

FinTech evolution: Strategic value management issues in a fast changing industry*

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Abstract

The FinTech revolution captures the simultaneous attack of a large number of technologies, notably mobile telephones and blockchain, which are ushering in efficiency or outreach to multiple niche markets. The use of mobile telephone technology has expanded Internet reach to the excluded, created possibilities for business where banks were not historically present and is potentially disruptive. The blockchain technology threatens to be even more disruptive as it may pull the carpet from under the monetary system as well as the property rights as we know them today. The proliferation of actors and innovators has created a confused landscape resulting in different possible scenarios, where banks may freeze, fight, form alliances with challengers, or be forced into flight by the BigTech.

1 | INTRODUCTION

The rise of FinTech has raised the heat level on the financial industry. FinTech concerns technology that is new and serves the clients of financial institutions, bypassing back office, middle office, and front office operations of incumbent financial institutions (Allayannis & Cartwright, 2016). The iceberg of bankers and financial institutions is melting and coping with this change requires them to figure out their strategic choices to meet this disruptive threat to their livelihood (Kotter & Rathgeber, 2006).

Any innovation creates change. This change translates into risk. Therefore, it is important to understand that different innovations create different types of risks. Innovations can be incremental or radical (Abernathy, 1978). More threatening is radical innovation, where technology creates possibilities of big players sustaining their advantage or challengers disrupting them (Christensen, 2006; Christensen, Bohmer, & Kenagy, 2000; Christensen, Johnson, & Rigby, 2002). Within the disruptive category are strategic innovations and catalytic innovations. Strategic innovations change the rules of the game. Catalytic innovations are involved in satisfying the consumers' unmet needs through low cost, simpler or satisficing models, by tapping resources in a manner unattractive to incumbents or their existing business models (Christensen, Baumann, Ruggles, & Sadtler, 2006). Dealing with risks

that could be disruptive, especially catalytic, calls for a change of strategy by incumbents.

What kind of risks can innovations in FinTech create? The most evident one is that they can disrupt the existing banking model and cause many banks to go under. At the micro level, for individuals and small businesses, it means not knowing where to place one's money: with banks that may go bankrupt or with FinTechs that may never break-even, they themselves disrupted by the next innovator in this rapid moving landscape. At the macro level, it means that the entire financial platform, on which business as we know it is being run, may have the carpet pulled out from beneath the feet. In addition to these systemic risks, we have the operating risks of ensuring the safety of deposits from moral hazard, security in payments, data transfers and privacy considerations. Public supervisory systems may be inadequate to oversee all the operations of all the mushrooming FinTech operators. So, what are the strategic options available to banks, FinTechs and regulators in a fast-changing and a perpetually innovating world?

In this article, we provide a review of the business history of two technological innovations that impacted the financial industry and strategic responses by incumbents and challengers, in the last century. We follow this with an outline of the geographical spread of two more recent technological innovations impacting the financial world and indicate why the distant past may no longer be a good guide to the present or the future. We then show the confused landscape that has resulted by the myriad of different initiatives, each aiming at taking

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a niche market. We end with some scenarios and strategic options open to banks, regulators and FinTech operators to shape the future of tomorrow.

2 | A BRIEF HISTORY OF TECHNOLOGICAL INNOVATIONS IMPACTING FINANCE

History is interesting in itself because it is a story of the past, with heroes and victims. It is also interesting because it provides lessons for the future. For example, researchers have hypothesized that products and industries move in life cycles of emergence, growth, maturity, and decline (Abernathy & Utterback, 1978; Audretsch & Feldman, 1996; Klepper, 1997; Vernon, 1966). They have then tried to understand what kind of strategies firms adopt in different stages of their life-cycle. The box below presents some of the technologies that have impacted the banking industry including checks, Automated Teller Machines (ATMs), Telex, Cards, Internet, mobile telephones, cloud computing, cryptology, robotics, and big data analytics.

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In this section, we focus on two technologies: ATMs and the telex and its use in payments. The history of the adoption of these two explains how banks approached absorption of technologies in the past.

2.1 | From Cash Dispensing to ATMs

The history of ATMs is recounted by Batiz-Lazo (2009). After the Second World War, the banking industry witnessed the quick spreading of checks. This was because checks saved the bother of carrying and counting money and receiving change for each transaction.

BOX 1.1 HISTORY OF SOME TECHNOLOGY INNOVATIONS IN FINANCE

1945: Cheques
 1958: The first credit card (*BankAmericard*)
 1967: ATMs
 1977: Telex and SWIFT Transfers
 1980s: Debit cards
 1990s: Internet Banking
 2000s: Mobile Payments, Crowdfunding, Cloud computing
 2005: Crowdfunding, Cloud computing
 2010s: Cryptocurrencies, E-wallets, robot advisors, big data analytics

Nevertheless, Banks still felt that it results in a lot of costly accounting. These costs were high owing to the rising labor costs in the fast-developing economies. Moreover, as incomes rose, the demand for leisure went up and banking staff no longer wanted to work on Saturdays. Since attracting good skilled-staff to monotone banking tasks has always been a challenge, bankers have always been sensitive to their desires. At the same time, customers wanted to be served not only on Saturdays but also on Sundays. Bankers were, therefore, on the lookout for innovations which could reduce labor costs and increase service.

