isShowQualifying=false&subcategory=143&brands=22205:Good%20As%20New>.

86 TMG interviews with Vodacom (June 30, 2022, and July 14, 2022); TMG interview with Telenor (August 29, 2022).

Figure 2.8. Framework for assessing the second-band market value chain



Source: TMG/A4AI research.

### 2.4.3. Growth of the refurbished smartphone market

The refurbished device market has seen significant growth over the last several years. Globally, in 2021 it grew over three times faster year-over-year than new smartphone shipments (15.0 percent vs 4.5 percent).<sup>87</sup> Notably, the highest growth rates were observed in low- and middle-income countries, including in Latin America (29 percent) and India (25 percent), with African markets growing slower but from a higher initial base (Figure 2.9).

87 Counterpoint Research. 2022. "Global Refurbished Smartphone Market Beats Expectations, Grows 15% YoY." (Apr. 20, 2022). <https://www.counterpointresearch.com/global-refurbished-smartphone-market-2021/>.

Several factors are driving this growth trend, including:

1. trade-in initiatives implemented in mature markets to migrate users from 4G to 5G;
2. increased demand for mobile devices due to hybrid work and study conditions associated with the COVID-19 pandemic;
3. component shortages that have impacted new device shipments also linked to the pandemic;
4. a push for sustainability and the benefits associated with device reuse; and
5. increased participation in this market by major e-commerce platforms.

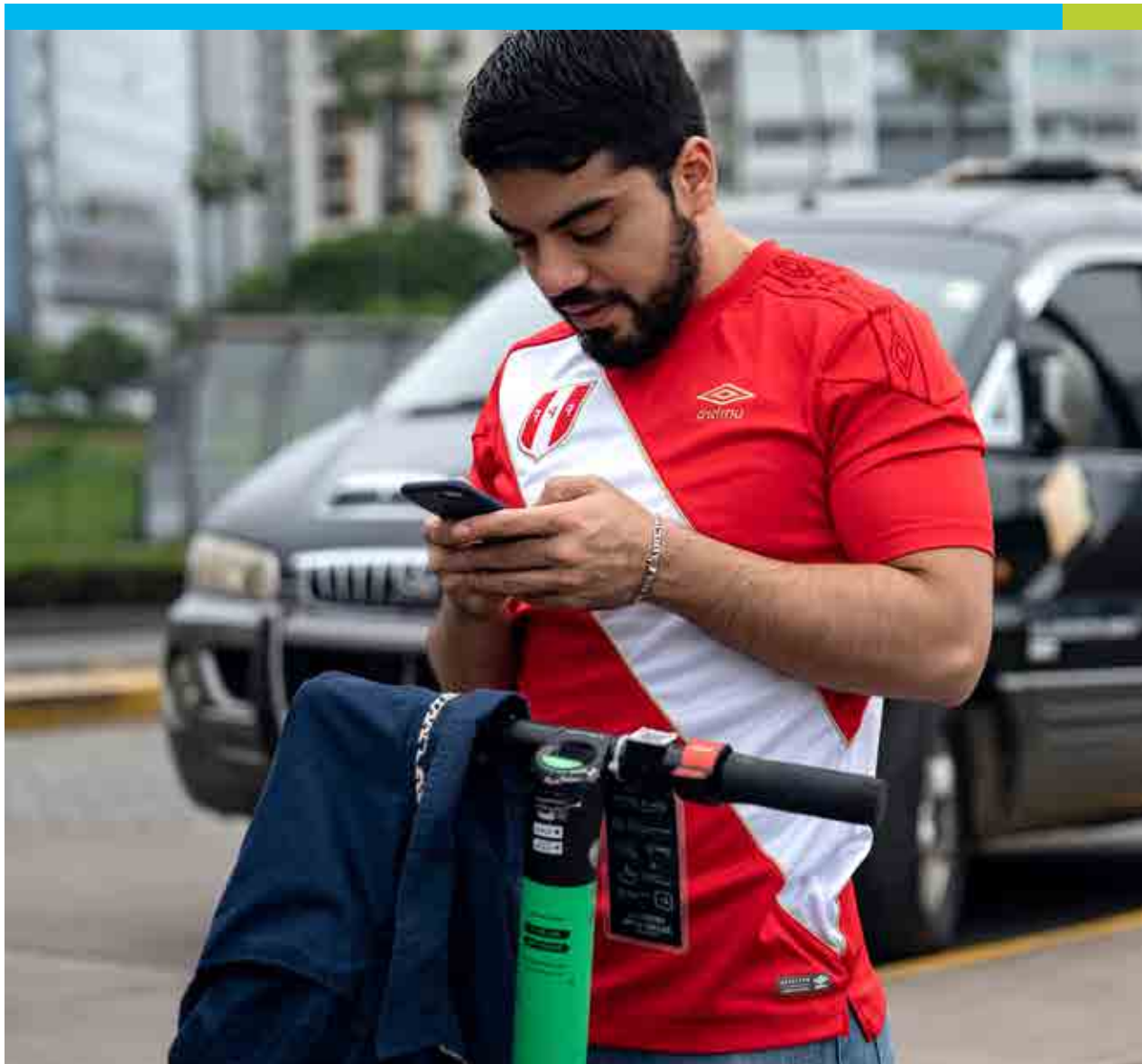
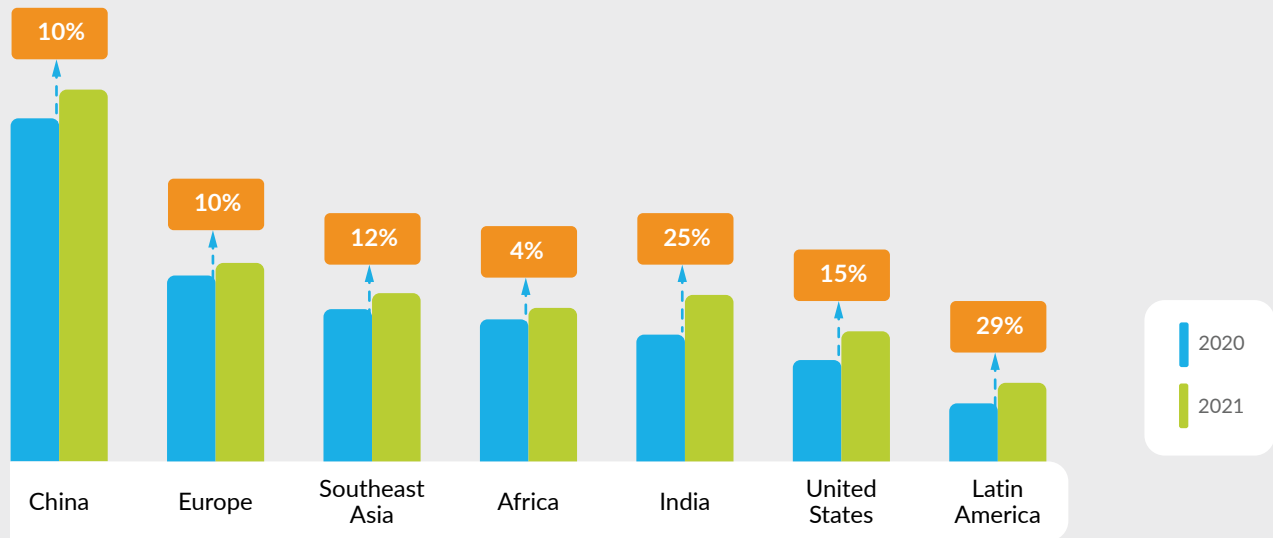


Figure 2.9. Refurbished smartphone market growth by region, 2020–2021



Source: Counterpoint Research.

Despite the significant growth of the refurbished device market, results of a survey conducted for this report confirm the findings of earlier desktop research and interviews, indicating that the market for refurbished phones remains underdeveloped in the target countries. On average, in the four target countries only 11 percent of the survey respondents reported buying a pre-owned device from a business, suggesting that the secondary market could be smaller than 11 percent of the total market (Table 2.7).

Table 2.7. Number of device buyers by country, device type, and location

Destination	Pre-owned from business	Pre-owned from family or friends	Total pre-owned from any location	Total new from any location
Colombia	7	25	32	205
Nigeria	37	22	59	225
Pakistan	40	22	62	217
Rwanda	44	19	63	236

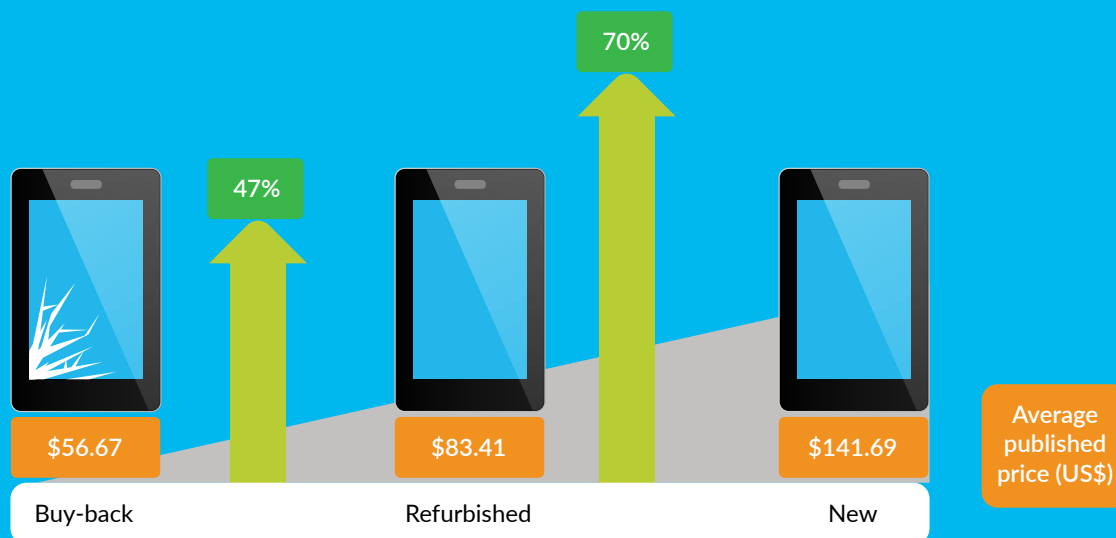
Source: TMG/A4AI.

## 2.4.4. Cost structure of refurbished devices

The first component in the cost structure of refurbished devices relates to the re-purchase price of pre-owned devices. This includes buy-back costs (i.e., price at which the refurbisher buys used devices), which are highly dependent on the condition of the device (see discussion in Box 2.14) and wholesale margins added on by intermediaries. Data from a large online secondary market reseller in the Indian market suggests that these can represent up to 50 percent of the retail price of a refurbished grade A device (Box 2.15).

### Box 2.14. Assessment of buy-back, refurbished, and new device prices with reference to the market in India, June 2022

An assessment of lowest priced refurbished grade A equivalent smartphones (i.e., less than USD 100) offered via an online reseller in India in June 2022<sup>88</sup> shows that, on average, the resale margin is around 47 percent above the published buy-back prices. As expected, average published retail prices for new devices are about 70 percent higher than for refurbished devices on this platform (Figure 2.14.1). Notably, at an average refurbished price of around US\$84, these smartphones are still above the US\$50 threshold for low-cost devices targeted in this report.



Source: TMG/A4AI analysis based on Cashify public data.

Beyond the cost of purchasing a device from the current owner, key cost drivers of refurbished devices include (i) the cost of collection; (ii) costs of refurbishment; (iii) shipping costs; and (iv) distribution and sales costs. Specific weights of these components vary between countries and the condition of the device when it is taken back. However, the single largest cost driver of retail prices of refurbished devices is the buy-back price. This is in turn a function of the brand, model, and condition of the device.

## 2.4.5. Consumers seek higher-end pre-owned devices, and the market is responding accordingly

The global refurbished smartphone market mostly targets high-end devices from brands such as Apple and Samsung, not the entry-level devices that are the focus of this report. This is a function of demand drivers for pre-owned devices, with consumers in emerging markets generally seeking access to flagship devices, such as iPhones, but at lower prices. Interviews conducted suggest that average retail prices of pre-owned devices in African markets such as a Nigeria and South Africa range from US\$170 to US\$230.<sup>89</sup>

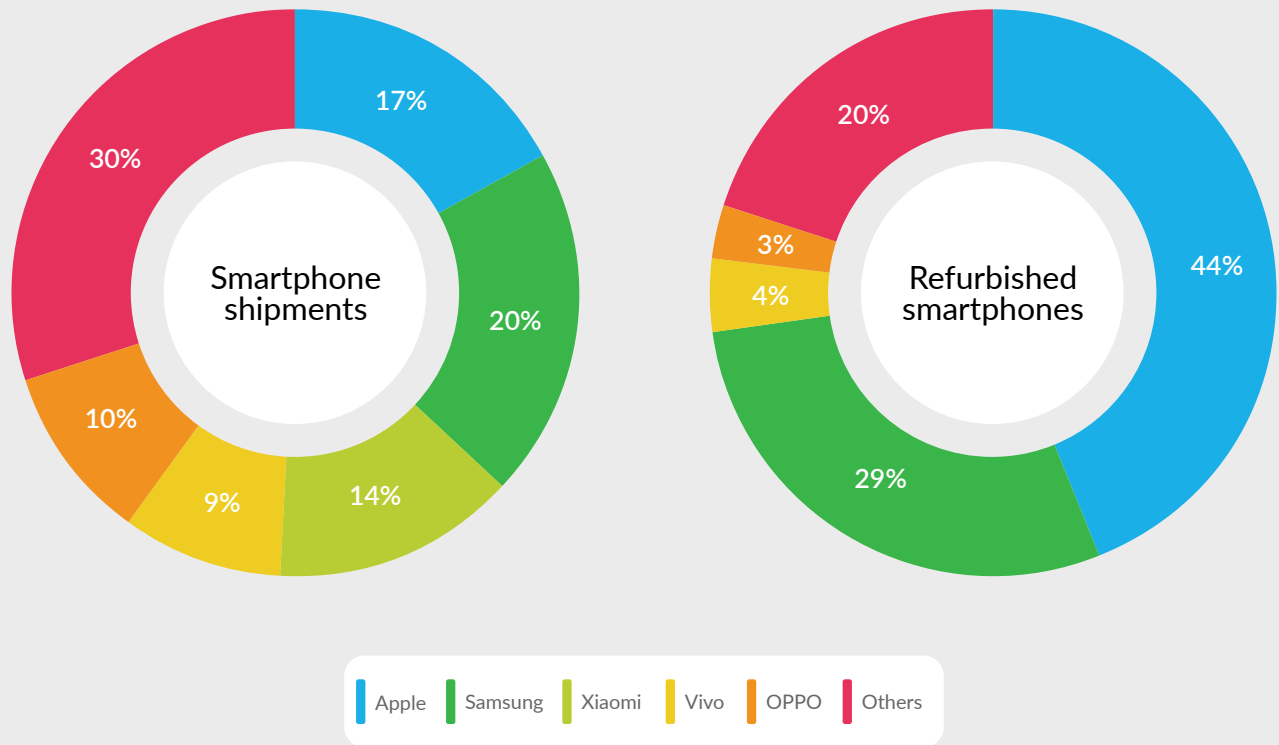
The durability and high quality of these types of high-end devices, as well as brand recognition and the status associated with the purchase of a flagship device, are key factors in the secondary market. Consumers purchase pre-owned devices to upgrade their devices, not to purchase an entry-level device. As a result of this, while Apple devices represented just over 17 percent of global smartphone shipments in 2021, they accounted for over 43 percent of total refurbished smartphones shipped globally. Similarly, Samsung shipped around 20 percent of total smartphones that year, but its smartphones represented about 29 percent of all refurbished devices. Combined, these two brands represented about 75 percent of the refurbished device market globally in 2021 (Figure 2.10). The global supply of pre-owned devices is expected to continue targeting these high-end segments in the near term.



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<sup>89</sup> TMG interviews with Vodacom, (June 30, 2022, and July 14, 2022); TMG interview with EZE Wholesale, (June 29, 2022).

**Figure 2.10.** Global smartphone shipments market share by brand (left); Refurbished smartphone global market share by brand (right), 2021



Source: TMG/A4AI based on Counterpoint Research data.

**Key finding 2.5. Global refurbished mobile device market targets high-end phones**

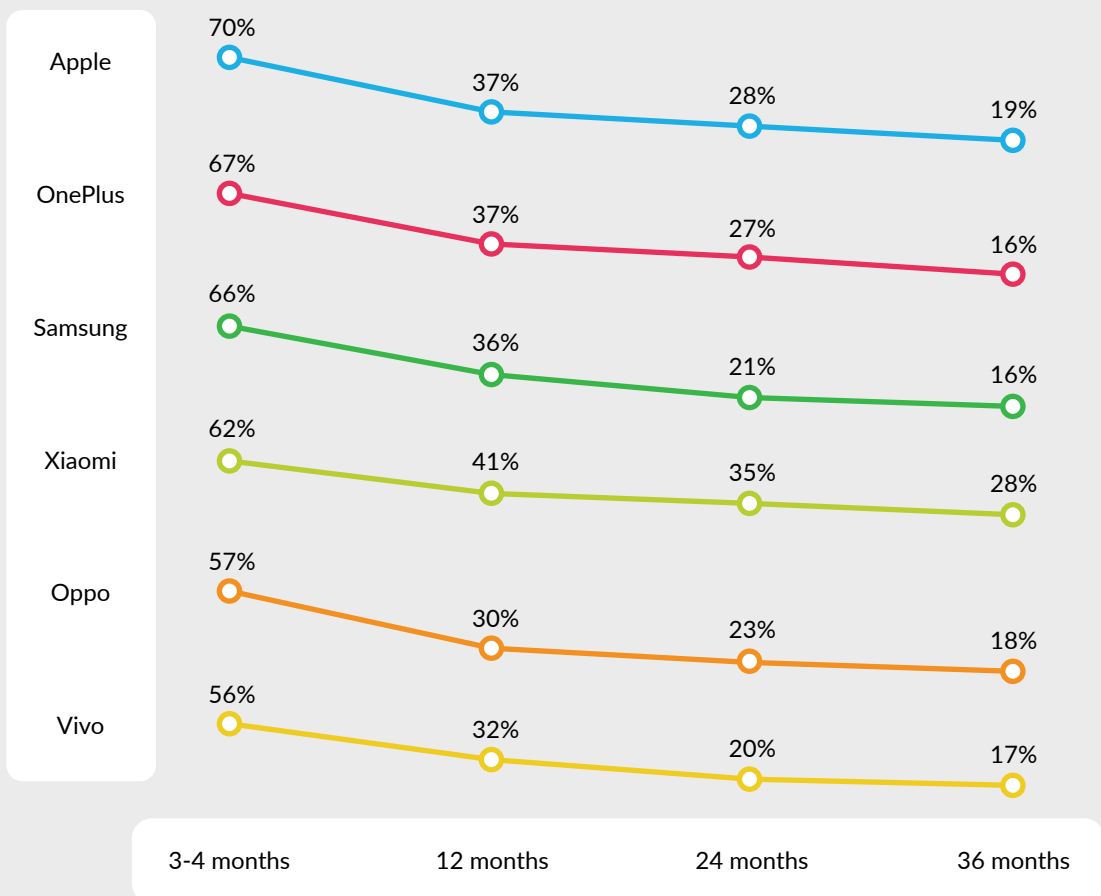
Key finding: Currently, the global refurbished smartphone market mostly targets high-end devices from brands such as Apple and Samsung, not entry-level devices.



## 2.4.6. Retail prices of pre-owned devices depend on multiple factors and vary widely

Retail prices of pre-owned devices vary widely in low- and middle-income countries and depend on familiar factors such as brand and model, as well as on factors specific to the secondary market, including age and condition of the device. Notably, different brands lose resale value at different rates depending on the age of the pre-owned device. Data from the Indian market suggests the resale value of smartphones decreases relatively uniformly among different brands. On average, their resale value drops by approximately 70–85 percent after three years of use, depending on the brand (Figure 2.11).

Figure 2.11. Average loss in resale value of smartphones by brand depending on age in India



Source: TMG/A4AI based on Cashify data.

The condition of pre-owned devices is another key factor impacting resale prices to consumers. The lower the grade of the refurbished device, the lower its price. While there is no single standard for grading refurbished smartphones, a three-grade scale from Grade A to Grade C (or some equivalent) is typically used by the refurbished device industry. Because refurbished devices are tested to ensure they are functional according to their specifications, grading is mostly used to signal the cosmetic condition of the device (Box 2.15).



### Box 2.15. Typical grading of refurbished handsets

Grading refurbished devices typically focuses on giving the prospective buyer a sense of the cosmetic condition of the refurbished device and identifying the imperfections it exhibits, including scratches, scuffs, and other marks. Grades convey information to the consumer as to what to expect from the handset so that they can be confident in their purchase. While no single, standardized grading system is used internationally for refurbished handsets, a three-rung scale from Grade A to Grade C (or an equivalent scale) is typically used. Some refurbishers may further segment their grading scales (e.g., Grade D, E, or “new in open box”) to give additional information to consumers.

- **Grade A**—Highest quality that can be expected from a refurbished device, often referred to as superb or excellent condition. Cosmetically, Grade A devices show almost no signs of prior ownership.
- **Grade B**—Second best quality level, which signifies that the device features some light evidence of prior use, like small scuffs or scratches. These devices are tested to ensure they are perfectly functional, and only have minor cosmetic signs of use that differentiate them from Grade A handsets.
- **Grade C**—This is often the lowest quality level for refurbished handsets. While these are tested to be in good working order, cosmetically they show signs of intense use by a prior owner, including significant scratches or other signs of wear and tear.

Source: TMG/A4AI research.

### *Key finding 2.6.* Factors impacting street prices of refurbished devices

Key Finding: Specific brand, model, age, and condition of a pre-owned device directly impact its value. On average, value can drop 70–85 percent within three years of launch of a device, depending on the brand.

Consistency and transparency in grading systems could provide consumers with more accurate information as to the condition of refurbished devices.

## 2.5. Conclusions

This chapter presents a supply-side assessment of the market for entry-level devices. It reviewed the various links in the value chain of both new and pre-owned devices to identify specific opportunities to optimize and reduce the cost of such devices. Based on the research undertaken, reducing tax burdens for entry-level devices and optimizing the distribution and sales channels can be two impactful options for lowering the cost of entry-level devices on the supply side. These opportunities are further discussed in Chapter 6, which presents a series of policy recommendations to promote entry-level device ownership.

The analysis did not identify other opportunities to significantly reduce the cost of entry-level devices by targeting other costs components of the value chain of new devices. Given that the costs of materials and manufacturing have been significantly optimized over the years, this suggests limited room for more significant improvement at this time.

Local manufacturing and the pre-owned device market have also been reviewed as potential alternatives to promote more affordability of entry-level devices. However, both strategies do not seem conducive to achieving these goals in the short to mid term. Local manufacturing policies face considerable challenges and are often unsustainable or unable to achieve efficiencies to lower the cost of entry-level devices in low- and middle-income countries. Similarly, the international pre-owned device market (for refurbished devices) typically focuses on mid-range phones, which are sold significantly above the price range of entry-level devices. As such, these do not target first-time internet users in the lowest-income brackets.



## 3. Demand-Side Assessment

### 3.1. Introduction

This chapter explores consumer perspectives of the mobile device market in the target countries (Colombia, Nigeria, Pakistan, and Rwanda). The analysis is based on commissioned research in the target countries, which included focus group discussions and a mobile phone-based survey. From this research, this chapter explores the ways that consumers navigate the mobile device market—and the market’s increasing diversity as more consumers enter it. In addition, it explains how consumers save for other major household purchases and how this process can inform ways to make smartphones more affordable. Finally, this chapter examines how financing interventions affect consumer’s perceptions of the market and factors that can influence whether these interventions are successful or not.

### 3.2. Research methodology

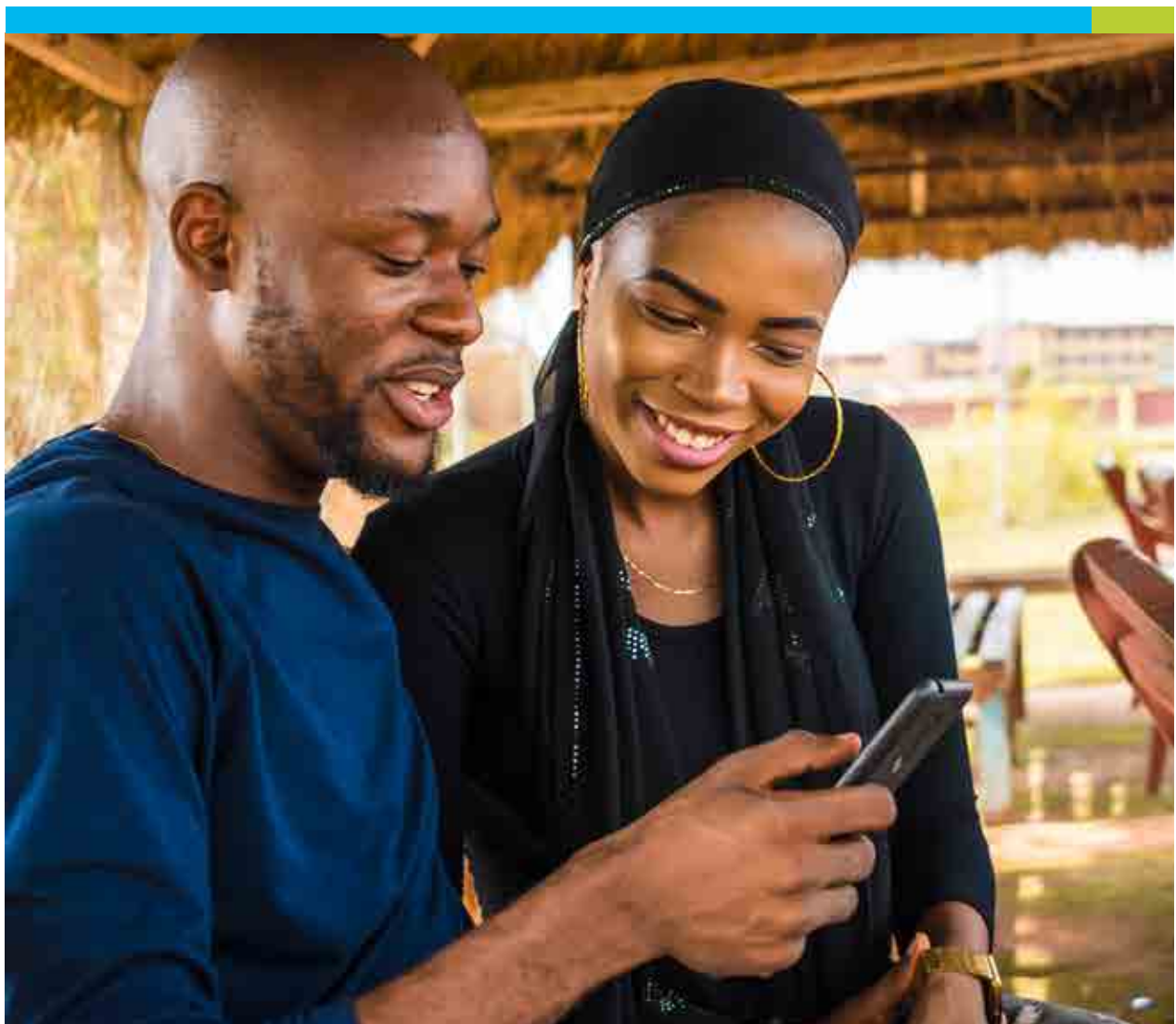
In addition to drawing from a wide amount of literature, this chapter highlights commissioned research in each target country, consisting of focus group discussions and a mobile phone-based survey. This Section summarizes the methodological notes for this work.

Two focus groups were conducted in each target country. The focus groups were structured around a 21-question facilitation guide that included an opening exercise followed by a discussion around major household purchases, perceptions of mobile devices, and consumer sentiment relating to the process (real and perceived) of purchasing a mobile phone.



The focus groups were targeted toward individuals with limited connectivity and often subject to social or economic marginalization. Each focus group had 8–12 participants, and no participant owned a smartphone. The groups were structured so that one group in each target country included only young people (ages 18–24) and the other group was exclusive of men.<sup>90</sup> This structure allowed for the exploration of dynamics around age and gender when purchasing a smartphone.

In addition to the focus groups, a computer-assisted telephone interviewing (CATI) survey was deployed in each target country. The survey included 32 questions relating to the respondent’s demographic profile, the device they owned, how the device was purchased, limitations and barriers to device ownership, and access to banking and financial services.



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<sup>90</sup> In line with our standard research practices, we defined the group’s membership as “exclusive of men” to welcome intersex/nonbinary participants and gender nonconforming individuals. In this exercise, all participants in this non-male groups identified as women.



Each survey had a sampling plan of at least 300 respondents, with limits on oversampling by gender, geography, or education and was limited to respondents who earned no more than the average income (defined as gross national income per capita). Because of this methodology, the survey sample is limited to only those who have access to a mobile phone (and in most cases, own it) and draws from the limited experiences of this population. This methodology, while informative to this study, should not be conflated with a nationally representative sample.

The focus groups and surveys work as methodological complements to each other. The focus groups targeted the unconnected and marginally connected, while mobile phone-based surveys tend to oversample those with better connectivity. For example, from our sample of 1,310 respondents across four countries, 772 (59 percent) answered the survey using a smartphone. In addition, the survey was limited to closed-answer questions, while the focus groups held greater potential to explore consumer perceptions and nuances in understanding their perspectives of how the device market works.

The different methods allow for some overlap in terms of understanding a composite picture of a consumer's journey from a new entrant in the device market to a well-connected "super user." Each method has limitations in its scope of analysis, and these strategies were chosen in a way to mitigate the respective limitations.

### 3.3. The state of smartphone ownership in low- and middle-income countries

#### Box 3.1. Rwanda focus group, select responses

“ I think one of the most important tools is the telephone, simply because it helps to be connected to the world around you, being able to reach out to your friends, relatives, parents for help, or sharing information about news, job opportunities, education opportunities.”

“ Besides the fact that the telephone is an important tool to get connected, my telephone is also my anti-stress medicine. My phone helps me relax when I'm tired, I can listen to music and view videos using my phone.”

—Participants, Rwanda focus groups

Smartphones are popular and desirable consumer goods. Country-level estimates for smartphone ownership reach upward of 80 percent in several high-income countries.<sup>91</sup> Hundreds of millions of new smartphones enter the market each quarter.<sup>92</sup> Global forecasts estimate another 1.2 billion smartphone-based mobile subscriptions in the next five years.<sup>93</sup> These numbers indicate an active market for these devices, with growing demand as more of the world comes online.

However, the rates of smartphone ownership vary widely: device access is not equal. In comparison with South Korea's pre-pandemic near universal ownership (97 percent), smartphone ownership reached only 42 percent in Nigeria and remained as low as less than one-third of those living in India (32 percent).<sup>94</sup> Of the 1.2 billion new subscriptions in the next five years, around one-third of those subscriptions will come from the Middle East and Africa, where device ownership has some of the lowest rates.<sup>95</sup> Despite their popularity, millions of people face barriers against smartphone ownership.

The cost of a smartphone remains too high for millions of people to afford. Financial cost remains the most frequently cited barrier to mobile device ownership for consumers in low- and middle-income countries.<sup>96</sup> The latest smartphone pricing estimates the least expensive device on the market globally represents roughly 20 percent of the average monthly income in that market.<sup>97</sup> This number more than doubles to 46 percent of average monthly income for those living in a least developed country (LDC).

High device costs are not only a problem between countries, but within countries as well. The least expensive new smartphone on offer in the target countries—Colombia, Nigeria, Pakistan, and Rwanda—ranged from US\$35–65 (Table 3.1).<sup>98</sup> As a share of income, this represents 62–117 percent of the estimated average monthly income for the poorest 10 percent in these countries, while the richest 10 percent would pay between 2–9 percent of their monthly income (Figure 3.1).<sup>99</sup> These disparities in income also interact with disparities in gender, with smartphone ownership as low as one in every five among women in Pakistan and one in every three women in Nigeria.<sup>100</sup>

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91 Shannon Schumacher, and Nicholas Kent. 2020. "8 charts on internet use around the world as countries grapple with COVID-19." Pew Research Center, (April 2, 2020). <https://www.pewresearch.org/fact-tank/2020/04/02/8-charts-on-internet-use-around-the-world-as-countries-grapple-with-covid-19/>.

92 IDC, Smartphone Market Share, (August 4, 2022). <https://www.idc.com/promo/smartphone-market-share>.

93 Ericsson, Ericsson Mobility Report, (June 2022). <https://www.ericsson.com/en/reports-and-papers/mobility-report>.

94 Shannon Schumacher, and Nicholas Kent, 2020. "8 charts on internet use around the world as countries grapple with COVID-19." Pew Research Center, (April 2, 2020). <https://www.pewresearch.org/fact-tank/2020/04/02/8-charts-on-internet-use-around-the-world-as-countries-grapple-with-covid-19/>.

95 Ericsson, Ericsson Mobility Report, (June 2022). <https://www.ericsson.com/en/reports-and-papers/mobility-report>.

96 GSMA, The Mobile Gender Gap Report 2022, p. 18 (2022). [https://www.gsma.com/r/wp-content/uploads/2022/06/The-Mobile-Gender-Gap-Report-2022.pdf?utm\\_source=website&utm\\_medium=download-button&utm\\_campaign=gender-gap-2022](https://www.gsma.com/r/wp-content/uploads/2022/06/The-Mobile-Gender-Gap-Report-2022.pdf?utm_source=website&utm_medium=download-button&utm_campaign=gender-gap-2022).

97 A4AI, Device Pricing 2022, (August 31, 2022). <https://a4ai.org/research/device-pricing-2022/>.

98 A4AI, Device Pricing 2022, (August 31, 2022). <https://a4ai.org/research/device-pricing-2022/>. Note that these retail prices refer to actual devices available in each country, which is different from the reference entry-level devices discussed in Section 1.2.

