



Inclusion through distribution

How blockchain supports financial inclusion

Consulting



Financial inclusion

Overview

In an ideal world, anyone with talent, determination and diligence would create and accumulate wealth as they wish. However, four conditions would be required to realise this vision:

- An effective way to make and receive payments safely;
- An effective way to protect wealth;
- An effective way to obtain financing with collateral or future cash flows; and
- An effective way to raise capital for promising business ventures.

The financial industry has been developed for centuries to provide products and services whilst achieving the above conditions. Despite this, the world remains far from ideal, where one can experience payment theft, fraud in lending, losses due to natural disasters, and unnecessary friction in capital raising. Financial institutions, taking into view the obvious risks inherent in the financial markets, tend to serve less risky segments, which are often characterised by large corporations and high net worth customers in more developed areas. Some segments of the population on the periphery are in desperate need of financing support and wealth protection and have to struggle to obtain financial services, whilst at the same time financial institutions are competing in the red sea of premium segments, resulting in high market saturation and increasingly low profit margins.

Distributed Ledger Technology (DLT), also more commonly known as Blockchain, may offer a new perspective to addressing the dilemma of financial inclusion. DLT has the potential to bring about a new level of transparency in enabling financial institutions to safely leverage synergies generated in the whole ecosystem, know their customers properly, detect fraudulent transactions reliably, and diversify their risks more effectively. These new benefits could enable financial institutions to offer their services to segments traditionally regarded as highly risky, particularly in less developed countries. DLT also has the potential to empower entrepreneurs to scale up decentralised financial services platforms where community members can help each other. These developments could ultimately facilitate the flow of wealth, alleviate wealth inequality, and potentially enhance social justice and stability. The potential impact of DLT in financial inclusion should not be underestimated.

“We have the internet of everything but not the inclusion of everyone.”¹

Ajay Banga
President & CEO, Mastercard International

This explains why governments and regulators are moving to adopt DLT in hosting digital identity, establishing trade finance platforms, and encouraging microfinance. The role that governments or regulators usually plays starts with facilitating the formation of a working group or consortium, adopting an international data standard, enforcing proper governance and onboarding processes, as well as negotiating interoperability with other international partners. Their proactive involvement can largely accelerate the deployment of the DLT technology and drive the progress of financial inclusion.

¹ Banga, A. (2015) Innovating for Inclusion. Newsroom.mastercard.com. Retrieved from <https://newsroom.mastercard.com/wp-content/uploads/2015/03/Ajay-Remarks1.pdf>

Unbanked population

According to the World Bank, the unbanked population ranged from less than 1% in developed countries to over 98% in developing countries.² Mobile phone adoption, on the other hand, has reached 62.9% of the world's population by 2016. In countries like Kenya, over 60% people receive money using the mobile phone, compared to the world's average of 2%.³ Whilst the reasons are many, most site the cost and time taken to travel to physically open accounts and an absence of trust as the primary reasons for not opening a traditional bank account.⁴

More and more digital platforms around the world have been established to support the unbanked population with basic financial services available through the mobile phone. Obviously, sending and receiving payments through electronic platforms are much could be considered much more secure than holding a bag of cash and walking for hours to and from the marketplace or place of business. However, mobile banking may not be best placed to solve some issues common in less developed areas:

- Lack of privacy protection;
- Frequent devaluation of currency;
- Cross-border payment with foreign exchange; and
- Production quota control.

DLT, which has been popularised due to its role as the underlying technology for Bitcoin, a crypto-currency with limited supply without a centralised governing body. Using the secured hash algorithm (SHA) and random generated payment addresses, anonymity is guaranteed and inflation is impossible. While Bitcoin itself may not be a good candidate to play the role of an official currency, there is a strong argument to say that the issuance of an official crypto-currency by a government may yield benefits in the longer run. A number of governments have been working on this direction and have tried in scenarios such as interbank clearing.⁵ Even though these government-backed crypto-currencies may not retain the anonymity in the design of Bitcoin, they can incorporate limitations in their supply and thus by their nature should prevent significant volatility and potential rapid devaluation.

