
Market-Driven Digital Innovations for Private Pharmacies and Drug Shops



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About SHOPS Plus: Sustaining Health Outcomes through the Private Sector (SHOPS) Plus is USAID's flagship initiative in private sector health. The project seeks to harness the full potential of the private sector and catalyze public-private engagement to improve health outcomes in family planning, HIV/AIDS, maternal and child health, and other health areas. SHOPS Plus supports the achievement of US government health priorities and improves the equity and quality of the total health system.

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Acronyms

ADDO	Accredited Drug Dispensing Outlet
CPD	Continuing Professional Development
LMIC	Low- And Middle-Income Country
POS	Point of Sale
PPMV	Patent and Proprietary Medicine Vendor
SHOPS Plus	Sustaining Health Outcomes through the Private Sector
SaaS	Software as a Service
TB	Tuberculosis
USAID	United States Agency for International Development

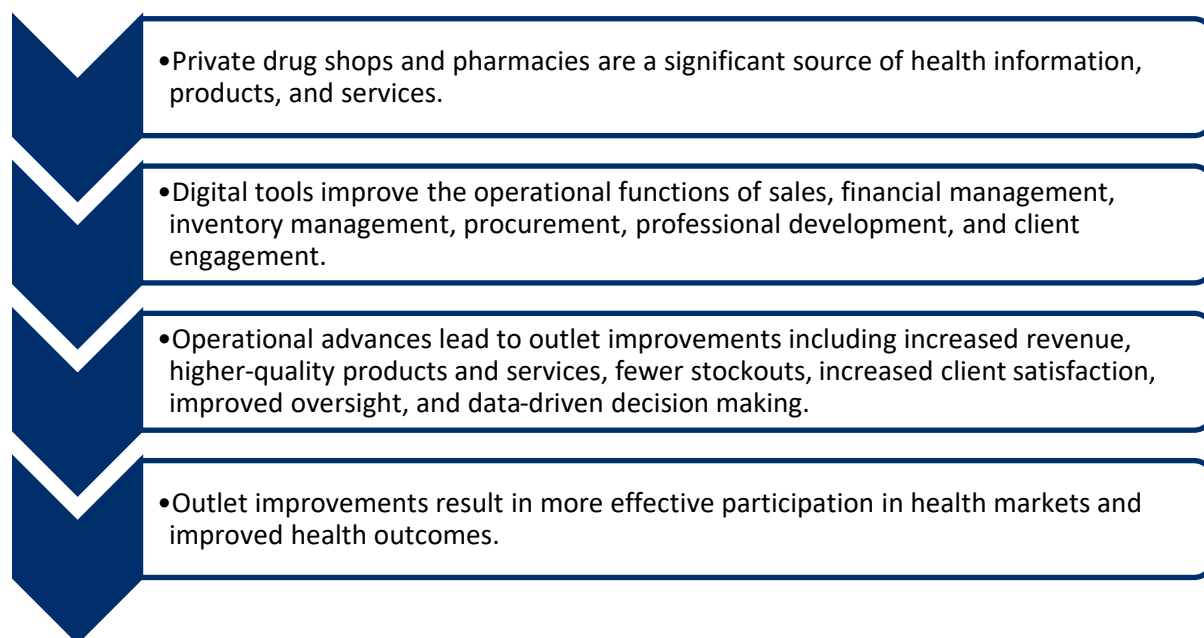
Introduction

Globally, the production, delivery, and consumption of health information, products, and services is in the middle of a historic digital transformation. Electronic health management information systems have revolutionized how countries collect, manage, and use health data and respond to population health needs and crises. Clinical facilities can digitally monitor and predict patient needs and commodities. Public and private health insurers have digitized enrollment, invoicing, and claims-processing functions to improve participation and increase the speed of reimbursement. Health workers can use mobile-enabled decision-aids to screen, diagnose, and engage with patients virtually. And individuals can participate more fully in their well-being through wearable health technologies, digital health applications, artificial intelligence chatbots, e-commerce platforms, mobile-enabled enrollment in health insurance, and other innovations. The potential benefits of digitization in the health sector include the democratization, systemization, and improved use of health information, increased access to essential health products and services, improved efficiency and decreased costs across the supply chain, higher quality, and satisfaction across the continuum of care, and, ultimately, better health. Yet this digital transformation is happening unevenly, with more rapid advances and adoption of technology occurring in high-income settings and among larger health facilities and health systems. To ensure that the poorest and most vulnerable populations realize the benefits of the digital health revolution, the acceleration of this digital transformation among frontline facilities in low- and middle-income countries (LMIC) should be a priority.

Private pharmacies and drug shops are important sources of health information, products, and services in LMIC (Bradley, Rosapep, and Shiras 2018; SHOPS Plus 2020). These outlets provide essential and complementary health resources in environments with significant constraints on public health services, and they are often the first point of contact for health care. As one example, an analysis of recent Demographic and Health Surveys data from 36 LMIC found that 41 percent of women bought their contraceptives at pharmacies or drug shops (SHOPS Plus 2020). However, these outlets are often fragmented, independently owned and operated, which means that operational best practices, systems, and tools are not in place. Additionally, these outlets often operate in settings where there is minimal awareness, capacity, or capital for investments in technologies that support the core functions of these health businesses. Operational inefficiencies detract from the quality, profitability, and scale of health outlets, which ultimately undercuts both revenue and public health objectives of pharmacists and drug shops proprietors (Miller and Goodman 2016; Wafula, Miriti, and Goodman 2012).

