# An Analytic Comparison of Payment Channels in Tanzania: Cash, POS, and Mobile

## I. Introduction

### A. Purpose and Scope of the Report

This report provides an in-depth analytical comparison of the primary payment channels currently operating within the United Republic of Tanzania. The analysis focuses on Cash (physical Tanzanian Shilling), Point of Sale (POS) systems encompassing both card-based payments and agent-based transactions (Wakala), and Mobile payment channels, including Unstructured Supplementary Service Data (USSD), standard application-based transactions, and application-based Quick Response (QR) code payments. The comparison examines each channel across several critical dimensions: operational characteristics, accessibility and geographic penetration, infrastructure requirements, cost structures for consumers and merchants, user experience factors (ease of use, speed, convenience), security aspects and associated risks, market adoption rates and usage trends, and the governing regulatory framework. The objective is to offer a comprehensive understanding of the strengths, weaknesses, interoperability dynamics, and overall suitability of each channel for different segments of the Tanzanian population and economy.

### B. Tanzanian Payment Landscape Overview

Tanzania's payment landscape is undergoing a significant transformation, characterized by a rapid shift towards digital payment methods, although cash remains deeply entrenched.[1] This transition is largely propelled by the remarkable growth and high penetration of mobile money services. As of 2023, formal financial inclusion reached 76% of the adult population, a substantial increase primarily attributed to mobile money adoption, which saw uptake rise to 72% of adults.[4] This contrasts sharply with bank account penetration, which stood at 22% in 2023.[4] Despite the surge in digital access points, predominantly mobile money agents [8], cash continues to be the preferred method for a majority of in-store transactions (76% preference reported by consumers) [2], and cash in circulation has continued to grow.[10] Payment card usage at the point of sale remains notably low, even though over 12 million cards have been issued; most card transactions (96%) occur at ATMs for cash withdrawal.[11]

The Bank of Tanzania (BoT) is playing a pivotal and proactive role in modernizing the

National Payment System (NPS).[13] Key initiatives include the implementation of the Tanzania Instant Payment System (TIPS) to foster real-time interoperability between banks and mobile money operators [14], the introduction of the national TANQR code standard for interoperable merchant payments [15], and regulatory measures aimed at enhancing consumer protection and reducing transaction costs, such as capping interbank transfer fees and prohibiting surcharges on POS card payments.[13] These efforts have coincided with significant growth in the volume and value of digital transactions across mobile money, Electronic Funds Transfers (EFT), and POS channels, alongside a surge in the number of merchants accepting digital payments.[1] Concurrently, the use of traditional paper-based instruments like cheques has seen a marked decline, further signalling the digital shift.[1] This dynamic environment presents a paradox: high digital access driven by mobile money coexisting with persistent cash preference and underdeveloped card payment infrastructure, a central theme explored in this report.

### C. Methodology

This comparative analysis relies on the synthesis of information gathered from publicly available sources, including official reports from the Bank of Tanzania (such as the annual NPS reports), demand-side surveys conducted by the Financial Sector Deepening Trust (FSDT) and partners (FinScope Tanzania surveys), global industry reports (GSMA State of the Industry Reports), studies by international organizations (IFC, World Bank), academic research, and reputable news articles and publications focusing on the Tanzanian financial sector. The data primarily reflects the period from 2021 to early 2025, incorporating the latest available statistics and regulatory updates to provide a current assessment of the payment channel landscape.

## II. Operational Characteristics of Payment Channels

Understanding the fundamental mechanics of each payment channel is essential before comparing their relative merits.

### A. Cash (Tanzanian Shilling - TZS)

The most traditional payment channel involves the direct physical exchange of Tanzanian Shilling banknotes and coins between parties.[25] The Bank of Tanzania holds the sole right to issue this legal tender and manages its circulation, ensuring adequate supply across various denominations (currently including TZS 500, 1000, 2000, 5000, and 10000 banknotes, alongside coins for smaller values).[25] The BoT focuses on maintaining the quality and security of the currency, incorporating features to deter counterfeiting and periodically withdrawing older series from circulation.[25] Cash transactions offer immediate finality upon physical exchange and require no intermediary or technological device for the basic transaction itself. The supporting infrastructure involves the BoT's currency distribution network through commercial banks, ATMs, and agents. Despite the digital push, cash remains a cornerstone of the Tanzanian economy, particularly vital for the unbanked and in areas with limited digital infrastructure, and its circulation continues to grow.[2] The operational simplicity and universal acceptance of cash—requiring no specific device, account, or connectivity—establish it as the default payment method for many daily transactions, especially within the informal economy and rural settings. Its physical nature provides a tangible sense of control and immediate settlement that digital alternatives must convincingly replicate or surpass in value proposition.[2]