Another valuable application of crypto-currency can be observed in the world of cross-border payments and remittances, which historically have been characterised by high individual transaction costs which challenge the affordability for the less affluent segments of the population. Without proper cross-border payment channels, many communities in the world are hindered from participation in the broader trade cycle; the negative

impact of which can be especially acute if their primary economic output is relatively concentrated. They have to rely on potentially costly intermediaries and are subject themselves to adverse pricing and trading agreements. Cloud-enabled DLT platforms, however, can allow frictionless cross-border transactions through a global consensus mechanism instead of centralised institutions or multiple intermediaries.⁶ As long as anonymity is managed and money laundering can be prevented, governments would appear to be more open in accepting the use of crypto-assets for remittance.

Lastly, governments could also use crypto-tokens to support the concept of production quotas, so that farmers in less developed areas can produce agricultural products based on the demand, thus avoiding potential wastage and undue pressure on pricing. For instance, take the example of tea. Envisage a situation where a farmer cannot sell tea leaves without holding a requisite crypto-token to support production. He could cultivate other produce without the corresponding token or purchase the tea-leave token from other farmers or producers. A clearer picture of the aggregated demand could be made available to producers, replacing the old and potentially inefficient market mechanisms.⁷

² Demirgüç-Kunt, A., Klapper, L., Singer, D., Ansar, S., Hess, J. (2018) The Global Findex Database 2017: Measuring Financial Inclusion and the Fintech Revolution. World Bank Group. Retrieved from <http://www.worldbank.org/en/programs/globalfindex>

³ Hodgson, C. (2017) The world's 2 billion unbanked, in 6 charts. Business Insider UK. Retrieved from <http://uk.businessinsider.com/the-worlds-unbanked-population-in-6-charts-2017-8/#these-10-countries-saw-the-biggest-increases-in-the-number-of-people-with-accounts-between-2011-and-2014-4>

⁴ Ibid.

⁵ Chen, Q. (2017) Next stop in the cryptocurrency craze: A government-backed coin. CNBC. Retrieved from <https://www.cnbc.com/2017/11/30/cryptocurrency-craze-springboards-government-backed-coin.html>

⁶ Arnold, M. (2018) Ripple and Swift slug it out over cross-border payments. Financial Times. Retrieved from <https://www.ft.com/content/631af8cc-47cc-11e8-8c77-ff51caedcde6>

⁷ Jadhav, R. (2013) Can tea cartel be more than a storm in a teacup? Reuters. Retrieved from <https://www.reuters.com/article/tea-cartel/can-tea-cartel-be-more-than-a-storm-in-a-teacup-idUSL4N0AU2VA20130128>

Microfinancing

The segment of the population often precluded from financing includes those who do not have a stable income, permanent address, or proper valuation of their collateral. This segment often fail to meet the know-your-customer (KYC) or the loan-to-value (LTV) requirements required for traditional banking services. For incumbent financial institutions to adequately service this segment, processes would be needed to collect more intelligence on these applicants and their collateral position, however quite often the financial returns fail to justify the cost, especially if it involves a vast geographical coverage, intermittent infrastructure and pervasive fraud.

DLT platforms have the potential to allow trustworthy organisations to share information real-time, securely, and cost-effectively over a wide geographical area. That is why governments are building DLT platforms to lower the cost and risk of KYC processes for financial institutions.⁸ Families, employers, and perhaps neighbors can provide proof if not guarantees for the applicants through DLT. The return

of these microfinancing transactions may not be considered as lucrative to incumbent banks and money lenders, but governments can leverage DLT to inject funding for microfinancing loans. DLT has the potential to provide an immutable record of all lending activity as well as automating the operations of the entire life cycle of the microfinancing transaction, including disbursement, interest payment, and settlements through the use of smart contracts.

Collateral information could also potentially be collected through DLT platform. Qualified appraisers could provide proper valuation of the collateral in the distributed ledger. Multiple financing using the same collateral could be detected easily by smart contracts using the hash information. Supporting documents could also be digitised and uploaded to the DLT platform through distributed file systems. In these circumstances, DLT has the potential to substantially lower the cost of microfinancing – not only through reducing costly manual effort but also through lowering the incidence of fraudulent financing.

