POLITECNICO DI TORINO

Master's Degree in Engineering and Management

Master Thesis

Fintech Sector: Business Model Analysis in the Mobile Payments Area

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Summary

Introduction

My master thesis wants to provide a general overview over the "**Fintech Paradigm**", in particular with attention versus the segment of "**Mobile Payments**".

I have structured my work as follow:

In **Chapter 1**, I have analyzed the main reasons that led to the birth of the Fintech paradigm and its exponential development in recent years.

In **Chapter 2**, I have defined what the term FinTech (Financial Technology) means, highlighting the fact that it is not a new concept, but rather a technology that has been applied to finance since the early 1900s.

In **Chapter 3**, I have illustrated a "Fintech Taxonomy" in order to differentiate markets segments and particular technologies relevant for Fintech. Some examples include Mobile Payments, Crowdfunding, Cryptocurrencies, P2P lending, Insurtech etc.

In **Chapter 4**, I have highlighted the main characteristics of the business models of the most important Fintech startups, classifying them according to the LASIC model.

In **Chapter 5**, I have introduced a part of Literature Review about two-sided platforms and network externalities, in order to better understand the economic factors leading the development of the Fintech industry.

In **Chapter 6**, I began to analyse in detail the world of Fintech Mobile Payments. The introduction of the second Payment Service Directive (PSD2), the development of APIs and related technologies are all factors that have characterized the development of digital payments and have helped to make them so important.

In **Chapter 7**, I talked about the banks and the possible strategies that can be implemented to ride the "Fintech" wave without the risk of drowning. For example, banks could take advantage of the skills they already have to improve their services, but above all, they could exploit new business models to cope with the advance of Fintech start-ups.

How will changing customer needs and behaviours in an increasingly cashless world change? This is certainly a question without an easy answer, but I have tried to identify six possible trends in **Chapter 8** that will affect and modify the payment industry of the future.

In **Chapter 9**, I have included a case study on Satispay, an Italian startup in the micro-payments sector that revolutionized the payment industry thanks to the possibility of making bank transfers through IBAN without transaction costs. I have described its growth, its business model, the strategy used to create the critical mass of users and the numerous partnerships held by the company.

Finally, in **Chapter 10**, I have made a brief literature review on S-Curves, technological paradigms and customer segments, in order to understand the market and technology conditions in which the company operates. In this way, I am able to better assess the efficacy of alternative market and innovation strategies for the future of Satispay.

Chapter 1 - The Emergence of FinTech

The Financial Crisis

The financial services industry has undergone a considerable shift since the financial crisis, as traditional firms, once central to all financial relationships, have seen their relevance diluted by FinTech firms. Without doubt, the financial crisis has had a profound and lasting effect on the way in which worldwide customers interact with the banks that they serve. Gone are the days when financial institutions were among the most respected and trusted organizations on the street; today customer trust in banks has fallen dramatically. Across Europe, 45% of customers say that the crisis has had a very negative impact on their trust in the banking industry.

With diminishing trust comes diminishing loyalty and therefore a significant demise in the fidelity banks enjoy among their customer base. The concept of the main bank with which customers hold most of their accounts and do the majority of their business is blurring. Therefore, the biggest tangible effect of the declining trust in the banking sector is a move by customers to diversify their banking relationships and this effect was felt by the sector immediately as the credit crisis and the fear of bank failures took hold. (EY 2010)

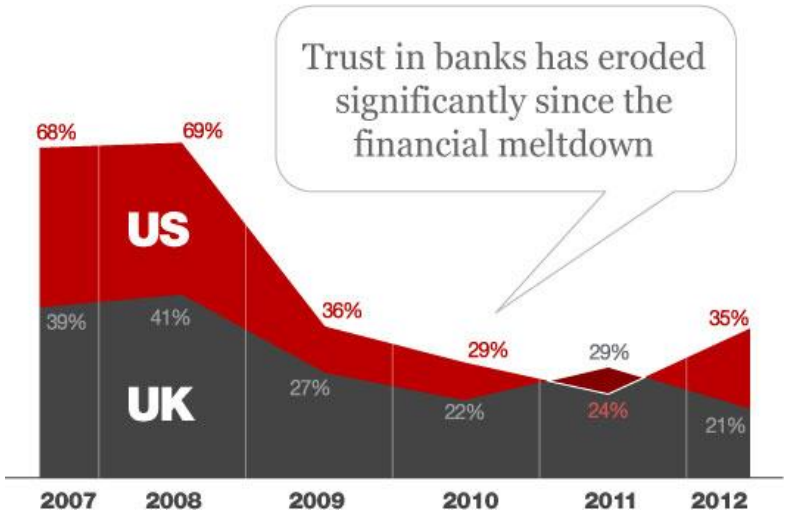


Figure 1: Erosion of trust in banks from 2007 to 2012 (The Financial Brand,2016)

New regulation and lower profitability of traditional financial intermediaries

Prior to the 2008 financial crisis, the traditional banking sector had considerable unmet demand, particularly in developed markets, and the vast majority of small and medium-sized enterprises (SMEs) in emerging markets went underserved. The crisis exacerbated this issue and threatened the collapse of the world's largest financial institutions. The post-crisis regulatory reform has been far-reaching for traditional banking-sector participants. Many regulators have been concerned with re-establishing stability in the financial system through better recovery systems and resolution plans for banks or by implementing higher capital requirements. The latter has altered the economic viability of traditional banking-sector participants to originate loans, translating into a contraction of the credit supply for individuals and SMEs. (Stein and Aggarwal 2016).

To better understand the changes that have contributed to the post-crisis of the worldwide banking system and the consequent advent of the Fintech paradigm, it is necessary to analyse the key factors of the profitability of banking institutions to highlight how these have changed in the last years.(Arner, Barberis, and Buckley 2015)

Figure 2: Driver of Bank Profitability (KPMG, 2016)

Low margins

The core business of traditional financial intermediaries, **money lending**, has certainly lost a good part of its margins in relation to the main sources of income linked to it: **interest margin** and **fees charged** to services. Interest margins for example, decreased exponentially due in particular to the main policies applied by Central Banks after the Financial Crisis.

With the aim of mitigating the effects of the "credit crunch", i.e the decline in credit to households and companies, these policies concerned the reduction of interest rates, in particular the prime and marginal lending rate. These rates have been gradually decreased until brought to zero, resulting in lowering the cost of money in interbank loans. At the same time, numerous quantitative easing measures have been launched by Central Banks, which have further contributed to lowering the interest rate curve.

The gradual breakdown of interest rates has led to a fall in the cost of money for banks and, consequently, a sharp reduction in active rates applied to customers. This decline was higher than that of deposit rates, which resulted in significant “compression” of banks’ margins.

Non-performing exposures

As a result of the financial crisis, "**non-performing exposures**”, as past due/overdue positions, defaults and sufferings, have increased considerably. This has had a negative impact in various forms: both in terms of unpaid interest on mortgages and in terms of the need to increase the provisions against the risk of loan losses and the recognition of losses on transferred or restructured positions.

Ratio between operating costs and profits

This ratio, in the banking system post 2008, has grown, reaching around 60% in 2016. While on the one hand, the main sources of income as marginal interests and commissions are difficult to maintain high for the conditions mentioned above, on the cost side, financial intermediaries have witnessed an incredible increase of operating costs. Adaptation of information systems, investments in new technologies to compete with new entrants and the regulator's demands in terms of higher provisions

for credit risks have been important factors that favoured the emergence of Fintech paradigm.

New capital requirement needs

In the aftermath of the financial crisis, there has been a gradual imposition by central regulators of greater capital and liquidity requirements for banks. At the same time, heavy impositions have been submitted from the point of view of the assets to be held, with the need for traditional financial institutions to hold a certain amount of safe and liquid assets, but extremely unprofitable, and to limit the holding of assets with greater and more risky returns.

All of these factors contributed to the decline in the banking system's productivity and the consequent development of the FinTech. In response, no depository institutions – referred to as peer-to-peer financing, loan-based crowdfunding platforms and marketplace lenders – began to provide loans of various types and duration to end users through online and mobile channels. Some of these companies lend from their own balance sheets, commonly referred to as “balance sheet lenders”, and some serve as brokers between investors and borrowers, commonly referred to as “platform lenders”. (Stein and Aggarwal 2016)

Lack of regulation in the digital financial sector allowed these companies to make whatever they want because it is common known that law needs time in order to understand and consequently regulate a new technology.

A connected digitalized world

The incredible digital transformation we are witnessing is universal, omnipresent and it is changing market rules, people's habits and society. Technology has grown at an exponential rate and especially in the last ten years, the evolution of the Internet versus a much faster broadband service, the introduction of smartphones and mobile devices, have contributed to a significant change in the world we live in.

Internet Diffusion

The underlying charts show Internet adoption rates that were reached in 2016. **Figure 3** shows that the percentage of users who use the Internet daily, considered an age segment of 18 to 49, is more than 90% in the US. Even more surprising, a thing that makes us understand the globalism of the Internet phenomenon is the Internet adoption rate for the age segment between 50 and 64 years: almost 90%. Over 65, the percentage drops to 60%, but remains high.

However, not only the United States have these high rates of Internet adoption, as the percentage of users who use the Internet every day, in most other developed countries, is virtually the same. These numbers clearly demonstrate the wide spread of the Internet and hence the acceptance of technology by all parts of the industrialized population.

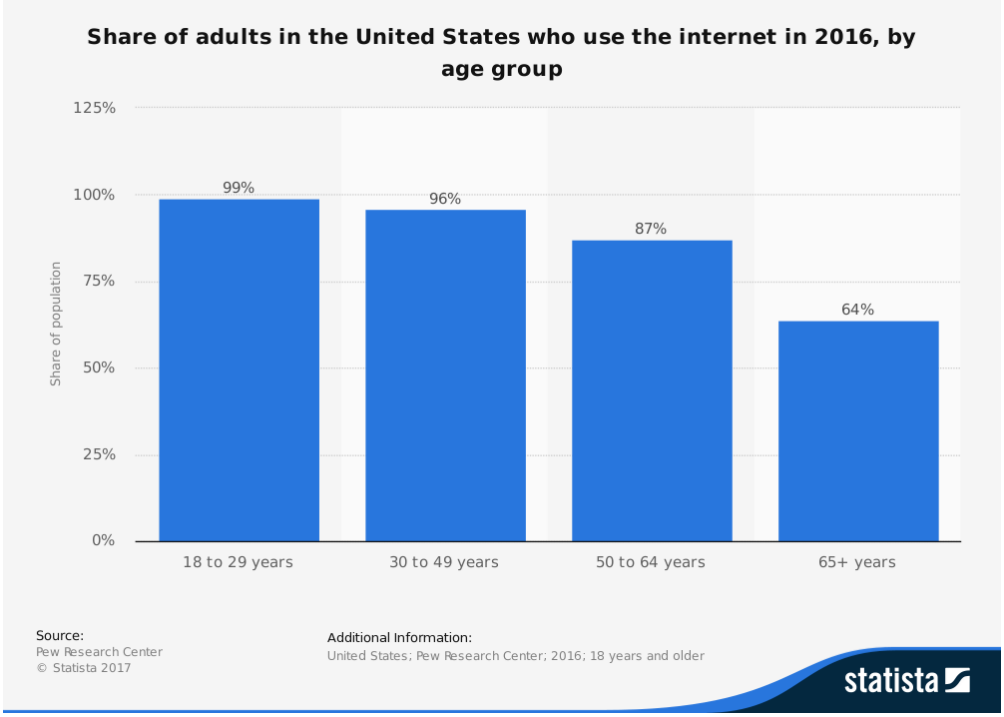


Figure 3: Internet Usage in US, by age group (Statista,2016)

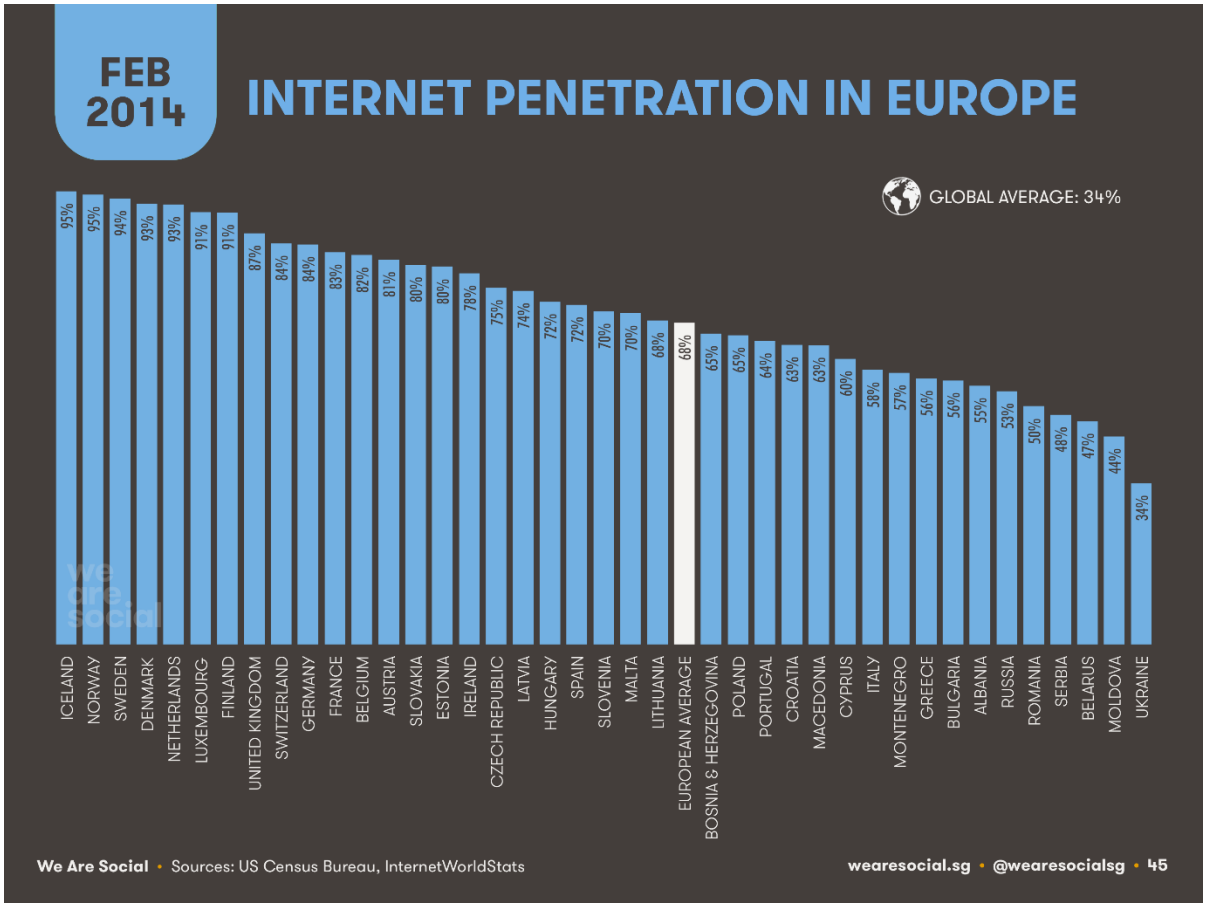


Figure 4: Internet Penetration in Europe (We Are Social, 2014)

As far as developing countries are concerned, the rate of adoption remains below 40%. It should be noted, however, that growth rates for these countries are obviously higher than the average, for example in India (14%) and in African countries (15%), which means a great demand for online services and platforms. It is Facebook CEO Mark Zuckerberg's intent to create a world entirely connected and one of the mission of his company for 2020, it is to provide internet connection to that countries which still cannot have access.

Clearly, we easily understand why the growth of internet accessibility has been one of the most important factor for the advent of FinTech start-ups into the worldwide panorama. P2P lending, crowdfunding, mobile payments are in particular the most influenced FinTech categories.

Mobile Diffusion

While we see an increasing Internet growth among developing countries and extremely high Internet adoption rates across all industrialized countries, we can also observe a significant increase in the adoption of mobile devices such as smartphones and tablets. As we can see in **Figure 5**, the net total mobile subscribers on a global scale is increasing constantly from 2012. Today, there are around 5 billion people connected via mobile, 28.5% more than in 2012. Until 2020, 5.7 billion of people have been forecasted to be connected via mobile. Considering that the world population forecasting for 2020 would be near 7.5 billion people, it means that about the 75% of the worldwide population would have a cell phone/smartphone and would be connected on the internet.