In 1967, they were able to introduce cash dispensers. These were machines which used punch cards. However, they still required manual accounting since a voucher was first given against which the person could withdraw cash for 6 months on any day of the week. Therefore, the customer could be satisfied since he now had access to cash anytime, anywhere. Nevertheless, there was some reorganization for banks as work done by retail branches shifted to more centralized back offices. However, the costs did not reduce dramatically. The leading manufacturer was Chubb Securities.¹

Five years later, in 1972, software technology improved sufficiently for electronic data processing to link the cash dispensing machine to the computer. It is this synchronous electronic data processing at the point of contact with the customer, which is the feature that distinguishes the cash dispenser from the ATM, although initially some used batch processing because telephone cables were not reliable. It means the ATM is linked to the bank's central computer. A successful partnership of Lloyds with IBM allowed the creation of a proper Data-Based Management System. By this time, Chubb decided to leave this market. Barclays copied the system in 1975.

Since then, especially from the 1980s, there have been a number of incremental innovations including Visual Display Units, cash coming out horizontally rather than vertically, fund transfers, and bill payments. However, by 1990, NCR was the leader in the field of manufacturing ATMs, displacing IBM, who then left this market. By 1994, the use of network technology had sufficiently advanced so that banks could start implanting ATMs at nonbranch locations. Networks serving a number of banks and other societies grew to provide clearing services. In the UK, one network (LINK) serviced all banks (the others closed). However, in the USA, with its fragmented market in 50 States, initially there were 200 networks, but these too witnessed a shake-out through mergers, till about five controlled 78% of the business.

The ATM revolution was aided because, in the 1980s, more companies were paying salaries directly into bank accounts. This means more people were banked and needed the ATMs to get their cash when they required. Therefore, ATMs could grow by about 30% per year, while banking staff growth slowed down to about 10% per year. Indeed, banking staff actually declined in the 1990s but this was probably because Internet banking came in.

¹Chubb Securities is part of United Technologies Corporation (UTC) since 2003.

The history of the ATM shows that initially they were a source of competitive advantage and created performance effects by reducing operational costs at each location. At the same time, the size of each bank's own network provided some competitive advantage in the wake of an increasingly mobile population who could not always come back to their registered branch for financial services.

However, later, as networks spread, they became a minimum necessity without which you could not compete in retail banking. The Shared Network effect increases the use of ATMs. In fact, network externalities were recognized: each new ATM brings added benefits to all members of the network. Initially, inter-bank fees were charged, but by 1999, these had been scrapped by banks. However, independent ATM operators may still charge fees.

Incremental innovations and product offerings continued in the 2000s and ATMs developed multifunctionality. In different regions of the world, ATMs may accept deposits, make payments of bills, transfer money, top up mobile phones prepaid cards, sell stamps, give loans, and permit international remittances.² These additional services may actually be the future of ATMs, and their traditional use of retrieving cash may become obsolete in a cashless economy.

At the end of 2014, there were over 3 million ATMs in the world, the leading locations being in China, USA, Japan, and India.³ The leading manufacturer was still NCR Corporation with 820,000 ATMs installed worldwide.⁴ They were overtaken by the merger of Diebold and Wincor Nixdorf, in August 2016, who together have more than a million ATMs in service. Wincor Nixdorf itself had acquired Brinks in 2015. Growth is taking place in all regions except Europe which shrank.⁵ Researchers estimate that about 99 billion cash withdrawal transacted through ATMs in 2015.⁶

We can see that banks successfully outsourced the technology and banking went on as usual.

2.2 | The Use of Telex for SWIFT payments

A second interesting story about the use of technology for financial institutions is recounted by Scott and Zachariadis (2012) who trace the history of the telex and its evolution to use by banking organizations in a cooperative called the Society for Worldwide Interbank Financial Telecommunication (SWIFT).

They trace the use and impact of telecommunications and network innovations in banking to the late 1840s when the recently developed electrical telegraph enabled faster inter-market communications

and reduced differences in securities prices between remote stock exchanges in the United States. The telegraph was still being used for communication in 1866 when the first transatlantic cable was laid and this then permitted transactions between NYC and London.

Several decades later, in 1933, Germany brought out teleprinters which could use the typewriter to send information. By 1945, a network of such teleprinters was called a telex and was being used in Europe. In about a decade, by 1957, 39 countries were connected by the telex system, including USA, Canada, 19 European countries, and 18 others.

In the 1960s, many large US and European banks established private networks and invested in computer installations to process and manage electronic data to reduce operational costs and permit international banking. It has to be remembered that even by late 1970s, the majority of international banking transactions was done by a few banks. Interbank transactions required sending many messages, often in free text, often leading to many errors. To standardize procedures to reduce errors, each bank was trying to make the other use its own internal standards system, especially Citibank, and the other banks did not like this.

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Therefore, on the initiative of European banks, in 1973, SWIFT was started as a cooperative or a not-for-profit financial institution, located in Brussels to avoid competition between New York City and London. It began as a closed "society" founded to reduce errors and increase efficiency in interbank payments between members. SWIFT founding membership amounted to a total of 239 banks from 15 countries. In order to ensure widespread compatibility in a sector experiencing asynchronous technological development, legacy telex specifications had to be accommodated in SWIFT's design. In 1977, by the time SWIFT went live, 518 institutions from 22 countries were connected to SWIFT's messaging services.

