

Digital Finance

New Times, New Challenges, New Opportunities

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Abstract*

Since the end of the great crisis of 2007–10, the financial services industry began a process of accelerating change. New business models based on convergent technological developments are challenging the status quo of a long-established and traditional industry. The purpose of this document is to consider the latest developments in the financial services industry and to discuss how they might affect the ability for firms—particularly small- and medium-sized enterprises (SMEs)—and individuals to access financing. It concludes that the transformative developments in the financial services industry will most likely improve and expand access of firms and individuals to finance, as well as increase formalization and financial inclusion. Some hurdles and risks that may hamper and/or delay the process are identified: the reaction of the industry incumbents, the lack of appropriate and timely regulation, the lack of access to good-quality and affordable digital connectivity (broadband access), and the unforeseen and seriously disruptive changes that might come from the payments space. To confront these risks, the public sector must define a set of proper and timely responses. The strategy for public interventions must be defined based on a deep understanding of the forces that are driving the change.

JEL Codes: E58, G21, G23 G28, O33

Keywords: blockchain, digital finance, digital history, digital technologies, financial markets, financial services, marketplace lending, SME financing

* Gabi Andrade, Diego Herrera, and César Tamayo made substantial contributions to this paper.

Introduction

Since the end of the great crisis of 2007–10, the financial services industry began a process of accelerating change. New business models based on convergent technological developments are challenging the status quo of a long-established and traditional industry. The purpose of this document is to consider the latest developments in the financial services industry and to discuss how they might affect the ability for firms—particularly small- and medium-sized enterprises (SMEs)—and individuals to access financing. The Connectivity Markets and Finance Division (CMF) of the Inter-American Development Bank (IDB) looks at the factors that impede access to productive finance in the Latin American and Caribbean (LAC) region, and determines how to improve access through public policies and financial engineering.

The overall thesis of this paper is that it seems plausible to think that the new business models of financial intermediation and capital markets organization, emerging from the adoption of convergent technologies, facilitate access to finance by SMEs and unbanked individuals, resulting in positive incentives for firms' formalization and financial inclusion. The following points support this view:

- New-entrant market lenders, with alternative intermediation models and advanced credit scoring techniques, are challenging traditional incumbent banks and pushing the financial services industry toward lowering lending spreads. They are also expanding the set of bankable firms and individuals.
- The use of e-commerce, e-payments, and other digital channels allows firms and individuals to create a credible and transmissible digital history or identity. These data can be fed into artificial intelligence-based credit score engines that deliver more accurate credit assessments. These improved processes reduce asymmetric information between borrowers and lenders, facilitating access to financing. Furthermore, the increased benefits of having a digital history or identity are driving more firms and individuals toward formalization and financial inclusion.
- New techniques and procedures to handle collateral, supported by blockchain-based registries, are making the use of collateral more efficient, cheaper, and more secure. This allows an expansion on the use of collateral and, hence, an enlargement of the firms that can access credit.
- More efficient, secure, and cheaper capital markets, organized around blockchain-based networks, will free up bank capital that can be reallocated toward the lending space.
- Other improvements in payments, reporting and compliance, insurance, trade finance, and other financial domains will result in a more efficient financial services industry.

This is an open document in three senses: One, readers are invited to contribute to it with comments, corrections, data, information, examples, and other inputs. The rapidly evolving nature of the subject demands continuous updates. Second, most of the statements made in the document have to do with the future configuration of the financial services industry. Since there is scant evidence to support the predictions offered here, the paper is controversial. Third, the document does not contain a lot of data, examples, or names of startups because they quickly become obsolete. Readers are encouraged to contribute to this discussion by sending comments to cmf@iadb.org.

The Drivers of Change

The first driver of change is the exponential growth of a set of technologies that are converging toward new business models that are challenging the modern-day financial services industry. The most important technologies for the dynamics of the financial services industry are: cloud computing, robotics, distributed ledger technologies (DLTs) (also known as blockchain), virtual currencies, biometrics, artificial intelligence and advanced analytics, the Internet of things, virtual-augmented reality, and advanced identity management methods.

These technologies are powerful in stimulating challenge because they enable business models of entry that require very little investment. For example, the possibility of accessing computing as a service using cloud computing allows entrants or challengers to start their business with almost no capital expenditure. This is an example of a more general trend of acquiring resources and assets through pay-as-you-go models, which is based on advances in digital connectivity.

The second driver is the change in customer preferences. Consumers had grown accustomed to their experience in other digital spaces (e.g., Google, Amazon, Facebook, Apple, AliBaba, Tencent). They now expect a satisfying digital experience and services that are free, personalized, and easy to use (“me-easy-free-now” customers). In exchange, customers are willing to give away their information. This new attitude poses a challenge to both incumbents and entrants to develop business models that can monetize customer information.¹

The third driver of change is the set of new financial regulations put in place in the wake of the financial crisis. New regulations have been implemented in two key domains:

¹ An interesting discussion of the changes in consumer preferences can be found in Maechler, Neher, and Park (2016).

- Systemic risk and consumer protection concerns (Dodd-Frank, Wall Street Reform and Customer Protection Act passed in 2010, the continually evolving bank capital standards of Basel III, and the KYC rules associated with AML regulations). Expected effects are lower margins (ROE) on most financial products based on balance sheet intermediation. Things will get worse as the implementation of Basel III becomes generalized. These regulatory changes have imposed costs on financial institutions, which, in turn, are directly transferred via prices and rates to financial consumers. Compliance cost is an important concern for incumbents in the financial services industry and it is expected to grow in future years (English and Hammond, 2017). Furthermore, regulatory pressure has translated into fines, reaching US\$204 billion around the world since 2008 (Cox, 2015).
- Competition. Lawmakers and regulators are trying to encourage increased competition in the financial services industry. The main example of this trend is Payments Service Directive 2, expected to be implemented by 2018 in the European Community (see below for further discussion).

The opportunities offered to entrants by the existence (and amplification after the crisis) of sizeable underserved market segments are the fourth driver of change. For the purposes of this note, the relevant underserved markets are the lower-tier SMEs and the large segment of unbanked individuals.

In summary, emerging business models are taking advantage of new technologies, changing demographics and consumer behavior, strong network effects, regulatory changes, and underserved market segments. New firms are challenging the traditional financial services industry. Although these developments are still recent, there is consensus among experts and market participants that they will have important effects on the financial services industry and, therefore, on the way firms can access productive financing.

Readings

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Changes in the Financial Services Industry and Access to Financing

This section explores the most important changes that are taking place in the financial services industry. It also lays out some hypotheses on how these changes might affect access to productive financing, focusing on their impact on SMEs.

1. The emergence of a new class of financial intermediaries will expand the range of firms and individual that can access financing.