A DLT platform could also support the collection of big data from the largely unbanked population. Historically, demographic information from this segment of the population has not been capable of capture due to the poor information infrastructure and lack of reliable databases surrounding their financing and wealth activities. Once a DLT platform is established, any qualified organisations in the ecosystem, from small rural banks and cooperatives to even not-for-profit charity organisations could run a data node and capture reliable information on which to draw inference and create opportunities. The access to this data can potentially reduce information asymmetry and incentivise more financial services providers to supply credit and liquidity to the ecosystem. It also allows governments and regulators to collect real-time information for decision making and policy setting. Other potential use cases for the enhanced data set include reporting intra-day liquidity and underwriting mandatory nationwide medical insurance policies with on-chain data.



⁸ Das, S. (2017) Singapore regulator, banks complete kyc blockchain prototype. CNN. Retrieved from <https://www.cnn.com/singapore-regulator-banks-complete-kyc-blockchain-prototype/>

MSME trade financing

Micro, small, and medium enterprises (MSME) represent an important segment in the overall flow of wealth. To support the gradual progression in economic well-being from poverty, an economy needs to encourage entrepreneurs to incubate new ventures, trade with overseas partners, hire more domestic labor, and eventually pay more tax. A closed economy without trade may find it difficult to create a sustainable economic growth.⁹

Unfortunately, MSMEs initiated by spirited entrepreneurs often face a number of challenges. When an overseas buyer makes a large order, the supplier typically needs additional working capital to produce the goods. It may technically use the buyer's purchase order as the collateral and proof of future cash flow, but traditional financial institutions may be reluctant to provide finance where there is a risk of double financing. Prior to DLT, it was not easy to detect if the same purchase order had been presented to more than one financial institutions for financing on multiple occasions.

Even if the goods ordered can be produced, the payment terms could have the potential to drive the supplier to insolvency. Again, it may technically use the invoice issued to the buyer as the proof of receivable to obtain invoice financing or factoring. But

the historical pervasiveness of forged invoices may continue to curb the appetite of financial institutions to provide the necessary financing service. This is another common cause of potentially significant losses in the trade financing business.

Not only do suppliers in developing economies find it challenging to obtain financing, established buyers in developed areas dealing with suppliers in less developed areas can find it hard to obtain financing because they cannot get through the KYC process of their banks for their trading partners. These buyers are often large multinational corporations with merchandisers residing in the less developed areas with their suppliers. They are happy to provide the proof of the credibility of their suppliers in countries where the banks may not have presence. Even so, there is no effective way to allow an onboarding process through these multinational corporations.

As a result, although MSMEs are found to have a continuously decreasing delinquency,¹⁰ and a much lower default in trade finance than other loans,¹¹ they have great difficulties in obtaining the necessary financing for their operations. Fraud has been a key reason. To tackle fraudulent financing, banks have to pool all their information in a centralised database in order to monitor and prevent issues like duplicated financing. Information security is an issue. This will not only

"In a system of free trade and free markets poor countries - and poor people - are not poor because others are rich. Indeed, if others became less rich the poor would in all probability become still poorer."

Margaret Thatcher
Former British Prime Minister

lead to the risk of sensitive business intelligence leakage, but the banks also face the regulatory constraint against offshore customer data hosting. A Trade Finance DLT platform resolves these issues through detecting duplication with hashes instead of the original transaction data. It facilitates the sharing of sensitive information among participants in the ecosystem, including financial institutions and corporations, without jeopardising with the customer data hosting regulations and privacy protection laws in individual jurisdictions. The cryptography embedded in DLT reassures financial institutions that all transaction documents in the platform, including the purchase order, bill of lading, invoice and etc. are not exposed in any way.