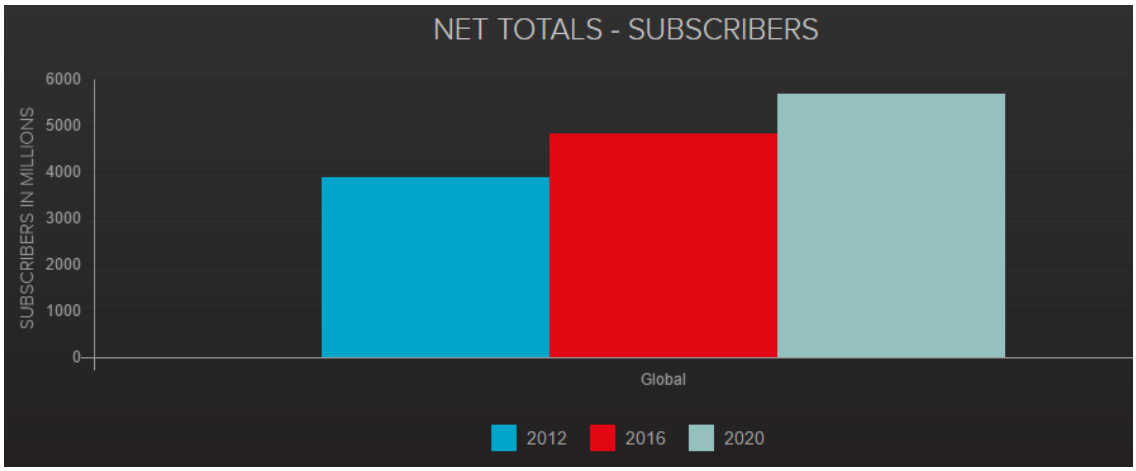


Figure 5: Totals cellphone subscribers in the World (The Mobile Economy, 2017)

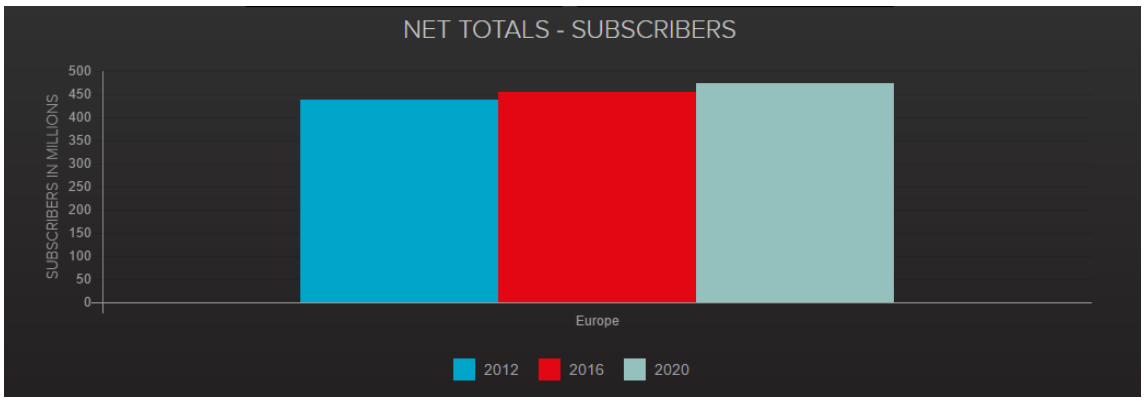


Figure 6: Totals cellphone subscribers in the Europe (The Mobile Economy, 2017)

With the rise in mobile devices and connectivity, people's habits and expectations have changed considerably in recent years. Salesforce.com reveals some interesting results on the average behaviour of 470 consumers monitored and interviewed regarding the use of their mobile phones. According to this study, the average smartphone user spends about 3.5 hours a day on their device. The new generation of young people between the ages of 18 and 24, the so-called Millennials, gets to spend 5.2 hours every day on their smartphones, while the average for people aged over 55 is about 2 hours. What are the most frequently performed activities? Access to e-mail, text messaging, Internet, social networks, use of entertainment apps such as games and listening to music. It is noteworthy that most social networking platforms like Instagram, Pinterest, Facebook and YouTube are accessible almost exclusively via mobile apps rather than via mobile web. (Salesforce 2014)

The study conducted by Salesforce.com may not really describe the behaviour of the entire smartphone user community, but it still provides us with a good perspective on where we are heading. People increasingly appreciate the convenience that mobile devices bring in everyday life. Whether they are smartphones, smart watches or tablets, they allow people to do their daily tasks more easily and efficiently. People are getting used to doing daily activities travelling, whether it is shopping, dating or writing email. The abundance of information that these devices provide us, significantly increase the quality of life of users, who are better informed when they have to make decisions, for example in making purchases. The ability to compare prices, check customer reviews, know the details of the products without having to go to the store or be assisted. This allows us to make better offers and save money.

The changing consumer behaviour

Traditional firms have been slower to respond to rising customer expectations. These have become increasingly mobile and ever-more demanding and consumer perceptions are changing at a rapid rate. The fast pace of technological development has only heightened the sense that traditional firms are lagging.

Powerful BigTechs like Google, Amazon, Facebook, and Apple have raised the bar of customer expectations by delivering superior personalized and digital customer

interactions. Inspired by the digital interfaces they encounter in their day-to-day lives, customers have started demanding similar levels of experience from their financial firms.

> *"Financial services for a long time has been about a product you buy and then you might get sub-par self-service afterwards. But providing an experience and actual self-service is what FinTech is going to be about in the future".*
>
> (Capgemini 2017)

FinTech firms have been quickly capable to identify the gaps in service left by traditional firms and began filling them with compelling offerings, taking advantage of the latest in technology to deliver better value propositions to customers in a number of areas and even catering to new customer segments. There was the exigence of a change in the business model of traditional firms and in order to respond to the transforming consumer behaviour, FinTech start-ups are revolutionizing the classical business model by putting at the centre the consumer and its needs. Why does traditional financial firms not react initially to this changing paradigm? (Capgemini 2017)

The main reason is that banks have always competed with other banking competitors as a top priority, and many other concerns such as increasing regulations, inflexible legacy systems, security, etc. In this way, banks have increasingly added operating costs to a cost structure, which in itself was already disproportionate. It was therefore impossible for banks to change their business model to respond to new consumer demands.

Most of the new entrants in the FinTech paradigm have embarked on their journeys, as agile startups, able to take advantage of next-generation technology without worrying about existing systems or cultures. The presence of low barriers has been fundamental for the growth and development of FinTech all over the world. The cost of starting a FinTech company has decreased significantly, leading to an exponential increase in the number of these start-ups.

By analyzing the VC financing in FinTech, we can say that these have increased exponentially in recent years with a global investment that has reached almost $ 25 billion in 2015. VC funding has been of fundamental importance in the financial services industry, giving FinTech innovation a chance to be born and developed (without funds it could not have happened.) On the other hand, the birth of this new paradigm has also contributed to change the mentality of traditional players, who have become increasingly active in the product development phase and have finally realized that they could not remain extraneous to the FinTech paradigm. Some organizations have created their own FinTech hubs/accelerators to drive new startups on their growth path.

Chapter 2 - What is FinTech?

FinTech History

Several definitions have been given about FinTech, however, I have selected three definitions that linked together captures the revolutionary and disruptive essence of this innovation:

> *"FinTech: an economic industry composed of companies that use technology to make financial systems more efficient. … "Fintech is a dynamic segment at the intersection of the financial services and technology sectors where technology-focused startups and new market entrants innovate the products and services currently provided by the traditional financial services industry" … "the aim (of Fintechs) is to inflict death by a thousand cuts. Fintech start-ups are nimble piranhas, each focusing on a small part of a bank's business model to attack." (McAuley, D Wharton FinTech, Online 2014)*

The FinTech industry is often regarded as a recent union between the world of financial services and information technology. However, the interconnection between the financial sector and technology has a long history that cannot be overlooked in order to carry out an accurate analysis of Fintech today.

In fact, the FinTech world is not a totally new and innovative change for the financial services industry. The introduction of the telegraph (first commercial use in 1838) (Harris 2016) and the laying of the first transatlantic cable in 1866 (thanks to the Atlantic Telegraph Company) provided the essential and necessary infrastructure for the **first major financial globalization** period at the end of Nineteenth century. This period began in 1870, with the laying of the transatlantic cable and other similar connections, until the advent of World War I. Subsequently, the introduction of the Automatic Teller Machine (ATM) in 1967 by Barclays Bank ("The Evolution of Fintech - The New York Times" 2016) will definitely mark the beginning of the **Modern FinTech era** to date.

Furthermore, the financial services industry has been one of the world's leading IT products and services purchasers with a total expenditure of over 197 billion dollars in 2014. Since the end of the 1980s, finance was an industry based on the transmission and manipulation of digital information. We are therefore not talking about a recent

trend, but it dates back to the 1990s, when the Financial Services industry became the largest IT buyer, a position it has maintained until today. Therefore, for at least twenty years, traditional financial services have been a driving force in the IT industry and continue to be the result of ongoing investments in this field. The industry plans to double its IT spending until 2020, both to support exponential growth of players within the Fintech market and to provide them the resources they need to operate.

Finally, the term FinTech is not limited to specific sectors (e.g financing) or particular business models (e.g P2P, microcredit or blockchain), but covers the entire range of services and products traditionally provided from the financial services industry. A generic analysis of business models that characterize Fintech start-ups will be discussed later in **Chapter 4**.

We can therefore distinguish three main periods that characterize the evolution of FinTech.

- Between **1866** and **1967**, the financial services industry, albeit strongly linked to technology, remained largely an analogic industry, at least in public perception.
- Since **1967**, the development of digital technology for communications and transaction processing has definitively transformed finance from an analogue to digital industry.
- In **1987**, financial services, at least in developed countries, had become not only highly globalized but also digitized. This period, which can be considered as the second major change period for the FinTech world, continued until 2008.

From 1967 to 2008, the FinTech industry was largely dominated by the traditional financial services industry, which used technology to provide financial products and services to consumers. However, since the financial crisis of 2008, the FinTech paradigm has changed radically again. New startups and large technology companies such as Google, Apple and Amazon have started providing financial products and services to businesses and the public, revolutionizing the industry altogether as discussed in **Chapter 1**. (Arner, Barberis, and Buckley 2015)

The arbors of financial globalization – FinTech 1.0

By the end of the 19th century, finance and technology combined to realize the first period of financial globalization that lasted until the First World War. During this period, technologies such as telegraph, railways, canals and steamships contributed to the development of financial interconnections across borders, enabling rapid financial information, transactions and payments throughout the world.

During the post-war period, while financial globalization had been steady and constant for decades, there were several technological developments, particularly in the field of communications and information technology, which contributed to restarting the innovation process in the financial industry. As the New York Times noted, a large part of our financial technology infrastructure was created from 1950 through 1970, beginning with the introduction of the modern-day credit card by Diners Club in 1950. In the 1960s, automated teller machines (ATMs) were introduced, but they did not really begin to replace bank tellers until the 1970s. In 1960, the Quotron system began to appear on brokers' desks as the first electronic system to provide stock market quotations. They looked very much like large desktop computers. In 1966, the global telex network was established, which sought to provide the framework for future financial technology development in the international arena. That was followed by the creation of the Clearing House Interbank Payments System, which allowed the most active banks in the world to transmit and settle payments in American dollars. (Harris 2016)

The combined impact of these innovations was very important for the subsequent evolution of the financial industry and allowed the first changes from an analogue industry to a digital one.

Development of Traditional Digital Financial Services – FinTech 2.0

The launch of the calculator and ATMs in 1967 has thus ensured the beginning of the modern FinTech era. From 1967 to 1987, financial services were transformed from analogue to digital services and they characterized the resulting transition to a fully computerized financial industry. Throughout this period, financial institutions

increased their use of IT in their internal activities, gradually replacing most paper-based mechanisms.

In the 1980s, banks began to utilize the sophisticated data and record-keeping systems available through large mainframe computers, some of which took up whole floors. Up to this point, most of the FinTech advancements were contained behind the scenes, in the back offices of banks and investment houses. In 1982, E-Trade brought FinTech to the light of day for the public with its electronic trading system available for individual investors. ("The Evolution of Fintech - The New York Times" 2016)

However, it was surely the emergence of the Internet that laid the foundation for the next development phase, starting with 1995 with Wells Fargo who used the World Wide Web (WWW) to give users the opportunity to check their online accounts. With the growth of the Internet in the 1990s, the E-Trade model was made available through online stock brokerage websites, which were among the first true Fintech companies. It was not until 1998 that banks began to introduce online banking capabilities to their customers. By 2001, eight banks in the United States had at least one million online clients and other major financial corporations around the world began developing similar systems and related regulatory frameworks to address risks. By 2005, the first direct banks without physical branches emerged (e.g. ING Direct, HSBC Direct) in the UK. At the beginning of the 21st century, internal bank processes, interactions with outsiders and a growing number of customer transactions were fully digitalized, as evidenced by the exponential increase in IT spending in recent years into the financial sector. (Arner, Barberis, and Buckley 2015)

Democratization of Digital Financial Services – FinTech 3.0

A mindset shift has occurred from a retail customer perspective as to *who* has the resources and legitimacy to provide financial services. Whilst it is difficult to identify how and where that trend started, it is possible to say that the 2008 financial crisis represents a turning point and has catalyzed the growth of the FinTech 3.0 era.

In Chapter 1, I have identified other three important factors, over financial crisis, which contributed at the rise of this new FinTech paradigm:

- A connected digitalized world and improvement of technology (Internet and mobile phones);
- A changing consumer behaviour;
- New regulation framework;

All these factors facilitated the explosion in the number of new technology that led entrants in financial services in the last few years, broadly operating under the term FinTechs. Nowadays, we could define FinTechs as firms that are combining innovative business models and technology to enable, enhance and disrupt financial services.

With the advent of Internet technology, FinTech began to improve upon much of the financial technology infrastructure with more sophisticated risk management, trade processing, cash management and data-analysis tools utilized by financial institutions that were largely unnoticed by the general public. In the 2000s, advancements in Internet connectivity paved the way for a host of new FinTech companies to create consumer-facing solutions. PayPal was among the early innovators that began transforming the way people manage their money through payments. eBay was one of the first ecommerce empowerment websites that allowed consumers to create the market and establish prices for auction items.

When the World Wide Web introduced Web 2.0, it began the democratization of the Internet, allowing anyone proficient in coding to create a dynamic and interactive website utilizing the Cloud as the intermediary for the exchange of data. This opened up an entirely new frontier for FinTech entrepreneurs seeking to supplant existing banking channels and disrupt traditional business models. Suddenly, the exchange of money between consumers and businesses, and between consumers and consumers was reduced to information bits that could be transferred instantly using a smartphone. A sharing economy has emerged, which is turning consumers into producers. Robo-advisors using algorithmic programming could provide customized investment advice and create personalized investment portfolios at a fraction of the cost of human advisors. Online lenders began to sprout, offering credit to a vast underserved market of consumers and businesses largely ignore by traditional banks. Crowdfunding sites are opening up new channels of financing for entrepreneurs, a

good many of which are embarking on their own FinTech start-ups, thus creating a perpetual stream of innovation.

Last year $12 billion of private capital was invested into FinTech, helping thousands of new companies to emerge, win customers and scale up their operations. Banks and other financial services companies have watched nervously as more, more FinTech firms have brought significant innovations to the market, and some of these more traditional companies have begun to engage with FinTechs through partnerships, incubator programs and outright acquisitions. We will discuss better these aspects in the next chapters.

Chapter 3 - Fintech Taxonomy

Payments

Everyone can see that commerce is becoming more and more a matter related to mobile. In 2014, smartphones have become the world's most popular Internet access tool, ranking first before desktop and portable computers. It is estimated that by 2020, the number of smartphones connected to the Internet will be more than 2.5 billion (Ericsson 2016).

Metcalf's law, the law that "the value of a telecommunications network is proportional to the square of the number of users connected of the system ", has never had a more powerful example than the one linked with the smartphone growth. Thanks to every new person who buys a smartphone and connects it to the network, the potential for interconnection through instant messaging apps like WhatsApp, Skype or the Chinese giant WeChat, but also through social media like Facebook, Instagram and Snapchat, increases exponentially.

What does this have to do with business? Along with social change from mobile devices, social networks and internet, **E-commerce** is affected at the same pace. E-commerce is growing year by year at a rate of 32% (Figure 1).

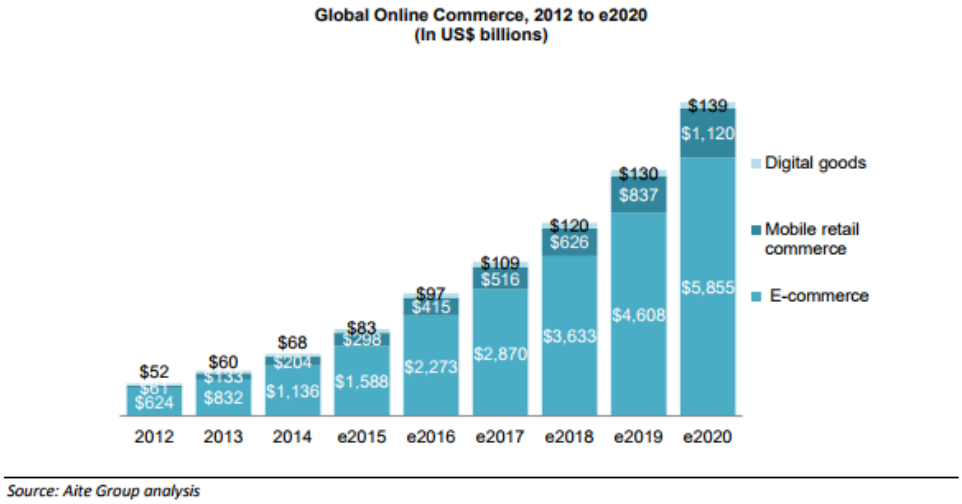


Figure 7: Global Online Commerce (Aite 2016)

The explosion of mobile commerce, at least in part, can certainly explain this growth. In North America and Europe, online purchases made by mobile devices increased by 58% between 2014 and 2015. If we analyze the desktop business, growth is dramatically lower: fixed computer or laptop makes only 3% of purchases. (Aite 2016)

Different technologies related to mobile payments have been developed over the last few years, in particular thanks to the advent of the smartphone (m-payment): therefore, we can defined as "**mobile-payment**" all those activities that enable payments or transfers of money through the smartphone. Various are the "branches" of mobile payment: we distinguish between *mobile remote payment, mobile commerce, mobile money transfer and mobile proximity payment.*

- The "mobile remote payment" includes those services that allow you to remotely activate payment of a good or service through your smartphone. These services use a wireless network and are usable through an application installed on the mobile phone, either through internet browsing, or by sending an SMS.

- The "mobile commerce" refers to activities that enable the selection or purchase of a certain product or service through the phone, usually with an application. Such services generally use the cellular network, and in order to use them you need to install an application on your phone or access the seller's website.

- "Mobile money transfers" includes services that allow the transfer of money from person to person, generally with reference to transfers between family members. The most intuitive case is **Money Transfer**, which concerns with immigrant transfers, cash flows that these people send to their relatives left in their countries of origin. Once again, these services use mobile network for distance transfers, and are usable via applications or sending SMS.

- Finally, "mobile proximity payments" refer to "proximity" electronic payments, which through the use of a wireless communication network and the use of NFC technology, "Near Field Communications", allow the mobile device to transmit the payment information to the beneficiary device

The increase in digital payment typologies, and in particular the mobile segment, has been undoubtedly influenced by the growth of e-commerce, which facilitated and encouraged the development of new "payment experiences". We can therefore say that the spread of smartphones has contributed to the development of e-commerce platforms, and these latter have contributed to the creation of new forms of digital payments.

Payment Technologies

Today, it is spreading, amongst the users, the will to have an optimal payment experience, in terms of speed, convenience and multi-channel accessibility. This new way of conceiving the payment experience has been made possible by the development and dissemination of new technologies, for example:

Mobile wallet

A "**mobile wallet**" is a digital wallet that, through the exploitation of the technologies described below, allows you to substitute your physical wallet, make it "virtual". This is usually an application that allows you to store credit or debit card data, through which you make payments.

