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Connecting DPI, AI and Behavioural Intelligence to Enable Cross-Border Trade in Africa

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Abstract

Africa's digital challenge is no longer the absence of infrastructure. It is fragmentation: identities, payment rails, data environments, regulatory regimes and private-sector platforms that work well inside one country and stop at its border. This publication argues that interoperable digital public infrastructure (DPI) can form a single trusted digital layer across borders, and that this layer is what allows artificial intelligence to understand economic activity and enable seamless cross-border trade. We set out a layered model connecting physical infrastructure, DPI, interoperability, AI and trade applications. Using a Kigali to Nairobi transaction as a worked example, we show where the East African stack breaks today. We then define five interoperability layers, identity, payments, data, regulatory and behavioural, and describe how behavioural intelligence built on top of them can assess risk, detect fraud, personalise financial services and surface trade opportunities. We close with the safeguards this demands on surveillance, consent, privacy, bias and explainability.

Keywords: Digital Public Infrastructure, Interoperability, Cross-Border Trade,Artificial Intelligence, Behavioural Intelligence, East Africa, Afcfta, Digital Payments

Introduction: from absence to fragmentation

For two decades the African digital agenda was framed as a build-out problem: lay fibre, expand mobile coverage, issue national IDs, launch mobile money. Much of that has happened. Kenya, Rwanda and Tanzania now run nationalidentity systems, instantpayment switches and digital tax and customs platforms that compare well with peers anywhere.

The binding constraint has shifted. Africa's challengeis no longer the absenceof digital infrastructure. It is fragmentation of digital systems, identities, payment rails, dataenvironments and private-sector platformsacross countries and sectors. Each national stack works. The stacks do not work together.

This matters most for trade. The African Continental Free Trade Area (AfCFTA) removes tariffs on paper, but a small business still cannot verify a buyer, sign a contract, get paid, convert currency,clear customs and access trade finance across a borderas one continuous digital journey. Every border reintroduces paperwork, intermediaries, delay and cost.

This publication makes three arguments:

- Interoperable DPI can create a singletrusted digital layer thatspans borders, so that identity, payments, data and compliance travel with the transaction.
- That trustedlayer is what makes AI useful for trade. AI can only understand economic activity it can see, and it can only act on data it can trust.
- Behavioural intelligence is the next frontier, moving from verifying who someone is to understanding what their pattern of economic activity reveals, and it must be governed from day one.
- To make the case, we first break down the infrastructure layersand how they connect.

The Infrastructure Layers and how they Connect

To see whereAI fits, we first separatethe layers of the digitaleconomy and show how each depends on the one beneath it.

Digital public infrastructure is the foundational set of shared digital systems that lets people, businesses and governments interact efficiently and securely. It covers digital identity, business identity, digital payments, data exchange, digital credentials and e-signatures. DPI sits as an intermediary layer between physical infrastructure, such as broadband and mobile networks,and the applications people use, such as online banking, health services and government portals [1].

This publication adds two layers to thatfamiliar picture. Between national DPI and AI sits an interoperability layer that lets national systems work across borders. Above it sits AI and behavioural intelligence, whichcan only be as good as the trusted, connected data beneath it (Figure 1).