The Marketplace Lender's Business Model

Marketplace lenders (MPLs) are a new class of financial institutions whose business model is based on digital platforms that match borrowers and lenders directly online. In a most basic version of the model, a MPL posts a list of projects asking for funding on its online platform and waits for prospective lenders to submit their bids. Then, there is an algorithm (more or less sophisticated) that matches both sides of the market. Once the matching has taken place, the MPL receives an origination fee and a fee for servicing the loan. Two characteristics fundamentally differentiate the MPL business model from the traditional incumbent bank (TIBs) model:

- MPLs do not use their balance sheet to intermediate between lenders and borrowers. Rather, MPLs match lenders with borrowers, on a one-to-one basis or on a portfolio basis, but the contractual relations between borrowers and lenders are kept off the balance sheet of the MPLs.²

² Some analysts use the concept of balance sheet lenders versus non-balance sheet lenders.

- MPLs do not issue or accept deposits. Hence, lenders bear the full risk of the loans that they are financing, unless they get some form of external insurance. In jurisdictions such as the United Kingdom, lenders consider loans to be an investment.³

The most important consequence of such a business model is that MPLs are not required to have the same levels of regulatory capital as a traditional financial institution, nor do they need to participate in any deposit insurance scheme. This is because MPLs do not generate any systemic risk, at least not in the usual sense of the word.

In addition to matching and servicing loans, some MPLs offer additional value to their customers. Some examples are the following:

- Artificial intelligence-based credit-scoring technology that optimizes the use of information. One of the advantages of MPLs over traditional incumbent banks is that MPLs have the flexibility not only to use the new information analysis to predict credit performance, but also to set loan profiles in such a way that they can be repaid with the cash flows generated by the daily operations of the businesses. This is a major improvement in lending practices. The expectation is that its generalized adoption in the lending space will enlarge the set of bankable SMEs. An interesting case is Square Capital.⁴ This lender uses the gateway it offers to SMEs for accessing credit card payments to gather information about firms' cash flows. In this way, it can tailor credit to each firm and claim repayment from the very payments it processes. PayPal is another example of enlarging the set of bankable SMEs (Ahmed, 2015).
- A better experience in terms of speed and ease of use. For example, the customer onboarding experience tends to be a major pain point for traditional banks. MPLs strive to make it a very smooth process, trying to eliminate most of the pain points in the origination process, both for investors and project owners.
- Some MPLs offer to their lender customers different forms of partial credit guarantees or insurance on the payment of the principal of their loans. In Latin America and the Caribbean, an example of such a trend is the Chilean market, where MPLs have turned their businesses into factoring, using guarantee schemes from mutual guarantee

³ See <https://www.fca.org.uk/firms/project-innovate-innovation-hub/loan-based-crowdfunding-platforms-summary-our-rules>

⁴ See <https://squareup.com/capital?gclid=C1bUks3i588CFQcfhgodo90BCg&pclid=146910996702&pdv=c&pkw=square+capital&pmt=e>

societies. CUMPLO, originally a peer-to-peer (P2P) platform, is an interesting case study.⁵

Initially, the MPL industry matched individual borrowers and lenders on a strict P2P basis. Today, they batch loans in portfolios that are sold to pools of lenders. While this is a natural transition toward improving the operational efficiency of MPLs, it does not change the essential characteristics of the MPL business model.

Market Segments

The MPL industry emerged some ten years ago, focusing on market segments that were underserved by traditional incumbent banks, such as the lower segments of SMEs and unbanked individuals. Since then, MPLs have evolved in two directions: (i) moving up the ladder and increasingly competing with banks for the richer segment of medium firms, challenging the traditional incumbent banks “from below”; and/or (ii) setting up alliances and partnerships with traditional incumbent banks. Rotman, Carroll, and Liu (2015) discuss different types of competition between banks and MPLs. One of the most striking aspects of their work is the description of SMEs’ access to credit in the United States, which resembles that of some less-developed countries.

Related to MPLs is another set of platforms also offering P2P financing. These are crowdfunding platforms. The difference between the two models is that crowdfunding platforms intermediate equity investments rather than loans. Crowdfunding is an interesting business model, but it has not developed as fast as the MPL segment (Wardrop et al., 2016). In some jurisdictions, “crowdfunding” connotes both MPLs and equity crowdfunding.

Industry Regulation

The regulatory domain of MPL and crowdfunding is still underdeveloped and lacks generally accepted good practices. Moreover, regulation of this space differs considerably across countries. Some countries have adopted a rather friendly “sandbox” approach, where innovators can test new models, while at the other extreme, several jurisdictions have opted for an outright prohibition of the practice. Some other countries, such as the United Kingdom (FCA 2014; 2016),⁶ Spain (Government of Spain, 2015), and Singapore (Monetary Authority of Singapore,

⁵ See <https://secure.cumplo.cl/>

⁶ UK regulation is to a large extent aligned with the Markets in Financial Instruments Directive (MiFID) within European Union law.

2016), directly regulate the sector. The important point is that today, in many jurisdictions, there is a lot of flux in this domain.

An interesting case of evolving regulation in the MPL space is China. A permissive regulatory environment allowed online lending to flourish, reaching US\$100 billion in assets and some 2,400 operating platforms. In 2016, a multi-billion-dollar scam, and some others of lesser amounts, affected millions of investors. The reaction of the Chinese authorities was to tighten the rules. Now, online lenders are banned from guaranteeing payments on loans, loan sizes are capped at RMB 1 million for individual and RMB 5 million for firms, and platforms are required to use a custodian bank. It remains to be seen whether these regulations will affect the growth of the industry. An excellent study of the regulatory domain in the LAC region is found in Herrera (2016).

Competition between Marketplace Lenders and Traditional Incumbent Banks

When MPLs first entered the market a few years ago, some industry analysts foresaw a path toward market disruption in which MPLs would take most of the business away from the traditional incumbent banks. However, competition between MPLs and traditional incumbent banks has shifted toward a wider and more complicated spectrum of relationships. These range from pure competition to various forms of collaboration: partnerships, outright acquisition, and everything in between.

The dominant model varies considerably across geographic areas. China is heading toward a more confrontational model in which MPLs are trying to take a significant amount of business from traditional incumbent banks. Europe and the United States, on the other hand, are shifting toward a collaborative system of partnerships and alliances between traditional incumbent banks and MPLs. In any case, there appears to be a trend toward convergence of the two models.

One sign that supports the convergence hypothesis is that some MPLs have chosen to obtain banking licenses to compete with traditional banks. These are called challenger banks, or neo-banks. Challengers thrive on transparency, superior data analytics, and cheaper and more efficient banking services and business models.⁷ The United Kingdom leads this trend, with over 40 new banks becoming licensed, including Atom, Starling, Monzo, Tide, Lintel, Clearbank, ZOPA, one of the first P2P on-line lenders, and others. A similar trend is occurring in the Netherlands (Bunq and Knab), and in Germany with N26, Fidor, Solaris, Wirecard, and others.