99 Details on the calculation of the estimates of average monthly income are explained in Appendix B.

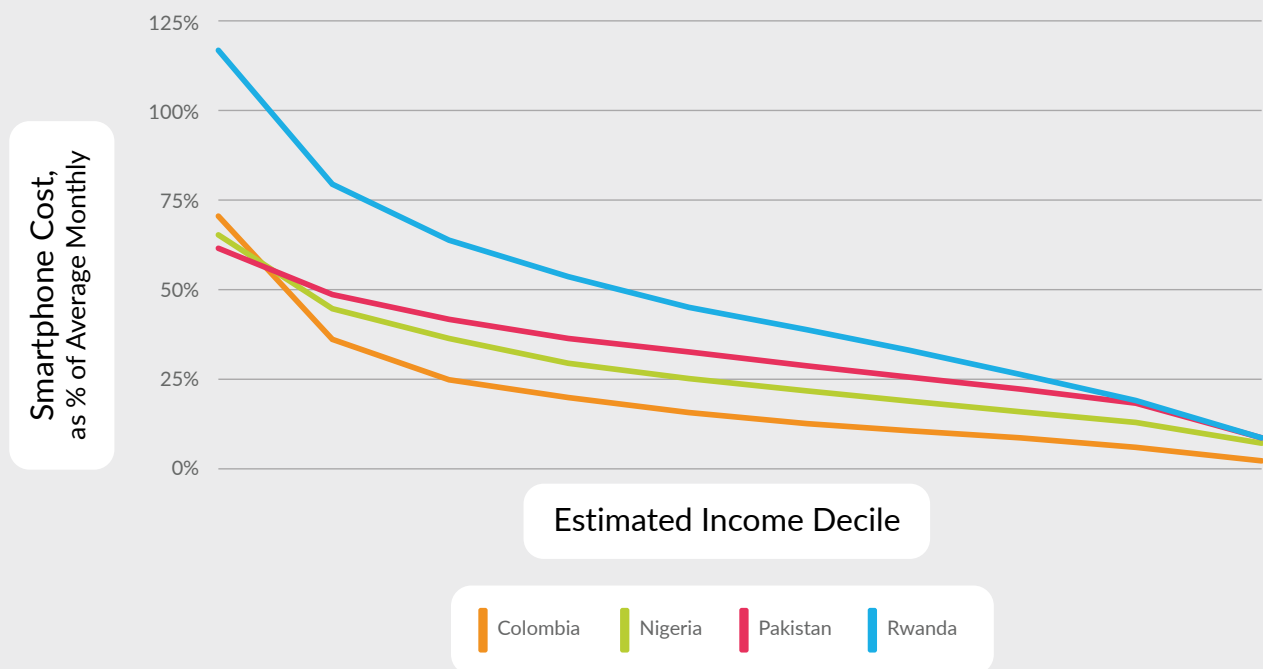
100 GSMA, The Mobile Gender Gap Report 2022, (2022). [https://www.gsma.com/r/wp-content/uploads/2022/06/The-Mobile-Gender-Gap-Report-2022.pdf?utm\\_source=website&utm\\_medium=download-button&utm\\_campaign=gender-gap-2022](https://www.gsma.com/r/wp-content/uploads/2022/06/The-Mobile-Gender-Gap-Report-2022.pdf?utm_source=website&utm_medium=download-button&utm_campaign=gender-gap-2022).

**Table 3.1. Reference least expensive entry-level smartphones, by target country**

Country	Reference device	Retail cost (US\$)
Colombia	ZTE Blade A31	\$64.53
Nigeria	Itel A23 LTE	\$60.87
Pakistan	Nokia 1 Plus	\$50.74
Rwanda	Mobicel Rio	\$34.99

Source: TMG/A4AI research.

**Figure 3.1. Smartphone affordability in target countries by income decile**



Source: TMG/A4AI.

Such inequalities, when left unaddressed, risk creating social problems. For example, gender disparities in device ownership and use risk creating the social proof for myths that discourage women's use of technology.<sup>101</sup> As such, device ownership becomes a crucial concern for a country's development. According to data from the GSM Association (GSMA), the progress in closing the gender gap in smartphone ownership has stalled, and 315 million fewer women than men own a smartphone.<sup>102</sup> In Pakistan, there is a sharp mobile ownership divide between women and men; 76 percent of men own a smartphone while only 51 percent of women own one.

In addition, increasing smartphone ownership, a part of digitalization, has broader implications for a country's development. Increases in broadband internet usage correlate with positive outcomes for economic growth.<sup>103</sup> Increases in meaningful connectivity—a measure of internet access that includes smartphone ownership—correlates with increased use of the Internet for educational, health, and good governance objectives, as well as overall informational autonomy for individuals.<sup>104</sup>

As such, governments and institutions have begun adding smartphone ownership as an important policy objective. Ownership and affordability are included as two indicators in the UN's proposed baseline for universal and meaningful connectivity.<sup>105</sup> National broadband plans and digital strategies from around the world increasingly include smartphone costs and availability. For example, a survey of 65 national broadband plans from low- and middle-income countries found that only 12 countries included smartphone affordability as a thematic concern.<sup>106</sup>

The transition point between policy interest and policy action requires further analyses to ensure that interventions are appropriately designed and effective. This includes understanding supply-side dynamics, as in the previous chapter, just as it also requires further research on the demand side of the mobile device market.

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101 A4AI. 2021. "The Cost of Exclusion Economic Consequences of the Digital Gender Gap." <https://a4ai.org/research/report/costs-of-exclusion-report/>.

102 GSMA. 2022. "The Mobile Gender Gap Report." [https://www.gsma.com/r/wp-content/uploads/2022/06/The-Mobile-Gender-Gap-Report-2022.pdf?utm\\_source=website&utm\\_medium=download-button&utm\\_campaign=gender-gap-2022](https://www.gsma.com/r/wp-content/uploads/2022/06/The-Mobile-Gender-Gap-Report-2022.pdf?utm_source=website&utm_medium=download-button&utm_campaign=gender-gap-2022).

103 ITU. 2018. "The economic contribution of broadband, digitization and ICT regulation." p. 9. [https://www.itu.int/en/ITU-D/Regulatory-Market/Documents/FINAL\\_1d\\_18-00513\\_Broadband-and-Digital-Transformation-E.pdf](https://www.itu.int/en/ITU-D/Regulatory-Market/Documents/FINAL_1d_18-00513_Broadband-and-Digital-Transformation-E.pdf).

104 A4AI. 2022. "Advancing Meaningful Connectivity: Towards Active and Participatory Digital Societies." (February 28, 2022). <https://a4ai.org/research/advancing-meaningful-connectivity-towards-active-and-participatory-digital-societies/>.

105 ITU. 2022. "Achieving universal and meaningful digital connectivity Setting a baseline and targets for 2030." [https://www.itu.int/itu-d/meetings/statistics/wp-content/uploads/sites/8/2022/04/UniversalMeaningfulDigitalConnectivityTargets2030\\_BackgroundPaper.pdf](https://www.itu.int/itu-d/meetings/statistics/wp-content/uploads/sites/8/2022/04/UniversalMeaningfulDigitalConnectivityTargets2030_BackgroundPaper.pdf).

106 A4AI. 2020. "AR20 Data on National Broadband Plans." <https://docs.google.com/spreadsheets/d/1Kh8pbilx2wnEmM2N4CLiOtW8iD0knsPbIt78wJ7KOg/edit#gid=0>.

## 3.4. Consumer motivations for purchasing a smartphone

Several factors interplay in consumers' evaluation of information and communication technology (ICT) devices. Substantial literature has been dedicated to the various motivations and barriers that affect consumers' purchasing decisions. An individual's digital literacy and their social environment can affect their valuation of a device.<sup>107</sup> Their individual perceptions of what becomes possible with a device, through professional or personal experiences, can also affect the value that someone will give to owning a device.<sup>108</sup> These factors and others interact with a consumer's available income to define their willingness to pay.<sup>109</sup> These factors are independently worth exploring, just as they are worth understanding in the context of each other.

### Box 3.2. Focus group, select responses on motivations for purchasing a smartphone

“ Everyone wishes to own a smartphone, but it is expensive. Therefore, it's practical to buy small phones since they can be efficient.”

—Participant, Rwanda youth group

“ As a student, the button phone is not useful for me at all and makes me feel inferior to others because there are some school assignments that we submit via email, so how do I do that on a button phone? How do I research a button phone? I need a smartphone badly but it is just so expensive.”

—Participant, Nigeria non-male group

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107 Broadband Commission for Sustainable Development. 2022 “Working Group Report: Strategies Towards Universal Smartphone Access Report.” (September 27, 2022). <https://www.broadbandcommission.org/publication/strategies-towards-universal-smartphone-access/>.

108 A4AI. 2020. “From luxury to lifeline: Reducing the cost of mobile devices to reach universal internet access.” <https://a4ai.org/report/from-luxury-to-lifeline-reducing-the-cost-of-mobile-devices-to-reach-universal-internet-access/>.

109 GSMA. 2022. “Making internet-enabled phone more affordable in low-and middle-income countries.” <https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2022/04/Making-internet-enabled-phones-more-affordable-in-low-and-middle-income-countries.pdf>.

Our research reconfirms this broad understanding of consumer motivations for purchasing a smartphone. In our focus groups across the target countries, consumers' decisions were understood through the affordability (or, more appropriately, the lack thereof) of smartphones. Participants varied, based on their interest levels, in how much they were willing to pay for a smartphone and whether a more basic mobile device would be sufficient for their needs (Box 3.2). In line with this, survey respondents with smartphones, on a consistent basis across all four countries, reported conducting three to four times as many online activities as their peers with only a basic feature phone (Table 3.2). These activities include work, study, using social media and online messaging services, using government services, e-commerce, looking up information, and entertainment. Price dominates consumer's understanding of smartphones, but it is not the exclusive factor.

**Table 3.2. Average number of activities conducted online, by country, gender, and device type (number of respondents)**

		Basic feature phone	Smart feature phone	Smartphone
Colombia	Women	2.5 (26)	6.3 (16)	8.4 (162)
	Men	2.0 (7)	9.0 (3)	8.6 (96)
Nigeria	Women	1.4 (63)	2.5 (35)	4.3 (80)
	Men	1.3 (32)	1.8 (13)	5.0 (111)
Pakistan	Women	1.1 (34)	2.0 (2)	5.5 (72)
	Men	1.3 (69)	2.0 (5)	5.4 (124)
Rwanda	Women	2.6 (89)	4.6 (31)	7.4 (74)
	Men	2.4 (53)	4.5 (23)	8.4 (52)

Source: TMG/A4AI.

The role of smart feature phones helps illustrate the dominance of price in consumer's minds. These devices were frequently mentioned as much more affordable and in turn, especially attractive among family members and others with limited literacy or digital skills. In the four surveyed countries, among survey respondents without a smartphone (N = 169), 74 percent (125) said they did not own one because it was too expensive, and 69 percent (116) said they would buy a smartphone today if they could afford it. These smart feature phones add a more affordable rung on the device ladder, with more simplistic functionality and a lower price point while still providing internet connectivity (Table 3.3). However, for many, these devices are too simple and do not meet their needs.

**Table 3.3. Average purchase price in US\$, by country, device, and location (number of respondents)**

	Pre-owned feature phone	New feature phone	Pre-owned smartphone, non-store	Pre-owned smartphone, from store	New smartphone
<b>Colombia</b>	\$49.83 (5)	\$63.65 (19)	\$101.72 (20)	\$87.77 (5)	\$149.54 (128)
<b>Nigeria</b>	\$29.45 (20)	\$29.11 (94)	\$81.53 (18)	\$64.55 (21)	\$124.5 (130)
<b>Pakistan</b>	\$26.11 (10)	\$18.55 (72)	\$38.76 (1)	\$118.89 (29)	\$163.35 (146)
<b>Rwanda</b>	\$15.31 (41)	\$22.76 (142)	\$202.57 (10)	\$79.34 (12)	\$105.65 (94)

Source: TMG/A4AI.

A consumer's interest in ICT also appears to affect what kind of device they own. Two hundred fifteen survey respondents reported owning a mobile device they bought used or refurbished. As a part of the survey sample, these respondents disproportionately were more likely to own a smartphone and to come from a lower-income decile. This pattern fits with a theory that price is not wholly deterministic of what kind of device someone owns, but that some consumers navigate the mobile device market differently based on their interests. Users that are more aware and interested in technology may seek alternative options, such as a refurbished phone, to fulfil their needs in terms of technology and capabilities of the handset. For these users, a basic or feature smartphone does not fulfil their interest in ICT. Based on this evidence and on complementary focus group evidence from the 2020 A4AI report *From Luxury to Lifeline* illustrating a comparatively large fear held by new entrants to the market of pre-owned devices, especially used devices.<sup>110</sup> This trend points to two potential extremes in how consumers buy differently based on their interests.

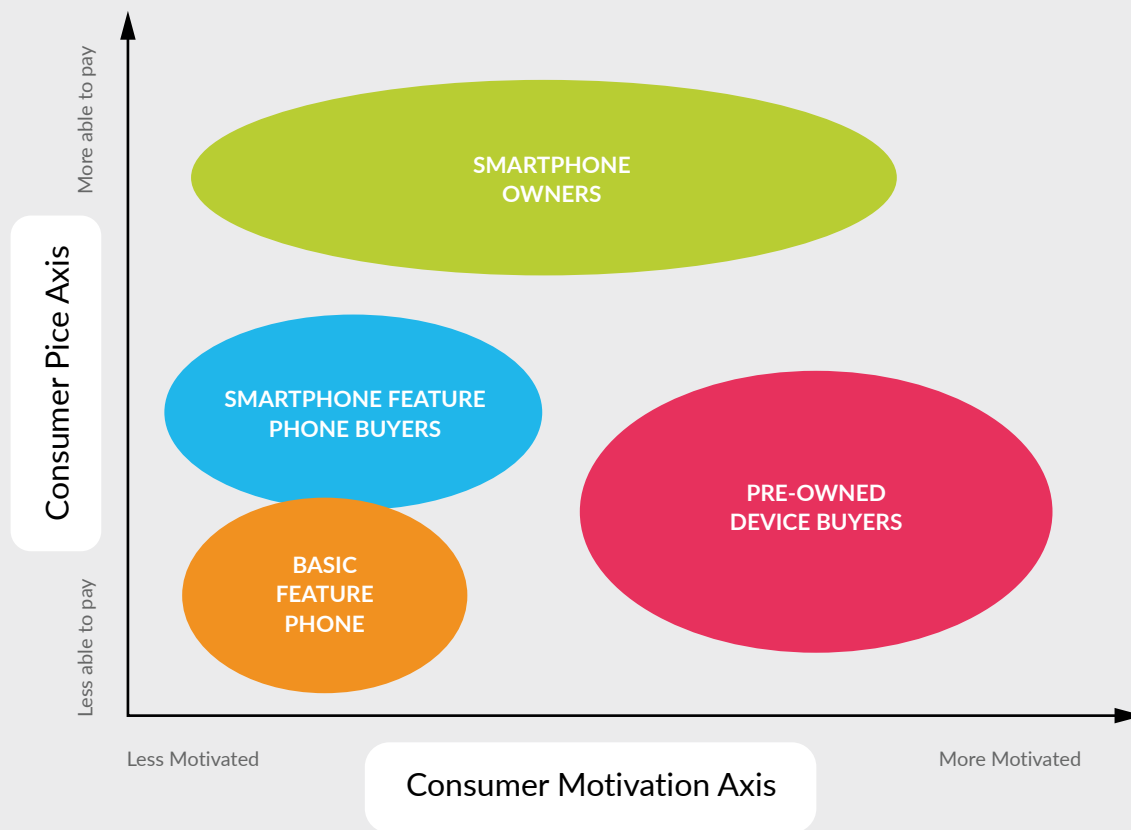
**Price and motivation intersect to create distinct market segments that appear across the target countries.**

While no country's mobile device market is strictly identical to any other, patterns do emerge to illustrate some consistency in behavior across national boundaries. This analysis uses price and motivation as separate axes on a matrix diagram. On the price axis, a consumer's position is determined by their ability to pay, with a higher position on the axis matching an ability to pay at a higher price point. On the motivation axis, a consumer's position is determined by their individual interest in ICT, with a higher position on the axis matching to a greater personal interest (Figure 3.2).

110 A4AI. 2020. "From luxury to lifeline: Reducing the cost of mobile devices to reach universal internet access." <https://a4ai.org/report/from-luxury-to-lifeline-reducing-the-cost-of-mobile-devices-to-reach-universal-internet-access/>.



Figure ES.2. Theoretical consumer price-motivation matrix



Source: TMG/A4AI.

The apparent role of smart feature phones and pre-owned devices illustrates the divergence that appears within the market and the consequent diversity that appears at a macroeconomic scale. Both user types are limited in their ability to pay: they likely hold similar positions on the price axis (although pre-owned smartphones are often significantly more expensive). However, each type holds disparate positions on the motivation axis. Smart feature phone users, not looking to carry out as many activities online, hold a lower position on the motivation axis. Basic feature phone users carry even greater limitations. In comparison, individuals with used or refurbished devices have navigated the market in a different way based on a higher position on the motivation axis that allows them to do more online.

This analysis points out that consumers' journeys through the mobile device market (as many consumers will return periodically to change, replace, or upgrade their device) are not linear or uniform. **Different consumers with different needs have different purchasing behaviors. With this knowledge, interventions to encourage or facilitate wider smartphone ownership must account for this diversity.**

In addition to a socially agnostic analysis, such as the one above, a person's background is an important factor in understanding their position within the matrix. Aspects of gender, age, geography, nationality, and education, as well as other social factors, can affect the distribution of a market's population across the matrix.

### Box 3.3. Focus group, select responses on consumer motivations to purchase a device

- For example, one female participant in a focus group in Pakistan defined her hypothetical process of buying a mobile device as being based on her husband's approval.
- For one woman in Colombia, her main motivation for owning a mobile device was based on her desire to stay in contact with relatives who live far away: her geographic position and migrant background affect her motivations to own a mobile device.

The examples in Box 3.3 illustrate ways that social status can factor into an individual's position in the analytical matrix. Cumulatively, these patterns can create disparities and inequalities that in turn manifest further social consequences.

In turn, an in-depth analysis of an individual country's mobile device market should combine both this matrix analysis and give specific attention to the distribution of people across the matrix. This process can help link social and economic consequences of the digital divide. For example, in all four target countries, two elements stood out (i) rural women were the demographic group least likely to own a smartphone and (ii) those on lower incomes were less likely to own a smartphone compared to their peers with higher incomes (Table 3.4). **Social context matters and measuring for it can also further inform where interventions can be best localized to respond to the relevant needs of that market.**

Other aspects, such as availability of relevant content and services, can also play a role in the distribution of people across the matrix. Data from the GSMA Mobile Connectivity Index has found a positive correlation between mobile internet use and the availability of relevant content and services.<sup>111</sup> Consumer motivation can be triggered by the availability of relevant services and content online that is valuable for users. One of the main barriers for mobile internet adoption is the availability of relevant content,<sup>112</sup> and it can be

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111 GSMA. 2021. "Accelerating Mobile Internet Adoption, Policy Consideration." p. 41. <https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2021/05/Accelerating-Mobile-Internet-Adoption-Policy-Considerations.pdf>.

112 GSMA. 2021. "Accelerating Mobile Internet Adoption, Policy Consideration." p. 41. <https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2021/05/Accelerating-Mobile-Internet-Adoption-Policy-Considerations.pdf>.

surmounted by offering relevant content relating to particular areas such as agriculture, health, or education, and in languages relevant to the population. Content in English predominates in websites; more than 55.0 percent of the content online is in English, less than 0.1 percent of the websites are in Hausa, Urdu, Igbo, and 150 other languages,<sup>113</sup> and only 9.0 percent of website traffic in Africa is local.<sup>114</sup>

**Table 3.2. Average number of activities conducted online, by country, gender, and device type (number of respondents)**

		Urban	Rural	Sample average
Colombia	Women	76.3	62.5	74.3
	Men	85.6	79.2	84.2
Nigeria	Women	63.3	35.6	44.9
	Men	81.1	46.7	71.2
Pakistan	Women	74.5	56.1	63.7
	Men	62.8	57.6	60.5
Rwanda	Women	56.7	29.4	37.8
	Men	54.0	31.6	40.3

Source: TMG/A4AI.

Based on the research conducted, affordability and motivation are the main aspects stakeholders designing handset affordability programs should take into consideration when designing a value proposition, but the ultimate design will depend on the context of each country and the target population. Gender, age, culture, and educational level are factors that determine the willingness to pay of the users and should be taken into consideration during the design of a successful handset affordability program. There is no one-size-fits-all type of solution—actors should adapt and respond to the needs of each context.

### **Key finding 3.1. Importance of social context and diversity**

**Key Finding:** Without interventions, the mobile device market will replicate pre-existing social and economic inequalities. The current state of smartphone affordability illustrates the digital divide and its inequalities today. These inequalities impact how someone navigates the mobile device market and can influence the type of device they purchase, if they purchase a device at all. Interventions to increase smartphone ownership must consider this diversity and be designed for multiple market segments.

113 W3Techs. 2023, "Usage statistics of content languages for websites." [https://w3techs.com/technologies/overview/content\\_language](https://w3techs.com/technologies/overview/content_language).

114 GSMA, "Accelerating Mobile Internet Adoption Policy Considerations." p. 41.

### 3.5. Consumer approaches to paying for major purchases

Smartphones are not the only major household purchase. Drawing from Gapminder’s Dollar Street, smartphones and other ICT devices frequently appear as a most-loved item across national boundaries and different incomes.<sup>115</sup> They belong to a category of material goods that are frequently purchased at a household or even individual level and carry a price tag well above daily spending habits for most of the world’s population.

This Section draws from this category to understand how people save for major household purchases to better understand how consumers navigate the choices between ordinary spending, major purchases that merit saving money over time, and using financing to facilitate a purchase.



115 See Gapminder, Dollar Street: most loved items in the world by income per month. <https://www.gapminder.org/dollar-street?topic=most-loved-items&media=all>.

People save money. In our focus groups, participants mentioned saving money for household goods, livestock, starting a business, laptops, tuition fees, clothes, weddings, health care, and other essentials. They compared practices and histories of saving money, for months, for years, with success, and in less fortunate times of using savings to pay for unseen emergencies. Among our survey respondents, just over one-third reported ever using some form of financing to purchase an expensive item (Table 3.5).

**Table 22. Payment and savings methods for major purchases (percentage of respondents), by country**

**When buying an expensive item...<sup>116</sup>**

	None of the following	Followed a savings plan		Taken a loan	Paid in installments	
<b>Colombia</b>	36.3	14.7	<b>43.3</b>	20.4	47.4	<b>56.8</b>
<b>Nigeria</b>	60.5	19.5	<b>77.3</b>	8.4	16.2	<b>22.7</b>
<b>Pakistan</b>	67.6	8.8	<b>84.6</b>	7.2	7.9	<b>15.4</b>
<b>Rwanda</b>	44.3	34.5	<b>59.9</b>	27.1	28.0	<b>40.1</b>
		No financing (total)		Any kind of financing (total)		

**When buying your mobile device...**

	Made up-front payment	Saved money for some time		Paid in installments	Taken a loan	Borrowed money from family/ friends	
<b>Colombia</b>	15.9	18.0	<b>33.9</b>	34.5	3.3	3.6	<b>41.4</b>
<b>Nigeria</b>	6.0	69.5	<b>75.5</b>	5.1	1.8	4.5	<b>11.4</b>
<b>Pakistan</b>	61.3	11.6	<b>72.9</b>	6.3	2.2	6.6	<b>15.1</b>
<b>Rwanda</b>	15.4	73.2	<b>88.6</b>	3.4	2.2	4.3	<b>9.9</b>
		No financing (total)		Any kind of financing (total)			

Source: TMG/A4AI.

<sup>116</sup> Due to the scope of the question (multiple purchases rather than the single purchase of the respondent's mobile device), respondents could choose more than one of the three options, and the numbers per row do not add up to 100 percent.

The popularity of saving money as a strategy to afford a device was even more common with mobile devices. Respondents reported personally saving money over time as their strategy to afford their device. This reached up to 69 percent of respondents in Nigeria and 73 percent of respondents in Rwanda. In large part, the evidence matches where the infrastructure is most widely available: installment plans, and similar strategies are substantially less common in the lower-income target countries compared to Colombia—both for smartphones and other purchases.

While formal financial structures are helpful and interventions should look to expand their availability, people also create and rely on informal financial structures to save money, as well. Focus group participants in the target countries recurrently mentioned using community saving schemes (also known as savings clubs, money committees, and *ibimina*<sup>117</sup>) to save money for major purchases. Indeed, in the latest edition of the Global Findex Database, savings clubs were more frequently used than formal banking or mobile money accounts in several target countries and peer countries (Table 3.6).<sup>118</sup> Given their popularity, these structures may be a critical component to understanding saving strategies and how people in these countries make major purchases.

**Table 3.6. Savings methods (percentage of national population, age 15+), by country**

	Saved at financial institution	Saved money using a mobile money account	Saved using a savings club/person outside the family
Colombia	11.39	41.20	6.15
Nigeria	17.73	1.59	24.73
Pakistan	2.37	0.81	5.91
Rwanda		No data	
Uganda	15.89	31.82	33.40
Kenya	21.45	37.25	31.64
Tanzania	6.27	19.22	18.65
South Sudan	1.49	0.73	10.63

Source: Global Findex Database, 2021.

117 *Ibimina* are informal savings groups in Rwanda. See Unguka Bank, *Ibimina Savings*, <https://ungukabank.com/ibiminasavings>.

118 World Bank. 2021. "The Global Findex Database 2021: Financial Inclusion, Digital Payments, and Resilience in the Age of COVID-19." <https://www.worldbank.org/en/publication/globalfindex>.

In comparison to the trusted processes of personal savings and savings clubs, **many focus group participants expressed skepticism about financing schemes as being financially inefficient.** In all four target countries, participants mentioned negative experiences with high interest rates for repayment. As a result, many indicated a preference against such financing strategies. Because of their interest rates, they were seen as financially imprudent for consumers and predatory as institutions. Financing interventions in this space must pay careful attention to avoid this trap to appeal to consumers.

Indeed, financing options were even less popular in the context of mobile devices. While 15.8 percent of respondents reported taking out a loan to pay for a major household purchase, only 2.4 percent of respondents did so for a mobile phone. About 25.0 percent of respondents had paid in installments for a major household good, while only 12.4 percent did so for their mobile device. This last number comes in the context of a huge outlier effect among respondents in Colombia; just over 33 percent of whom had paid through installments. Installment plans were used by 3–6 percent of respondents in the three other target countries. Overall, efforts to encourage financing options for smartphones face a large disadvantage against other financial strategies when it comes to how people afford major purchases. To succeed, these options must be perceived as financially efficient by consumers.

### *Key finding 3.2.* Saving money is a popular approach to purchase a mobile device

Key Finding: People in our target countries, across different social backgrounds, indeed save money to make major purchases, particularly mobile devices. When drawing from the consumer experience, there are trusted practices and institutions that help people afford these major purchases. Incorporating these practices and institutions and/or borrowing on their ways of operating may lend credibility to new financing strategies from a consumer perspective.

## 3.6. Fair financing from the consumer's perspective

Many macroeconomic analyses of the mobile device market tier consumers in groups based on their ability to pay: the most affluent consumers being able to afford any device of their choice; then consumers able to pay outright for their device, accepting limitations in functionality as a compromise; then consumers who would be able to afford a device on an installment basis; and finally, those who would not be able to afford a device, even with such interventions. The following Section focuses on that third group to understand how financing solutions might be successful and what aspects are important to note from a consumer perspective about these strategies.



This analysis begins with the fundamental actors in a transaction: a buyer and a seller. From the perspective of many focus group participants and survey respondents, the experience of buying a mobile phone is the comparatively quick execution of a long-considered plan. Many save money over a long period of time, typically in the range of multiple months, if not longer. In that time, consumers frequently collect information to ensure they make the right decision.

Consumers seek a product they can trust and will rely on cues that convey a seller's reliability. In our survey, confidence in the integrity of the vendor was the most often cited reason for why they bought their device where they bought it. Other similarly coded reasons, such as offering warranties, providing customer support, and having a reputation for good prices, were the next, most often reasons (Table 3.7).

**Table 3.7. Consumer motivations for purchase location (as percentage of commercial device buyers), by country**

	Colombia	Nigeria	Pakistan	Rwanda
Proximity of the store/business	25.9	8.8	44.6	31.2
Confidence of the quality of the vendor	30.7	27.9	38.4	34.4
Availability of payment options	40.6	11.1	8.5	15.2
Risks with used/refurbished devices	12.7	3.1	3.5	24.1
Availability of mobile phones and data plans in the same store	28.8	13.4	15.5	17.4
Availability of multiple device types to choose from	37.3	14.1	12.4	20.2
The phone was offered together with other goods/services	16.0	16.8	14.7	14.5
Knew someone else who recommended the store business	16.0	19.8	19.0	14.5
Reputation for cheap/good prices	33.5	33.6	20.9	27.0
Customer support	30.7	13.0	18.2	20.2
Availability of certain brands to choose from	32.5	21.0	13.0	7.8
The warranty offered by the store/business	41.0	23.7	11.7	30.0

Source: TMG/A4AI.

This trend was reaffirmed in focus group discussions. One participant in Rwanda said she would always buy her device from a network operator, because of their warranties. Others in many countries went to trusted stores such as well-known supermarkets or marketplaces nearby. Another participant in Colombia ruled out buying used devices from a seller because of the uncertainty of where the phone was sourced or its quality, while another in Rwanda said he can only afford to buy a pre-owned device because that is the only price point available to him. This matches with earlier research in other low- and middle-income countries around vendor trust as a crucial dynamic for consumers.<sup>119</sup>

### Box 3.4. Focus group, select responses

“ Personally, I always prefer buying my telephone with telecom companies, because they have always long period of warranty in case the device break down, which is very different from shops in town where they always avoid to replace the phone when it is not working or when it has some technical issues.”

—Participant, Rwanda non-male group

“ I'm not going to buy my cell phone from a person who I don't know where they got it from, or if they had to steal from someone. Yes, that they are selling it to me like... I don't know.”

—Participant, Colombia non-male group

Device brands also convey trustworthiness to consumers. In our focus groups, iPhones and Samsung devices were frequently mentioned as desirable and trusted brands that consumers would buy—if they could afford it. At the other end, there were brands that consumers considered dangerous and of poor quality that they would not trust.

While saving money for a new device, consumers collect information about what kind of device they want and where they will make their purchase. This matters because financing and policy interventions introduce new actors into the transaction. These new actors can create stability or instability in the transaction, depending on the consumer's perspective. Many discussions on financing innovations focus on building the seller's trust in the transaction by developing creditworthiness proxies for the buyer. However, the relationship to the consumer should be just as important.

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119 A4AI. 2020. “From luxury to lifeline: Reducing the cost of mobile devices to reach universal internet access.” <https://a4ai.org/report/from-luxury-to-lifeline-reducing-the-cost-of-mobile-devices-to-reach-universal-internet-access/>.

### Box 3.5. Focus group, select responses

“ Personally, I think I can only participate in a promotion where I am winning as a customer. I first look at the quality of the product but also my capacity to afford such a product. I don't want to fall into a trap where I will lose my money paying for a product which is substandard or expensive.”

—Participant, Rwanda non-male group

Consumers have strong opinions on fair and trustworthy financial strategies. In drawing from experiences beyond the mobile device market, consumers do not want financing schemes that overemphasize recuperating capital investment through high interest rates. Instead, participants in our research spoke more positively about saving their money on a personal level and purchasing the product after they had saved enough money.

This poses a clear challenge for policy makers looking to implement financing options as an alternative. It is not just about creating these programs, but also making these programs appealing to consumers. **Fundamentally, consumers need to believe that interest repayments are worth the extra cost of financing a smartphone purchase.**

New device financing may benefit from a strategy that centers the consumer's experience. From this research, three crucial features emerge to do that. First, financing interventions should be prepared to build trust within the transaction for everyone involved, not just for sellers. Second, financing must avoid or at a minimum reduce being perceived as financially inefficient to avoid non-take-up. Third, these interventions need to account for the diversity of consumers within the market and address that diversity within their design. Effective communication and outreach campaigns should accompany fair device financing interventions to build consumer trust in these schemes.

Indeed, financing strategies so far inequitably help different consumer segments. Consistently across the four target countries, women were less likely than men to have used any financing strategy for a major purchase and similarly so for people living in rural areas compared to their urban peers (Table 3.8). Several factors will interrelate here to financial inclusion, creditworthiness, and earning power as to why these inequalities exist. However, it is important to note them to mitigate replicating them as new financing strategies are developed.

**Table 3.8. Participation rates, financing for expensive item (percent of respondents), by country, gender, and geography**

<b>Colombia</b>	Women	55.4	Urban	59.9
	Men	58.9	Rural	40.7
<b>Nigeria</b>	Women	17.6	Urban	24.7
	Men	28.4	Rural	20.5
<b>Pakistan</b>	Women	8.5	Urban	17.6
	Men	19.6	Rural	13.1
<b>Rwanda</b>	Women	38.3	Urban	49.5
	Men	43.0	Rural	35.3

*Source:* TMG/A4AI.

Financing schemes are not, by definition, negative. However, badly designed financing schemes can have a long-term negative impact toward the broader goal of closing the digital divide through increased entry-level device ownership by omitting certain market segments or consumer populations. It is also important to note that failing to fill this gap leaves a space for predatory practices that consumers in our focus groups saw, knew, and sometimes used—including loan sharks and loans with exorbitant interest rates.

### **Key finding 3.3. Consumers are skeptical of financing schemes**

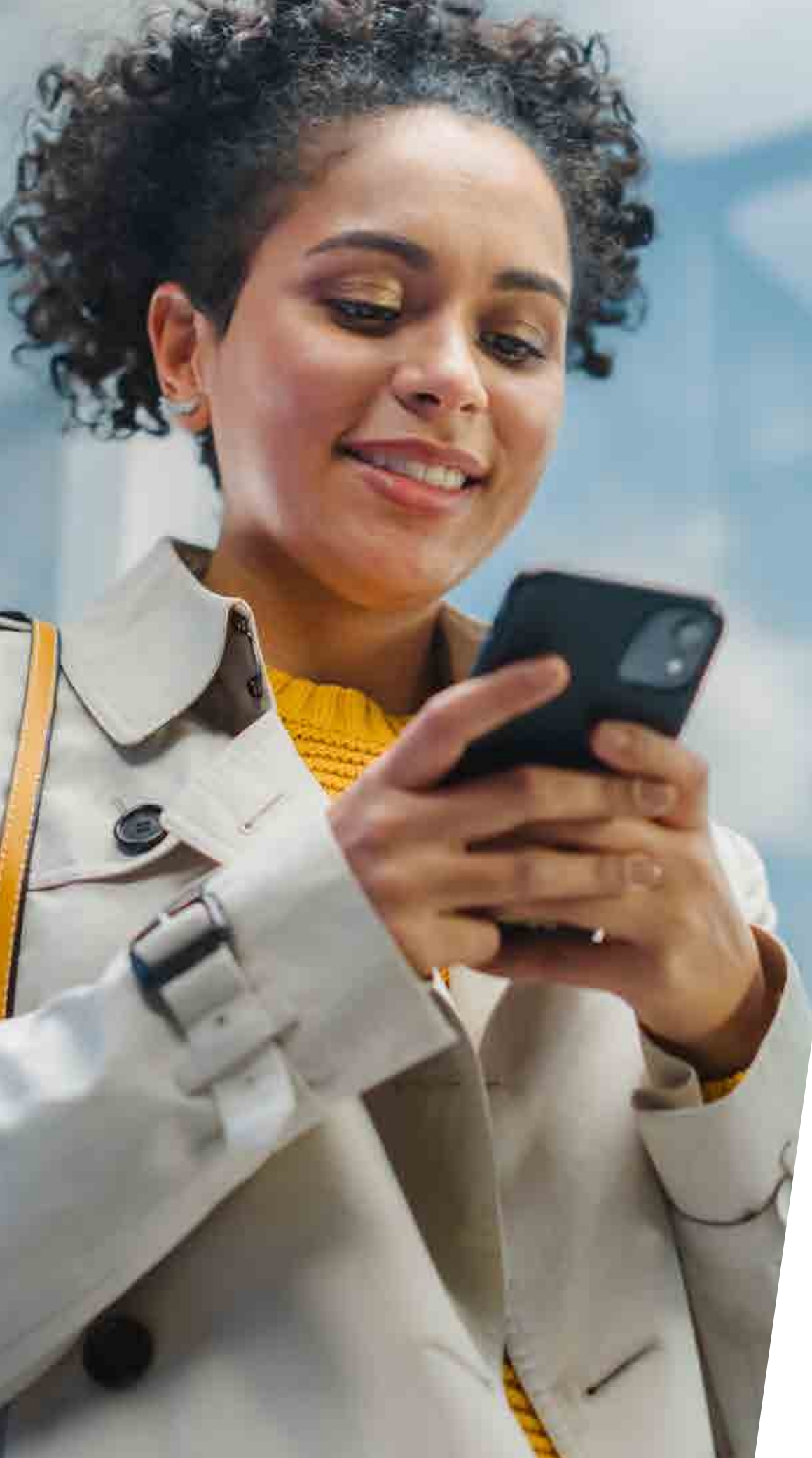
**Key Finding:** Financing schemes, in general, hold a negative reputation among target consumers in the target countries. In a purchasing decision highly guided by consumer perceptions of trust, financing schemes introduce a new actor (the lender) and new instability compared to more common methods of personal savings and financial management. In particular, women were less likely than men to have used any financing strategy for a major purchase and similarly so for people living in rural areas compared to their urban peers. For financing schemes to be successful, they must overcome this perception and make consumers feel like they benefit from using such a scheme rather than just agreeing to a larger price tag over time.