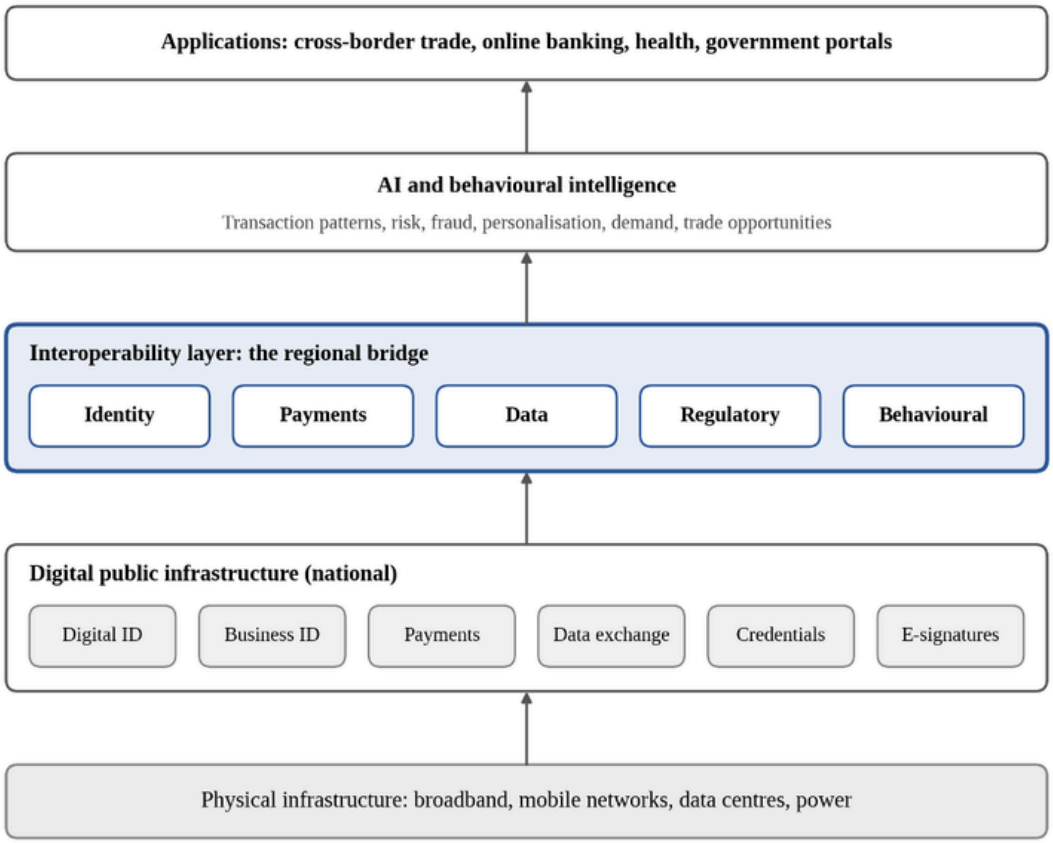
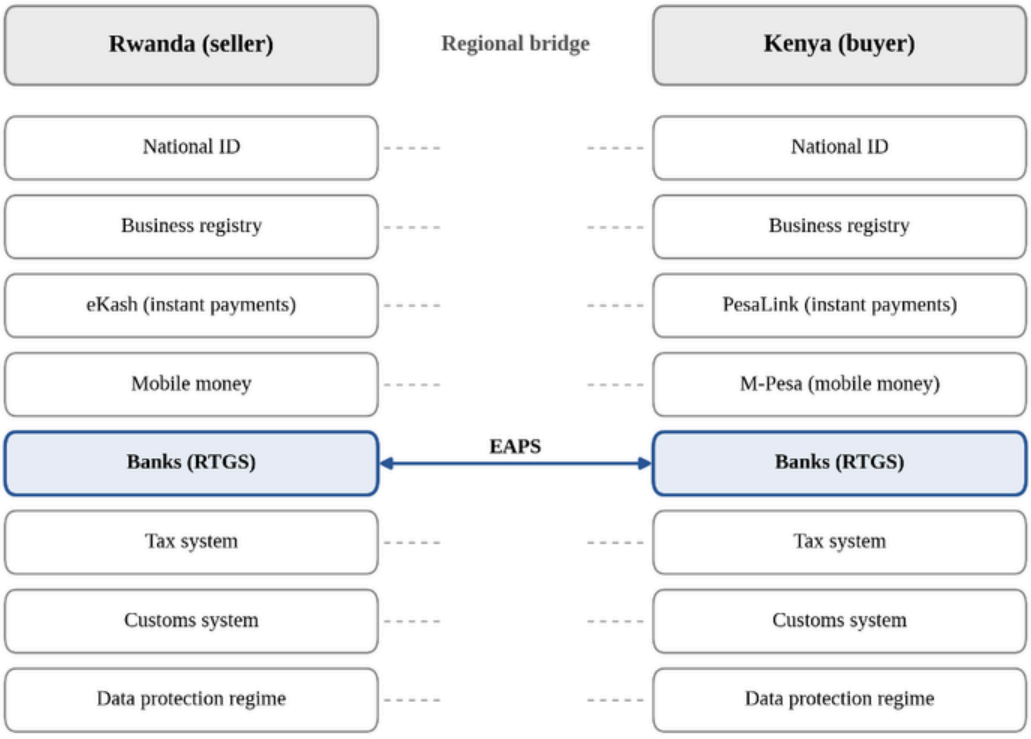


Figure 1: Layered model: interoperability is the bridge that lets AI read trusted activity

Read from the bottom up: physical networks carry national DPI; the interoperability layer connects national DPI into one regionalfabric; AI reads economic activityacross that fabric; and trade applications are built on top. Remove the interoperability layer and AI sees only one country at a time.

