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Digital Economy Outlook

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1. Summary

The framework for digital regulation in Latin America: How to balance innovation and safety?. Latinamerican countries lack a financial regulation framework that is harmonised and suited to the challenges of the digital age. So far, the authorities in the region have chosen not to stall innovation but this inaction could end up holding back the region's development.

Decentralized Applications (DApps): The building blocks of the future Internet. Distributed Ledger Technologies are giving birth to a new breed of applications, which do not run on a company's proprietary servers, but on peer-to-peer networks. The implications range from the emergence of new business models to the onset of a new discipline - tokenomics - and even the design of a new Internet.

Instant payments: Wider roll-out of instant payment systems heralds more competition between payments rails. Instant payment systems have been slowly rolled out around the world, with systems now available in nearly all OECD countries. The increased availability, coupled with technological and regulatory changes, could see new business models that leverage these rails for e-commerce, P2P payments and other value-add services for consumers and firms, leading to rapid growth in use in coming years and increased competition with other forms of payment.

The cloud vs. mainframe conundrum. A quick on-line search of "cloud computing case studies" returns lots of success stories. Cloud adoption appears to benefit all kinds of organisations, from on-line content providers to government agencies. However, supervisors seem to prefer mainframe IT in some critical sectors. Is this preference substantiated?

Enhancing Economic Empowerment through Financial Inclusion. Financial exclusion does not necessarily mean financial inactivity. The World Economic Forum (WEF) has launched an initiative to create an innovative framework to better understand how data can help in shaping effective policies to generate the conditions to achieve full-quality financial inclusion with customer-centric products and services. The metrics proposed include maturity of payments, credit, savings services and the overall regulatory environment.

2. The framework for digital regulation in Latin America

Lucía Pacheco

How to balance innovation and safety?

Latinamerican countries lack a financial regulation framework that is harmonised and suited to the challenges of the digital age. So far, the authorities in the region have chosen not to stall innovation but this inaction could end up holding back the region's development.

The **digital transformation of financial services** is a mix of adopting exponential technologies, innovative infrastructures and new business models. Thus, the **digitisation of financial services in Latin America** can enhance and expand the range of products and services at the disposal of consumers and companies in the region, help to bring down costs and achieve efficiency gains in the system, and ultimately can broaden the proportion of population financially included, even in rural areas.

Even though there are clear benefits, digitisation can also engender new risks in terms of the stability and integrity of the financial system and consumer protection, especially in environments with low levels of financial and digital literacy. The **traditional framework of financial regulation and supervision lacks the dynamism and flexibility** needed to adapt to an environment that is subject to continuous changes, which can even prove disruptive, and it appears **to fall short to address the challenges that go beyond the mere realm of financial services and require cross-cutting regulation.** A holistic response by governments and regulators is therefore called for to develop a new regulatory framework.

Even though the authorities in Latin America recognise the benefits (and to a large extent the risks as well), up to now and with very few exceptions, they have confined themselves to interventions limited to regulating certain innovative business models, such as *crowdfunding*, and reacted to critical challenges in an assortment of different ways without any regional coordination. Yet in the new digital environment the barriers between countries and sectors become blurred, so **a consistent response based on basic principles has to be defined.** Coordination between countries can help the region **to reap the advantages of the integration of Latin American markets** and achieve economies of scale and increase the likelihood of achieving efficiency gains.

In defining such general principles, it is important for Latin America to follow the **best practices defined at the international level** by the standard-setting bodies[1] and the **experience of other geographical areas** where the regulatory debate is at a more mature stage, such as the European Union or Singapore.

1: Pacheco, L. Fintech: implications for regulation and supervision. Digital Economic Outlook by BBVA Research, December 2017.

In line with these best practices, the key pillars on which to build the digital regulation framework in Latin America should be:

- **based on risks and activities**, rather than on institutions under the supervisory spotlight
- **holistic**, not only including the traditional oversight concerns in the financial sector (prudential and conduct-related issues), but also those that relate to data protection, cybersecurity and competition
- **cross-cutting**, based on **close coordination among authorities** from different sectors and countries, while **including the private sector** right from the outset
- **flexible** and ready for the future, to enable adaptation to a rapidly-changing environment in terms of technology and business models
- **agnostic to technology** and focussed solely on regulating the effects of how it is applied.