## 3.7. Conclusions

Our research suggests that in addition to the wider range of device types for sale—basic feature phones and smartphones, new and used, formal and informal economies—a wide range of consumers are entering the market as well. They come with different skill sets, levels of literacy, and interest in technology; earn different levels of income; are from different geographical locations; and some face gender disparities and carry different social norms. As interventions are designed to accelerate this process and bring even more people into the mobile device market, attention should be paid to understanding these differences as part of the consumer journey.

Moreover, our research confirms that people save for major household purchases and that mobile devices are frequently perceived to belong to this category as well. A wide range of financial strategies are used by individuals looking to buy a device. Fundamentally, from a consumer perspective, financing programs and strategies like installment plans carry implicit negative bias as being fiscally inefficient for the consumer. Interventions must overcome or mitigate this perception to draw in new consumers.

Finally, the demand analysis identified that within the exchange of money for a mobile device, trust and consumer perceptions of integrity and security are essential factors that enable a successful transaction. When financing innovations or interventions alter this relationship, this can have a positive or negative impact. Designers of these innovations must therefore carefully consider the potential consequences of their intervention from a consumer perspective, as well as the fiduciary concerns of device manufacturers and sellers.



## 4. Financing Schemes

### 4.1. Introduction

This chapter explores various financing schemes available for the purchase of mobile devices globally, highlighting useful practices applicable to entry-level device financing for low-income consumers. Based on research and interviews conducted for this report, this chapter provides a typology of financing schemes for mobile devices and case studies on different initiatives identified internationally. To understand the significance of the innovations in mobile device financing, each of these schemes is assessed in terms of how it addresses key factors that determine the supply of credit for the purchase of mobile devices. The objective is to provide a reference framework for the design of innovative financing initiatives to positively influence these determinants of supply of credit and promote financing initiatives for entry-level devices.

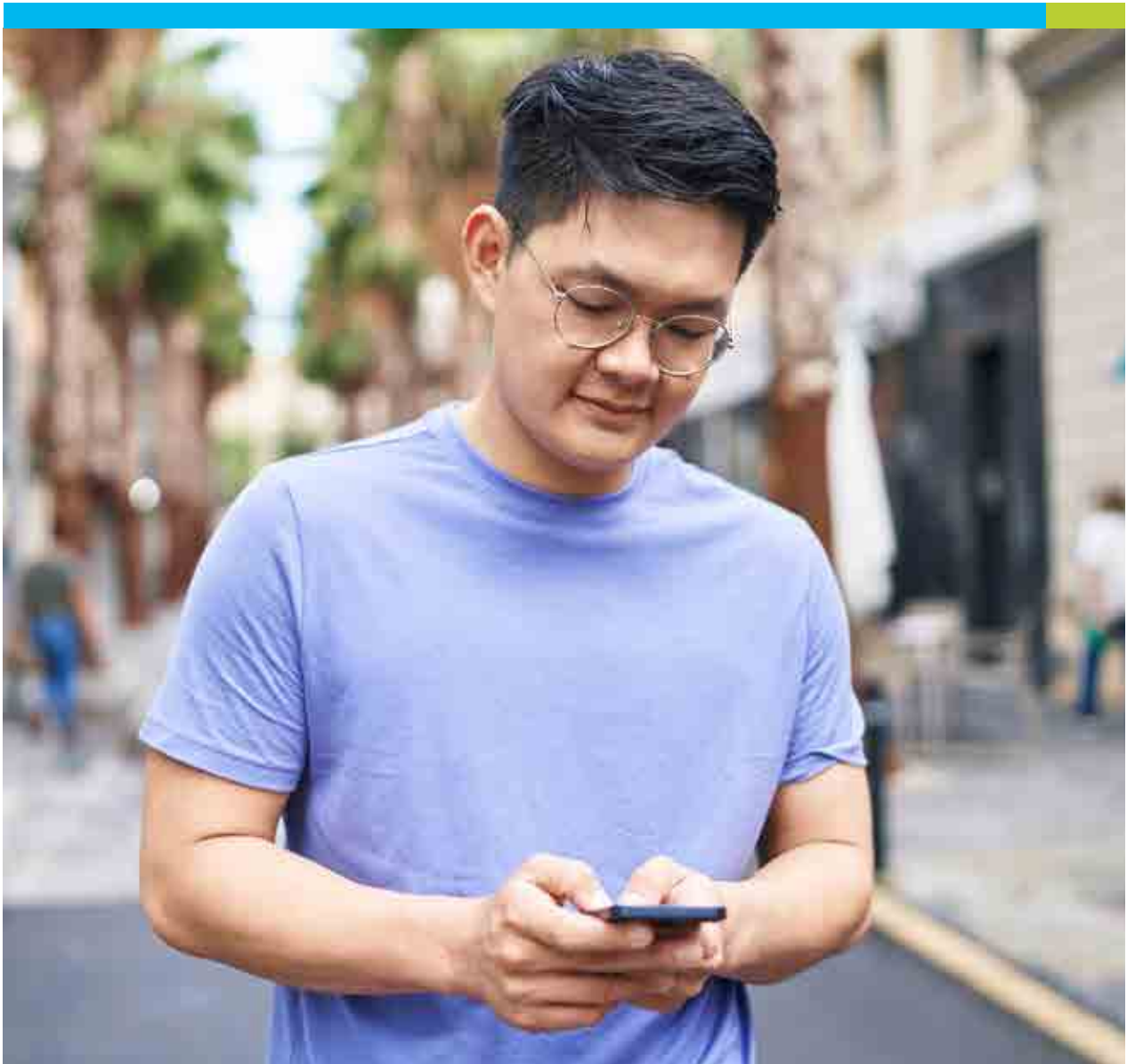
### 4.2. Financing schemes for the purchase of entry-level devices

This report takes a broad view of what constitutes a financing scheme for the purchase of an internet-enabled mobile device, including smartphones. Financing schemes are arrangements that a consumer enters into that allow them to acquire a device when:

- the cost of that device both exceeds any surplus left over from their short-term (e.g., monthly) budget; and
- borrowing is preferred to the disutility involved in accumulating monthly surpluses until the device can be purchased outright.



Thus, financing schemes involve *borrowing by a consumer from an external party against future income, that is, against the cost of future consumption*. Borrowing is rationally undertaken if doing so has a favorable impact on consumption possibilities after the repayment of the loan, with any necessary interest. In financial terms, borrowing will take place if there is positive net present value to the consumer after purchase of the device. This chapter also takes a broad view of what constitutes “interest” or the cost of future consumption. This may be in the form of explicit interest paid on a loan, a “time price” for an installment payment over some future period that is higher than the cash price for payment now, or higher usage prices that cross-subsidize the device from future consumption.<sup>120</sup>







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120 For a generic treatment of nature and types of consumer credit, see, for example, Bertola, et al. 2006. (editors). “The Economics of Consumer Credit.” Chapter 1, MIT Press.

Further, as the report is ultimately interested in how the international financial institutions (IFIs), the public sector, and relevant private sector actors can increase economically beneficial financing, this chapter does not deal with direct lending from other consumers who have surpluses, (e.g., other family members, or grey market lending). As such, this chapter deals with appropriately licensed *financial intermediaries*.

The degree and type of financial intermediation that consumers use vary sharply among low- and middle-income countries. For example, the demand survey undertaken in the four target countries (Colombia, Nigeria, Pakistan, and Rwanda) revealed that among consumers who already possess phones, the share who possess a traditional bank account varies from nearly 80 percent in Nigeria to 17 percent in Pakistan. The advent of mobile money has introduced, for the first time, broad consumer segments to formal financial transactions. For example, 94 percent of respondents in Rwanda report having a mobile money account. Still, a significant segment of consumers remains unbanked in the broadest sense of that term. This is true even among citizens who already have a mobile device. In Colombia, 41 percent report having no form of banking account; it is 50 percent in Pakistan. Of course, the percentage of unbanked among those who do not yet have the privilege of owning a mobile device is much higher (Table 4.1). It is also worth noting that certain types of banking are not used for financing mobile devices. For example, community savings and credit cooperative societies (SACCOs) are typically focused on providing short-term funding for emergencies, family obligations, transport, or seasonal agricultural production challenges. They are very common in countries like Rwanda, but less prevalent in the remaining target countries (Table 4.1).





**Table 4.1. Demand survey results— types of bank accounts possessed by respondents in target countries**

Form of banking	Colombia 	Nigeria 	Pakistan 	Rwanda 
Bank account	34%	79%	17%	52%
Account in a cooperative or savings association	4%	8%	2%	27%
Mobile money account	32%	18%	36%	94%
Neither	41%	12%	50%	1%
Don't know	1%	1%	1%	N/A
Did not respond	1%	1%	3%	0%

Source: TMG/A4AI research.

It is worth emphasizing that, based on the results of the demand analysis, in many areas of the world these financing schemes represent a small share of overall purchasing of mobile devices (Table 4.2). In Colombia, over 50 percent of respondents used some form of installment plan or loan, but in Nigeria, Pakistan, and Rwanda financing schemes, as we defined them, involved around 10 percent or less of purchases (Nigeria—8 percent, Pakistan—11 percent, and Rwanda—6 percent).<sup>121</sup> Moreover, most financing schemes for Internet-enabled devices were developed relatively recently<sup>122</sup> and tend to target higher-end smartphones, rather than entry-level devices, which are the key focus of this report.

**Table 4.2. Demand survey results—methods to finance phone purchase**

Form of banking	Colombia	Nigeria	Pakistan	Rwanda
				
Up-front payment	22%	7%	76%	17%
Saved money for some time	25%	82%	14%	80%
Borrowed money from family/friends	5%	5%	8%	5%
Installments	49%	6%	8%	4%
Loan	5%	2%	3%	2%
Other	2%	3%	N/A	2%
Refused	0%	N/A	0%	N/A

Source: TMG/A4AI research.

Another significant qualification of the scope of this chapter is that it does not address the issues related to optimal levels of borrowing. The issue of how much credit consumers should make use of has long involved controversy, reflecting legitimate concerns of consumer welfare. These concerns include the merits of consumptive versus productive credit,<sup>123</sup> asymmetric perception of future utility and disutility,<sup>124</sup> and

121 It is worth noting that respondents reported a higher use of credit for other expensive consumer goods: 68 percent in Colombia (1.4x the percentage for phones), 24 percent in Nigeria (3.0x the percentage for phones), 15 percent in Pakistan (1.2x the percentage for phones) and 56 percent in Rwanda (10.0x the percentage for phones).

122 One of the first documented adopters of financing schemes for devices in low- and middle-income countries was MTN Rwanda in partnership with Mobisol. See GSMA. 2017. “Accelerating affordable smartphone ownership in emerging markets.” <https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2017/07/accelerating-affordable-smartphone-ownership-emerging-markets-2017.pdf>.

123 Productive credit is for investment in an asset that generates income or wealth. Consumptive credit, i.e., for furniture, clothing, and nondurable household goods, is often viewed as simply credit for facilitating living beyond one’s means.

124 This refers to the notion that consumers tend to discount future disutilities more than future satisfaction. For example, the future satisfaction arising from the use of a durable good may be better appreciated than the sacrifice of future consumption created by a deferred payment in a credit transaction. This asymmetry in perception may lead to overborrowing.

lack of transparency or abusive practices of financial intermediaries, which can prevent consumers from understanding lending methods or being misinformed about the terms (e.g., actual interest rates) they face. When developing mobile device financing schemes for low-income consumers, it is important to protect them from predatory lending practices and from taking on debt they cannot repay. The transparency of fees and pricing is also critical to ensure that individuals understand the lifetime cost of a loan. Financing initiatives must include consumer protection components to safeguard low-income individuals from extortionary lending practices, over-indebtedness, and the misuse of personal data.<sup>125</sup>



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125 Max Mattern, and Alexander Sotiriou. 2022. "As PAYGo Moves Beyond Solar, Addressing Risks Can Ensure Impact." CGAP, (June 21, 2022). <https://www.cgap.org/blog/paygo-moves-beyond-solar-addressing-risks-can-ensure-impact-0>.

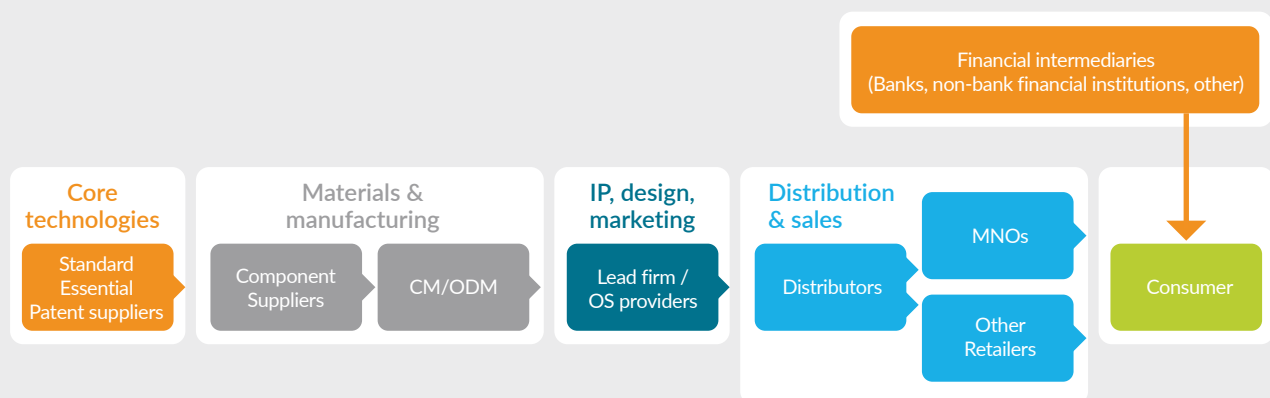
Finally, as with the other chapters of this report, **the focus here is on entry-level devices that are affordable to a currently unserved segment of the population, that is (i) smart feature phones and (ii) low-cost smartphones.** As set out in Section 1.2, these are low-cost handsets, below the USD 50 retail price threshold, that allow a user to obtain internet access and downloadable apps from a universal app store.

### 4.3. Typology and assessment of financing schemes

As indicated in the previous Section, this chapter examines schemes that financial intermediaries have developed or are currently developing that permit consumers to purchase a device over time. Before creating a typology to understand the different characteristics of these schemes, it is worth asking, who are these financial intermediaries? In mobile device financing, as with other consumer goods, financial intermediaries include a diverse set of actors.

Figure 4.1 is an expansion of the device value chain set out in Section 2.2.1.1 above. In addition to disaggregating and highlighting some additional actors of the value chain, it introduces financial intermediaries supplying credit to the consumer. These intermediaries include commercial banks, and non-bank financial institutions (NBFIs).

**Figure 4.1. Financial intermediation to promote consumer purchases within the context of the device value chain**



Source: TMG/A4AI.

Among the nontraditional financial institutions, this report includes Fintechs offering innovations on traditional banking products, such as everyday bank accounts or credit cards, and better payment infrastructures, as well as easier to use and more understandable financial instruments for consumers.<sup>126</sup>

Among the NBFIs are many participants within the device value chain itself, acting as financial intermediaries. These are entities offering financial intermediation as a complement to their “core” business. The most obvious example of these are mobile network operators (MNOs) offering installment schemes and other forms of credit for devices. Less common in actively promoting financing schemes in developing markets are participants playing roles farther up in the device value chain (e.g., original equipment manufacturers [OEMs]<sup>127</sup> and operating systems [OS] providers). Important exceptions include Maraphone, Transsion, and KaiOS, which are considered below, among others.

Of course, just as participants in the value chain may find a role in promoting financial intermediation, financial intermediaries have a significant role to play throughout the value chain, which ultimately influences the possibilities for financing consumer devices. To some degree or other, financial intermediaries may lend to multiple participants in the value chain. It is noted that lending of financial intermediaries to those participants that are not consumers is not of specific interest to this report. However, there are significant activities that these financial intermediaries may engage in that are directly related to lending to the consumer. For example, financial intermediaries may directly buy MNOs receivables in a manner that will allow the MNO to offer more credit to consumers.<sup>128</sup>

### 4.3.1. Determinants of the supply of credit

To understand the significance of the innovations in mobile device financing, it is important to identify the determinants of the supply of credit<sup>129</sup> for the purchase of these devices. Innovative business models of financial intermediaries can address key determinants, pushing the boundaries of what the return to lending is, how costs are reduced, and how responsive suppliers will be to a given increase in expected return. Initiatives can be designed to positively influence these determinants within the context of these models to effectively shift the supply curve out or change its shape to make suppliers more responsive.

126 For a typology of nontraditional financial institutions, see, for example, Hueber, et al. 2019. “Fintechs and the New Wave of Financial Intermediaries.” presented at the Twenty-Third Pacific Asia Conference on Information Systems. [https://cocoa.ethz.ch/downloads/2019/07/2247\\_PACIS2019-FinTechs%20and%20the%20New%20Wave%20of%20Financial%20Intermediaries.pdf](https://cocoa.ethz.ch/downloads/2019/07/2247_PACIS2019-FinTechs%20and%20the%20New%20Wave%20of%20Financial%20Intermediaries.pdf).

127 Although OEMs quite regularly make financing arrangements to accept payments from MNOs and retailers over time, less frequently do they extend finance directly to the consumer.

128 For example, starting in 2018, IDB Invest (the private sector arm of the Inter-American Development Bank [IDB] Group) has engaged in reverse factoring of supply chain finance (SCF) with several MNOs in Latin America to purchase receivables arising from the sale of mobile devices. Under this scheme, MNOs sell their invoices or receivables at a discounted rate to banks or other financial intermediaries, and in return get faster access to the money they are owed. The aim is to optimize cash flows for working capital while ensuring that consumers have access to installment payments. See IDB Invest. 2018. “Reducing the Digital Divide through Smartphone Financing in Latin America and the Caribbean.” Development Effectiveness Briefs N°5. <https://www.idbinvest.org/en/publications/debrief-reducing-digital-divide-through-smartphone-financing-latin-america-and>.

129 The demand for credit for devices has been examined by Facebook Connectivity and the World Bank as part of an affordability analysis to predict the level of take-up of devices as a function of financing terms and subsidies. Key insights from that research is examined in Section 6.3.2.

Based on the research undertaken, five determinants of the supply of financing for devices have been identified and summarized in Figure 4.2. The nature of the market of interest to this report—the low-income consumer segment in low- and middle-income markets—represents challenges for these determinants.

Figure 4.2. Determinants of the supply of financing for devices



Source: TMG/A4AI.

1. **The unit revenue from lending** is traditionally stated in terms of an interest rate and other associated lending fees; however, when the financial intermediaries are directly benefiting from the sales of the device being financed—as is the case with many of the NBFIs discussed above— other revenue streams come into play. In low- and middle-income markets, the affordability of what might be required in monthly payments is low. Evidence from the surveys undertaken suggests that the maximum amount consumers



are willing to pay for a device is about 5 percent of the monthly income of the consumer of interest to this study (around US\$4.19 per month). This implies that the principal repayment on the device cost, as well as the unit revenue from lending, must fit within a budget of US\$2–3 per month. Thus, if a consumer could commit 40 percent of their monthly income (US\$22) to a down payment on a US\$50 entry-level device and repay over a year, the maximum a lender may be able to capture would be US\$8 to cover origination, processing, and the expected cost of default.<sup>130</sup> This would not be a margin that a traditional bank would be willing to undertake; however, an NBFi (e.g., a mobile operator) may be able to rely on complementary revenue from the end user that increases margins.



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130 The smartphone cost of US\$50 less US\$22 down payment, means US\$28 to repay over the year period. Assuming the maximum that the lender could expect based on our survey results is US\$3 over 12 months or US\$36 - US\$28 = US\$8, out of which all costs would need to be recovered.

2. **Operating costs** comprise the costs of originating the loan, processing payments, and collection and debt expenses. The loan origination includes marketing, application processing, evaluation of the potential borrower, and sale of the device. Origination is by far the costliest activity. In the past, the lack of digitization and information on consumers' ability to pay made loan origination very expensive, if not impossible. Even today, if a lender requires a standard credit history, the costs of obtaining this can be prohibitive. For example, in Rwanda, the subscriber acquisition costs, which includes credit checks, were reported to be between US\$20–30 per customer.<sup>131</sup> In our example above, the financing arrangements allowed for a margin of US\$8, which would be inadequate to cover these costs.
3. **Nonoperating costs** are the taxes and payments to creditors and owners of the financial intermediaries that must be deducted from operating profits. Taxes on financial institutions may be high in low- and middle-income markets. However, due to the typically above-normal commercial risk, in some cases political risk, in these markets the costs of debt and equity can be elevated.
4. **Scale effects**, the unit operating, and nonoperating costs are impacted by the scale of the financing operation. Where costs are fixed or have significant fixed elements, unit costs will decrease with scale. Scale effects are related to the size of individual loans as well as the size of the market served. The nature of the object of the loan (entry-level devices), as well as the customer segment involved, means that the size of the loans will be small. The potential market size also will vary—in a market such as India the market could be in the millions; in Rwanda the market is likely to remain in four digits.
5. **Probability of default**, which relates to the probability of return to lending. All other things constant, the greater the probability of default, the higher the price financial intermediaries will demand from borrowers.<sup>132</sup> Given low and variable incomes typical of the markets of interest to this study, the probability of default may be relatively high.

### 4.3.2. Financing schemes in low- and middle-income markets

Five types of financing arrangements were identified in the research undertaken and assessed in terms of their ability to contend with the challenges to the determinants of supply identified in the previous Section. Table 4.3 summarizes these arrangements.

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131 TMG interview with Lipa Later, (September 22, 2022).

132 The price charged for loans is not always positively correlated to the probability of default. All things equal, at low levels of interest (i.e., low cost to the consumer), the probability of default is low, which explains why economists often identify a flat level of supply over a certain level of interest. At excessive levels of interest, adverse selection kicks in (i.e., problematic customers become disproportionately represented among borrowers), and the lenders curtail credit, leading to a backward bend in the credit supply curve.

Table 4.3. Financing arrangements for mobile devices identified

# Schemes	Lender	Distinguishing feature	Impact and reach	Examples
1 Traditional lending	Banks and most Fintechs	A bank offers loans in return for future principal and interest payments in regular intervals over a fixed period. Relies on demonstrated credit history.	Not used extensively in mobile device sales due to demand and supply constraints in low- and middle-income markets.	<ul style="list-style-type: none"> <li>• Access Bank – Nigeria</li> <li>• Bank of Kigali – Rwanda</li> <li>• Habib Bank Limited (HBL) – Pakistan</li> <li>• Faysal Bank – Pakistan</li> <li>• Equity Bank – Kenya</li> <li>• First National Bank – South Africa</li> <li>• Sonata Finance – India</li> <li>• BBVA/Movistar – Colombia</li> </ul>
2 Buy now, pay later	MNOs and associated mobile money institutions  Other retailers   OEMs	Down payment, uniform payments over fixed period (installment loan), lower interest costs made possible by prospect of additional incremental revenue streams.	Varied degrees of success; KYC requirements are lower, but still require history of previous transactions. Terms may still not be favorable enough to reach unserved users.	<ul style="list-style-type: none"> <li>• Claro – Colombia</li> <li>• MTN – Uganda, Nigeria</li> <li>• Vodacom – South Africa</li> <li>• Lipa Later – Kenya, Uganda, Tanzania, Rwanda, Nigeria, and South Africa</li> <li>• Mercado Libre – Latin America</li> <li>• Addi – Colombia</li> <li>• Zerofinance – Nigeria</li> <li>• Daraz – Pakistan</li> <li>• Bajajfinserve – India</li> <li>• Maraphone – Rwanda</li> <li>• Transsion – Nigeria, Rwanda</li> </ul>
3 PAYGo		Financing made at the point of sale. Payments are made flexibly with usage of device. Periodic inability to pay typically does not result in termination of relationship, but rather locking of the device until repayment begins again.	Limited, but growing innovative model that offers comparatively realistic pathway for the unserved.	<ul style="list-style-type: none"> <li>• PayJoy – Mexico, Brazil, Colombia, India, Kenya, and South Africa</li> <li>• Kistpay – Pakistan</li> <li>• Safaricom – Kenya</li> <li>• M-Kopa – Nigeria, Kenya, Ghana, and Uganda</li> <li>• VITALITE – Zambia</li> <li>• Moon – Senegal</li> <li>• d.light – over 62 countries with distribution centers in East Africa, West Africa, India, Southeast Asia, and the United States</li> </ul>
4 Alternate asset-based financing	Provider of durable and/or high-valued asset	Financing with collateral of previously leased asset.	Limited by the dependency on acquisition of borrower on alternate asset.	<ul style="list-style-type: none"> <li>• Engie – Rwanda</li> </ul>
5 Service subsidy	MNOs  Applications service/ OS provider	Devices provided at an initial low fee with commitments to payments for service into the future.	Traditional model used by MNOs.  Nascent approach. Largely untested.	<ul style="list-style-type: none"> <li>• Virtually all MNOs offering postpaid services.</li> <li>• KaiOS – Ethiopia, Mozambique, Tanzania, and South Africa</li> </ul>

Source: TMG/A4AI.

The following subsections present further details and evaluate these schemes, emphasizing their suitability for low-income individuals. After a description of salient features of the schemes, examples are provided based on interviews undertaken by the project team. These often cover novel business cases or financing schemes where specific performance metrics are either not available or considered sensitive and not shared by the relevant stakeholder. Accordingly, metrics such as scale of the programs, interest rates charged, and default rates, among others, are presented where available. The scheme is then ranked by its ability to address the challenges presented in low- and middle-income markets to the five determinants of supply of device financing discussed in Section 4.3.1. Ranking is provided based on qualitative considerations and by color code (green indicates a successful approach to address the challenge; red indicates the challenge is largely unaddressed; and orange indicates that the approach has pros and cons, and the ranking is difficult to assess).



### 4.3.2.1. Traditional lending

Traditional lending involves the end user borrowing directly from a bank or indirectly through an MNO or other participant in the value chain that provides financing in partnership with a bank in an arrangement with three key characteristics. Firstly, securing credit for the device typically involves an initial down payment and payment of the remaining amount in installments with interest at regular intervals over a defined period. Secondly, the return on lending is in the form of interest as well as other fixed fees for originating the loan. Thirdly, the bank will generally also require a bank account history, credit check, formal documentation of income, proof of address, and so forth to assess a customers' creditworthiness and risk for default. These know your customer (KYC) requirements are often unable to be met by low-income, underbanked populations with no formal bank account or credit history.

#### Box 4.1. Access BankF –Nigeria

In Nigeria, Access Bank launched a device financing program in 2019 available to salaried Access Bank customers.<sup>133</sup> The program, called "Access Device Financing," allows customers to make payments in up to 12 monthly installments, includes an optional monthly airtime bundle with MTN, and does not require collateral.<sup>134</sup> To apply for a device finance loan, customers must download a bank app and enter an email address and a phone number linked to their bank verification number (BVN).<sup>135</sup> Then customers must enter details, such as their address, name, salary account name and number, BVN, and so forth, and agree to the terms and conditions.<sup>136</sup> Next, customers can select a phone of their choice, enter additional information, and subsequently receive an email with requirements for device pickup.<sup>137</sup> While Access Bank offers a device financing solution, the program requires that customers are salaried, have a bank account, and already have a smartphone or at least have access to a smartphone to apply for the loan. Hence, this program excludes unbanked individuals in the lowest-income brackets.

Source: TMG/A4A1.

In addition to relatively extensive requirements to assess creditworthiness, banks normally also charge comparatively higher interest rates on loans, a further obstacle for low-income individuals, as shown in the demand surveys discussed in Section 3.6. Interest rates in a traditional lending scheme are "comparatively high" for three reasons. Firstly, traditional lending schemes rely exclusively on interest payments and other

133 The Guardian, Nigeria. 2020. "Nigerians embrace smartphone financing scheme." (October 7, 2020). <https://guardian.ng/technology/nigerians-embrace-smartphone-financing-scheme/>.

134 Access Bank PLC, Access Device Financing. <https://www.accessbankplc.com/personal/borrowing/access-device-financing#access-more>.

135 Access Bank PLC, Access Device Financing. <https://www.accessbankplc.com/personal/borrowing/access-device-financing#access-more>.

136 Access Bank PLC, Access Device Financing. <https://www.accessbankplc.com/personal/borrowing/access-device-financing#access-more>.

137 Access Bank PLC, Access Device Financing. <https://www.accessbankplc.com/personal/borrowing/access-device-financing#access-more>.

fees for loan origination for the return to the lender. A bank cannot offer discounts on these interest rates, as its relationship with the end user does not typically extend beyond the loan (i.e., there is no other source of margin for the bank). Unlike MNOs who offer financing schemes and obtain revenues from the provision of services, such as voice and data, the interest rate is the only source of return for traditional banks.

Secondly, the interest rate offered to retail customers is a function of underlying costs of capital in the country. In low- and middle-income countries, risk may be higher, access to international capital markets more limited, and the government's fiscal and monetary framework more restrictive.<sup>138</sup> Other factors, such as inflation, operating costs, and provisions for bad debt also affect interest rates. For instance, banks in Africa face higher overhead costs than in other regions.<sup>139</sup> Uganda's central bank found that, on average between 2008 and 2018, operating costs contributed to 61 percent of banks' overall interest rate spread, and provisions for bad debt attributed 12 percent.<sup>140</sup> Lastly, the traditional banking sector may not be as competitive as in more developed markets, allowing for above-market returns to the lender.

#### Box 4.2. Movistar Colombia—Movistar Money

In Colombia, Movistar launched a smartphone financing plan called Movistar Money in partnership with Banco Bilbao Vizcaya Argentaria (BBVA) in Q1 2022. Currently, the program is in the initial phase and targets existing Movistar post-paid customers. In subsequent phases, Movistar intends to attract new post-paid clients and prepaid subscribers. Movistar Money involves fixed installments and includes payments for the device in the customers' monthly bill. The plan requires no down payment and financing is available for up to 36 months. Customers are approved for financing based on their consumption history with Movistar, and Movistar may also run a credit check with credit bureaus (such as Experian and Datacredito) to assess creditworthiness. On average, the devices sold under Movistar Money plans have a retail price of about US\$260. Movistar currently provides financing schemes for entry-level devices; however, more partners such as PayJoy are being sought to address this market segment.<sup>141</sup>

Source: TMG/A4AI.

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138 A recent example of how current fiscal and political troubles feed through to the cost of capital—for Pakistan—can be found at FitchRatings. 2022. "Fitch Revises Pakistan's Outlook to Negative; Affairs at 'B-.'" (July 18, 2022). <https://www.fitchratings.com/research/sovereigns/fitch-revises-pakistan-outlook-to-negative-affirms-at-b-18-07-2022>.

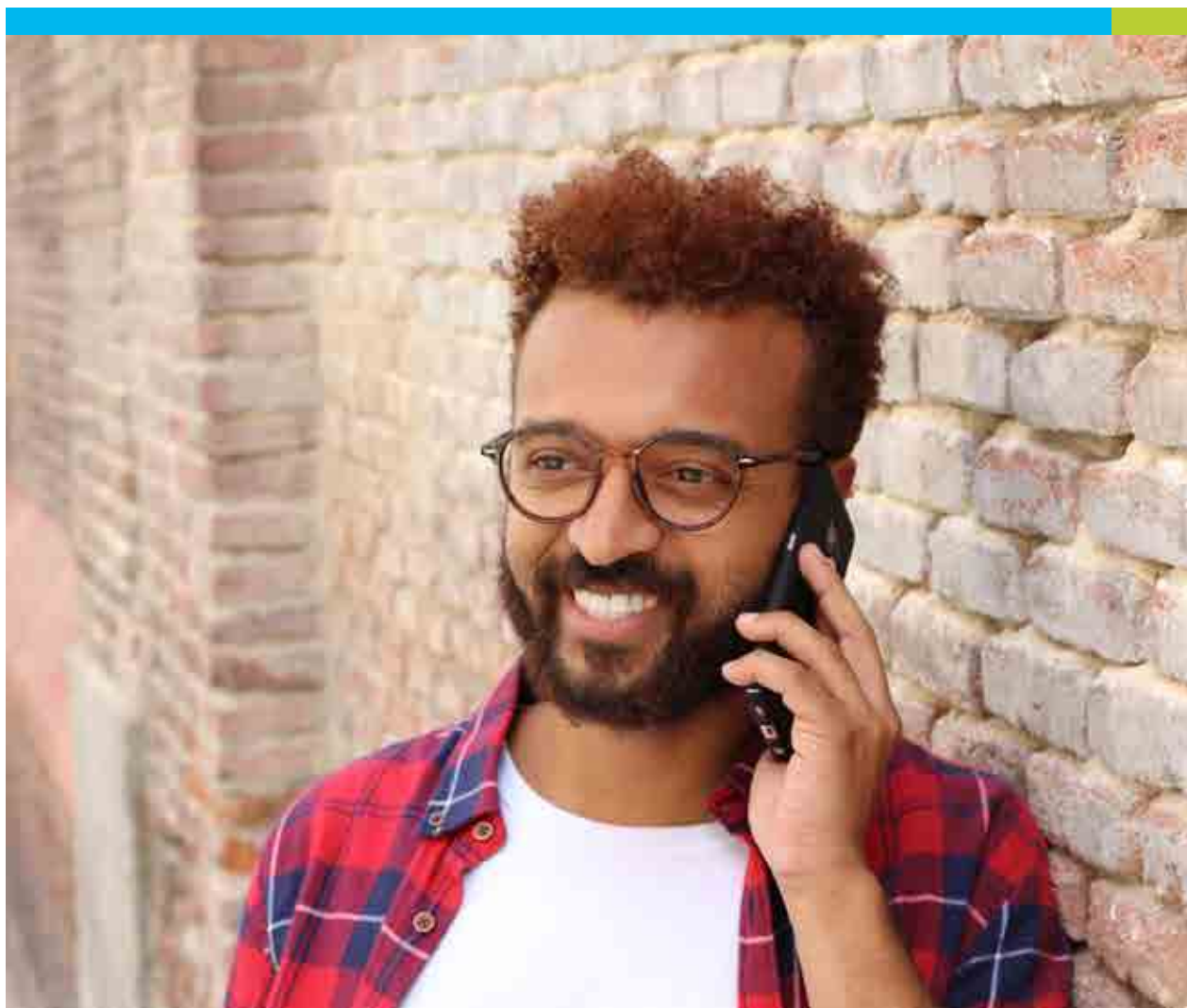
139 The Economist. 2020. "Why interest rates are so high in Africa." (May 21, 2020). <https://www.economist.com/finance-and-economics/2020/05/21/why-interest-rates-are-so-high-in-africa>.