⁷See <http://fintechnews.ch/fintech/the-worlds-top-10-neo-and-challenger-banks-in-2016/6345/>

In the United States, challenger banks face a more difficult environment. To obtain a charter, new banks must get approval from a national regulator, such as the Office of the Comptroller of the Currency (OCC) or a state regulator, along with deposit insurance from the Federal Deposit Insurance Corporation, which requires approval and significant resources, in addition to at least one physical branch⁸.

Traditional banks are already targeting some of these challenger banks. Examples of this are Sumitomo Mitsui Card Company's investment in Stripe,⁹ Group BPCE's purchase of Fidor, and BBVA's acquisition of Holvi and of a 29.5 percent ownership of Atom Bank.¹⁰

The evolution of the lending space of the financial services industry in the medium-term is difficult to predict. However, at this point, most analysts have changed their views and do not see major disruptions to the industry coming from the lending side. Most believe that the true disruption of the financial services industry will not come from the lending-investment side, but rather from the fee-based services related to the use of customers' information for transactions such as payments.

Readings

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⁸ The Office of the Comptroller of the Currency has recently released a draft licensing manual for fintech companies seeking the agency's new limited-purpose national bank charters. The special-purpose banks will be subject to most banking laws and regulations, but this type of charters will not authorize deposit-taking.

<https://www.occ.gov/publications/publications-by-type/licensing-manuals/file-pub-lm-fintech-licensing-manual-supplement.pdf>

⁹ <https://techcrunch.com/2016/10/03/stripe-debuts-payments-in-japan-with-new-investor-sumitomo-mitsui-card-company/>

¹⁰ <http://www.telegraph.co.uk/personal-banking/savings/peer-to-peer-giant-zopa-to-launch-digital-bank/>
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2. New and improved products, processes, and business models based on the use of digital information will reduce the costs of dealing with asymmetric information and will expand the set of firms and individuals that can access credit.

The lack of perfect information about a borrower's ability and willingness to pay results in an increase in lending spreads, thus limiting access to financing. This problem is particularly acute for SMEs. Traditionally, there have been two ways to deal with imperfect information about borrower's characteristics: improving the quality of information and requiring collateral. The problem is that both are costly activities. The following sections will discuss how new technologies can be applied to reduce the costs of information collection and management of collateral.

Credit and Information

The degree of certainty about borrowers' characteristics depends on the amount and quality of the information available to the lender, as well as the way in which it is processed. More and better information reduces uncertainty. But gathering information is costly, especially information on small firms. When the marginal cost of acquiring an additional piece of information exceeds its expected profit, the prospective lender stops collecting information and applies the credit

spread corresponding to the level of certainty achieved. This is the basis of the information asymmetry problem (Stiglitz and Weiss, 1981). New technologies can help produce better information about borrowers at a very low cost, expanding the number of firms that can access credit.

Traditional Information Sources and the Cost of Credit

Until very recently, lenders had just three sources of information about a prospective borrower firm: (i) data about commercial and financial activity furnished by the firm; (ii) data purchased from credit bureaus and third-party vendors; and (iii) data generated from bilateral transactions between the borrower and the lender.

The datasets furnished by the firms were not particularly useful, because firms had plenty of incentives to alter data to embellish their profiles so they could get credit. On the other hand, data from credit bureaus tended to be biased toward reporting delinquencies, but it said little about firms' prospects. Therefore, the most trustworthy data was transactional data originated bilaterally with the borrower. Such data, however, could only originate from a banking relationship or from commercial relations between suppliers and purchasers. Since the prospective lender observed these data directly, they were completely trustworthy.

In conclusion, traditional information sources delivered data that was either incomplete, untrustworthy, or both. Acquiring additional data was expensive, and for SMEs it was not worth the cost. Hence, lenders applied spreads so high that they became unaffordable. That was (and largely remains) the basis for the information gridlock that prevents many small firms from accessing credit.

New Sources of Trusted and Low-cost Information

The expansion of e-commerce, the introduction of new e-payment technologies, the entrance of MPL in the lending space, and certain regulatory changes that are taking place in the financial services industry have changed the landscape considerably. SMEs are now able to construct a digital history (or financial identity) by conducting business using digital platforms. They can choose to adopt digital invoicing, operate (buy and sell) on e-commerce platforms, and use digital payments channels. The digital history so constructed has a very rich informational content, and it has also the important property of being trusted by third parties. The SMEs that originate the digital data cannot change it, unless they could somehow tamper with the databases.

Concurrently, a new set of techniques based on artificial intelligence and advanced analytics has been developed. These techniques can process data to produce better forecasts about the creditworthiness of the borrowers, especially in the SME segment. This is known as advanced credit scoring.

The MPLs were the first to introduce these techniques. Soon after, the advanced credit scoring functions were spun off from the lending units. They now operate as independent companies that can sell technology or services to lenders, whether they are MPLs or traditional incumbent banks. There is an ongoing debate about the robustness of the advanced credit scoring techniques in an economic downturn. It will be difficult to solve until a full cycle has taken its course.

Table 1. Technology-based Credit Scoring Platforms

Competitor	Resources	Product offers	Consumer (C), Enterprises (E) or Both (B)	Webpage
Verde International	Big Data, big analytics, Social Physics	Credit decision-making, loan origination, market intelligence for FI	B	http://www.verdeadvisor.com/#
Cignifi (Equifax)	Big Data	Credit decision-making, loan origination, market intelligence for FI	C	http://cignifi.com/
Microbilt	Big Data	Credit decision-making, loan origination, market intelligence for FI	C	http://www.microbilt.com/category/credit-decisioning
Kreditech	Big Data, Machine Learning	Credit decision-making, loan origination, Underwriting, Collection	B	https://www.kreditech.com/what-we-do/
Zest Finance	Machine learning, Big Data	Credit decision-making	C	https://www.zestfinance.com/
Aire	Machine learning, Big Data	Credit decision-making	C	http://aire.io/
Creditkarma	Big Data	Credit decision-making	C	https://www.creditkarma.com/
Finacel	Big Data	Credit decision-making	C	http://www.finacel.co/#products
Credit Kudos	Big Data, APIs	Credit decision-making	C	https://creditkudos.com/lenders/
Destacame	Big Data	Credit decision-making	B	https://www.destacame.cl/#main
First Access	Big Data	Credit decision-making	B (Low Income)	https://www.firstaccessmarket.com/
Visor	Big Data, Machine Learning	Credit decision-making	B	https://www.visor.io

Source: Diego Herrera elaboration.