Five major challenges

In this process of adaptation to the new environment, Latin America is facing five major urgent challenges:

- **Achieving "end-to-end" digital financial products and services** by making the most of the advance of internet and mobile penetration in Latin America. The possibility of financial institutions offering a straightforward and secure digital *onboarding* process enables an enhanced customer experience and, by bringing down the costs of affiliation, it makes it possible to expand the offer of financial services to a population segment that had previously not been catered for. To this end the authorities must set in motion efficient and secure **digital ID systems** or, failing this, allow online identification and verification of customer identity in a suitable and secure manner by deploying the most cutting-edge technologies in this field.
- **Ensuring data protection and regulating the rules for accessing this properly.** Latin American countries must continue to make inroads into building sound data protection frameworks that are supported by an institutional structure where responsibilities are clearly defined. This arrangement is a necessary condition to allowing technologies to be adopted such as ***cloud computing*.**
- At the same time as new challenges spring up in relation to the improper use of data and security, data has become the **central element in generating personalised value-added services** for customers, which are in turn necessary to ensuring their satisfaction and winning their trust and connecting the population with the opportunities offered by the digital age. In the current environment the barriers among sectors become blurred and so in **designing sector standards** to regulate data access it becomes necessary **to avoid bringing in disparities** among the various different financial service providers.

- **Establishing a harmonised and clear-cut regulatory framework to allow cloud computing to be adopted in the financial sector** and ensuring adequate risk management. The adoption of *cloud computing* to store and process large volumes of collected data provides substantial advantages in terms of speed, efficiency, time-to-market and productivity.

- **Enhancing the efficiency and robustness of the payments system.** This is probably the area where Latin America has been seeing the biggest innovations. Such progress is based on developing mobile solutions and, in some countries, on introducing instant payment schemes. There is no doubt that this brings numerous advantages to the financial system through reduced transaction costs, though also for the economy as a whole. Ultimately, a greater digital transactionality reduces the use of cash and might constrain informality. Going forward, Latin America should continue to make progress in this direction.

- **The encouragement of *fintech* innovation by all players.** Here **regulatory *sandboxes*** make it possible to create a secure environment for experimentation where banks and new providers can try out innovative solutions without incurring the full regulatory burden from the start. They contribute to increasing dialogue between the public and private sectors as well as cooperation among different authorities.

Any regulatory reform or new policy should ensure that there is a **balanced regulatory environment** and contribute to reducing disparities among the various market participants. To this effect, regulators should **consider vertical fintech licences** which are specific to certain activities and risks, in line with what has already been and is being done in the region to regulate *crowdfunding* activity or certain payment activities.

The state of play

Many Latin American regulators are of the view that the market size of many of the above "fintech" activities is still small and they have consequently taken a **"wait and see" attitude** in a bid to avoid holding up innovation. Nevertheless, **regulatory inaction can also represent a brake on innovation in highly regulated industries.** This is especially significant in a civil law system as the one that predominates in Latin America, where legislation that is in force is often interpreted strictly and therefore turns out to be less inclined towards innovation than the Anglo-Saxon *common law* system. This difference adds more rigidity to the regulatory reform process, which often has to base itself on reforming or enacting new laws, which is a slower and more expensive process than issuing second tier rules.

In light of this **the authorities in the region urgently need to begin designing a regulatory framework** which achieves a balance between encouraging innovation as well as financial inclusion and ensuring both the soundness of the system and consumer protection.

Mexico: a reference point for the region

Over this month of March, Mexico's Congress passed the **new Law on Financial Technology Act (known as the FinTech Law)** aimed at promoting technological innovation towards providing more affordable and suitable financial services. The FinTech Law introduces two **new licences** for fintech institutions engaged in e-money business and crowdfunding. It moreover empowers Mexico's central bank to regulate **transactions using virtual assets** and introduces **open banking requirements**. At the same time, it proposes creating a **regulatory sandbox** and a Financial Innovation Group as a body for consultation, advisory services and public-private coordination. Following the passing of the Law the baton is being passed to Banxico, the National Banking and Securities Commission (CNBV) and the Ministry of the Treasury and Public Credit (SCHP), which will have to define a **comprehensive body of second tier regulation** in the next two years.

3. Decentralized Applications (DApps)

Javier Sebastián

DApps: The building blocks of the future Internet

Distributed Ledger Technologies are giving birth to a new breed of applications, which do not run on a company's proprietary servers, but on peer-to-peer networks. The implications range from the emergence of new business models to the onset of a new discipline - tokenomics - and even the design of a new Internet.

What is a DApp?

Although the Internet was originally built on open protocols, most of the services we use on it today are being provided by centralized applications running on servers owned by individual companies like Google or Amazon. However, there is growing concern related to centralized applications, to the point where some famous Internet voices are spreading the idea that the "Internet is broken". Centralized apps are arguably less transparent, have a single point of failure, fail to prevent net censorship and act as data silos, among other known issues. Due to these concerns, and leveraging DLTs, new kinds of Internet applications are being built, known as decentralized applications or DApps.