Market-based digital solutions that use business models and market forces to incentivize the use of supportive technologies at private health outlets are a promising and sustainable approach to encouraging digital transformation in the private sector. Leveraging technological innovations in pharmacies and drug shops has the potential to create operational efficiencies, improve the quality and quantity of products and services offered, and generate more revenue. For example, pharmacies in Latin America have expanded in size and products offered by driving scalable growth through automated inventory management systems and e-commerce services (Combet, Callahan, and Sanchez 2020). Figure 1 offers a logic model for how operational efficiencies and improvements among private pharmacies and drug shops can lead to more effective participation in health markets and improved health outcomes.

Figure 1: Logic framework linking digital solutions for pharmacies and drug shops to healthy markets



The objective of this brief is to provide examples of market-driven digital innovations that support one or more operational function of private pharmacies and drug shops in LMIC. The primary audiences for this brief are private pharmacy and drug shop proprietors with traditional brick-and-mortar storefronts who may benefit from the adoption of digital tools and approaches that improve the quality, efficiency, and scale of their operations. Secondary audiences for this brief are donors and implementing partners who seek to advance sustainable private sector participation in total health markets. This brief does not attempt to catalogue all digital innovations for pharmacies and drug shops but instead identifies examples of innovative models to encourage adoption, scale, and replication. Finally, this brief does not focus on e-commerce models¹ or digital solutions that are not primarily for use by pharmacists and drug shop proprietors (e.g., digital tools that primarily serve wholesalers, manufacturers, patients, etc.). We conclude by summarizing the state of the art and highlighting gaps and opportunities for further digital innovation.

Methods

SHOPS Plus conducted a search of the grey literature and complemented the search with more than 30 interviews with key informants from pharmacies, drug shops, and digital health innovators from diverse global settings. A full list of key informants is provided in the Annex.

¹ Examples include MyDawa.com in Kenya and Kasha.rw in Rwanda

Functions of Pharmacies and Drug Shops

Through discussions with pharmacists, drug shop proprietors, pharmacy and drug shop associations, and digital health innovators in emerging markets, we identified six core operational functions of pharmacies and drug shops that benefit from some level of digitization (Figure 2). These functions include sales, financial management, inventory management, procurement, professional development, and client engagement. A functional definition used in the discussions with stakeholders and in writing this paper is provided in Table 1. While the operations of pharmacies and drug shops are not identical and certainly extend beyond these six functions, these functions are cross-cutting and relevant to some extent to both pharmacies and drug shops. In the following case studies, we highlight innovative digital tools that have emerged to play a supportive role for these functions and discuss their utility to pharmacies, drug shops, or both.

Figure 2: Functions of pharmacies and drug shops that benefit from digitization



Table 1: Definitions of Operational Functions

Operational Function	Definition
Sales	Activities related to the sale of products and receipt of payment
Financial management	Activities related to tracking revenue, profits, debits, credit, losses, loans, and other monetary and in-kind transactions
Inventory management	Activities related to the managing the level, movement, condition, and quality of stock
Procurement	Activities related to the sourcing, ordering, purchase, delivery, and quality control of stock
Professional development	Activities related to pharmacy or drug shop staff knowledge, education, and training
Client engagement	Activities related to client communication, screening, diagnosis, referral, loyalty, and marketing

Sales, Financial Management, and Inventory Management

Sales, financial management, and inventory management are interconnected functions, and many digital tools assist with more than one of these functions. Point of sale (POS) systems support the sales function and help pharmacies and drug shops electronically accept and process client payments (cash, credit, debit, mobile) for products. These transactions can then serve as inputs into financial management systems and inventory management systems, which can then inform procurement systems. POS systems can be used as a standalone software including mobile applications, or they can be pre-loaded on hardware (kiosks, tablets). A myriad of commercial POS systems is available globally; the systems are general but can be tailored to the needs of pharmacies or drug shops in a specific country.

Digital financial management and accounting tools are intended to help pharmacists and drug shop proprietors understand the financial health of their businesses, including revenues, profits, losses, credits, and debts. Many inventory and POS tools offer some level of financial management, oversight, and reporting. In addition to inventory and sales management platforms with integrated financial management tools, some pharmacies and drug shops use non-health-specific software like Microsoft Excel or local accounting software.

POS, financial management, and inventory management platforms are more common among larger pharmacies with greater resources than in smaller drug shops, but smaller pharmacies and drug shops also see the potential utility in these digital tools. The chairman of the Nyamagana District Accredited Drug Dispensing Outlet (ADDO) Association in Tanzania noted that financial management was the “ndio ‘uti wa mgongo” (backbone of a business) and that digital systems provide greater visibility on the financial health of their business. In this section, we provide two examples of digital tools that support these functions in diverse global settings.

Maisha Meds: A last-mile POS and inventory management app in sub-Saharan Africa

Geographic presence: Ethiopia, Kenya, Nigeria, Uganda, Tanzania, and Zambia

Where to access: Google Play Store

Intended users: Pharmacies and drug shops

Purpose: POS and inventory management

Cost to user: Free; additional costs for training and hardware as needed

Website: <https://maishameds.org/>

Maisha Meds is a mobile application for Android devices available for free on Google Play. It can be used as a POS, inventory, and financial management system in last-mile clinics, pharmacies, and drug shops in Ethiopia, Kenya, Nigeria, Uganda, Tanzania, and Zambia. Maisha Meds was developed with small independent facilities in mind; it works offline and on even the most basic Android devices. One notable feature of



Maisha Meds is that it includes a comprehensive drug list of all registered pharmaceutical products including brands and forms (e.g., pill vs. liquid, strength, package size) in each country, comprising tens of thousands of entries. This makes it easier for users to select the appropriate product for sale and identify the exact product that needs to be restocked. The app also provides some consumer insights by tracking patient ID, name, age, and gender.

