How Blockchain Is Transforming Latin America's Trade

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Introduction

In a recent report, IBM experts argued that our world consists of eleven core systems, such as in transportation and healthcare.[1] Each system, or ecosystem, has many public and private sector organizations spanning multiple industries. For example, the healthcare ecosystem includes doctors, hospitals, pharmacies, insurers, researchers, drug manufacturers, regulators, and so on. It just like the other ten major ecosystems also includes huge inefficiencies: think of medical records in healthcare – entering the same data over and over, tremendous amount of paper and duplication, lack of digitization and data share. Though hard to calculate, these inefficiencies are systemic – they weigh on all parts of the system, whether insurance companies, staff at doctors' practices, or the patient himself. IBM believes the costs of the inefficiencies in the eleven core systems total $15 trillion, or 28 percent of world GDP.[2]

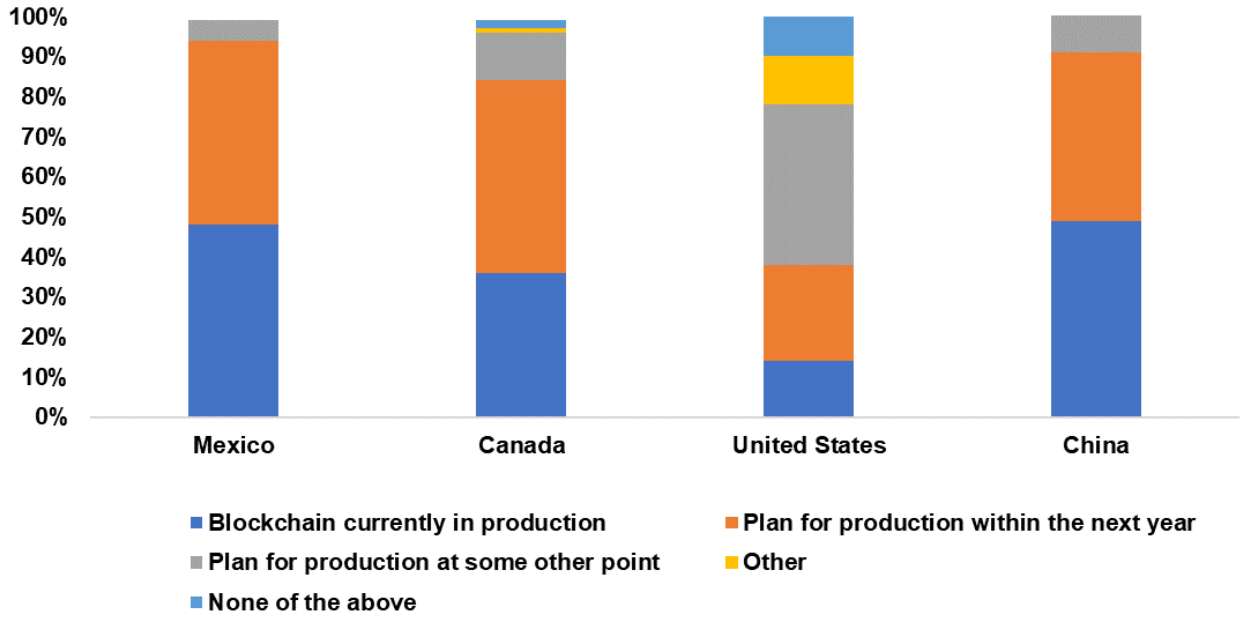
Just like the medical sector or transportation sector, the world trading system is a complex system of systems. It also has tremendous slack. For example, banks that provide trade finance duplicate due diligence and data entry work and still often process letters of credit manually; logistics providers, ports, freight forwarders, and customs brokers that "touch" a shipment send same pieces of information in multiple occasions to each other; and ships, ports, and trucks in moving goods to and from port are often unsynchronized, with thousands of worker hours wasted in wait time and mix-ups in the millions of logistics processes taking place around the world each day. Simple things such as errors or illegible entries in bills of lading (which are still often written by hand) and tiny misunderstandings between an exporter and its foreign customers can cause days of unnecessary work.