Fragmentation in Practice: Kigalito Nairobi

The greatest challenge on the continent is the fragmentation and lack of interoperability of DPI. Consider a business in Kigali selling to a business in Nairobi. Know-your-business checks, payments,foreign exchange, e-signature, customs, logistics, tax, settlement and trade finance should operate as one layer. Instead, the seller and buyer each sit inside a separate national stack (Figure 2).



EAPS links central bank RTGS systems only: no retail, mobile money, identity, data or trade documents.

Dashed: no regional interoperability layer today.

Figure 2: From Kigali to Nairobi, only the banks are bridged

The one regional link is the East African Payment System (EAPS), which went live in November 2013 and now connects the central bank RTGS systems of Kenya, Tanzania, Uganda and Rwanda [2,3]. EAPS is valuable but narrow. It is primarilybank to bank,and a 2022 EAC report on payment harmonisation found low uptake, with banks preferring established correspondent relationships [4]. It does not solve retail payments, identity, mobile money, credentials, data, e-commerce or trade document interoperability.

National progress is real. Since 14 July 2026 every interoperable retail transfer between banks and e-money issuersin Rwanda runs through eKash, and Rwanda is piloting a cross- border connection with Tanzania's instantpayment system. But each such link is being built bilaterally, one corridor at a time [5,6].

Each East Africancountry faces its own versionof the problem, including:

- Mature private-sector infrastructure that is not yet regionalDPI.
- Multiple ecosystems withouta fully consolidated interoperability layer.
- Strong public coordination at home but limited regionalconnectivity.
- Domestic interoperability withoutregional alignment.

Five Interoperability Layers

Closing the gap requires interoperability across five layers,not one. Paymentsget most of the attention, but a payment that cannot be matched to a verifiedbusiness, a signedcontract and a compliant data flow does not complete a trade (Table 1).

Table 1. Five interoperability layers

Layer	What it must Connect	Interoperability Tools	Gap Today
Identity	People and businesses across national ID systems and business registries	Cross-border identity integration, mutual recognition of KYC and KYB, verifiable digital credentials, cross-recognised e-signatures	Every new market means a fresh KYB process
Payments	Banks, mobile money, fintechs and switches across currencies	Payment interoperability between national instant switches, common messaging standards, regional settlement and FX	Regional rails serve banks, not wallets or SMEs
Data	Invoices, trade documents, transaction and credit histories	APIs, common data standards, consent-based data exchange, data portability	Data stays inside national and institutional silos
Regulatory	Data protection, AML/CFT, licensing and e-transaction laws	Regulatory harmonisation, mutual recognition, cross-border data transfer rules, joint sandboxes	Each regime is defined nationally
Behavioural	Signals of how people and businesses actually transact	Shared risk and fraud signal standards, privacy-preserving analytics, common model governance	No shared way to read economic behaviour across borders

The first four layers are familiar from DPI policy.Behavioural interoperability is the new one. It asks whether a pattern of trustworthy activity built in one country can count in another: whether a Nairobi supplier can recognise a Kigali buyer's track record without seeing her raw data. This is the layer that turns infrastructure into intelligence, and the one that carries the most risk.

From trust to intelligence

Each generation of infrastructure asks a sharperquestion (Table 2).