### B. Point of Sale (POS)

POS transactions encompass payments facilitated at a merchant's location using specialized terminals or agent-managed devices.

- 1. Card Payments (Debit/Credit/Prepaid)
  Operational Process: Card payments involve a customer presenting a payment card—issued by banks under international schemes like Visa, Mastercard, UnionPay, American Express, or local schemes like N-Card—at a merchant equipped with a POS terminal.12 The transaction is initiated through various methods depending on the card and terminal technology: swiping the magnetic stripe, dipping the EMV chip, or tapping the card/NFC-enabled phone for contactless payment.29 Chip-based transactions typically require PIN verification by the customer. The POS terminal securely communicates the transaction details to the merchant's acquiring bank or payment processor, which then routes the request through the respective card network (e.g., VisaNet, Mastercard Network) to the customer's issuing bank for authorization. Once approved, the transaction is confirmed, though final settlement of funds between the involved banks occurs later through clearing systems like TACH or TISS.34 The emergence of virtual cards, often linked to mobile wallets, adds another dimension, allowing online payments or potentially in-store payments via QR codes linked to the card details.13
  Infrastructure: This channel necessitates the customer possessing a payment card linked to a bank account, the merchant having a POS terminal (requiring power and typically GPRS or IP connectivity), relationships with an acquiring bank and payment processor, participation in card scheme networks, and reliance on interbank settlement systems.29

Context/Importance: While the number of POS terminals and transaction values are growing, overall card usage for payments at the point of sale remains low in Tanzania.11 Acceptance is concentrated in formal sectors like supermarkets, hotels, and tourism-oriented businesses, primarily in urban centers.12 A significant regulatory development is the BoT's directive prohibiting merchants from levying surcharges on consumers for card payments.13 Innovations like NMB Bank and Mastercard's QR Pay-by-Link (QR PBL) aim to expand card acceptance by enabling payments via QR codes or secure links, eliminating the need for physical POS terminals for merchants.35 The inherent operational complexity involving multiple intermediaries (issuer bank, acquirer bank, card scheme, processor) translates directly into transaction costs, primarily the Merchant Discount Rate (MDR), which is typically borne by the merchant.38 This cost structure represents a significant hurdle for merchant adoption, especially for small and medium enterprises (SMEs) operating on thin margins, thereby contributing to the observed low POS usage despite increasing card issuance.2 Solutions like QR PBL 35 address the hardware cost barrier but do not fundamentally alter the MDR structure; their success will depend on offering a lower total cost of acceptance compared to traditional POS or mobile money.

- 2. Agent-Based Transactions (Wakala)
  Operational Process: Agent banking involves customers accessing financial services through BoT-approved third-party agents ("Wakala"), who are often existing retail businesses operating under agreement with banks or financial institutions.8 Common services include cash deposits into bank accounts, cash withdrawals from accounts (using cards or cardless methods via mobile banking apps/USSD), balance inquiries, bill payments, and potentially facilitating account opening or loan applications.41 The customer typically identifies themselves using an ID, bank card, or mobile phone number. The agent utilizes a specific device, such as a POS machine or a mobile phone application provided by the bank, connected to the bank's core system to process the transaction.8 Customer verification, often via PIN entry or signature, is required. Transaction confirmation is usually provided via a printed receipt or an SMS notification to both the customer and the agent.43 A critical operational aspect for the agent is managing liquidity – maintaining sufficient physical cash to handle withdrawals and adequate electronic float in their linked bank account to process deposits.44
  Infrastructure: This channel relies on a network of agent outlets equipped with necessary devices (POS or smartphone) and reliable connectivity.8 Agents require a dedicated bank account for their operations, and customers need a bank account or a means to identify themselves within the bank's system. The bank must have a robust agent banking platform managing these interactions.