⁹ Casabona, M. (2018) Microfinance, MSMEs and the Macro Economy: Evidence from India. Honors College Theses. Retrieved from https://digitalcommons.pace.edu/cgi/viewcontent.cgi?article=1174&context=honorscollege_theses

¹⁰ Hong Kong and Singapore launch a joint project on cross-border trade and trade finance platform. (2017) Hong Kong Monetary Authority. Retrieved from <https://www.hkma.gov.hk/eng/key-information/press-releases/2017/20171115-6.shtml>

¹¹ Heath, A. (2015) Seven percent of world trade counterfeit. CEE Packaging. Retrieved from <http://ceepackaging.com/2015/09/03/seven-percent-of-world-trade-counterfeit/>

At the commencement of the onboarding process, when a qualified financial institution has completed the KYC process and hashes the customer information on chain, the same customer will enjoy a much faster onboarding process with another financial institution in the network because the same hash is produced by the second financial institution, and a duplication is detected. This will facilitate a customer qualified by one participant in the ecosystem to work with all the other participants in the same ecosystem easily. Further, in some DLT platforms, a hierarchical identity management system can be administered, allowing a financial institution to onboard their large clients, who can then further onboard their business partners anywhere in the world. This will greatly enhance the scalability of the ecosystem and improve the accessibility to the much needed credit and liquidity by MSMEs.

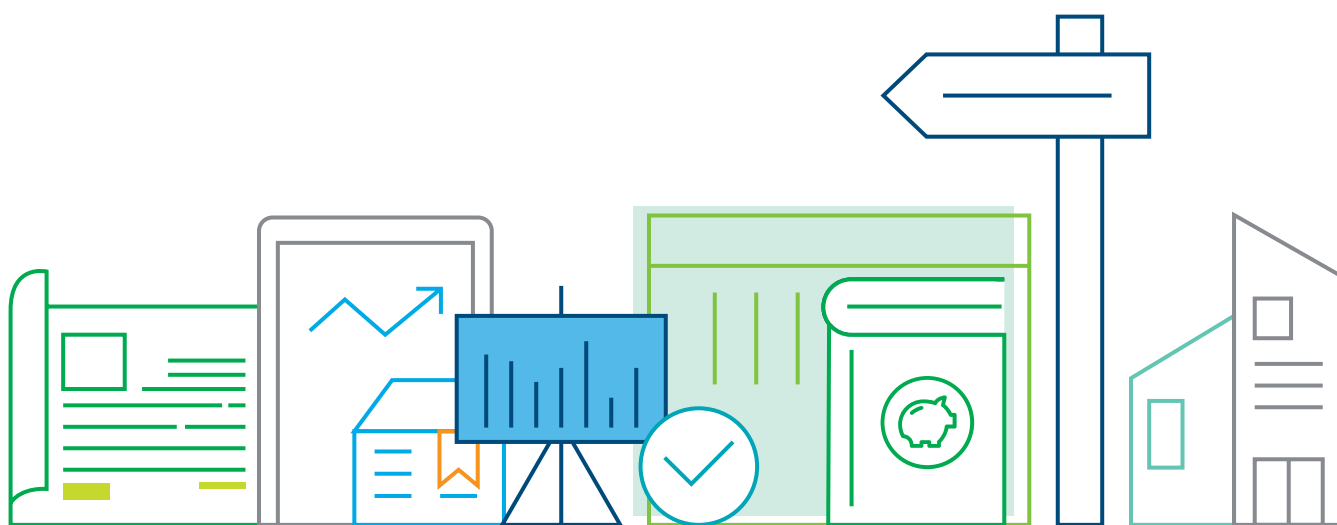
Last but not least, all documents on the platform such as purchase orders and invoices are all digitally signed by

the parties participated in the contract, and are immutable. As a result, it is almost impossible to forge any trading documents on a DLT platform. When fraud happens, it is also very easy to trace back the liability. In this sense, the distributed ledger itself can be regarded as a huge global audit trail.

This may explain why regulators pioneered in the collaboration of trade finance platform development. For instance, the Hong Kong Monetary Authority and the Monetary Authority of Singapore signed a memorandum in this regard which DLT was selected to be the underlying data synchronisation platform, also known as the Global Trade Connectivity Network (GTCN). The motive behind their proactive involvement has largely been the pursuit of financial inclusion through helping MSMEs. The Hong Kong Monetary Authority even made this goal explicit in their recent announcement on the virtual bank licensing application.¹²

Supply chain traceability

Another major challenge for governments and regulators is the sheer amount of counterfeit products in the market, historically this is estimated to be over US\$600 billion and representing 7% of global trade.¹³ These products range from mobile phones and toys to baby formula, medicines, and diamonds. Counterfeit food products alone amount to US\$40 billion annually. They are not only damaging the economy but also putting at risk the health of the people. As a result, over US\$16 billion have been spent on anti-counterfeit technology, but the amount of counterfeit products continues to rise.¹⁴ Regulators and governments have thus shifted their attention to how DLT may help.