Launched in 2018, the use of Maisha Meds is still small scale; it is used by approximately 500 facilities across all markets, with drug shops comprising approximately a quarter of these users. While many of the outlets using Maisha Meds are affiliated with a donor-funded project, this is not a requirement. Outlets that are partnered with a donor-funded project can procure commodities through Maisha Meds and also benefit from incentives and donor subsidization of certain products at the POS. The mobile app can be paired with at-cost training, stock assessments, and hardware (tablet, stand, and lock), totaling approximately US\$200. The Maisha Meds mobile app is freely available to users because the nonprofit organization that developed it generates its revenue through technical assistance to donor-funded projects that use the app. A secondary source of revenue is through the sale of data insights to donors.

Samuel Biganio, Chairman of the Nyamagana District ADDO Association

As the Chairman of the Nyamagana District ADDO Association in Tanzania, Mr. Samuel Biganio noted that most ADDOs in his district use paper-based ledgers and counter books and therefore have many difficulties managing their inventories as well as the performance of their businesses. When he adopted Maisha Meds in his ADDO, he was able to identify items that were nearly out of stock, compare purchase prices from different wholesalers, review historical purchase prices, and get a clear visibility of the growth (or lack thereof) of his business. He also liked that he could monitor inventory and sales activities remotely. While Mr. Biganio believes that overall, the app has helped his business, he felt that he could benefit from more training and technical support. Ultimately, he believes that digital solutions like Maisha Meds offer useful operational visibility to small business owners.

mSupply: A global full spectrum supply chain tool

How to access: mSupply website

Intended users: Pharmacies; relevant to drug shops

Purpose: Inventory management

Cost to user: Free desktop version; \$800/year single user; \$2400/year multiuser

Website: <https://www.msupply.org.nz/>

mSupply is an inventory control system that can be used by individual pharmacists, dispensaries, and pharmaceutical distributors as well ministries of health as a complete supply chain tool. Initially developed in Nepal in 1998, mSupply is currently used primarily by ministries of health in more than 30 LMIC. mSupply has a graphical interface that helps orient new users who are not experienced with computers, and it can be configured to fit different workflows. The tool helps users manage inventory, purchase orders, incoming goods, and reporting using a first expiry, first out (“FEFO”) approach. mSupply is functional offline to facilitate use in rural and last-mile settings. Users can also conduct some financial

management tasks, including budgeting, receiving payments from customers, managing a cash register, and issuing receipts. However, developers acknowledge that it might not fully replace a proper bookkeeping package. mSupply is offered as a software license for both Android and desktop, but there is a free version that is available for desktop only. Support and maintenance are annual payments, but they are optional and mSupply will continue to operate normally without those costs. While most paid users are in the public health sector, a number of private pharmacy clients also have successfully adopted the free version to support their practices.



Pharmacist Sunil Koju, Pharmacist and Director, Astamangal Pharmacy, Kathmandu

Pharmacist Sunil Koju works as a manager at a nonprofit hospital and runs his own small private pharmacy in Nepal. He discovered mSupply while looking for inventory management systems for the hospital. While the hospital ultimately needed a more integrated system that included electronic medical records, Dr. Koju felt that the free version of mSupply would help his private practice with inventory management and billing. Previously, the only digital tool he had used in his private practice was Excel for bookkeeping. mSupply’s graphical interface was easy to set up and Dr. Koju has been able to use the system without any technical support. He believes that mSupply has benefited his practice, and he especially appreciates the information it provides on drug interactions, the prescription records system, and the dashboards. Dr. Koju did note some challenges, however. The administrative part of mSupply is international, not specific to Nepal, which means it cannot be used for legal purposes and is not recognized by the Inland Revenue Department for electronic billing. Additionally, the free version is not mobile enabled, and it makes his computer run slowly. As a pharmacist, Dr. Koju recommends mSupply for smaller community pharmacies.

Procurement

The procurement function of pharmacies and drug shops includes activities related to the sourcing, ordering, purchase, delivery, and quality control of stock. Pharmacists and drug shop proprietors must ensure that their shelves are stocked with products and commodities that are responsive to the demands of their clients in terms of quantity and quality. In its most basic form, stocktaking is done with pen and paper, and procurement is completed by making phone calls to local wholesalers, manufacturers, or other distributors. However, these processes lack transparency, and small errors can lead to delays and stockouts. As with patient-facing e-commerce models, digital marketplaces for procurement can expedite the purchase and delivery of products and improve oversight and quality. Revenue models for digital procurement tend to be driven by the volume of products ordered rather than license, Software as a Service (SaaS), or other models so digital innovations in this space tend to focus more on larger and more formal private health outlets like pharmacies. However, the relevance of these digital innovations to drug shops is obvious. Drug shops would benefit from e-procurement models and marketplaces that offered a broader product offering than pharmaceuticals.