Information Aggregation and Portability

There is still room for improvement in the information management scheme explained above. The digital channels used by SMEs are many and diverse. An SME can use several e-commerce venues for selling its products, it might be connected to different digital supply management systems, it typically deals with a variety of financial institutions, and it keeps accounting data in separate digital formats. Hence, the data generated in each system by the same SME are stored in different proprietary databases with no provisions or established procedures for sharing them with third parties. But, for a lender to have a full picture of the digital history of a firm, it needs to aggregate the information dispersed around many databases—a costly activity.

One way to tackle the problem would be to ask the SME to gather all the information and send it to the lender. The problem with this approach is that the SME may be tempted to tamper with the data to make it look better. An alternative way could be to ask a trusted third party to collect and repackage the information. The drawback of this approach is that the owners of the databases may not be inclined to share the information with third parties, or would do so only for a hefty price. None of these alternatives solves the problem of the cost of gathering the information.

The only way out of it is to tackle head on the ownership and portability of the data. There are some jurisdictions in which the right to possess and use the information generated by a firm or an individual is recognized explicitly. This is the case of the European Union, where Payment Services Directive 2 (PSD2) (Ley and Bailey, undated) mandates that all financial institutions share clients' information with third parties if the former so choose. These types of regulatory initiatives will open the way for the emergence of firms devoted to information aggregation.¹¹

It is possible that the lack of efficient aggregation mechanisms is the reason why in China the major lenders to SMEs are the financial arms of the large e-commerce and e-payment companies, such as Tencent, Ali Baba, AliPay, and others. These companies have most of the data on firms integrated. In the United States and Europe, the e-commerce giants do not conduct substantial financial activities with their SMEs, probably because the e-commerce platforms are independent from the e-payment platforms, and there is no easy and credible way to aggregate them.

¹¹ Some firms are also starting to design solutions to integrate invoicing, reconciliation, cash management, and financial accounting with payments and financing platforms. (Xero and Crunch). Others, like Capital One, started offering their small business clients access to new technologies, like e-Invoicing, bill presentment, or payroll solutions through partnership with fintech firms.

A subsequent question is, Why are the e-commerce and the e-payments subspaces compartmentalized in the West and integrated in Asia? Why have Amazon, Google, or eBay not used the information they keep about their SMEs to build up substantial lending operations, like their eastern peers? A hypothesis is that in the West, credit cards, debit cards, and bank transfer channels worked well even before e-commerce, while in Asia they did not.

Summary

In summary, there have been considerable advances in digital finance, but much remains to be done. The information is being produced and recorded within different digital channels. But, since lenders typically find it difficult to trust information about borrowers when it comes from external sources, the problem that remains to be solved is the aggregation of the different databases and the transmission of the full information in a trusted way. Therefore, there is still a business opportunity for information aggregators, that is, platforms that pull together information from different sources and then sell it to prospective lenders. For these platforms to work, the right technology for information transmission and handling must be adopted.

Note on the Sources of Information and Advanced Credit Scoring

For the sake of simplicity, only a few of the information sources used by advanced credit scoring engines have been presented here. In fact, most advanced credit score systems not only use data on e-commerce and e-payments; they also use data on behavioral patterns of the firm, such as phone records, social media interactions, and others. An example is Fair Isaac Corp., whose FICO scores are the world's most used credit ratings. It recently partnered with startups Lenddo and EFL Global Ltd. to use mobile-phone information to help facilitate loans for small businesses and individuals in India. A startup called Juvo is developing with Liberty Global Plc's Cable & Wireless Communications a credit scoring method using cellphone data in several Caribbean markets. Equifax Inc., another major credit-score company, has begun using utility and telecommunications data in Latin America to predict a potential borrower's credit risk (Kharif, 2016).

Note on Information and Formalization

A firm's decision to become formal or to remain informal hinges on a quick cost-benefit analysis exercise. The main costs are the tax and social security burdens. One of the main benefits of formality is that it increases the possibility of accessing formal credit markets. Thus, more firms will find it profitable to become formal. Firms that agree to participate in digital platforms, and

hence to leave digital tracks, position themselves in the antechamber of formalization. Tax collection agencies can act on digital information about firms' economic activities to assess their tax liabilities. If governments manage this situation appropriately, they will set firms on a path to formalization.

Readings

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http://www3.weforum.org/docs/Innovative_Solutions_Accelerate_Adoption_Electronic_Payments_Merchants_report_2016.pdf

3. New technologies will allow a more efficient management of collateral, resulting in more firms accessing credit.

The second instrument that can be used to address the asymmetric information problem is the pledging of collateral. This is the idea behind the concept of asset-backed financing, in which assets, such as trade accounts receivable, inventory, machinery, equipment, and real estate are used to secure loans. The key advantage of asset-backed financing is that firms can access funds regardless of their balance sheet position, future cash flow prospects, credit history, or personal guarantee from related individuals, such as the owners. The problem is the costs associated with collateral management.

The issues surrounding the use of collateral are many and varied, ranging from legal considerations to management processes. Having an adequate legal and institutional environment is a sine qua non condition for collateral to function in a reasonable manner. This section, however, focuses only on those aspects directly related to collateral management.

Collateral management is a very costly activity, plagued with all sorts of problems and inefficiencies that result in high transaction costs that restrict its use for credit purposes. Furthermore, the returns-to-scale-nature of the activity discriminates against smaller firms, making it expensive and sometimes unaffordable for this market segment.

One of the main problems with collateral is that it is difficult to know the exact status of the underlying pledged asset(s). Often, an asset is pledged twice or even multiple times. For example, asset rehypothecation is a common practice in which financial intermediaries securitize existing collateral to reduce the cost of pledging collateral in subsequent trades. As

assets are re-hypothecated, ownership structures and asset composition can become ambiguous due to the lack of clear transaction and ownership history, exacerbating counterparty risk and asset valuation uncertainty. Regulatory constraints are in place to limit the extent to which an asset can be rehypothecated. However, without a mechanism for tracking transaction history, enforcement is difficult and costly. A technology (and a corresponding business model) that allowed collateral to be managed more efficiently would improve SMEs' access to credit.

The Distributed Ledger (Blockchain) Technology and Collateral Management

There is growing consensus in the financial services industry that distributed ledger technology (DLT), also known as blockchain, might just be the answer to the problem. Blockchain technology has been around for a while in different forms. The best known is Bitcoin, the cryptocurrency. In its most abstract form, a blockchain may be described as a tamper-evident ledger, shared within a network of entities, where the ledger holds a record of transactions between the entities. To achieve tamper-evidence in the ledger, blockchain uses cryptographic hash functions. DLT is an important tool for managing collateral because it is a data base with an architecture that embeds a set of properties that make it particularly suitable for the task.