Today, SWIFT is a core part of the financial services infrastructure and is widely regarded as the most secure trusted third-party network in the world, serving 200 countries with over 11,000 users who sent over 6 billion messages in 2015.⁷ It is an industry cooperative supporting an enthusiastic community of practice and transformed into an unexpected network phenomenon. Indeed, the network externalities are huge and SWIFT achieved such success that it has been accused of being an installed base stifling innovation. As a result, in recent years, SWIFT has had to institute new categories of membership in an effort to counter concerns about its bank-dominated governance and it continues to search for ways to meet the requirements of key constituents in the financial supply chain.

² https://www.accenture.com/_acnmedia/PDF-10/Accenture-Banking-ATM-Benchmarking-2016.pdf accessed on February 8, 2017.

³ <https://www.atmmarketplace.com/news/global-atm-count-forecast-to-reach-4m-within-5-years/> accessed on February 8, 2017

⁴ <https://www.ncr.com/financial-services/cash-dispenser-atms> accessed on February 8, 2017.

⁵ https://www.accenture.com/_acnmedia/PDF-10/Accenture-Banking-ATM-Benchmarking-2016.pdf accessed on February 8, 2017.

⁶ <https://www.atmmarketplace.com/news/atm-withdrawals-rising-worldwide-study-finds/> accessed on February 8, 2017

⁷ <https://www.swift.com/about-us/highlights-2015> accessed on February 9, 2017.

Once again, we see how banks externalized the use of technology. However, this time they jointly owned a network which they are now opening to others.

3 | RECENT TECHNOLOGICAL INNOVATIONS

The biggest technological change agents today have been the Internet combined with the mobile telephone which made it accessible by the world's poor and the blockchain technology which may further reduce costs.

3.1 | The evolution of the mobile telephone and its impact on Finance

The story of mobile telephones is more crucial to understanding the underlying technology that is influencing a lot of today's FinTech revolution. Fortunately for us, we can use the work of Giachetti and Marchi (2010) to resume this.

The first generation of mobile phones came out in 1980. They were analog handsets with their own network. They were meant for use in cars by business people. The sales were, therefore, B2B by Original Equipment Manufacturers (OEMs) such as Motorola, Erikson, and Nokia.

A decade later, in 1991, a second generation (2G) of digital handsets came out using a Global Systems for Mobile Communications (known as GSM), which allowed interoperability. Certainly, switching from analog created discontinuity and we can say that a new product life cycle was ushered in. In this stage, the Telephone Networks started distribution since the product was small enough to be sold to retail customers and the Telephone companies had this contact. Incremental product innovations followed, including SMS and games. This led to design innovations to allow keyboards. Product technologies varied according to the OEM. In 1999, the Wireless Application Protocol (WAP) allowed consulting Internet through different appliances, including mobile telephones. Components were outsourced. Increase in differentiated products. Nokia took the lead from Motorola. Thanks to the amazing opportunity for growth to retail consumers, Panasonic, Siemens, Samsung, Alcatel, Philips, Sony, NEC, and Sagem entered the market for manufacturing phones. Once the market had saturated, for example in Europe by 2001, sales dropped, prices crashed, and a shakeout started in Europe. But low-cost manufacturers from China and Taiwan came in.

In 2005, a third-generation (3G) of mobile phones started using UMTS technology that allowed video features. At the same time, sales to emerging markets took off. MMS, color displays, and digital camera were new product features. Firms that failed were those who did not offer both high-end and low-end phones. With outsourcing, a new business model started with networks keeping (sometimes) only design/brand and integrating operating system software with partnerships. Consequently, some OEMs were integrated, some not, and some network operators also tried to make their own brands. New models were increasing.

In terms of industry life cycle, by 2005, we could say that we had achieved maturity in most markets. At the same time, product innovations continued. For example, technological convergence started (many technologies in one instrument: camera, dictaphone, video, computing). This product innovation is now threatening other industries. We see that there is retaliation as PC manufacturers such as Apple started entering into the phone business too. Alliances with designers started.

Today, a fourth-generation of mobile phones is allowing even faster communication on the Internet. The new customers are perhaps limited to those at the bottom of the pyramid. Little wonder that low-cost telephones, such as Oppo and Vivo (and Huawei) have overtaken Xiaomi and Apple in China⁸ (see *The Economist*).

Understanding all these developments is crucial to understand FinTech today since it is based largely on the history of the Internet and mobile telephones that jointly make FinTech possible. Today, transfers and payments have gone beyond SWIFT's links which are largely B2B. Starting from Paypal who initiated C2B payments, we now have hundreds of payment apps including ApplePay, Facebook Digital Payments, Android Pay. Telephone apps such as MPesa are now permitting rapid transfers between people in the developing world. After originating in poor countries such as Kenya, South Africa, and the Philippines, mobile payments have now become ubiquitous. The biggest mobile payment technology provider is Square. IZettle, Square's European rival, raised €60m (\$63.4m) in new funding. The company provides card readers that accept mobile and contactless payments. Today, there are also online foreign exchange dealers and online overseas remittances. Payments include charity payments. ING has partnered with Dutch startup, Whydonate, to create a contactless charity collection box to help keep the charity sector innovative at a time when cash is being used less frequently. Twitter has started Twitter Donations. Besides financial transactions, mobile phones are being used by microfinance institutions to enter data such as poverty evaluation surveys and repayments, permitting staff to save time and to use the extra time to have more meaningful relationships with clients permitting them to sell more. At the same time, the stored data is more useful since it can be transferred to a computer and be used for better decision making.⁹

3.2 | Blockchain and the future

The blockchain is a recent strategy that is now portending to be the next big thing. It was invented in 1991 by Stuart Haber and W. Scott Stornetta and outlined in an article in the *Journal of Cryptology* (Haber & Stornetta, 1991). However, it was brought to fame by its use in a cryptocurrency called Bitcoin, invented by an anonymous author(s) who called themselves Satoshi Nakamoto (Nakamoto, 2008). Bitcoin had a strong initial growth in the quantity of circulation with a price

⁸ <http://www.economist.com/news/business/21716080-how-two-obscure-local-smartphone-manufacturers-made-it-top-beating-apple-xiaomi-and> accessed on Feb 9, 2017.