Now however this setting is changing. New technologies such as blockchain, AI, and internet of things are streamlining how trade is done: the part of the world trading system are becoming more symbiotic and data among them digitized. Blockchain holds particular promise for defeating the many inefficiencies in just about all mechanics of world trade work – trade logistics, supply chain management, customs and border administration, cross-border payments, and trade finance. For example, blockchain enables all parties on the same ledger to gain visibility to the same data at the same time, reducing the tremendous amount of paperwork and duplication of entries that bedevil trade logistics, trade compliance, and trade finance. It provides security and transparency: when all parties in a supply chain – suppliers, manufacturers, logistics firms, warehouses, trade finance banks, and so on – include their data on the same blockchain, everyone in the supply chain has end-to-end visibility into any one shipment and the quality, state and movement of products, which can facilitate supply chain management, cargo tracking, customs clearance, and supply chain finance. Blockchain also enables instantaneous clearance of

transactions, reducing the time in international payments from days to seconds. And smart contracts built on blockchain can significantly accelerate contract enforcement in trade transactions: if the importer and exporter sign a smart contract, the importer's bank would automatically pay the exporter when the importer has verifiably gained possession of the shipment. No intermediaries would be needed to verify that event x has occurred to trigger a contractual action y.

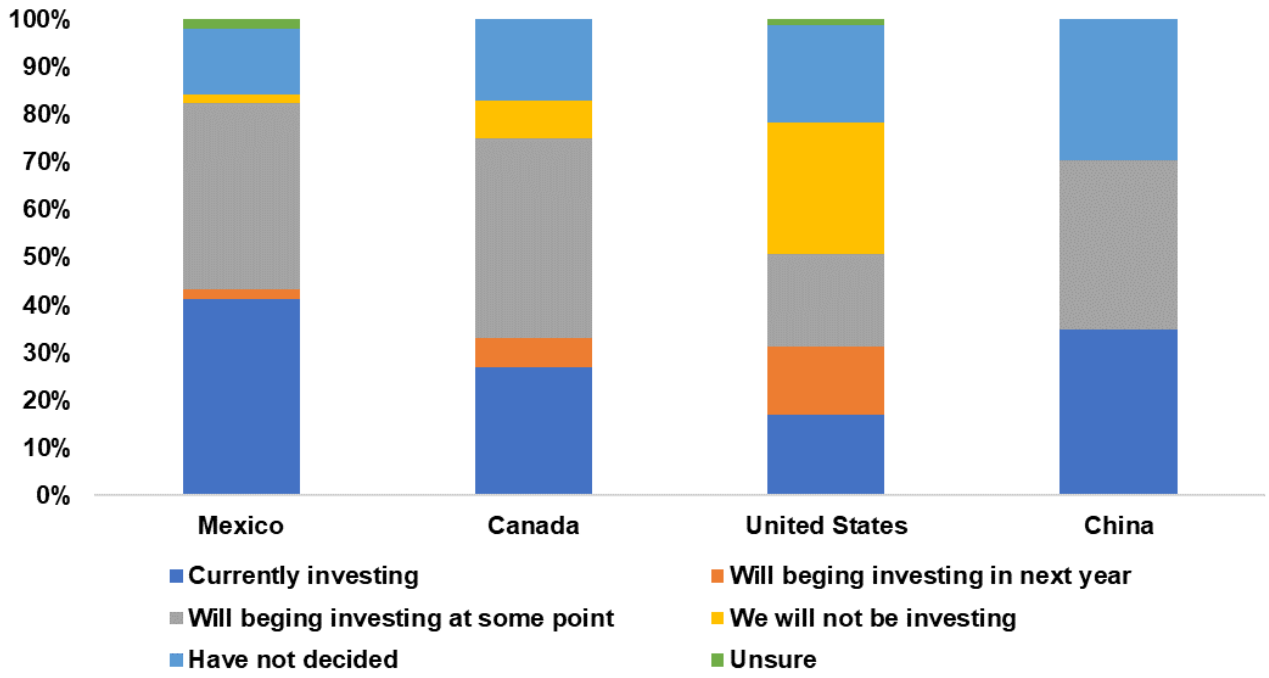
Blockchain, in short, helps the world close in on the Holy Grail of world trade: integration, interoperability, and automation of the physical, information, and financial supply chains that undergird trade transactions. Several government agencies and corporations are already investing in blockchain, as are venture capitalists: in 2015-17 alone, VCs invested $1.7 billion in blockchain startups.[3] A recent survey by Deloitte suggests that Mexican executives are as keen to invest in blockchain as their Chinese peers, and are pursuing blockchain more eagerly than Canadian and U.S. executive (figures 1-2).[4]