A DApp is a kind of Internet application with a backend that runs on a decentralized peer-to-peer (P2P) network. No single node in the network has complete control over a DApp. They are more flexible, transparent, distributed and resilient, and they have a better incentivized structure than current software models. Bitcoin is an example of a DApp. Depending on the functionality of the DApp, different data structures are used to store application data. For example, the Bitcoin DApp uses the blockchain data structure.

Any computer connected to the Internet can be a peer in the network; therefore, it becomes a big challenge to detect and prevent peers from making invalid changes to the application data and sharing incorrect information with others. As there is no central server to coordinate the peers and decide whether the data published by a peer is right or wrong, some kind of consensus between peers is needed to ensure the fair functioning of the application. There are specific consensus protocols to tackle this challenge, designed specifically for the type of data structure that a DApp uses.

Characteristics of a DApp

The DApp space is currently an emerging field with a lot of smart people still experimenting with new models. There are different opinions on what, exactly, a DApp is. Nevertheless, there are some features common to all DApps:

Open Source: Decentralized, closed-source applications require users to trust that the app is as decentralized as the core developers say it is, and that they do not have access to their data through a central source. This is particularly important when the application is designed to transfer value. On the other hand, in the most extreme licensing model, open sourcing an application allows competitors to take the code, white label it, and sell it as their own. So, where is

the benefit? Bitcoin is a good example. Satoshi kept an initial number of bitcoins and let others use the rest. As bitcoins were limited in quantity and the network itself provided huge value to society in the form of its novel proof-of-work mechanism, the value of bitcoin started to increase and so did his wealth. Being open source made it possible for the network to achieve the transparency it needed to improve itself through developer contributions and to gain the trust of its users that gives its coins real-world value. Open sourcing a DApp will gain the trust of potential users. Users want to get behind the people best suited to maintaining a DApp, and these tend to be the original developers.

Internal "currency": A recurring question is how to monetize a DApp. Traditional modes of monetization for centralized applications include transaction fees, advertising revenues, referral commissions, access rights to user data, and subscription services. In a DApp these models do not work, because the developers are not providing a service which they can charge for, they do not control access rights to user data, and they cannot embed advertising or subscription services. The way for a developer to make money with an open-source DApp is to allocate scarce resources in the network by issuing a limited amount of a proprietary token. Users need this token to use the network. Owners of scarce resources get paid in tokens. As the network grows to include more users, the existence of a fixed amount of tokens from the outset makes the value of the tokens increase as well. This model can be applied to any kind of DApp. Scarce resources can include computing power, storage space, trades, images, videos, texts, ads, and so on. The design of the role of the token, how they are distributed and how to govern the token "monetary" policy is already known as "tokenomics."

Decentralized Consensus: Before Bitcoin, consensus on transaction validity always required some degree of centralization. A payment, for example, had to go through a clearing house that monitored all transactions. Bitcoin is peer-to-peer (P2P), which means nodes are able to talk to each other directly. P2P networks are not new, they were invented before the blockchain. But blockchain adds decentralized consensus, a mechanism for participants to agree on something in a decentralized way. There have been lots of decentralized protocols in the past, but they all required nodes to trust one another. The blockchain is the first decentralized database that is highly tamper-resistant, an immutable record that every node has a copy of, so no one can cheat the network.

No Central Point of Failure: DApps cannot be shut down because there is no server to take down. Data in a DApp is decentralized across all of its nodes. Each node is independent; if one fails, the others are still able to run the DApp.

