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RHEA SUBRAMANYA  
ALBAN JACKOHANGO  
FRANK MATSAERT  
THOMAS SMITH



# Unlocking Africa's Trade Potential: The TWIN Digital Trade Platform

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01

## Foreword

Just 14 per cent of African trade takes place within the continent, compared to 59 per cent in Asia, and 68 per cent in Europe.<sup>1</sup> The African Continental Free Trade Area (AfCFTA), if combined with the transformative power of technology, offers a huge opportunity to put this right by unlocking trade in Africa. Trade has long been recognised as one of the most powerful engines for economic growth, but for far too long, the continent's potential has been held back by inefficiencies and barriers that frustrate cross-border commerce. Technology offers us a chance to unlock that potential at a critical moment for Africa and for the world.

The solutions are here. Blockchain and distributed-ledger technology have shown extraordinary promise in simplifying and securing trade transactions, cutting delays and reducing costs. The Trade Worldwide Information Network (TWIN) represents an innovative digital infrastructure capable of streamlining trade with and within Africa's borders. With TWIN, we have a chance to build a system that is faster, cheaper and simpler – one that could support unlocking the full potential of the AfCFTA, catalysing the growth of intra-African trade and creating new opportunities for businesses to thrive, and desperately needed jobs to be created in Africa.

However, this potential will not be realised without leadership and investment. The cost of implementing TWIN is modest when compared to the transformative gains it promises. The opportunity to support such a platform offers an incredible return for global donors. Africa's future prosperity – and its role in global trade – will depend on the investments we make today. I urge policymakers and international development partners to seize this moment and support this initiative, helping to lay the groundwork for a more interconnected, prosperous world.

My Institute is proud to be working hand in hand with other global trade organisations to help establish TWIN, making trade a force for good, especially for Africa.

**Tony Blair**

**Executive Chairman**

## 02

## Executive Summary

Global trade is the lifeblood of the world economy, but its true potential is often hindered by an outdated, paper-driven system. Every day, 4 billion paper documents are generated to facilitate trade, yet this avalanche of paperwork can create as many obstacles as opportunities. Bureaucracy inflates costs, delays shipments and locks out businesses. To meet the demands of a fast-moving global economy, trade must enter the digital age.

Nowhere is this clearer than in Africa. Trade is vital for Africa's economic development but the continent is underperforming, weighed down by myriad challenges. Africa's share of global trade has fallen by two-thirds over the past 75 years, and trade within the continent sits at less than 5 per cent of its full potential. Non-tariff barriers – which are constraining thanks to the cumbersome bureaucracy involved – are equivalent to three times the average import tariff on the continent.

Fortunately there is a solution that can help unlock trade and economic growth: a new digital trade platform known as the Trade Worldwide Information Network (TWIN). It relies on distributed-ledger technologies (DLT), such as blockchain, and other emerging technologies to facilitate paperless trade through seamless connectivity and coordination. It reengineers how supply-chain actors relate across borders and enables features such as digital versions of certificates of origin, phytosanitary certificates, export certificates, inspection reports and other documents transmitted directly from source; they can also be shared seamlessly, securely and at minimal cost. The platform also enables real-time tracking of goods, helping to streamline customs procedures and reduce the time and cost associated with cross-border transactions, by automatically translating documentation into the language of an importing country.

Early trials in Kenya and industry studies suggest that TWIN could transform African trade by making it cheaper, faster and simpler. By streamlining import and export processes and providing end-to-end digital connectivity, TWIN could reduce some trade costs by up to 20 per cent. Moreover, by simplifying trade processes and improving data transparency TWIN can

make it easier for exporters to track shipments, reduce risks of fraud or error, and improve access to finance – all of which will incentivise more trade. It's also important to note that these estimates represent the opportunity based on the current state of the technology: further advances – particularly in areas such as computer vision and artificial intelligence – offer the potential for larger-scale improvements.