140 Keith Jefferies, Elizabeth Kasekende, Doreen K Rubatsimbira, and Nicole Ntungire. 2020. "Exploring the Determinants of Interest Rate Spreads in the Uganda Banking System." Bank of Uganda, Working Paper No. 17/2020, p. 13 (June 2020). <https://www.bou.or.ug/bou/bouwebsite/bouwebsitecontent/research/BoUworkingPapers/research/BouWorkingPapers/2020/Exploring-the-Determinants-of-Interest-Rate-Spreads-in-the-Uganda-Banking-System.pdf>.

141 TMG interview with Movistar, (October 14, 2022).



Device financing partnerships between MNOs or OEMs with commercial banks often are not feasible to target entry-level device markets due to high interest rates for entry-level devices. For example, in Rwanda, local manufacturer Maraphone explored financing partnerships with commercial banks, but found that banks proposed an interest rate of around 16 percent, much higher than what Maraphone perceived as a manageable level for its target demographic: 5 percent.<sup>142</sup> Similarly, in Kenya, the MNO Safaricom approached commercial banks to help scale its Lipa Mdogo (“pay little by little”) smartphone financing program (further discussed in Box 4.7 below), but indicated that banks making commercial loans have different “objectives.”<sup>143</sup> In sum, while traditional banks are the financing space (as indicated in the Access Bank/MTN and BBVA/Movistar examples above), stakeholder interviews revealed that traditional financial institutions like banks typically are not involved or interested in financing entry-level devices. Instead, they focus on higher-range devices, effectively targeting higher-income consumers.








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142 TMG interview with Maraphone, (September 28, 2022).

143 TMG interview with Safaricom, (September 27, 2022).



**Key finding 4.1. Traditional lending generally targets higher-end devices and consumers with formal credit histories**

Assessment by determinant of supply		Comparative strength for target market
<b>Unit revenue from lending</b>	Generally limited to interest and other (up-front) lending fees. Traditional banks do not gain additional value from the fact that the loan is being used for a mobile device.	
<b>Operating costs</b>	Operating costs are kept high by standard KYC requirements and the absence of mobile applications and payment platforms. Banks may benefit by servicing a larger client base than NBFIs; however, the size of the loans are still small particularly compared to the cost base.	
<b>Nonoperating costs</b>	Neutral tax regime and costs of debt and equity are not likely to be significantly different from those faced by NBFIs. High cost of capital in developing markets inflates the underlying cost base relative to that faced in more developed markets.	
<b>Scale effects</b>	While the customer base is likely to be larger than typical NBFIs, there is no gain in scale in the size of the loan. Scale in size of the market is offset by high operating costs overall.	
<b>Probability of default</b>	Theoretically, traditional banks would face a lower probability of default due to more extensive KYC requirements; however, the customer segment of concern is not likely to be of interest to traditional banks, so no advantage is captured.	

**Overall finding** *While traditional banks can and do play a role in mobile device financing, they are generally not involved in financing entry-level devices for low-income consumers.*

**4.3.2.2. Buy now, pay later (BNPL)**

BNPL shares the same basic payment scheme with traditional lending: the customer purchases a phone by making a down-payment and paying back the remaining balance over time via fixed installments. However, this financing model relies on varying degrees of customers' credit histories to determine the risk of default and may also include device locking mechanisms to encourage repayment. MNOs, retailers, and OEMs provide BNPL financing for internet-enabled devices. The specific relationships these lenders have with the borrowers allow modifications to the traditional banking arrangements:

- the lender can capture additional revenue beyond the interest and other loan fees. For MNOs, the additional revenue includes future usage revenue; for retailers and OEMs it includes margins on the sale of the device itself;
- the lender may have access to pre-existing information about consumer behavior, leading to lower costs of KYC; and
- the lender may have additional leverage in discouraging default, (e.g., limiting access to communications service).

These three BNPL attributes permit the lender to reach a broader potential customer base, although given risk of the target market segment, very high mark-ups have been observed in places like Kenya and South Africa. For sustainability, sharing risks among more partners is therefore becoming more and more critical.

### Box 4.3. Vodacom South Africa—Installment payment plans

In South Africa, Vodacom offers its own device financing scheme, as well as financing through PayJoy or M-KOPA. For its own financing program, Vodacom vets existing customers who have been with the network for at least six months by reviewing their data and mobile money history. Vodacom divides the customer base into customers who are eligible for financing and those who are not. Then Vodacom offers a fixed installment plan to eligible customers. Vodacom offers Google and Samsung devices with a locking mechanism on installment.<sup>144</sup> In South Africa during 2021, Vodacom moved 3 million customers to 4G using the device locking tool.<sup>145</sup>

Vodacom manages the device locking mechanism. For the Google device lock controller (DLC), Vodacom worked with a partner to build a Vodacom-branded application to lock the device and provide an interface to customers. Samsung devices come with the Samsung Knox capability already enabled. If a customer misses a payment, they are given a 10-day grace period to catch up, otherwise Vodacom locks down the device so the customer cannot make calls or open apps. Customers can use the dialing function, but only to call Vodacom and access the Vodacom app to make payments. Vodacom has implemented this financing project with partner Optasia, which assists with the customer scoring and balance sheet. At the time of this report, about 1,600 customers in South Africa paid for devices by installment, and Vodacom was planning to scale up the program in the future.<sup>146</sup>

Source: TMG/A4AI.

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144 TMG interview with Vodacom, (July 14, 2022).

145 TMG interview with Vodacom, (September 30, 2022).

146 TMG interview with Vodacom, (September 30, 2022).

#### Box 4.4. Lipa Later—Installment payment plans

Lipa Later, which operates in Kenya, Uganda, Tanzania, Rwanda, Nigeria, and South Africa, provides BNPL financing for smartphones, among other products.<sup>147</sup> In Rwanda, customers can sign up for financing through a call center or on Lipa Later’s website. When customers choose to apply, they must complete a questionnaire which asks for their address, next of kin, date of birth, whether they are self-employed, proof of salary, and so forth. Given the diffusion of mobile financial services, in Rwanda Lipa Later accepts a verified mobile money statement as proof of income. If approved, Lipa Later offers the customer a line of credit, provides a list of partnership shops, and shares the contract with the client via short message system (SMS) ahead of the actual purchase. Interviews revealed that Lipa Later typically works with customers who already have a smartphone, as it would be difficult to read a contract on a feature phone.

The standard financing timeline for customers is 12 months, and the company uses a locking software on some smartphones. If a customer does not make a payment after 30 days, Lipa Later sends them a reminder message, after 60 days it locks the phone (if this feature is available), and after 90 days, Lipa Later sends the customer’s file to an external debt collector. After 120 days of nonpayment, Lipa Later engages its repossessing team to retrieve the item so it can be resold.<sup>148</sup> Thus, as Lipa Later provides financing for a more extensive range of products, including furniture, electronics, and smartphones that cannot be locked, it requires comparatively more KYC information to offer financing and repossesses products. The default rate varies between countries. Lipa Later is willing to take more risk in Rwanda because there is greater traceability; however, in Kenya, where more people are off the grid, the default rate is 12 percent.

Source: TMG/A4AI.

#### Box 4.5. Claro Colombia—Installment payment plans

In Colombia, operator Claro provides financing to customers that have a minimum 12-month history with Claro. The operator also checks the credit scores of potential buyers, which helps determine the down payment and interest rate for the plan. The down payment and financing period depend on the customers’ credit score, and the down payment can range from 10 to 50 percent of the cost of the phone. Additionally, prepaid customers are typically required to make a higher down payment compared to post-paid subscribers to mitigate risk of default.

In the case of default, customers typically sign a promissory note and Claro will work to collect the debt and may report users to prevent them from acquiring more credit. In Colombia, MNOs are required to sell devices, including 4G enabled devices, independently from service plans. Accordingly, MNOs are prohibited from locking the device and interrupting the provision of mobile service in the event of nonpayment of the device.<sup>149</sup> Thus, Claro has a limited set of “tools” it can deploy in implementing BNPL.

Source: TMG/A4AI.






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147 Lipa Later. <https://lipalater.com/>.

148 TMG interview with Lipa Later, (September 22, 2022).

149 TMG interview with Claro, (October 25, 2022).

### Key finding 4.2. Buy now, pay later financing targets consumers with formal credit histories

Assessment by determinant of supply		Ranking
<b>Unit revenue from lending</b>	The lender can offer more favorable interest rates based on the fact that it captures additional revenue from the transaction: margin on the device and/or usage of the device post-sale.	
<b>Operating costs</b>	Operating costs are kept low as KYC requirements are met by access to information that is already on hand by the lender (i.e., existing transaction relationships through mobile service sales or mobile money payments). Similarly, the use of mobile money applications reduces the cost of the payment process.	
<b>Nonoperating costs</b>	Neutral tax regime and costs of debt and equity are not likely to be significantly different from those faced by traditional financial intermediaries.	
<b>Scale effects</b>	While the size of the loans is small and the customer base likely to be more limited than at traditional banks, the use of existing platforms (mobile money and billing systems) represents greater economies of scale.	
<b>Probability of default</b>	Theoretically, NBFIs would face a higher probability of default due to more limited KYC requirements; however, the lender benefits from specific customer financial information.	
<b>Overall finding</b>	<i>By design, BNPL programs are not focused on serving unbanked users given that financing still relies on data such as credit or account history. There are limits on this model's ability to reach those who have not previously had a phone (and therefore lack any transaction history).</i>	

#### 4.3.2.3. Pay-as-you-go (PAYGo) financing

PAYGo financing allows the user to lease a device with flexible payments tied to use. Ownership transfers to the borrower after the device is paid off. The PAYGo model employs a locking mechanism to reduce risk to the lender.<sup>150</sup> Through the locking mechanism the lender regulates the benefit of device ownership and thus can strongly incentivize payments for the device. This allows the lender to ease up on the ex ante requirements for lending, which lowers origination costs and default rates.

150 Max Mattern. 2020. "Innovations in Asset Finance Unlocking the potential for low-income customers." CGAP, slide 19. [https://www.cgap.org/sites/default/files/publications/slidedeck/2020\\_05\\_Slidedeck\\_Innovations\\_Asset\\_Finance\\_0.pdf](https://www.cgap.org/sites/default/files/publications/slidedeck/2020_05_Slidedeck_Innovations_Asset_Finance_0.pdf).

Indeed, the ability to influence customer behavior is typically strong enough to allow very limited KYC requirements and thus can be appropriate for the unserved and unbanked. PAYGo schemes are also typically implemented by lenders that have a relationship beyond the lending, and so earn incremental revenue from usage of the device.

PAYGo financing for mobile devices is similar to financing off-grid solar, which is meant to support unbanked individuals without a credit history. The PAYGo solar industry provides solar home systems to customers at the bottom of the pyramid, which can be paid for in flexible installments.<sup>151</sup> PAYGo solar companies have also expanded to offer appliance bundles, such as televisions and other consumer electronics, with solar home systems.

Today, several companies have built on the PAYGo solar home system model to provide PAYGo financing specifically for smartphones, allowing customers to purchase a device on credit and make flexible installment payments over time, as described in Box 4.6 and Box 4.7. Similarly, MNOs and Fintechs are also entering this space and deploying PAYGo schemes to finance access to entry-level devices, as described in Box 4.8 and Box 4.9.

#### Box 4.6. PayJoy— PAYGo model

PayJoy is a company that offers PAYGo financing with a device-locking mechanism through partnerships with retailers and MNOs in several emerging markets. To qualify for financing, customers must provide a copy of their ID, a phone number, and a selfie. PayJoy does not ask for proof of income or references, and if approved, customers receive a phone immediately. While PayJoy does not have much prior data on potential customers, the company has a customer base of about 4 million and is able to find patterns to assess creditworthiness based on other characteristics, such as what retailer customers visit and which phone they want to purchase. PayJoy provides loans to 90 percent of its applicants because the locking technology helps the company collect loans and minimize fraud.<sup>152</sup>

Source: TMG/A4AI.

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151 USAID. 2017. "Pay-As-You-Go Solar as a Driver of Financial Inclusion." p. 1 (August 2017). <https://www.usaid.gov/sites/default/files/documents/15396/USAID-PAYGO.pdf>.

152 TMG interview with PayJoy, (October 18, 2022).

### Box 4.7. Kistpay—PAYGo model

In Pakistan, Kistpay is a Shariah-compliant financing platform that offers PAYGo financing for smartphones. Kistpay created a platform to initiate smartphone lending in the absence of documented income through its partnership with Google DLC. To apply for financing, Kistpay confirms whether a potential customer has a biometrically verified SIM card and is over the age of 18. Kistpay offers smartphone financing for devices ranging in price from US\$50 to US\$1,500 and requires customers to make a 40 percent down payment through mobile money services or cash. Kistpay does not charge processing fees, interest, or late payment fees, to keep down the price of devices. The Kistpay plan includes insurance and provides six months of data for all devices, in partnership with operators. Additionally, devices sold through Kistpay must be connected to Google DLC, which allows Kistpay to lock the phone anywhere. Notably, OEMs must complete technical integration to enable the Google DLC mechanism and to put in place measures to ensure that devices are not hacked if locked. Several manufacturers including Nokia, Oppo, Xiaomi, and Dcode (a local company), have partnered with Kistpay. While Kistpay does not charge interest, it does receive a retail commission from smartphone insurance plans and collects a referral fee from referring customers to other platforms, such as apps.<sup>153</sup>

Source: TMG/A4AI.

### Box 4.8. Safaricom Kenya , Lipa Mdogo—PAYGo model

In 2020, Safaricom launched a financing program combined with the Google DLC in Kenya. Safaricom indicated that it finances 30,000 to 40,000 devices per month under the Lipa Mdogo (“buy now, pay little by little”) financing plan. Currently, the program is entirely financed by Safaricom, and the average default rate is just below 11 percent. Safaricom indicated that if the default rate were in the single digits, it would be able to expand the program. Additionally, Safaricom noted that it is interested in partnering with third-party banks and other players to scale the program. To be eligible for financing, customers must have been with the network for at least one year, use M-PESA with a minimum transaction history of six months, and be between 18 and 75 years of age. Safaricom also checks customer loans within the Safaricom network (M-PESA and M-Shwari).

The financing program started with the goal of moving customers from 2G to 4G devices. The maximum financing period is one year, and customers have a three-day grace period to make payments. On the fourth day, Safaricom locks the device screen and services, and customers can only use the phone to make payments. The program includes four devices ranging from entry level to middle tier. Lipa Mdogo’s entry-level device is the Safaricom branded 4G Neon Ray Pro, which is priced at KES 6,000 (about US\$50). Customers must make an initial down payment of KES 500 (about US\$4) and can make daily installment payments for as little as KES 20 (about US\$0.16). Safaricom is also working with Google to onboard more devices with the locking mechanism.<sup>154</sup>

Source: TMG/A4AI.

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153 TMG interview with Kistpay, (June 22, 2022).

154 TMG interview with Safaricom, (September 27, 2022).

### Box 4.9. M-KOPA—PAYGo model

M-KOPA, an off-grid solar home system company operating in Kenya, Uganda, Nigeria, and Ghana also offers products such as lights, refrigerators, televisions, and smartphones through PAYGo financing.<sup>155</sup> Research indicates that, globally, televisions are the most popular add-on appliance for PAYGo solar customers followed by fans, solar water pumps, and refrigeration units.<sup>156</sup> In terms of smartphones, M-KOPA offers mid- to high-range 4G Samsung and Nokia devices.<sup>157</sup> In Kenya, the Samsung A12, one of the most popular devices M-KOPA offers, has a retail price of KES 30,549 (about US\$252) and requires a down payment of KES 4,500 (about US\$37).<sup>158</sup> Devices offered by M-KOPA are priced significantly above the US\$50 entry-level devices.






Source: TMG/A4AI.



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- 155 GSMA. 2020. “M-KOPA: applying the pay-as-you-go model to smartphones in Africa.” p. 2.  
<https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2022/04/M-KOPA-Applying-the-pay-as-you-go-model-to-smartphones-in-Africa.pdf>.
- 156 GOGLA. 2021. “Global Off-Grid Solar Market Report Semi-Annual Sales and Impact Data.” p. 14.  
[https://www.gogla.org/sites/default/files/resource\\_docs/gogla\\_sales-and-impact-reporth2-2021\\_def2.pdf](https://www.gogla.org/sites/default/files/resource_docs/gogla_sales-and-impact-reporth2-2021_def2.pdf).
- 157 GSMA. 2020. “M-KOPA: applying the pay-as-you-go model to smartphones in Africa.” p. 3.  
<https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2022/04/M-KOPA-Applying-the-pay-as-you-go-model-to-smartphones-in-Africa.pdf>.
- 158 GSMA. 2020. “M-KOPA: applying the pay-as-you-go model to smartphones in Africa.” p. 3.  
<https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2022/04/M-KOPA-Applying-the-pay-as-you-go-model-to-smartphones-in-Africa.pdf>.



### Key finding 4.3. Pay-as-you-go financing is an option for entry-level phones

Assessment by determinant of supply		Ranking
<b>Unit revenue from lending</b>	Similar to BNPL, the lender can offer more favorable interest rates since it captures additional revenue from the margin on the device, service revenues and/or other fees.	
<b>Operating costs</b>	Operating costs are kept low as KYC requirements are minimal. Mobile money applications reduce the cost of the relationship once the device is in the hands of the borrower.	
<b>Nonoperating costs</b>	Neutral tax regime and costs of debt and equity are not likely to be significantly different from those faced by other financial intermediaries.	
<b>Scale effects</b>	Like BNPL, the size of the loans is small, and the customer base is likely to be more limited than at traditional banks; however, the use of existing platforms (mobile money) represents greater economies of scale.	
<b>Probability of default</b>	Like BNPL, these NBFIs would face a higher probability of default due to more limited KYC requirements; however, tying repayment to usage incentivizes compliance from end users, including those previously excluded from the market.	

**Overall finding** *There are a variety of PAYGo financing options for smartphones that include locking mechanisms and involve a range of terms and conditions depending on the product. While many lenders in this space limit themselves to financing for higher-end devices, some are also able to offer financing for entry-level handsets.*

#### 4.3.2.4. Alternate asset-based financing

Alternate asset-based financing allows customers to finance an internet-enabled device using a previously leased asset as collateral. In low- and middle-income markets, there are several examples of companies that enable individuals to borrow against the equity in their solar home system to finance mobile devices. In the event of nonpayment, the solar home system can be locked until the customer makes a payment (Box 4.10). This financing model relies on customers having established credit by making payments on a lease for another asset against which they can borrow to purchase a handset. It is possible, with the advent of widely adopted internet of things (IoT), that a similar approach could be tried with other assets besides solar systems.

Alternate asset-based financing can thus be a variant of BNPL or PAYGo schemes, where the terms of repayment can be in fixed installments or usage based. In either case, the pre-existing relationship provides a KYC that is not linked to traditional credit history, and the arrangement involves additional revenues beyond interest payments.

### **Box 4.10. ENGIE Energy Access—Alternate asset-based financing model**

In Rwanda, ENGIE Energy Access, a PAYGo home solar company, also offers smartphone financing to its customers. To qualify for the PAYGo solar program, ENGIE assesses customers' financial means, previous loans and how these were repaid, income, regularity of income, address, identification number, phone number, whether the customer owns a house/land, and the land certification number. Customers are not required to have a bank statement or mobile money account, but they must provide a phone number. ENGIE has field agents that conduct physical visits to customer locations to conduct interviews. Like device locking mechanisms, ENGIE's solar home systems have a shutdown feature if customers do not make payments. Customers are given a notification of 15 days before the shutdown, and again 5 days, 2 days, and on the day of shutdown. If customers exceed the 30-day grace period after the date of shutdown, ENGIE repossesses the system or renegotiates the terms of repayment. The default rate for the PAYGo solar program is between 7 and 20 percent (higher rates of default were experienced during the COVID-19 pandemic). The maximum loan period for a solar system is 36 months, and customers receive a discount if they make payments before the deadline. Additionally, the Renewable Energy Fund Project, financed by the World Bank Group for the Government of Rwanda, supports individuals at the bottom of the pyramid in accessing home solar systems through a subsidy.

In 2019, ENGIE began offering smartphones on installment to its solar system customers. ENGIE partnered with Techno, Infinix, and other OEMs to offer smartphones to its customers on a six-month installment plan. The smartphones range in price from US\$60 to US\$200.<sup>159</sup> While the smartphones that ENGIE offers do not have a locking feature, ENGIE can push customers to make payments by shutting down their solar products.<sup>160</sup> Notably, only about 2 percent of ENGIE's customers have purchased a smartphone through the company. However, ENGIE also offers other products such as lamps and televisions, and comparatively more customers opt to purchase a television set than a smartphone.<sup>161</sup> It is unclear why the demand for smartphones is low, although this is in line with global trends in the PAYGo solar space. However, as noted above, ENGIE'S catalogue of smartphones are generally above the price-point of an entry-level US\$50 device, and as such, may be too expensive for farmers and other off-grid customers with variable income to afford.

**Source:** TMG/A4AI.






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159 TMG interview with ENGIE, (September 29, 2022).

160 TMG interview with ENGIE, (September 29, 2022).

161 TMG interview with ENGIE, (September 29, 2022).

**Key finding 4.4. Alternate asset-based financing targets low-income users, but requires the successful repayment of a prior loan**

Assessment by determinant of supply		Ranking
<b>Unit revenue from lending</b>	Like BNPL and PAYGo, the lender can offer more favorable interest rates since it captures additional revenue from the margin on the device.	
<b>Operating costs</b>	Operating costs are kept low as KYC requirements are minimal. Mobile money applications reduce the cost of the relationship once the device is in the hands of the borrower.	
<b>Nonoperating costs</b>	Neutral tax regime and costs of debt and equity are not likely to be significantly different from those faced by other financial intermediaries.	
<b>Scale effects</b>	Similar to BNPL, the size of the loans is small and the customer base is likely to be more limited than at traditional banks; however, the use of existing platforms (mobile money) represents greater economies of scale.	
<b>Probability of default</b>	Like BNPL, these NBFIs would face a higher probability of default due to more limited KYC requirements; however, tying repayment to usage of a high-valued asset incentivizes compliance by end users, including those previously excluded from the markets.	

**Overall finding** *Alternate asset-based financing for low-income groups shares much in common with PAYGo. However, it requires that users have successfully paid back an off-grid solar home system or similar asset to use as collateral. Thus, although alternate asset-based financing leverages collateral, it is only available to a certain subset of the low-income population and may still not be affordable to those in the lowest-income brackets.*

### 4.3.2.5. Service subsidy

Service subsidies allow MNOs and/or application service providers to offer devices to customers at a lower initial price, with commitments to pay for services in the future. The traditional subsidy model is used by virtually all MNOs in the sale of handsets in post-paid subscriptions. MNOs bundle discounted handsets with a service contract, which allows the operator to lock consumers to their network and recover the subsidy through the sale of services such as data, voice, and SMS (Box 4.11).<sup>162</sup> Similarly, an application

162 GSMA. 2017. "Accelerating Affordable Smartphone Ownership in Emerging Markets." p. 44 & 47. [https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2018/08/Accelerating-affordable-smartphone-ownership-in-emerging-markets-2017\\_we.pdf](https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2018/08/Accelerating-affordable-smartphone-ownership-in-emerging-markets-2017_we.pdf).

service provider can subsidize the up-front cost of a phone in exchange for having its application pre-installed or otherwise promoted on the device, with the aim of growing its user base. Service subsidies do not require credit assessments, as customers pay for the device outright (Box 4.12). Section 6.5.1.2 below further discusses targeted subsidy program that can be implemented by the public sector to target residual demand that cannot be covered with other direct interventions to make devices affordable to a low-income consumer.

### Box 4.11. Standard MNO subsidy

MNOs have traditionally offered a purchase price of a device to the end user that is significantly lower than the cost. In return for this subsidy, the MNO will require the end user to stay with the network at least long enough to generate an offsetting margin on usage services. The network will attempt to prevent the end user from using the device on another network with either a mandatory service agreement, a “subsidy lock,” or both. For post-paid subscribers, to use the phone on another network, an early termination fee must be paid, which effectively compensates the MNO for the remainder of the subsidy. Thus, the applicable termination fee falls over the period that the customer remains with the MNO. Typically, the contractual obligation is backed up with a subsidy lock as well.

Source: TMG/A4AI.

### Box 4.12. KaiOS—Kai Vibe program

KaiOS is a mobile operating system designed for smart feature phones, which requires little memory and uses less energy than other operating systems.<sup>163</sup> KaiOS smart feature phones have become popular in various emerging markets, as these devices are more affordable than smartphones but also allow users to access the internet and use popular apps (see Section 1.2).<sup>164</sup> Notably, KaiOS is developing a subsidy program to provide 4G handsets at the cost of 2G devices in the open market.<sup>165</sup>

Kai Vibe is a circular subsidy program based on a risk-sharing model that helps subsidize devices between parties that have an interest in bringing more individuals online.<sup>166</sup> This approach has an up-front subsidy financed through app usage and acquisition fees. KaiOS has launched trials in Ethiopia, Mozambique,

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163 KaiOS, About KaiOS. <https://developer.kaiostech.com/>.

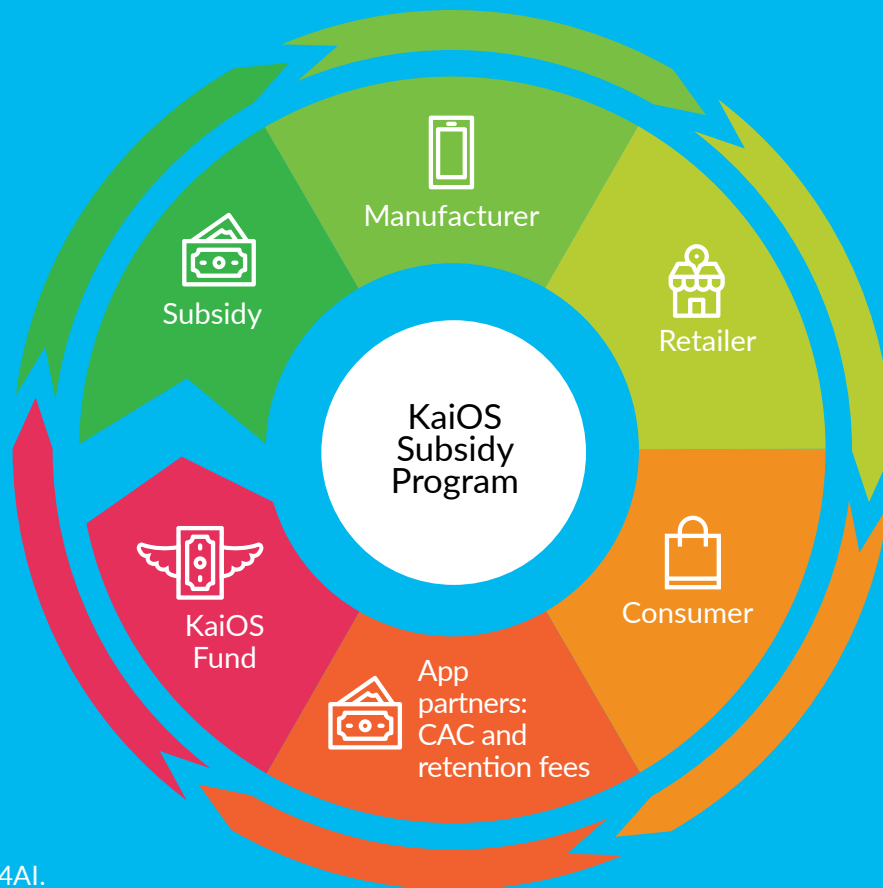
164 Paula Gilbert. “First KaiOS smart feature phone drops in Malawi.” *Connecting Africa*. [https://www.connectingafrica.com/author.asp?section\\_id=761&doc\\_id=762961](https://www.connectingafrica.com/author.asp?section_id=761&doc_id=762961).

165 TMG interviews with KaiOS, (June 20, 2022, and October 11, 2022).

166 TMG interview with KaiOS, (June 20, 2022).

Tanzania, and South Africa, together with a mobile provider and a major app developer.<sup>167</sup> In this pilot, the app partner pays a retention fee in exchange for having its app preloaded on devices. The retention fee is then used to subsidize the cost of the phone for consumers.<sup>168</sup>

In scaling up the subsidy program, KaiOS plans to subsidize the up-front cost of phones through a fund comprised of debt, equity, guarantees, and grants, rather than through app partners (Figure 4.12.1).<sup>169</sup> Manufacturers can configure phones to promote certain apps, and the proceeds from the activation of partner apps and services would give KaiOS enough resources to pay back the fund.<sup>170</sup> To implement this program, KaiOS will need to know roughly how many customers will use partner apps or services like mobile wallets to ensure that the app and retention fees can cover the initial subsidy. Based on this data, KaiOS plans to adjust the subsidy amount to ensure that the model is sustainable. As of the time of this report, it is difficult to determine how successful this solution will be, or whether the amount of subsidy needed can indeed yield a sustainable model for all stakeholders, although this is still being explored.



Source: TMG/A4AI.






167 TMG interview with KaiOS, (October 11, 2022).

168 TMG interview with KaiOS, (October 11, 2022).

169 TMG interview with KaiOS, (October 11, 2022).

170 TMG interview with KaiOS, (October 11, 2022).

**Key finding 4.5. Certain service subsidies target entry-level devices**

Assessment by determinant of supply		Ranking
<b>Unit revenue from lending</b>	Like BNPL and PAYGo, the lender can offer more favorable interest rates since it captures additional revenue from the margin on the device. However, there can be specific challenges to the type of cross-subsidy (e.g., reliance on post-paid relationship and customer lock-in in the traditional MNO model; and data privacy when applications providers subsidize).	
<b>Operating costs</b>	Operating costs are kept low as KYC requirements are minimal. Mobile money applications reduce the cost of the relationship once the device is in the hands of the borrower.	
<b>Nonoperating costs</b>	Neutral tax regime and costs of debt and equity are not likely to be significantly different from those faced by other financial intermediaries.	
<b>Scale effects</b>	Similar to BNPL and PAYGo, the size of the loans is small and the customer base likely to be more limited than at traditional banks; however, the use of existing platforms (mobile money) can permit greater economies of scale.	
<b>Probability of default</b>	The traditional MNO model effectively reduces default risk by limiting the offering of the device subsidy to post-paid customers. In the case where the device subsidy is spread out over multiple parties, there is still a large question mark over default probabilities. In this latter case, like BNPL, NBFIs would face a higher probability of default due to more limited KYC requirements; however, the lender may benefit from specific customer financial information.	

**Overall finding** *There are several service subsidy options for Internet-enabled devices. KaiOS's application-based subsidy program specifically targets entry-level devices for low-income customers. However, application-based programs also raise concerns over customer privacy, given that applications also derive value from user data. Moreover, while traditional MNO service subsidies may lower the up-front cost of a device, the long-term cost of the service contract may not be affordable to individuals at the bottom of the pyramid.*

## 4.4. Conclusions

While several smartphone financing schemes have been identified in the survey, these models typically do not provide financing for entry-level devices or specifically target unbanked individuals at the bottom of the pyramid. Of the examples discussed above, only Kistpay specifically targets unbanked individuals and offers financing for phones in the US\$50 range. Safaricom's Lipa Mdogo program also offers financing for entry-level operator-branded phones, and the customer vetting requirements are more suitable for individuals without documented income.

Among the five financing schemes identified in this chapter, PAYGo and alternate asset-based financing have the most potential for reaching low-income and unbanked individuals. These options offer lower interest rates than other schemes, as they leverage lenders' ability to generate revenue from the margin on the device, an increase in service revenue, and additional fees. Both schemes have relatively low operational costs and mitigate the risk of default that comes from limited KYC requirements that incentivize compliance by end users by tying repayment to other factors. Table 4.4 summarizes each financing scheme reviewed in terms of determinants of supply identified in this chapter.

**Table 4.4. Evaluation of financing scheme suitability for low-income and unbanked individuals—five determinants of supply of device financing**

	Traditional Lending	By Now, Pay Later	PAYGo	Alternate asset-based financing	Service Subsidy
Unit revenue for lending	Unaddressed	Successfully addressed	Successfully addressed	Successfully addressed	Difficult to assess
Operating costs	Unaddressed	Successfully addressed	Successfully addressed	Successfully addressed	Successfully addressed
Non-operational costs	Difficult to assess	Difficult to assess	Difficult to assess	Difficult to assess	Difficult to assess
Scale effects	Difficult to assess	Difficult to assess	Difficult to assess	Difficult to assess	Difficult to assess
Probability of default	Difficult to assess	Difficult to assess	Successfully addressed	Successfully addressed	Difficult to assess

Determinants of supply of device financing

■ Determinant successfully addressed

■ Difficult to assess

■ Determinant unaddressed

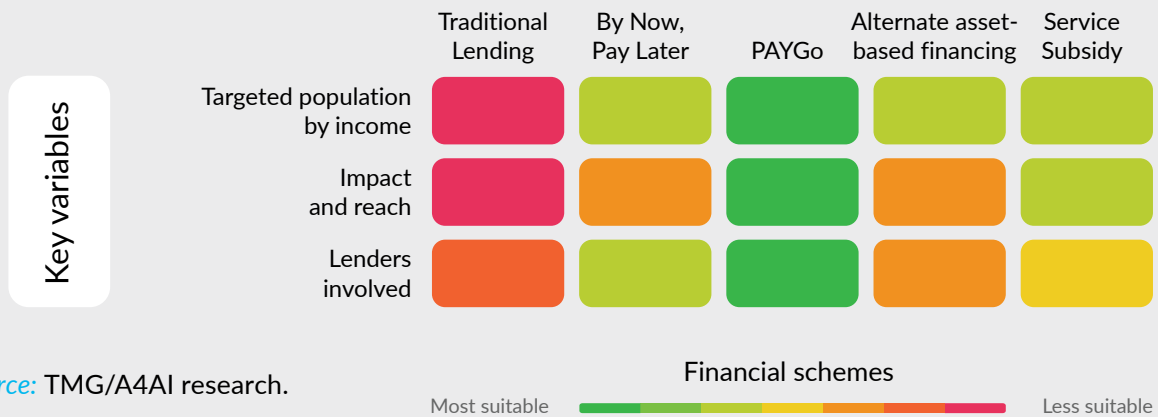
Source: TMG/A4AI.