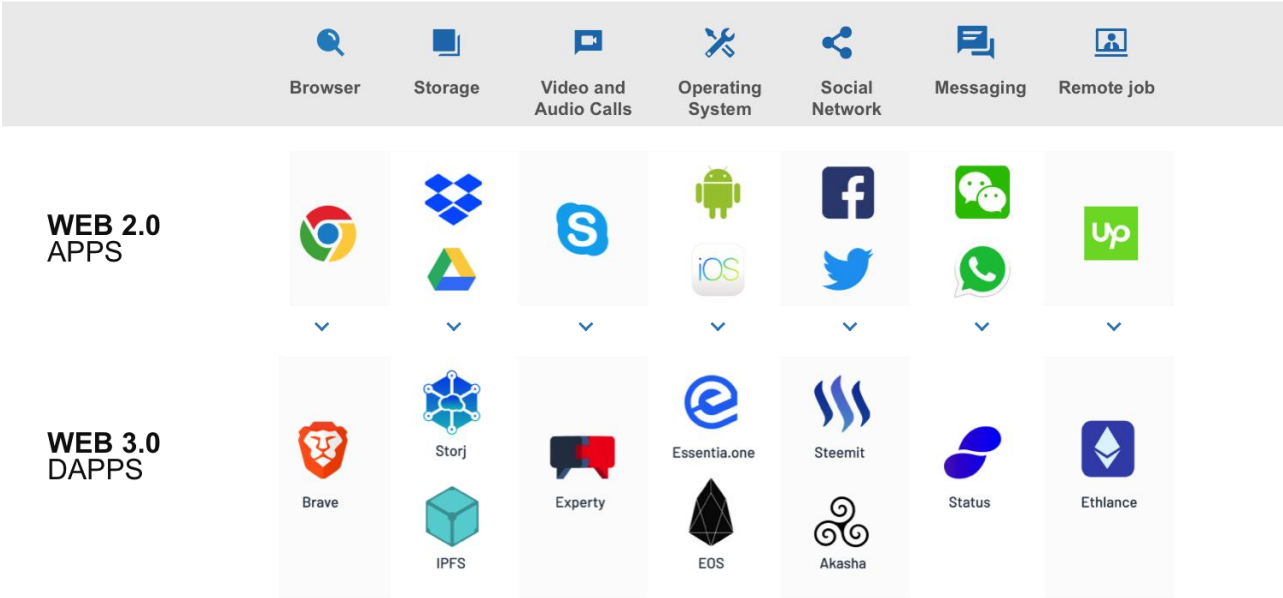
The way towards Web 3.0

The Web was pretty decentralized from the outset. The HTTP protocol connected everyone on the planet with a computing device and an Internet connection. People would host personal servers for others to connect to, and everyone owned their data. But relatively quickly, application servers began taking off and the centralized model of data ownership as we know it today was born. This happened in a natural way: one company pays for maintenance of a server and profits from the users that utilize the software on it. Almost every Internet application we use today is centralized.

More recent applications, mostly entailed in the so-called “sharing economy” like Uber and Airbnb decentralize the “real-world” parts of a business by providing a central and trusted data store. They usually act as marketplaces where providers and consumers can match their services and needs in a way that allows them to capture a bigger part of the generated value compared with fully centralized applications. However, there is still a central part managing the application and building a business model around fees and commissions. Their semi-decentralized scheme foreshadows the development of even more decentralized apps.

Are there any standalone DApps that satisfy all four criteria: no central point of failure, they issue their own internal currency, have decentralized consensus, and are open source? Not yet, but they are coming. As Figure 1 shows, practically all the applications we habitually use have an equivalent DApp being developed, in what is already know as the “Web 3.0”, a DLT-based Internet instead of the current server-based Internet. There are even decentralized versions of Uber (La’Zooz), AirBnB (CryptoCribs) and eBay (OpenBazaar).

Figure 1 Decentralized equivalents of today’s common Internet applications



Source: Matteo Gianpietro Zago (https://medium.com/@matteozago/why-the-web-3-0-matters-and-you-should-know-about-it-a5851d63c949)

Obviously, there are still uncertainties that could hinder the realization of this DApps-based Web, including whether there are sufficient incentives to generate such platforms with a user experience comparable to centralized alternatives, how a DApp connects to centralized payment or logistics systems, what happens when the original developer has left the project, and whether the financial incentives for the open source community are strong enough to sustain the project.

Nevertheless, if these challenges are overcome, the combination of DLTs as infrastructure and DApps as consumer-facing service provisioning instruments, together with the development of “tokenomics” could potentially represent a quantum leap towards a totally different way of doing businesses and, eventually, the birth of a whole new type of economy.

4. Instant payments

Edward Corcoran

Wider roll-out of instant payment systems heralds more competition between payments rails

Instant payment systems have been slowly rolled out around the world, with systems now available in nearly all OECD countries. The increased availability, coupled with technological and regulatory changes, could see new business models that leverage these rails for e-commerce, P2P payments and other value-add services for consumers and firms, leading to rapid growth in use in coming years and increased competition with other forms of payment.

What are instant payments?

While there's no fixed definition, an instant payment transaction - sometimes also referred to as a fast or real-time payment - is generally defined as a transaction where the funds are available to the recipient nearly immediately (typically in less than 30 seconds) and with 24/7/365 service.[2]

Account-to-account retail payment systems offering this level of functionality are not new, but only recently have they become more widespread. They typically seek to enhance existing bank payment systems, which often only offer services during weekdays, have execution delays, and have limited ability to overlay additional services.

The demand for more rapid person-to-person (P2P) and person-to-business (P2B) payments has been filled in part by other systems, including the card networks, digital wallets such as PayPal, and other forms of mobile payments. However, these can have their drawbacks, including higher costs and settlement uncertainty particularly for merchants, and smaller user bases. Few have also made much of a dent in business-to-business (B2B) payments, where banks remain dominant.