First, DLT systems are resilient and secure, as there is no single point of failure or corruption, as there is in centralized systems. DLT implies that a copy of the ledger containing all the relevant information (asset ownership, pledge status, etc.) is distributed throughout a network, and the network must validate any modification to the ledger using a consensus mechanism and should be immediately reflected in all the copies of the ledger.

Second, DLT uses cryptographic proofs to provide integrity to the information contained in the ledger, making records virtually tamper-proof. Specifically, any data file can be hashed to produce a unique alphanumeric identifier, equivalent to its digital fingerprint, that is validated and then registered on the ledger. This provides a time stamp that proves the existence of that data file in that specific status at that precise moment in time. Any attempt to modify the content of the data file or remove it would be detected and corrected by other nodes in the network.

Third, the distributed ledger contains all previous history of all the transactions that have taken place, thereby providing traceability, auditability, and thus enhanced transparency.¹² Finally, DLT allows the use of smart contracts that further contribute to the efficiency of the system. The reason is because smart contracts allow the automatic execution of pledged collateral or the automatic unpledge and repledge of collateral. An example of this is the repo

¹² DLT implies an "append-only" principle, meaning that deleting or reversing transactions is impossible. As such, any transaction or change is always recorded and is easily traceable.

market, where trials are being conducted to automatize the pledging and unpledging of the underlying securities.

Use Cases

There are several projects to explore the implementation of DLT to collateral management. To name a few, BNP Paribas is currently developing Collat-Shaker, which applies blockchain technology to enable more efficient collateral management in international trade operations involving commodities, by providing a common status on the transaction to all participants in the deal. Each participant can then update this status in real time, thus enabling fast, simple, and accurate follow-up. BNP Paribas is just one of the custodians considering this technology; others are Deutsche Bank, SIX Securities, and the collateral management provider Depository Trust and Clearing Corporation (DTCC). A group of central securities depositories is working with stock exchange operator Deutsche Börse on a new blockchain-based solution aimed at improving collateral management.

Central securities depositories from Canada, Luxembourg, Norway, and South Africa—all members of the Liquidity Alliance—are working with the stock exchange firm to create what they call the “LA Ledger.” The initiative is currently in the prototyping phase, using the code underlying the Hyperledger project as its basis. The firms involved are looking to seek approval for the solution from regulators.¹³

In November 2016, LaBChain, a European banking-finance-insurance consortium disclosed its second proof of concept (POC) on blockchain-based collateral management. The experiment involved Caisse des Dépôts, Crédit Agricole, CNP Assurances, Natixis AM Finance, and OCTO Technology. The partners have developed an experimental Blockchain platform to manage securities lending non-cash collateral. The POC was on Ethereum to test the potential of smart contracts in middle-office services.

In Finland, a significant group of stakeholders is working on a project to build a new kind of organizationally distributed but logically centralized e-invoicing address registry using the Ethereum Blockchain. The consortium includes leading European B2B business integrators, such as OpusCapita, Tieto, Enfo and Basware; banks such as OP, Nordea, Danske, and the s.k. Samlink group of Finnish Savings banks; the LähiTapiola insurance company; and government agencies such as The Finnish Tax Authority, the Finnish Business Registry, the

¹³ See <http://www.clearstream.com/clearstream-en/strategy-and-initiatives/partnerships--1-/liquidity-alliance>

Government Services for Finance and HR. The Association of Finnish Accounting Firms covers SMEs.

Trade Finance Applications

In a fundamental sense, trade finance is an elaborated example of multistage collateral management. As such, DLT can help revamp most areas that still involve paper-intensive processes and multiple parties, and that are prone to errors and fraud. The digitization of documents and the use of a transparent distributed ledger visible to the relevant parties can increase efficiency and accuracy, provide collateral traceability, reduce the risk of fraud, make working capital more predictable, and reduce costs. Several consortia have been working on POCs, or are further along, using DLT to streamline processes in trade finance. These include the following:

Standard Chartered Bank, DBS Bank, and Infocomm Development Authority of Singapore (IDA) developed a POC for an invoice-trading platform using Ripple's DLT. The platform allows banks to convert invoices into digital assets that can be easily tracked. The project is envisioned as an open ecosystem where third parties can participate and verify the authenticity of the documents (January 2016).

Banking consortium R3CEV announced that 15 of its members have completed a test using the distributed ledger platform Corda for accounts receivable invoicing and letter-of-credit (LC) transactions. Participating banks in the test were: Barclays, BBVA, BNP Paribas, Commonwealth Bank of Australia, Danske Bank, ING Bank, Intesa Sanpaolo, Natixis, Nordea, Scotiabank, UBS, UniCredit, US Bank, and Wells Fargo.

Bank of America Merrill Lynch, HSBC, and the IDA of Singapore jointly developed a prototype solution built on DLT that mirrors an LC. The application allows information sharing in real time between exporters, importers, and their respective banks on a private, permissioned, distributed ledger built on Hyperledger. Smart contracts then can execute trade deals automatically (August 2016).

Barclays, in partnership with startup Wave, conducted the first trade transaction using DLT for dematerializing the bill of lading and successfully transferring trade documentation, cutting processing times from 10 days to less than four hours. The transaction guaranteed US\$100,000 in dairy exports from a cooperative in Ireland to a Seychelles trading company (September 2016).

Microsoft and Bank of America Merrill Lynch are collaborating to transform trade finance with Azure Blockchain as a service. As part of this collaboration, the companies will build and

test technology, create frameworks, and establish best practices for blockchain-powered exchanges between businesses, their customers, and banks (September 2016).

The Hong Kong Monetary Authority (HKMA), together with the Hong Kong Applied Science and Technology Research Institute (ASTRI), a trade service provider, and five participating banks formed a working group to explore a POC to illustrate the ability of DLT to improve the transparency of trade transactions and facilitate the banks' financing services in three major areas: the use of smart contracts in open account trade,¹⁴ tracking of trade transaction statuses, and the matching of invoices to purchase orders (November 2016).

IBM and multinational India-based Mahindra are developing a blockchain-based trade finance solution to offer to banks in India. The cloud-based tool seeks to facilitate trade finance transactions between buyers and suppliers.

Land Registries

Land registries are a prime example of collateral management. Two countries are working on designing platforms using DLT for land registries. In Georgia, BitFury will develop a permissioned blockchain for the National Agency of Public Registry (NAPR), an office of the Georgian Ministry of Justice, which will operate it. This private blockchain will be tied to the bitcoin blockchain, suggesting that a form of merge-mining will secure the land registry.

In Sweden, the Swedish National Land Survey is working with blockchain startup ChromaWay, consulting firm Kairos Future, and telephone service provider Telia on a POC that investigates how blockchain technology could reduce the risk of manual errors while creating more secure processes for registering and recording land titles. Embedded smart contract capabilities are consistent with ethereum and the bitcoin blockchain.