DrugStoc: An e-procurement tool for pharmacies in Nigeria

Geographic presence: Nigeria

Where to access: Google Play Store, Apple App Store, DrugStoc website

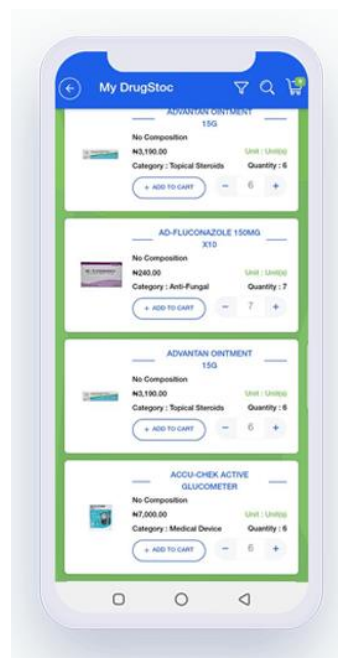
Intended users: Pharmacies, with potential for drug shops

Purpose: Procurement

Cost to user: Free to register, percentage fee on purchases

Website: <https://www.drugstoc.com/>

DrugStoc is a venture-backed cloud-based distribution platform in Nigeria that connects pharmacies and clinics with high-quality health commodities. The platform was developed in 2015 to increase the transparency of commodity prices, reduce the circulation of counterfeit and substandard drugs, and reduce costs for pharmacies and ultimately patients. DrugStoc purchases directly from manufacturers, pharmaceutical companies, and importers to ensure that drugs are high quality and to reduce wholesaler price mark-up. Because DrugStoc aggregates demand, the company has greater purchasing power and is able to take a percentage of sales without increasing the overall price. For this reason, use of the platform is free to users. Users can access the platform through the mobile application or via a secure website to compare prices, order products, track the free, 24-hour delivery, and manage invoices. DrugStoc offers a credit-based system so that users do not pay for products until they are sold. Access to this financing mechanism gives users more financial freedom and flexibility and reduces stockouts due to revenue fluctuations. Currently, there are more than 3,000 registered users of DrugStoc and approximately 2,500 of these users purchase products on a monthly basis. Approximately 75 percent of users are pharmacies, and the rest are medical professionals. DrugStoc verifies that all users are registered, licensed pharmacists or medical professionals. When asked about the possibility of expanding DrugStoc clientele to include drug shops (called patent and proprietary medicine vendors, or PPMVs, in Nigeria), the founders noted that DrugStoc was currently highly tailored to registered pharmacies and that marketing the tool to drug shops would require some rethinking and redesign of both the digital platform and their protocols. They acknowledged that



a tool like DrugStoc would be potentially very useful for PPMVs and that there was certainly market potential.

Pharmacist Adebola Adeyemi, Pharmacy Manager, Jadanet Pharmacy, Abuja

"I started using the DrugStoc mobile app nine months ago when a representative came to my pharmacy and told me about how to use it. The prices are in the competitive range, sometimes even cheaper than I could purchase them previously. I also love the fast and free delivery. I used to pay separately for delivery when I would purchase products before DrugStoc.

The reason I love DrugStoc is because it makes it very easy to buy products. You can use the app to see pictures, packaging, pack size, and availability. So, it makes the business of purchasing easy. Before DrugStoc, we used notebooks to write down what we wanted to purchase and then we would take a picture and send it to the wholesalers to get the order. But sometimes the handwriting was bad, or the notes were incomplete, so it was more challenging. I also use DrugStoc when I am with a client to see if the product that they are looking for is available for purchase. This expands the number of products that I can offer my clients without even having it on my shelves.

I also use DrugStoc during stocktaking when I see we are running short of a product. However, for inventory management I use Microsoft Excel. I use another application, Store Angel, for point of sale. It would be nice to have one tool that could do everything at once. Something like that would be really nice and we would be willing to pay for it."

Professional Development and Client Engagement

Pharmacists and drug shop proprietors differ in their professional development needs but, both cadres can benefit from staying current on best practices, rules, and regulations in their fields. Continuous medical education for providers at both types of outlets assures and improves the quality of health services at these important community-based facilities. Pharmacists are health care professionals whose professional responsibilities and accountabilities include ensuring that clients derive maximum therapeutic benefit from their treatments with medicines. This requires them to keep abreast of developments in pharmacy practice and the pharmaceutical sciences, as well as advances in knowledge and technology relating to the use of medicines. Pharmacists also typically require continuing medical education or continuing professional development (CPD) credits to maintain licensure. Drug shop proprietors do not have the same level of education and licensure requirements but in countries like Tanzania, Uganda, and Liberia, there are opportunities to become an ADDO, which requires training and certification as well. Digital solutions that can streamline e-learning opportunities and certification and create professional networks can be valuable tools for private pharmacies and drug shops that might otherwise spend substantial time and money on professional development.

Very closely tied to professional development is client engagement. As pharmacist and drug shop professionals improve their knowledge and technical competencies, this translates to an improved ability to engage with clients and to differentiate the quality of their business from surrounding competitors. For pharmacies and drug shops, this can entail screening for health conditions, counseling, testing, advising on which products to purchase, following up on refills, encouraging customer loyalty, and other forms of engagement. Pharmacies and drug shops have demonstrated that they can concurrently advance public health and generate revenue by screening for endemic diseases like tuberculosis (TB), malaria, and diarrheal diseases and then selling rapid diagnostic tests or drugs, or by making paid referrals to health centers (Khan, Salve, and Porter 2015; Lönnroth, Uplekar, and Blanc 2006). Similarly for family planning, pharmacists and drug shop proprietors can counsel clients who then may choose to purchase their method and even have it administered at the outlet (depending on country regulations) (USAID 2013; Wafula, Miriti, and Goodman 2012). However, screening and counseling tools are often designed for use in public health clinical settings and not incentivized or tailored for private non-clinical settings such as pharmacies and drug shops. Digital tools that can facilitate transactional relationships and help pharmacies and drug shops improve the quality of their services, improve their customers' health, and increase revenue may prove to be the most sustainable and adoptable digital solutions for pharmacies and drug shops.

**Pharmacist Kim Nging Sang,
Pharmacy Ponleu Samaki,
Phnom Penh**

"I believe that it will benefit my business in terms of gaining client's trust. When this client gets proper treatment because of my pharmacy's referral, this client will bring their friends or family members to my pharmacy more and more. There are lots of pharmacies surrounding mine and there is price competition. Believe it or not, even one cent higher, people will go somewhere else! So, gaining a client's trust by building my competency is one of the best things I need to do."