To make this vision a reality, Africa needs more investment (via international aid in particular) in its digital economic infrastructure. Implementing TWIN in 30 African countries would cost \$165 million – less than 0.1 per cent of the total Organisation for Economic Co-operation and Development (OECD) budget for official development assistance in 2023. This funding would not only improve the economic outlook for Africa, but also be in the interest of donors. Improving Africa's digital economic infrastructure offers a route to future prosperity that would reduce the continent's reliance on future aid flows. Moreover, as Africa is a vital provider of critical minerals needed for the green transition and the AI revolution, reducing trade barriers in Africa amounts to a global public good. And there's a further global benefit: TWIN has the potential to modernise trade processes beyond Africa, in other key trading regions such as Asia, Europe and the Americas. The UK, for example, is currently trialling its use.

TWIN is more than a technological upgrade. It is a blueprint for unlocking Africa's trade potential and integrating the continent into the global economy. By embracing this digital platform, Africa can build a trade system that is faster, cheaper and simpler – and transform its economic future.

# 03

## The Analogue Global Trading System

The global trading system is a cornerstone of economic growth. In 2022, trade contributed 62.5 per cent<sup>2</sup> of global GDP – and, in recent decades, it helped lift a billion people out of poverty.<sup>3</sup>

Despite its significance, trade has not kept pace with the digital progress that has been apparent in the wider global economy. While there are “islands of excellence” in the form of specific countries and corporations, there is no global and effective cross-border digital ecosystem for trade. According to the International Chamber of Commerce, 4 billion documents are required to support the handling, clearance and transit of goods, services and capital across the world.<sup>4</sup> It is an analogue system in an increasingly digital world.

As a result, trade is more costly, more complex and more time consuming than it needs to be. A single transaction can cost up to \$80,000, involve 27 documents and take two to three months.<sup>5</sup> These costs are particularly high in regions such as Africa, where bureaucracy often excludes dynamic small and medium-sized enterprises (SMEs) from trading altogether.<sup>6</sup>

Yet the digital tools to transform trade do now exist. With appropriate investment in digital infrastructure, common standards and protocols – and through partnerships both between governments *and* between governments and private sector – there is now an opportunity to unleash a new wave of trade-enabled growth and poverty reduction. Africa offers a unique springboard to realise the potential of this new digital infrastructure.

# 04

## African Trade: An Unfulfilled Opportunity

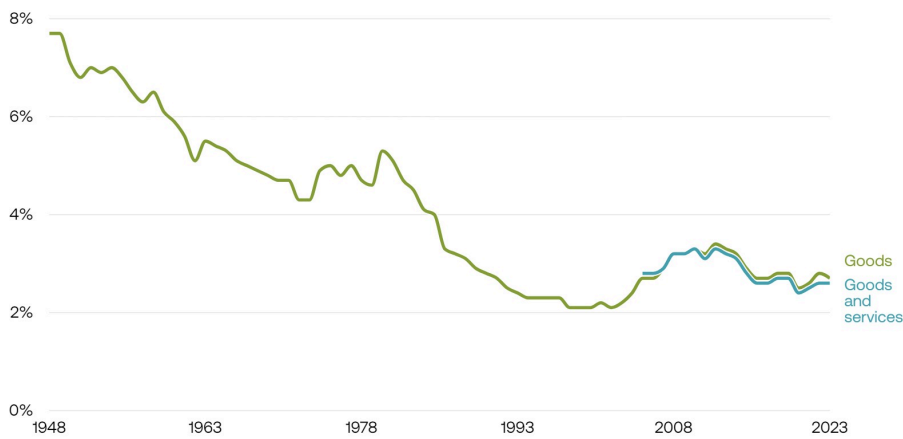
Trade is an economic necessity for Africa. The continent relies heavily on imports to meet its demand for essential goods such as food and refined fuel.<sup>7</sup> Most African countries pay for at least two-thirds of their imports in US dollars<sup>8</sup> – and local prices skyrocket without sufficient foreign-exchange reserves – straining domestic markets. Exports of raw materials such as minerals and oil are a vital source of economic output and the primary source of foreign exchange; they bring more than two-and-a-half times as much foreign exchange into Africa<sup>9</sup> as official development assistance, foreign direct investment and remittances combined.

However, the nature of Africa's trade, relying heavily on exporting raw materials and importing high-cost finished goods, has done little to unlock the continent's broader economic potential. In fact, despite Africa's reliance on global trade, its share of it has fallen by two-thirds in the past 75 years.