Readings on Collateral Management

The Bank for International Settlements (2014) describes how collateral management services are changing to address expected increases in demand for collateral. It provides an overview of the variety of approaches being undertaken by many of the service providers. The report identifies several benefits resulting from ongoing innovations and highlights that increased complexity leads to increased operational risks. A view from the market can be found in the following:

<https://www.bnymellon.com/global-assets/pdf/our-thinking/collateral-management-a-review-of-market-challenges.pdf>

¹⁴ In open account trading, a seller delivers the goods to a buyer directly before any payment is due and without relying on documentary credit issued by a bank. This system provides opportunities but entails an increased risk of fraud.

https://www2.deloitte.com/content/dam/Deloitte/fr/Documents/Pages/Services%20financiers/Deloitte_Collateral-management-Survey-current-practices-and-trends_juill%20%20%20.pdf

http://cdn.resources.getsmarter.ac/wp-content/uploads/2016/08/mit_blockchain_transactions_report.pdf

https://www.sc.com/BeyondBorders/wp-content/uploads/2016/06/2016-06-16-BeyondBorders-Report-SCB_Nema_Blockchain-Paper-Final.pdf

<https://bitsonblocks.net/2016/02/02/in-a-nutshell-dtcc-whitepaper-jan-2016/#more-861>

<http://finadium.com/bnpp-testing-blockchain-collatshaker-for-collateral-management/>

<http://www.coindesk.com/market-infrastructure-giants-to-tap-dlt-for-collateral-management/>

An excellent discussion on asset-based financing for SMEs can be found in:

<https://www.oecd.org/cfe/smes/New-Approaches-SME-full-report.pdf>

4. New digital technologies will increase capital markets efficiency, freeing up intermediaries' capital for lending.

Efficiency Gains in Capital Markets, New Technologies, and DLT

Capital markets provide two kinds of services: a trading layer, where supply and demand for investments in securities are matched and trades executed; and a core layer, consisting of recording, storing, and reconciling data on securities ownership and financial obligations. The trading layer is largely solved. The only outstanding issue is the speed at which trades can be executed, especially in situations where computer-based algorithms are sending the orders. The core layer is much more problematic. The current methods and processes are highly complex. They use fragmented technology systems and data architectures that lack common standards. This creates the need to reconcile data with massive systems and process duplication, which results in high transaction costs and excessive delays in executing tasks, tying up capital of all market participants. Fragmentation and lack of interoperability are also large obstacles to market integration.

Several studies have been conducted on the efficiency gains to be obtained upon the introduction of new technologies, particularly the DLT. A study conducted by Bank of Santander estimated that DLT could reduce banks' infrastructure costs by US\$15 billion to US\$20 billion per year. A report by Accenture estimates that blockchain technology could help the world's largest investment banks cut their infrastructure costs by between US\$8 billion and US\$12 billion a year by 2025.

While most studies agree on a similar outcome, many of them are cautious about the timing of the implementations, given the competitive-collaborative nature of the solutions and the costs of replacing the legacy infrastructure. For example, McKinsey expects “long-term benefits in the billions of dollars, although these benefits may take five years to materialize. In OTC derivatives, DLT could create US\$4 billion to US\$7 billion in value through lower counterparty risk and operating costs. Streamlined operations, instant settlement and better visibility could reduce counterparty risk capital costs from US\$4 billion to US\$2 billion; better collateral management could save US\$500 million to US\$1 billion; and streamlined client onboarding, trade processing and settlement in the back and middle office could deliver \$1 billion to US\$2 billion in savings.”¹⁵

The World Economic Forum (WEF) published one of the most comprehensive studies on DLT and capital markets in 2016 (WEF, 2016). The main conclusion of the study is that DLT has great potential to drive simplicity and efficiency through the establishment of new financial services infrastructure and processes based on a set of common standards. The study identified the following six key value drivers for DLT:

1. Operational simplification: DLT reduces / eliminates manual efforts required to perform reconciliation and resolve disputes
2. Regulatory efficiency improvement: DLT enables real-time monitoring of financial activity between regulators and regulated entities
3. Counterparty risk reduction: DLT challenges the need to trust counterparties to fulfil obligations as agreements are codified and executed in a shared and immutable environment
4. Clearing and settlement time reduction: DLT disintermediates third parties that support transaction verification / validation and accelerates settlement
5. Liquidity and capital improvement: DLT reduces locked-in capital and provides transparency into sourcing liquidity for assets
6. Fraud minimization: DLT enables asset provenance and full transaction history to be established within a single source of truth

A study conducted by IOSCO reached very similar conclusions (IOSCO, 2017). The study also discusses the risks associated with the introduction of DLT and relevant regulatory issues.

¹⁵ See <https://www.finextra.com/finextra-downloads/newsdocs/the%20fintech%20%20%20paper.pdf>; <http://www.mckinsey.com/industries/financial-services/our-insights/capital-markets-and-investment-banking-2016-time-for-tough-choices-and-bold-actions>

What Do Incumbents Say?

The following quote summarizes how capital market incumbents regard the changes that might come following the adoption of blockchain technology:

Today's global financial markets are underpinned by a complex network of internal systems and service providers that support the processing of hundreds of millions of financial transactions each day. This amalgamation of internal and external systems may appear disorderly, but as a result of painstaking efforts over the years, they have been integrated to enable the seamless and efficient flow of assets, information and data across markets and regions. While the current system was not created through intentional architecture and design, it provides the necessary stability, reliability and certainty that ensure global markets are efficient, transparent and cost effective.

DTCC believes that distributed ledger technologies have the potential to address certain limitations of the current post-trade process by modernizing, streamlining and simplifying the siloed design of the financial industry infrastructure with a shared fabric of common information. There are several key features that make this technology a potentially attractive option to improve existing processes, including the fact that standard rules exist for securities transaction validation and replication; immutable linkage to transaction history and auditability.

While distributed ledger technology has captured the imagination of the industry, key challenges with the platform will need to be overcome before it can be widely adopted or considered enterprise-ready. In addition, the industry itself needs to determine whether using the platform is more cost effective than improving existing technology and whether it can overcome its inherent scale and performance challenges. Furthermore, there needs to be industry-wide discussion, including regulatory and policymaker engagement, and consensus on developing requirements and determining whether trusted third parties are best positioned to develop them.