SwipeRx: A digital network for pharmacists in Southeast Asia

Geographic presence: Cambodia, Indonesia, Malaysia, Philippines, Thailand, and Vietnam

How to access: Google Play Store, Apple App Store

Intended users: Pharmacists and pharmacy professionals

Purpose: Professional development and client engagement

Cost to user: Free

Website: <https://www.mclinica.com/swiperx-pharmacy-trade-solutions/>

Created by mClinica in 2017, SwipeRx is a mobile application that seeks to address fragmentation of knowledge, practices, and systems in the pharmacy sector by bringing together the largest digital membership of pharmacy professionals in Southeast Asia. Pharmacy professionals can use SwipeRx for free to communicate with other pharmacy professionals, receive pharmacy-specific news and medicine-specific awareness campaigns, access customized features like screening and referral tools, complete accredited continuing professional education modules to renew their licenses, and participate in pharmacy-related research. As of 2021, more than 195,000 users from over 40,000 public and private pharmacies in Cambodia, Indonesia, Malaysia, Philippines, Thailand, and Vietnam have joined the SwipeRx network. mClinica is a technology start-up that is able to make SwipeRx free to pharmacy professionals because of its partnerships with public and private stakeholders who have a vested interest in the quality of pharmaceutical service provision as well as the data that the sector generates. In partnership with global health organizations and pharmaceutical companies, mClinica generates digital awareness and educational content, operates e-referral systems, and collects market insights to improve quality of care at the pharmacy. In select markets, SwipeRx includes a digital supply chain function that enables pharmacies to access quality medicine for the best price.

While SwipeRx is currently only available to pharmacists in six Asian countries, this digital network model certainly has potential for replication in other regions and with other cadres of professionals such as drug shop proprietors. mClinica has also recognized opportunities to expand their offering into supply chain and patient engagement software for end-to-end digital solutions.



**Pharmacist Cinta Suci Hasibuan,
Pharmacy Manager,
Apotek Ganda Jaya, Medan, Indonesia**

"I use SwipeRx three or four times a week to use the drug tool, follow the newsfeed, and access CPD modules. What really helps me is the A-to-Z drug information feature—I use that feature to check drug dosage and how to dispense and counsel regarding correct use. Because of that, I can provide correct information to my patients. I also find the newsfeed and announcements posted on SwipeRx really helpful because I can keep myself up to date with the latest pharmacy-related information. The COVID-19 pandemic did not affect my ability to up level my knowledge and ability to collect CPD points because I can get those from online CPD modules through the SwipeRx app. Recently, I joined the SwipeRx e-Referral Program. With the program, I am now able to refer presumptive TB clients who come to my pharmacy to health facilities using a tool that is simple and very easy to use. Now, if a patient describes TB symptoms to me, they can no longer be treated with over-the-counter drugs purchased from pharmacy. As a pharmacist, I must refer them for further treatment to a health facility. I suggest expanding the referral tool so that we can apply it for health needs beyond TB. In addition to sending SMS reminder messages, I would like to be able to help patients make an online appointment at the referral facility."

Redbird: Health monitoring in partnership with pharmacies

Geographic presence: Ghana

Access: Progressive web application

Intended users: Pharmacists and pharmacy professionals

Purpose: Client diagnosis and health monitoring

Cost to user: Free software, at-cost hardware start-up fee, commodities purchased through Redbird

Website: <https://redbird.co/>



Redbird is a venture-backed for-profit company that partners with pharmacies to expand their choice of rapid testing for 10 chronic and acute conditions including anemia, diabetes, hypertension, obesity (body mass index and cholesterol), hepatitis B, malaria, typhoid, prostate cancer, and pregnancy. Pharmacies who opt into the Redbird Health Tech network agree to purchase diagnostic consumables exclusively from Redbird and in exchange receive the software, hardware, and training necessary to provide quality testing and manage patient records. Redbird also shares consumer insights with pharmacies. Patients can visit any Redbird pharmacy and the pharmacist can access their history and add new test results through a Redbird software-enabled tablet. Patients can also monitor their medical records via a progressive web-based "Health Passport" and receive short message service (SMS)-based alerts and referrals. Since its launch in 2018, the Redbird network has grown to more than 360 pharmacies in Ghana, mainly in Accra and Kumasi, and has recorded over 125,000 tests from more than 35,000 patients. The large volume of tests also gives Redbird more purchasing power with importers, which decreases the cost of consumables to pharmacists. Redbird chief executive, Patrick Beattie, noted that when they developed this business model, there was not much interest among pharmacies in paying for software as a service (SaaS). Instead, pharmacies found the exclusive purchase agreement for consumables appealing. Pharmacies that have opted into the Redbird network have typically already used at least one digital system in their practices (none was entirely paper based); however, Redbird noted that the systems are diverse and often customized, making it difficult to offer seamless integration with one dominant

technology partner. Currently, Redbird is only available to registered pharmacies, and drug shops are unable to participate. However, there are no restrictions on the sale of rapid diagnostics among drug shops in Ghana and this may offer an important market for future growth.