Recent developments

A combination of the renewal of existing infrastructure and the recognition of the need to meet customer demands for always-on and more rapid services has driven the development of new bank-to-bank instant payment systems in the last ten years. With the November 2017 launch of the EU's instant payment scheme, SEPA Instant Credit Transfer (SCT Inst) and the USA-based Clearing House's Real-Time Payments, as well as the launch of Australia's New Payments Platform in February 2017, instant payment systems are now available in nearly all OECD countries. Service availability for individual users, however, depends on whether their bank has joined a system.

2: Committee on Payments and Market Infrastructures (2016), *Fast payments – Enhancing the speed and availability of retail payments*. BIS

System attributes do differ, including across value thresholds, pricing to end-users (e.g. free, maximum number of transactions, paid per transaction), channels (e.g. online, mobile, physical), and addressing (e.g. bank account number, mobile number, email address). However, there is a trend towards making systems more versatile and fit for digital financial services, for example with higher value limits, new addressing functionality and value-add services, such as remittance information that allows straight-through processing.

Following the rise of significant non-bank payment service providers (PSPs), the membership of instant payment systems is also being revised. The UK has, for example, committed to extending direct access to its Faster Payment Scheme to include a number of non-bank PSPs, which could include the largest merchant acquirers and fast-growing cross-border payment fintechs.[3]

SEPA Inst

The European Payments Council SCT Inst Scheme, which sets out the basic rules for instant payments in euros, entered into force on 21 November 2017. It allows for the execution of credit transfers of up to 15,000 euros across the EU in a maximum time of 10 seconds.

Unlike its slower predecessor, the SEPA Credit Transfer, SCT Inst is optional for EU banks. Since its launch 25% of European payment service providers - over 1,000 - have joined the scheme by connecting to a participating system.[4] However, the European Payments Council estimates that it will take until 2020 to reach 50% participation.[5] This may also be impacted by competition from the European Central Bank's own instant payment solution, TARGET2 Instant Payment Settlement (TIPS), which is expected to launch in November 2018.

Instant payments in a changing landscape

More rapid payments offer convenience and liquidity benefits to the consumers and businesses that use credit transfers today. But it is the over-the-top or linked services that are likely to bring the most value. Some of these may not be dependent on improved speed or availability *per se*, but to the refresh of the underlying architecture, for example the addition of request-to-pay and e-invoicing functionality. Other services may leverage technological and regulatory changes, with instant payments facilitating the growth of new business models.

The EU's revised Payment Services Directive (PSD2) in particular is expected to strengthen and expand the existing role of payment initiation.[6] It brings into regulation the act of a third party initiating a payment via online banking on behalf of a user and, crucially, is likely to make it much easier from end-2019, as many banks will provide user-friendly APIs to comply with PSD2 security requirements.

3: Bank of England(7 July 2017), *Bank of England extends direct access to RTGS accounts to non-bank payment service providers*, Press Release.
4: See European Payments Council, SEPA
5: Unlike in most other countries the EU scheme can be implemented by multiple, inter-operable systems. For example, EBA Clearing, an industry consortium which operates an existing "slow" SEPA payment system, has launched RT1, a pan-European service whose development was supported by more than 40 European banks.
6: Corcoran, E. (2017). PSD2 Impementation. *BBVA Digital Economy Outlook*. September 2017.

This easier access to instant payments functionality by third parties will make more viable a whole range of services. Within e-commerce, instant payments plus payment initiation could pose a threat to digital wallets and debit / credit cards, especially if merchants place a premium on quick access to their funds. For P2P payments, closed loop systems which require a separate user account would no longer be necessary, nor would piggybacking on the card networks. And from a B2B perspective, firms may be able to take advantage of more direct links into existing products and processes, like billing and invoicing or treasury management.

These developments will rest on both the wider uptake of instant payments by banks and users - which itself will be influenced by the evolution of costs for instant payments, as well as the availability of third party services facilitated by PSD2 APIs. There is the possibility of feedback between the two: a virtuous circle where new services feed increased use of instant payments and vice versa. Although this future won't itself come about immediately, instant payments could see rapid growth in coming years.

5. The cloud vs. mainframe conundrum

Jesús Lozano

A quick on-line search of "cloud computing case studies" returns lots of success stories. Cloud adoption appears to benefit all kinds of organisations, from on-line content providers to government agencies. However, supervisors seem to prefer mainframe IT in some critical sectors. Is this preference substantiated?