FIGURE 1

## Africa's annual exports and imports as a share of world trade have steadily decreased between 1948 and 2023



Source: UNCTAD. Note: Exports and imports of combined goods and services data are obtained from balance of payments.

Data are in current prices.

Several key factors explain why Africa is falling behind.

### Commodity Dependence

Most African nations (with the exception of a handful such as Tunisia, Morocco and Egypt) are commodity-dependent, relying on raw materials for 60 per cent<sup>10</sup> or more of their national merchandise export revenue. This leaves many countries trapped in the early stages of global supply chains. For instance, Africa is home to 30 per cent of the world's mineral reserves,<sup>12</sup> 12 per cent of its oil and 8 per cent of its natural gas,<sup>11</sup> yet it contributes just 2 per cent of global manufacturing value addition.<sup>12</sup>

### Limited Intra-African Trade

In 2021, intra-African trade accounted for only around 14 per cent of Africa's

total trade, compared to 68 per cent in Europe and 59 per cent in Asia.<sup>13</sup> Yet intra-regional trade is often of higher value, with three times as much manufacturing value addition as external flows.<sup>14</sup> Effective implementation of the African Continental Free Trade Area (AfCFTA) is expected to boost intra-African trade by up to 34 per cent by 2045, especially in terms of the share of manufactured exports.<sup>15</sup>

### **Faster Growth Elsewhere**

While African countries have had some recent successes in boosting their share of exports of manufactured goods and foodstuffs, this growth has not kept pace with growth elsewhere in the global economy.<sup>16</sup> In general, other regions have been reducing trade barriers and integrating their economies far faster than in Africa. This was particularly true in the 1990s and 2000s with the integration of the former Soviet Republics and China into the global economy, as well as the creation of the European Union.

Despite this mixed record, trade is a key future opportunity for Africa. This is embodied by the AfCFTA, which has been established to create a state-of-the-art single market for goods and services across Africa. By slashing trade barriers and reducing trade costs, it is projected to increase regional incomes by up to 9 per cent and to lift 50 million people out of extreme poverty by 2035.<sup>17</sup> The hope is that by doing so, more African countries will be able to replicate the success of other export-led development models in countries such as South Korea<sup>18</sup> and Morocco,<sup>19</sup> which were able to industrialise by integrating themselves into global manufacturing value chains. For Africa to do so it needs an innovative, forward-thinking and technologically driven solution that helps remove barriers to trade, enhances trust and cross-border cooperation, and shifts the trade ecosystem into a new paradigm.

## 05

## Bureaucracy at the Border

Africa's trade potential is being held back. Dmitry Grozoubinski, the founder and director of training consultancy ExplainTrade, has noted that "it takes a second truck full of paperwork to move every truck across Africa because of different customs forms and bureaucratic procedures between countries".<sup>20</sup> Africa's score on a United Nations assessment of cross-border paperless trade stands at a dismal 33 per cent,<sup>21</sup> compared to 42 per cent<sup>22</sup> in the Asia-Pacific region and 56 per cent<sup>23</sup> in Latin America and the Caribbean. Bureaucracy restricts trade in at least three ways.

### Financial Costs

Intra-African trade is already held back by high direct costs: import tariffs average 6 per cent across the continent,<sup>24</sup> which is higher than other regions; for example, there are no import tariffs within the EU, while those within the countries included in the South American trade bloc Mercosur, the Association of Southeast Asian Nations (ASEAN) and the United States-Mexico-Canada Agreement (USMCA) are well under 2 per cent. But non-tariff barriers are even more costly, with some border-policy measures (such as price controls) equivalent to an 18 per cent import tariff,<sup>25</sup> which is three times the continent's average tariff rate. Bureaucracy is a key driver of these non-tariff barriers: border-related administrative costs can be as high as 20 per cent of goods' retail cost.<sup>26</sup>

### Time Delays

Customs and other border-process delays can also hamper trade. On average, documentary compliance for exports can take more than four days in sub-Saharan Africa,<sup>27</sup> significantly higher than in other regions. Import clearances can take more than a month versus less than a week in Germany and Thailand.<sup>28</sup> Moreover, the lack of established continent-spanning trade lanes means that goods often cross multiple borders; goods being shipped from Kenya to the Netherlands, for example, can cross as many as eight national or regional borders.<sup>29</sup> These delays impose additional direct costs on businesses, can increase uncertainty about the arrival of shipments, and

can reduce trust among trade partners, hindering Africa's participation in time-sensitive global supply chains (such as those for foodstuffs).