NFC technology e tokenization

NFC (Near Field Communication) is what enables two devices to communicate wirelessly when they are close together. NFC is actually a subset of something called RFID (radio-frequency identification), a technology that allows us to identify things through radio waves. NFC, uses a specific RFID frequency (13.56MHz, to be exact) for close-range communications. To date, one of the more common uses for NFC is identification cards to gain access to places like office buildings and private garages. However, increasingly, NFC is being used to power something called “contactless” payments. A contactless payment is a transaction that requires no physical contact between a device like a smartphone and a payments terminal. When a contactless payment is initiated (by a customer holding or tapping a mobile device to the payments terminal), the NFC technology goes to work. Using that specific frequency we talked about, the NFC-enabled reader and the smartphone pass encrypted information back and forth to each other to complete the payment. This all takes just seconds. Speed, in fact, is one of the main feature parts of NFC payments. (Square Inc 2016)

Mobile payments innovation focused a lot on security, as payment security is one of the main problem of those are making a payment: "**tokenization**" systems have been developed, which allow the user to transform the data of your card or your payment

account into temporary tokens, allowing you to pay without having to share your details with the payee.

NFC technology applied to "mobile proximity payments"

The ability to carry out so-called "mobile proximity payment" through the smartphone is due to the exploitation of NFC technology. To better understand the functioning of this technology, we can say that it is characterized by three main characteristics:

- The presence of a "secure element"
- Interaction mode
- Security systems

The **Secure Element** (SE) as a tamper-resistant platform capable of securely hosting applications and their confidential and cryptographic data in accordance with the rules and security requirements set forth by a set of well-identified trusted authorities. Put simply, a Secure Element can be considered to be a chip that offers a dynamic environment to store data securely, process data securely and perform communication with external entities securely. If you try to mess with it by tampering in any form, it may self-destruct, but will not allow you to gain unauthorized access.
In today's smartphones, a Secure Element can be found as a chip embedded directly into the phone's hardware, or in a SIM card provided by your network operator that can be inserted into the mobile phone. (Ganeshji Marwaha 2014)

With regard to interaction mode, there are several ways NFC technology allows a device to interact with another device:

- **Reader-writer**, which allows the device to read/write a "passive" device;
- **P2P**, which allows bi-univocal exchange between active NFC subjects, for example two cellphones;
- **Card emulation**, which allows the device to "emulate" a payment card that interacts with a reader (POS contactless).

The security of the payment transaction is a "key concern" for anyone who wants to make electronic payments. In payments through the exploitation of NFC technologies, security is ensured through a "tokenization" system: the essential element of Near Field Communication (NFC) tokenization is replacing a Primary Account Number (PAN) with a token. The token is a randomly generated 16-digit number that replaces the PAN, but it represents that PAN to everyone involved in the transaction. Because the token is simply a random number, and not a genuine PAN, someone listening in on the conversation will get the token, but it is useless outside the conversation currently taking place. In addition to the tokenized PAN, the smartphone card-emulation software (either in a secure element or in running in phone memory or in the cloud) generates a dynamic card verification value (dCVV, to use Visa's term for it). This dCVV is a cryptographic value that is unique to the single transaction and can be used only once. (Ericsson 2016)

Mobile payment solutions using this technology require the interaction and collaboration of multiple actors, each with a specific role: the owner of the secure element, which can be the phone operator, or even the device manufacturer, depending on where the secure element is located.

The "service provider", who is the party that provides the payment service to the consumer, usually the bank. The person who generates the token and associates it with the payment instrument generally, the circuits managing the payment cards (Visa and Maestro). Finally, the person who develops and manages the mobile wallet, that is, the application that the user downloads on his cell phone. At this point, it should be noted that the user directly interfaces with the latter subject, or rather his brand. Therefore, the developer and handler of the wallet gets the direct user interface.

Blockchain technology

Blockchain technology is a topic that, to describe it well and in detail, I should have written a whole thesis on it. Therefore, in this chapter, I would like to introduce the argument to explain its importance in the paradigm of digital payment and how this is structured.

Historically, when talking about money transactions or any other kind of value, people and businesses have always been blindly entrusted with classical financial intermediaries such as banks and governments that have always guaranteed confidence and security in movements (Lexology, 2016). The main function of intermediaries is to perform the classical operations of the transactional process such as authentication and keeping the registers. The occurrence and implementation of this set of activities has allowed banks and financial intermediaries to build a reputation based on trust for all these types of transactions. The need for intermediaries becomes even more necessary and crucial if the transaction is carried out digitally. Since digital resources such as money, stocks, and intellectual property are essentially files, they are incredibly easy to reproduce, copy or hack. What if there was a way to conduct digital transactions without a third party intermediary? Well, this possibility exists today and the technology is called Blockchain

Blockchain Vs Bitcoin — What is the connection?

The term Bitcoin was used for the first time in a 2008 white paper, written by a person or group of people under the pseudonym of "Satoshi Nakamoto". The White Paper described a completely innovative P2P electronic payment system, named **Bitcoin**, which guaranteed direct digital currency transfer and therefore online payments without intermediaries and in absolute security. (Nakamoto) Despite the term Blockchain is commonly associated with Bitcoin, the former can be used in multiple circumstances, very different from the scope of payments. In fact, with the term Bitcoin, we refer to only one of about seven hundred applications using the Blockchain system today.

"[Blockchain] is for Bitcoin, what the Internet is for e-mail. A great electronic system, at the top of which you can create applications. Currency is just one." - (Sally Davies, FT Technology Reporter)

What is Blockchain?

Blockchain is a type of distributed registry or decentralized database that keeps track of digital transactions. The main difference is that instead of having a central administrator as a traditional database (think of banks, governments, and

accountants), there is the presence of a book that has a network of replicated, synchronized databases, visible to anyone inside the network. (Fresible) Blockchain networks can be private, so with a limited membership similar to an intranet, or public (such as Internet) accessible to anyone in the world.

When a digital transaction is performed, it is grouped into a block protected by encryption with other transactions that have occurred over the past 10 minutes and sent to the entire network. Miners (network members with high levels of computing power) compete to validate transactions by resolving complex encoded issues. (The Blockchain Review 2016) The first miner to solve the problems and validate the block receives a reward. (In the Bitcoin Blockchain network, for example, a miner would receive Bitcoins).

The validated transaction block is then timestamped and added to a chain in a linear and chronological order. New validated transaction blocks are linked to older blocks, creating a blockchain that shows every transaction made in the history of that Blockchain. ("What Is the Bitcoin Blockchain and How Does It Work? | Crypto Currency Technology Explained - YouTube" n.d.) The entire chain is continually kept up-to-date, enabling each online ledger to be the same for everyone, giving each person the opportunity to demonstrate what one possesses at any given moment.

As previously mentioned, Blockchain technology guarantees the execution of financial transactions without the need for a third-party intermediary to control its authenticity, security, and so on. This is possible thanks to the decentralized and cryptographic nature of Blockchain, which allows users to trust each other and to transact with P2P. The benefits that this kind of technology has brought and will bring in the future are many, but the majority of these are closely related to security. Cybernetic attacks that have often hit and worried the big financial giants (as banks, governments' exc.) are virtually impossible to accomplish on the Blockchain. For example, if someone wants to break a particular block of a Blockchain, a hacker should not only gain access to that specific block, but all procedural blocks would go back to the entire history of that Blockchain. In addition, in the end, he would need to attack every ledger of the chain, which could be millions, simultaneously. (Manzanares 2017)

This is explained because a hypothetical attack would prove almost impossible to accomplish.

Investment Management

Different financial institutions, including private banks, registered investment advisors, bank brokers and insurers, offered wealth management services to their customers. In particular, in the past, they were used to target higher-end of customers with investable capital, such as ultra-high and high net worth.

The services offered by financial institutions in the wealth management sector are:

- **Advisory**, as for example investment allocation strategies, active money management and securities/derivatives analysis;
- **Brokerage**, including distribution of wealth products (e.g mutual funds, ETF's, annuities and insurance products), access to rare products and assets and brokerage account management;
- **Value-add services**, as wealth transfer planning, estate/tax strategies, retirement planning exc.

As explained at the beginning of Chapter 1, the financial crisis has been the cause of the resulting loss of trust from customers towards consolidated intermediaries, particularly with regard to banks and financial institutions. Since 2009, digital technology companies have emerged with completely innovative ideas on investment and consulting. While traditional asset management companies were trying to remodel their business models and their internal organization in order to respect the new regulatory requirements and the complexity of crisis-led consolidation, start-ups have been so fertile to exploit their high-tech talents and build simpler and cheaper methods for providing financial advice in an innovative way.

There have been so many disruptive technologies that have contributed to completely changing the paradigm of the "**Investment Management**" sector we are talking about: from *automated asset management services* to *social trading platforms*. All this to ensure new low-cost and less complicated alternatives to traditional wealth managers. (EY 2016)

Driven by innovative financial and software engineers specialized in finance, these companies are *"Digital Registered Investment Advisors"* (RIAs) that offer simplified

financial solutions without the need for a person-to-person interaction. The exponential increase in these new digital realities has led to the emergence of two alternatives to the traditional asset management model, characterized by an advisor at the centre of operations.

Fully automated digital wealth managers:

This model uses a B2C (Business-to-Consumer) approach and aims to offer fully automated investment services without the need for a financial advisor to require any modification to the stock portfolio. Currently, the most innovative companies on this front are **Wealthfront** and **Betterment**. They have been able to offer simple tools to use and which have greatly improved customer experience of users. To begin using the platform, new customers only need to complete their profile, an online risk tolerance questionnaire, and they receive a recommended portfolio (obviously based on the percentage of risk they want to face), which can be composed by bonds, equity securities, BTP exc. (EY 2016)

Advisor-assisted digital wealth managers:

This model, in turn, relates the fully-automated digital investment platform, where customers can sign-up and monitor their investments and earnings, with a virtual financial advisor who usually carries out simple financial planning and periodic phone review. The most innovative companies in the "Digital advisor-assisted" sector are certainly: **Personal Capital**, **Future Advisor** and **LearnVest**.

To further differentiate from fully automated platforms, these startups have been thinking of offering value-added services that only through a further figure within the ecosystem were able to do so: the digital advisor.

For example, asset aggregation capability, which allows providing more holistic advices based on a comprehensive view of customer assets and liabilities, but also cost tracking and budgeting. Moreover, these companies offer often a sort of financial planning consultancy service, in order to provide customers with the knowledge they need to understand and analyse rationally the proposed suggestions from the digital advisor or the automated platform. (EY 2016)

Social trading

Social trading is another one of the most innovative key trends that is expanding in recent years in the area of Investment Management.

"Today, social trading has become an established, network-based methodology, which continues to empower novice traders and assist them to either make informed decisions as to when to execute trades via their retail platforms, or indeed to conduct the trades automatically by following a particular trade leader. " (FinanceFeeds)

Thus, social trading allows individual investors to build and share diversified portfolios or investment strategies with other interested people or other investors. The term "Social" also means a way for investors to share their opinions, fears, feelings about market trends and, above all, obtain market news from public opinions. If at first it could seem that altruism was not an attitude that in the financial sector (alienated by profit thirst) would have been particularly successful, maybe we were wrong.

"Social trading helps to leverage existing capabilities within the crowd to create a more accurate understanding of the market and provide low-cost alternatives to investment funds for customers." (Mcwaters 2015)

Estimize, for example, is an open financial estimates platform that helps to connect the world of financial analysts, which can be private, buy-side or sell-side, and on the other that of private investors and students. Gathering different financial estimates from a heterogeneous community of individuals, Estimize is able to provide its users with a more accurate and more representative view of expectations than just-selling data sets, characterized by a huge variance. ("Estimize Website")

Covestor is another great example of social trading platform, which gives the user the access to all the talent, insight and experience of the marketplace of investors. With Covestor, the portfolio of every investors is matched to the portfolio of a money

manager — trade for trade, maneuver for maneuver. The Portfolio Manager places an order, the platform calculates the combined number of shares the Portfolio Manager and clients require and place a "super order" that is sent to the market as one order. Obviously, the clients remain in complete control of their virtual wallet and they can change every time they want their portfolio manager. (“Covestor website")

Market Provisioning

New technologies

The use of algorithms in trading has grown dramatically with the evolution of the computing power, and today, considering the amount of data we are subjected, we can no longer do without it. The first application of these algorithms was the determination of the optimal portfolio in the 1970s until the emergence of fully automated algorithmic operations in the early 1990s. Today, we have fully automated platforms that guarantee the creation of optimized and diversified portfolios without the help of a financial consultant (as mentioned in the previous paragraph). However, the main objective of algorithmic trading has always been to exploit arbitrage opportunities in time and/or between different locations by leveraging low-latency access to quotations (i.e high-frequency trading, autonomous market makers) and thus providing liquidity to the market. These high-frequency operators replaced the market-making activities traditionally carried out by brokers, which were used to provide liquidity to the market and stabilized the prices manually by matching the bids. All this taking the risks of buying and selling shares in exchange for spreads.

Since the popularity and profitability of high-frequency trading will decrease over the years, the next evolution of algorithmic trading will surely depend on improved computing performance. This improvement will provide to an ever-wider range of financial operations to leverage the benefits of automation. The proliferation of more intelligent machines will enable even more leveraging machine-based trading to quickly respond to real-life events (price collapse, business failures, policy decisions with impact on markets and so on). Market maker's trading strategies can become more diversified as they have access to an ever-increasing amount of data and will be able to predict the different market conditions from these.

Therefore, a further improvement in trading algorithms with machine learning for example, could help expand and improve the analysis in the financial sector and could

lead to the convergence towards a single market view. Technologies that will surely be fundamental to the future of algorithmic trading are:

- **Machine Accessible Data**

The ability to generate news feeds via real-time algorithms, without the need for human interpretation (news readable by the machine), will be crucial to discovering major events faster than news. Social media/sentiment analysis is a classic example that can be used to explain this new technology. Often, news comes first on social networks respect newspapers or TV news, and the ability to find and process news that can directly affect financial markets in real-time will be very important.

- **Big Data**

Big data analytics allows accessing extensive real-time data sets through specialised databases and uncovering predictive insights on market movements based on correlations mapping. The development of these analyses will allow traders to leverage broader and deeper sets of data in making trades and more factors seemingly less relevant to the market / stock performance will be discovered and used for trading strategies.

- **Artificial Intelligence / Machine Learning**

Artificial intelligence is fundamental today in order to ask questions, discover, test hypotheses and take decisions automatically based on advanced analytics on extensive data sets. Financial institutions have the opportunity to self-correct and continuously improve trading strategies with minimal human interaction through machine learning and prescriptive analytics. Therefore, the involvement of humans in the overall trading process may decrease as machines automate a wide range of core activities from hypothesising to decision making. The accuracy, consistency and speed of trades will improve through automation and self-learning.

New market platforms

Many existing financial assets and products are still fully bound by financial institutions in the role of intermediary, whose role remains essential to connect and act on behalf of buyers and sellers. For most activities (e.g public shares, liquid bonds), there are formal markets to facilitate the connection between buyers and sellers,

generally in the form of exchanges. And this slice of the market, where demand and supply are well defined, is also the segment where new technologies and new start-ups are already present and offer the range of services, already described above. Instead, for less liquid and less standardized goods (such as bonds, forward contracts, and futures contracts), demand and supply are often dispersed and the connection between buyers and sellers is often inefficient. For this series of goods and services, there is a reference market called OTC (over the counter), which is not subject to the classic legal rules and where it is also possible to enter into atypical contracts other than those stipulated for normal assets.

Therefore, it can easily be seen that many illiquid financial assets are still highly dependent on intermediate institutions and it is in this area that new technologies have to push and innovate. Following the 2009 financial crisis, which exponentially reduced the risk appetite of traditional brokers and increased the bank's capital requirements, we witnessed a significant decrease in liquidity linked to financial assets and above all to this type of particular businesses (OTC market).

Thus, leveraging the automation and standardization of the flow of information, numerous platforms have emerged with the aim of changing the paradigm concerning how demand and supply are matched in different market types. These platforms automate and standardize demand / supply data collection from brokers or buyers and sellers in order to create an overall view of the market. This facilitates the discovery of the most suitable counterparts for each type of transaction. Generally, data is collected, processed, and then analyzed through a set of ad-hoc metrics to allow buyers to find sellers and more critically evaluate their reliability. This has also led to the emergence of numerous P2P lending and crowdfunding platforms that can more easily and accurately assess the creditworthiness and the financial position of their customers with the aim of providing mortgages, loans and credit to start their business. The topic will be discussed in detail in the next paragraphs

For example, **Algomi** combines Big Data with social networks in order to secure commercial and financial opportunities for private investors, funds and banks that negotiate multilateral transactions. Algomi's most famous service is definitely

"Honeycomb", linking customers, including professional investors, to databases built using data mining and analytics techniques, installed in a lot of banks in the world.

ClauseMatch is another Fintech start-up in the field of commodities and derivative contracts. It brings an unprecedented productivity for document workflow saving you millions in terms of time and resources, while significantly reducing risk and providing accountability. It works as a browser-based collaborative document editor containing in its core a detailed workflow, where comments, approvals and changes are a part of a full audit trail, providing an unprecedented control of content.(ClauseMatch)

Insurance

The global insurance industry has approximately $15 trillion in assets under management and $5 trillion in annual premium revenues. Considering the amount of technological improvements implemented in other sectors of financial services, inside the insurance industry the things have not change so much and the digitalization came late with respect to other industries. The level of customer satisfaction and loyalty ratings are the lowest inside the financial services panorama and this means that new technological innovations could improve a lot the performance entire system. (Accenture 2016)

The insurance industry has been one of the most affected by the changes of Fintech paradigm in these last years. For this reason, a new term has been coined in order to update the concept of insurance with the new technologies present on the market: **InsurTech**

Insurances have traditionally managed the whole value chain through product/service distribution, subscription, loss management and investment/risk management. With a network of independent agencies, conventional underwriting typologies and risk management reinsurance, incumbents have dominated the market for years, but digitization of the value chain is completely revolutionizing the insurance industry and will hardly stop running. (Kanaskar 2017)

We can say that InsurTech industry is characterized by two mega trends: Insurance Disaggregation and Connected Insurance

Insurance Disaggregation

Experts talk about “Behaviour Disaggregation” to describe how consumer behaviours can be tracked and analysed to engage with consumers directly in real-time, price risk accurately and with the aim to provide frictionless services.(Kanaskar 2017)

The “behaviour disaggregation” affects directly on the fragmentation of the insurance value chain and its activities, creating lots of opportunities but also many pitfalls for insurers. Emerge the exigence of challenging different scenarios and changing the old paradigm in many sector of the insurance industry’s value chain as: distribution, risk management, pricing & underwriting, investment and product design.