¹² Hong Kong Monetary Authority, op cit, page 4

¹³ Heath, op cit, page 4

¹⁴ Australia and NZ food and wine producers embrace technology to fight Chinese knock-offs. (2017) News.com.au. Retrieved from <http://www.news.com.au/technology/innovation/australia-and-nz-food-and-wine-producers-embrace-technology-to-fight-chinese-knockoffs/news-story/e735abbac442ea398a6df803699df7e1>

“Government control gives rise to fraud, suppression of Truth, intensification of the black market and artificial scarcity. Above all, it unmans the people and deprives them of initiative, it undoes the teaching of self-help...”

Mahātmā Gāndhī
Leader of the Indian
Independence Movement

A valuable feature of DLT platform is the ability to trace all products back to their sources. MSMEs often find it challenging to sell their products overseas especially to reputed corporations because of the potential risk of counterfeit supplies from MSMEs. In addition to the challenge of the large volume of counterfeit products, large corporations also have to ensure that the products are "clean" from using sweat shops in less developed areas, sanctioned countries, or funding conflict zones. Without any cost-effective mechanism to guarantee compliance, larger corporations are often forced to rely on reputed wholesalers and merchandisers – thus excluding MSMEs from participating.

With the DLT platform, the source of every single product could be traced, and the shipping routes made transparent. Retailers could have peace in mind that their products are not putting their reputation at risk and they can gain a reprieve from reliance on numerous intermediaries or audit inspection on the field. MSMEs are also benefited in that they can save the intermediary cost and the savings will boost their profit margins. In near future, the transparency offered by DLT platforms could help MSMEs stand firm on their feet more readily, allow them to build their brand and grow larger and stronger. There is no incentive to leave a non-compliant or poor-quality record in an immutable ledger – thus potentially marring their reputation forever. Therefore, using DLT in supply chain traceability offers an incentive for governments and regulators to fight the counterfeit market while enhancing financial inclusion.

Crowdfunding

As the ecosystem grows along with DLT platforms, more and more data will be put on-chain and this could result in a further synergies being realised in enabling financial institutions to conduct effective credit underwriting and offer tailored and risk-sensitive pricing. DLT could lower the financing cost for many MSMEs and facilitate individual-to-MSME lending. Once transparency is enabled through a DLT platform, individuals need not rely on large financial institutions to conduct underwriting and fraud detection on their behalf. They could select projects

they want to finance, in terms of risk and return portfolio and/or driven by cause and interest. Many more interesting business ventures could become viable as long as they can find sponsors in the ecosystem.

Initial Coin Offering (ICO) has been perhaps the most exciting channel for fund raising in recent times. With a proper business model, a sound technology architecture and a welcoming jurisdiction, a new venture would easily obtain funding from individual investors. The funding mechanism is all coded in the smart contract and the transactions can be considered fully transparent. ICO is not meant to replace Initial Public Offering (IPO) owing to the regulatory constraint, but the concept could be applied in stock exchanges to create additional access to capital for MSMEs.

The views of governments and regulators towards ICO vary. Some are concerned about its ability to launder money, bypass currency control, and engender Ponzi scheme like financing and investment. The concern drove some countries to ban the capital raising channel altogether. However, some others preferred to protect investors with new legislation, warn investors about the risks, provide support with a regulatory sandbox, or simply adopt a laissez-faire mentality.¹⁵ Nevertheless, ICO is a new funding channel for MSMEs and should be further explored to balance the capital infused on financial inclusion with the risk to investors.