Context/Importance: Agent banking significantly extends the physical reach of financial institutions beyond traditional branches, playing a crucial role in improving access to banking services, particularly in rural and underserved areas.8 Agents often leverage existing retail infrastructure and may represent multiple financial institutions, including banks and Mobile Network Operators (MNOs).8 The BoT's Agent Banking Guidelines provide the regulatory framework.41 Agents serve as a vital cash interface point, bridging the gap between the digital banking system and the cash economy. The operational effectiveness of agent banking hinges critically on the agent's ability to manage both physical cash and electronic float.44 An imbalance – insufficient cash for withdrawals or insufficient e-float for deposits – leads to transaction failures, creating significant operational friction and negatively impacting the channel's reliability and user experience.44

### C. Mobile Payments

Mobile payments leverage the widespread mobile phone penetration in Tanzania, offering services primarily through MNOs (Vodacom M-Pesa, Tigo Pesa/Mixx by Yas, Airtel Money, Halotel) and increasingly integrated with banks.

- 1. USSD (Unstructured Supplementary Service Data)
  Operational Process: USSD-based mobile money operates through provider-specific shortcodes (e.g., *150*00# for M-Pesa, *150*01# for Tigo Pesa, *150*60# for Airtel Money) dialled by the user.47 This initiates an interactive session displaying text-based menus on the phone's screen. Users navigate these menus by inputting corresponding numbers to select services like 'Send Money', 'Pay Bill', 'Withdraw Cash', 'Check Balance', etc. They then enter required information such as the recipient's phone number, merchant/biller code, transaction amount, and finally authenticate the transaction using their secret PIN.47 A key feature is its compatibility with all types of mobile phones, including basic feature phones, and its ability to function without requiring an internet data connection.48
  Infrastructure: This channel relies solely on the MNO's Global System for Mobile Communications (GSM) network infrastructure for signalling and the MNO's mobile money platform for processing transactions.
  Context/Importance: USSD has been the foundational channel for mobile money access in Tanzania since its inception, driven by the high prevalence of feature phones.48 It remains essential for financial inclusion, particularly in rural areas or among populations with limited access to smartphones or reliable internet data. Notably, even many smartphone owners continue to use USSD for mobile money

transactions.11 The persistent preference for USSD, even among those with smartphones 11, points towards strong user habituation. It may also suggest perceived advantages over apps, such as avoiding data costs, a belief in its simplicity for basic tasks, or potentially usability challenges or lack of compelling features in the available apps.5 This enduring reliance on USSD presents a significant hurdle for providers aiming to promote newer, app-dependent features like integrated QR code payments.

- 2. App-Based Channels (Standard Transactions & QR Code)
  Operational Process (Standard): Users install provider-specific mobile applications (e.g., M-Pesa App, Tigo Pesa App, Airtel Money App) onto their smartphones.48 Accessing the app typically involves logging in using the registered phone number and authenticating via PIN or biometric features (fingerprint/facial recognition) available on the smartphone.65 These applications offer a graphical user interface (GUI) providing access to a range of services, including peer-to-peer (P2P) money transfers, bill payments (common examples include LUKU electricity tokens, DAWASCO water bills, and government payments via GePG) 60, airtime top-ups, transfers between mobile wallets and bank accounts, viewing transaction history and downloading statements, and potentially accessing linked services like digital savings and loans.66
  Operational Process (QR Code): QR code functionality is primarily designed for person-to-merchant (P2M) payments. Merchants enrolled in services like Lipa Kwa Simu or Lipa Namba display a QR code associated with their merchant account; this code can be static (printed) or dynamic (generated on a screen for each transaction).11 The customer uses the scanning function within their mobile money or banking app to capture the merchant's QR code.33 The app automatically retrieves the merchant's payment details from the code. The customer then typically enters the transaction amount and confirms the payment using their PIN or biometrics.35 To foster interoperability, Tanzania has implemented a national standard, the Tanzania QR Code (TANQR), which allows payments from various participating providers' apps to any TANQR-compliant merchant code.15 Additionally, specific solutions like NMB and Mastercard's QR Pay-by-Link enable card payments via QR codes, directing users to a secure payment link.35
  Infrastructure: App-based channels necessitate smartphone ownership by the user. Merchants may also need a smartphone or dedicated device to generate dynamic QR codes. Reliable internet connectivity (mobile data or Wi-Fi) is essential for app functionality. The system relies on the MNO's or bank's application platform, backend processing systems, and potentially integration with national infrastructure like TIPS and TANQR.