In the picture below, we can understand how the value chain functions, what are the segments that characterize it but we can also notice how digitization is affecting it. In the last part of the picture, it is possible to notice how the value chain is transitioning versus a new disruptive industry and we can start to imagine how this will become.

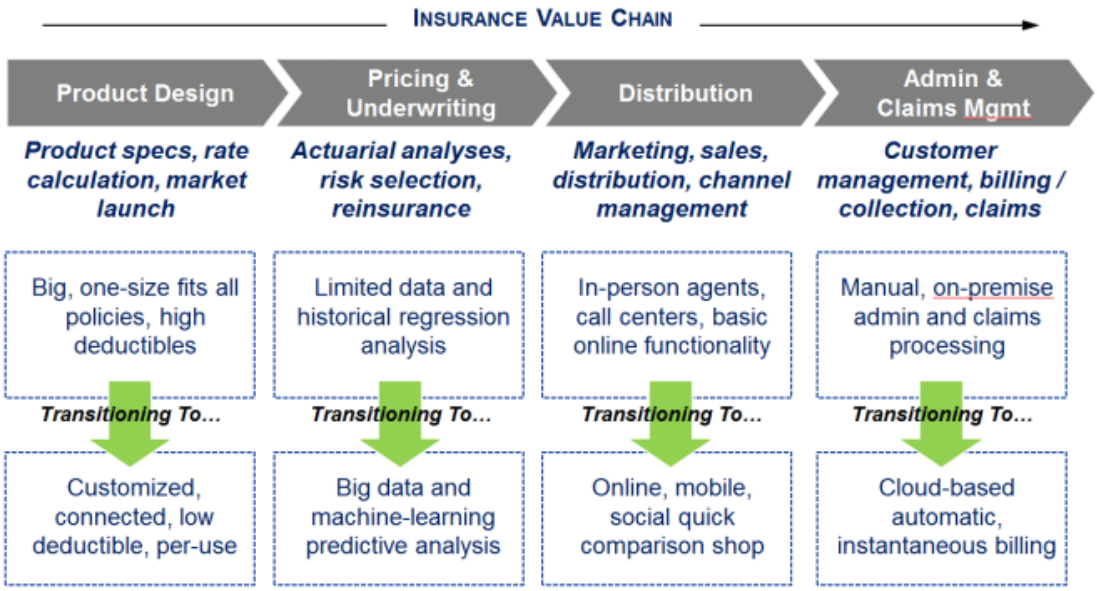


Figure 8: Insurance Value Chain (TechCrunch,2016)

We can say that every part of the insurance value chain is, nowadays, characterized by a process of digitization (some segments more and other less) but finally, it is possible to offer people an omnichannel experience, surely more personalized and in line with the needs of individuals.

"A key step for insurance companies will be to reduce costs from the claims management segment. How? Easy, through digitization and automation. By adopting a "no-touch" complaint method, it is possible to ensure a drastic reduction in costs, offering at the same time better predictive and preventative tools. Digitization could also help in preventing fraud and allowing risk managers to have a direct and concrete relationship with customers, instead of losing too much time behind the documentation. Another improvement is surely visible also in the subscription sector. Insurances that have passed on the use of digital platforms are increasingly receiving benefits such as increased subscription speed, better accuracy, better risk assessment

and better risk segmentation. Finally, also designing new products is more efficient. "(Pacor 2016)

Traditional insurance companies have always made profits by keeping the money they do not pay out in claims. This means that whenever they pay your claim, they lose profit. This is why getting claims paid fast and in full is often impossible. **Lemonade**, one of the most important Insurtech start-up in the US, has a business model that is completely different from the one of traditional insurance companies and from this, we would be able to understand really how the industry is radically changed. Lemonade takes a fixed fee out from customers' monthly payments, pay reinsurance and use the rest for paying out claims. In essence, they treat premiums as if they were still money of the customers and return unclaimed remainders in their annual "Giveback". Giveback is a unique feature of Lemonade, where each year leftover money is donated to causes that stakeholders care about ("Lemonade Inc.")

"**Metromile**" is another example of InsurTech start-up focused on customer needs, which is one of the pillar of the Fintech revolution: "Focusing on changing customer behaviours". Metromile is a pay-per-mile insurance created in order to be affordable for low-mileage drivers. The motto of the company is: "If you aren't driving much, you shouldn't be paying much".

We can therefore understand how Insurtech is forcing disaggregation at an industry-level scale. Business models have been overturned as happened in many other industries in which digitalization became important. Traditional risk pools are shrinking, risk is migrating from consumers to products, and the nature of risk is evolving thanks to self-driving cars, FinTech providers, sharing economy and hedge funds and securitization. (Kanaskar 2017)

Normally, digitalization decrease the amount of costs and entry barriers levels, breaking down financial expenses to enter in the industry. For start-ups that desire to enter into the insurance market, these are all positive factors that led to the entrance in the industry of new competitors, offering alternative underwriting models and new services.

Connected Insurance

The increase in the number of smart devices allowed customers to become always more connected, at home, at work, in the car, when they practise sports, leisure activities exc. Nowadays, in the era of Big Data, companies must be able to understand the key importance of data collected by users in order to improve their activities and to maximize their revenues. The challenge is to predict customer behaviours, to find pattern inside this amount of data and to offer products/services aligned with consumer expectations.

About 90% of the data stored in the world has been created over the last two years, and most of these are personal data. The advent of the Internet of Things has allowed the spread of sensors and data transmitters throughout the surrounding environment. These sensors identify the changes or occurrences around them and subsequently send these data to cloud storage systems. Wearable devices, tablets and smartphones are thus able to gather information about physical activity (footsteps, km and calories), heart rate, geo-localization exc. Building sensors instead measure air quality while those on the roads allow studying traffic patterns and weather conditions. (Lewis 2017)

Without any doubt, one the most important factor in the process of digitizing the insurance industry is cyber-security, along with obviously the pressure to properly handle the risk. The security level of networked devices, can certainly not be considered high, indeed... each device represents a potential entry point for data breaches and interconnectivity can significantly increase this type of damages. This type of problem will surely lead to demand for IT insurance in order to protect insurance systems from external attacks and in order to insure databases and customer information in the case in which a data breach happen. Therefore, it is true that normally digitalization and automatization help to decrease costs, but it is true also the fact that new technologies bring also new costs as for example cybersecurity.

AI and Robotic Process Automation (RPA), which is radically changing the traditional value chain, helping insurers reduce costs and processing times, will rapidly influence the insurance industry. The amount of data that companies have collected over the

years have certainly been fundamental to the development and technological advancement of the AI, as well as the recent rise in computational power and the diffusion of sensors into the surrounding environment. Therefore, the use of large data volumes and intelligent algorithms enables faster, more efficient and more useful pattern recognition for every aspect of the life of the insurer. (Mind The Bridge 2017)

Artificial Intelligence (AI) and Internet of Things (IoT) represented technologies where half of the global investment by InsurTech startups has been made. Investments in the AI and in the IOT increased exponentially, reaching in 2016, $ 1.7 billion. Analytics, Artificial Intelligence (AI), and Internet of Things (IoT) represented 56 percent of the total number of transactions occurring in 2016 and about 70 percent of the total value invested, according to the Burnmark report. (All The Bridge 2017)

According to the Venture Scanner (Venture Scanner 2017) report, the main segments in which the industry is articulated are:

- **Car Insurance** (130 startups, $6.6B total funding)
- **Health/Travel Insurance** (132 startups, $9.3B total funding)
- **Life, Home, P&C -Property & Casualty- Insurance** (114 startups, $ 6.9B total funding)

Insurance has been different from other traditional financial services, as players in insurance, unless they are pure brokers, have to take on element of risk and hold associated capital, all of which comes with ton loads of regulatory requirements. Due to these reasons, Insurtech has been slow to penetrate the $6 trillion insurance industry goliath. The pace however may accelerate. According to McKinsey, automation could leave up to 25 percent of the insurance industry's current full-time positions consolidated or replaced over the next decade. (McKinsey & Company 2016)

Capital Raising

Crowdfunding

Crowdfunding is the practise of capital raising for a project or venture through the collective effort of a large number of people including friends, customers and individual investors. The funding is possible typically via the Internet, thanks to social media and crowdfunding platforms.

Crowdfunding can be considered the opposite of the mainstream approach to finance. Traditionally, if you want to raise funds to start a business or launch a new product on the market, you must do market research, create a business model, realize a complete and detailed business plan, build a prototype and then look for someone inside a limited circle of wealthy entrepreneurs or institutions in order to obtain funds for the idea. These sources of funding included banks, business angels and venture capital companies, limit your possibilities to a few key players. Crowdfunding platforms, however, dramatically simplify the traditional model. It is much easier to have your opportunity in front of multiple stakeholders and give them different ways to help grow your business, which can be investing thousands of euros in exchange for equity or contributing with smaller sums in exchange for a first version of the product or for the beta version of a software or other rewards (Fundable 2017)

Crowdfunding actors can be classified into three different type stakeholders: the project initiators who look for money for their projects, the supporters who are willing to fund a specific project, and the matchmaking crowdfunding platforms acting as intermediaries(Belleflamme, Lambert, and Schwienbacher 2014)

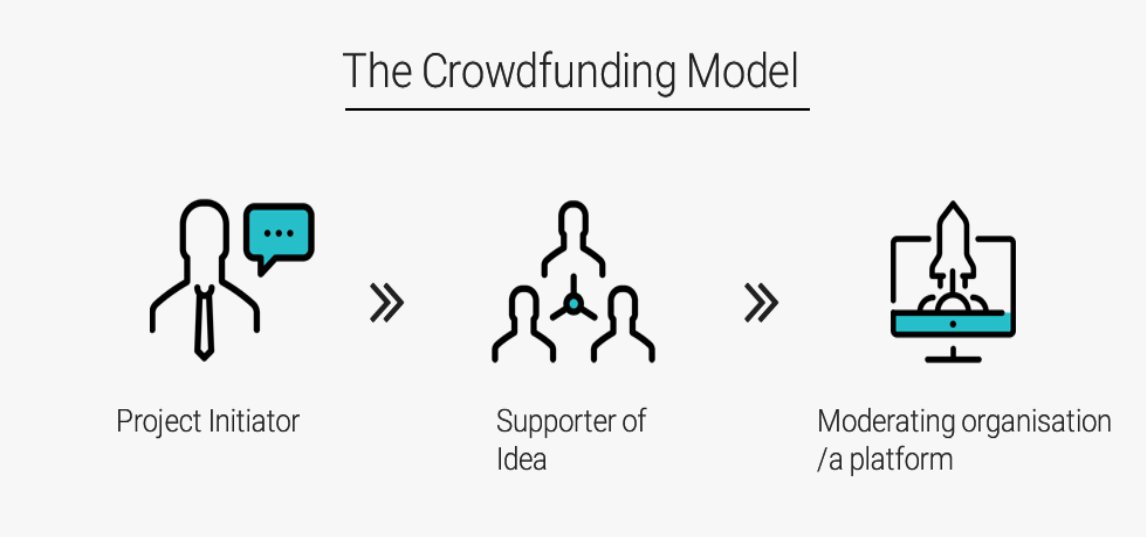


Figure 9: Crowdfunding actors

Funding Mechanism

"*In contrast to traditional financial intermediaries, crowdfunding platforms do not borrow, pool, and lend money on their own account. They focus on the matching of project initiators and backers by providing information about the projects and functionalities, e.g. for reducing the risks of the investment. Therefore, crowdfunding intermediaries provide particular funding mechanisms, such as pledge levels, minimum pledge amounts and the all-or-nothing/keep-it-all-principle."* (Moritz and Block 2014)

Project initiators have the possibility to define different amounts of pledge. Each pledge level implies a certain return, which increases with higher pledge amounts (e.g. a postcard for 5 euros, or a poster for 10 euros). Another important aspect to consider and important in order to classify the different types of crowdfunding platforms is the all-or-nothing principle and the keep-it-all principle.

The main difference is that the all-or-nothing principle allows project initiator to be paid out only in the case in which they reach their funding goal. In the case funds are not enough to achieve the initial pre-defined amount, the entire sum is given back to contributors. In the second case, the keep-it-all principle means that in the case the initial funding goal is not reached, donations are however given to the project

initiator. This funding principle is particularly used for charitable projects or projects that use crowdfunding as a subordinate source of funding (Blohm et al. 2013)

The main important feature of a crowdfunding platform is the typology of return offered by the project starter. There is the possibility to offer different type of return, passing from an altruistic reward as postcard, a musical CD exc. or financial compensations. From this bandwidth of possible returns, we can identify four main types of crowdfunding, which are reward-based, donation-based, equity-based and debt-based crowdfunding.

Rewards-Based Crowdfunding

Rewards-Based Crowdfunding is characterized by individual contributions, typically small amount of money (between $1 and $1000), in order to help to develop your business but in exchange for a "reward". This latter is often the item being produced, as for example a music album, a video, a movie or a physical object. Reward-based form can be considered very similar to the donation-based one even though there is the presence of a reward in exchange of funds.

Kickstarter (about 128.000 projects successfully funded from 2009 (Kickstarter 2017)) and Indiegogo (176.000 campaigns from 226 countries in 2015 (IndieGogo 2015)) are the two most important reward-based crowdfunding platform on the Internet.

Donation-Based Crowdfunding

Donation-Based Crowdfunding is characterized by the fact that there is not any financial return or reward for the donors or contributors beyond the gratitude and joy of the beneficiary. Normally, in this type of crowdfunding, donors donate small amounts of money as in the previous case, with an average between 10$ to 1000$.This type of fundraising include especially non-profit initiatives as donations for disaster relief, building hospital, schools for children in Africa, medical bills exc.

Crowdrise and GoFundMe are two of the most known donation-based crowdfunding platforms into the US. Kiva is another very important platform with the goal to connect people through lending to alleviate poverty.

Equity-Based Crowdfunding

Equity-Based Crowdfunding is very different from the other two types of capital raising described before. This type of crowdfunding allows investors to donate larger amounts of money (typically 1000$ and up) and to become part owners of the company by trading capital for equity shares. Therefore, in such case the equity owners will receive a financial return on their investment and if the company is successful on the market, they will receive also a part of the profits in the form of dividends as happens in the traditional financial model.

The projects launched on the equity-based crowdfunding platforms are very different from those previously listed, as the ultimate end of the entrepreneur using this type of service is to finance the launch or growth of a company, and therefore not just that of starting a creative project or a no-profit cause.

AngelList and Crowdfunder are the most famous equity-based crowdfunding startups in the US, but many others are worthy of note. Fundable, EarlyShares and CircleUp for example, are other popular platforms and Crowdcube and Seedrs are important also in Europe. (Crowdfunding Hacks 2016)

Debt-Based Crowdfunding

Debt-based crowdfunding is another form of crowdfunding that is becoming very interesting and increasingly used in many developed and developing countries. This model is based on a request for support and resources from other investors in exchange for interest.

Debt-based crowdfunding, also commonly referred to as "crowd lending," has proved to be a great successful solutions for start-ups and little and medium-sized businesses. Despite being very similar to subscribing a traditional bank loan, these platforms are often able to secure lower and more competitive rates, with greater flexibility and options to protect those who provide capital. It is a great opportunity for small business owners and start-ups to acquire financial support and resources outside traditional forms of lending such as banks and credit unions. (Crowdfund.co 2016)

The concepts of Debt-crowdfunding and P2P Lending can be considered the same. For a better explanation of the topic, see the section on P2P.

Deposits and Lending

We have mentioned many times in the previous chapters that the main cause of lower risk appetite among banks has been certainly the economic crisis in 2009. This has contributed to an increasingly limited access to traditional bank loans. Over the same period, alternative lending platforms, using P2P models, have grown steadily. These platforms have learned to float the ball and using alternative adjudication methods, streamlined and automated processes, have been able to build services to offer loans to an ever-growing client base. Above all, P2P start-ups give credit to that part of population that after the regulatory change and the greater attention by banks in granting credit to third parties, would not have been able to take advantage of bank lending services.

In fact, banks normally receive savings from their account holders and offer a percentage of interest on savings to their clients. In most countries, regulatory authorities require banks to insure and maintain a minimum reserve on the savings they hold. Therefore, using the funds saved, retail banks originate loans to borrowers and receive interest in exchange. The award of debtors' risk profiles determines lending availability and interest rates, typically by using credit scores. (Mcwaters 2015) Normally, the interest rate granted on savings is lower than that required for repayment of the loan, and in this way banks can generate profits.

A number of factors, which, as previously mentioned, had affected the crisis of the traditional lending system, favoured the emergence of alternative lending platforms. For example:

- The availability of loans to individuals and companies with higher risk profiles is not so high, especially after the scandal of subprime loans.

- Traditional adjudication processes are complicated and limit the possibility of lending in a short period of time.

- Operational inefficiency and reduced risk appetite for banks result in low returns on savings.

We can therefore say that these new alternative lending institutions emerged to solving those that were the main problems of the traditional lending model. New industry start-ups are emerging around the world, offering a multitude of value propositions, services and strategies that are going to threaten more and more traditional business models. P2P lending platforms provide customers low-cost, fast, flexible, and more customer-oriented alternatives with respect to mainstream retail banking that traditional financial institution once dominated.

P2P Lending

P2P Lending can be considered as a two-sided market that is not much different from the classic banking system (Klafft 2008). Lenders and borrowers are the main target of users that P2P platforms aim to network. While creditors are looking for opportunities to invest money as effectively as possible (always considering a given level of risk), borrowers, with different insolvency level of risk, seek liquidity sources for their business. P2P web sites act as intermediaries and allow matching demand and supply. They seek to meet expectations of both parties. (Alexander, Alexander and Daniel 2011)

Online P2P lending platforms differ in type and the approach adopted. They can basically be divided into two types: commercial and non-commercial (Ashta and Assadi 2008). While commercial platforms in general are limited to national markets, non-commercial platforms often operate globally. The main difference between the two platform types is the lender's general intention and his expectations concerning returns. A lender who engages in commercial platforms gets a reasonable interest for the risk he is taking. In non-commercial platforms lenders get no or little reward for the risks they are willing to take. Here lenders rather want to "donate" small loans to projects in economically underdeveloped regions in the world. (Bachmann, Becker, and Buerckner 2011)

Lending process

Some platforms link lenders and borrowers directly between them while others link them through a third intermediary (a bank). P2P online lending platforms differ normally in how the borrower's interest rate is set. Some websites, such as

Prosper.com, use an auction process (Galloway 2009) where borrowers are able to set a maximum interest rate they are willing to spend. For a limited period of time (the auction can last from seven to twenty-one days), creditors can then make their bids, fixing the amount they are willing to finance and the minimum interest rate they are willing to accept. Instead, there are other platforms, such as the German Smava.de one, which calculate interest rates for a loan request, depending on the characteristics of borrowers (financial and demographic).