The industry hype and research into this new platform has been unprecedented but also generally uncoordinated up to this point. Thus, the industry is at risk of repeating the past and creating countless new siloed solutions based on different standards and with significant reconciliation challenges—essentially a new system with the same challenges

we face today. To avoid this, the industry should engage in a collaborative re-architecture of core processes and practices to ensure standardization.¹⁶

Potential Effects on SMEs' Access to Credit

As these improvements begin to take place, SMEs will benefit in several ways, some directly, some others indirectly:

1. The process for directly accessing capital markets will become simpler and much cheaper. This will allow smaller firms to seek direct financing on these markets.
2. Financial intermediaries will be able to use capital markets to match large pools of savings (institutional investors) with SME lending. This will be achieved in two ways: first, by securitizing portfolios of loans sitting in the balance sheets of incumbent banks. Second, MPLs will use capital markets to make more efficient their off-balance funding techniques.
3. Other types of investments, particularly infrastructure, will be funded in better conditions on the capital markets. In this way, balance sheet space will be freed up so that banks can potentially lend to SMEs.
4. A larger set of corporates will be able to access capital markets directly, freeing up capital for banks to potentially lend to SMEs.

Use Cases

There are several projects that are applying DLT to capital markets. Much of the focus has been on developing DLT use cases in middle- and back-office functions directed at increasing efficiencies and providing savings by streamlining securities transfers. Efficiencies such as holding less capital against unsettled trades (reducing counterparty risk), decreasing the percentage of human error in matching trades, reducing the workforce needed for administrative and settlement-related functions, and expediting the settlement timeline. Some of them are in the design stage, some others are in the pilot phase, and a few are already in production.

Perhaps the most interesting development to follow, because of its scale and the strategic role it plays in the architecture of modern capital markets, is the DTCC, a US post-trade services group that processes and warehouses more than US\$1.5 trillion of notional value of securities a year. The idea is that the main repository for data on credit derivatives trades will move some of its databases onto the blockchain. The project will be based on the Hyperledger¹⁷ open-source platform. It will use inputs from market participants, including Barclays, Citi, Credit

¹⁶ See <http://www.dtcc.com/news/2016/january/25/blockchain>

¹⁷ See <https://www.hyperledger.org>

Suisse, Deutsche Bank, JP Morgan, UBS and Wells Fargo, and market infrastructure providers IHS Markit and the Intercontinental Exchange (ICE). The Japan Exchange Group, JPX, has conducted a study that concludes the following:

The Japan Exchange Group, Inc. (JPX) established an internal research group late last year and has studied the applicability of DLT to capital market infrastructure. Through two POCs with six other domestic financial institutions, between April and June 2016, we have tested whether a streamlined process on securities market, security issuance, trading, settlement, clearing, and ownership registry, could be realized in a DLT environment. Through our research and POCs, we have concluded that DLT has the potential to transform capital market structure by encouraging new business development, improving operational efficiency, and contributing to cost reduction” (Saito et al., 2016).

The Australian Securities Exchange (ASX) has completed a prototype post-trade solution using blockchain technology. It is looking to make a final decision on whether to implement it at the end of 2017. Once the decision is made, the organization will move toward building an "industrial-strength solution" to use as its equity settlement and clearing platform. For this, ASX has partnered with Digital Asset Holdings, a fintech company, to develop a new back-office system as part of a broader technology overhaul at the exchange.

The Sydney Stock Exchange (SSX) has also announced that its blockchain-focused joint venture, APX Settlement (APXS), has prototyped a blockchain for equity securities. The blockchain system is part of a bid by the small exchange to reduce dependency on the ASX for post-trade services through a partnership with local startup Bit Trade Labs.

Readings about Capital Markets and DLT

There is a vast literature on the new face of capital markets after DLT is mainstreamed. The following are a few particularly relevant publications that offer a realistic and thorough evaluation of the actual benefits of DLT and the hurdles to its adoption:

<http://www.bis.org/cpmi/publ/d157.pdf>

<http://www.gartner.com/smarterwithgartner/top-10-mistakes-in-enterprise-blockchain-projects/>

<http://www.oliverwyman.com/content/dam/oliver-wyman/global/en/2016/feb/BlockChain-In-Capital-Markets.pdf>

<https://www.weforum.org/reports/the-future-of-financial-infrastructure-an-ambitious-look-at-how-blockchain-can-reshape-financial-services/>

[http://www.ey.com/Publication/vwLUAssets/ey-blockchain-dlt-and-the-capital-markets-journey/\\$FILE/ey-blockchain-dlt-and-the-capital-markets-journey.pdf](http://www.ey.com/Publication/vwLUAssets/ey-blockchain-dlt-and-the-capital-markets-journey/$FILE/ey-blockchain-dlt-and-the-capital-markets-journey.pdf)

FINRA has prepared a very good, clearly written report on the effects of DLT on securities markets:

https://www.finextra.com/finextra-downloads/newsdocs/finra_blockchain_report.pdf

A view from the JPX, the Japan Exchange Group:

http://www.jpx.co.jp/english/corporate/research-study/working-paper/b5b4pj000000i468-att/E_JPX_working_paper_No15.pdf

The European Securities and Markets Authority (ESMA) view on the application of DLT to securities markets

https://www.esma.europa.eu/sites/default/files/library/2016-773_dp_dlt.pdf

5. Access to finance will also benefit from technological improvements in other areas.

Payments

Payments deserve special mention, since the shortcomings and high costs associated with payment systems, especially in the cross-border subspace, are disproportionately borne by SMEs that export. (Cross-border payments represent 20 percent of global payment flows but 50 percent of transactional revenues.)

There is a great deal of pressure from challenger firms on the traditional banking quasi-monopoly of the payment systems. Moreover, governments, central banks, and regulators have been sympathetic to the general outcry that the payment systems are antiquated and that it is time to apply new technologies and let competition produce much-needed improvements.

It is expected that the corresponding efficiency gains will be passed on to SMEs as well as to the rest of the productive sector, contributing to further gains in aggregate productivity. Furthermore, it is likely that the payments space will be a main driver of a general reconfiguration of the FSI. This idea is developed in Ketterer and Andrade (2016).

Readings

<http://www.mckinsey.com/industries/financial-services/our-insights/global-payments-2015-a-healthy-industry-confronts-disruption>

Regtech

The costs of compliance in the financial services industry are quite substantial. For example, large banks, such as HSBC, Deutsche Bank, and JPMorgan, spend well over US\$1 billion a

year each on regulatory compliance and controls, and [BBVA recently estimated](#) that 10 to 15 percent of all bank staff are dedicated to this area. These costs become disproportionately higher in the area of “know your client” (KYC).

Given the increasing returns-to-scale property of compliance, those costs particularly affect the smallest segments of borrowers, such as SMEs. Hence, any cost improvement in compliance will result in lower operating costs of bank lending operations, increasing the number of firms potentially being financed.