Beyond the determinants of supply, by offering the most flexible conditions to loan recipients, PAYGo appears to be the most accessible financing option for the target population. It is notably more flexible than the alternatives in three ways.

- First, PAYGo offers greater flexibility with regards to loan repayment. In a PAYGo scheme, installments do not need to be fixed over time. This enables users to vary the amount they repay depending on their cash availability at the time of payment. This is particularly helpful for loan recipients working in the informal sector or engaged in seasonal labor that do not have a fixed monthly salary and do not generate a steady cash flow.
- Second, PAYGo does not require loan recipients to own assets which can be used as collateral. Users that do not own other durable or high-valued assets can be borrowers without any major limitations.
- Third, PAYGo reduces the limitations for the lenders to create the scheme as it does not require partnering with a provider of durable and/or high-valued assets to deploy the scheme. An MNO or NBFi can set up the financing scheme without relying on any other lender.

**Table 4.5. Assessment of financing scheme suitability for low-income individuals—key variables**



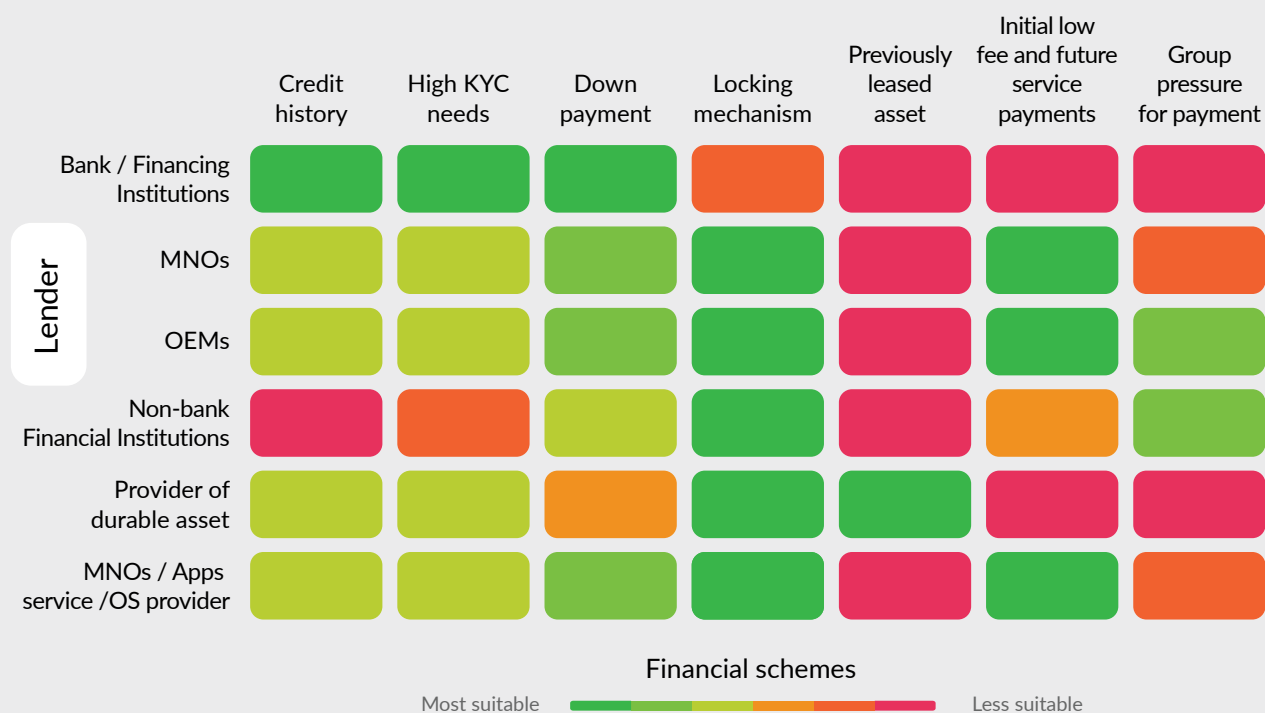
Source: TMG/A4AI research.

It is acknowledged that the experience with PAYGo schemes has been to date relatively modest in the device financing space. This is explained in part by the fact that it has only recently been launched in markets reviewed. However, it is possible that the limited scale of the entry-level device market may require some degree of subsidy, as in our discussion on private capital mobilization (Chapter 5) and policy recommendations (Chapter 6). It is also noted that these assessments are made assuming that no policy interventions are made for support. The degree to which public sector or other sources of support may be implemented may change the relative merits and likelihood of success of any particular financial scheme.

Ranging from financing institutions to MNOs, retailers, and providers of durable and/or high-valued assets, there are many kinds of lenders that provide financing for the purchase of mobile devices. These lenders offer a range of financial schemes that use different mechanisms to mitigate default risk. For example, some lenders, such as traditional banks, incur high operating costs to implement KYC requirements and check credit histories of potential borrowers. Others, such as NBFIs, use leverage groups or social pressure mechanisms to encourage loan repayment (e.g., by lending to members of cooperatives). However, specific technical mechanisms, such as device locking software and the use of down payments, are tools that are being used by lenders, including NBFIs and MNOs, to mitigate default risk.

The choice of tools depends on the type of borrower, how much financial information (if any) is available on them, and the financial capacity of the lender. Lenders looking to set up financing schemes to target low-income and unbanked individuals should consider the effectiveness of different options available and the feasibility of applying one or the other depending on the specific context (Table 4.6).

**Table 4.6. Tools to assess creditworthiness and mitigate default risk by lender type**



Source: TMG/A4AI.



# 5. Private Capital Mobilization for Device Financing

## 5.1. Introduction

This chapter builds on the framework for the analysis of financing schemes for entry-level devices presented in Chapter 4 and provides recommendations and insights as to how mobile device financing schemes can be promoted with the assistance of the public sector and international financial institutions (IFIs) in low- and middle-income markets, with emphasis on the lowest segment of demand. It identifies eight initiatives for IFIs and the public sector to mobilize private sector capital to increase the supply of credit available for mobile device finance. Specific recommendations are provided with respect to leveraging private sector funds, lowering costs, or otherwise incentivizing a prudential supply of credit for device acquisition.

Based on the research undertaken, various types of initiatives have been identified. It is noted these initiatives are identified for promoting the *supply of credit*. Analogous considerations exist for the demand for credit. Initiatives that beneficially increase demand for credit essentially involve increasing the net present value of device acquisition to the purchaser. These initiatives would, therefore, include lowering the cost of the device (e.g., through direct device subsidies, tax reduction), demonstrating the full utility that the device offers, and lowering future disutility by ensuring credit policies are provided on fair and transparent terms. These demand-oriented policies are, for the most part, in the hands of public sector actors and will be discussed more fully in Chapter 6, which addresses policy recommendations.

It is important to note that, to date, little activity has been undertaken by the public sector or IFIs to promote device financing.

## 5.2. IFI and state actions for mobilizing private sector capital

A wide variety of potential actions can be adopted by IFIs or the public sector to address relevant challenges in the supply of device finance discussed in Chapter 4. These include (i) adopting policies to facilitate the role of non-bank financial institutions (NBFIs); (ii) “lean into” schemes that are structurally more likely to address the target segment; (iii) implementing tax benefits and subsidy schemes; (iv) providing credit guarantees to lenders to reduce risks of defaults; (v) offering debt funding at favorable interest; (vi) providing equity funding with moderate return thresholds; (vii) kick-starting or providing earlier stage support for entities engaging in device financing; and (viii) offering receivable purchasing facilities to free up the cash flow of lenders. Each of these actions and their relative merits are discussed below.



## 5.2.1. Facilitating the role of NBFIs

One of the major shifts in financing in recent years is the increase in the number and scale of non-bank actors. The value chain analysis presented in Section 4.3 shows that a wide range of market players benefit from the increased sales of mobile devices. Many of these players have shown an interest in promoting device sales in a manner that improves the terms for the consumer over traditional lending. For example, mobile network operators (MNOs) have been involved in financing devices since the dawn of mobile services, but there are other actors engaged in these activities as well, including original equipment manufacturers (OEMs) and application providers that could commit resources to expanding financing opportunities (see discussion in Section 4.3.2.5). To facilitate the role of the NBFIs, specific policies can be implemented to promote private capital mobilization. These include:

- **Authorization of new, responsible financial intermediaries.** Applications or operating system (OS) providers, OEMs, MNOs, and other retailers have found ways of effectively sharing the incremental benefits of device sales in a manner that banks are not able to. However, in many countries the legal framework for financial intermediation may be overly restrictive and effectively denies these players opportunities to engage in lending so that these benefits can be shared (see further discussion in Section 6.5.2.3).

The call to states to create an open and level playing field that allows non-bank players to offer payment services has long been an objective of policy advocacy in mobile service regulation.<sup>171</sup> However, it is clear from the financial survey that the role of non-bank players extends beyond offering financial services over mobile phones; it is the enabler of access to mobile phones themselves.

- **Coordination.** Related to the observation that many players within the value chain can benefit from increased access to financing, some financing solutions may involve multiple participants. The KaiOS case study presented in Box 4.12 highlights the complexity of these efforts. The state or IFIs can play a key role in bringing these parties together. This coordination role can be played out with the context of a funding program or simply by facilitating their interaction within a general policy of promoting access to affordable devices (see discussion in Section 6.2).

## 5.2.2. “Lean into” schemes that are structurally more likely to address the target segment

As summarized in Section 4.4, there are certain financing schemes that address the challenges of providing access to the low-income and unbanked segment of the market, PAYGo in particular. Here the public sector could support regulatory changes that underly the specific scheme. For example, Colombia prohibits the use of device locking that facilitates PAYGo and BNPL schemes. Such restrictions should be reviewed to promote these innovative financing schemes, while ensuring other rules are in place to protect consumers and competition in the market. Similarly, IFIs could work strategically with start-ups aiming to achieve scale in this space via initiatives described below under Subsections 5.2.4, 5.2.5, and 5.2.6.

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171 See for example, GSMA's Mobile Money and Regulatory Handbook, 2018.





### 5.2.3. Taxes and subsidies

Private sector financing schemes, as any commercial enterprise, would benefit from reduced taxes or state subsidies whether tied to offset specific costs (default) or generically provided to supplement return on lending. It is important to distinguish direct *device subsidy*, which is a topic discussed in Section 6.5.1.2 below, and *device financing subsidy*, which would be provided to the financial intermediary for carrying out the financing activity itself (see further discussion in Section 6.5.1.5). The survey of financing schemes presented in Section 4.3 did not uncover a direct example of this currently being conducted successfully. There may be good policy reasons for such actions, including the fact that embedding on-going sector-specific or activity-specific favorable tax rates and subsidies in fiscal policies is harmful to the practice of maintaining a fiscal level playing field and tends to distort markets over time. Should outright grants be deemed appropriate, they should be targeted and of short duration (e.g., in the form of support for a pilot and initial stage program roll-out—see Section further discussion in 5.2.7).

### 5.2.4. Guarantees

Instead of, or in combination with direct lending, financial intermediaries, IFIs, and states can provide private sector financial intermediaries with guarantees or risk capital that lowers their risks, enabling them to offer the borrowers more favorable terms.



### 5.2.4.1. Partial credit guarantees

*Partial credit guarantees* (PCGs) cover nonpayment by the borrower or issuer (for any reason) on the guaranteed portion of the principal and interest due. As implied by the term, the coverage of principal and interest is partial to enable risk sharing with the lender that benefits from the guarantee. PRGs are another type of guarantee instrument where the partiality applies not to the coverage amount, but to the risks covered. PRGs cover select risks only and are typically employed where the financial institutions are prepared to accept risks of an arrangement but have concerns about certain contractual undertakings where nonperformance by a counterparty can lead to a financial loss. States (as compared to IFIs) can often offer more broadly defined guarantees where the concern is about private party performance, and in this case, the ministry of finance or relevant sector ministry covers the nonperformance of the loan obligation or performance obligations based on predetermined triggers, but states may be more constrained in terms of ability to commit to guarantees.

### 5.2.4.2. First loss credit guarantees

One type of credit guarantee that may be particularly well suited to mobilize an additional supply of financing for mobile devices are first-loss credit guarantees (FLCGs). FLCGs are part of a family of instruments that provide risk protection to lenders by a party that agrees to bear first losses in an investment to attract the participation of investors and/or lenders who otherwise would not have participated in the financing. The instruments through which first losses can be provided include:

- equity, through which the provider takes the most junior equity position;
- subordinated debt, in which the provider takes the most junior debt position;
- grants, which may be utilized by the investor or lender in the event of a loss or otherwise converted into debt or equity; and
- FLCGs to cover a set amount of loss.

The FLCG, like other first loss instruments, is intended to have the effect of lowering interest rates and lowering the collateral requirements for borrowers. For lenders, in addition to lowering risk, it can reduce capital requirements for the loans they provide, which should incentivize them to actively promote lending to the target borrowers. In principle, then, FLCGs, can:

- mobilize levels of capital that are multiples greater than the guarantees;
- induce sustainable investment into markets that have been heretofore underserved;
- create a “demonstration effect” that will allow a future stream of investment without the need for guarantees, once the banks more favorably adjust their risk-return expectations; and
- improve the terms at which borrowers can access capital.

Historically, FLCGs were used to stimulate lending after economic recession or facilitating access for small and medium sized enterprises. In the last couple of decades, the use of FLCGs has expanded to new areas of commercial activity where the return was either unknown, difficult to measure, or socioeconomically significant, such as in the deployment of green technologies. The FLCG arrangements could be arranged

through two different modes: (i) project-based, designed for a specific debt and equity funding initiative; and (ii) facility-based, which makes FLCGs available for a wide range of eligible projects. Section 6.5.1.3 provides a detailed discussion of how IFIs can use FLCGs to support affordable entry-level devices.

### 5.2.5. Debt funding at favorable interest

There were several programs identified in our finance scheme survey that were already bumping up against balance sheet constraints (e.g., the Lipa Mdogo program in Kenya discussed in Box 4.8)

This is to say, the demand for credit on the terms being offered exceeded the NBFIs' ability to supply credit and/or manage the working capital requirements. In the ideal case, these financial intermediaries should be able to resort to broader capital markets for incremental resources. However, in addition to capital markets being underdeveloped in low- and middle-income countries, the requirements to keep the cost of funding low are tight. There will be a general concern regarding how balance sheet support is used. Ideally, one would like this support to be targeted rather than used as a generic corporate support. Therefore, debt financing could be targeted or made conditional on the type of scheme borrowers implement. How debt funding could be used to promote entry-level device affordability is discussed in Section 6.5.1.4.

With respect to debt financing, there are several products that IFIs and the state could offer to meet this challenge:

- **Loans.** IFIs and state banks can provide a wide variety of loans, which differ in terms of their repayment risks to the lender, interest rate structure, purpose (project or corporate finance), and so forth. IFIs typically lend on a floating-rate basis with a variety of front-end fees, as well as ongoing commitment fees on undisbursed balances. IFIs traditionally loan in major currencies but can offer loans in local currencies as well. Loans will have specific covenants, which the borrower must observe in the interest of safeguarding the ability to repay. If a covenant is breached, the borrower may have to pay some form of penalty. However, the important point is that IFIs and the state can provide additional capital with a lower required return than the private market.
- **Syndication.** Beyond undertaking debt financing on its own account, an IFI may lead in the syndication of debt with co-financiers such as other IFIs, international commercial banks, local and regional banks, funds, and insurance companies. There are different relevant types of syndications:
  - o “B-loans” involving commercial banks, where the IFI effectively fronts the loan to the borrower;
  - o parallel loans involving other IFIs and local banks in an arrangement in which the IFI arranges both its own loans and those of other lending participants to the borrower; and
  - o credit insurance involving insurance companies, in an arrangement in which the IFI is the sole lender, but shares risk with an insurance counterparty.

Syndication promotes risk sharing, which can add resources to the funding effort. The downside of syndication can be the higher coordination costs and increased confidentiality issues due to the number of parties involved. The relative merits are, of course, a function of the number and types of players in the syndication.

- **Blended finance.** IFIs can offer mixes of debt, guarantee products, and equity with different rates, tenor, and security. Under certain facilities, they can also include performance-based incentive structures, such as specific market barriers and failures and the requirements of donor partners. By design, these programs tend to be complementary to other financing sources and relatively small in total funds loaned.



## 5.2.6. Equity funding with moderate return thresholds

As has been demonstrated in the survey of device financing schemes, the private sector has taken the lead. Thus, the role of the IFIs, and potentially the state, should be to provide complementary equity participation to increase the balance sheet for additional lending. IFIs engaging in equity investments with the private sector (e.g., the International Finance Corporation [IFC]), have maintained ownership to a level of between 5 percent and 20 percent of total equity. National governments in principle could provide the same type and level of support in a joint venture or special purpose vehicle form of a public-private partnership (PPP). Note that, as with debt financing, the equity participant would have to come to a deal with moderate expectations of return on investment given the market constraints. The challenge with this initiative is finding an entity that is (i) sufficiently interested in growing the targeted customer segment, and (ii) of the scale that merits a minority shareholding. Until PAYGo finds sufficient traction in the market, financial intermediaries will struggle to attract equity partners.

## 5.2.7. Kick-starting or providing earlier stage support

Several of the innovative financial schemes discussed in Section 4.3 illustrate that there is a virtuous circle of expanding and lowering the cost of financing by launching initiatives. These initiatives increase the knowledge of consumer types and consumer behavior, highlight and quantify opportunities for alternative revenue streams, and expose means of reducing lending costs. These positive effects attract more funding to the effort, which results in more scale and know your customer (KYC) and so on. The industry could benefit from state and IFI funding for the initial stages of these on-going or planned efforts that have a reasonable probability of success. Note these sorts of grants would not represent on-going subsidies, but rather be targeted for a defined period.

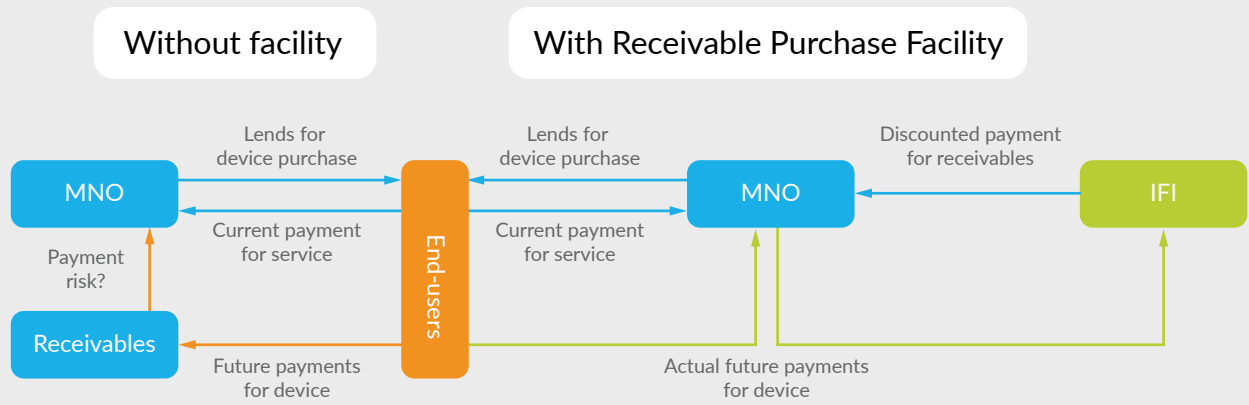
## 5.2.8. Receivable purchase facility

Another means by which an IFI or state could improve the balance sheet or lower the risk undertaken by an entity involved in device financing—and augment its ability to lend more—is by purchasing receivables from the entity. Purchasing receivables is a common practice in financing, including for MNOs. The arrangement is illustrated in simplified terms in Figure 5.1. Without the facility, the MNO, by selling the device below cost initially, is effectively lending to the end user against installments over time.<sup>172</sup> With a receivable purchase facility, the bank or IFI purchases the receivables from the MNO. The MNO continues to act as collection agent but is released from the burden of the receivables, making cash available for further financing, payment of payables, capital expenditure, and so forth.

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<sup>172</sup> What is not captured in this Figure (to simplify for exposition purposes) is that the MNO may be effectively financing the devices from the OEM itself, which means that the MNO has associated payables alongside its receivables.

Figure 5.1. Financing scheme with/without receivable purchase facility



Source: TMG/A4AI.







Although there are clear benefits for the MNO in terms of boosting free cash flow and de-risking its receivables in exchange for discounting, there are several questions that emerge that relate to whether this arrangement could be used to support financing of entry-level devices to the target market segment. For example, as generally applied, the cash made available is not necessarily used for prescribed purposes. The IFI would have to make its purchase conditional on how the proceeds from the facility are used. Also, it is not clear whether there would be a common perception of what an appropriate discount would be, given the state of receivables. Finally, it is not clear whether the value of receivables for any retailer would reach the scale to make this a prospect worth the cost of implementation to the IFI. Further, along with the minimal scale and size of the receivables that can be pooled for a single transaction, considering the high probability of default, it would be difficult to meet market expectations for such asset-backed securities to be traded by IFIs.

These issues may go a far way to explaining why receivable purchasing has not been fully implemented in the device financing space to any great extent.

### 5.3. Conclusions

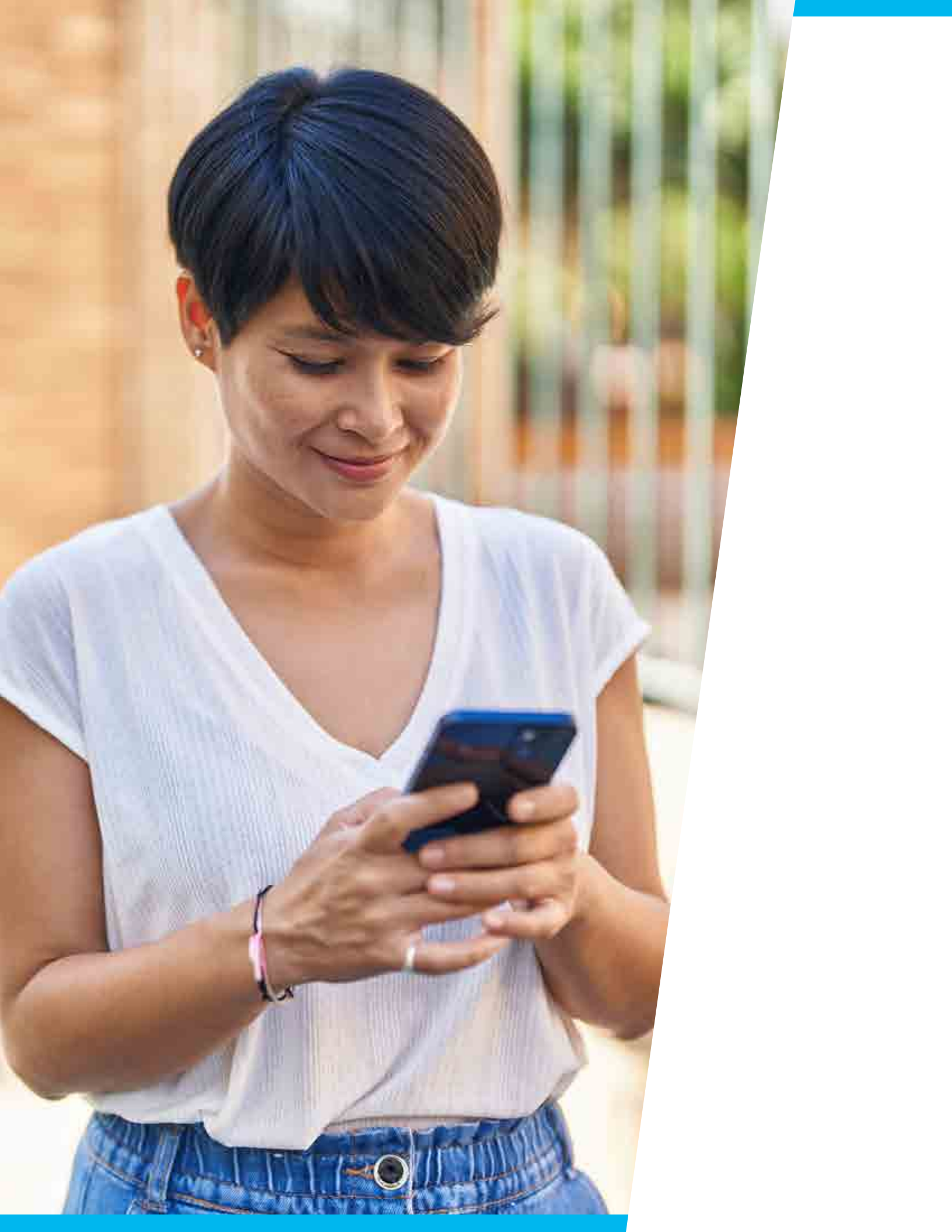
Based on the discussion above, Table 5.1 summarizes the types of initiatives that can positively impact determinants of supply for device financing, concrete examples of these initiatives, and the high-level pros and cons of each.

Table 5.1. Initiatives that can positively impact those determinants of supply of device financing

#	Initiative type	Supply determinant	How does this look in practice	Pros	Cons
1	Facilitating the activities of NBFIs (e.g., MNOs and other players within the device value chain) in financing	Unit revenue of lending	<ul style="list-style-type: none"> <li>• More NBFIs are authorized for financial services</li> <li>• Coordination</li> </ul>	Increases lending sources through increase in number of NBFIs	Requires prudential approach to encourage the “right” type of financing
2	Favor structurally, more appropriate schemes	All	Initiatives 3–7 are targeted toward PAYGo or certain BNPL schemes	Increases probability that target enduser is reached	Limits the opportunities for increasing device financing generally
3	Tax or other subsidies for financing (not for devices themselves, which is discussed in Section 6.5.1.2)	All	Financial activity is given favorable fiscal treatment;	Lowers costs of engaging in financing	Undermines benefits of neutral tax policy; risks distorting market; may be difficult to implement
4	Debt funding at favorable interest	Non-operating costs: debt funding	<ul style="list-style-type: none"> <li>• Loans</li> <li>• Guarantees</li> <li>• Hybrids (blended finance)</li> <li>• Syndication</li> </ul>	Increases balance sheet for financing; covenants may be less intrusive on decision-making than equity holding	May require significant credit history; specific limitations related to type of debt financing
5	Equity funding with moderate return thresholds	Non-operating costs: equity funding	<ul style="list-style-type: none"> <li>• IFI minority holding</li> <li>• PPP</li> </ul>	Increases balance sheet for financing; no debt covenants; reduces financing expense	Profits shared; potential loss of control
6	Kick-starting or providing early stage support	Scale effects	Grants to implement pilots	Can create virtuous circle of lending	By design limited in scope
7	Receivable purchase facility	Scale effects; default risks	IFI buys receivables from MNOs or other retailer	Augments balance sheet, increasing resources for more lending; reduces risk to MNO/retailer after discounting for possible risk in receivables	Initiative remains largely untested in device financing. Not clear whether the scale or discount can be adequately attractive to IFIs

Source: TMG/A4I.





# 6. Policy Recommendations

## 6.1. Introduction

This report has focused on affordability and access to entry-level devices by consumers with low incomes in low- and middle-income countries. This focus comes with particular attention to the unbanked as a market segment and the need for financial inclusion and financing options to be part of any comprehensive device affordability strategy. Solving this gap offers a unique opportunity for economic and social development through greater device ownership.

From the information gathered in this project, this chapter draws out the policy options and strategies relevant to bridge this gap. It assumes that the reader already holds a policy interest in greater entry-level device affordability and focuses on possible individual interventions and their features. As such, this chapter identifies a policy design framework and does not develop a specific policy strategy for a particular country or policy context. This framework prioritizes a set of interventions for consideration by policy makers and international financial institutions (IFIs) as they design policies and programs to promote entry-level device affordability.

This chapter considers the policy context of low- and middle-income countries, looks at the barriers that make entry-level devices unaffordable for much of the world's unconnected population and illustrates the importance of market context in considering policy interventions. A framework is presented for evaluating policy options to promote entry-level device financing along six key metrics, namely: (i) financial sustainability, (ii) suitability; (iii) scalability, (iv) ecological sustainability, (v) adaptability, and (vi) complexity. This framework is then applied to discuss leading policy recommendations for the design of effective programs to increase entry-level device affordability and ownership.

## 6.2. Policy context

This Section describes the broad policy context within a country and the impact of that context on policy design and implementation. The policy context is the totality of relevant high-level government policies and strategies, such as a national broadband plan or comparable digital policy instrument. The policy context can influence the overall alignment of stakeholder interests and expectations related to market developments. While some countries have implemented high-level policy targets relating to device affordability, the overall policy context for low- and middle-income countries, including the four target countries, indicates gaps within the current policy context and opportunities for development.

### 6.2.1. Importance of policy alignment

This chapter focuses on example policy actions to increase entry-level device affordability; however, it would be incomplete without first emphasizing the importance of aligning digital policies at multiple levels.

Policy alignment refers to the overall relationship and coherence of the various policies, strategies, and interventions implemented by a government. This ranges from the high-level, multi-year strategies down to the implementation details of individual interventions at the project level. Because of the nature and lifespan of each policy type, alignment usually depends on what is included within the national broadband plan or digital policy, which then cascades through lower policy levels.

This alignment can bring strategic coherence that eases tensions across the sector and enables more confident and longer-term planning. For example, debates around high-level policies can determine the government's position on the dilemma between revenue now and revenue later. This dilemma summarizes the frequent tension between the government's interest to raise revenue now (e.g., through higher tax rates and other mechanisms that apply to the information and communications technology [ICT] sector) and to collect revenue later (e.g., by creating favorable tax rates for the ICT or other sectors with the anticipation this will expand growth at a later stage). By deciding the government's position at the determination point of a high-level policy, it can provide strategic coherence for other subsequent policies. Policy alignment can also increase the probability that interventions involving actions across multiple sectors (e.g., communications and financial sectors) are adequately comprehensive and coordinated.

Without this alignment, multiple policy interventions can have conflicting or counterproductive impacts. For example, efforts to subsidize device costs to encourage ownership would conflict with costly importation duties that maintain a device's high price point in the commercial market. With overall principles and expectations set through higher-level policies, smaller project implementation can avoid these potential incompatibilities.

Other stakeholders, outside of government, can benefit from strategic coherence in the policy environment. For the private sector, a coherent and trusted public sector position provides a more consistent investment climate and enables longer-term planning. By engaging stakeholders in the policy process as well, governments can socialize the guiding principles for the market's development over time and align interests across public and private sectors. In turn, this can motivate all stakeholders to feel ownership over critical policy issues, such as device affordability, and collaborate in a positive way, including capital contributions.

## 6.2.2. Survey of national broadband plans

A national broadband plan, a term used in this report in a broad sense to also include digital strategies or similar policies, can be a leading indicator of the overall policy environment and a starting point for understanding the political priority given to device affordability in each country. National broadband plans are guiding documents that provide multi-year strategic guidance for the development of the ICT sector within a country. The A4AI Affordability Report 2020 details many of the ways that these policies affect market development and the affordability of internet services and related devices.<sup>173</sup> Given their strategic importance and capacity to facilitate policy change in multiple areas across the ICT sector, these plans offer an opportunity to consolidate intention and action around device affordability when effectively used.

Across low- and middle-income countries, entry-level device affordability remains an incidental topic in broadband planning. A survey of 65 low- and middle-income countries and their national broadband plans identified only 12 countries that included smartphone affordability as a thematic concern.<sup>174</sup> Of those 12 countries, only 4 included specific targets around smartphone affordability. This is a very narrow focus on devices compared to their essential character for the functioning of a strong ICT market.

### **Recommendation 6.1. Include device affordability within broadband plans and strategies**

The underrepresentation of device affordability as a theme within broadband planning offers an opportunity for initial policy action. Where national broadband plans have the potential to set long-term targets and coalesce political will around specific themes within the ICT market, policy makers can accelerate focus on smartphone ownership by incorporating it as a theme within national broadband plans. This process can engage other stakeholders and build a stronger policy context from which to develop individual policy interventions.



173 A4AI & Web Foundations. 2020. *The Affordability Report*. <https://a4ai.org/research/affordability-report-2020/>.

174 A4AI, Broadband Policy Trends Briefing. (forthcoming, 2022).; also see: A4AI. 2020. *The Affordability Report*, pp. 50–51. <https://a4ai.org/wp-content/uploads/2020/12/Affordability-Report-2020.pdf>. Note, the 12 countries that included smartphone affordability as a thematic concern in their national broadband plans are: Gambia, Sri Lanka, Malawi, Ecuador, Kenya, the Dominican Republic, Nigeria, Mauritius, Turkey, Rwanda, Senegal, and Costa Rica. The most common documents surveyed included: national broadband plans, ICT strategies and plans, digital strategies and agendas, good government plans, and telecommunications policies/high-level documents, including a strategic vision for a country's ICT development.

### 6.2.3. Examples of device affordability as strategic priorities

Among the target countries, different examples of strategic priority are demonstrated for device affordability. While the national broadband plans for Colombia and Pakistan make no meaningful mentions of device affordability, both Nigeria and Rwanda are examples of countries that have set measurable targets toward smartphone affordability (Table 6.1).

**Table 6.1. Examples of inclusion of device affordability within national broadband plans in the target countries**

	Nigeria 	Rwanda 
<b>Plan</b>	Nigerian National Broadband Plan 2020–2025 <sup>173</sup>	National Broadband Policy and Strategy <sup>174</sup>
<b>Year</b>	2020	2022
<b>Targets</b>	Commitments to lower customs duty on certain devices, social investment scheme expansion for device access, local assembly of smartphones.	Achieve 85 percent of smart device ownership by adult population, 90 percent of households.

Source: TMG/A4AI research.