P2P online lending platforms act as intermediaries in transactions and generate profits through service fees, which are collected by borrowers and lenders (Klafft 2008). Many of these business models are based on charging borrowers a closing fee of a certain percentage of the loan fund as well as commissions on late payment or failed payments. Other platforms, on the other hand, often require a service fee to the lender calculated on the amount financed. (Bachmann, Becker and Buerckner 2011)

Alternative adjudication

Alternative lending platforms assess the creditworthiness of borrowers based on metrics beyond the credit scores used by traditional lenders. This is perhaps the main reason of the success of P2P lending platform against traditional banks.

Lenddo, for example is a world leader company in scoring and identity verification technology. Its scoring-system is implemented into many popular P2P lending platforms in order to verify the identity and the creditworthiness of lenders and borrowers. It uses non-traditional data to provide credit scoring and verification for the emerging middle class. Lenddo's patented score is a powerful predictor of an individual's character or 'willingness to pay'. The LenddoScore ranges from 1 to 1000, with higher scores representing a lower propensity to default. (Lenddo n.d.)

Another type of alternative adjudication is provided by the start-up **Kabbage**, a technology company that quickly connects small businesses with capital. Kabbage's technology reviews data generated by dozens of business operations to automatically understand business performance and deliver fast, flexible funding entirely online.

For small business owners, access to capital is the single biggest roadblock to growing their businesses, to hire new employees, purchase more goods exc. Traditional bank

often does not offer funds or loan to entrepreneurs, companies or people with high risk profile and these type of alternative lending platforms are the only way for them to obtain an help.

Lean, automated processes

The automatization that characterize online alternative lending platform is another main reason that explain the exponential growth of this type of systems. Asking for a loan in a traditional bank involves the writing of hundreds of documents, guarantees in case of non-payment, weeks of waiting and lots of rejection.

The possibility to grant a loan or not is today evaluated thanks to software based on analysis of data including cash flow, past credit use and vendor payment history. Using online data and relatively little input from the business owner, algorithms are able to assess risk, build credit profiles, and make lending decisions quickly. The time of processing and granting a loan using an online lending platform lasts maximum one week. The big data method allows approving people who have been conditioned to rejection from big banks yet who are perfectly capable of growing their business and repaying a loan.

The entire most important online platform have implemented this type of automated processes, in order to increase the value of their offer and to increase the security behind the transactions. Different platform can implement these IT systems directly by themselves or they can acquire specific software or analysis of data from third parties. Kabbage and Lenddo, described above, are two example of company that processes user' data also for third parties and their product/services are implemented in the entire sector.

The most popular P2P Lending platform are **Lending Club**, **Prosper** and **Funding Circle**.

Chapter 4: FinTech Business Models and its numbers

The LASIC Principles

The FinTech industry refers to innovative financial services or products supplied through new technologies. As described in Chapter 1, the improvement in technology (such as mobile devices and the Internet) along with a widespread adoption worldwide, have contributed to change radically consumer' expectations. Many companies or start-ups are working on products related to FinTech and many disruptive innovations related to financial services are emerging.

This has given rise to a boom in FinTech start-ups in major technology hubs, such as Silicon Valley, Germany (especially in the capital, Berlin) and London. The amount of the investment in FinTech companies grew by 201% globally in 2014; moreover, this figure can be compared with a 63% growth in the total venture capital loan in the same year (Accenture 2015).

However, it is known that not all funded startups are successful into the target market. In a sector like this, constantly evolving, where regulations are constantly changing and network externalities play a crucial role, there are many factors that can affect the success/failure of a FinTech company (EY 2016)

The **"LASIC PRINCIPLES**" contains in itself five important attributes that must be present within the business models of these new entrepreneurial realities, if their purpose is to create something sustainable and useful. The five attributes are low margin, asset light, scalability, innovation and compliance easy.

Low margin

Low profit margin is one of the most common features of successful FinTech companies at the beginning of their experience as startup. In fact, users do not have a great economic availability for service providers of any kind (such as games, music or films). The high network effects exhibited in such technologies require an initial phase of critical mass accumulation. Most products or services in this sector have large network effects, which means that users have more benefits from the product/service if many others also use it. In order to achieve this, that is to reach the critical mass,

expensive marketing efforts are required and often the product/service is sold at the beginning for free just to increase the number of users who use it (**freemium business models**). In order to generate revenues, new solutions must necessarily be implemented, such as advertising space, additional features to the basic product, etc. Once critical mass is created, monetization becomes possible through channels such as advertising, subscription fees or consumer data analysis.

Therefore, initially the profit margins will remain low at the user level. The idea is to first obtain a large mass of users and achieve profitability through low margins and high demand. Subsequently, the accumulation of large amounts of consumer data can be monetized through third parties or by creating new products. One of these examples is Alipay, which, analysing the behaviour of consumer spending through big data, has managed to develop a credit service for them.

Light Asset

The asset light companies are able to be innovative and scalable, as they do not have to look after large fixed costs on the assets compared to their business activities. Asset-light business models are of great importance for companies that want to move in a dynamic way and in the end could make them more sustainable.

How to be asset-light? Through outsourcing.

There are activities that are called "core" or even defined core competence, because they are fundamental for the company and those that create and bring value. This type of activity must be internalized. All those activities that do not create value can be outsourced, as is often done with logistics. In this way, the company is able not to charge unnecessary fixed costs for activities that are not fundamental to the business.

We can easily understand why FinTech paradigm is characterized by a "**disaggregation**" of the value chain. Fintech start-ups' focus their attention on key activities for their value proposition and outsource operations that are not important or do not create competitive advantage, reducing fixed and operating costs. (Gartner 2017)

Scalability

FinTech companies are all characterized by scalable business model. We can define a scalable business model as: "*A business model that is agile and which provides exponentially increasing returns to scale in terms of growth from additional resources applied*".

Following Osterwalder and Pigneur's (2010) Business Model Canvas, business models can be based on many different value propositions towards customers. While some business models allow for economies of scale, others are based on economies of scope and differentiation.

Scalable business models have normally the following characteristics (Nielsen and Lund 2015):

- The business potential is characterized by exponentially increasing returns to scale;
- They remove themselves from otherwise typical capacity constraints of that type of business;
- Partners enrich the value proposition without hurting profits;
- Stakeholders take multiple roles and create value for one another;
- The business model becomes a platform that attracts new partners, including competitors

Innovative Solutions

FinTech businesses also need to be innovative in its products and operations. These new entrants generally focus their attention on a specific part of the banking value chain. In this way, it is easier for new start-ups to innovate and succeed in penetrating the market replacing traditional financial companies.

As we can see in **Figure 10**, Fintech companies cover all financial segments today, albeit in different sizes: the percentages highlighted in black represent the "**market share**" subtracted from Fintech to the traditional "incumbent" of financial services.

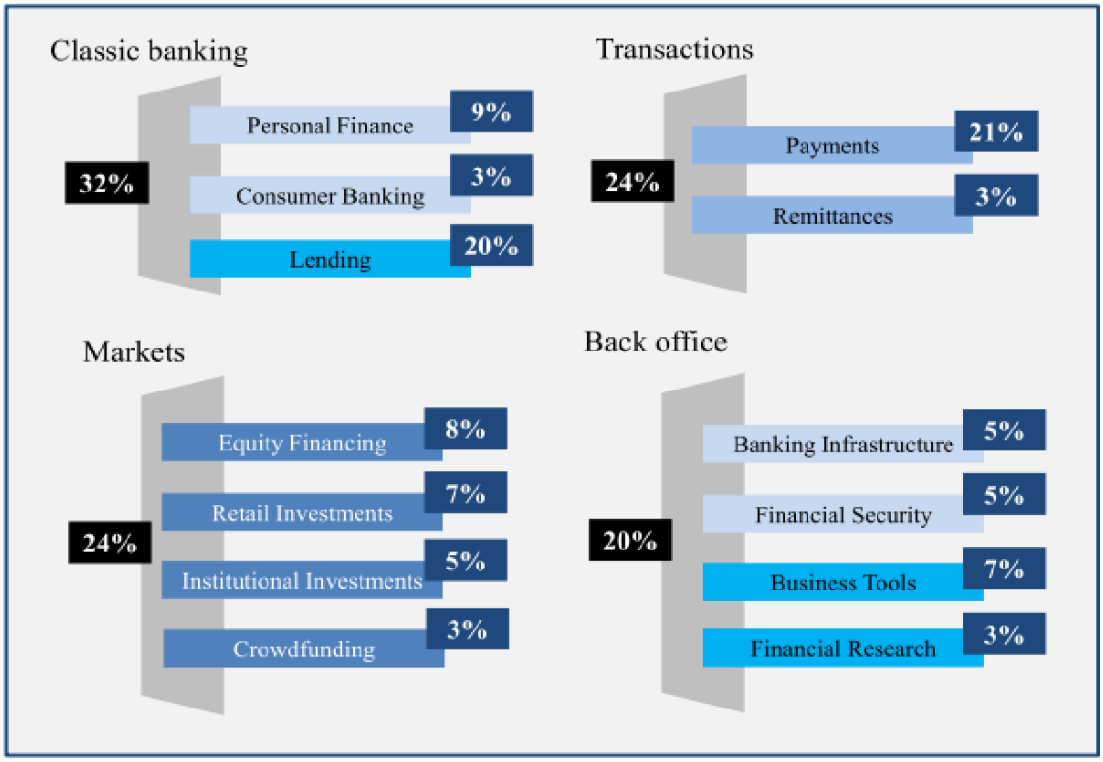


Figure 10: Market share of FinTech

Ease of Compliance

Companies that are not subject to high compliance regimes can be innovative and require less capital. The economic crisis of 2009 and the new legislative directives of the last few years have radically changed the financial services industry. These changes have allowed the new start-ups to born and grow in a less regularized context and all this has contributed to the exponential development of the FinTech paradigm. The main advantage of operating in a lightly regulated environment is that much less resources are spent by companies for compliance activities, encouraging innovation.

Numbers of Fintech - EY Report

Markets

FinTech is clearly more than just hype. In the six markets analysed by EY Report, a weighted average of 15.5% of digitally active consumers are FinTech users (according to our definition as having used at least two FinTech products). Hong Kong, where 29.1% of the digitally active use FinTech products, and Canada, with 8.2% are the only markets surveyed that differ significantly from the 15.5% average; all other countries' rates gravitate within 2.5 percentage points **(Figure 10)**.

The survey suggests the proportion could swell to twice these levels, or even higher, within 12 months.

Figure 1: FinTech users by market

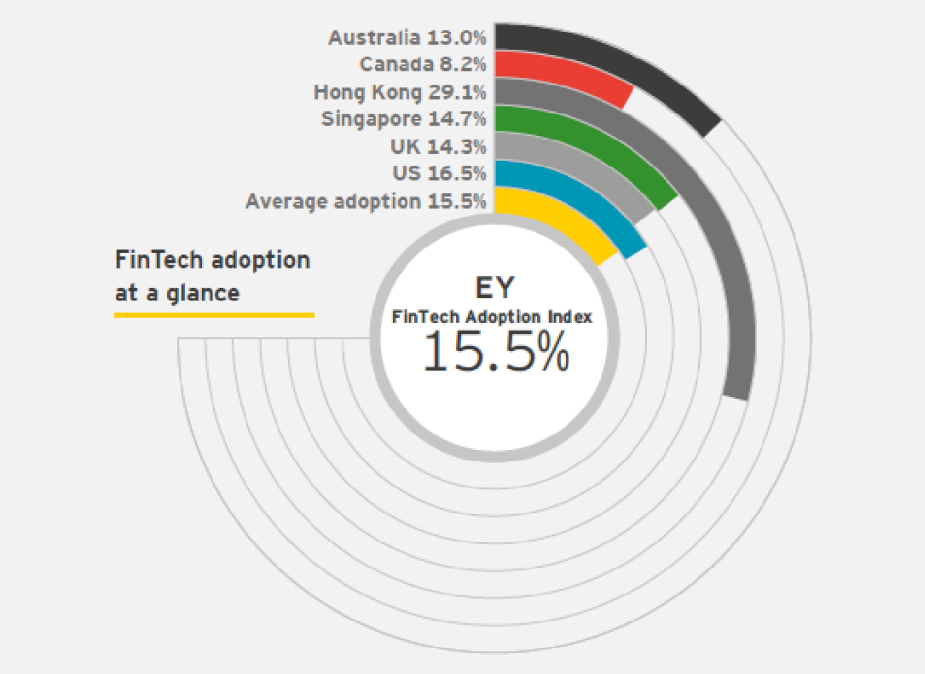


Figure 10*:* EY FinTech Adoption Index 2015

Products

That money transfers and payments have high adoption rates should not come as a surprise. In effect, these are entry-level FinTech products, allowing consumers to test

the waters with simple transactions that do not involve much risk or commitment. Payment services provided by FinTechs are also an integral part of the customer journey of many popular e-commerce sites, designed to eliminate friction and improve conversion rates at the purchase stage.

Because of these factors, the survey evidenced that 17.6% of respondents have made a transaction in the last six months through an online company that is not a bank. Online payments (including through PayPal) account for the most transactions in this category, followed by online foreign exchange and overseas remittances **(Figure 11)**.

The savings and investments category comes as the second most heavily used, at 16.7%. Online stockbroking and spread betting are the most common activity types within this category. These are followed in order by online budgeting and planning, online investments, equity and rewards crowdfunding and investing through peer-to-peer (or marketplace lending services) loans.

Insurance, including health premium aggregators and car insurance utilizing telematics, intended to lower premiums, is the third most-used FinTech category, followed by online borrowing (through peer-to-peer websites). These two categories of FinTech have the lowest adoption, though both still have usage rates above 5% among those we surveyed.

Figure 2: Analysis of FinTech use by product type

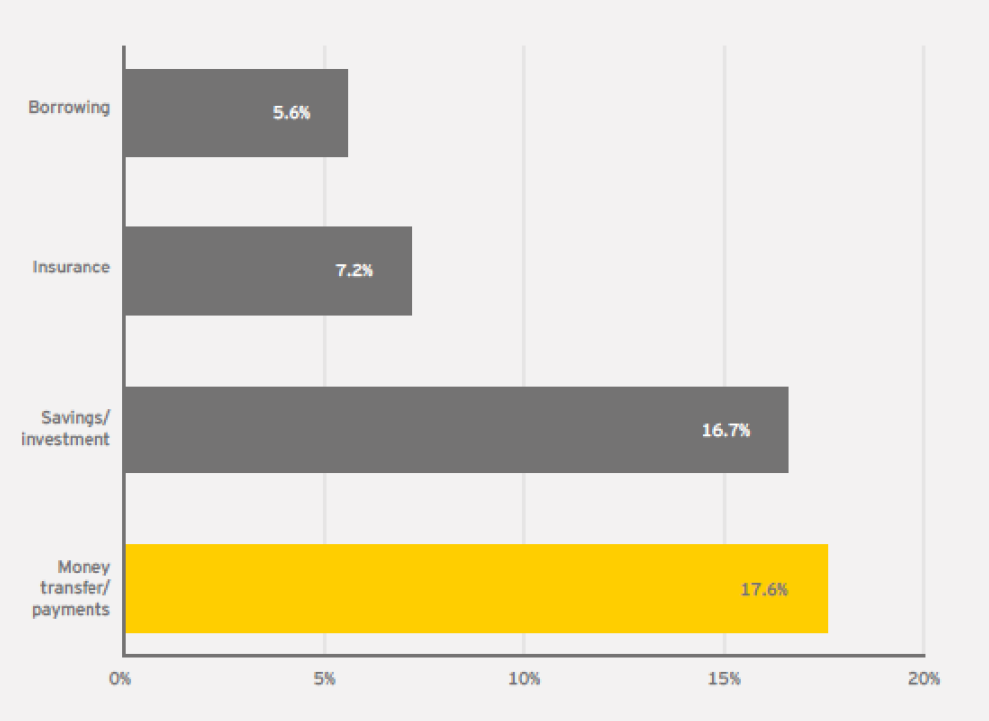


Figure 11*:* 2592 respondents who indicated using at least one FinTech service (EY FinTech Adoption Index)

Customer preferences

Consumers using these new online financial services say that a big part of their appeal is the ease of setting up an account. More than two in five FinTech users (43.4%) cite ease of setup as the number one reason to use these products. This is followed by more attractive rates/fees, access to different products and services, and better online experience and functionality **(Figure 12)**.

That FinTech succeeds along these dimensions, especially ease of setup and the quality of online experience, is in our view thanks to the functional design principles followed by many FinTech firms. These design principles include:

• Construction and delivery of their proposition entirely around the consumer, ideally embedded in a non-financial services use case

• Simple and intuitive customer visuals and journey, with easy on boarding

• Simple product constructs (customizable, but with limited variability) with no penalties or commitments.

The use of these design principles, in many cases for building services from the ground up, has led to easy-to-understand customer propositions and product sets that can be very appealing. By contrast, traditional players are often constrained by product silos, rigid product suites and pricing structures, and legacy core IT systems. As a result, their online products have more cumbersome user interfaces than FinTech products, and are more adapt to involve complex and manual processes. Banks are not necessarily stuck with this baggage. Many are beginning to replicate certain FinTech design principles, using mechanisms like customer experience laboratories and rapid prototyping to research and test new services. These methodologies are allowing traditional financial institutions to create more intuitive online products. In certain service areas and segments, financial services companies are getting to where they want to be by collaborating with FinTechs.