Pharmacist Kwaku Ankamah, Lesson Pharmacy, Accra

When Pharmacist Kwaku Ankamah took over Lesson Pharmacy in Accra from his parents in 2012, he had big plans for digitizing the core functions of the practice. In addition to introducing custom-made POS and inventory management software, Kwaku discovered Redbird, and decided to introduce this system as well since the business model was relatively low risk. In reflecting on his experience with Redbird from 2015 to 2021, Kwaku feels that it has significantly improved his business:

“I had a lot of clients with chronic conditions like hypertension and diabetes. But when I introduced them to Redbird, it makes them come in regularly and I can keep clients here. They feel some attachment to this. They get SMS test results on their phones. They can come in any time and their information is readily available. In terms of commodities, Redbird is very competitive and cheap. The test I use the most is blood glucose. It flies out of the window. I don't do less than 10 tests every morning, then malaria tests, typhoid, hemoglobin, then hepatitis B. Tests can be used with any client at all. The fortunate thing is that I can easily register the person on the platform. Twenty to 30 percent of clients who are not in a hurry I can register. Those who can't wait or don't have their information, they will still register as an anonymous person to get results. I like that I can use the data too; it's not just for Redbird.”

Key Takeaways

A wide variety of digital solutions is available across markets in LMIC, with varying levels of uptake in each country. This brief provides a framework for understanding opportunities to leverage market-driven digital technologies to support and improve the operational functions of private pharmacies and drug shops. In speaking with numerous key informants, several recurring themes emerged. In this section, we discuss these key takeaways and implications for private and public stakeholders.

Digital solutions for pharmacies and drug shops are fragmented and small scale in LMIC

Despite an explosion in the number and type of digital tools that have become available to private pharmacies and drug shops in the last decade, the adoption of these technologies remains relatively small scale. Outlets that do adopt supportive technologies tend to be larger facilities in urban areas, to have more resources and wealthier clientele, and to already have some familiarity with digital technology. Small, private, and independent health outlets in last-mile locales face numerous barriers to the adoption of supportive digital technologies, including a lack of infrastructure (electricity, network coverage), capacity, capital, and information.

The wide variety of digital solutions available in the market promotes healthy competition and innovation but also leads to a fragmented field where myriad systems are used for similar purposes. It is also difficult to assess and compare the quality and capacity of the digital tools. One irony is that marketing for digital tools is often still door-to-door and word-of-mouth, which requires substantial time to build up a strong client base.

From a public health perspective, fragmentation could make it difficult to seamlessly integrate private sector data with public sector logistics, health information, insurance, and surveillance systems in the future. One potential investment by donors, implementing partners, and private sector stakeholders could be a digital marketplace for health providers that provides simple, transparent, and credible assessments of the different tools in a country. This marketplace could increase awareness of and drive business to the digital solutions that offer the highest quality and the most accessibility. Donor-funded projects, social franchises, and implementing partners can also play a role to overcome the hurdles of initial adoption of technology by providing training, subsidies, and other incentives for adoption. For example, transparent digital systems make it easier for private outlets to invoice donors that can subsidize certain essential medicines like antiretroviral drugs or family planning products. In theory, the market-driven nature of the tools should help sustain that use even without subsidization as private outlets realize real financial gains from increased efficiency, quality, client satisfaction, and revenue.

The market for drug shop innovations is overlooked but full of potential

While there is less uptake of digital tools among drug shops compared with pharmacies, drug shop stakeholders expressed enthusiasm about introducing supportive digital technologies into their businesses, particularly in the areas of financial management, procurement, and reporting. As noted earlier, many of the barriers to uptake are due to awareness, capacity, and capital among drug shop proprietors. But there are supply-side barriers as well. Many commercial digital health innovators have not yet recognized the drug shop market potential. Commercial innovators have focused on pharmacies that are more organized, sell a wider range of approved products, and often sell at larger volumes. Despite this, several digital health innovators did

acknowledge that their products would eventually flow down market to become more accessible to drug shops. At the same time, drug shops have been the focus of international donors and the development sector, which may unintentionally edge out some of the commercial competition. Much of the technology that has been developed for drug shops specifically has been a result of donor-driven initiatives and has not been designed with profit or revenue generation in mind. However, donors are beginning to emphasize the need for locally led digital innovation and private sector business models that can sustainably scale beyond project periods. Commercial innovators should take note and capitalize on this largely untapped market.

Pharmacies vs. drug shops: Differences in technology needs

While there is substantial overlap in the attributes and functions of pharmacies and drug shops, there are also several distinctions that affect the ways in which the two types of businesses engage with technology. Because pharmacies are more specialized and regulated than drug shops, pharmacies tend to be more formal, organized, and are earlier adopters of digital solutions. At the outset, the capacity of pharmacists and their staff to adopt digital technologies tends to be higher and they have more resources and space for technology. This also may mean that pharmacies may be more interested in software that they can use on a desktop or laptop instead of a mobile device. Drug shops are more likely to want a mobile-enabled digital tool, but this comes with risks: phones and tablets are easier to steal and therefore must come with theft prevention accessories such as a locking tablet stand.

Salum Kitika, Chairman of Pwani Regional ADDO Association

“Pharmacy systems typically use desktops and laptops. ADDOs need a tablet or iPad-type approach so that business owners can sync and view their data from wherever. But tablets are easy to steal compared to desktops—the latter have better security.”

Private pharmacists and drug shop proprietors often must decide whether to adopt an end-to-end digital system or a product with a specialized function. Larger facilities with greater capacity (often pharmacies) may prefer a more holistic system. Indeed, the digital innovations that have high potential for impact are those that seamlessly integrate POS, inventory management, procurement, and financial management functions. However, a drug shop may be overwhelmed and even deterred by the prospect of simultaneously digitizing every management function. Digital tools that offer an integrated yet modular approach to these functionalities may be preferable for smaller outlets, which are keen to introduce technologies at their own pace and to fill their most pressing needs. Digital innovators can also increase uptake of digital tools and expand their client base by building in offline functionality, optimizing for mobile, and designing simple, graphics-based interfaces.