Figure 1 – Has Your Organization either brought blockchain to production or is planning to do so?



Source: Deloitte 2018 survey of 1,053 executives worldwide.

Figure 2 – Is Your Organization Investing in Replacing Parts or All of Your Existing Systems with Blockchain-Based Enhancements?



Source: Deloitte 2018 survey of 1,053 executives worldwide.

The blockchain revolution is already transforming Latin America's trade; the following sections take a look at how. Table 1 summarizes selected pilots and use cases.[5]

Table 1 – Selected Use Cases of Blockchain in LAC and Global Trade Communities

Sector	Organization	Blockchain Application
Logistics management	Port of Veracruz	Port of Veracruz is working with Mexico's General Administration of Customs to adopt blockchain and smart contracts to transmit information and automate processes between the stakeholders in the port community (such as terminal operators, railroads, logistics providers, tax authority, port authority, and so on).
	IBM-Maersk	Maersk and IBM's joint venture blockchain started in June 2016 and piloted in such areas as shipping pineapples from Colombia to the port of Rotterdam.[6] Since then, the network has connected shippers, ports, customs offices, banks, and others in Maersk's global supply chains track freight and replace redundant and time-consuming paperwork.[7]

Customs administration	Customs of Peru, Mexico, and Costa Rica with IDB and Mictsoft	Peru, Mexico and Costa Rica are pursuing a pilot project with the IDB and Microsoft called CADENA, which uses blockchain to make customs' mutual recognition agreements (MRAs) and Authorized Economic Operator (AEO) programs more secure and efficient.
	U.S. Customs and Border Protection (CBP) Korean Customs Service (KCS)	CBP formed a group in September that will research the agency's potential use of blockchain. Already, the group has identified 14 specific use cases, ranging from tracking licenses and permits, to certificates of origin.[8] Malltail and KSC have signed an MoU to launch a blockchain-based customs platform. The goal is to use blockchain to speed customs clearance times in seven Malltail distribution centers across the U.S., Japan and Germany.[9]
Trade finance	BBVA	In 2017, the Barcelona-based Frime bought more than 25 tons of frozen tuna from Pinsa Congelados, of Maztlan, México, with the help of a letter of credit issued by BBVA in Spain and processed by Mexican outpost BBVA Bancomer.
	HSBC We.trade	In May 2018, HSBC announced it had completed "the world's first commercially viable trade-finance transaction using blockchain."[10] HSBC's proof of concept was a blockchain-based letter of credit for a transaction with Cargill. Banco Santander, Deutsche Bank, HSBC, KBC, Natixis, Rabobank, Société Générale, and UniCredit have created a blockchain consortium "we.trade" to streamline trade finance transactions among them and expand trade finance to European SMEs.
Cross-border payments	Bradesco, Santander	The Tokyo-based MUFG and São Paulo-based Bradesco have agreed to collaborate to create a cross-border payments service based on distributed ledger technology from Ripple. Santander in Brazil has launched a service One Pay FX to use blockchain in settling B2B cross-border payments.
	J.P. Morgan	JPMorgan Chase's new Interbank Information Network (IIN) is a blockchain-based method for participating banks to transfer U.S. dollars across borders and institutions more efficiently than using the SWIFT network.