One technology model that is expected to reduce compliance costs is the application of technology to streamline and facilitate regulatory compliance and monitoring or, simply, regulatory technology (regtech). Regtech consists of using DLT and other technologies to transmit and store real-time financial information to eliminate errors associated with manual audit activities, improve efficiency, reduce reporting costs, and support deeper regulatory oversight. Supervisors could be connected online with supervisees, and artificial intelligence and other technologies could be used to process information in real time. In fact, regtech could be a solution for regulators in the sense that it will allow continuous monitoring capacity, in real time, with the possibility of anticipating markets and their participants’ movements, thus reducing the compliance breach (Gutierrez, 2014). Regtech also benefits financial institutions by reducing the use of resources for regulatory compliance and its associated costs. Finance ministries, central banks, and other policymakers will be able to closely follow macrofinancial data to make decisions.

Furthermore, regtech enables a change in the way the KYC issue is conceived. The concept of “know your client” becomes “know your data.” This means that, rather than scrutinizing credentials ex-ante, ex-post analysis of the digital track will suffice to uncover suspicious operations and other market misconduct.

Regulators appear to be keen to encourage regtech. One of the leaders of this trend is the UK’s Financial Conduct Authority, which last year issued a “call for input” to increase its engagement and collaboration with the regtech community (FCA, 2016b).

Regtech: Pilots and Proofs of Concept

A large U.S. bank recently used an artificial intelligence system from Stanford University spinout Ayasdi to help it pass the U.S. Federal Reserve’s stress test, having failed it the previous year. Ayasdi’s system uses topology, a subfield of mathematics that studies shapes, to recognize patterns in data and find complex relationships.

Suade is a company that focuses on risk data aggregation,¹⁸ which involves gathering and analyzing information on capital and liquidity for use in internal models and in reports to regulators. It provides a compliance-as-a-service platform that keeps banks in line and up to date with the latest regulatory requirements.

In the area of customer identity, the most important value is to speed up the client onboarding process and make it more user-friendly. This is one of the most frequently cited pain points of the banking experience. Firms such as Onfido¹⁹ are offering this type of service to the financial services industry.

KYC is also a major source of cost in compliance. Several pilots and POCs for identity registries using DLT (both permissioned ledgers and public, or permission-less, ledgers) are being developed. Existing processes and requirements are still manually intensive and represent increasing costs for financial institutions, while the centralized and siloed nature of the databases are also an inconvenience for customers and a source of inefficiency in the system. DLT can be used to create a shared and trusted registry containing KYC information. Some examples of Digital identity/ KYC registries are described below.

The consortium R3 and 10 of its member banks have developed a POC for a KYC registry using DLT to facilitate compliance with regulatory requirements and allowing identities to be managed by their owners. The project simulated establishing the identity of both a legal entity and an individual using KYC data and identity attestations by third parties. Participating institutions were BBVA, CIBC, ING, Intesa Sanpaolo, Natixis, Nordea, Northern Trust, Société Générale, and UBS.

The Hong Kong Monetary Authority is working on a POC on a DLT network to implement a digital identity management platform that could automate some of the KYC requirements and the customer authentication process. The POC is being developed with five participant banks, and it was reported to be at a very early stage in October 2016.

Readings

https://www.bbvaresearch.com/wp-content/uploads/2016/02/DEO_Feb16-EN_Cap1.pdf

<http://thomsonreuters.com/en/press-releases/2016/may/thomson-reuters-2016-know-your-customer-surveys.html>

<https://www2.deloitte.com/content/dam/Deloitte/ie/Documents/FinancialServices/ie-regtech-pdf.pdf>

¹⁸ See https://suade.org/?ftcamp=crm/email//nbe/fintechFT/product#_blank

¹⁹ See https://onfido.com/?ftcamp=crm/email//nbe/fintechFT/product#_blank

<https://due.com/blog/everything-need-regtech-new-fintech/>

[http://www.ey.com/Publication/vwLUAssets/EY-Innovating-with-RegTech/\\$FILE/EY-Innovating-with-RegTech.pdf](http://www.ey.com/Publication/vwLUAssets/EY-Innovating-with-RegTech/$FILE/EY-Innovating-with-RegTech.pdf)

https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2847806

[International Institute of Finance](#)

Trade Finance

Trade finance is one of the areas in which SMEs can benefit the most if transaction costs are reduced, since many SMEs are exporters. Recently, and specifically for SMEs, a group of seven European banks have agreed to collaborate on the development and commercialization of a new product called “Digital Trade Chain” (DTC), to simplify trade finance processes for SMEs by addressing the challenge of managing, tracking, and securing domestic and international trade transactions. Forecasts are positive in terms of expected efficiency gains and the reduction in transaction costs for all parties involved in trade finance transactions.

Insurance

Insurance will benefit from the adoption of Internet of things, big data management, and artificial intelligence. Insurance technology innovations have taken place into two areas: distribution process and product design. Insurance product distribution is saddled with the inefficiencies associated to manual processes, especially in claims handling. This whole process can be simplified by using electronic records. New technologies will allow insurance companies to design and offer highly customized products. In the near future, more accurate actuarial assessments, real-time follow-up of insured objects, and a reduction of insurance fraud will result in cheaper premiums. This process will improve SMEs’ access to finance, since the cost of insurance is an important component of the overall cost of credit, especially whenever collateral is involved.²⁰

Readings

A very good review of this area can be found in:

<https://www2.deloitte.com/content/dam/Deloitte/us/Documents/financial-services/us-fsi-tech-trends-insurance-perspective.pdf>.

²⁰ Current fintech insurance solutions focus on distribution, including e-brokers, that focus on the digital experience (like e-broker), and insurance marketplaces and aggregators, that allow to easily look, compare, and buy among several options (like e-insurance).

Applications of blockchain to insurtech are discussed in:

<http://www.mckinsey.com/industries/financial-services/our-insights/blockchain-in-insurance-opportunity-or-threat>.

<http://www.mckinsey.com/industries/financial-services/our-insights/time-for-insurance-companies-to-face-digital-reality?cid=insurance-eml-alt-mip-mck-oth-1703>

Conclusions

This paper has reviewed a series of transformative developments in the financial services industry that will most likely improve and expand access of firms and individuals to finance, as well as increase formalization and financial inclusion. However, there are still some hurdles and risks that may hamper and/or delay the process:

- Incumbents might try to recourse to non-market actions to fight off the competitive threat coming from the new entrant-challenger firms.
- Many regulatory challenges, arising from the new business models, need to be addressed in a proper and timely fashion.
- The lack of good-quality and affordable digital connectivity (broadband access) available to most firms and individuals, due to a deficient regulatory framework and insufficient infrastructure, must be remedied. This is a sine qua non condition for digital transformation to take place.
- The fintech revolution may end up reshaping the financial services industry in ways that lead to outcomes opposite to the ones foreseen (and wished for) in this paper. It is likely that important and seriously disruptive changes will come from the payments space. This issue will be discussed in a forthcoming paper.

The public sector must define a set of proper and timely responses to the risks identified in this domain. The strategy for public interventions must be defined based on a deep understanding of the forces that are driving the change.

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