Pharmacists want better tools for patient engagement

Pharmacists expressed a keen interest in using digital tools to help them improve ongoing engagement and follow-up with their clients. In particular, pharmacists wanted software that supported client case management and allowed them to collect patient information that could support follow-up initiatives and continuity of care in the community. This type of digital solution would be similar to electronic medical records but would use a more interactive format so that pharmacists could build relationships with clients based on their chronic conditions, medications, and adherence. Pharmacists felt that this type of digital solution would improve

both the health and satisfaction of their clients and their own bottom line, as clients were timelier about refilling prescriptions and visiting the pharmacies.

“Lately I’ve been thinking about how we can incorporate automatic reminders for us pharmacists to call our clients, especially clients with co-morbidities and chronic conditions. Those ones need to be followed more of the time and reminders would be really helpful.”

Pharmacist Kwaku Ankamah, Lesson Pharmacy, Ghana

“As a pharmacist, I would like to have more patient engagement software with medication management. I would like to hear about any software for that.”

Pharmacist Sunil Koju, Astamangal Pharmacy, Nepal

The cost structure of digital solutions matter

Smaller, private pharmacies and drug shops are incredibly price sensitive, and most are unwilling to pay upfront or ongoing costs for digital solutions unless there is an immediately apparent operational or financial payoff. Digital innovators that have developed alternative revenue models that avoid these outright costs are much more appealing to small, independent outlets, which struggle to raise capital for innovations and improvements. Acceptable revenue models include exclusive procurement agreements, the sale of market data, and direct access to specific cadres. All of the drug shop proprietors and pharmacists in LMIC who provided input to this brief opted for a free version of the digital solution, where available, and specifically adopted the technology because there was limited financial risk involved. Some stakeholders voiced a willingness to pay a one-time fee for hardware or said that they would consider a paid version in the future if the benefit was clear.

There are tradeoffs between tailoring digital platforms to a national or regional market

While it is tempting to laud digital innovators who are able to “reach scale” by creating a product or service that can be, with only minor modifications, launched regionally (say sub-Saharan Africa) rather than just nationally (say, Kenya), there are tradeoffs to offering a more scalable generalized product vs. one that responds to the nuances of a specific market. Unless there are similar regulations in place across countries in a region, a lot of work must be done to ensure that digital applications comply with all the rules and regulations specific to each country. One challenge specific to the health market comprises the rules around the sales and administration of certain health products. For example, the ability of pharmacies and drug shops to administer rapid diagnostic tests, counsel on family planning, and sell/administer family planning products varies widely from country to country. Some digital innovators choose a broader approach, hoping to serve a greater number of markets with more generalized products. This scale can help subsidize the development of new and innovative features, but the tools themselves may not be as responsive to national rules and systems, particularly if pharmacists or drug shop proprietors do not pay to customize the tools.

There are gaps where new market-based digital approaches could play a supportive role

Pharmacies and drug shops stakeholders noted two functionalities where they perceived a gap in responsive market-driven digital technologies: accounting and reporting. Paper-based accounting makes it hard for private pharmacies and drug shop proprietors to access financing. Financial institutions require long-standing, verifiable financial recordkeeping in order to offer credit to small and medium-sized health outlets, particularly those that do not have alternative collateral for loans. A recent SHOPS Plus report noted that the lack of access to finance is an important factor that drives stockouts at health outlets (Estevez and Griffith 2020). Without access to working capital, pharmacies and drug shops can struggle to maintain an adequate inventory of drugs and other supplies. Digital solutions can create access to financing in two innovative ways. The first is by offering upfront credit to outlets for the procurement of products, which they can pay back as they sell. This model, used by DrugStoc in Nigeria, relieves the demands on day-to-day capital so that pharmacies and drug shops can smooth their spending across other expenses as they generate revenue. The second way is by building an organized record of debits, credits, profits, and losses, which can ultimately serve as proof of the “credit worthiness” of the outlet at banks and microfinance institutions. While some digital tools offered basic accounting functions, many stakeholders noted that improved and integrated financial management and accounting tools would be a welcome addition to existing tools that focus on sales, inventory management, and procurement.

“Financial management is the ‘Uti wa mgongo’ [backbone of any business]. ADDOs currently use manual, paper-based systems of recordkeeping – ledger books. This makes financial recordkeeping a challenge for ADDOs that digital technology could address. In particular, it would help with access to finance, as ADDOs would be able to value their business and present their financial position to financial institutions and access credits.”

Samuel Biganio, Chairman of Nyamagana District ADDO Association, Tanzania

A second gap was in market-driven routine reporting tools. Private sector reporting into national health management information systems has become a priority for many national governments that want increased oversight of the entire health system. Because of this, a number of innovative digital reporting tools have been developed, tested, and implemented. However, there is a disconnect between the desires of ministries of health and the realities of private sector use of these tools. In country settings where regulations require reporting by private pharmacies and/or drug shops, these regulations are rarely incentivized or enforced (Bunyi 2019; Mangone and Romorini 2021). The business case has not been adequately made to busy, private pharmacists and drug shop proprietors on why they should participate in reporting and therefore many do not. While many digital reporting tools are well suited to the task of reporting in last-mile facilities, they are typically only used in the context of donor-funded projects, which provide only temporary financial and other incentives to pharmacists and drug shops proprietors. Despite this, there is recognition even among pharmacists and drug shops that there could be utility in receiving insights for this type of reporting. As the perceived value of private sector market data grows, there may be new opportunities to share or sell aggregated data and place-based consumer insights, which could drive greater development of private sector reporting systems.