## 6.3. Barriers to affordability and steps to action

This Section discusses the main barriers to mobile device affordability identified in the project and presents a proposed approach toward undertaking a review of specific market conditions to design policy interventions. While unaffordable entry-level devices remain a challenge in many markets, the lack of action to date in many of them offers new territory to test and refine policy interventions to reduce costs and expand device ownership.

175 Nigeria Communication Commission. 2020. Nigerian National Broadband Plan 2020–2025. <https://www.ncc.gov.ng/documents/880-nigerian-national-broadband-plan-2020-2025/file>.

176 Ministry of ICT and Innovation. 2022. “The National Broadband Policy and Strategy.” <https://www.minict.gov.rw/index.php?eID=dumpFile&t=f&f=55955&token=4f911fb560969db5f90a30e7247393d25ba8d6c9>.

### 6.3.1. Barriers to affordable entry-level device ownership

The (un)affordability of entry-level devices remains a key reason for low rates of ownership. This report has examined the cost basis of smartphones (Chapter 2); consumer perceptions of prices, value for money, and trust (Chapter 3); and willingness to lend in the context of financing options for device purchases (Chapter 4). Figure 6.1 presents the key barriers to affordability of entry-level devices identified which can be affected by different policy interventions.

Figure 6.1. Key barriers to affordable smartphone ownership



Source: TMG/A4AI.

Potential savings from **supply-side interventions** are limited to specific links within the value chain. Two key areas were identified that can allow policy makers to affect the cost structure and, ultimately, the retail price of entry-level devices. Taxation is a major cost driver for entry-level devices in many countries (in some cases the combined tax burden can be as high as 30-40 percent of the device's total cost). This includes various indirect taxes, such as import duties, value added tax (VAT), general sales tax (GST), or excise tax, among others. Targeted tax reductions or exemptions thus represent a significant opportunity to lower the total cost of entry-level devices in some countries, but as noted earlier in this report, any consideration of taxation policy must consider impact of overall revenue collection resulting from increased handset purchases (and related revenue from taxation of associated digital services) that may be stimulated by lower total costs of handsets. Distribution costs are another link in the value chain where further optimization may be possible to lower the costs of devices in many countries. While realizing these cost savings will depend on private negotiations between stakeholders in the value chain, policy makers can play an indirect role in creating enabling environments and providing other essential infrastructure to indirectly support this process.

Policy interventions to affect the **demand side** of the device market must address the market's diversity foremost. In addition to a consumer's socioeconomic background, a consumer's ability to pay and motivation to own a device create divergent market segments that seek different device types. Innovations in this space also need to pay close attention to the way that changes in financial relationships between consumers and sellers may also affect the consumer's trust in the transaction, and in turn, the consumer's willingness to buy.

In looking to facilitate a wider and more active **device financing market**, the most urgent gaps—and the most promising options for intervention—remain in how financial intermediaries can reach a financing price point that is attractive to, and manageable for, the target customer segment. Lenders are receptive to incorporating new data points for identification, verification, and creditworthiness to broaden the scope of available financing, where appropriate. Also important is building trust between lenders and consumers, as they often remain wary of the cost effectiveness of financing strategies for mobile devices and trustworthiness of financing providers.

These barriers indicate initial areas for focused policy intervention to increase entry-level device affordability and ownership, with particular attention to low-income market segments. While this Section illustrates common features across low- and middle-income countries and their device markets, a further analysis of the specific features and pain points in a country's device market will be needed to prioritize interventions.

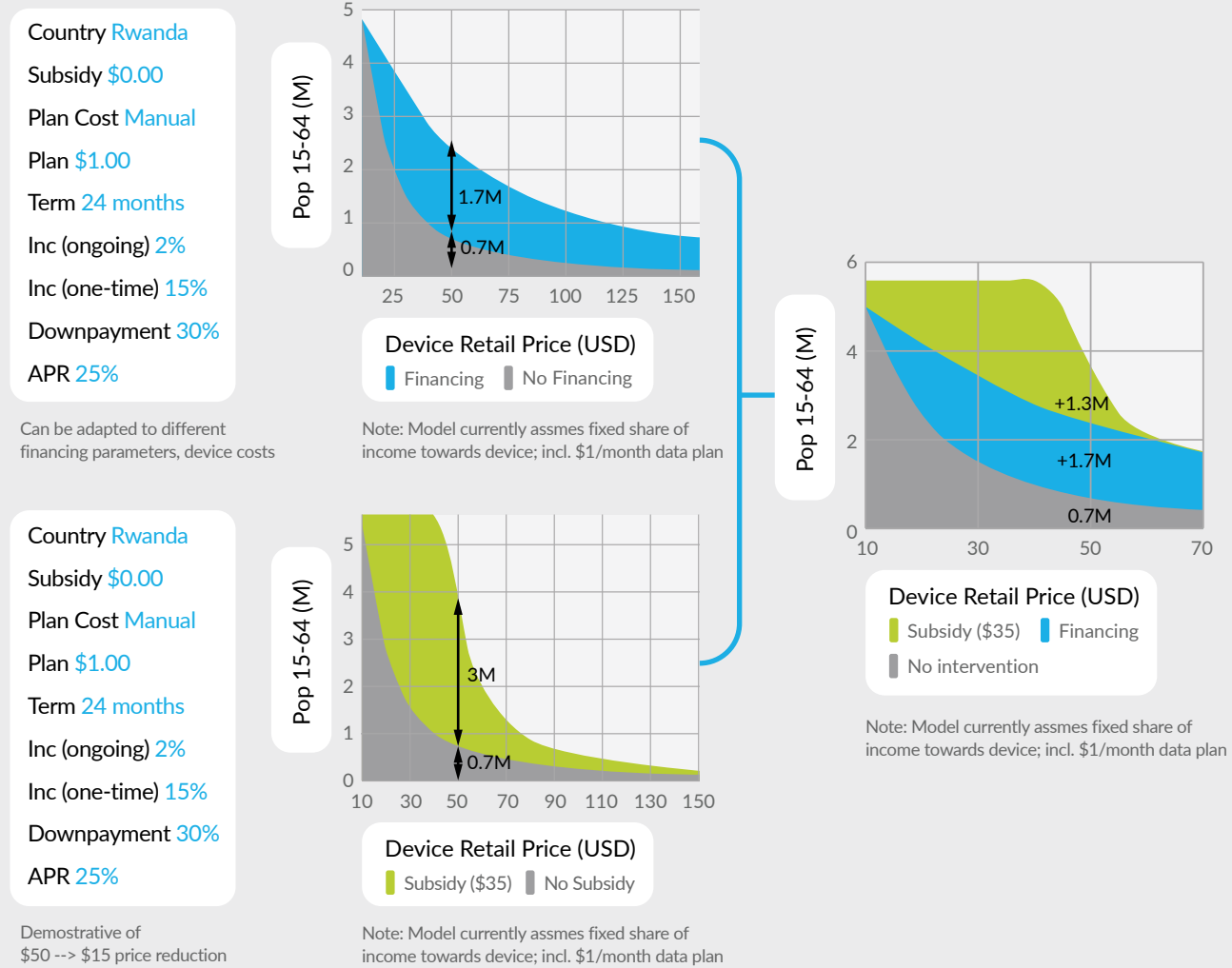
### 6.3.2. Market context

Market conditions are not uniform. Major factors that determine the rate of device adoption in a country include average incomes, financial inclusion, social norms, regulatory frameworks, and distribution networks. For example, the much higher rates of financing used by consumers in Colombia to purchase mobile devices are consistent with consumers having closer familiarity with financing schemes in general, as compared to consumers in other target countries. Countries with strongly held beliefs that discourage smartphone ownership by women and girls will require specific, gender-responsive policies to address this. Due to the diversity of markets and their implications on how a policy is received, policy makers should account for these dynamics in policy design. As such, informed decision-making requires accurate and up-to-date data collection on device ownership and existing barriers for ownership by low-income individuals in a particular market (e.g., via household surveys, census data).

Another critical piece to assess the market landscape is conducting a demand analysis, which is necessary to understand potential interventions in terms of financing and subsidies. As is made clear in Section 6.5, mobilizing financing for device acquisitions has significant benefits over subsidy programs, both in terms of program sustainability, mitigating market distortions, and program targeting and control. Demand analysis can inform the likely addressable market for financing and the residual market that may have to be addressed through subsidies. Demand can be measured through a combination of market surveys, focus groups, targeted interviews, and modelling techniques. The recent effort by Meta and the World Bank Group can be further developed and applied to target country markets (Figure 6.2). This analysis can be run iteratively during program design to ensure that, as specific elements of the program are developed, gaps can be reassessed and addressed.



Figure 6.2. Demand (in millions) relative to price considering financing and subsidy programs



Source: Meta and the World Bank.

Accordingly, policy interventions should be designed in response to the barriers that are relevant and dominant in the market. The strength of these barriers, the populations they affect, and other factors will all vary from one country to the next. As such, policy makers should identify unique or divergent factors that apply to their context before replicating or implementing policy strategies. This can ensure that these policies are effective and respond to real problems, rather than theoretical ones.

### *Recommendation 6.2. Engage all stakeholders in the policy design stage*

Policy makers should include comprehensive market analyses and stakeholder perspectives within the policy design process. Identifying and documenting the correct barriers and their severity within a market relies on accurate market information and data collection. Policy makers hold one position within the sector and can benefit from learning from other stakeholders within the market to understand how different factors affect purchasing patterns overall. As such, policy makers will benefit from the inputs of the private sector and civil society at the design stage to build connections between barriers and solutions, and increase the probability of effective and efficient investment and intervention in encouraging entry-level device ownership.

## 6.4. Evaluating policy recommendations

With agreement on the urgency in greater connectivity, an understanding of the scope of the problem within a target market, and the political will to undertake action, policy makers can begin to design interventions that respond to the appropriate barriers based on available resources. This Section discusses types of policy actions, important considerations for policy design, and present recommendations that can apply to multiple markets. Notably, the objective is to provide a framework for an analysis of addressing entry-level device affordability, with the understanding that additional policy interventions may be identified based on country-specific conditions.

### 6.4.1. Type of policy action

There are several ways for policy makers to act to increase the adoption of entry-level devices within a market. These measures will vary in scope, cost, and longevity. Policies may or may not have a direct focus on devices as their subject area. As such, it is important to think of policy interventions in several different scales and steps.

- Direct interventions are projects and policies that are actively targeted toward affordable devices. They are typically discrete, measurable projects with defined budgets and timelines and a specific mechanism that relates to device affordability. An example of such a policy would be customs duty and VAT exemptions for entry-level mobile devices.
- Enabling environments are broader policies that have a consequential effect on device costs, typically as a part of several consequences of the policy's implementation. Positive examples of such a policy would be a universal service policy that includes device affordability as one of its targets. A negative example of such a policy would be importation restrictions on e-waste that limit the pre-owned device market.

- Virtuous cycles are policies that may not have direct applications to device affordability but incidentally affect the device market. Examples of such a policy include investment in locally produced digital content or e-government services that then spur demand for smart devices, or women's economic empowerment programs that can help reduce the digital gender gap.

As policy makers design their policy approach to device affordability, they should do so with a broad mindset that includes consideration of how to create an enabling environment and what virtuous cycles can be generated. This is particularly important as these latter policies typically have longer lifespans and may be more sustainable in the long term.



## 6.4.2. Evaluation criteria for policy design

In addition to the type of policy, several factors are important to the evaluation of effective policy design. These factors are not purely economic. A policy's alignment with the social environment and market context, as discussed above in Section 6.2, is also an important factor to consider throughout the design stage. Table 6.2 describes the set of evaluation criteria for policies targeting entry-level device affordability. These evaluation criteria are important to include within the policy design process. Their discussion and consideration can help identify potential limitations in the idea generation phase and encourage revisions before implementation of pilots to increase the chances for positive impact.

**Table 6.2. Evaluation criteria for policy design**

### Sustainability (financial)

The financial sustainability of a policy intervention can be an essential factor in the policy's longevity and scalability. As such, policies should be designed in a way that can sustain the market conditions they try to create. For example, subsidization policies may struggle to maintain financial sustainability as they continue, when there is no revenue stream to counterbalance the cost of the policy.

### Suitability

A policy's suitability is governed in large part by how well it responds to specific barriers for affordability and the market context in which it operates. Unsuitable policies may fail to gain the necessary resources to be effective or may underperform against targets when they fail to accurately address the market problems and increase device affordability.

### Scalability

The appropriateness of a policy program may be affected by the potential for that program to scale. Smaller, more limited trials or provisional implementations can allow for policy innovation in a way that does not overburden budgets and enables policy makers to test new strategies to compare results. However, measurable impact in the market may only be possible at scale. As such, programs should be assessed for their ability to scale sustainably over time.

### Sustainability (ecological)

In addition to financial sustainability, device policies should consider the ecological implications of their implementation. For example, the pre-owned device market exists in almost every part of the world, creates more affordable price points for tech savvy users (albeit for higher-end devices), and extends the lifespan of a mobile device's use. In turn, policies that support this market can reduce the generation of e-waste.

### Adaptability

Policies, especially longer-term interventions, should be responsive to innovations within the market. For example, policies that focus on low-end smart devices may invest in devices that only have limited connectivity to 3G networks or lower. Devices without 4G functionality (or higher) will have limited impact for affected users and may impede the policy's success.

### Complexity

The complexity of a policy intervention can determine the costs related to sustaining it and the required resources (including time and staffing) to start implementation. The more granular or restricted a program may become, the policy typically becomes more complex to implement. Ways of embedding policies within pre-existing practices (such as pre-existing social program or educational initiatives) can reduce complexity.

*Source:* TMG/A4AI.

## 6.5. Policy recommendations for entry-level device affordability

Few policies are universally correct in all circumstances without adaptations relevant to the market in question. This Section summarizes several policies that may be appropriate to consider for a wide range of markets in low- and middle-income countries, and focuses on their potential for making internet enabled devices affordable for low-income populations in those countries. However, attention should be paid to testing these recommendations against relevant design criteria (Section 6.4.2) and in consideration of the market context (Section 6.3.2).

Table 6.3 summarizes several example policies to increase device affordability. Their exact implementation details and the appropriateness for each market will vary depending on the relevant conditions in each country. However, these policies demonstrate the wide breadth of options available to policy makers and give indicative suggestions for practice across a range of geographies. Section 6.6 provides a framework for review and recommends priority measures for consideration by policy makers and IFIs to increase device affordability.

**Table 5.1. Initiatives that can positively impact those determinants of supply of device financing**

	Direct intervention	Enabling environment	Virtuous cycles
<b>Supply barriers</b>	VAT (and other sales and similar taxes) and custom duty exemptions/reductions for entry-level devices	Regulatory ease of doing business (as a retailer, importer, or manufacturer)	Adequate policies and infrastructure for e-commerce and distribution networks
<b>Demand barriers</b>	Device subsidization (through universal service and access fund [USAF] or otherwise)	Framework for disadvantaged populations	Local and relevant content generation Digital skills
<b>Financing barriers</b>	Credit and risk guarantees Debt and equity funding Financing scheme subsidization	Financial and mobile money regulation Financial consumer protection	Increased financial literacy and awareness

Source: TMG/A4I.

Policy makers engaged in designing policies to promote device affordability should define device specifications such as network connectivity, battery life, memory, display, and camera to align with the target population's needs and program's goals (Table 6.4). A successful program will be one that takes into consideration the needs of the target population and promotes the affordability of a device that responds to those needs. Specific surveys and consultations should be undertaken to make this determination on a case-by-case basis.

For example, a program targeting the delivery of basic connectivity could focus on measures to promote affordability of smart feature phones or low-cost smartphones (as defined in Section 2.2.2). These types of phones will allow the target population to become familiarized with the technology and access simple capabilities, such as instant messaging and web browsing. If, on the other hand, a program targets increased economic empowerment, a smart feature phone or even a low-cost smartphone may not provide the required specifications. Instead, an economic empowerment connectivity program could focus on increasing the affordability of a smartphone with more memory, longer battery life, better cameras, and overall capabilities that allow the users to download and store files and applications, and make, edit, and upload videos to promote products and businesses online, among others.

Device specifications will have a direct impact on the costs of a program to promote affordability. As discussed in Chapter 1 of this report, materials and manufacturing represent the highest cost components for entry-level devices, accounting for 60 to 75 percent of the total cost of a device (not considering taxes). Accordingly, the choice of device will be a central decision to secure funding and ensure sustainability of device affordability programs, as further discussed below.

**Table 6.4. Minimum phone design specifications according to the use**

	Basic use	Economic empowerment
<b>Network</b>	Min 4G connectivity	Min 4G connectivity
<b>Battery</b>	Short to medium battery life	Long battery life
<b>Memory</b>	Enough to have basic applications	Enough to save large files and applications
<b>Display</b>	Noncritical	Enough to be able to navigate websites and social platforms
<b>Camera</b>	Noncritical	Enough to take pictures and videos of quality to upload and share in social media and messaging apps

Source: TMG/A4I.

## 6.5.1. Direct interventions

Direct interventions use the public sector's capital or preferential financing to pay for some part of the device's costs in the value chain or to reduce costs by exempting these devices from taxes and deferring revenue collection. These policies can have the most immediate and most measurable impacts on the affordability of devices but may have some of the largest challenges with sustainability and scalability.



### 6.5.1.1. Tax exemptions for entry-level devices

On the supply side, policy makers can assess whether granting tax exemptions for entry-level devices and device inputs is appropriate when designing policy interventions. This is one lever uniquely available to policy makers, which can have a direct, and potentially significant, impact on entry-level device affordability in a specific country. VAT and other similar sales tax exemptions can significantly reduce the cost of an entry-level device when the tax savings are passed along to the consumer. Similarly, customs duty exemptions can reduce the ultimate cost a consumer pays for an entry-level device when that device is imported, either in parts or as a composite unit for sale. Combined, such tax burdens can be as high as 30–40 percent of the device's total cost in some countries (Section 2.2.4).

In several markets where this strategy has been attempted, tax exemptions have altered market behaviors for consumers and manufacturers alike and spurred smartphone ownership. Box 6.1 provides an overview of Colombia's tax structure for mobile phones, which exempts devices under a certain price threshold from VAT. Similarly, Box 6.2 outlines the positive impact of Kenya's 2009 policy to exempt mobile devices from VAT.



## Box 6.1. Tax exemptions for entry-level mobile devices—Colombia

As discussed in the supply-side analysis chapter, Colombia's 2016 tax reform implemented VAT exemptions on devices costing less than US\$200,<sup>177</sup> and the government does not impose an import duty on mobile devices.<sup>178</sup> Up until 2016, basic cell phones in Colombia were subject to a VAT rate of 16 percent.<sup>179</sup> Within the first one-half of 2017, following the tax reform, cell phone imports grew by 18.9 percent, the majority of which were VAT exempt, saving consumers an estimated COP 891 billion (US\$197.28 million).<sup>180</sup> Moreover, several manufacturers with handsets priced just above the threshold adjusted prices to fall below the VAT cutoff, thereby increasing the number of VAT-free devices available to consumers.<sup>181</sup> To compensate for the tax exemption, the government increased VAT for several digital products/services to 19 percent, including for handsets that exceeded the exemption threshold.<sup>182</sup>

The tax benefits generated significant growth in the number of lower-priced device purchases among the Colombian population.<sup>183</sup> The Minister of Finance at the time estimated that Colombia's tax policy stimulated demand and increased consumption, thereby supporting the country's technological modernization and progress.<sup>184</sup>

Source: TMG/A4AI.

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177 Basic feature phones and smartphones with retail prices under COP 836,008 (~US\$200) are exempted from VAT. See Ministry of Finance and Public Credit. 2017. "Excluding VAT for mobile devices and computers, Colombian households saved \$891 billion." Bulletin No. 180, (August 30, 2017). [https://www.minhacienda.gov.co/webcenter/content/conn/ConexionContent/path/Enterprise%20Libraries/Minhacienda/saladeprensa/Boletines/2017/Boletin\\_180\\_Exclusi%C3%B3n\\_IVA\\_celulares\\_tabletas\\_computadores\\_TIC\\_30\\_08\\_2017.pdf](https://www.minhacienda.gov.co/webcenter/content/conn/ConexionContent/path/Enterprise%20Libraries/Minhacienda/saladeprensa/Boletines/2017/Boletin_180_Exclusi%C3%B3n_IVA_celulares_tabletas_computadores_TIC_30_08_2017.pdf).

178 See DIAN. 2022. "Tariff inquiries: merchandise profile 8517.13.00.00." (January 1, 2022). <https://muisca.dian.gov.co/WebArancel/DefResultadoConsNomenclaturas.faces>.

179 Ministry of Finance and Public Credit. 2017. "Excluding VAT for mobile devices and computers, Colombian households saved \$891 billion." Bulletin No. 180, (August 30, 2017). [https://www.minhacienda.gov.co/webcenter/content/conn/ConexionContent/path/Enterprise%20Libraries/Minhacienda/saladeprensa/Boletines/2017/Boletin\\_180\\_Exclusi%C3%B3n\\_IVA\\_celulares\\_tabletas\\_computadores\\_TIC\\_30\\_08\\_2017.pdf](https://www.minhacienda.gov.co/webcenter/content/conn/ConexionContent/path/Enterprise%20Libraries/Minhacienda/saladeprensa/Boletines/2017/Boletin_180_Exclusi%C3%B3n_IVA_celulares_tabletas_computadores_TIC_30_08_2017.pdf).

180 Ministry of Finance and Public Credit. 2017. "Excluding VAT for mobile devices and computers, Colombian households saved \$891 billion." Bulletin No. 180, (August 30, 2017). [https://www.minhacienda.gov.co/webcenter/content/conn/ConexionContent/path/Enterprise%20Libraries/Minhacienda/saladeprensa/Boletines/2017/Boletin\\_180\\_Exclusi%C3%B3n\\_IVA\\_celulares\\_tabletas\\_computadores\\_TIC\\_30\\_08\\_2017.pdf](https://www.minhacienda.gov.co/webcenter/content/conn/ConexionContent/path/Enterprise%20Libraries/Minhacienda/saladeprensa/Boletines/2017/Boletin_180_Exclusi%C3%B3n_IVA_celulares_tabletas_computadores_TIC_30_08_2017.pdf).

181 A4AI. 2020. "Eliminating luxury taxation on ICT essentials." (March 2, 2020). <https://a4ai.org/research/good-practices/eliminating-luxury-taxation-on-ict-essentials/>.

182 A4AI. 2020. "Eliminating luxury taxation on ICT essentials." (March 2, 2020); Government of Colombia, Law 1819 of 2016, Article 468. <https://www.funcionpublica.gov.co/eva/gestornormativo/norma.php?i=79140#7>.

183 Ministry of Finance and Public Credit. 2017. "Excluding VAT for mobile devices and computers, Colombian households saved \$891 billion." Bulletin No. 180, (August 30, 2017). [https://www.minhacienda.gov.co/webcenter/content/conn/ConexionContent/path/Enterprise%20Libraries/Minhacienda/saladeprensa/Boletines/2017/Boletin\\_180\\_Exclusi%C3%B3n\\_IVA\\_celulares\\_tabletas\\_computadores\\_TIC\\_30\\_08\\_2017.pdf](https://www.minhacienda.gov.co/webcenter/content/conn/ConexionContent/path/Enterprise%20Libraries/Minhacienda/saladeprensa/Boletines/2017/Boletin_180_Exclusi%C3%B3n_IVA_celulares_tabletas_computadores_TIC_30_08_2017.pdf).

184 Ministry of Finance and Public Credit. 2017. "Excluding VAT for mobile devices and computers, Colombian households saved \$891 billion." Bulletin No. 180, (August 30, 2017). [https://www.minhacienda.gov.co/webcenter/content/conn/ConexionContent/path/Enterprise%20Libraries/Minhacienda/saladeprensa/Boletines/2017/Boletin\\_180\\_Exclusi%C3%B3n\\_IVA\\_celulares\\_tabletas\\_computadores\\_TIC\\_30\\_08\\_2017.pdf](https://www.minhacienda.gov.co/webcenter/content/conn/ConexionContent/path/Enterprise%20Libraries/Minhacienda/saladeprensa/Boletines/2017/Boletin_180_Exclusi%C3%B3n_IVA_celulares_tabletas_computadores_TIC_30_08_2017.pdf).

## Box 6.2. Tax exemptions for mobile devices—Kenya

In 2009, the Kenyan government exempted mobile handsets from the country's 16 percent VAT.<sup>185</sup> Between 2009 and 2011, handset purchases in Kenya increased over 200 percent, and the rate of mobile penetration increased by 20 percentage points, from 50 percent to 70 percent.<sup>186</sup> Over the same period, VAT reduction also contributed to greater unique mobile subscriber penetration, which increased from 29 percent to 39 percent.<sup>187</sup> Additionally, increased adoption promoted competition among Kenya's three mobile operators, which subsequently contributed to lower prices and better network coverage, directly benefiting consumers.<sup>188</sup> Notably, however, Kenya has recently moved away from these fiscal policies, reestablishing import duties on mobile devices (Section 2.2.4).

Source: TMG/A4AI.

In assessing potential tax exemptions on entry-level devices, the short-term impact on fiscal revenue should be weighed against projected long-term gains from increased broadband service penetration in terms of economic growth, employment, and future increases in overall tax revenue. This will be necessary to gain support from key government stakeholders (e.g., legislators, finance ministries, tax authorities) particularly in low- and middle-income countries that may be facing challenging macroeconomic conditions (see discussion in 2.2.4.3).

Table 6.5 presents a set of design recommendations for implementing the proposed tax exemption interventions, thus identifying the relationship between each policy action and the key evaluation criteria for considering effective policy design in relation to device affordability.

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185 GSMA & Deloitte. 2011. "Mobile telephony and taxation in Kenya." p. 3.  
<https://www.gsma.com/publicpolicy/wp-content/uploads/2012/03/mobiletelephoneandtaxationinkenya.pdf>.

186 GSMA & Deloitte. 2011. "Mobile telephony and taxation in Kenya." p. 3.  
<https://www.gsma.com/publicpolicy/wp-content/uploads/2012/03/mobiletelephoneandtaxationinkenya.pdf>.

187 GSMA. 2017. "Taxing Mobile Connectivity in Sub-Saharan Africa." p. 34.  
[https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2017/07/Taxing-mobile-connectivity-in-Sub-Saharan-Africa\\_July-2017.pdf](https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2017/07/Taxing-mobile-connectivity-in-Sub-Saharan-Africa_July-2017.pdf).

188 A4AI. 2019. "Kenya: Treating mobile phones as essential for all."  
<https://a4ai.org/research/good-practices/treating-mobile-phones-as-essential-for-all/>.

**Table 6.5. Design recommendations—tax exemptions for entry-level devices**

#	Policy action	Description	Evaluation criteria
1	Assess existing tax structures in the market	Determine whether an opportunity exists to lower the tax burden on entry-level devices and whether such policies are fiscally feasible.	<ul style="list-style-type: none"> <li>• Sustainability (financial)</li> <li>• Scalability</li> </ul>
2	Conduct a socio-economic assessment	Evaluate the negative short-term impact on fiscal revenue versus the long-term gains from expected increased broadband service penetration.	<ul style="list-style-type: none"> <li>• Suitability</li> </ul>
3	Develop targeted tax exemptions	Set exemption thresholds for entry-level devices that are achievable and desirable considering the preceding analysis. The program can be optimized in terms of adaptability (e.g., can evolve as technological and socioeconomic considerations change), ecological sustainability (e.g., include, if possible, refurbished devices), and complexity (e.g., simplify implementation processes).	<ul style="list-style-type: none"> <li>• Adaptability</li> <li>• Sustainability (ecological)</li> <li>• Complexity</li> </ul>

Source: TMG/A4I.

### 6.5.1.2. Targeted subsidization

Targeted subsidies reduce the price consumers pay for their devices. However, these types of subsidies are not always feasible or desirable. Subsidies should be considered as a complement to other direct interventions to target residual demand that cannot be covered with other interventions. Their feasibility depends on the market context and certain design preconditions, including financial as well as operational aspects to ensure the effectiveness and sustainability of subsidies.

Subsidy programs require sufficient funding to operate. Accordingly, the government entities tasked with providing subsidies must have the capacity and legal authority to allocate enough funding for the program to be financially viable over its lifetime. This is a particular challenge in low- and middle-income countries. Diversification of funding sources, such as by fostering public-private partnerships which combine government subsidies (e.g., from a universal service and access fund [USAF] with private subsidies from mobile network operators (MNOs) or original equipment manufacturers (OEMs), may contribute to the financial sustainability of these interventions. Similarly, when designing subsidy programs, a key consideration is to determine how much of the cost would be subsidized and how much participants must pay directly to benefit. Ensuring participants bear some financial obligation promotes ownership in the program and provides a mechanism to monitor whether the program's objectives are being achieved.

Successfully implementing a device subsidy program is rarely simple and will require piloting and testing to refine its scope and conditions. In addition, for such a program to run smoothly a diverse set of stakeholders must be involved in its implementation. Accordingly, subsidy programs are often jointly implemented by the ministry of telecommunications and finance, regulatory authorities, MNOs, and government agencies with a well-established track record of providing public services and delivering assistance programs. Together, these stakeholders must identify the appropriate target population and the ideal device and data plan to subsidize. These types of initiatives can be targeted to reach specific vulnerable groups and should be carefully considered to assess their potential benefits, while considering the local context. Linking these limited subsidy schemes with broader social programs can facilitate implementation and performance monitoring. Completing this step will lower the risk of targeting the wrong population with devices and services that may be of little benefit. Stakeholders involved must also analyze the financial capacity of the target population and, on this basis, set an appropriate co-payment scheme to encourage beneficiaries to take a stake in the program.

While the factors discussed are important, they may not be sufficient to ensure the success of a subsidy program. Unexpected complications and challenges may still arise and cause the subsidy program to fail. It is thus crucial that any subsidy program is very carefully designed and tailored to the local conditions in which it will be implemented, and it should include a degree of flexibility to identify and address unforeseen challenges that may arise. Box 6.3 describes a device and service subsidization program recently launched in the Dominican Republic, which relies on the government's food subsidy program and an MNO as implementation partners. Box 6.4 discusses Malaysia's Jaringan Prihatin program, which concluded in August 2022, and subsidized devices and service bundles for low-income individuals.



### Box 6.3. Device subsidization—the Dominican Republic

In April 2022, the Dominican Republic launched a pilot program called *Canasta Digital Social*, designed to provide subsidized smartphones and data/voice bundles to 2,000 low-income women, head of households. The Dominican Telecommunications Institute (Indotel) and Supérate, a comprehensive social program scheme, administered the program.

Indotel embedded the smartphone subsidy program in *Supérate's* food subsidy program to facilitate implementation and monitoring. The beneficiaries of *Canasta Digital Social* were selected from *Supérate's* beneficiaries. This allowed the *Canasta Digital Social* program to leverage pre-existing relationships to encourage timely monthly payments and mitigate the risk of default, as well as lower the costs of administering the program in terms of selection, training, and follow-up with the beneficiaries.<sup>189</sup>

Through a reverse auction, Indotel selected Altice, an MNO, to implement the program. Altice provides a Samsung A12 smartphone (identified by Indotel as the most appropriate device with the functionalities and performance required by the beneficiaries) to participants free of charge as part of the program. The monthly cost of the service bundle is shared between Indotel and the participant over a 24-month period. Indotel subsidizes 80 percent of the cost of the 10GB and 100 voice minutes data/voice bundle using resources from the USAF, while participants are responsible for paying the remaining 20 percent.

Indotel identified high rates of default and a lack of buy-in from participants as the two primary potential challenges that could impede the program's success. To mitigate default risks, *Supérate* regularly follows up with program participants to encourage payment, and Altice monitors the levels of data consumption to ensure participants are taking full advantage of the program's benefits. In addition, training sessions to provide digital skills were implemented through *Supérate* as part of the program. The training focused on productive skills, such as video editing using the mobile device, to assist participants in leveraging digital connectivity to develop small businesses.

Indotel estimates that 93 percent of the beneficiaries are making payments, and, on average, they use 5–10GB of data per month. Based on the results of the pilot program, the implementing partners plan to include an additional 2,000 women in the program in the coming two years.<sup>190</sup>

Source: TMG/A4AI.

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189 TMG interview with Indotel, (November 23, 2022).

190 TMG interview with Indotel, (November 23, 2022).

## Box 6.4. Device subsidization—Malaysia

Malaysia implemented the Jaringan Prihatin program<sup>191</sup> to subsidize data plans and smart devices for low-income individuals. The initiative was part of the 2021 budget and involved a total investment of RM 3.5 billion (US\$793.7 million). The government provided RM 2 billion (US\$453.6 million), in funding, and 12 telecommunications companies and service providers supplied data plans valued at RM 1.5 billion (US\$340.2 million).<sup>192</sup>

Between May and September 2021, beneficiaries registered for the program through the telcos and service providers. Participants acquired specific smart devices and 12-month data plans that were available through the program. The device specifications varied according to the mobile operator and data plan. The data subsidy was RM 15 (US\$3.40) per month for 12 months, and the subsidy for a smartphone varied depending on the demographic characteristics of the applicant. Applicants with children under 18 years of age could receive a subsidy of RM 300 (US\$68.04), and those with no children under 18 had access to a RM 180 (US\$40.82) device subsidy. According to the Ministry of Finance, as of June 2021, 2.8 million individuals registered for the program and over 500,000 beneficiaries obtained new mobile devices.<sup>193</sup>

The entire program ran from May 2021 until August 2022.<sup>194</sup> During this time, it is worth noting that the program implementation faced challenges relating to fraudulent practices. Reports indicate that individuals were contacted over the phone by persons posing as program representatives and subsidy providers requesting personal and financial information such as credit card numbers and security codes. In response, the Malaysian Communications and Multimedia Commission (MCMC) took an active role in warning the public against providing personal and financial information to third parties over the phone.<sup>195</sup>

Source: TMG/A4AI.

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191 Ministry of Finance Malaysia. 2021. "Muhyiddin launches RM3.5 billion Jaringan Prihatin Programme to bridge digital gap." (May 5, 2021). <https://www.mof.gov.my/portal/en/news/press-citations/muhyiddin-launches-rm3-5-billion-jaringan-prihatin-programme-to-bridge-digital-gap>.

192 Ministry of Finance Malaysia. 2020. Budget 2021, Jaringan Prihatin, (November 2020). <https://belanjawan2021.treasury.gov.my/manfaat/index.php/en/jaringanprihatin-en>.

193 Ministry of Finance. 2021. "Jaringan Prihatin extended until 31 August—Ministry of Finance." (July 1, 2021). <https://www.mof.gov.my/portal/ms/berita/akhbar/jaringan-prihatin-dilanjutkan-sehingga-31-ogos-kementerian-kewangan>.

194 Ministry of Finance. 2021. "Jaringan Prihatin extended until 31 August—Ministry of Finance." (July 1, 2021). <https://www.mof.gov.my/portal/ms/berita/akhbar/jaringan-prihatin-dilanjutkan-sehingga-31-ogos-kementerian-kewangan>.