⁹ <https://nextbillion.net/can-tech-humanize-microfinance-an-unexpected-benefit-of-going-digital/>

hovering around \$200 till 2012. Its initial popularity was based on a libertarian political ideology of decentralization. It then spurted to over \$1,100 in 2013 before collapsing back to \$200 in 2014. Nevertheless, in 2017, the value of bitcoins shot up to \$7,000 because China stopped the outflow of the Renminbi, and many people took refuge in Bitcoins. Speculative fever pushed the value to almost \$20,000 before settling back to \$6,000.

The initial difficulties of establishing Bitcoins were those of any two-sided market: they needed to find people who would use it to pay and those who would accept the currency (Rayskin, 2016; Rochet & Tirole, 2006; Venkatesh, Morris, Davis, & Davis, 2003). Seeing the success of Bitcoins, hundreds of currencies are being proposed in competition; in 2015, Raymaekers (2015) had already counted 483; in November 2017, 1,278 cryptocurrencies have been registered.¹⁰

It emerges now that what is exciting big institutional actors is not the cryptocurrency but the possible use of the distributed ledger technology (DLT) on which cryptocurrencies are a possible application. In fact, the miners of Bitcoins are verifying and adding security to the transactions using their own computing power. This kind of cloud computing approach has been already used in the early 2000s by clustered research programs such as SETI@home that uses millions of individual personal computers around the world to analyze radio signals from space (Anderson, Cobb, Korpela, Lebofsky, & Werthimer, 2002). These miners are paid by the issue of new Bitcoins for their verification work. Banks, foreign exchanges, and stock exchanges are interested in the distributed ledger technology if it could increase speed, accuracy, reliability, security, and traceability and reduce their costs (Mori, 2016), notably for transactions such as the transfer of stocks, deeds, or bonds (White, 2017). In fact, this external verification would lead to outsourcing the maintenance of records. A consortium of 80 leading financial institutions has created a laboratory called Corda for this purpose. They are an open source experimental platform to ease transactions between the partners. A Japanese consortium of banks is proposing to create J-Coins.

Besides financial transactions, mobile phones are being used by microfinance institutions to enter data such as poverty evaluation surveys and repayments, permitting staff to save time and to use the extra time to have more meaningful relationships with clients permitting them to sell more.

Beyond banks, many other DLT applications include securing contracts, certifications, conducting due diligence, and maintaining financial statement records. A new rising star is Ethereum, a competitor of Bitcoins, who is proposing the ability to execute smart contracts using the blockchain. The BigTech operators are also examining and experimenting with the use of blockchain as well as a cryptocurrency. For example, Microsoft and Apple allowed its customers to pay for their software in Bitcoins until December 2016. Amazon had launched AmazonCoins in 2012. Recently, it has bought three domain names related to cryptocurrencies, which gives them an option of going into this area. It does not yet accept payment in other cryptocurrencies.

Central Banks are disturbed because issuing base money was their preserve, although over 90% of the money is created by banks if we use a broader definition of money (M2). However, central banks have a role in monetary policy if they can control money and the banking system. If independent operators start creating alternative money, their control over the economy weakens and this worries regulators who fear that their control is weakened. However, some governments like Japan have already legalized the acceptance of Bitcoins as a currency. However, Russia is a strong opponent of cryptocurrencies because it feels it is promoting money-laundering.

At a more global level, cryptocurrencies are coming in to change the way we use, store and record payments. Bitcoin is the largest cryptocurrency with a market capitalization of over 16 billion dollars, covering 85% of the market capitalization of all the currencies. The next Ethereum has a market capitalization of \$1 billion, the others are significantly smaller: for example, Ripple and Litecoin are a little above \$200 million.¹¹ DLT may be especially useful in lowering costs of remittances to the very poor. Service providers like Bitpay are charging a 1% fee and take only one day for international payments in bitcoins, severely undercutting bank transfers that cost around 4% and take four days.¹²

Developing countries may also be looking at such technologies helping them leapfrog the development of infrastructure such as land registry (Kewell, Adams, & Parry, 2017; Scott, Loonam, & Kumar, 2017). The blockchain could be an instrument for building cooperation and solidarity finance (Scott et al., 2017) or for promoting environmental goals or health goals through initiatives such as SolarCoin and CureCoin (Kewell et al., 2017). Donors want to use this technology to ensure that their money reaches the poorest instead of evaporating in political intermediation. At the same time, such technologies also impose risks (Shermin, 2017) including theft such as the Mt. Gox case. Finally, data analytics and data security technologies are having a huge impact on the way financial business is done. In fact, the capture of data may be influencing many firms to quickly adopt this technology.