Table 2. From trust to intelligence

Layer	The question it asks	What it produces
Traditional infrastructure	**Who are you?**	Identity, at a point in time
DPI	**Can I trust this transaction?**	Verified identity, payment and data, shared across institutions
AI	**What are you doing?**	Understanding of activity as it happens
Behavioural intelligence	**What does your pattern of activity tell us about your economic behaviour?**	Insight into reliability, capacity, risk and opportunity over time

DPI establishes trust.AI reads activity.Behavioural intelligence reads the patternbehind the activity. Each step depends on the one before it: an AI model trained on fragmented, unverified data produces confident answers that cannot be trusted, and behavioural signals that cannot cross a border are useless for cross-border trade. Once the interoperability gaps are bridged,AI and behavioural intelligence can be appliedto:

- Understand transaction patterns across corridors, sectors and seasons.
- Personalise financialservices, such as working capitalsized to a trader's actual cycle rather than a generic product.
- Assess individuals and businesses onbehaviour, not only collateral, openingcredit to SMEs and informal traders with thin files.
- Assess and price risk for trade finance, invoicefinancing and cross-border credit.
- Detect fraud by recognising anomalous behaviour across institutions and countries, not just within one.
- Predict demand for goods across markets,helping producers and logistics provider's plan.
- Identify trade opportunities, matching buyers and sellers across borders based on verified activity.

For the Kigali business sellingto Nairobi, this is the difference betweenbeing a strangerat every border and arriving with a portable, verified economic reputation.

Risks and safeguards

The greatest challenge is not technical. A layer that can read economic behaviour across borders is also a layer that can watch,exclude and discriminate at scale. Five risks must be designed for from the start (Table 3).

Table 3. Risks and Safeguards

Risk	What could go wrong	Safeguard
Surveillance	Behavioural data is repurposed for monitoring citizens or competitors	Purpose limitation in law, separation between trade analytics and state security uses, independent oversight
Consent	Users cannot meaningfully agree to how their patterns are used across borders	Granular, revocable consent through DPI consent managers, in a language the user understands
Privacy	Raw transaction data moves across jurisdictions with weak protection	Share signals and scores, not raw data, using federated and privacy-preserving techniques; align cross-border transfer rules
Bias	Models trained on formal-sector data penalise informal traders, women and rural businesses	Representative training data, bias audits by segment and country, human review of adverse decisions
Explainability	A trader is refused credit or flagged for fraud with no reason given	Explainable models for regulated decisions, a right to an explanation and a clear route to appeal

The principle is simple: the more a system knows about economicbehaviour, the more accountable it must be. Behavioural intelligence that is not consented, explainable and auditable will lose the trust that DPI was built to create.

Recommendations and conclusion

- Treat regionalinteroperability as DPI, not as a bilateral project. The East African Community should define a regional interoperability layer spanning all five layers, with shared standards that national stacks plug into.

- Extend paymentsinteroperability to retail.Link nationalinstant switches such as eKash and TIPS so that wallets, SMEs and individuals, not only banks, can transact across borders in real time.
- Make business identity portable. Mutual recognition of KYB and verifiable business credentials would let a company verifiedin Kigali trade in Nairobiwithout starting again.
- Standardise tradedata. Common formatsfor invoices, e-signatures, customs and tax documents, exchanged through consented APIs.
- Govern behavioural intelligence before scalingit. Agree regional ruleson consent, explainability, bias audits and purpose limitation before cross-border behavioural signals are shared.
- Build through public-private partnership. Governments set standards and safeguards. Banks,mobile money operators and fintechs, whose private infrastructure is often already more regional than public rails, build and compete on top.

Africa has built the pieces. The next decade will be decided by whether they connect. Interoperable DPI turns national stacks into a trusted regional layer. AI turns that layer into understanding. Behavioural intelligence turns understanding into opportunity for the traders, SMEs and consumers that AfCFTA was meant to serve, provided it is built on consent and accountability from the start.

Disclosure

The authors are, respectively, Directorof Technology and Innovation and Director of Growth and Ecosystems Management at Equity Technology Group, part of a financial services group active in the markets discussed in this paper. The views expressed are the authors' own and do not necessarily represent those of Equity Technology Group or Equity Group Holdings.

Declaration of generative AI use

During the preparation of this work, the authors used Claude (Anthropic) to draft and structure the manuscript text from the authors' research framework and notes, and to assist with literature search, diagrams and formatting. The research framework, arguments and recommendations were developed by the authors. After using this tool, the authors reviewed and edited the content as needed and take full responsibility for the contentof the publication.

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