### **Complexity**

African trade involves myriad stakeholders with competing priorities, and the lack of communication between them creates inefficiencies. A study on the export of fresh produce from Kenya to the EU identified 40 actors across 30 organisations and seven countries, requiring more than 100 documents per shipment.<sup>30</sup> This led to the use of multiple enterprise resource-planning systems in a single shipment, along with older and less secure forms of communication such as email, mail/courier, telephone and text. The sheer complexity of these interactions explains some of the delays and costs highlighted above, but it also has a cooling effect on trade itself by deterring businesses from exports.

## 06

## A Digital Solution: How Blockchain Can Help Unlock African Trade

A system-wide digital transformation is required to unlock the full potential of trade-led growth in Africa. Individual firms and countries can only do so much to modernise trade; to leverage gains at scale there's a need for digital infrastructure that enables interconnectivity and interoperability in a manner that is sustainable and inclusive.

African businesses are eager to adopt digital solutions to facilitate better and increased trade. Their top priority is to use technology to reduce trade costs and improve intra-African supply-chain alignment and security. For instance, according to a survey of African business leaders, the top strategy to reduce trade and supply-chain costs in Africa was to digitalise inventory management.<sup>31</sup> And there is evidence of industry's willingness to embrace technology: from 2021 to 2023, sub-Saharan Africa raised its trade-digitalisation score by 12 percentage points, which was the fastest improvement by any region.<sup>32</sup>

The Trade Worldwide Information Network (TWIN) has been built to break down trade barriers and improve the connections between national trading systems. Acting as a digital backbone, TWIN makes trade faster, more transparent and predictable, while also improving trade sustainability by reducing dependence on paper. TWIN's core mission is to simplify and streamline trade processes, making it easier for businesses to operate across borders.

TWIN has been developed by a group of six well-respected international trade-facilitation partners – the Global Alliance for Trade Facilitation, the Chartered Institute of Export & International Trade, the IOTA Foundation, TradeMark Africa, the Tony Blair Institute for Global Change and the World Economic Forum – based on a successful pilot of the technology between Kenya and the Netherlands.<sup>33</sup> The partners are in the late stages of setting

up the not-for-profit TWIN Foundation, a neutral organisation similar to the Python Software Foundation, with a dedicated focus on trade technology. The TWIN Foundation will ensure proper governance and provide the necessary expertise on regulatory requirements, data standards and interoperability rules. As the developer and custodian of this digital trade infrastructure, the foundation will offer countries open-source access to cutting-edge technologies as public goods to enhance their trade capabilities. It will also act as a centre of excellence, supporting users and coordinating with governments and international organisations to enable smooth integration and connectivity across borders.

TWIN will modernise trade by replacing outdated, paper-based processes with secure, digital alternatives using distributed-ledger technology (DLT), developed by the IOTA Foundation.<sup>34</sup> This open-source platform will ensure that crucial trade documents, such as certificates of origin, are digitally transformed, making cross-border transactions more efficient and secure. With DLT, multiple participants (whether governments, individuals or companies) can access, validate and record transactions simultaneously, transparently and in near real-time.<sup>35</sup> The result is a system in which information is permanently recorded, accessible to all parties and free from the need for a central authority. Beyond its blockchain foundation, TWIN will also be designed to be able to integrate frontier technologies such as natural language processing, computer vision and artificial intelligence, ensuring that it not only addresses current trade challenges but is ready to adapt to future innovations.

There are a number of ongoing pilots of the TWIN infrastructure that are being undertaken in Kenya and the UK by TWIN partners;<sup>36</sup> there are also pilots in Europe, including with port operators and under the EU Service Infrastructure blockchain initiative. Other use cases are being designed to simplify agrolistics, critical-minerals traceability, maritime trade, transport, and logistics in Africa, the Caribbean and Asia.