A brief conclusion to this section is that in the past, banks either absorbed the technology or collaborated to control it. However, the speed of technological change and the extremely rapid growth of the mobile operators may require new strategic responses since many of them are now bigger than many banks. Finally, blockchain technology might disturb not only banks but the banking system. We look at these rapid and complex changes in the next section.

4 | THE FINTECH REVOLUTION: A CONFUSED LANDSCAPE OF NICHE INITIATIVES

Technology has always pushed the frontier of what is possible. What distinguishes the present is the speed of change in technology, the

¹⁰ <https://coinmarketcap.com>, accessed on November, 14th 2017.

¹¹ <https://coinmarketcap.com/all/> accessed on February 19, 2017.

¹² <https://bitcoinmagazine.com/articles/bitpay-raises-40m-series-b-funding-expand-emerging-asian-markets/>

rapidity of the changes in applications of these technologies, and the multiplicity of actors of various sizes, with innovative business models, which make the landscape of technology in finance difficult to understand. This section adds examples of many different changes to appreciate the confusion created by the multi-pronged threats that bankers seem to be facing to their established business model.

The increase in the use of the Internet and the development of Web 2.0 led to many business model innovations such as democratic innovations; crowdsourcing, ecosystem innovations, and recombinant innovations (Shuen, 2008). As early as 1998, we saw a life insurance company, Prudential, starting Egg (Birkinshaw, 2003). Although it was initially promising, the experiment did not work well: it was too early. Also in 1998, we saw the creation of Paypal by E-bay, which became the biggest alternative payment channel, permitting rapid transfers from retail consumers towards business. In the last decade, since 2005, we have seen a surge in the applications of dealing with finance on the Internet and, more recently, on mobile telephones, such as Alipay and TransferWise. Internet and Mobile provided opportunities to communicate at a low price with a large audience and provided cheap computing power. The cheap communication through electronic word-of-mouth as well as access to information through statistics providing the number of people taking certain actions has reduced information asymmetry and enable decision making for purchasing innovative products and using new technologies (Thies, Wessel, & Benlian, 2016). Today, people in general and the younger generation, in particular, are comfortable with online money and this has enabled many applications to succeed where Egg failed a decade earlier. Moreover, the low interest rates since the financial crisis have permitted entrepreneurs to take more risks. Finally, the 2008 crisis also woke up the financial employees who lost interest in being locked inside megabanks which were too conservative in a fast-changing world. Figure 1

summarizes these forces that are pushing the extraordinary growth of FinTechs.

As a result, all kinds of financial services are now being proposed through alternative mediums outside the brick and mortar banks. This includes savings products and investment payment; borrowing and lending; transfers between persons; bill payments; insurance; monetization services and big data analytics based financial advisory services.

Many of the savings and investments products are now based on platforms which permit savers to channel their savings directly to investments which may be too risky for banks or which do not provide monetary rewards. These include equity crowdfunding into micro and small businesses, reward-based crowdfunding, donations, as well as online stockbroking services. Even budgeting and planning programs are now available online on a free basis or a software as a service (SaaS) basis. This means that many users pay a fee to use the same program and the fee is often based on their usage. However, the landscape is changing fast. A few years ago, Kickstarter and Indiegogo, the early innovators, had most of the big deals. This is no longer the case: already in 2017, large deals are dominated on the Ethereum platform.

Borrowing and lending platforms of the P2P kind have mushroomed since Zopa first set up its platform in 2005 in the UK (Kupp & Anderson, 2007). These platforms permitted bypassing financial intermediaries like banks which took a huge spread between interest paid to savers and interest charged on loans. Today, many of these platforms have already had an initial public offering and have millions of customers in two-sided markets. For example, Lending Club raised \$870 million through an IPO in 2014. More recently, Funding Circle recently raised \$100 million in an IPO. The company had lent £2.5 billion by December 2016 and facilitated £1.1 billion of loans in 2016 alone. At the same time, Kiva in the US also started in 2005 and initiated the peer-to-institution lending, useful in encouraging the retail

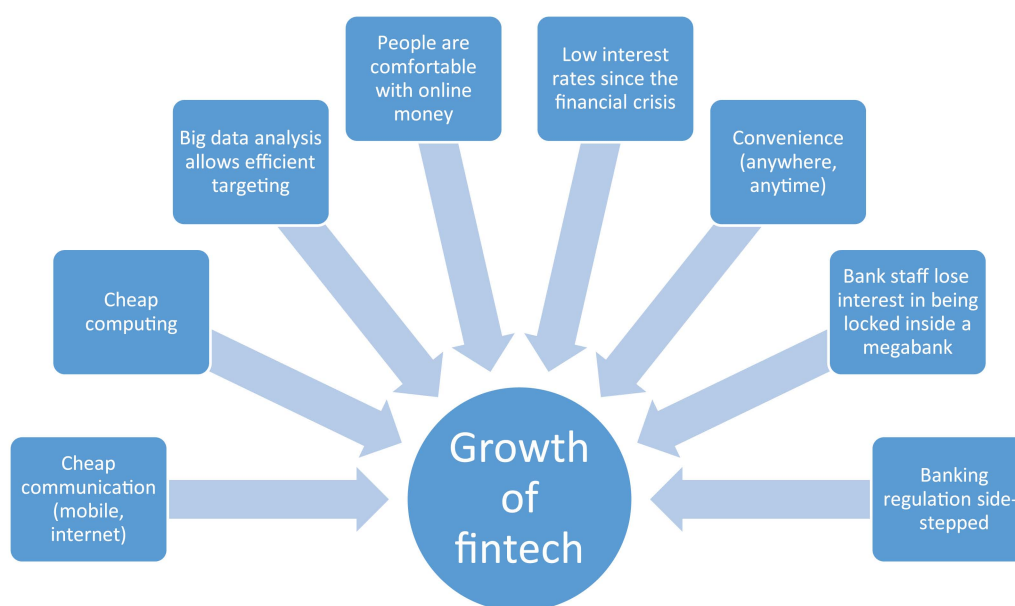


FIGURE 1 Reasons for growth of FinTech. [Color figure can be viewed at wileyonlinelibrary.com]

Source: Authors.