Figure 3: Reasons for using FinTech services (reasons that responses voted as first choice)

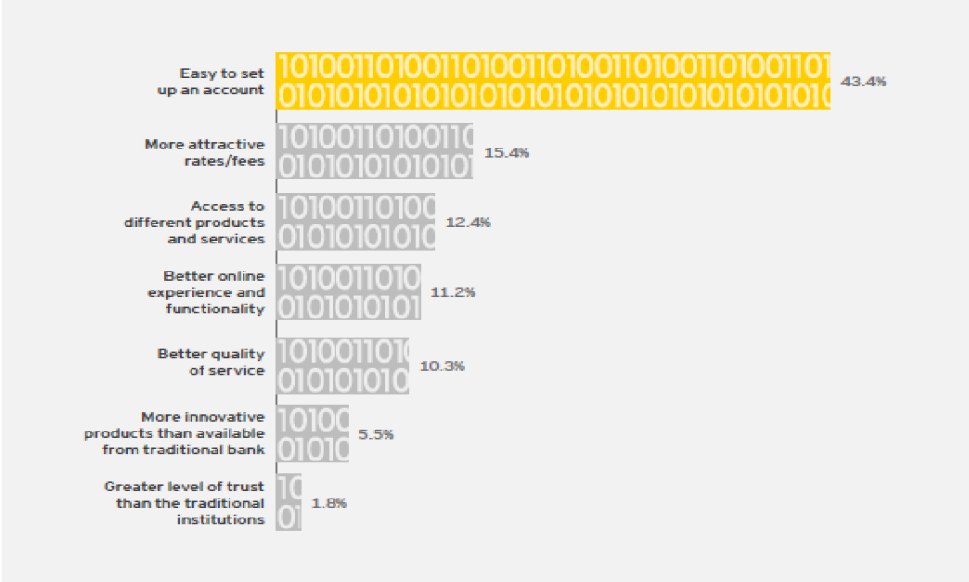


Figure 12: Classification of customer preferences (EY FinTech Adoption Index)

Adopters and income brackets

The use of FinTech skews toward younger, higher-income groups. For instance, about one in every four respondents aged 25 to 34 has used at least two FinTech products in the last six months.

FinTech use is also higher than average among 35 to 44 year olds (21.3%), and among those in the 18 to 24 cohort (17.7%). For each cohort above age 44, the proportion of FinTech users declines and is below the average of all users (**Figure 13**). Younger non-FinTech users are also far more likely than older non-users to say they plan to try additional FinTech products in the future. Among non-FinTech users aged 18 to 34, roughly 23% expect to be using at least two of these newer online financial products in the next six months. If they behave as they say they intend to, nearly half (47.8%) of all digitally active consumers aged 25 to 34 will be FinTech users in the near future.

FinTech use is light among those who make less than US$30,000 (**Figure 14**). Usage grows steadily as respondents 'incomes move higher, reaching 44% for those with incomes above US $150,000. In addition, many high earners not currently using FinTech expect to make more use of their products in the next six months, suggesting a situation where almost 60% of people earning US $150,000 and above may soon be FinTech users. The high adoption rates, current and planned, reflect higher earners' greater interest in money transfer and investment products, the FinTech propositions of most interest to this cohort.

Figure 4: Use of FinTech users by age group

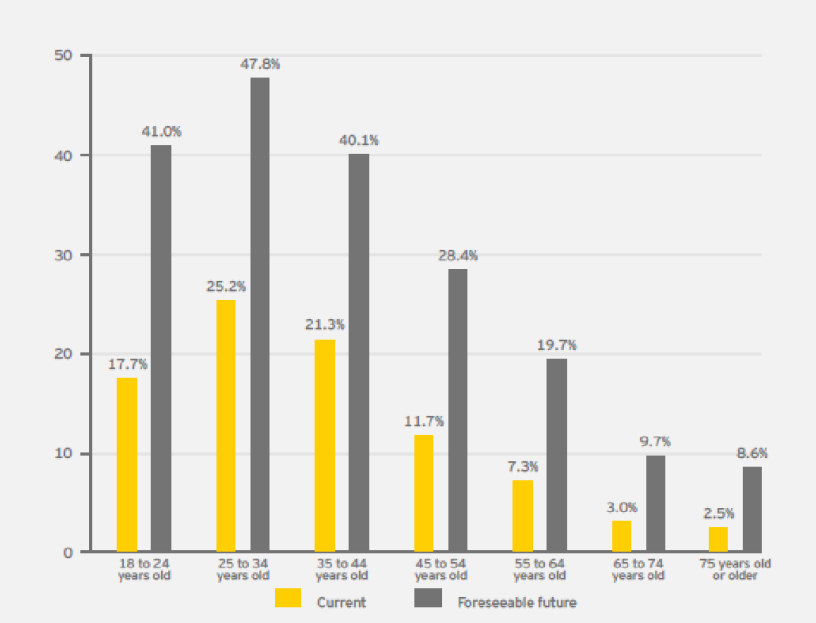


***Figure 13**: FinTech users by age group* (EY FinTech Adoption Index)

Figure 5: Profile of FinTech users by income group

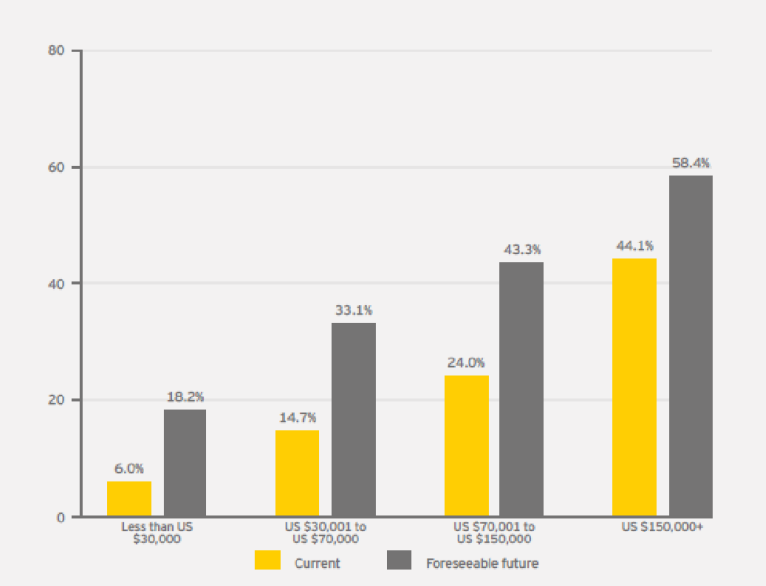


Figure 14*:* FinTech users by income group (EY FinTech Adoption Index)

Chapter 5 – Literature Review: Two-sided platforms and network externalities

Two-Sided Platform

As regards industrial economics, the literature about networks is a good starting point to understand how payment systems are organised. Indeed, this literature analyses the way a payment system prices access to its infrastructure and usage of its services, in the presence of network externalities. Network economics also deal with a number of essential issues for payment systems, such as standard setting, compatibility among service providers, and the role of an installed base of network facilities. However, we will see that the theory about two-sided markets provides us with new elements to explain the way retail payment systems work, because it formalises the existence of indirect network externalities between two distinct groups of users, the consumers and the merchants. The payment system acts as an intermediary, which facilitates the interactions between end-users, trying to get the two sides of the market on board by choosing appropriate prices.

What are the consequences of those indirect network externalities for the pricing of the system's services? How do retail payment systems compete to attract new members and to increase their transaction volume? What are the limits of this theory to understand the way retail payment systems work? (Verdier 2006)

We start by discussing the two hypotheses provided by Rochet and Tirole (2004) to characterise two-sided markets: The presence of indirect network externalities and the impact of the price structure on the transaction volume.

Then we make a distinction between closed-loop and open-loop payment systems, which is necessary to discuss the second hypothesis. This typology enables us to show that two-sided market theory contributes to a better understanding of the asymmetric prices chosen by payment platforms.

First section: Contributions of two-sided markets theory to retail payment systems economics

Why does the two-sided market theory help to better understand retail payment systems? Do all retail payment systems meet the criteria used to define double-sided markets? In this section, we will discuss the two hypotheses provided by Rochet and Tirole (2004) to characterize the two-sided markets. Therefore, we try to identify retail payment systems that fit these assumptions.

Definition chosen for two-sided markets:

"A first criterion: the presence of indirect network externalities"

We specify the definition of two-sided markets. The economic literature on topic is too recent to offer a unique definition of this concept.

However, this theory starts from the following observation. There are markets in which the interactions between a group of buyers presented B (as "Buyers") and a group of sellers called S (as "Sellers") are regulated by a platform. This platform is available for every market segment. In fact, the number of agents in a particular group (for example B) is available for platform on the platform on the other side of the market (for example, S). The presence of an indirect network between two groups of two-sided users. (Verdier 2006)

“A second criterion: a volume of transaction depending on the price structure”

However, Rochet and Tirole (2004) consider that the first criterion is not sufficient to conclude that a market is two-sided. They suggest a more precise definition, which implies the prices chosen by the platform. Consider a platform that organizes the interactions between a group of buyers B and a group of sellers S, evaluating the use of the infrastructure p (a) and p (b) respectively. It is said that the market is one-way if the total volume V of transactions that cross the platform depends only on the aggregate price level, ie p (a) + p (b). As a result, this volume is insensitive to the allocation of prices between buyers and sellers. It is said that the market is bilateral when V depends on the relative prices paid by the two groups of users. Therefore, the

pricing structure is not neutral to the platform: it affects the number of transactions carried out and the participation of each group of agents.

Indirect network externalities in retail payment systems

The development of retail payment systems can be consider strictly correlated to the existence of indirect network externalities on retail banking markets. For instance, when a consumer joins a payment platform, it will take into account the number of merchants accepting the payment instruments marketed by the system. Conversely, the merchants' benefits from membership will increase with the number of consumers holding the payment instruments of the system. As a result, demands from consumers and merchants depend closely on each other. Therefore, it is important for this type of payment systems that they use logical prices in order to attract on the platform both groups of users. Thus, retail payment systems have a specific logic, which it is very similar to the first criterion used to define two-sided markets, above. (Verdier 2006)

The specific nature of retail payment systems is due to a large number of creditors and debtors. In fact, the way in which it operates directly and indirectly influences the use of payment instruments on consumers and the acceptance of payments by traders. Furthermore, consumers and consumers do not use the system for the same purposes. Indeed, members of a retail payment system must provide the two distinct groups of agents, consumers and traders and then use the system.

Network externalities occur both as external entities and as externality between groups. Outside the group, the group participates in the same group participation (Rohlfs, 1974). This is typical for social networking platforms like Facebook. It can be fantastic for another. In the example of Facebook, a large consumer base is of great value to advertisers. This effect is called externality between the groups, and is what characterizes and defines the two-sided platforms. Sun and Tse (2009).

Evans and Schmalensee (2010) introduce the critical term to describe the nature of network externalities. This will be the case for achieving a balance. If the network is less critical, the network will act negatively and will bring the number of participants

to zero. This is demonstrated by the decline of Friendster (the first social network site), which has been closed. Furthermore, Evans and Schmalensee (2010) argue that the critical mass constraint is two-dimensional for two-sided platforms due to the externalities of the crossed groups present. For Amazon is a valuable platform for buyers and sellers.

Typology of retail payment systems

There are two types of retail payment systems: **closed-loop** and **open-loop** systems. At this point in our analysis, it is important to understand these types of systems, considering the fact that the results obtained from the economic literature on platform pricing are closely linked to the type of system analyzed.

As we will see in the next chapters, in a **closed loop system**, the platform is managed only by a company, which signs all contracts directly with cardholders and dealers. In addition, the payment system authorizes and regulates all transactions. The Amex, Diners Club, Discover and private cards such as the "Pass" card that we can find at Carrefour are often referred to as closed-circuit retail payment systems. For example, American Express issues cards, but these can only be accepted by merchants affiliated to its platform and directly debit both consumers and merchants. Also as regards the system system used by Carrefour for its "Pass" card is very similar, except that its acceptance network is limited to Carrefour stores.

Closed-loop systems are often described as "**three-part systems**", precisely because of this direct relationship between the platform and its end users. (Verdier 2006)

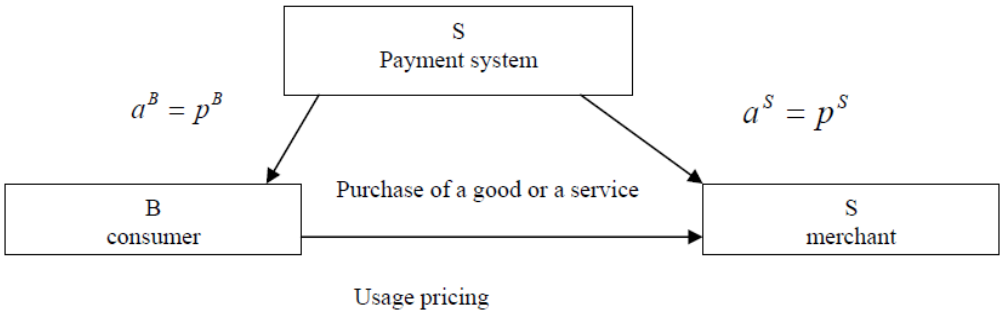


Figure 15: Closed-loop systems scheme (Verdier, 2006)

The organization of **open circuit payment systems** is certainly more complex, as its members act as intermediaries between the platform and its end users, consumers and traders.

We will see later that open platforms are characterized by two levels of charging: the price of services provided by the platform to banks and the price of services provided by banks to end users. The system subsequently decides a pricing method for its members, which may result in a fixed tariff for access to its network and / or a variable price for the use of its infrastructure. In this case, the impact of the prices chosen by the platform on the end users depends on the degree of competition between the banks. For example, if retail bank markets are perfectly competitive, platform prices are completely transferred to consumers and merchants. Visa and MasterCard payment card systems are examples of open circuit systems. Banks pay taxes to become members, but remain free to choose their pricing policy for cardholders and traders. (Verdier 2006)

Figure 2: an open-loop system

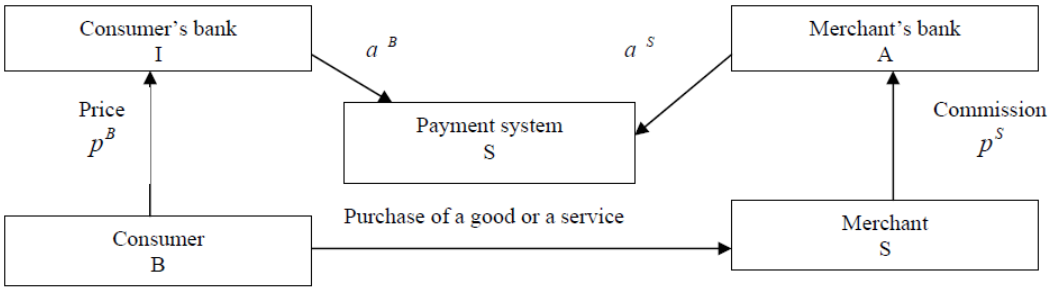


Figure 16: Open-loop systems scheme (Verdier, 2006)

Relation between pricing and volumes of transactions in retail payment systems

How does the price chosen by the platform affect the amount of transactions processed through the platform?

The first condition is that traders should not be able to discriminate according to the type of payment used. In fact, if this were not the case, traders could not refuse any type of payment instrument and the volume of transactions have been always maximized. For this reason, the payment platform would have a secondary role in setting usage rates.

We have previously introduced the two types of card payment systems: closed circuit systems such as American Express and open circuit systems such as Visa and Mastercard. We have to make a distinction between the two types of systems, as the existence of intermediaries affects the price chosen by the platform on end users.

- ***Case of closed-loop payment systems***

The closed-loop payment systems that use a linear tariff, perfectly meet the theoretical framework built by Rochet and Tirole (2003) to analyze the prices of the two-sided platform.

To begin with, the two researchers assumed that a monopolistic platform chooses the prices p(a) and p(b) for buyers and sellers, respectively, to maximize their profits. I will not go into the details and description of the calculations made by Rochet and Tirole, but I will concentrate only on the conclusions they highlight.

These results show that the price structure plays a key role in maximizing the volume of transactions. However, most closed-loop payment systems do not use a linear rate depending on usage. Consumers often pay flat subscription fees to the platform, while merchants pay a percentage of the total amount of the transaction.

Indeed, it can be observed that payment pricing structures are often oriented towards one side of the market. David Evans (2003), in his studies, presented the Diners Club credit system that grew thanks to asymmetric prices charged to consumers and traders. In the first years since its creation in 1949, Diners earned over four-fifths of its revenue from the merchant side. In the beginning, credit cards were given to consumers to encourage them to participate in the system and create network externalities. In the meantime, companies were ready to pay more for membership in order to attract consumers they perceived as valuable. These examples show that the

theory of two sides of the market offers us a good structure to explain the asymmetric pricing of payment platforms.

- ***Case of open-loop systems***

Considering open-loop systems, the situation is certainly more complex, since there are two levels of prices that have to be taken into consideration:

- *The prices imposed by the platform to the banks*
- *The prices imposed by the banks to customers*.

It is important to analyze this difference because the impact of platform pricing on consumers will depend on the type of competition between the members of the system payment institutions. Therefore, we are interested in examining the impact of platform prices on the number of interactions between consumers and traders.

The literature review provides an in-depth analysis of open circuit payment card systems, managed by payment card associations. These systems use a particular commission mechanism to charge the use of the platform, called "interchange fees".

Prices of payment card systems and interchange fees

The literature on payment card systems assumes that the platform chooses a tariff: the bank of the merchant, A, (A for "Acquirer") pays to the client bank, I, (I for "Issuer") a price for the interaction "a", which is called the "interchange fee". In this case, using the notations we introduced above, we have:

$$p(a) = -p(b) = a$$

If the interchange fee is greater than 0, the cardholder's bank is subsidized each time the card is used. Consequently, if this subsidy is partially transferred to the cardholder, who pays a lower price per transaction, this is in order to stimulate consumer demand. In compensation, the buyer (A) can pass totally or partially his "a" cost to the "m" commissions paid by the merchants. This linear calculation studied in the literature is a good representation of systems like Visa and Mastercard. In effect, the merchant's bank pays a fixed percentage per transaction to the consumer's bank,

which exactly matches the definition of interchange fees in the literature. (Verdier 2006)

This example suggests that the theoretical results shown in the literature strongly depend on the choice of modeling. In fact, in all the articles, the interbank commission is modeled using a linear and multilateral tariff.