## How TWIN Works in Practice

TWIN is a digital-information pipeline that securely transmits data across national and organisational borders, eliminating the need for siloed data storage and offline communication methods. When a product is transported from one country to another, the receiving country can communicate with the exporting country to request and validate trade information. Here are the key steps in a TWIN-enabled supply chain.

1. A product grown in the originating country is inspected by a relevant authority using that country's TWIN node; a fingerprint of the documents are encrypted together with the identity of the issuing authority to create a digital twin into the distributed ledger.
2. As the product and its digital twin travel through the supply chain, new scans and inspection verifications are added to the distributed ledger, including all trade documents, such as seaway bills and customs declarations.
3. As the product approaches its final import destination, the receiving country's TWIN node verifies each step of its journey by accessing the digital twin using the TWIN ledger and admits verified products for distribution without risk of lost data, falsified documents or missing data.

Evidence from early trials and related studies of the use of DLT suggests that TWIN could significantly boost trade by making it cheaper, faster and simpler:

### **Making Trade Cheaper**

TWIN can reduce the costs of trade and by doing so help reduce the prices

of traded goods, easing the rising cost of living for 1.5 billion people in Africa. High trade costs are reduced by connecting actors across borders, as well as streamlining import and export processes. The latter includes digitally automated documentary compliance checks and customs clearance, avoiding delay penalties, and wastage from spoilage. Early evidence suggests that digital connectivity could reduce trade costs substantially, indicating that TWIN could potentially lower some by up to a fifth.<sup>37</sup> More targeted estimates from the Asia-Pacific region suggest that trade digitalisation has the potential to reduce transport and logistic costs, including documentary compliance, delay penalties and wastage due to spoilage, by up to 25 per cent.<sup>38</sup> Reduced trade costs benefit African traders by making their exports more competitively priced; they also enable access to new trade routes, goods and services, and suppliers that were otherwise not financially feasible. One empirical study estimates that reducing trade costs in Africa by 20 per cent could increase the average size of exporters in terms of turnover and number of employees by 14 per cent and the number of new exporters who successfully continue exporting after starting by almost a fifth.<sup>39</sup> Companies that export tend to be more productive than their domestically focused counterparts, so having a larger number of exporters operating at scale is likely to boost productivity growth.

### **Making Trade Faster**

TWIN can significantly cut cross-border processing times, making trade faster. This means lower costs and reduced administrative burden for African businesses trying to export, in turn enhancing their growth and creating more jobs. In one industry study, digitised trade records – such as electronic bills of lading – helped cut transaction times for complex voyages from Latin America to Asia from up to 30 days to less than 15 days.<sup>40</sup> Similarly, a pilot study in the United Kingdom has suggested that TWIN could reduce the time taken for customs operations by reducing misdeclarations and false positives.<sup>41</sup> For Africa, early evidence suggests that TWIN could enable the continent to develop a trade-data ecosystem, which could cut overall trade administrative time significantly.<sup>42</sup> These critical efficiency gains are particularly important for SMEs, given that they are more constrained by cashflow, more reliant on trade finance and hence more at risk of



unpredictable delays. TWIN could significantly boost SME productivity by reducing the time lost to regulatory compliance and bureaucracy, as well as by cutting the duration of trade-finance contracts and thus lowering their cost.<sup>43</sup>

### **Making Trade Simpler**

TWIN simplifies trade by ensuring that trade data are available, secure and easy to use, all while respecting local data laws. Simpler trade means more African businesses of all sizes can reach international markets and sell their goods, democratising trade and creating more opportunity for African entrepreneurs. DLT makes it impossible to alter or forge data, providing a permanent and unchangeable record of transactions. The platform is also transparent and, because it's based on open-source technology, is available to everyone, allowing data to be easily verified by new users. TWIN therefore makes it easier for exporters to monitor their shipments and makes them less likely to be subject to fraud or error; it can even improve access to finance, particularly for SMEs. For example, TWIN enables SMEs to generate and transact with more transparent and reliable data. They can use these data to build trust with financial institutions, who in turn may offer them more competitive lending terms and lines of credit for cross-border transactions.<sup>44</sup>

For all of these reasons, TWIN could be an essential building block in helping to digitalise African trade. If it is combined with broader investment in digital trade infrastructure (including legacy data-system upgrades, customs automation and logistics) it could help boost intra-African trade.