Trade Logistics

Logistics efficiency is very low in Latin America and the Caribbean (LAC). In the World Bank's Logistics Performance Index, the competence of logistics services in LAC countries is lower than that in China, India, or South Africa. The only exception is Panama which does somewhat better than India but worse than China. Some LAC economies also trail such African economies as Nigeria. But the quality of logistics is not the only challenge; there are significant systemic challenges and transactions costs in Latin America's trade-related logistics supply chains. The shipping giant Maersk has calculated that an exporter of cut flowers from Kenya needs to carry out 200 separate communications involving 30 players such as farmers, freight forwarders, land-based transporters, customs brokers, governments, ports and carriers to move a shipment to the Netherlands.[11] A ship coming to a port exchanges at least 15 messages to port operator, customs, and exporter. Different databases need to be reconciled against each other and sources of

discrepancies hunted down, often by sifting through paper documents by hand. In many LAC export sectors such as vehicles, processed foods, or electronics, shipments require 20 different documents such as bill of lading, cargo manifest, customs declaration, that are still often paper-based and printed; exporters enter as many as 75 percent of the same data fields over and over, which takes time and increases the odds of errors.[12] All in all, these hassle factors add as much as 20-30 percent to firms' shipping costs.[13]

Blockchain can make a huge difference in this complex setting: it enables all these data to be logged onto a blockchain only once and become visible to all players in real-time – reducing the paperwork involved with moving goods from one country to another. The most promising pilot is Maersk's new blockchain platform developed with IBM, piloted in various settings such as in shipping pineapples from Colombia to the port of Rotterdam. Instead of disparate databases, missing documents, and duplicate data entries, all players have the same bird's eye view to the process of the trade transaction, access all documents related to it, and can instantly share the same digital data and information with everyone involved. All entries on the ledger are immutable and updated on everyone screens in real time Digitizing and simplifying this process can shave 20-30 percent off the exporter's shipping costs, and reduce the many emails and documents that need to be sent to different parties to orchestrate a shipment.[14] Global companies too are applying blockchain in their logistics operations. For example, Korea's Samsung SDS estimates that its blockchain significantly lowers time between the launch of a product and its shipping, enabling it to respond faster to rivals' product launches.

Blockchain is also changing LAC ports. In general, port automation can be transformative for LAC trade: in a 2008 study, LAC economies had 172 percent higher ocean transport costs to the U.S. market than the Netherlands, and a third of the cost in LAC owed to differences in port efficiency.[15] Ports around the world are now becoming Smart Ports, leveraging the internet of things, artificial intelligence, and blockchain to optimize their operations, streamline the movement of goods and transport operators, secure and facilitate data sharing and information flows among the many stakeholders that "touch" any one shipment, integrate better with adjacent city logistics, and improve environmental sustainability. Some ports have been so automated that they barely have any human workers; in China, the port of Qingdao has reduced the number of workers to unload a ship from 60 to nine – which are mostly technicians with remote controls that move cranes.[16] Labor costs have been reduced by 70 percent, while efficiency increased by 30 percent, meaning shorter port calls called for by megaships eager for their next assignment. Accidents involving people are brought to zero.

In the family of smart port technologies, blockchain is being adopted quickly. The world's "port of ports" and frontrunner in the application of new technologies, the Port of Rotterdam is in January 2019 starting a blockchain pilot to streamline the multimodal transport of a container from a factory in Asia to the Netherlands involving a network of three companies logistics operators, and port operators. Port of Valencia in Spain, the second largest port in the Mediterranean, is also planning a smart, paperless port based on blockchain. LAC economies are also testing blockchain in smartening ports: for example, the port of Veracruz, which is turning 500 years in 2019, is working with Mexico's General Administration of Customs (AGA) to adopt blockchain and smart contracts to transmit information and automate processes between the stakeholders in the port community (such as terminal operators, railroads, logistics providers,

tax authority, port authority, and so on) cementing trust and streamlining operations among them.[17]

Customs and Border Administration

Most trade experts would probably single out customs as the worst bottleneck to LAC countries' trade – and improvements in customs as yielding significant economic gains. Recent firm-level data from Uruguay show that if all shipments subject to physical inspection cleared customs within a day, exports would increase by almost 6 percent.[18] For time-sensitive goods, a one-day delay in goods reaching their destination is equivalent to 6 percent decrease in the country's trade or to adding 360 kilometers of transport distance.[19] Of course, customs have challenges, facing such problems as customs fraud – undervaluation and misdeclaration of contents of shipments – and with the complexities of verifying shipments;' product codes and the origin of products shipped from free trade agreement (FTA) partners. There are also challenges among the many border agencies to share data in real-time.