TABLE 1 A possible classification of FinTech startups with examples

Alternative Finance	Blockchain/Bitcoin	Challenger Banks
FundedByMe, Funderbeam, TWINO	I/O Digital, Settlemint, Tradle	Monese, N26, Revolut
Financial Inclusion	Innovative Banking Software	InsurTech
EasyPay Albania, ID Finance, MyBucks	Connective, Dorsum, Oradian	Gavin, InsureApp, Openclaims
Payments and Transfers	PFM Robo Advisory	Risk, Intelligence and Security
Doccle, Payworks, Twisto	I Know First, Meniga, VT FinTech	Carbon Delta, Cybersprint, Seqvoia

Source: <https://europe2017.FinTech.nl/> accessed on October 8, 2017.

market for financing microfinance institutions. Another kind of online platform, (e.g., Greensill Capital) provides supplier finance (factoring) without the paperwork, thus adding to efficiency.

The insurance market has also seen huge changes in technologies, including the use of Internet and mobile telephones for clients to interact with the insurance company (Njegomir & Rihter, 2013). Today, car insurance companies are using telematics to locate vehicles and to screen safe drivers from risky drivers and are willing to provide discounts in insurance premiums to the former (Azzopardi & Cortis, 2013; Langmore, 2016). Health insurance aggregators permit the consumer to compare all the different possibilities available and their costs (Lamb, 2011). For agriculture, we have seen the development of index insurance which uses satellite-based data and/or weather stations to provide cut-offs for claims (Njegomir & Rihter, 2013).

Wealth management used to be for the rich. Now, with robots, the expert knowledge of the analysts are captured in algorithms which allow middle-class investors to access investment strategies, hitherto unavailable to them. Huge firms such as Betterment, WealthFront, and Wealthify have already billions of dollars in assets under automated wealth management, charging extremely low fees.¹³ According to the Betterment website,¹⁴ the three trends that ushered in automated wealth management are that transaction costs have fallen drastically and therefore “buy and hold” is no longer an optimal strategy; diversification costs have also fallen to zero; and defined benefit pension plans no longer exist and people want to plan for retirement.

Many of the savings and investments products are now based on platforms which permit savers to channel their savings directly to investments which may be too risky for banks or which do not provide monetary rewards.

From the foregoing, we can appreciate that today, the FinTech landscape is confused and confusing, with thousands of startups offering different services. The industry as a whole is sometimes called FinTech, sometimes Alternative Finance. By one estimate, crowdfunding alone did about 34 billion dollars of transactions in 2015, mostly

in North America (MasSolution, 2015). In another study on alternative finance (Zhang et al., 2016), East Asia and Pacific had a market value of 101 billion dollars, of which 100 billion dollars was in China alone.

Table 1 provides one example of bifurcating this confused landscape. This is the one used by the European FinTech Awards. They have over 400 startups who have applied to get an award. The top three startups in each category, based on the number of likes received by a certain date, are indicated as examples. However, many industry players mentioned in the preceding paragraphs are much larger.

So far, we have indicated that banks were able to control technology in the past but that the high speed of technological change and the proliferation of innovators in the FinTech industry causes confusion and may lead to a different outcome. In the next section, we provide perspective by offering some alternative scenarios for strategic value management for the different actors.

5 | STRATEGIC VALUE MANAGEMENT IN THE FINTECH INDUSTRY

In today's world with superabundant financial capital and rising inequality, technology can be harnessed to increase productivity and reduce work time (Ashta, 2015), to redistribute opportunities, or to offer other solutions to create more growth (Mankins, Harris, & Harding, 2017). The advocates of growth recommend multiple experiments to have a few winners. The winners are those that create value that can be captured and managed by firms.

5.1 | Value creation by FinTech

It is important to understand that technology is really creating value in financial services. First, costs are being cut dramatically thanks to technology. This is not just the processing costs within banks, but also other transaction costs (Scott et al., 2017). For example, the customers do not have to spend time or energy on going to the bank. In developing countries, especially, this means that they also have less risk since they need to carry less cash and are, therefore, less likely to be robbed.

Second, revenues are increased because Banking becomes 24/7: Anytime, Anywhere. This means that the velocity of transactions increases, driving up revenue. Moreover, as more and more transactions are done electronically, the data are captured and big data analytics allows better targeting and faster adaptation to changing needs of customers, not just for the financial industry but for all the customers which it can advise or with whom it share its data. The aforesaid

¹³ The economist (2017): Silicon Speculators, October 28.: <https://www.economist.com/news/finance-and-economics/21730693-automated-wealthmanagers-are-getting-bigger-they-still-manage-very-small> accessed on October 31, 2017

¹⁴ <https://www.betterment.com/resources/inside-betterment/our-story/the-best-job-in-the-world/> accessed on October 31, 2017

reduction in costs also means that the bank can now serve the long tail of small consumers better and further increase its revenue.