The benefits from TWIN are not static: they are likely to increase over time if combined with other emerging technologies such as AI. For example, TWIN could be used to reimagine port-management services, from volume tracking to traceability. It could provide product-tracking services for logistics firms, displaying information in real-time and providing anti-smuggling features. The data generated by TWIN could be used by governments to generate and monitor national, regional and sector-specific trade statistics, and to identify supply-chain incidents to manage. Even trade-finance and insurance-management systems could be automated to

draw from data, such as receivables. Finally, it could be expanded beyond trade to support other border-crossing elements such as travel visas and immigration. As the TWIN technology is open-source, and all actors are in control of their own data, TWIN provides opportunities for anyone to develop new services on the platform, unleashing the power of innovation to create better digital services to drive global trade.

For African policymakers, the upsides from TWIN are clear: cheaper, faster and simpler trade that can underpin productivity growth and rising prosperity, and help support a trade-led route to economic development. To quote the International Monetary Fund, trade is “the principal means through which the emergence of new technologies and digitalization, in combination with a rapidly growing labour force, could create new and higher paying jobs”.<sup>45</sup>

## 07

## Investing in Africa's Future: A Win-Win for Global Development

While TWIN holds great promise, it has not yet been rolled out across Africa due to a lack of funding. The plan to implement TWIN across 30 African countries over the course of seven years comes with a projected cost of \$165 million – a relatively modest investment considering the potential benefits. This funding would cover two things: country-specific costs of setting up a national node in each of the 30 countries (\$5.3 million each, \$160 million in total) and a one-off investment of \$5 million to establish the central infrastructure and the not-for-profit TWIN Foundation to maintain and upgrade the technology to international standards.

As OECD countries consider how to allocate the roughly 10 per cent of their aid budgets that goes to economic infrastructure,<sup>46</sup> TWIN stands tall as a low-cost, high-impact solution. Its total cost is less than 0.1 per cent of the OECD Development Assistance Committee's annual aid budget of \$223.7 billion<sup>47</sup> and less than 1 per cent of the economic infrastructure aid budget. It is also a project that goes with the grain of existing aid intentions. For example, the United States has already signalled its intent to invest more in infrastructure to facilitate two-way trade.<sup>48</sup>

TWIN is not only good for Africa but also a good investment for prospective aid donors. It directly improves Africa's economic prospects and hence reduces aid reliance in the future; it also reduces the costs for donor countries to access critical inputs – particularly minerals – that will fuel the digital and green transitions that are already underway. For example, Africa is a source of 42 of the 63 elements used in cutting-edge low-carbon technologies<sup>49</sup> and the continent is home to almost half of the world's cobalt,<sup>50</sup> a critical mineral in electrical vehicles whose demand is expected to more than double by 2030. Africa could also potentially replace Russia as a supplier of liquefied natural gas to Europe in the wake of the war in Ukraine.<sup>51</sup>

TWIN's benefits are not unique to Africa: they could apply to many other

regions, including Asia, Europe and the Americas. Its implementation in Africa can thus serve as proof of concept for its extension.



## Conclusion

Africa stands on the brink of a transformative opportunity. With trade acting as a critical lever for economic development, overcoming the continent's longstanding trade barriers is essential. The TWIN platform offers a modern, scalable solution. It promises to reduce costs, cut delays and simplify cross-border transactions through cutting-edge digital technology.

But TWIN is more than just a digital trade platform: it's a blueprint for a more interconnected, prosperous Africa. Investing in TWIN isn't just about securing the continent's future, because it is also setting the stage for a more resilient global economy. The benefits of streamlined trade extend far beyond Africa's borders, boosting global supply chains and ensuring access to resources such as critical minerals.

For donor countries, the imperative is clear. A modest investment today – just 0.07 per cent of OECD aid budgets – could unlock billions in future growth, reduce dependency on aid and help to establish Africa's place in the global marketplace. In an increasingly interconnected world, investing in Africa's digital trade infrastructure isn't just a choice – it's an essential step towards global economic stability and shared prosperity.

# Endnotes

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## General enquiries

[info@institute.global](mailto:info@institute.global)

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