Blockchain is a gamechanger for customs. The technology can do the impossible: enable customs to secure, facilitate and defeat fraud in trade. Blockchain is already being piloted in many customs administrations around the world, including in the United Kingdom, Korea, Singapore, and a grouping of 15 countries in East Africa. In 2017, U.S. Customs and Border Protection (CBP) developed 14 use cases for blockchain, such as keeping track of partnering government agencies licenses, permits, and certificate of origin reporting. The Korea Customs Service (KSC) is front runner in using blockchain in customs, with a recent pilot with over 50 Korean companies on the exporting side and 10 companies in Vietnam and Singapore on the importing side.[20]

Also LAC customs have embraced blockchain. Peru, Mexico, and Costa Rica have made particularly strong progress with applying blockchain in customs, pursuing a pilot project with the IDB and Microsoft called CADENA, which uses blockchain to make customs' mutual recognition agreements (MRAs) and Authorized Economic Operator (AEO) programs more secure and efficient. The timing is right, in that LAC governments are actively pursuing MRAs. For example, in 2018 the customs of Colombia, Chile, Mexico and Peru that form the Pacific Alliance signed an MRA; under negotiation are MRAs among Central American countries, Andean Community countries, and Mercosur members.[21] These agreements imply data sharing on recent AEO certifications among the various parties, something that can be very complex is done as it typically is, by email among the different customs. By using blockchain, these various customs will have access to the same, secure information logged only once in the same place. This also ensures that traders will access the MRA benefits from the moment they receive their AEO certification.[22]

CADENA has been designed as a pilot to first and foremost enable the various stakeholders learn about blockchain's operation and consider possible further use cases. For example, the stakeholders have found that CADENA could next be expanded to automate the entire AEO certification process, and foster risk management in customs. CADENA is also helping the stakeholders see how blockchain is guaranteeing the integrity of the data received by customs and helping to safeguard data, such as by enabling different tiers of access and users. The pilot is

also helping the participating customs and stakeholders to learn about the various considerations related to blockchains, such as interoperability of blockchain platforms, alignment of incentives among all parties in a supply chain to adopt blockchain, and governance of the data shared among parties on a blockchain.[23] There are also questions still around how to best make blockchain-based systems interact with the region's single windows, whether small businesses are able to use blockchain, and whether customs have the capabilities to operate blockchain-based systems.

Cross-Border Payments

Global cross-border payments are enormous, $150 trillion or double the size of the world economy in 2015. Companies around the world, including in Latin America, pay significant fees to process payments their international suppliers. A wire typically costs $50-$75, making it unattractive to sellers and buyers making multiple small transactions. Cross-border wire payments using SWIFT network can take days to clear and involve transaction fees of several percentages, quite easily 1-3 percent and in some cases up to 10 percent, as each bank in the payment value chains takes its cut.[24] Each intermediary is a possible point of failure: some 60 percent of B2B payments require manual intervention, each taking between 15-20 minutes.[25] The payments settlement process takes an astonishing amount of time, 3-5 days, for those used to operating with the instantaneousness of emails. It is in principle faster for the exporter to fly over to see the importer and get paid in cash than to wait for a bank wire.

Latin American companies have devised workarounds to avoid paying high fees, such as bundling multiple payments into a single wire. But blockchain can change the game for payments. Rather than using SWIFT to reconcile each financial institution's ledger, an interbank blockchain could track all transactions publicly and transparently: transactions could be settled directly rather than by correspondent banks.[26] Just about all major banks have experimented with blockchain in cross-border payments and trade finance, including in LAC. For example, the Tokyo-based MUFG and São Paulo-based Bradesco have agreed to collaborate to create a cross-border payments service based on distributed ledger technology from Ripple. Santander in Brazil has launched a service One Pay FX to use blockchain in settling B2B cross-border payments.[27] The value propositions are lower costs and shortened settlement: payments clear immediately or at most in less than two hours, as opposed to 48 hours they currently take, and, according to the blockchain company Ripple that enable One Pay FX, reduced the cost of transactions by a third.[28] The service was piloted in Brazil in 2018, along with Spain, UK, and Poland. Brazil's Central Bank has been highly active in supporting and testing blockchain in payments, and considered pilots in cross-border payments.[29]