Third, for the industry as a whole, the emergence of new operators is welcome since they are out of the purview of banking regulations by side-stepping deposits. For crowdfunding, this also means that risks are lowered for borrowers since more people are lending to you (less dependence on a few big banks).

Nevertheless, a number of challenges remain. The first is the digital divide: young versus old; poor versus rich; rural versus urban. Young people are more comfortable with mobile technology and adapt to it faster. Older people are more conservative and stick to brick and mortar banking. The poor do not have access to computers and although they usually have a phone, it is not always a smartphone. Finally, cable connections are often not available in rural areas and satellite availability may be a challenge for poor countries. Therefore, technology does not reach everyone easily and adaptations need to be made.

A second problem is linked with security. This concerns privacy, hacking, and fraud. However, these problems existed even in cash transactions, but now the nature of the risk has changed. At the same times, investigation tools can also be more electronic. As a result, we are seeing a different kind of educated crime and educated police.

Finally, there are issues of discomfort and mistrust. People like to know that there is a human presence somewhere to whom a complaint can be lodged or legal action taken. But with Internet banking, especially for international transactions, jurisdictional issues may become complex.

5.2 | Will banks be able to capture the value?

For the purpose of this section, we consider banks and financial institutions as the incumbents who are the traditional large actors in the

financial services landscape. The challengers are the new technology providers. Although the latter may today represent billions of dollars of business, banks are looking at trillions of dollars of transactions. As a result, the challengers may be operating below the warning radar of the incumbents. The incumbents are aware of the presence of the challengers and know that some of them may be adding considerable value and may grow very fast. Figure 2 captures the options available to banks.

Moreover, as more and more transactions are done electronically, the data is captured and big data analytics allows better targeting and faster adaptation to changing needs of customers, not just for the financial industry but for all the customers which it can advise or with whom it share its data.

Certainly, the banks can take the freeze response: wait and see how the challenger develops. But they may wake up too late when the challenger is too big to be bought and will have to face the consequences of the disruptive innovation.

A second possibility is to fight or compete through making radical sustaining innovations. Banks try to compete, but usually cannot. This is because the FinTech challenger is playing on the fringes: any one fringe is too small for the banks who have high costs. Therefore, it is possible that small banks may finally lose out and close. However, large banks may decide to get into innovative technology themselves. In fact, their ability to offer Internet banking or mobile banking may influence customer retention (Xue, Hitt, & Chen, 2011). Their success may depend upon their ability to set up autonomous units with access to lateral coordination within the bank (Weigelt & Miller, 2013).

A third possibility is that large Banks eventually buy out the startup FinTech if it is showing potential to outgrow the fringe. However, there

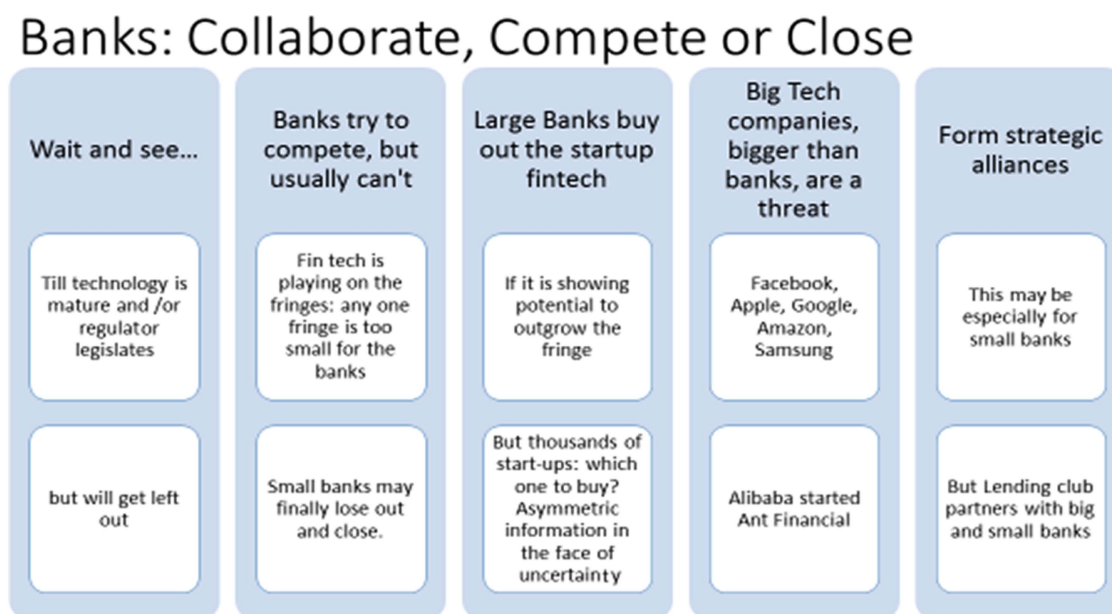


FIGURE 2 Strategic options available for banks. [Color figure can be viewed at wileyonlinelibrary.com]

Source: Authors.

are thousands of start-ups: how many can the bank monitor and which one should it buy? The bank is faced with the problem of asymmetric information in the face of uncertainty.