195 Malaysian Communications and Multimedia Commission. 2021. "Awat Taktik Penipuan Scammer Terkini." (September 23, 2021). [https://www.mcmc.gov.my/skmmgovmy/media/General/pdf/NOTIS\\_PEMBERITAHUAN\\_\\_PERINGATAN\\_SCAM.pdf](https://www.mcmc.gov.my/skmmgovmy/media/General/pdf/NOTIS_PEMBERITAHUAN__PERINGATAN_SCAM.pdf).

Table 6.6 presents a set of design recommendations for implementing device subsidy programs, identifying the relationship between each policy action and the key evaluation criteria identified when considering effective policy design.

**Table 6.6. Design recommendations—Device subsidization**

#	Policy action	Description	Evaluation criteria
1	Demand analysis	Determine the residual market for subsidization that cannot be addressed via tax reductions, financing schemes, and other policy interventions. The objective is to mitigate market distortions and to ensure the program can be effectively implemented to achieve policy targets.	<ul style="list-style-type: none"> <li>Suitability</li> <li>Sustainability (financial)</li> </ul>
2	Assess the availability of public funds and the legal framework	Determine whether funding is available to support a subsidy program and how it may be disbursed.	<ul style="list-style-type: none"> <li>Sustainability (financial)</li> </ul>
3	Assess design variables	Assess the type of device(s) to be covered (e.g., technical specifications, price, etc.), whether to target a specific group (e.g., low-income, rural populations, women), the service package to be included, how much would be subsidized, and how much participants must pay, etc.	<ul style="list-style-type: none"> <li>Suitability</li> <li>Adaptability</li> </ul>
4	Select the appropriate partners	Recruit MNOs and other stakeholders (such as government social service programs) to participate in the subsidy program, define their roles, and identify who will cover the subsidies for both the device and service plan.	<ul style="list-style-type: none"> <li>Sustainability (financial)</li> <li>Suitability</li> <li>Complexity</li> </ul>
5	Monitoring	Assess whether ownership can be monitored or controlled (e.g., through locking mechanisms, leveraging social pressure), so that subsidized devices are retained and used by the intended target group.	<ul style="list-style-type: none"> <li>Suitability</li> </ul>

Source: TMG/A4I.



### 6.5.1.3. Credit guarantees

As discussed in Section 5.2.4, credit guarantees reduce lenders' potential risk by financing mobile devices. By reducing that risk, policy makers and IFIs can encourage lenders to provide more favorable terms to consumers and/or offer more financing with greater confidence. First-loss credit guarantees (FLCGs) can be effective, resource-multiplying forms of assistance that can be relatively simple to implement and is adaptable to application. However, they are not without potential pitfalls. It must be kept in mind that an FLCG:<sup>196</sup>

- does not eliminate risk, indeed by compensating risk it can potentially lower attention, which may increase the probability and severity of the occurrence of risk events;
- is generally introduced in a manner that does not diversify risk (although this can be mitigated through aggregation of funded projects through an FLCG facility);
- can create a moral hazard (i.e., attracting projects that are disproportionately risky); and
- if overused, can have a detrimental impact on “normal” commercial lending.

At the time of writing, there was no specific experience with an FLCG applied to entry-level device financing; however, there are illustrative examples from many other sectors. In Box 6.5 and Box 6.6, experience with FLCGs from the alternative energy and health care sectors are described.

#### Box 6.5. FLCG—ADB for India Solar Power

In 2011, the Asian Development Bank (ADB) was brought in to assist the government of India stimulate financing in solar projects to ensure that technology, policy, and commercial risks would be undertaken at reasonable cost by the private banking system. The ADB developed a program that would reduce the cost of financing to a level that solar project implementers could afford. It agreed to cover 50 percent of the initial loan amount on a first-loss basis. The facility effectively replaced 50 percent of the debt rating of the Indian commercial banks rating of B to BB with the ADB's AAA credit rating. In doing so, the debt financing could be brought down in cost and its tenor lengthened to 15 years. The fee for the guarantee was subsidized by the International Climate Fund so ADB's annual fee was reduced to 0.87–1.25 percent of the guarantee value annually.

*Source:* TMG/A4AI based on ADB data.

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196 Additional criticism of credit guarantees, particularly when the underlying business environment for lending is not reformed, can be found in ADB. 2016. “Credit Guarantees: Challenging their roles in improving access to finance in the Pacific Region.” <https://www.adb.org/sites/default/files/publication/203871/credit-guarantees.pdf>.

### Box 6.6. FLCG—MCF for African health care providers

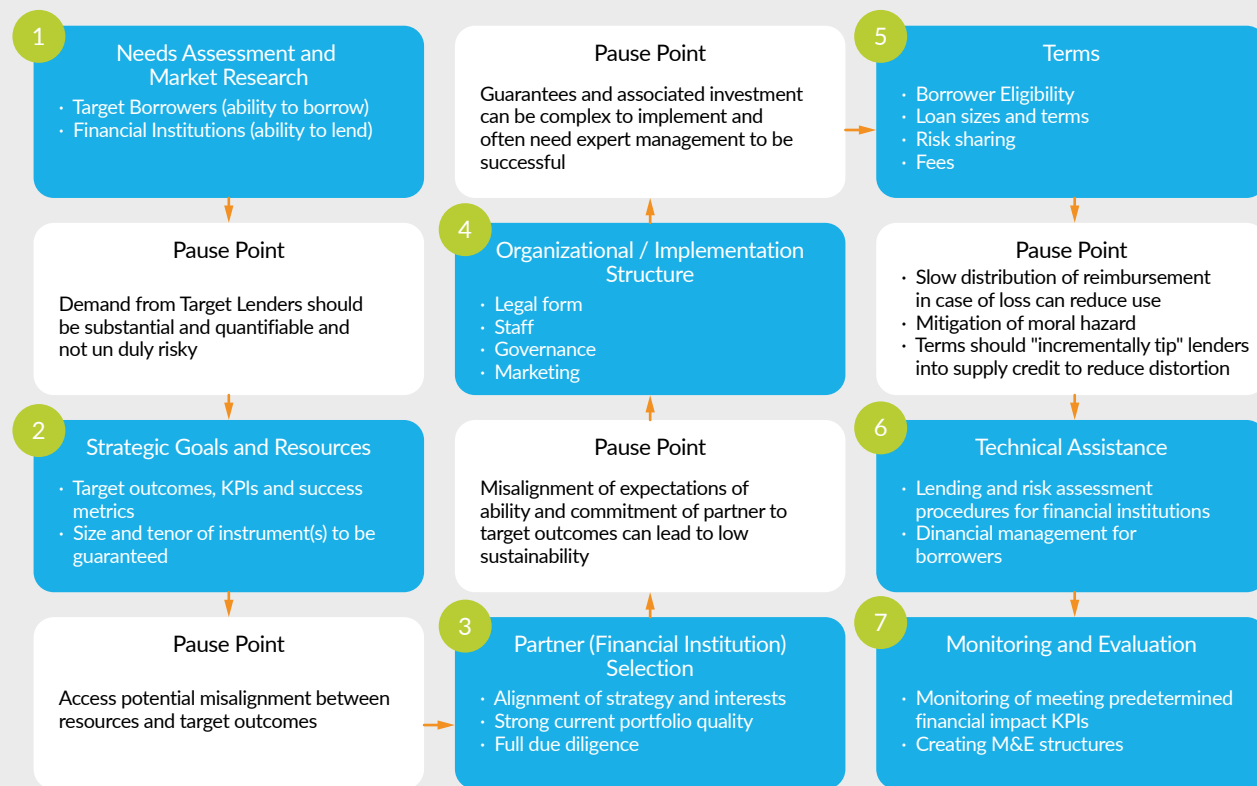
Medical Credit Fund (MCF) works with local financial intermediaries across Africa to provide loans to small- and medium-sized health care providers. MCF was created with a grant of US\$1 million in USAID funding but has since raised capital through a variety of IFIs and impact funds. MCF is structured as a blended finance facility with US\$41.5 million of debt capital and US\$7.75million of first-loss capital. MCF coinvests its own capital and provides guarantees to local banks. It also has US\$12 million in grant aid to provide technical assistance to health care service providers. It makes loans of between US\$1,000 and US\$2.5 million and has a 97.2 percent repayment rate.

*Source:* TMG/A4AI based on Chemonics/MCF.



An FLCG can be designed in a manner that maximizes the expected benefits and minimizes the potential downsides of financing. A framework to do so is depicted in Figure 6.3.

**Figure 6.3. Framework for structuring FLCGs**



Source: TMG adapted from Gain and iGravity.<sup>197</sup>

1. The process for implementing an FLCG program begins with an analysis of the gap in financing in any country and sector. The sector in our case would be mobile device financing. The FLCG scheme would only be considered in a market where there is an adequate threshold of demand and the ability of local or other commercial interests to lend.
2. The funding of the FLCG program—whether it is project-based or facility-based—should be clearly structured around the specific purpose of device financing, with relevant eligibility criteria for the types of borrowers to be targeted. Considering this purpose and target segment, the funding should be right sized to ensure sustainability in respect to the desired outcomes and expected amount and type of

197 Patrick Elmer and Elizabeth West. 2018. "Guarantees and Other Risking Sharing Mechanisms for Nutrition Financing." Gain and iGravity, November 2018.

investment. Initially the FLCG program could be launched as a set of pilots to assess likely take-up, required guarantee to loan ratios, and so forth, that could serve as reference for a larger-scale program design for the future. An important strategic consideration will also be what types of schemes to support. As discussed in Chapter 4, there are certain schemes that address the challenges of providing access to the low-income and unbanked segments of the market, PAYGo in particular.

3. How the financial intermediary partners are chosen for participation in the FLCG program will be as important as the selection of the borrowers. The strength of partnerships will be essential in launching and sustaining the program over multiple years, so partners should demonstrate genuine interest in exploring this area of market expansion. There should be an understanding and consensus as to how the fund will be used and the objective of weaning the financial intermediaries off guarantees once the financing is shown to be sustainable without them. Of course, the partners must also have the wherewithal (established through due diligence) to seek out, agree, and deliver financing in a manner consistent with the objectives of the program.
4. Whether project based or facility based, the program may take one of a variety of forms—supporting debt, equity, or blended arrangements. They may be quite complex with multiple players involved; this will require considerable effort to appropriately staff the program and establish effective governance to seek out appropriate borrowers and implement the desired investments.
5. The terms of the lending will need to fit the risk-sharing objectives of the program to manage incentives as well as prevent untimely depletion of available funds. The three elements of risk-sharing that will need to be specified (but may differ from one project to another) are:
  - capital covered by the guarantee (i.e., principal or principal and some or all interest);
  - coverage percentage by the guarantee (i.e., percentage first loss to capital involved); and
  - recovery process (i.e., how the financial intermediary recovers losses after attempting recoveries via loan collection procedures).

In addition to the risk-sharing terms, fees for the guarantees will need to be determined. Care will need to be taken to find the right balance between preventing the overuse of guarantees (by pricing too low) and discouraging lending (by pricing too high). Additional participants in the program may need to be introduced to offset/subsidize the required fees. The terms of the loan will have a significant impact on the utilization capital supported by the FLCG. The design of the terms will also influence the risk of moral hazard (the reduction of commitment to pay induced by the knowledge that the loan is to some extent guaranteed). Moral hazard can be reduced by not communicating to the borrowing party that some of the loan is guaranteed and ensuring that there are other negative ramifications of defaulting to the borrowing party (e.g., limiting future access to credit).

6. Both the borrowers and the partner financial institutions will likely benefit from consumer awareness and technical assistance efforts. Depending on how the funds are implemented, the FLCG itself may need to have technical assistance provided (i.e., if it is being administered on the ground through an agency less familiar with FLCG transactions).
7. Finally, monitoring, reporting, and feedback loops are important to measure performance and adjust the implementation model to ensure maximal effectiveness and efficiency of the program.

Beyond the specific requirements of developing the FLCG program, there are likely to be important ancillary initiatives to undertake. Here the public sector could support regulatory changes that underly the specific scheme. For example, Colombia prohibits the use of device locking that facilitates PAYGo and BNPL schemes. IFIs could work strategically with start-ups aiming to achieve scale in this space via initiatives described below.

Table 6.7 presents a set of design recommendations for implementing an FLCG initiative, identifying the relationship between each policy action, and identifying the key evaluation criteria when considering effective policy design.

**Table 6.7. Design recommendations—FLCG**

#	Policy action	Description	Evaluation criteria
1	Conduct needs assessment and market research	As part of the market analysis, measure the demand and supply gap for device financing.	<ul style="list-style-type: none"> <li>• Sustainability (financial)</li> <li>• Suitability</li> </ul>
2	Identify strategic goals and resources	Determine scale, whether the funding will be project based or facility based, sources of funding, what types of schemes are to be supported, and expected outcomes.	<ul style="list-style-type: none"> <li>• Sustainability (financial)</li> <li>• Suitability</li> <li>• Scalability</li> <li>• Sustainability (ecological)</li> <li>• Adaptability</li> <li>• Complexity</li> </ul>
3	Select partner(s)	Solicit interest and develop partnerships with appropriate financial intermediaries.	<ul style="list-style-type: none"> <li>• Sustainability (financial)</li> <li>• Suitability</li> <li>• Complexity</li> </ul>
4	Form implementation structure	Institutionalize the program.	<ul style="list-style-type: none"> <li>• Suitability</li> <li>• Scalability</li> <li>• Complexity</li> </ul>
5	Design terms	Detail the terms of the lender, borrowers, recovery process for the lenders in case of default, and fees for guarantees.	<ul style="list-style-type: none"> <li>• Sustainability (financial)</li> <li>• Suitability</li> <li>• Adaptability</li> <li>• Complexity</li> </ul>
6	Deploy technical assistance	Ensure capable, efficient lending and informed borrowing.	<ul style="list-style-type: none"> <li>• Scalability</li> </ul>
7	Monitor and evaluate	Assess activity during implementation and after borrower relationship close.	<ul style="list-style-type: none"> <li>• Sustainability (financial)</li> <li>• Suitability</li> <li>• Adaptability</li> </ul>

Source: TMG/A4I.

### 6.5.1.4. Debt and equity funding

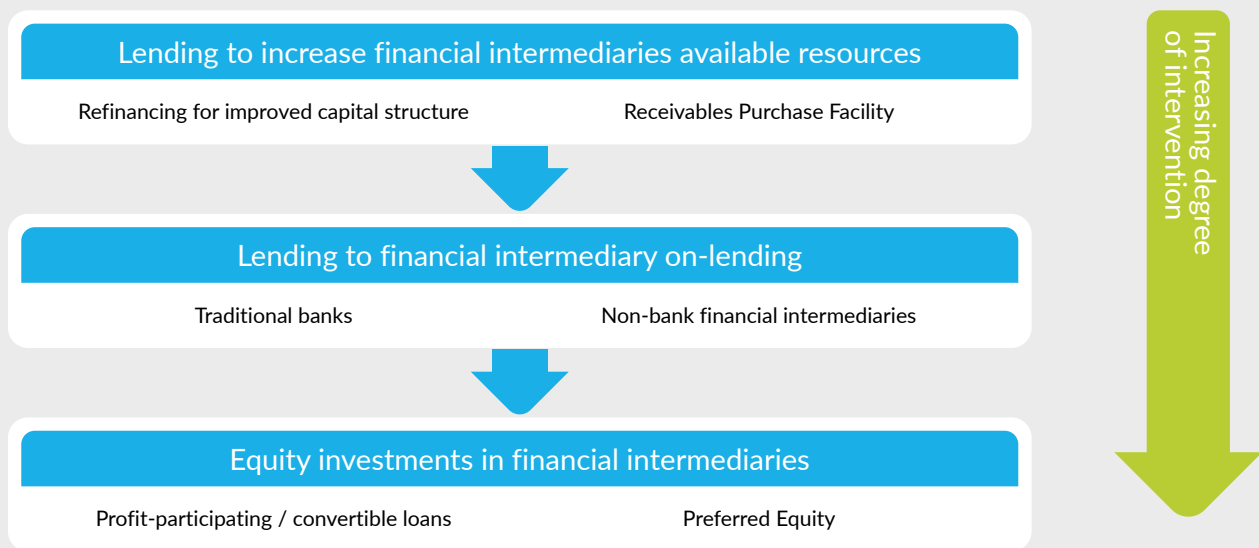
Credit guarantees of the type described in Section 6.5.1.3 represent a means of mobilizing private sector capital through an offer of risk protection. It is, however, quite possible that the private capital markets are too underdeveloped to play a significant role in device financing or can only play a partial role. If this is the case, then a more active role in debt and equity financing may have to be played by IFIs and the state.

Whether or not the IFIs and/or the state should have to play a more active role should emerge from the market analysis step in the FLCG framework outlined in Table 6.7; the market analysis assesses the gap between demand for financing and the local market's ability to meet that demand.

However, IFIs and national governments are not in the position to lend to consumers. Thus, even here, interventions will be required to occur through existing or created retail lenders. In the interest of preserving IFI and state capital and avoiding market distortion, it is recommended that attempts at more interventionist debt or equity policy be structured in a ladder of increasing intervention, such that policy makers exhaust the potential of less intrusive intervention before advancing to the next rung.

For each of these interventions, care must be taken to ensure that the use of funds provided are tied to specific objectives of the program, namely, entry-level device financing. Unfortunately, these interventions may be more difficult to target the specific objectives of device financing. Unless the sole commercial objective of the funded entity is device financing, the IFI and state may struggle to establish the kind of conditionality that would prevent the funding from being used for other purposes (Figure 6.4).

Figure 6.3. Framework for structuring FLCGs



Source: TMG adapted from Gain and

Table 6.8 presents a set of design recommendations for implementing debt and equity funding interventions, identifying the relationship between each policy action and the key evaluation criteria when considering effective policy design.

**Table 6.8. Design recommendations—debt and equity funding**

#	Policy action	Description	Evaluation criteria
1	Assess residual requirements that cannot be met through credit guarantees	Estimate the demand and supply gap for device financing post-credit guarantee implementation.	<ul style="list-style-type: none"> <li>• Sustainability (financial)</li> <li>• Suitability</li> </ul>
2	Develop “light-touch” lending to add to financial intermediaries’ resources	Identify strategic goals and resources; partners; implementation structure; terms, and monitoring evaluation framework.	<ul style="list-style-type: none"> <li>• Sustainability (financial)</li> <li>• Suitability</li> <li>• Scalability</li> <li>• Sustainability (ecological)</li> <li>• Adaptability</li> <li>• Complexity</li> </ul>
3	Assess residual requirements that cannot be met through “light touch” lending	Estimate demand and supply gap for device financing post-credit guarantee and “light-touch” lending implementation.	<ul style="list-style-type: none"> <li>• Sustainability (financial)</li> <li>• Suitability</li> </ul>
4	Develop full loan program for financial intermediaries	Identify strategic goals and resources; partners; implementation structure; terms; and monitoring evaluation framework.	<ul style="list-style-type: none"> <li>• Sustainability (financial)</li> <li>• Suitability</li> <li>• Scalability</li> <li>• Sustainability (ecological)</li> <li>• Adaptability</li> <li>• Complexity</li> </ul>
5	Assess residual requirements that cannot be met through full lending program	Estimate demand and supply gap for device financing post-credit guarantee and lending initiatives.	<ul style="list-style-type: none"> <li>• Sustainability (financial)</li> <li>• Suitability</li> </ul>
6	Develop equity investment program for financial intermediaries	Identify vehicle (investment in existing entity, new PPP); strategic goals and resources; implementation structure; terms and monitoring evaluation framework.	<ul style="list-style-type: none"> <li>• Sustainability (financial)</li> <li>• Suitability</li> <li>• Scalability</li> <li>• Sustainability (ecological)</li> <li>• Adaptability</li> <li>• Complexity</li> </ul>

Source: TMG/A4I.





### 6.5.1.5. Favorable fiscal treatment/subsidies for financing

A final type of direct intervention to reduce financing barriers is action taken by the state (and possibly supported by an IFI) to provide subsidies or tax benefits to the financial intermediaries. Notably, this intervention would be distinct from a device subsidy described in Section 6.5.1.2 above. These subsidies would form an explicit part of a financing scheme implemented by a financial intermediary (e.g., an MNO) and intended to cover default losses, lower interest rates, or otherwise improve terms of financing to the MNO's borrowing customer.

Although there are potentially many vehicles through which this type of support could be implemented, the USAF are typically structured in a manner that carry the degree of transparency and competitive tendering that could optimize the outcomes if effectively applied. For example, universal service programs are typically (if following best practice):

- explicitly aligned with the overall government broadband policy;
- developed through a public consultation process that ensures the entities that will participate in financing have a say in how the program is developed;
- subject to transparent reporting of available funds, designated uses, and accounting of results; and
- structured in a manner (e.g., allocated through competitive, reverse auctions) that require the fund recipient to put some skin in the game.

The recommendations for design below therefore set out how a USAF program might be structured to fund device financing. One major limitation of USAF programs is that only telecommunications service licensees (who contribute to the fund) may typically bid for the subsidy. However, this may be appropriate should it be determined that MNOs are best suited for successful implementation of the financing scheme. Also, should non-licensees also be possible candidates, the state (again possibly supported by IFI funding) could either amend the rules governing the USAF or set up a facility apart from the USAF that has similar distribution processes, but broader eligibility criteria for participants.

Table 6.9 presents a set of design recommendations for implementing programs regarding favorable fiscal treatment/subsidies for financing, identifying the relationship between each policy action and the key evaluation criteria when considering effective policy design.

Table 6.9. Design recommendations—favorable fiscal treatment/subsidies for financing

#	Policy action	Description	Evaluation criteria
1	Assess the availability of public funds, such as the universal and access funds	Determine whether funding is available to support a subsidy program and how it may be disbursed.	<ul style="list-style-type: none"> <li>• Sustainability (financial)</li> </ul>
2	Assess the legal framework under which such funds can be allocated	Assess the type of device(s) to be covered (e.g., technical specifications, price, etc.), whether to target a specific group (e.g., low-income, rural populations, women), the service package to be included, how much would be subsidized, and how much participants must pay, etc.	<ul style="list-style-type: none"> <li>• Suitability</li> </ul>
3	High-level program design	Model sustainability and scalability of proposed scheme.	<ul style="list-style-type: none"> <li>• Sustainability (financial)</li> <li>• Suitability</li> <li>• Complexity</li> </ul>
4	Detailed program design	<ul style="list-style-type: none"> <li>• identify the customer segment that the scheme is designed to address, (e.g., nationals of a given age and/or gender that do not currently have a SIM);</li> <li>• set out the minimum requirements of the arrangements of the device financing (e.g., the type of device to be sold, how locking mechanisms are to be used);</li> <li>• set out the minimum criteria defining what constitutes a credible financing scheme;</li> <li>• set out the formula that defines the winning bid, (e.g., least subsidy per handset and service plan);</li> <li>• invite the operators to propose a credible financing scheme to reach that customer segment in the manner identified by the minimum arrangements requirements and include a proposed amount for subsidization of each handset sold within the scheme;</li> <li>• set out the reporting elements required to ensure the fund can verify the number of devices financed under this regime, whether the user with the stated national ID is using the device, etc.; and</li> <li>• withhold payment of subsidies to the operator until the effective usage of the subsidy, (e.g., confirmation of usage by the identified national, is provided).</li> </ul>	<ul style="list-style-type: none"> <li>• Sustainability (financial)</li> <li>• Suitability</li> <li>• Scalability</li> <li>• Sustainability (ecological)</li> <li>• Adaptability</li> <li>• Complexity</li> </ul>
5	Program implementation with monitoring and evaluation framework	Execution of program in compliance with funding requirements in tranches with review, evaluation, and optimization stages in between tranches.	<ul style="list-style-type: none"> <li>• Sustainability (financial)</li> <li>• Suitability</li> </ul>

Source: TMG/A4I.

It is obvious that such a program would not directly target the customer segment of concern; however, based on the research provided in this report, the customer segment would be largely self-selecting. The individuals would not have an internet-enabled device previously registered; the program would likely be targeted at a set of devices that are generally not attractive to higher income consumers; and so forth. As such, this approach is not unlike the service subsidies that are currently provided by broadband ISPs under the Emergency Broadband Benefit<sup>198</sup> and new Affordable Connectivity Benefit program<sup>199</sup> in the United States but administered via a competitive process designed to have the operators have some “skin in the game.”

### *Recommendation 6.3. Direct interventions to increase affordability of entry-level devices*

Policy makers should identify direct interventions based on prevailing market conditions. Research undertaken in this report suggests the following approach could be followed to guide this decision-making process:

- First, where viable, policy makers should explore if there are opportunities for reducing the cost of entry-level devices via import duty, VAT, and other tax exemptions, balancing fiscal revenue objectives with handset affordability and universal connectivity objectives.
- Second, targeted interventions to reduce barriers to device financing should also be explored. This includes interventions aimed at reducing private lenders’ potential risk of financing entry-level devices and encouraging them to provide more favorable terms to consumers and/or offer more financing with greater confidence (e.g., via FLCGs). If private lenders’ ability to participate is limited, then the state (and possibly supported by IFIs) may consider a more active role via interventions, such as debt and equity financing or subsidies or tax benefits to the financial intermediaries.
- Third, device subsidies should be considered as a complement to other direct interventions to target residual demand that cannot be covered with other such interventions. When designing subsidy programs of this type, policy makers should ensure beneficiaries bear some financial obligation to promote their ownership in the program and provide a mechanism to monitor compliance with the program’s policy objectives.

## 6.5.2. Enabling environments

Policy makers can create an enabling environment for affordable devices by affecting the conditions in which other stakeholders engage in the market. Effective policy-making efforts in this area require consultation and collaboration with the affected stakeholders. Policy changes in this area may be hard to directly quantify but will have the prospect of being the most sustainable interventions towards an affordable entry-level device market.

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198 Provided for under the Consolidated Appropriations Act, 2021; See Congress.gov, Public Law No: 116-260 (12/27/2020). <https://www.congress.gov/bill/116th-congress/house-bill/133/text>.

199 FCC, Affordable Connectivity Program. <https://www.fcc.gov/acp>.



### 6.5.2.1. Regulatory environment

The regulatory ease of doing business impacts the device market and should be evaluated when developing policies to promote device ownership. Whether it is difficult or easy to maintain a business as a manufacturer, retailer, importer, financier, or distributor, regulatory costs still accumulate as part of the cost of selling devices to consumers.

National industrial policies can thus directly impact the complex supply chain of entry-level devices, potentially increasing costs within the device ecosystem. Where policy makers can reduce such burdens, they can encourage new entrants into the market and create a more diverse and robust device market. For instance, lower-income countries can attract foreign direct investment by creating special economic zones or export processing zones with less onerous rules for businesses.<sup>200</sup> Furthermore, trade liberalization policies reduce the cost of intermediate inputs and benefit global production.<sup>201</sup> Naturally, the regulatory environment

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200 The World Bank Group. 2020. "Trading for Development in the Age of Global Value Chains." p. 46. <https://www.worldbank.org/en/publication/wdr2020>.

varies from country to country, and as such, policy makers should examine the regulatory context in specific countries of interest and consider how this environment may encourage or hinder the device market when designing policies to improve handset affordability.

Recent developments in Pakistan and China highlight challenges created by the regulatory environment on device affordability and manufacturing. Box 6.7 summarizes challenges faced by local manufacturers in Pakistan because of industrial, tax, and monetary policies in the country. Restrictions on access to U.S. dollars due to challenging macroeconomic conditions have limited local manufacturers' ability to import components to assemble devices. Combined with high import duties that had been implemented to promote local manufacturing, existing policies have led to disruptions in the market (even before the catastrophic floods that affected the country in mid-2022). Box 6.8 provides an overview of the ongoing supply chain disruptions and geopolitical challenges faced by companies that manufacture devices in China, leading firms such as Apple to begin moving production elsewhere.

### Box 6.7. Regulatory environment— Pakistan

The impact of regulatory burdens on local smartphone production is evident in Pakistan, where the recent U.S. dollar shortage was linked to import restrictions, including mobile phone components (see further discussion in Section 2.3.2).<sup>202</sup> In response to the dollar shortage, Pakistan restricted imports and overseas payments, negatively impacting local manufacturers that could not import parts.<sup>203</sup> Consequently, OEMs such as Samsung and Transsion with manufacturing/assembly plants in Pakistan announced closures and layoffs.<sup>204</sup> As a result, the dollar shortage will likely reduce the supply of locally manufactured, lower-cost devices available to consumers, as imported phones are subject to higher taxes, and are typically more expensive.<sup>205</sup>

Source: TMG/A4AI.

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201 The World Bank Group. 2020. "Trading for Development in the Age of Global Value Chains." p. 47. <https://www.worldbank.org/en/publication/wdr2020>.

202 The Express Tribune, Usman Hanif. 2022. "Mobile phone assembly units may shut down." The Express Tribune, (June 22, 2022). <https://tribune.com.pk/story/2362777/mobile-phone-assembly-units-may-shut-down>.

203 Alarabiya News, Bloomberg. 2022. "Facing dollar crunch, Pakistan halts overseas payments for online gaming, other apps." (November 27, 2022). <https://english.alarabiya.net/business/economy/2022/11/27/Facing-dollar-shortage-Pakistan-halts-overseas-payments-for-online-gaming-other-app>.

204 Usman Hanif. 2022. "Mobile phone assembly units may shut down." The Express Tribune, (June 22, 2022). <https://tribune.com.pk/story/2362777/mobile-phone-assembly-units-may-shut-down>.

205 Usman Hanif. 2022. "Mobile phone assembly units may shut down." The Express Tribune, (June 22, 2022). <https://tribune.com.pk/story/2362777/mobile-phone-assembly-units-may-shut-down>.

## Box 6.8. Regulatory environment—China

In China, supply chain disruptions from the country's zero COVID-19 policy, coupled with geopolitical tensions, have resulted in several OEMs moving device production out of the country.<sup>206</sup> In early November 2022, Apple released a statement that its primary iPhone 14 Pro and iPhone 14 Pro Max assembly facility in Zhengzhou, China was impacted by COVID-19 restrictions and was operating at “significantly reduced capacity,” resulting in reduced device shipments.<sup>207</sup> Analysts stated that Apple would move 5 percent of iPhone 14 production to India by the end of 2022 and could shift 25 percent of all iPhone production to India by 2025.<sup>208</sup>

Moreover, geopolitical tensions, such as the 15 percent tariff hike on technology products in 2019, increased costs for companies that manufacture in China.<sup>209</sup> Following the U.S.-China tariff war under the Trump administration, Google reportedly searched for alternative manufacturing locations, with plans to move production of its Pixel 7 from Foxconn facilities in China to Vietnam.<sup>210</sup> Furthermore, other technology products that were previously made in China, such as Apple iPads, Microsoft Xbox consoles, and Amazon Fire TV devices are now being manufactured in India and Vietnam.<sup>211</sup>

Source: TMG/A4AI.

### 6.5.2.2. Framework for disadvantaged populations

It is well documented that women and populations living in remote, isolated areas are less likely to have access to a mobile device.<sup>212</sup> When designing policies to promote entry-level device ownership and affordability, policy makers and other stakeholders should consider initiatives that respond to the specific needs of these populations and their intersectionality.

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206 Daisuke Wakabayashi, and Tripp Mickle. 2022. “Tech Companies Slowly Shift Production Away From China.” New York Times, (September 1, 2022). <https://www.nytimes.com/2022/09/01/business/tech-companies-china.html>.

207 Apple. 2022. “Update on supply of Phone 14 Pro and iPhone 14 Pro Max.” (November 6, 2022). <https://www.apple.com/newsroom/2022/11/update-on-supply-of-iphone-14-pro-and-iphone-14-pro-max/>.

208 Arjun Kharpal. 2022. “Apple begins making the iPhone 14 in India, marking a big shift in its manufacturing strategy.” CNBC, (September 26, 2022). <https://www.cnbc.com/2022/09/26/apple-starts-manufacturing-the-iphone-14-in-india.html>.

209 Daisuke Wakabayashi, and Tripp Mickle. 2022. “Tech Companies Slowly Shift Production Away From China.” New York Times, (September 1, 2022). <https://www.nytimes.com/2022/09/01/business/tech-companies-china.html>.

210 Daisuke Wakabayashi, and Tripp Mickle. 2022. “Tech Companies Slowly Shift Production Away From China.” New York Times, (September 1, 2022). <https://www.nytimes.com/2022/09/01/business/tech-companies-china.html>.

211 Daisuke Wakabayashi, and Tripp Mickle. 2022. “Tech Companies Slowly Shift Production Away From China.” New York Times, (September 1, 2022). <https://www.nytimes.com/2022/09/01/business/tech-companies-china.html>.

212 GSMA. 2020. “The Mobile Gender Gap Report 2022.” (June 2022). <https://www.gsma.com/r/wp-content/uploads/2022/06/The-Mobile-Gender-Gap-Report-2022.pdf>.



For women, aspects such as the affordability of the device, wage gaps, privacy and security, and literacy and skills interplay to discourage use of the internet and smart device ownership. Rural communities are shaped by higher service costs and lower average demand, which result in having access to slower, more expensive, and less reliable internet services. Policy interventions, and particularly any potential financing program for entry-level devices, should be carefully designed to target the specificities of these vulnerable populations.

### 6.5.2.3. Regulation expanding financial supply

The government's regulation of financing can affect how that market functions. Due to the nature of the business, the importance of regulating the market to avoid predatory practices is crucial. However, expanding the number of eligible, trusted institutions that can provide financing may in turn encourage more lenders in the market to provide competitive offers to consumers.

Thus, an open and level playing field that allows non-bank mobile money providers to enter the market is key for the success of new financial intermediaries. This requires a nondiscriminatory licensing regime. Licensing regulations in Pakistan and Trinidad & Tobago illustrate how licensing requirements can encourage or discourage new market entrants and thus affect the supply of financing. Box 6.9 discusses the microfinance institution (MFI) licensing regulations in Pakistan, which are straightforward and inexpensive for new institutions wishing to enter the finance market. Conversely, Box 6.10 describes the complex licensing conditions for e-money issuers (EMIs), such as mobile wallets, in Trinidad & Tobago, which make it challenging for new entities to enter the market.

#### Box 6.9. Pakistan—MFI licensing regulations expanding financial supply

Stakeholder consultations with Kistpay, a financing platform specializing in smartphones and other devices, revealed that the process to obtain a license for microfinance banks is relatively straightforward and inexpensive in Pakistan.<sup>213</sup> There is a separate legal framework in Pakistan that governs the activities of microfinance banks (MFBs).<sup>214</sup> MFBs are licensed and regulated by the State Bank of Pakistan (SBP), as laid out in the MFIs Ordinance

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213 TMG interview with Kistpay, (October 4, 2022).

214 State Bank of Pakistan. "Licensing Requirements and Guidelines for Setting Up Microfinance Banks." <https://www.sbp.org.pk/about/micro/criteria.htm>.