Trade Finance

International trade finance is about ensuring that the seller of a product in country A will get paid once the buyer in country B gets the product. In this process, both sellers and buyers have serious informational problems. Sellers of products worry about when and whether they get paid by the buyer, and buyers of products worry about whether the seller will actually ship and whether the goods are of the expected quality. Seller would like to get paid as early as possible, the buyer typically would like to pay as late as possible. These problems is why sellers and buyers have

delegated the management of their transactions to banks or insurance companies whose staff can assess the buyer's ability to pay and seller's ability to deliver quality on time, track products as they make their way to the buyer, and release payment to the seller when the buyer is in possession of the products. The process is complex and susceptible to fraud. For example, in 2008, J.P. Morgan Chase was defrauded almost $700 million with fictitious purchase orders and fake invoices used to get loans for inexistent metal shipments.[30] To date, 82 percent of global executives report experiencing fraud in trade. [31]

To cover their bases, banks have for decades engaged in strenuous and time-consuming paper-based and manual processes to issue a letter of credit. The piles of paper that for bigger transactions can run dozens of pages and take several weeks to fill with data and contractual provisions. Some 56 percent of banks' cost for a letter of credit arises from this long and often still manual document handling and checking of the data in the documents – a process duplicated among all banks in a transaction.[32] A particularly time-consuming process is regulatorily mandated know-your-customer (KYC) check. Banks need to request new customers to submit identification documents each time an individual or corporate customer starts a new relationship with a bank (such as opens an account, applies for credit, or seeks an insurance policy), and to monitor flow of funds to detect money laundering. Adding time and complexity especially to trade finance operations is that each bank currently runs its own KYC check, duplicating efforts and requiring customers to provide the same information multiple times to different institutions. In large transactions, ascertaining parties' identities can take weeks. SME trade finance is collateral damage: the global trade finance gap is estimated at $1.6 trillion, most of it reflecting the vast gap between trade finance requests made by SMEs and the financing actually provided by banks. With the fixed costs of KYC checks and other paperwork proportionally very high in SMEs' deals, banks and SMEs alike tend to find a letter of credit for an SME uneconomical.

Several banks are now looking to overcome the tremendous processing costs of letter of credit. Blockchain has already been piloted in LAC: in 2017, the Barcelona-based Frime bought more than 25 tons of frozen tuna from Pinsa Congelados, of Maztlan, México, with the help of a letter of credit issued by BBVA in Spain and processed by Mexican outpost BBVA Bancomer.[33] Use cases suggest that blockchain is cutting the time of issuing of the letter of credit for a small transaction to its approval of it to only 4 hours, from 7-10 days – or made it 60 times faster.[34] Also the payments clear faster: in a test with a "major correspondent bank", Standard Chartered used Ripple's platform to complete a transaction in less than 10 seconds, or 17,280 times faster than the 48 hours than the bank's typical trade finance transaction.[35] Blockchain can also solve the challenges of KYC checks. For example, in 2017, OCBC Bank, HSBC, IMDA, and Mitsubishi UFJ Financial Group (MUFG) became the first consortium in Southeast Asia to successfully complete a proof of concept for a KYC blockchain. The main benefit is end of duplication: customers need to provide their information only once, all parties can access the same information in real-time and digitally, and all information is secure and immutable, reducing concerns of errors and fraud and odds of actual criminal events [36]

Banks that inherently have to work together in trade finance transactions have also banded together in blockchain consortia. For example, in Europe, Banco Santander, Deutsche Bank, HSBC, KBC, Natixis, Rabobank, Société Générale, and UniCredit have created a blockchain consortium "we.trade" to streamline trade finance transactions among them and expand trade

finance to European SMEs. In Thailand, the Thailand Blockchain Community Initiative consisting of 14 Thai banks, in cooperation with three state enterprises and four corporations, has created a common letter of credit platform to handle tens of billions of dollars of trade finance.[37] By cutting out the middlemen and boosting efficiency, some estimates show that blockchain technology could reduce banks' infrastructure costs by $15 billion to $20 billion annually through 2022. It is likely only a matter time that blockchain pilots proliferate also in Latin American trade finance.