A fourth scenario is that the competition may be with Big Tech companies which are bigger than banks. In the early days of mobile banking, it was not clear whether the industry would be dominated by banks, telecoms, card operators, hardware or software providers or makers of handsets (Mas & Rotman, 2008). Indeed, this sparked a theory that when there are turf battles by established players, nothing may happen since they would agree to a common architecture for the new industry (Ozcan & Santos, 2015). Yet, we do see that mobile banking has taken off but that there are new big players in the field. These include the likes of Facebook, Apple, Google, Amazon, and Samsung. For example, Alibaba started Ant Financial. These technology-based companies realize the importance of the big data, especially if it is linked to payments. Therefore, they may enter the financial market only to capture the data. Obtaining this data may depend on who owns the customer and this is the primary source of conflict (Ozcan & Santos, 2015). Certainly, smaller banks cannot compete with the large challengers and big banks are going to find it a challenge too. Some of these big players will take over banks or start their own banks, just as banks will take over some of the smaller FinTech operators. This is very similar to the conception, a few years ago, that mobile payments would be bank-led or telecom-led (Ozcan & Santos, 2015), except that totally new challengers are coming in.

The current state of thinking considers that banks will form strategic alliances with FinTech companies to create recombinant innovations and jointly provide services. This may be especially for small banks. However, we see that pure play FinTechs, such as Lending club, partners with big and small banks.

Strategic analysts should not forget that being incumbents, banks have certain advantages. First, they know the markets and the regulations. Second, they have already frequent customer interaction, estimated at 17 times a month. This provides them a repeat purchase behavior that is difficult for any challenger to change. Third, older people feel comfortable with physical brick and mortar points. Fourth, banks have big data on customers' financials and projects and know exactly which product to propose, based on their experience. Finally, banks have deep pockets and few alternative projects to finance. These deep pockets provide them the ability to lobby and ensure that legislation favors their continuation.

On the other hand, banks have prudential regulation to comply with and are thus at a disadvantage against nimble operators who do not have to comply with these norms since they do not take deposits.

Regulators, especially in developed countries, are very careful before making any change to the banking system (Ashta, 2017) but may prefer to make changes where people are excluded (Scott et al., 2017). This is because the banking system or the payment system is the backbone on which all commercial transactions are undertaken. The regulator is loss averse and would not like to take any risks against established incumbents. Therefore, regulators may hamper growth and retard value creations by limiting the fields in which challengers can operate. This may be because of prudential fears or

security concerns (Ozcan & Santos, 2015). Nevertheless, if regulators block innovation too long, the State of the regions would become less competitive than other regions (Cortet, Rijks, & Nijland, 2016). In Europe, for example, the first Payment Services Directive led to a ring-fenced zone of small payments where FinTech could operate. It is only recently that Europe has woken up to the fact that very little investment in FinTech is being done by banks and they have passed the second payment services directive (the PSD2). This will allow payment service providers access to information on different banks with which consumers have accounts to enable them to rapidly make payments from the optimal account.

The performance paradox in times of disruptive uncertainty, the focus of our research in the FinTech context, is that efficiency may only help us remain in the old conventional field, while creativity may require reduced resources being focused on performance improvement in the traditional field.

At the same time, the large technology-based challengers do not like restrictive regulations since it limits their ability to innovate. They would like enabling regulation to even the field with the banks. They also have deep pockets.

The endgame is not clear and that is why the sector is interesting and this article brings clarity to the different situations of Value Management in the different categories of the FinTech market. Some of these Strategic Value Management lessons will be similar to those learnt from the past, but others will be totally new and even challenge theories of change management (Kotter, 1995). In this changing world of bankers and financial institutions, there is already a sense of urgency. Many have already put together a guiding team. However, the speed of technological change is such that any new vision and strategy developed is already obsolete by the time the guiding team agrees to it. Therefore, putting the strategy in place and changing the culture of the banks and financial institutions may prove trying. (Mowery & Simcoe, 2002).

6 | CONCLUDING REMARKS

We have studied four radical innovations in the history and present of the banking industry. So far, we have seen that banks were able to capture the ATM as well as telex transfer technologies, either through partnerships or through cooperative ownership. This is because the technology was catering essentially to existing clients of banks. However, the telephone (more than the Internet) has permitted a last-mile contact with customers who are not banking clients nor even those of microfinance. This has permitted telecoms to enter into the financial services and they threaten to be disruptive. This is especially true of China where the telecoms network was as well established as Europe and mainstream bank penetration was lower as in many developing countries, leading to rapid expansion of operators like Alipay who are now many times larger than Paypal (Augustine, 2017). There may be alliances or banks or telecoms may just buy each other out. Bitcoins seems to be even more revolutionary because many do not

understand it nor its possible outcomes. Banks are grouping together to see if they can create a cooperative network to test the technology, but the endgame is far from clear.

The performance paradox in times of disruptive uncertainty, the focus of our research in the FinTech context, is that efficiency may only help us remain in the old conventional field, while creativity may require reduced resources being focused on performance improvement in the traditional field. The ability of the bank to set up autonomous units or responsibility centers to deal with the complexity of innovation as well as the ability of these units to tap into knowledge existing elsewhere in the bank, may be crucial for success in sustaining innovations, calling for architectural innovations in organization design (Weigelt & Miller, 2013). Conversely, the ability of challengers to take subversive actions may be crucial for success in disruptive innovations: For example, PayPal's initial goal was to make payments independent of the State (Bureau, 2013).

Future research needs to look at value management theories to see how they respond to such change oriented performance management (Chaboud et al., 2018). It may also be interesting to study this sector through the lens of organisational adaptation theory.

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