Second section: modelling competition between payment systems: perspective from two-sided markets theory

The two-sided market theory offers a good start to model also platform competition, which sheds light on how payment systems interact strategically. In this section, we show that payment platforms can compete both to attract new consumers and to affiliate new traders. Later, when different payment platforms are available, the platforms compete for use. The intensity of the competition for membership will depend on the possibility for users to belong to different platforms.

There are three type of competition that occurs in two-sided platforms:

1) **Platform to platform**;
2) **Platform to partner**;
3**) Between participants within platform** (Parker & Van Alstyne, 2014).

Configuration 1 is found between platforms, like for Uber and Lyft, which both are platforms connecting drivers with passengers.

Configuration 2 occurs when the platform take on its partners by developing competing products or services. Like when Microsoft developed Windows Media Player and competed with one of its partners, RealNetworks, who made a video player for Windows (Eisenmann et al.,2011).

Configuration 3 occurs when participants within one group competes. As in the case of

Uber and Lyft where drivers in the same city competes for the same passengers.

The nature of competition for two-sided platforms is dependent on whether the participants single or multi-home. Single-homing is when a participant chooses to use only one platform, and multi-homing is when a participant is present on two or more platforms (Armstrong, 2006).
Further, Armstrong (2006) shows that this leads to three configurations:

- Both groups single-home;
- One group single-home and one group multi-home;
- Both groups multi-home.

With configuration 1) it is most likely that one platform will dominate the market (Sun & Tse, 2007b). This is the case of Facebook as the number one social networking site. Sun and Tse (2007b) shows that "as the tendency for single-homing increases, the likelihood for a smaller network to survive and co-exist with the larger one decreases" (Sun and Tse, 2007). MySpace, for example, could not compete with Facebook and pivoted into a fan site formusicians, as it could not co-exist as a social networking site.

Configuration 2) is the most common according to Armstrong (2006), and he refers to them as competitive bottlenecks: "Here, if it wishes to interact with an agent on the singlehoming side, the multi-homing side has no choice but to deal with that agent's chosen platform" (Armstrong, 2006). Thus giving the platform with one single-homing group monopoly power of providing access to that group for the multi-homing side. This is the case of Etsy, a marketplace for handmade items, where sellers tend to only sell their items on Etsy giving the platform monopoly power of providing access to the handmade items. As they coin themselves: "Discover items you can't find anywhere else" (Etsy, 2015).

Configuration 3) is according to Armstrong (2006) uncommon because "If each member of group 2 joins all platforms, there is no need for any member of group 1 to board more than one platform if the goal is to reach group 2". Sun and Tse (2007) argues that it is possible for multiple platforms to exist when participants tend to

multi-home. In the case of Uber and Lyft many drivers multi-home, simply to increase their chance of getting assignments. Passengers also multi-home because there are economic incentives in doing so (free rides provided by the platforms), and because they tend to use the platform that can provide them with a ride the fastest which might differ from time to time and place to place. Both Uber and Lyft co-exist despite the strong competition between them, thus underpinning the statement of Sun and Tse (2007).

Evans and Schmalensee (2010) argues that consumers tend to multi-home because of differentiation between different platforms and because it is easy to switch between platforms. As in the case of Amazon and Etsy, many consumers are present on each platform because of the differences in what kind of products you can buy. Caillaud and Jullien (2001) shows that the emergence of Internet opens possibilities of sophisticated pricing strategies that makes it possible to steal the competing platform's participants. For example the pricing strategies deployed by both Uber and Lyft where passengers get $20 off when you register, leading to passengers registering at both platforms. Thus making, "market structures with overlapping market shares (...) likely to emerge, where one or two groups of users rely on several matchmakers to satisfy their needs" (Caillaud & Jullien, 2001).

Chapter 6 – The World of FinTech Payments

The Second Payment Services Directive (PSD2)

The Second Payment Services Directive (PSD2) is a new important European legislation related to the payments world, which was promulgated in January 2016. This second Directive is a review of the first Payment Services Directive (PSD1) that changed totally the operations of Payment Service Providers (PSPs), which have replied to it with a multitude of significant innovation. Within 13 January 2018, all Member States of UE must implement these type of rules as national law.

The first Payment Services Directive (PSD) was designed to establish a European wide legal framework for payment services by setting the information requirements and the respective rights and obligations of payment service users and providers. It also introduced a new category of PSP, namely '**payment institutions'**, i.e. providers of payment services unconnected to the taking of deposits or the issuing of electronic money, by laying down the authorisation requirements. ("Leading the Way We Pay The Second Payment Services Directive (PSD2)" 2016)

Why is there a Second Payment Services (PSD2)?

Analysing the effects introduced by PSD, the European Commission understood that the Directive had been drastically important because it introduced many benefits in the world of payments and in other sectors of the Fintech paradigm:

- Competition has increased exponentially, limiting market entry barriers for non-bank operators, such as start-ups, innovation labs, etc. (eg payment institutions);

- Economies of scale also increase, providing the basis for the operational implementation of the Single Euro Payments Area (SEPA);

- Transparency has been strengthened since the information requirements for PSPs and all payment service obligations and rights are now well established.

However, legislation must remain relevant to the environment it refers to. The financial services industry - not least the payment industry - is experiencing a period of

rapid change, as markets develop, client needs evolve and technological capabilities advance. The PSD needs to be updated to make it future-proof for the new generation of PSPs. ("Leading the Way We Pay The Second Payment Services Directive (PSD2)" 2016)

PSD2 Key Benefits

The new directive has been one of the most important factor for the development of Fintech paradigm and above all, for the diffusion of new, innovative and disruptive Fintech startups linked to the payments sector.

The PSD2 introduced many benefits, which helped to complete and improve the previous regulation on payments. For example:

A. Economic benefits

Competition in the market of electronic payments has been more stimulated by the PSD2, providing all the necessary legislation and rules for new companies to enter or continue to operate in the market. Therefore, an increase in the supply of payments services has been crucial for the increase in the consumer's benefit, which can exploit different type of payment services and new and competitive service providers.

These new services are mainly related to internet payments, and are of two types:

- The **Payment Initiation Service** (PISP);
- The **Account Information Service** (AISP).

The first service, **PISP**, relates to purchases made on the internet and operates through a software linking a trader's website to the payer's online banking platform. There is therefore the involvement of a third party, a third party provider, who is between the payer and his online payment account, and gives impetus to payment in favor of the beneficiary; under the terms of the directive, such "third party" does not ever have access to the payer's funds.

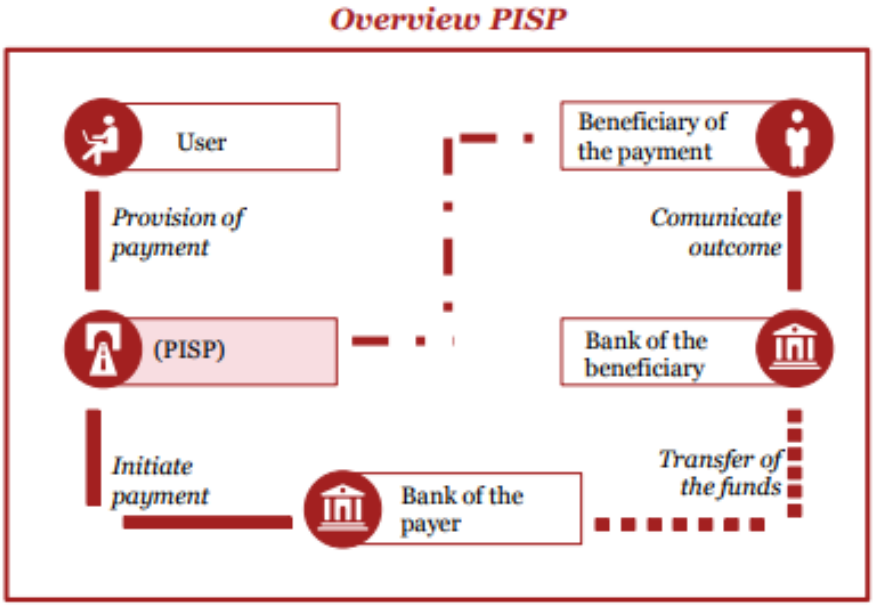


Figure 17: PISP Overview (PWC,2015)

The second service covered by the new directive is the accounting information service (**AISP**) and concerns the service offered to those who have accounts accessible online, which allows them to have complete information on their payment accounts, even if they are detained at multiple intermediaries. The directive requires providers of this accounting service to not use customer information and data for purposes other than those of the service.

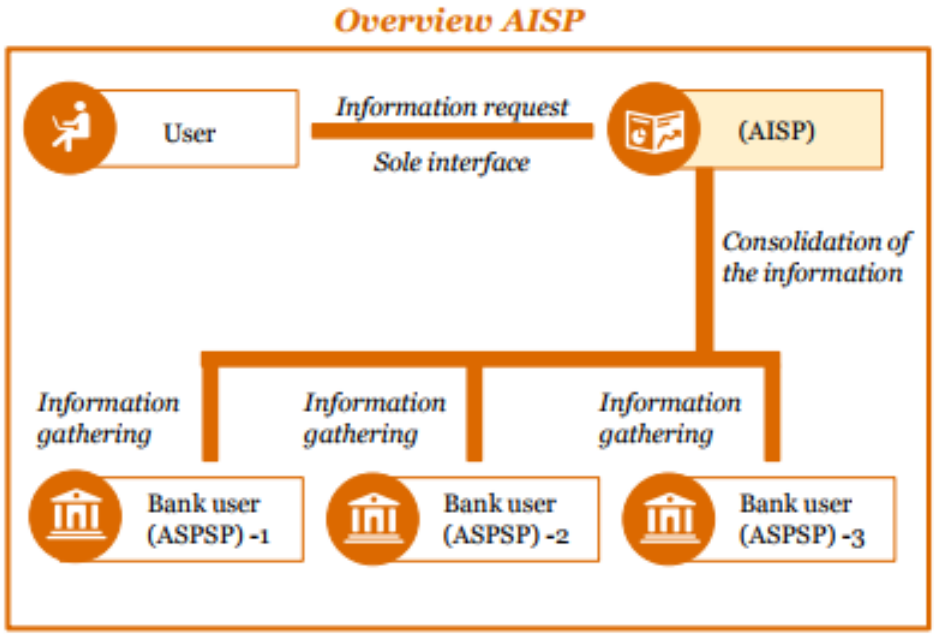


Figure 18: AISP Overview (PWC,2015)

The revolutionary element introduced by the directive is as follows: given these new services provided by "third party providers", there will be an obligation for the intermediary holding the payer's account, to provide the third party provider with full access to the online account of the payer, without a contractual relationship between the parties.

In addition, PSD2 will bring a **significant reduction in consumer spending and will prohibit the "surcharge" for card payments** in most cases (including all debit and consumer credit cards), both online and in stores. The surcharge is a common thing in some Member States, especially for online payments in certain specific sectors such as travel and hospitality. In all cases where card charges imposed on merchants are capped, in accordance with the Interchange Fee Regulation, merchants will no longer be allowed to surcharge consumers for using their payment card. This will apply to domestic as well as cross-border payments. In this way, the ban will cover around 95% of all payments in the EU and consumers should be able to save around € 700 million a year. The new rules will improve the consumer experience, which will be able to pay with just one card throughout. (European Commission 2015)

B. Consumers' rights

“Consumer rights are protected in the event of unauthorised debts from an account under certain condition”. This is written in the PSD, who protects consumer against fraud or misunderstandings.

In order to understand better the concept, I would like to explain what is a **direct debit**: A direct debit can be defined as: "An arrangement made with a bank that allows a third party to transfer money from a person's account on agreed dates, typically in order to pay bills.". However, since the biller can collect funds from a payer’s account, if the payer has granted a mandate to the biller, the payer must have also the right to be refunded.

As Member States, actually, have not a common legislation about this important issue, in order to enhance consumer protection and promote legal certainty further, the new Directive PSD2 will fix the problem, providing a legislative basis to **the unconditional refund** right that already exists for SEPA direct debit (i.e. direct debits in euro).

Also in the case in which the transaction amount is not known in advance, PSD2 guarantees a better protection to the consumers. For example, in the case of travel bookings, refuel stations, car rentals and auctions exc. The payee will only be allowed to block funds on the account of the payer if the payer has approved the exact amount that can be blocked. In consequence, the payer's bank can immediately release the blocked funds, only in the case it received the exact amount of the transaction and at the latest after having received the payment order.

For what concerning money transfers and money remittances outside the EU or paying with a currency different from Euro in other countries, the new Directive has changed totally the situation, giving the opportunity to companies as TransferWise, MoneyGram and Western Union to grow and become leader in the money transfer industry. The current legislation in the EU, addresses only money transfers inside the EU borders and it is limited to the currencies of the Member States (Euro, GBP, Swiss Franc, Swedish Crown exc). PSD 2 will apply to payment transactions in all currencies where only one of the payment service providers is located within the Union (also known as one-leg-out transactions), hence covering payment transactions

to persons outside the EU as regards the EU part of the transaction. This should contribute to better information of money remitters, and lower the cost of money remittances because of higher transparency on the market. (AdvaPay 2015)

C. Payment security

Payments security is also one of the most important thing for customer. Companies which operate in the payment industry have to be very focused on this topic, as is one of main weakness of the bank industry and people are very sceptics about this. The new Directive focuses on a high level of payment security. All payment service providers, including payment startups, banks and third party providers (TPPs) will need to prove their level of security and the measures in act to guarantee safe and secure payments.

Conclusions

Today, Third Party Providers (TPPs), or fintech start-ups that operates into the payment industry, are officially recognized as payment service providers thanks to this regulatory enforcement. PS2D has to be considered one of the most important directive of the 21th century.

Banks have been obliged to open their infrastructure and give third parties access to their customers' accounts and payment information, allowing them to have operations directly from the internet banking accounts. **Application Programming Interface**, also called Open API, have been the secret for TPPs to access data of banks. Through this typology of dialogue, new payments service providers have been able to use bank data as inputs for their services and activities offered to customers. TPPs had the possibility to strategically leverage APIs: they improve functionality, introduce new products and third-party services to their core bids, cutting innovation costs, creating and experimenting faster and cheaper concepts and improving their cross-selling and reachability potential.

After 2008, with the financial crisis of banks, consumer's loyalty versus banks decreases exponentially and the increasing use of alternative payment instruments can be easily explained. This tendency is also proven by survey results that put in evidence that 43% of respondents (the survey has been submitted in Europe) said

they use tools such as Sofort, Paypal, Transferwise, MoneyGram or Satispay. In addition, the study found that, 76% of the banks surveyed, in order to react at the emergence of Fintech solutions, introduced new features to improve existing products and that 48% expect instead to market entirely new products.

PSD2 has been the starting point for the development of consumer-focused services also outside the world of payments, thanks to the attention placed on customer data and customer purchase information.

The importance of API's

The FinTech industry is growing exponentially. Many new innovative products every year take advantage of the power of new technologies. Many of these innovations are simply original, unprecedented approaches and ideas based on existing solutions, the APIs.

Try to imagine an online digital wallet, a web-based app to monitor, control budgets and pay invoices. Web developers can make it user-friendly, with a wonderful color-rich interface, graphics, charts, sliders and so on. You can get the best user experience in the world, where everything is intuitive, simple and fast with just a few clicks. They can find the best ways to make money on the service through subscriptions, announcements and partnerships that offer special offers or selling financial products. In other words, they have a complete finished product ready for the market. Is it true? No!

The most important thing missing is the fuel for their engine: **user data**. Without these, the whole service makes no sense. So, how could the data be acquired? Manually entering numbers is certainly not a valid method, which could perhaps be used three decades ago, but not in the 21st century. There must be a simple solution that automatically does all this. Fortunately, there are APIs: they will access the user's accounts and retrieve all the necessary information. The only thing that developers have to do is implement the APIs and find a way to let their code communicate with them.

Therefore, APIs provide the gateway for innovative and contextual solutions that would be difficult to offer without Open Banking. As outlined by the WRBR, there are three types of APIs:

1) **Private APIs**: These are APIs that are used within the traditional banking organization, reducing friction and enhancing operational efficiency. A vast majority (88%) of banks viewed private APIs as essential in 2015.
2) **Partner APIs**: These are usually between a bank and specific third-party partners, enabling the expansion of product lines, channels, etc.

3) **Open APIs**: In this scenario, business data is made available to third parties that many not have a formal relationship with the bank. Because of the structure of open APIs, many banks have a greater concern around security.

We can identify three big advantages regarding the use of APIs:

- They provide real data for a variety of applications;
- They are easy to implement;
- They are already here. Developers can use them almost instantly, focusing on what is important for their product and its users. Some APIs do not even need more features built around them: customizing and branding of the user interface is enough to get final application ready to be marketed.