The IT lingo

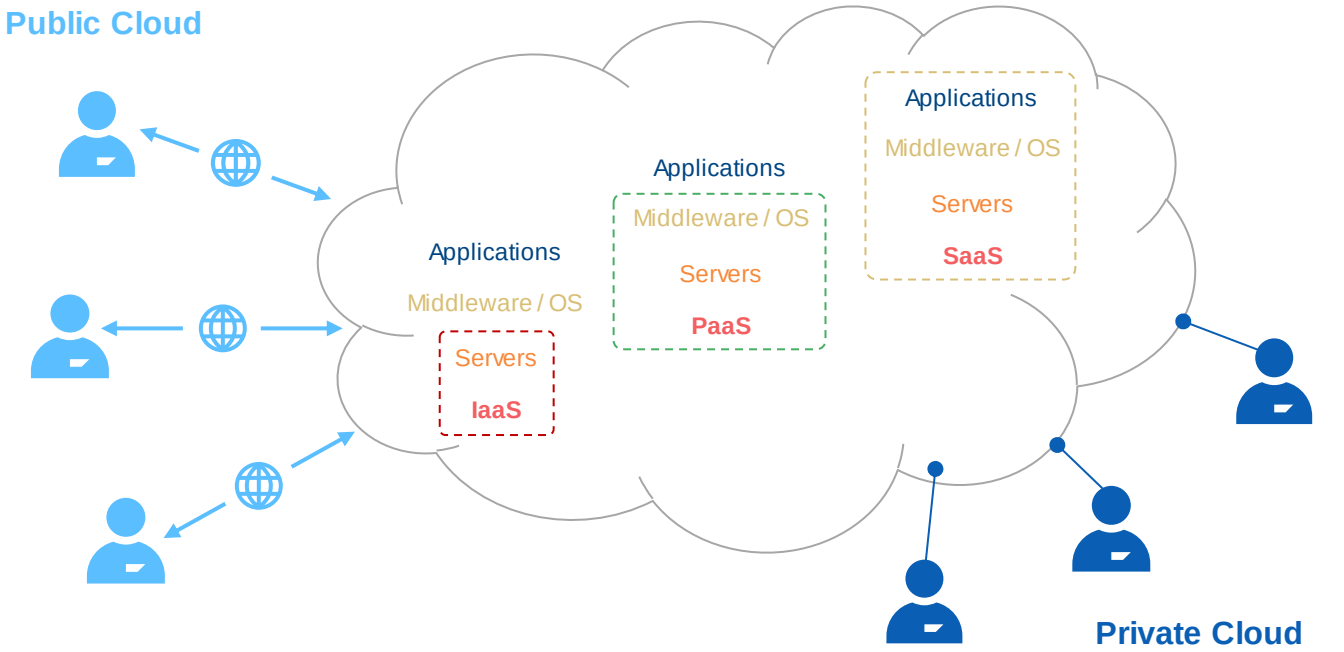
Cloud computing is a new IT paradigm that provides resources to develop and run software, abstracting away the underlying hardware. This allows users to focus on software without taking issues relating to IT infrastructure into consideration.

Depending on the access to a given implementation, **cloud computing can be divided into three broad categories: private, public or hybrid**. The first term refers to a cloud infrastructure that can only be used by a single organisation, the second to an infrastructure available to the general public, and the latter to a solution that combines a mix of private and public infrastructures.

In addition, cloud computing can be classified according to the features provided to its users: **Infrastructure as a Service (IaaS), Platform as a Service (PaaS) or Software as a Service (SaaS)**, among others.

IaaS is a virtualisation of computer hardware offered by cloud service providers (CSPs) that allows the deployment of remote or virtual data centers, while PaaS adds an extra layer onto IaaS to ease the implementation and operation of software, and SaaS refers to software solutions hosted by a Cloud Service Provider that can be accessed and used remotely.

Figure 2 Cloud computing typology



Source: BBVA Research

On the other hand, **mainframe computers, meaning the larger and more powerful computers used traditionally by large organizations for critical applications, bulk data and transaction processing, etc**., have been the IT standard for decades, thanks to their proven reliability, availability and serviceability (RAS).

Although these systems are usually installed in only a limited number of data centers, **they can also be implemented in many different ways**. For instance, they can be fully owned and operated by the final user, shared by different organisations or just "consumed" remotely by organisations while being operated by technology suppliers.

The advantages of a public cloud

Notwithstanding this**,** in the rest of this article, when comparing mainframe IT with cloud computing we will refer to **the type of cloud that most differs from a mainframe IT owned and operated by a company; a public cloud.** In a private cloud the IT infrastructure can actually be fully operated and owned by the final user, as with the most traditional mainframe IT implementations.

Thus, **the main benefits of a public cloud** can be grouped in 3 categories: **costs, flexibility and scalability**.