Blockchain Policy Agenda for LAC

Blockchain holds tremendous promise for undoing the greatest pain-points facing LAC firms that are seeking to engage in trade. Pilots show that blockchain can help accelerate cross-border payments, shipments, and customs clearance; secure trade transactions and combat fraud and money-laundering; and lower costs to intermediaries – and likely eventually the costs for exporters and importers and SMEs to engage in trade. Blockchain is bringing Latin America closer to the Holy Grail of world trade: integration and automation of financial, logistical, informational supply chains undergirding trade transactions. Positively, most LAC governments are already predisposed to blockchain. They can now accelerate its use and expand its benefits through four specific measures:

- **Enable blockchain use cases and experimentation through blockchain labs and sandboxes**. Blockchain is a rather new technology and many potential applications have not even come into view in trade or beyond. It should as such not be heavily regulated – besides, national laws already apply to blockchain, such as on trade privacy and cybersecurity. Rather, governments need to focus on cultivating blockchain use cases and ecosystems. LAC governments can work with private venture capital funds to provide startup funding for promising blockchain applications, and set up national blockchain labs that serve as incubators of blockchain companies. Governments can also provide regulatory flexibility to companies testing blockchain applications. For example, LAC economies could adopt blockchain sandboxes where companies that are testing blockchain can bring their technologies to market without the need for the gamut of regulatory approvals that might otherwise apply. Such a sandbox could also be especially powerful if regionalized, for LAC companies to bring innovations to market across the region and for national regulators in the region to together discuss issues and eventual regulatory frameworks that pertain to blockchain.

- **Rather than discrete solutions, think systems and interoperability standards.** Since blockchains' scalability is a function of the network of users and interoperability among blockchains (such as among two blockchain systems in trade finance or among ledgers used by a port, postal service, and customs, it is important for LAC governments and stakeholders to ensure interconnections and interoperability in the blockchains used by the various players in trade – customs, ports, banks, logistics companies, and exporters and importers. This can be done in two ways. First, LAC countries can design the regional blockchain ecosystem as interoperable. IDB has launched the Global Knowledge Alliance for the Development of the Blockchain Ecosystem in Latin America and the Caribbean (LAC-Chain) precisely to accelerate the use of permissioned blockchains and

their interoperability in LAC economies and trade. Another solution is interoperability standards that define among the many blockchain stakeholder and ledgers such issues as what the terminology and definition of terms are, how the various ledgers integrate, and how information and data among the users are shared and how users are expected to treated. The International Standards Organization (ISO) is working on blockchain standards across several realms; a new entity Digital Standards for Trade (DST) in Singapore that the author has established with other players such as the Asian Development Bank will also facilitate the establishment of global blockchain standards in trade. It is critical that LAC economies build these standards in, to be able to interoperate with counterparts around the world.

- **Measure the adoption and impact of blockchain in LAC trade and SME trade, in particular.** In the spirit of "what you can't measure you cannot change," LAC governments and stakeholders need to measure blockchain's adoption across economies and in trade-related applications, and the impact of blockchain on LAC trade and SME trade in particular, to understand the social, economic and trade, and financial returns of blockchain, on enterprises of different sizes, in different sectors, and in different regions, and to understand the challenges firms face to the adoption of these technologies. Governments also need to measure and assess blockchain-related policies, regulations, and their effects in the region and beyond, to identify best practice frameworks. These data could be discussed in an annual LAC Blockchain Forum, perhaps supported by IDB, that brings together governments and companies to review the adoption and uses of blockchain in trade and other sectors, share use cases, enable policymakers and regulators learn about new blockchain applications and discuss with business how to best facilitate the adoption of blockchain in private and public sectors.

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