2001.<sup>215</sup> MFBs must have a license from the SBP in order to operate.<sup>216</sup> The requirements to set up a new MFB and transform a non-deposit-taking MFI into an MFB are as follows:

- Institutions must have demonstrated successful microfinance experience as a microfinance MFI locally or globally. Alternatively, a person, or group of persons, with financial and managerial capacity and commitment to the financial sector must establish an MFI for at least three years to be eligible for an MFB license. Under certain circumstances, the SBP may make exceptions to this rule.
- MFBs have the following minimum capital requirements, which must be maintained at all times:
  - o Nationwide MFBs: PKR 1,000 million (US\$4.44 million);
  - o Province-wide MFBs: PKR 500 million (US\$2.22 million);
  - o Region-wide MFBs: PKR 400 million (US\$ 1.78 million); and
  - o District-wide MFBs: PKR 300 million (US\$1.33 million).<sup>217</sup>
- MFBs must maintain a capital adequacy ratio (CAR) of at least 15 percent of their risk-weighted assets.
- Promoters/sponsors must pay at least 51 percent of the minimum capital, and shares paid for by the sponsors must remain in the custody of the Central Depository Company of Pakistan Limited (CDC).
- The application requires a PKR 1 million (US\$4,444) nonrefundable processing fee.
- There are additional requirements regarding the personal net worth of sponsor directors, public flotation of share capital, foreign investment, criteria for the board of directors/CEO, and information/documents for the application.
- The SBP also lays out further requirements for the transformation of MFIs (such as nongovernmental organizations [NGOs]) into MFBs.<sup>218</sup>

Based on stakeholder interviews, obtaining a microfinance banking license is not viewed as a major hurdle for institutions entering the device financing market in Pakistan. The rules, regulations, and application instructions/materials are provided in a clear and transparent manner on the SBP's website.<sup>219</sup>

**Source:** TMG/A4A1.

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215 State Bank of Pakistan. "Microfinance Institutions Ordinance 2001 (As amended up to 1st July 2007)." [https://www.sbp.org.pk/l\\_frame/MF\\_Inst\\_Ord\\_2001.pdf](https://www.sbp.org.pk/l_frame/MF_Inst_Ord_2001.pdf).

216 State Bank of Pakistan. "Licensing Requirements and Guidelines for Setting Up Microfinance Banks." <https://www.sbp.org.pk/about/micro/criteria.htm>.

217 State Bank of Pakistan. "Licensing Requirements and Guidelines for Setting Up Microfinance Banks." <https://www.sbp.org.pk/about/micro/criteria.htm>.

218 State Bank of Pakistan. "Licensing Requirements and Guidelines for Setting Up Microfinance Banks." <https://www.sbp.org.pk/about/micro/criteria.htm>.

219 State Bank of Pakistan. "Licensing Requirements and Guidelines for Setting Up Microfinance Banks." <https://www.sbp.org.pk/about/micro/criteria.htm>.

### Box 6.10. Trinidad & Tobago—EMI licensing regulations restricting financial supply

In Trinidad & Tobago, the government issued regulations establishing licensing requirements for e-money issuers (EMIs) that are not licensed financial institutions;<sup>220</sup> however, these licenses are onerous to acquire. EMIs can provide the following activities in Trinidad & Tobago: issue e-money accounts, cash-in, cash-out, provide payment services, and transfer money or remittances.<sup>221</sup> To apply for an EMI license, entities must also register separately as a payment service provider<sup>222</sup> and apply for registration with the Financial Intelligence Unit (FIU).<sup>223</sup>

The payment service provider application involves submitting general information about the business (e.g., names of owners/partners/directors, address, articles of incorporation, etc.), the latest audited financial statements, an outline of the company's organizational structure, original and copies of agreements with any third-party payment service providers, details of the operations of the payment service, lists of all offices where services will be offered, and details of the payment service system (e.g., process flow, technology, security features, etc.), among other requirements.<sup>224</sup>

Additionally, the EMI application requires general name and contact information, as well as documents on the following:

- company's legal and corporate governance arrangements (e.g., certified copy of the articles of incorporation, by-laws, latest annual return, etc.);
- group and organization structure (e.g., organizational chart of board of directors, senior management, and corporate controllers, etc.);
- business operations (e.g., business model with diagram showing process flow and transactions and information on the company's platform, audited financial statements from the past three years, etc.);
- risk management (e.g., risk management policy and framework, policies regarding cyber resilience, anti-money laundering and combatting terrorist financing policies, etc.);

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220 Central Bank of Trinidad & Tobago. 2020. "The E-Money Issuer Order." (August 4, 2020). [https://www.central-bank.org.tt/sites/default/files/page-file-uploads/legal-notice-284-emoney-issuer-order-2020\\_2.pdf](https://www.central-bank.org.tt/sites/default/files/page-file-uploads/legal-notice-284-emoney-issuer-order-2020_2.pdf).

221 Central Bank of Trinidad & Tobago. 2020. "The E-Money Issuer Order." (August 4, 2020). [https://www.central-bank.org.tt/sites/default/files/page-file-uploads/legal-notice-284-emoney-issuer-order-2020\\_2.pdf](https://www.central-bank.org.tt/sites/default/files/page-file-uploads/legal-notice-284-emoney-issuer-order-2020_2.pdf).

222 See, Central Bank of Trinidad & Tobago. 2012. "Payment System Guideline No. 3 – Operation of Payment Service Providers." (November 2012). [https://www.central-bank.org.tt/sites/default/files/page-file-uploads/Payments%20System%20Guideline%20No%203%20-%20Operation%20of%20Payment%20Service%20Providers\\_1.pdf](https://www.central-bank.org.tt/sites/default/files/page-file-uploads/Payments%20System%20Guideline%20No%203%20-%20Operation%20of%20Payment%20Service%20Providers_1.pdf).

223 Central Bank of Trinidad & Tobago. 2020. "The E-Money Issuer Order." p. 1139 (August 4, 2020). [https://www.central-bank.org.tt/sites/default/files/page-file-uploads/legal-notice-284-emoney-issuer-order-2020\\_2.pdf](https://www.central-bank.org.tt/sites/default/files/page-file-uploads/legal-notice-284-emoney-issuer-order-2020_2.pdf).

224 Central Bank of Trinidad & Tobago. 2012. "Payment System Guideline No. 3 – Operation of Payment Service Providers." pp. 10–11 (November 2012). [https://www.central-bank.org.tt/sites/default/files/page-file-uploads/Payments%20System%20Guideline%20No%203%20-%20Operation%20of%20Payment%20Service%20Providers\\_1.pdf](https://www.central-bank.org.tt/sites/default/files/page-file-uploads/Payments%20System%20Guideline%20No%203%20-%20Operation%20of%20Payment%20Service%20Providers_1.pdf).

- ICT (e.g., network infrastructure diagram, etc.);
- outsourcing arrangements, agent, and agent management (e.g., list of agents used, information on agents including name, address, GPS coordinates, etc.);
- settlement and liquidity requirements (e.g., information on settlement process, timeline, etc.); and
- market conduct (e.g., terms and conditions for use of e-money accounts, procedures for addressing customer complaints and dispute resolution).<sup>225</sup>

Applicants must submit a letter to the Central Bank containing the application form and supporting documents and pay an application fee of TTD 10,000 (US\$1,474). If approved, E-money issuers must pay an annual registration fee of TTD 20,000 (US\$2,948).<sup>226</sup> The application procedure to obtain an EMI license in Trinidad & Tobago is quite complex and, as a result, may hinder the country's financial supply.

Source: TMG/A4A1.

#### 6.5.2.4. Financial services regulation increasing consumer trust

Financial regulations also impact consumers' trust in financial products by establishing certain protections. Recently, consumer protection regulations have struggled to keep up with rapidly evolving digital finance services and products.<sup>227</sup> The Consultative Group to Assist the Poor (CGAP) has identified four types of risks for consumers using digital financial services: fraud, lack of transparency, misuse of data, and insufficient grievance redress mechanisms.<sup>228</sup> Moreover, risks to consumers are evolving and now include mobile app and biometric ID fraud and authorized push payment scams, among others.<sup>229</sup> The resulting risk of potential

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225 Central Bank of Trinidad & Tobago. "Part A – Instructions for Completing the E-Money Issuer Application Form." pp. 1–9. [https://www.central-bank.org.tt/sites/default/files/page-file-uploads/emi-form-20221905\\_1.pdf](https://www.central-bank.org.tt/sites/default/files/page-file-uploads/emi-form-20221905_1.pdf).

226 Central Bank of Trinidad & Tobago. Fintech Entities (E-money Issuers): Application and Registration Fees. <https://www.central-bank.org.tt/fintech/fintech-entities>.

227 Eric Duflos, and Gerhard Coetzee. 2022. "Rethinking Consumer Protection: A Responsible Digital Finance Ecosystem." CGAP, (August 17, 2022). <https://www.cgap.org/blog/rethinking-consumer-protection-responsible-digital-finance-ecosystem#Footnote%202>.

228 Eric Duflos, and Gerhard Coetzee. 2022. "Rethinking Consumer Protection: A Responsible Digital Finance Ecosystem." CGAP, (August 17, 2022). <https://www.cgap.org/blog/rethinking-consumer-protection-responsible-digital-finance-ecosystem#Footnote%202>.

229 Eric Duflos, and Gerhard Coetzee. 2022. "Rethinking Consumer Protection: A Responsible Digital Finance Ecosystem." CGAP, (August 17, 2022). <https://www.cgap.org/blog/rethinking-consumer-protection-responsible-digital-finance-ecosystem#Footnote%202>.

financial losses can cause consumers to lose trust in digital financial services.<sup>230</sup> Hence, it is critical that consumer protection regulations are put in place to safeguard consumers from extortionary lending practices, over-indebtedness, and misuse of personal data,<sup>231</sup> and thereby increase trust in financial services. Box 6.11 examines Kenya's approach to encourage innovative financial services while also imposing licensing and consumer protection regulations on digital credit providers.

### Box 6.11. Consumer protection regulations in Kenya

Kenya's regulatory environment has encouraged innovations in financial services while also protecting consumer interests. Digital platforms, including mobile money and mobile banking, have supported greater financial inclusion.<sup>232</sup> Importantly, the Kenyan government permitted non-banks (e.g., MNOs) to issue electronic money and hold matching value assets in regulated banks, allowing platforms such as M-Pesa to expand.<sup>233</sup>

Additionally, in 2022, the Central Bank of Kenya implemented Digital Credit Providers Regulations, 2022, which require digital credit providers to obtain a license.<sup>234</sup> The regulations provide government oversight of previously unregulated digital credit providers and aim to address concerns over predatory lending and unethical debt collection practices.<sup>235</sup> The regulations impose several consumer protection obligations on digital credit providers, including requirements to establish a complaints redress mechanism and to ensure that any advertisements do not include "false, misleading, or deceptive representation."<sup>236</sup> Hence, Kenya's regulatory environment has improved financial access while prioritizing consumer protection.

Source: TMG/A4AI.

230 Eric Duflos, and Gerhard Coetzee. 2022. "Rethinking Consumer Protection: A Responsible Digital Finance Ecosystem." CGAP, (August 17, 2022). <https://www.cgap.org/blog/rethinking-consumer-protection-responsible-digital-finance-ecosystem#Footnote%202>.

231 Max Mattern, and Alexander Sotiriou. 2022. "As PAYGo Moves Beyond Solar, Addressing Risks Can Ensure Impact." CGAP, (June 21, 2022). <https://www.cgap.org/blog/paygo-moves-beyond-solar-addressing-risks-can-ensure-impact-0>.

232 International Monetary Fund, IMF country Report No. 18/296 Kenya Selected Issues, p. 9, (October 2018). <https://www.imf.org/en/Publications/CR/Issues/2018/10/23/Kenya-Selected-Issues-46302>.

233 International Monetary Fund, IMF country Report No. 18/296 Kenya Selected Issues, p. 11, (October 2018). <https://www.imf.org/en/Publications/CR/Issues/2018/10/23/Kenya-Selected-Issues-46302>.

234 Central Bank of Kenya, Publication of Regulations for Digital Credit Providers and Commencement of their Supervision, [https://www.centralbank.go.ke/uploads/press\\_releases/2119450187\\_Press%20Release%20-%20Publication%20of%20Regulations%20for%20Digital%20Credit%20Providers%20and%20Commencement%20of%20their%20Supervision.pdf](https://www.centralbank.go.ke/uploads/press_releases/2119450187_Press%20Release%20-%20Publication%20of%20Regulations%20for%20Digital%20Credit%20Providers%20and%20Commencement%20of%20their%20Supervision.pdf).

235 Id. Also see, The Central Bank of Kenya (Digital Credit Providers) Regulations, 2022, (March 18, 2022). <https://www.centralbank.go.ke/wp-content/uploads/2022/03/L-.N.-No.-46-Central-Bank-of-Kenya-Digital-Credit-Providers-Regulations-2022.pdf>.

236 Id., pp. 281–283.

### 6.5.3. Virtuous cycles

In addition to the policies directly oriented toward device affordability and toward creating enabling environments, other policies are relevant to the cost of devices, even when they are not directly focused on device affordability as a political priority. These policies range in scope and size but can incidentally affect the prices that consumers pay for their device through a range of factors. These policy areas are important because they can provide avenues for intervention on device affordability, where political will is focused on other priorities that can create or mitigate barriers for consumers.

#### 6.5.3.1. Infrastructure

Country-specific infrastructure and e-commerce policies are additional factors that policy makers should consider when crafting policy interventions. When the government has adequate infrastructure for well-functioning distribution networks and e-commerce policies (including fraud prevention, secure payments, and consumer rights), this can make it easier to sell devices in a country. This has a particular effect on rural and remote communities, which are more vulnerable to surcharges based on distribution and delivery models. However, the scope of the relevant policies to this factor is much broader than solely device affordability.

As noted in the supply-side analysis, distribution and marketing accounts for about 16–17 percent of the total cost of a device, on average. Distribution involves delivering a device to the destination market (assuming the device is not locally manufactured/assembled) and ensuring customers can access devices at points of sale. This process involves several intermediaries that import, warehouse, and distribute devices to retailers. Adequate infrastructure, such as maritime ports, trains, and roadways support these intricate distribution networks and support strategies to optimize distribution and sales chains, such as “just-in-time” manufacturing and importation of devices. Furthermore, e-commerce policies to prevent fraud, secure payment, and so forth help protect consumers from counterfeit handsets and other scams when purchasing a device. Policy makers should review whether adequate infrastructure and e-commerce policies exist in a specific country of interest to determine whether any gaps exist that policy interventions may address.

#### 6.5.3.2. Local and relevant content

By supporting local and relevant content generation, policy makers can create a digital ecosystem that appeals to local communities and encourages device ownership. Such efforts can prioritize other policy areas such as agriculture, education, health, or governance, with an incidental impact on making it more valuable for someone to own a smart device through which they can access such content and participate in their community. This area can also have a specific impact on marginalized communities or market segments by prioritizing support for content for these communities. Similarly, including device affordability interventions within frameworks targeting such other policy areas can also reinforce their impact and effectiveness, as they will also benefit from increased device ownership and usage of digital services. Box 6.12 describes how the e-Burkina project in Burkina Faso promoted relevant local content through improved e-services, with a focus on supporting entrepreneurs.

## Box 6.12. Local and relevant content—Burkina Faso

In 2017, Burkina Faso launched the e-Burkina project, with the support of the World Bank, to promote and strengthen the capacity and use of ICT by the public administration and the general population. The project aims to promote and improve e-services and supports entrepreneurs in the digital sector, especially those with a focus on agriculture and rural areas.<sup>237</sup>

Under this program, the government has designed e-services to appeal to an inclusive audience, including women and girls, and has created a platform to support rural communities with ICT content related to agriculture and innovation.<sup>238</sup>

Source: TMG/A4AI.

### 6.5.3.3. Digital skills

Non-internet users often report the lack of digital skills as one of the main barriers to connecting to the internet.<sup>239</sup> A key step to motivate access to the internet is to support users in their journey to understand what a smartphone is and how to use it for their needs.

Gaining the necessary level of digital skills has the potential to change the experience of an Internet user. Those with the right skills can sell and buy online, attend courses, look for a job online, or have access to telemedicine services, as well as entertainment and social interactions, among many other potential experiences. Initiatives that promote access to entry-level devices should go hand in hand with the necessary training to guarantee that users understand the tools and applications available to create value for their lives. Box 6.13 examines efforts by Tigo, an MNO, and other stakeholders to develop women's digital skills in Latin America through training workshops.

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237 The National Agency for the Promotion of Information and Communication Technologies, E-Burkina, (March 20, 2019). [https://www.anptic.gov.bf/projets-1/details?tx\\_news\\_pi1%5Baction%5D=detail&tx\\_news\\_pi1%5Bcontroller%5D=News&tx\\_news\\_pi1%5Bnews%5D=6&cHash=33f5f2bd2af0964e4d1510db47ef9be6](https://www.anptic.gov.bf/projets-1/details?tx_news_pi1%5Baction%5D=detail&tx_news_pi1%5Bcontroller%5D=News&tx_news_pi1%5Bnews%5D=6&cHash=33f5f2bd2af0964e4d1510db47ef9be6).

238 The Economist of Faso, Digital Transformation in Burkina Faso, (February 23,2022). <https://www.leconomistedufaso.bf/2022/02/23/transformation-digitale-au-burkina-faso-lanptic-au-coeur-de-la-digitalisation-des-services-publics/>.

239 GSMA. 2022. "The State of Mobile Internet Connectivity." (October 2022). [https://www.gsma.com/r/wp-content/uploads/2022/12/The-State-of-Mobile-Internet-Connectivity-Report-2022.pdf?utm\\_source=website&utm\\_medium=download-button&utm\\_campaign=somic22](https://www.gsma.com/r/wp-content/uploads/2022/12/The-State-of-Mobile-Internet-Connectivity-Report-2022.pdf?utm_source=website&utm_medium=download-button&utm_campaign=somic22).

### Box 6.13. Digital skills—Latin America

In 2018, Tigo, a provider of fixed and mobile services, and the Institute for Financing Development (Creceer IFD) launched Mujeres Conectadas in Bolivia to integrate more women into the digital economy. The participants received tablets and ICT training workshops. The training had a duration of six months, under a flexible schedule, and covered topics related to women and technology, Internet and social media, digital education and entrepreneurship, and digital security and parenting. By 2022, the program trained 360,000 women in Bolivia and had expanded to Guatemala, El Salvador, and Colombia.<sup>240</sup>

In 2022, Tigo launched the Conectadas online platform to expand the Mujeres Conectadas program to help women develop digital skills in Latin America. The program targets women in Bolivia, Guatemala, Costa Rica, El Salvador, Honduras, Nicaragua, Panama, Colombia, and Paraguay, and offers free training in social media, digital entrepreneurship, and personal finances. The training was developed in partnership with Fundacion Grameen.<sup>241</sup>

Source: TMG/A4AI.



240 A4AI. 2020. "Supporting digital skills for women." (July 29, 2020). <https://a4ai.org/research/supporting-digital-skills-for-women/>.

241 Tigo. 2022. "Tigo launches its new platform "Conectadas" for the training and digital inclusion of women and girls in Latin America." <https://www.tigo.com.pa/sala-de-prensa/pa-or-tigo-digitaliza-programa-conectadas-lanza-plataforma-virtual-9-paises>.



#### 6.5.3.4. Financial literacy

Beyond consumer protection regulations applied to financial intermediaries to increase trust, additional initiatives may be undertaken on the consumer side to promote mobile device financing. Specifically, programs aimed at financial literacy and awareness will be important to scale commercial financial schemes among low-income individuals that are the focus of this report.

#### ***Recommendation 6.4. Enabling environment and virtuous cycle interventions to increase affordability of entry-level devices***

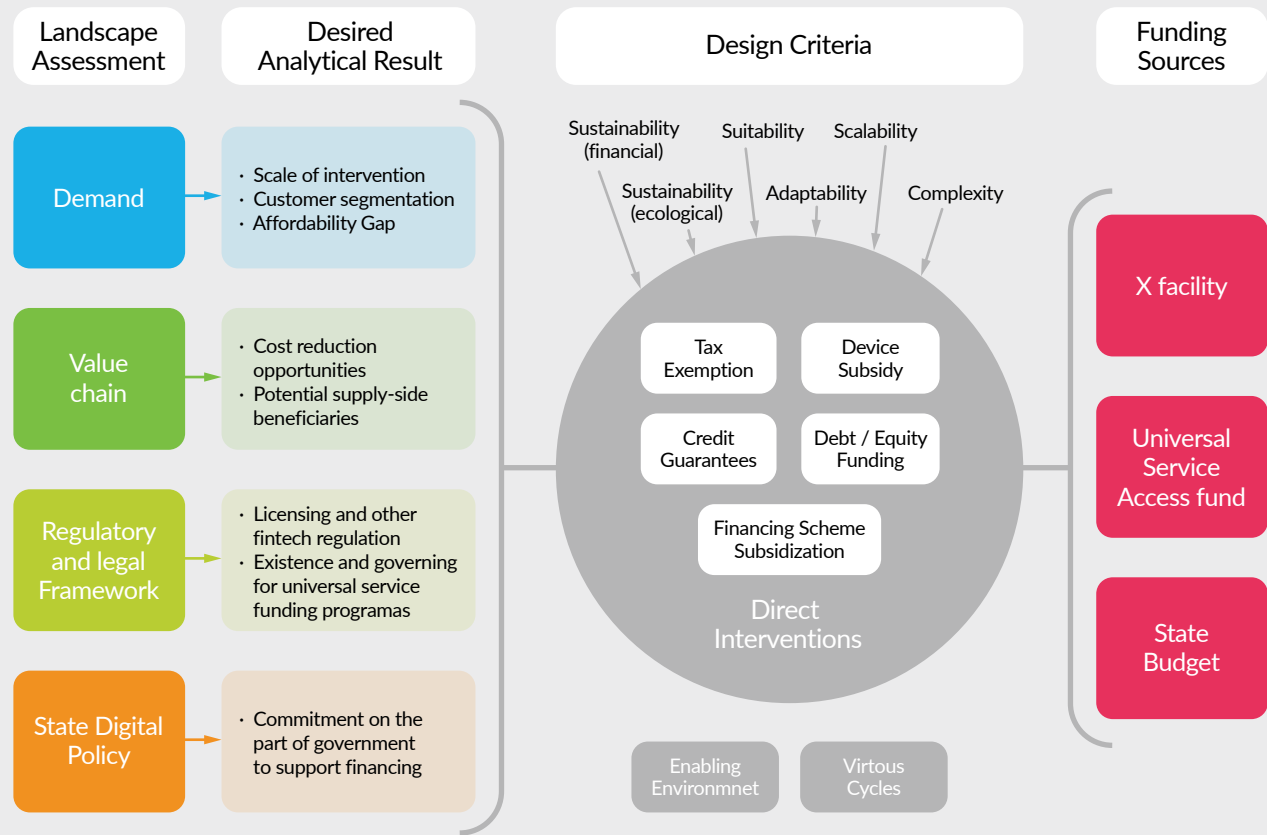
Policy makers should identify additional policy interventions to promote an enabling regulatory environment to bring down costs of entry-level devices (e.g., by fostering ease of doing business and reducing costs of various players within the national value chain), reduce barriers to the supply of financing (e.g., by ensuring streamlined regulations for NBFIs), promote demand for device financing (e.g., by strengthening regulations promoting consumer rights and trust), and address the needs of disadvantaged populations (e.g., women and rural populations).

Similarly, policy makers should spur virtuous cycles toward healthier, more robust device markets with greater affordability (e.g., by promoting basic infrastructure, development of local content, digital skills, and financial literacy).

## 6.6. Conclusions: Designing an effective program for increasing device ownership

This chapter describes a set of policies and design approaches for increasing entry-level device adoption for the most economically disadvantaged in low- and middle-income countries. The selection of policies arises from consideration of specific approaches, models, and initiatives analyzed in the preceding Chapters. Not all the policy interventions will be appropriate for all contexts, and the ones that are appropriate will need to be tailored to maximize the likelihood of success to take account of national market conditions. The framework within which a set of programs may be optimally designed is captured in summary form in Figure 6.5.

Figure 6.5. Policy program design framework



Source: TMG/A4AI.

The first step should be a landscape assessment covering the following:

- *Demand assessment*, including the current demand for entry-level devices, willingness to pay, and finance. The analysis should also encompass the types of demand-side obstacles reviewed in Chapter 3 of this report. Ideally, enough empirical evidence would be generated to estimate a demand curve for entry-level devices that would permit testing of different policy options (financing vs. subsidy) that would be required to meet all demands in the country (Section 6.3.2). The outcome of the demand study would be to assess the affordability gap, the composition of the gap along demographic and geography lines, and the scale of intervention necessary to achieve the desired gap mitigation.

- *Value chain considerations*, including an analysis of the cost dynamics covered in Chapter 2, as well as the status and determinants of supply of financing for devices covered in Chapter 4. The outcome of this analysis will both identify opportunities for optimization of costs of entry-level devices as well as inform the gap between demand and supply of financing for entry-level devices. It will also act as an initial scan of the market for possible partners to support device financing initiatives.
- *Regulatory and legal framework review* should examine the current tax regime as well as obstacles and risks to implementation of device financing and other policies to reduce costs of entry-level devices. Through this analysis, specific actions with respect to the enabling environment would be identified in licensing and Fintech regulation, the universal service regime, and other domestic sources of funding for programs to foster entry-level device ownership by targeted groups.
- *State of digital policy* would be examined to assess how focused and coordinated the state is to make broader entry-level device adoption a policy priority. If necessary, a digital policy should be supplemented to increase or expand such commitment.



Once the landscape is fully assessed, a comprehensive program of initiatives and interventions can be developed. A range of policy actions are available for policy makers to choose from. Based on research undertaken, the following high-level approach can serve to guide policy makers and IFIs in this decision-making process.

- Direct interventions should be identified based on prevailing market conditions. First, where viable, one option governments can explore is whether there are opportunities to reduce the cost of entry-level devices via import duty, VAT, and other tax exemptions. Second, targeted interventions to reduce barriers to device financing should be explored. This includes interventions aimed at reducing private lenders' potential risk of financing entry-level devices and encouraging them to provide more favorable terms to consumers and/or offer more financing with greater confidence (e.g., via the use of FLCGs). If private lenders' ability to participate is limited, then the state (and possibly supported by IFIs) may consider a more active role via interventions such as debt and equity financing or subsidies or tax benefits to the financial intermediaries. Third, device subsidies should be considered as a complement to other direct interventions to target residual demand that cannot be covered with other such interventions.
- Additional policy interventions should be developed to cultivate an enabling environment (e.g., by fostering ease of doing business, reducing barriers to the supply of financing, promoting consumers rights and trust, and addressing the needs of disadvantaged populations, among others) or spur virtuous cycles toward healthier, more robust device markets with greater affordability (e.g., by promoting basic infrastructure, development of local content, digital skills, and financial literacy).
- Lastly, a comprehensive program should be developed considering available funding resources, including grants and aid available, which may include specially designed or existing IFI facilities, existing sector resources (e.g., from a USAF) or the state budget, among others.

Several factors are relevant for policy makers to consider. This report discusses the design criteria that should increase the chances of successful direct interventions. These criteria should be applied both within the policy design process and in subsequent cycles of review after implementation to ensure that these projects deliver on the promise to make entry-level devices affordable to low-income consumers.

Of course, a comprehensive program is likely to be developed over an extended period that might begin with identification of a single program and/or set of pilots, which may be scaled by leveraging lessons learned. However, it is advisable that the individual projects be conceived within a comprehensive framework to ensure consistency and progressive improvement toward the long-term goal of full adoption of entry-level devices by the target populations.

# Appendix A: Stakeholder Consultations

Research for this report included numerous interviews with key stakeholders active in the mobile device ecosystem. The interviews provided first-hand information regarding the current state of smartphone affordability in emerging markets, as well as information on the cost structure of devices, financing schemes, and the pre-owned market for devices.

Stakeholders	Representatives
CGAP	<ul style="list-style-type: none"> <li>• Max William Mattern, Financial Sector Specialist</li> </ul>
Claro	<ul style="list-style-type: none"> <li>• Santiago Pardo Fajardo, Vice President Corporate Affairs and Government</li> <li>• Luz Neila Munoz Roncancio, Director of Terminals and Home Equipment</li> </ul>
Communications Regulatory Commission of Colombia (CRC)	<ul style="list-style-type: none"> <li>• Hugo Romero, Advisor to the CRC Commissioners</li> <li>• Isabella Russo Carvajal, Economist</li> </ul>
Dominican Institute of Telecommunications (INDOTEL)	<ul style="list-style-type: none"> <li>• Angela Lora, Project Development Coordinator</li> <li>• Roger Brito, Project Control and Monitoring Coordinator</li> </ul>
ENGIE	<ul style="list-style-type: none"> <li>• Louis Rwagaju, Head of Corporate Sales and Government Partnerships</li> </ul>
EZE Wholesale	<ul style="list-style-type: none"> <li>• Josh Nzewi, Chief Executive Officer and Co-Founder</li> </ul>
Facebook	<ul style="list-style-type: none"> <li>• Robert Pepper, Head of Global Connectivity Policy, and Planning</li> </ul>
Google	<ul style="list-style-type: none"> <li>• Ricardo Tavares, Senior Manager of Government Affairs and Public Policy for Devices &amp; Services</li> <li>• Ankur Khangaonkar, Lead Product Manager (Android Go)</li> </ul>
GSMA	<ul style="list-style-type: none"> <li>• Saira Faisal Syed, Country Lead on Digital Transformation (Pakistan)</li> </ul>
International Finance Corporation (IFC)	<ul style="list-style-type: none"> <li>• Erica Noda, Lead, Global Client Relations</li> </ul>
KaiOS	<ul style="list-style-type: none"> <li>• Sebastien Codeville, Chief Executive Officer and Founder</li> <li>• Nicolas Zibell, Chief Business Officer</li> </ul>

Kistpay	<ul style="list-style-type: none"> <li>• Asif Jafri, Founder</li> </ul>
LipaLater	<ul style="list-style-type: none"> <li>• Louis Muhire, Rwanda Country Manager</li> </ul>
Maraphone	<ul style="list-style-type: none"> <li>• Eddy Serba, Managing Director</li> </ul>
Movistar	<ul style="list-style-type: none"> <li>• Luis Carlos Verhelst Coronel, Head of Devices &amp; Logistics</li> <li>• Ximena Riaño Agudelo, Chief of Public Affairs</li> <li>• Luisa Fernanda Garcia Salgado, Scrum Master</li> </ul>
MTN Rwanda	<ul style="list-style-type: none"> <li>• Mitwa Kaemba Ng'ambi, Chief Executive Officer</li> </ul>
New Path	<ul style="list-style-type: none"> <li>• Alasdair Chesney, Chief Executive Officer and Founder</li> </ul>
Pakistan—Universal Service Fund	<ul style="list-style-type: none"> <li>• Haaris Mahmood Chaudhary, Chief Executive Officer</li> </ul>
PayJoy	<ul style="list-style-type: none"> <li>• Deepak Murthy, President</li> <li>• Dominique Friedl, General Manager, Africa</li> </ul>
Safaricom	<ul style="list-style-type: none"> <li>• Bruce Onchere, Senior Manager Terminals Strategy, Planning &amp; Projects</li> <li>• Dephine Syokau Mang'uu</li> <li>• Carol Njeri Mburu</li> </ul>
Telenor	<ul style="list-style-type: none"> <li>• Tom Riege, SVP, CEO Office</li> <li>• Siti Fauziah Abu, Head of Public Regulatory Affairs, Asia</li> <li>• Arisa Siong, Director, Public Regulatory Affairs</li> <li>• Jonathan Yap, Director, Public and Regulatory Affairs Asia</li> </ul>
Transsion	<ul style="list-style-type: none"> <li>• Didier Dushime, Head of Strategic Partnership and Business Development Department</li> </ul>
Ufone	<ul style="list-style-type: none"> <li>• Fawad Ahmad Khan Niazi, Head of Regulatory Strategy &amp; Compliance</li> <li>• Naveed Khalid Butt, Group Chief Regulatory Officer, Ufone and PTCL</li> </ul>
USAID	<ul style="list-style-type: none"> <li>• Diana Boncheva, Senior Advisor, Digital Finance</li> <li>• Lauren Bieniek Program Manager, Digital Development for Feed the Future</li> <li>• Lauren Grubbs, Program Specialist</li> <li>• Paul Nelson, Senior Digital Finance Advisor, Acting Lead for the Digital Finance Team</li> <li>• Sait Mboob, Regional Private Enterprise Office—Sahel</li> <li>• Tom Koutsky, Digital Inclusion Team Lead, Senior Connectivity Policy Advisor</li> <li>• Taha Gaya, Digital Finance Advisor, US Global Development Lab</li> </ul>
Vodafone/Vodacom	<ul style="list-style-type: none"> <li>• Davide Tacchino, Terminals Managing Executive</li> <li>• Joe Griffin, Senior Manager Sustainability Strategy</li> <li>• Maleeha Khan, UN Affairs Coordinator</li> <li>• Rishaun Doolam, Product Portfolio Manager</li> </ul>

# Appendix B: Income Decile Estimate Methodology

Given the importance of understanding device affordability dynamics, not just at a national level but within a national context, our research uses estimates for income deciles within the four target countries.

This is an indicative exercise with limitations. It is likely that the method includes errors through rounding and simplification, but it allows for a consistent, comparative measurement across all four target countries based on the same data sources. It should not be used to infer information about income or wealth overall within a country, but it can be a useful approach for a comparative, demographic analysis based on income inequality.

The estimates are calculated by using the latest available PovcalNet data in each target country.<sup>242</sup> In this research project, each target country had estimated economic shares, based on either consumption or income, from 2016 to 2019, down to the decile level.

These deciles were then combined with the latest available gross national income (GNI) and working-age population estimates,<sup>243</sup> for each country to calculate an average monthly income at the decile level. This is achieved by first using the PovcalNet data with GNI to calculate projected shares of the GNI per decile. The data are then divided by one-tenth of the working-age population to arrive at an estimated average income per capita at the decile level.

The data were used in our survey research to create indicative income deciles for our survey respondents. This was done by averaging the estimated average income per decile to arrive at an indicative maximum between the two deciles. This method assumes a normal distribution of each decile's population by income: this assumption is likely incorrect and implies deep limitations on how this method can be used.

This research does not attest to the accuracy of these estimates. Our focus is not to measure poverty within the four target countries but rather to understand how differences in income affect consumer choices within the mobile device market. This method of estimation, in light of limited data availability with greater accuracy on a comparative and consistent basis, enables further research that explains the relationship between income and affordability, but it is not recommended as an authoritative method that could replace more accurate data around income distribution within these countries.

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242 World Bank. 2022. "Poverty and Inequality Platform." <https://pip.worldbank.org/home>.

243 World Bank, GNI. 2021. "Atlas method (current US\$)." <https://data.worldbank.org/indicator/NY.GNP.ATLS.CD>;  
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