“Digital reporting tools can be helpful to ADDOs in two ways: In the first case, disease surveillance and dispensing data can identify trends in a particular area, helping ADDOs better prepare for and respond to market needs. In the second case, data collection and reporting can separate formal and proper running ADDOs from the quacks.

Pharmacy and drug shop associations also have an incentive to have their members using digital technology. It will help them in tracking their membership and their activities. Further, this membership data can be monetized by the association to partner with other companies like gas and mobile companies. Associations should play an active role in increasing adoption of approved digital solutions.”

- Salum Kitika, Chairman of Pwani Regional ADDO Association

Conclusion

As technology evolves and proliferates, there will be more opportunities to extend supportive digital tools to frontline private health outlets like pharmacies and drug shops that serve the most vulnerable and marginalized populations. Digital tools for sales, financial management, inventory management, procurement, professional development, and client engagement have extraordinary potential to improve the business and public health mandates of private, last-mile outlets. These tools significantly affect the efficiency, profitability, reliability, and quality of private health outlets. Stakeholders at private drug shops and small pharmacies are only just beginning to adopt digital tools for different operational functions and realize the benefits of digital transformation. It is clear that there is

What would you need to start using digital tools to manage your business?

1. Human resources: Computer skills, English language, drug knowledge
2. Financial support to cover system costs: Annual fee, monthly maintenance
3. Pharmacy context and client behavior: If we set up our pharmacy full of digital systems/tools, we need to ensure our clients are ready for this. The pharmacies in Cambodia are not yet digitized for this reason, but as things change, we need to be ready.

- Pharmacist Kim Nging Sang, Pharmacy Ponleu Samaki, Phnom Penh

a need for additional investments in both the digital tools and in the intended users of these tools. Market-driven digital tools that focus on the business case and integrate multiple functions in a modular fashion are needed. Existing tools need to be adapted in response to user feedback and evolving requirements. Digital innovators need guidance to help them recognize important market potential of small pharmacies and drug shops. Finally, pharmacies, and especially drug shops, still need support from donors and implementing partners to build their capacity and demand for these tools, improve the enabling environment, and generate complementary client demand in the markets in which they work. Working together, public, and private stakeholders can accelerate a digital transformation among private pharmacies and drug shops that will ultimately improve their ability to participate in, contribute to, and benefit from the public health system.

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Annex. Key Informants

Stakeholder Name and Title	Organization [Innovation]	Organizational Presence
Samuel Biganio, Chairman	Nyamagana District ADDO Association	Tanzania
Salum Kitika, Chairman	Pwani Regional ADDO Association	Tanzania
Ogheneovo Ugbebor, Registered Pharmacist and Deputy Team Leader	Palladium	Nigeria
Najib Bello, Community Pharmacist	Najbel Pharmacy	Nigeria
Safinat Isa, Community Pharmacist		Nigeria
Isa Bala, PPMV		Nigeria
Folashade Ojeleke, Proprietor	Damilat PMS PPMV	Nigeria
Kenzie Harder, Pharmacy Manager	SafeNetRx	United States
Lakshmi Radhakrishnan, Business Development Anand Sethuraman, Founder and CEO	Vanuston Intelligence Pvt Ltd [Medeil Pharmacy Management System]	India
Michael Ajiffa, Lead Pharmacist and Director	Field Intelligence [Shelflife]	Kenya
Ernest Jura, CEO and Founder	CollabMed	Kenya
Farouk Meralli, CEO Josselyn Neukom, Vice President Public Health	mClinica [SwipeRx]	Cambodia, Indonesia, Malaysia, Philippines, Vietnam, Thailand,
Daniel Mutambi, CEO	DawaPay	Kenya
Chibuzo Opara, CEO Adham Yehia, Co-founder Christopher Abhulimhen, Client Growth and Marketing Manager	DrugStoc	Nigeria
Dr. Stanley Njoroge	Health Strat [QualiPharm]	Kenya
Elizabeth Nzisa	Core Based Solutions [PhamaCore]	Kenya
Daniella Munene, CEO	Pharmaceutical Society of Kenya	Kenya
Anna Wilet, Itel	Pharmaceutical Society of Namibia	Namibia
Sunil Koju, Pharmacist and Director	Astamangal Pharmacy	Nepal
Patrick Beattie, CEO	Redbird [Redbird]	Ghana
Nana Frimpong, VP for Africa	Vezeeta	Egypt
Alassane Kagamate, Supply Chain Manager, Cote d'Ivoire Ben Traore, Software Engineer and Project Management, Cote d'Ivoire Gary Willetts, Director of Sustainable Solutions	mSupply	Cote d'Ivoire, Nepal, New Zealand, Global
Meg McLaughlin, Director of Research and Implementation	THINKMD	Kenya, Tanzania
Daniel Rosen, Managing Director of New Business	Maisha Meds	Ethiopia, Kenya, Nigeria, Uganda, Tanzania, and Zambia

Stakeholder Name and Title	Organization [Innovation]	Organizational Presence
Jafary Liana, Pharmacist and Consultant	Apotheker Consultancy	Tanzania
Kwaku Ankamah, Pharmacist	Lesson Pharmacy	Ghana
Dennis Sennyonjo, Chairman	National Drug Shop Advocacy Initiative	Uganda
Nicole Dagata, Health Informatics Associate	Clinton Health Access Initiative	United States
Adebola Adeyemi, Pharmacy Manager	Jadanet Pharmacy	Nigeria
Cinta Suci Hasibuan, Pharmacy Manager	Apotek Ganda Jaya	Indonesia
Kim Nging Sang Pharmacist and Pharmacy Owner	Pharmacy Ponleu Samaki	Cambodia