Context/Importance: Mobile apps offer the potential for a more intuitive and feature-rich user experience compared to USSD.63 QR codes specifically aim to streamline and simplify merchant payments, offering an alternative to POS card terminals. However, adoption of app-based payments, particularly QR codes for P2M transactions, remains low despite high mobile money account penetration.11 The growth of smartphone ownership (estimated 23.4 million in 2024) is a positive trend, but feature phones (56.9 million) still dominate, limiting the reach of app-only services.67 The national TANQR standard is a key initiative to promote interoperable QR payments.17 The establishment of TANQR 17 and its integration within the TIPS framework 15 signifies a concerted regulatory effort to overcome the fragmentation and low adoption that plagued earlier proprietary QR solutions. Standardization and interoperability address crucial technical hurdles.80 However, the ultimate success of TANQR depends on overcoming strong user preferences for USSD 11 and cash 2, as well as ensuring the value proposition—in terms of cost and convenience—is compelling for both consumers and merchants compared to established methods. The current restriction limiting TANQR issuance to banks and MNOs 79 might initially slow down participation from smaller fintech players, potentially limiting innovation or reach compared to a fully open ecosystem. Furthermore, the operational flow for app-based transactions, whether standard or QR-initiated, often involves more steps (app download, login, menu navigation or scanning, data dependency) 61 compared to the linear navigation of USSD menus 47 or the simplicity of cash. This potential usability friction, coupled with data requirements and associated costs, could contribute to the relatively lower usage of apps and QR codes despite their potential advantages in functionality and user interface design.

**Table 1: Payment Channel Operational Characteristics Summary**

| Feature | Cash (TZS) | POS - Card Payment | POS - Agent Banking (Wakala) | Mobile - USSD | Mobile - App (Standard) | Mobile - App (QR Code) |
|---|---|---|---|---|---|---|
| **Key User Steps** | Physical exchange | Present card (tap/dip/swipe), enter PIN | Visit agent, provide ID/card/phone, specify | Dial shortcode, navigate menus, enter details & | Open app, login, navigate GUI, enter details & PIN/bio | Open app, login, scan QR, enter amount, confirm PIN/bio |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | transaction, confirm | PIN | | |
| **Key Merchant /Agent Steps** | Receive/give cash, provide change | Operate POS terminal, provide receipt | Verify customer, use device (POS/phone), process transaction, manage float/cash, provide receipt/SMS | N/A (P2P/Bill Pay) | N/A (P2P/Bill Pay) | Display QR code (static/dynamic), receive confirmation |
| **Required User Infra.** | None | Bank account, Payment card (physical/virtual) | Bank account/identifier, ID/card/phone | Any mobile phone, Mobile money account, SIM | Smartphone, Data connection, App installed, MM/Bank account | Smartphone, Data connection, App installed, MM/Bank account |
| **Required Merchant /Agent Infra.** | Secure storage | POS terminal, Power, Connectivity, Bank account | Outlet, Device (POS/phone), Connectivity, Bank account, Float/Cash | N/A | N/A (Merchant needs MM account for P2B) | Merchant account, QR code (Static/Dynamic device+data) |
| **Key Intermediaries** | BoT (issuer) | Issuer Bank, Acquirer Bank, Card Scheme, Processor | Bank, Agent | MNO, Mobile Money Platform | MNO/Bank, App Platform, Data Provider | MNO/Bank, App Platform, Data Provider, QR Scheme (TANQR) |
| **Transaction** | Immediate (physical) | Near real-time (authoriza | Near real-time (bank | Near real-time | Near real-time | Near real-time |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Finality** | | tion), delayed (settlemen t) | system update) | | | |
| **Primary Use Cases** | Everyday purchases , informal sector | Formal retail, hospitality , ATM withdrawa l | Cash-in/o ut, bill pay, basic banking services | P2P, bill pay, airtime, balance check | P2P, bill pay, bank transfer, history, value-add s | Merchant payments (P2M) |
| **Sources** | 25 | 13 | 8 | 47 | 48 | 11 |

## III. Accessibility, Penetration, and Infrastructure

The ability of different payment channels to reach and serve the Tanzanian population varies significantly based on geography, infrastructure availability, and demographic factors.