¹⁵ Medina, D. (2017) How Governments Are Reacting to ICOs. Coindesk. Retrieved from <https://www.coindesk.com/governments-reacting-icos/>

Microinsurance

Microinsurance and microfinancing are two very closely related business concepts. Both of them target the long tail of small and medium sized customer segments, in which those customers are usually enclosed in a community without official or centralised information databases. DLT platforms could make significant amounts of information transparent to the insurers, and thus potentially lower premiums for MSMEs. For instance, the total insurable cargo value being shipped could be easily retrieved from a DLT platform, and can be validated with supporting purchase documents. Meanwhile, instead of insuring the bulk of any shipment, insurance firms could now insure a very specific lot of products, and even for a very small subset of events.

Just like trade finance, double claims could be detected in microinsurance facilitated through DLT, and reduce the provision for fraud. KYC could be undertaken much faster and cost effectively. Most importantly, microinsurers can often find it difficult to further transfer the risk to reinsurance. DLT platforms can potentially allow individuals in a community to pool up their resources as provision for each other, with high transparency and automated claims processing through smart contracts. This reduces the need for a large back office operation or claims inspection before setting up the microinsurance ecosystem.

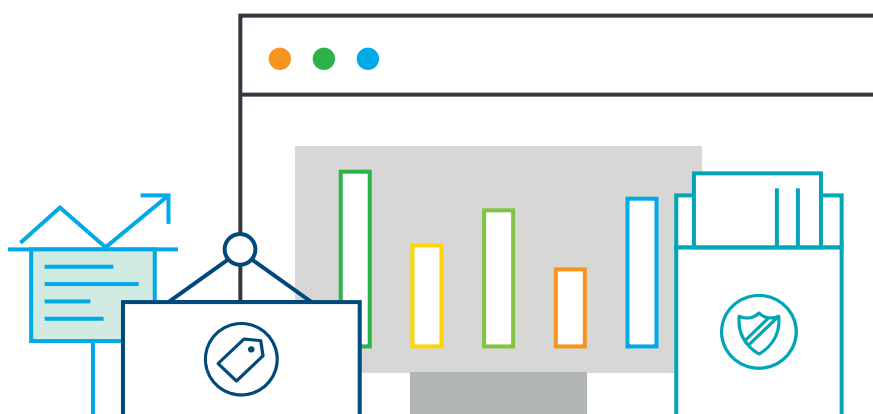
A DLT platform can also allow reinsurers to collaborate with these microinsurance companies and allow the latter to transfer the risks. The treaties between insurance and reinsurance firms are all programed into the smart contract. When a claim comes through, it will be uploaded to the network and the payment is automatically triggered without any need to undertake reconciliation. The cost of operations is thus much lowered, rendering microinsurance for MSMEs a viable business model.

There is a growing appetite for reinsurance investment, with the total amounting to US\$605 billion by June 2016.¹⁶ Outstanding catastrophe bonds alone stand at US\$26 billion. Governments should leverage these investments on reinsurance and channel them to the uninsured rural areas to enhance financial inclusion. DLT provides a highly cost-effective way to connect the microinsurance platforms with institutional reinsurance investors. Liberalisation of the insurance market in less developed areas are underway and it is a win-win scenario for both reinsurance firms and governments with the aspiration of inclusion.

Talent and employment

A DLT platform could also be used to prevent inflation of qualifications in candidate CVs, and thus help MSMEs source strong and qualified talent from a wider geographic area. Where certified professions such as insurance agents or financial planners are needed, a DLT platform can disemble both the profile and validated certification to all potential employers, especially for those that who cannot afford a HR agency or other form of independent validation. Lastly, crypto-currency could facilitate the compensation of ad hoc and short-term hiring of potential resources, solving different technical programs for MSMEs in less developed areas.

Government and regulators can play a role in these certification platforms by providing an official endorsement of the records. The education and quality assurance system of a country can be strengthened with the use of these platforms so as to assure the quality of the labour force. It can facilitate the recruitment by foreign enterprises and the export of services to overseas clients.



¹⁶ Reinsurance Market Outlook: Hurricane Harvey Highlights Protection Gap; September 2017. (2017) Aon Benfield. Retrieved from <http://thoughtleadership.aonbenfield.com/Documents/20170910-ab-analytics-rmo-september.pdf>

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