Regarding costs, thanks to the economies of scale, public cloud providers can offer lower prices and a **"Pay-per-use" business model** which includes operation, maintenance and security. Unlike with mainframe IT, it is not necessary to invest in technology procurement and deployment, or to over-size the infrastructure to cater for potential future needs.

Moreover, the innate abstraction from hardware infrastructure of **cloud services reduces time-to-market and facilitates innovation**. Indeed, cloud computing is best suited to keeping up with the pace of technological change due to the faster adoption of new technologies by cloud providers. This means that users of cloud services can test new technologies sooner and easily adopt or abandon them.

The only potential drawback of cloud computing in this field is the **lack of interoperability standards** that can make portability of data and applications to other cloud providers difficult. Nevertheless, the cross-sectoral and international nature of cloud services creates more incentives to develop standards for interoperability than with past technologies, where vendor lock-in is also an issue. Moreover, some regions are working on facilitating this data portability via initiatives such as the free flow of data promoted by the European Union.

Finally, **the shortage of technical skills is a major concern nowadays**. Operating IT systems requires deep and up-to-date technological knowledge, but the cost of attracting skilled employees is high, especially for non-technological companies such as banks, which are less-well-placed to attract, train and retain expert staff relative to technology companies. Therefore, cloud users can **leverage the technical skills of cloud providers, diminishing the demand for scarce resources** and releasing funds for investment in other activities.

Security and privacy in the age of cloud computing

Security would be one of the areas that would potentially receive such spare funds. In particular, there are two central issues when talking about security: "privacy" (protection and processing of personal data) and "information security" (ensuring confidentiality, integrity and availability).

Although, **it is widely assumed that data privacy is best protected in mainframe environments** as a result of the positive security track record of mainframe IT, the apparently controlled execution of processes and the known location of data, this is not altogether true.

Firstly, major cloud providers also have an impressive security track-record with no major known incidents.

Secondly, services such as banking are nowadays offered from different locations and accessible through remote channels. This creates potential attack points to mainframe systems, which in some cases were not designed to be open to third parties.

Thirdly, although location of data in a public cloud is not always straightforward, major cloud suppliers provide tools that allow users to set the geographical area where data is to be stored and processed, if they wish to do so.

Regarding information security, **cloud computing seems to be as well-placed as (if not better than) mainframe IT when it comes to safeguarding integrity and availability**. Cloud services embody redundancy, high availability and resiliency thanks to their distributed nature. In most cases, **cloud providers have stronger security than most individual companies can maintain and manage *in situ***.

Despite the alleged loss of control of data and processes executed in a public cloud, **users can choose the degree of control/protection needed for each type of data**. In fact, providers offer most of the security options available in mainframe IT adapted to cloud services (encryption, virtualisation, …) as well as other cloud-specific security features and even Security as a Service (SECaaS).

Moreover, cloud providers are responsible for keeping systems updated and some of them design their own hardware. This makes their systems more difficult to hack, reduces the need to patch software and allows a higher level of automation. Cloud computing also offers **better incident response**, since the wide range of clients operating simultaneously can identify vulnerabilities and share security information faster.

As a result, **the approach to security can be decided by users and be more harmonised, resilient and responsive than in a mainframe environment**.

Outsourcing issues

The advantages of cloud computing over mainframe IT are significant and most of the concerns over cloud computing are due to misconceptions or can be considerably mitigated. In particular, cloud computing allows companies to set their desired degree of security and to take advantage of state-of-the-art security technology embodying redundancy, high availability and resilience.

However, most financial authorities consider cloud computing to be a form of outsourcing and impose additional requirements such as requesting prior authorisation or additional legal safeguards. In highly supervised sectors such as banking this slows down the adoption of cloud by financial institutions and hampers the competitive position vis-à-vis new entrants, since **cloud services are already one of the preferred computing options for non-financial companies**.

Whatever the case, the implementation of a mainframe or cloud infrastructure in banking must be decided after a thoughtful assessment of the benefits and risks of each specific implementation.

6. Enhancing Economic Empowerment through Financial Inclusion*

Noelia Cámara

Financial exclusion does not necessarily mean financial inactivity. The World Economic Forum (WEF) has launched an initiative to create an innovative framework to better understand how data can help in shaping effective policies to generate the conditions to achieve full-quality financial inclusion with customer-centric products and services. The metrics proposed include maturity of payments, credit, savings services and the overall regulatory environment.

A data-driven transformation for inclusive finance

Financial exclusion does not necessarily mean financial inactivity. There are numerous groups of society that, although financially very active, lack access to formal financial services and to inclusive financial products. This forces them to rely on more expensive or even abusive financial products offered by informal financial services providers. Due to advances in technology, the unprecedented advent of transactional and behavioural big data and greater multistakeholder collaboration, there is a realistic opportunity to reach the financially excluded and the many more who are underserved with economically viable financial services specially designed to meet their needs.