### A. Geographic Distribution (Urban vs. Rural)

Access to financial service points has markedly improved across Tanzania. By 2023, data indicated that 89% of the adult population lived within a 5-kilometer radius of a financial access point, a substantial increase from 45% in 2013/14.[8] Even in rural areas, access has expanded, with 78% of rural adults living within 5km of an access point in 2023.[45] However, this headline figure obscures crucial differences in the *types* of services readily available. The vast majority of these access points are mobile money agents.[8] Bank agents, offering a broader range of banking services, constitute only 11% of all access points, and POS terminals accepting card payments are even scarcer, primarily concentrated in urban centers and specific sectors like tourism, large supermarkets, and hotels.[12] This means that while basic mobile money cash-in/cash-out services are widely accessible geographically, access to formal banking services via agents or card payment facilities remains heavily skewed towards urban areas. Rural populations, despite being near *an* access point, often lack convenient access to diverse financial services beyond basic mobile money transactions, reinforcing an urban-rural divide in the *depth* of financial inclusion.[8]

Connectivity further exacerbates this divide. The limited reach and reliability of 3G and 4G mobile data networks, particularly in rural Tanzania, create significant barriers for services dependent on internet connectivity.[8] This includes app-based mobile money and banking, dynamic QR code generation, and potentially some POS terminal operations. Consequently, USSD, which operates over the basic GSM network without requiring data [63], remains a critical channel for digital access in rural zones, enabling basic mobile money functions.[10] However, this reliance on USSD due to infrastructure constraints limits the ability of rural populations to adopt and benefit from richer, app-based financial services, including potentially more user-friendly interfaces or integrated features like QR payments, thus perpetuating the use of simpler mobile money functions and cash.[8] Cash usage is likely most prevalent in rural areas due to these infrastructure limitations, lower average incomes, and potentially lower digital financial literacy.

### B. Infrastructure Prerequisites

Participation in different payment channels requires varying levels of infrastructure for both users and service providers:

- **Accounts:** Cash requires no formal account. POS card payments necessitate a bank account for both the customer (linked to the card) and the merchant.[29] Agent banking transactions typically involve a customer's bank account and the agent's operational bank account.[41] Mobile money hinges on mobile money accounts (wallets linked to a SIM card) for active users, agents, and participating merchants [11]; unregistered users can receive funds but cannot initiate transactions.[47] The significantly higher penetration of mobile money accounts (72% uptake in 2023) compared to bank accounts (22% uptake in 2023) highlights the central role of MNOs in initial digital financial access.[4] Banks are increasingly using mobile channels (like Bank-to-Wallet/Wallet-to-Bank transfers facilitated by TIPS) and agent networks to bridge this gap, but the primary digital financial relationship for most Tanzanians remains with their mobile money provider.[8]
- **Devices:** Cash requires no device. POS card payments need a physical or virtual payment card for the customer and a POS terminal for the merchant.[13] Agent banking involves a card or phone for the customer and typically a dedicated POS device or smartphone app for the agent.[8] Mobile money via USSD functions on any mobile phone, including basic feature phones.[48] App-based mobile money, including QR code scanning, mandates smartphone ownership for the user [33], and potentially for the merchant if generating dynamic QR codes. While smartphone penetration is growing (approx. 30% of connections in 2024), feature phones remain the dominant device type in Tanzania.[67]
- **Connectivity:** Cash operates offline. POS terminals generally require GPRS or IP connectivity to communicate with acquiring networks. Agent devices need network connectivity – GSM signal for USSD-based operations, and potentially

mobile data for POS or app-based systems.[8] Mobile money via USSD relies on GSM network coverage. Mobile apps and QR code functions depend on internet access (mobile data or Wi-Fi). Network coverage and reliability, while improving, remain inconsistent, particularly in rural areas.[8]

- **Agent Network:** A robust agent network is fundamental for the cash interface (cash-in/cash-out) required by both mobile money and agent banking systems. Tanzania boasts an extensive and growing mobile money agent network, exceeding 1.47 million agents by the end of 2024.[8] The bank agent network is considerably smaller, although there is significant overlap, with many mobile money agents also serving as bank agents.[8] While agent density is high nationally, distribution may be concentrated in certain areas.[46]
- **Identification (KYC):** Accessing formal financial services typically requires Know Your Customer (KYC) verification. Opening bank accounts and higher tiers of mobile money accounts necessitates formal identification, often the National ID (NIDA), but also potentially passports, voter IDs, or driving licenses.[11] Tanzania mandates biometric registration for all SIM cards, linking the SIM (and associated mobile money account) to a verified identity.[89] Lack of required documentation remains a barrier to financial access for some individuals.[45]

The varying infrastructure dependencies create a resilience matrix. Cash is the most resilient, requiring no technology. USSD mobile money depends only on the basic GSM signal. App-based mobile services, QR payments, and POS card systems rely on a more complex chain including smartphones, data networks, and reliable power for terminals and backend servers. Agent banking depends on the agent's device connectivity and, crucially, their liquidity (cash and float).[44] This differential reliability, particularly the robustness of cash and USSD in environments with weak infrastructure, significantly influences user trust and channel preference, especially outside major urban centers.[8]

### C. Demographic Reach and Financial Inclusion Linkages

Tanzania has achieved impressive gains in headline financial inclusion, reaching 76% formal inclusion among adults in 2023.[6] This progress has been overwhelmingly driven by the success of mobile money [3], which has provided a digital entry point for millions previously excluded from the formal financial system. Bank account usage, while increasing to 22% in 2023 from 17% in 2017, remains significantly lower.[4] The number of financially excluded adults decreased from 7.8 million in 2017 to 6.4 million in 2023, even as the adult population grew.[4]

However, this overall progress masks significant disparities across demographic segments. Rural financial inclusion continues to lag behind urban areas, although the gap is narrowing.[45] As noted, rural access points are predominantly mobile money agents, limiting the range of available services.[8] A persistent gender gap also exists, though it too has shown improvement. In 2017, women were less likely than men to use formal financial services, particularly mobile money and banking, attributed partly to lower income, lower financial literacy, and less access to enabling devices like smartphones.[45] By 2023, the proportion of financially excluded women had decreased significantly.[45] Age also plays a role; youth (16-24 years) form a large demographic but often lack stable income, relying on dependency or casual work, which impacts their financial behaviour.[98] Older populations may face challenges with digital literacy.

Income level and livelihood source are critical determinants. Low or irregular income is a major barrier to using formal financial services, particularly banking, where minimum balance requirements can be prohibitive.[4] Mobile money has proven more accessible to informal business owners.[99] Recognizing these disparities, Tanzania's third National Financial Inclusion Framework (NFIF-3, 2023-2028) specifically targets underserved segments including women, youth, Micro, Small, and Medium Enterprises (MSMEs), persons with disabilities, and smallholder farmers and fishers.[6] This targeted approach acknowledges that achieving deeper financial inclusion requires moving beyond generic access and addressing the specific needs and constraints of different population groups through tailored products, channels, and policies.

While mobile money access is widespread, the *depth* of financial inclusion—meaningful usage of a diverse range of financial services beyond basic transfers and cash-out—remains a challenge. FinScope 2023 data suggests that many use mobile money primarily for remittances and accessing cash.[5] The uptake of more complex formal financial products like banking services, insurance, formal credit, and investment products is considerably lower, especially among rural, female, and low-income populations.[4] This indicates that barriers related to cost, product suitability, financial literacy, and trust persist even after initial access is achieved.[5]

**Table 2: Infrastructure Requirements Comparison**

| **Requirement** | **Cash (TZS)** | **POS - Card Payment** | **POS - Agent Banking (Wakala)** | **Mobile - USSD** | **Mobile - App (Standard/QR)** |
|---|---|---|---|---|---|
| **User: Account** | None | Bank Account | Bank Account / | Mobile Money | |

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|---|---|---|---|---|
| | | | Identifier | |

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