Since the emergence of global data sources, in the early 2010s, and especially with the publication of the first global demand side database by the World Bank (Global Findex, 2011), financial inclusion has taken a more visible place on the global stage. For the first time, we had reliable statistical data about the progress of financial inclusion around the world. These data, together with the supply side datasets provided by the IMF and GSMA, provided a framework to understand implications in advancing the issue. In addition, regulators, representing more than half of developing countries, committed to the goal of improving financial inclusion at the Maya Declaration (Alliance for Financial Inclusion, 2011). It represents the world's first commitment platform which enables member institutions to make concrete financial inclusion targets.

Today, we still have 2 billion people worldwide who are financially excluded, resulting in forgone economic opportunities and the dependence on riskier, more expensive methods to pay, save, borrow and acquire assets, which represent threats to overall financial wellbeing and social cohesion. Last month, the World Economic Forum and a coalition of the world's leading international organisations launched a new set of 55 financial inclusion metrics for a better understanding of financial exclusion by measuring access, usage and impact of financial services. [7] The new indicators are mainly intended to develop business strategies and public policies to lift people out of poverty by "financially including" them, as they allow a more granular analysis of opportunities and roadblocks for the underbanked and unbanked in developing markets.

7 BBVA, Bill and Melinda Gates Foundation, International Finance Corporation, Mastercard, PayPal, Telenor, UNSGSA and the World Bank are part of the coalition.

Impact of Financial Inclusion: from access to economic empowerment

Financial inclusion is at a turning point. Significant scope exists for the public and private sectors to scale up their cooperation to endorse a more nuanced understanding of how financial services are consumed, as well as their impact on living standards. The rapidly changing regulatory and market expectations, customers demanding greater convenience, improved service and higher transparency are challenges for suppliers, consumers and policy makers. The WEF proposes a set of specific metrics to analyse the maturity of payments, credit, savings services and the overall regulatory environment. Greater visibility into these inputs is vital to financially include those left out of the formal economy by offering customer-centric products and services for the excluded to participate in the formal financial system in an efficient manner. There are two core areas to continue a coherent evolution in measurement:

- **Demand-side insights** and a higher emphasis on usage. Most current financial inclusion metrics have derived straightforward supply-side insights – with a primary focus on access. As financial innovation increasingly transforms the provisioning of financial services into a more customer-centric platform, demand-side insights and an emphasis on usage take greater relevance.

- More datasets which provide **greater granularity**. Data science techniques and computational improvements allow for bankers to find the number of loans in a given geography disaggregated by type (size, maturity, client gender), in a timely and easy manner. However, this information is seldom present in the global databases. Existing data sources also lack visibility on more mature financial behaviour as individuals advance in their "customer journey". Further, there is little quantification on how end-consumers are better-off from being financially included.

All these efforts aim to build a framework to better understand how data can be further employed to measure access, impact and usage of financial services, and help in shaping effective policies to generate the conditions to achieve full-quality financial inclusion. In addition, the metrics will allow organisations to develop business strategies and public policies to lift people out of poverty by "financially including" them as well as explore new business opportunities, as they allow a more granular analysis of available data and a higher focus on the consumer. Without good data, we cannot map potential demand for financial services, track progress, and develop the much needed tailored products and services for vulnerable groups, including women and old people.

Financial Health for Economic Empowerment

Financial inclusion is not an end, but a means to achieve better economic well-being, reduce inequality by offsetting unexpected shocks and building more resilient households and firms. It goes beyond having a bank account or having a loan from a microfinance institution. Correctly measuring financial inclusion demands regular modernisation in methodology as we delve deeper into the economics and psychology of financial inclusion. Prosperity is not directly derived from the ownership of bank accounts, but from their appropriate and consistent use. **Financial health** is a relatively new term in the financial inclusion community for assessing how well financial systems help build resilience from shocks and create opportunities to boost economic prosperity. As people around the world face more financial opportunities and threats, access to financial services needs to be accompanied by proper and steadfast acceptance

that leads to good financial health for consumers and providers. The financial health framework developed by the CFSI (Centre for Financial Services Innovation) enables to build tangible measures of financial inclusion impact, including consumer financial success, outline specific behaviours associated with consumer outcomes, and create pathways for the financial services industry to help encouraging consumer well-being.

Researchers, policy makers and industry should create knowledge for a better understanding of financial inclusion and be aware that if you cannot measure it, you cannot improve it.

** This note summarises the main ideas presented in the WEF's report: Advancing Financial Inclusion Metrics: Shifting from Access to Economic Empowerment*

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