APIs can help banks and FinTech start-ups in pursuing new distribution channels, while also finding new ways to improve the customer digital banking experience. In addition, the product development process can occur more quickly, responding to rapid changes in digital technology and capabilities (voice banking, P2P, loan processing, risk management, etc.). According to the WRBR, 78.3% of banks are counting on APIs to help them improve the customer experience, with Fintech firms agreeing. (The Financial Brand 2017)

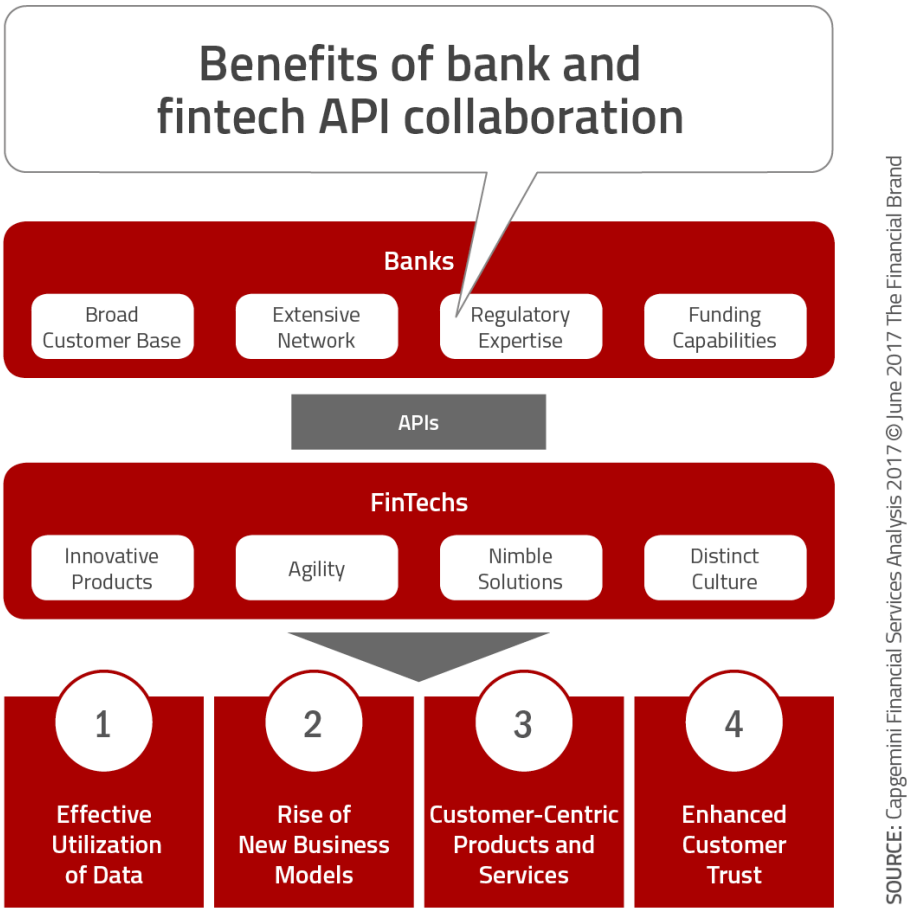


Figure 19: API benefits for banks and Fintech startups (Capgemini, Financial Services Analysis)

Another important factor to consider is security and responsibility. When you deal with sensitive data, you need to secure them properly. This means additional costs, falling into regulations on storing users' information, and so on. It is simply easier and safer to rely on the expertise of a third party company, which developed the API and takes all responsibility for the data hosted on their servers, not to mention the costs of storage and security. (The Paypers 2016)

Open APIs would allow third-party developers to create helpful services and tools that customers can utilize. For example, third-party lenders would now have access to historic transactional data to determine a borrower's risk level, hence, customers will have access to better loan terms. Many other examples have been mentioned in the previous chapters of the thesis.

Therefore, collecting as much data as possible and finding the most efficient ways to use it to the benefit of the customer—that is the ideal idea for a bank. The customers of a bank create a massive amount of data that often goes underutilized, and using technology and API's, they can allow customers to have access to refined and usable data so they can improve their personal financial situation.

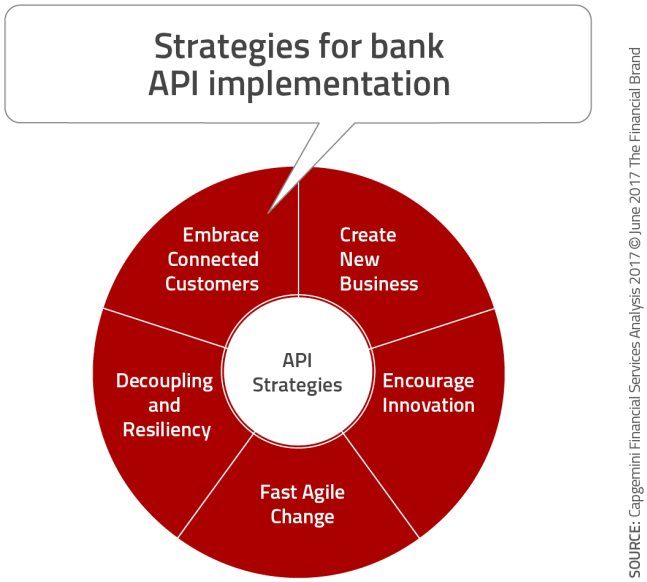


Figure 20: Strategies for bank API implementation (The Financial Brand, 2017)

API strategies that banks can adopt are very numerous: (The Financial Brand 2017)

- **Create new businesses**: Increase the reach and depth of product lines or segments
- **Encourage innovation**: Facilitate innovation not possible with internet resources
- **Increase speed of change**: By breaking down silos, APIs can improve speed to market
- **Decoupling platforms**: Rejoining platforms through APIs reduces cost of development

- **Embrace IoT future**: APIs can allow for a future where the consumer is identified by their device

This argument will be described with major details in Chapter 7.

However, to be technically accurate, right now, banks are just looking to expose their APIs to some start-ups and companies that are working with them closely. In simple words, they are not like Stripe or Facebook APIs, which are completely open and fully self-serve. Most banks ease into the use of APIs, moving from private, to partner and rarely to open APIs. (Let's Talk Payments - Medium 2016b)

There are lots of banks, FinTech start-ups and other companies that are trying to develop their API's to enlarge and to improve their business. I choose to talk about Google and Apple because they are subject of two case studies inside the dissertation. Stripe and Square are two start-ups that are revolutionizing the world of payments and I think it could be interesting to understand how their API's are developed. And finally, MasterCard because I was interested to understand how a "Scheme" player can use API's for their business.

In the image, we can find a list by segments of all the players that are making their APIs available.

Figure 21: Who is using API's? (GoMedici,2016)

Google

The technology giant offers exclusive Wallet APIs, which enable the integration of its popular Google Wallet services. The APIs help streamline purchase flow across mobile apps and websites. Two major API offerings include:

- **Instant Buy**: this API provides a cloud-based method to access and store payment information. It increases conversions by streamlining purchase flow and reducing the amount of information customers need to enter. It can integrate with existing payments infrastructure and offer payment services quickly, easily, and free of charge.

- **Wallet Objects**: this API is a simple platform to connect businesses to millions of Google users and display loyalty programs, offers, and more. Businesses can engage with customers through the always-available platform with location-

based notifications, real-time updates, and messaging. Moreover, it becomes easier to manage updates at scale through the cloud.

Apple

The 2014 saw the advent of a secure and convenient way to pay at stores using an iPhone 6 or 6+ with NFC and fingerprint Touch ID. Apple Pay is helping users avoid the hassle of carrying a physical wallet and to conduct payments in a secure manner. Apple has provided APIs and SDKs to third party developers to allow them to integrate Apple Pay in their apps. This has seen Apple Pay integrated in a number of payment systems, especially in the case of in-app purchases. More and more banks have been able to integrate Apple Pay thanks to the APIs. This powerful Apple Pay feature will further boost its upcoming international expansion.

MasterCard

The credit card processing giant offers an array of API based solutions to cover a multitude of features of payments solutions. For example, these are the most important API's that Mastercard has officially offered to developers in order to improve its payments solutions:

- **Simplify Commerce**: enables acceptance of e-commerce and mobile commerce payments, regardless of the payment brand.
- **MoneySend**: enables money transfer service through multiple access channels.
- **Mobile UI SDK**: can be integrated into a proximity payment mobile UI application to enable mobile banking and mobile wallet service.
- **rePower**: allows participants to add funds to accounts through various points of deposit.
- **MasterPass** – Merchant Checkout: enables online checkout by retrieving payment card information from a digital wallet in the MasterPass network.
- **Western Union Money Transfers**: enables financial institutions to send and receive money transfers using Western Union Agent Network.

Square

In 2014, Square publicly opened its Connect API to allow merchants and third-party developers to create apps and tools around Square's platform. Merchants can use Connect API to retrieve activity reports for processed payments, refunds and deposits. Square itself received a massive $150 millions in funds in 2014 and has offered a number of new services like Square Cash and Square Order. Moreover, the company has also come up with upgraded versions of mPOS hardware solutions. We certainly expect Square to offer even more solutions in 2015, from an API perspective.

Stripe

APIs by Stripe lets developers integrate payments within their website or apps. Stripe already went global in early 2014 supporting more than 130 currencies. With Stripe, a customer in South Africa can make purchases from a Stripe-using merchant in the UK. For merchants, Stripe APIs bring a one-stop solution to multi-currency acceptance rather than having to work with multiple financial partners.

Stripe recently updated its APIs to support bitcoin-based payments as well. Launched in March 2014, Stripe has earned itself a reputation for offering hassle-free online payment APIs to address businesses of all sizes.

Digital Payments Instruments

Various payment instruments are available for those who want to make a money transfer. The most intuitive case involves the use of "legal" currency, and the involvement of the payer and the sole recipient.

The alternative to this means of payment concerns the use of "bank money": in this case, the transfer of money is for a "debt", as it is made through an "intermediary", with the promise of payment of the third beneficiary at a deferred time: this category includes bank transfer and payments through the use of payment cards.

The multinational Diners introduced payment cards, plasticized cards with a microchip or magnetic stripe issued by authorized intermediaries, for the first time since the 1950s in America. Servizi Interbancari introduced the first Italian payment card, CartaSì, in 1986.

Today, the tools available for this way of payment are:

- **Debt card**:

  The debit card is normally issued by a bank or a Paying Institute and is associated with a current account or payment account held by the holder at the issuer: the payment transactions made are immediately debited to the account of the holder, and therefore there is always a need for funds on that account to cover the transaction

- **Credit card**:

  Payment by credit card is different from the previous one, since it is not an order to your bank to pay by drawing from the bank account or the payment account of the payer. It is a request to the issuing company to make the payment to the beneficiary and then reserving later to retaliate on the bank account of the payer. The issuing company (bank or payment institution) delivers a sort of "credit" to the cardholder, which is credited for as long as the sums are not debited to the holder's current account.

- **Prepaid Card:**

Finally, this concern the use of a prepaid card (electronic money) issued by a bank or by an IMEL. As far as this payment method is concerned, it does not require the presence of a current account or a payment account: in the card used for payments, a certain amount of monetary units is credited, physically conferred by the holder or transferred from the bank account.

In all cases of card use, there is a payment circuit, associated with the card, which has the function of propagating, through its communication network, the request for expense and the related permissions from the payee (operator) to the issuing institution.

Payment circuits offer a set of rules, standards, and procedures for executing international and domestic payments by using payment cards. The most commonly used payment circuits (Visa, Mastercard, American Express) operate according to a **four-part "schema"**, which requires the interaction of multiple actors:

1) **Issuer**. Authorized subject from the payment scheme to issue payment cards, and it grants also payment authorization (Bank, IMEL, post-office, IP);

2) **Acquirer**. Entities managing the transactions by implementing the agreement with the operator. He proceeds to credit the account of the merchant, and charges the commissions (banks, IMELs, post offices, IPs);
3) **Cardholder**. Holder of payment card.

4) **Merchant**. It is the beneficiary of payments, which have an agreement with the acquirer. It accepts payment cards as payment instrument.

Finally, we have mentioned before the Scheme, which we prefer to not consider inside the four-part schema. The Scheme can be defined as a Payments electronic circuit like Visa, MasterCard, American Express exc.

Example (Brown 2014)

We can start from the standard four-party model, mentioned in the subchapter before: **Merchants, Acquirers, Issuers and Schemes**.

One company of each of the four category is involved during a transaction in which there is a payment. For our scenario, it is important to understand how the process works and how much, each party, is paid.

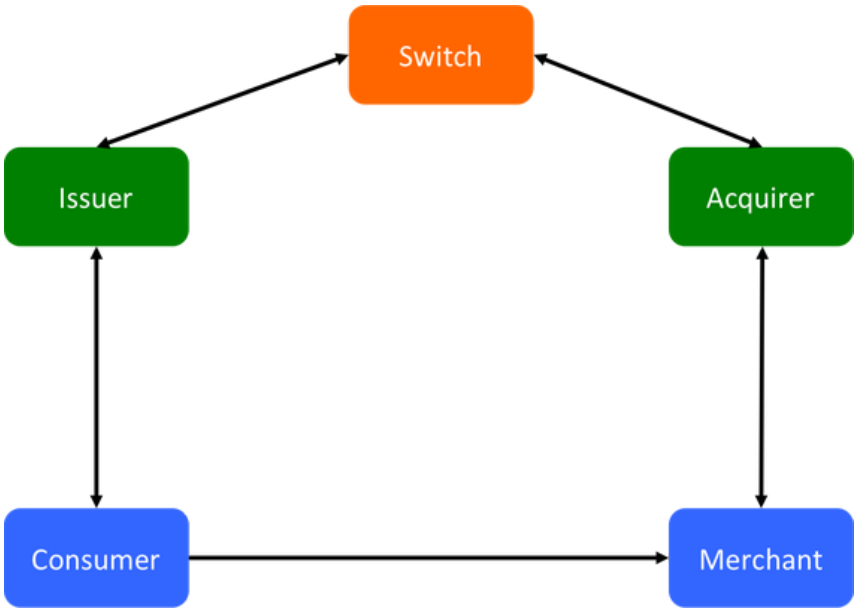


Figure 22: The Four-party model: Merchants obtain card processing services from Acquirers, who route transactions via Schemes to Issuers, who debit Consumers' accounts.

The Scenario

We have to make some assumptions in order to ideate a useful and correct example: I am using a Visa Debit card, issued by an Italian bank, as Unicredit, to buy €100 of goods from an online merchant. Now, it is easy to understand what happens: I am paying €100.

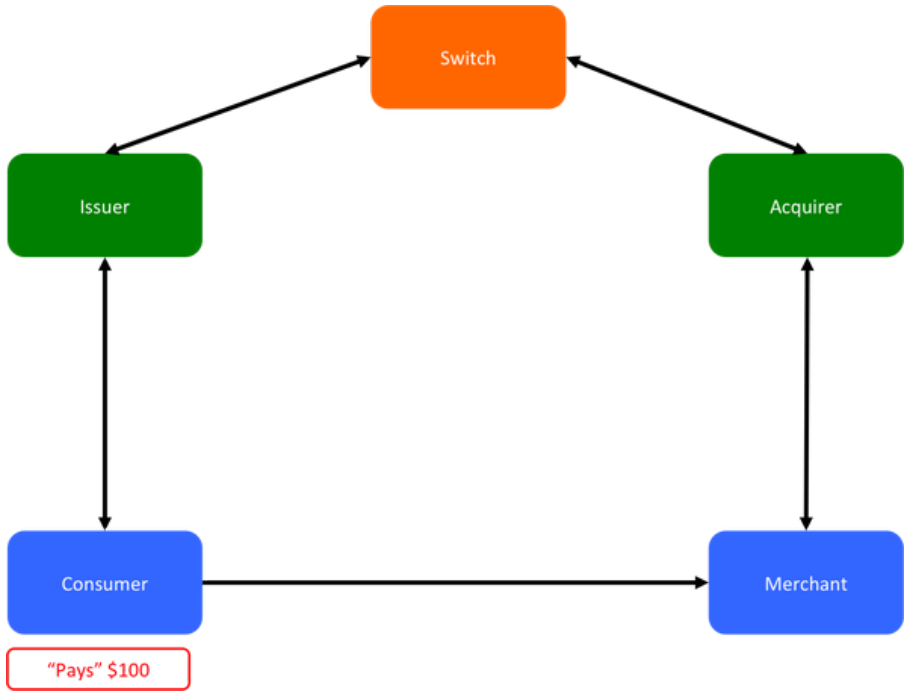


Figure 23*:* Consumer pays 100€

The Merchant's Perspective: The Merchant Discount Fee

Moreover, what about the Merchant? It normally has a contract with an acquirer. What does that look like? Also under assumptions, an example: **1.99% plus 25cent** per transaction (plus some other recurring/monthly fees, etc)

Therefore, for our €100 transaction, we can compute the merchant's percentage he will actually receive from Elavon/Costco:

- Payment amount: €100
- Elavon/Costco takes **1.99% + 25cent** = **€2.24**. This is often called the "**merchant discount fee**". So, the merchant gets **€97.76**

Our scenario now looks like the one below:

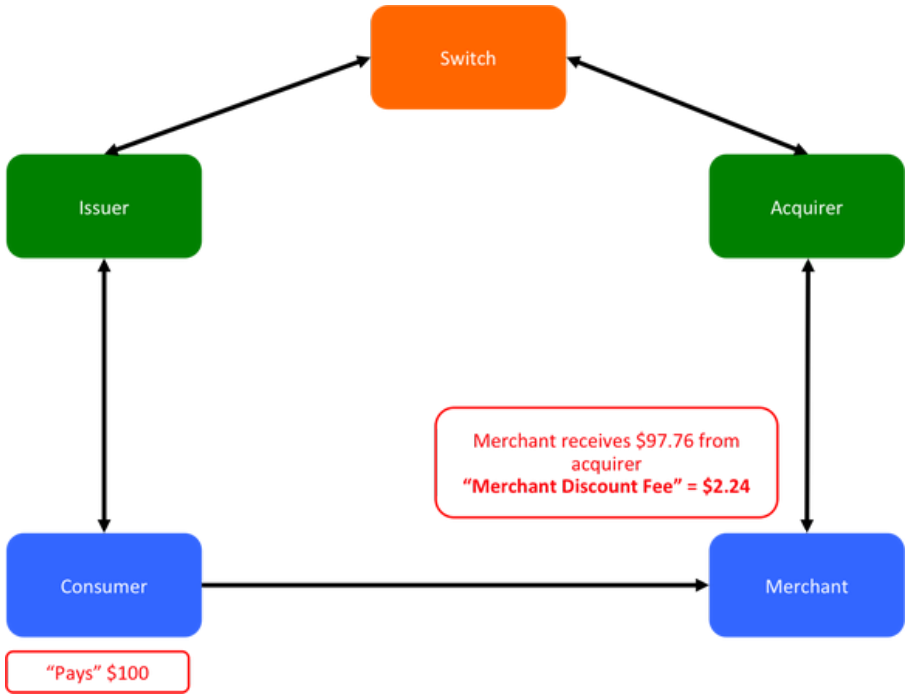


***Figure 24**: Merchant receives €97.76 from the €100 transaction. Elavon gets €2.24. However, how is the €2.24 distributed between the acquirer, issuer and scheme?*

The Issuer's Perspective: The Interchange Fee

We have identified how much money the merchant has paid to the "credit card industry". However, how is that money divided between all the participants?

"Interchange fee" is the fee that is paid to whoever issued the card – and it is set by the scheme (Visa in this case).

Let's assume also in this case that the issuer is entitled to **1.65% + 15cent.**

- Transaction value: **€100**
- Issuer receives 1.65% + 15cent = **€1.80**. This is the **interchange fee.**

Therefore, issuer owes **€98.20** to the other participants (Visa, Elavon and the Merchant). And we already know that the merchant only gets €97.76 of that money (their merchant discount fee was €2.24, remember?). That means there is 44cent left to share between Visa (Scheme) and Elavon (Acquirer).

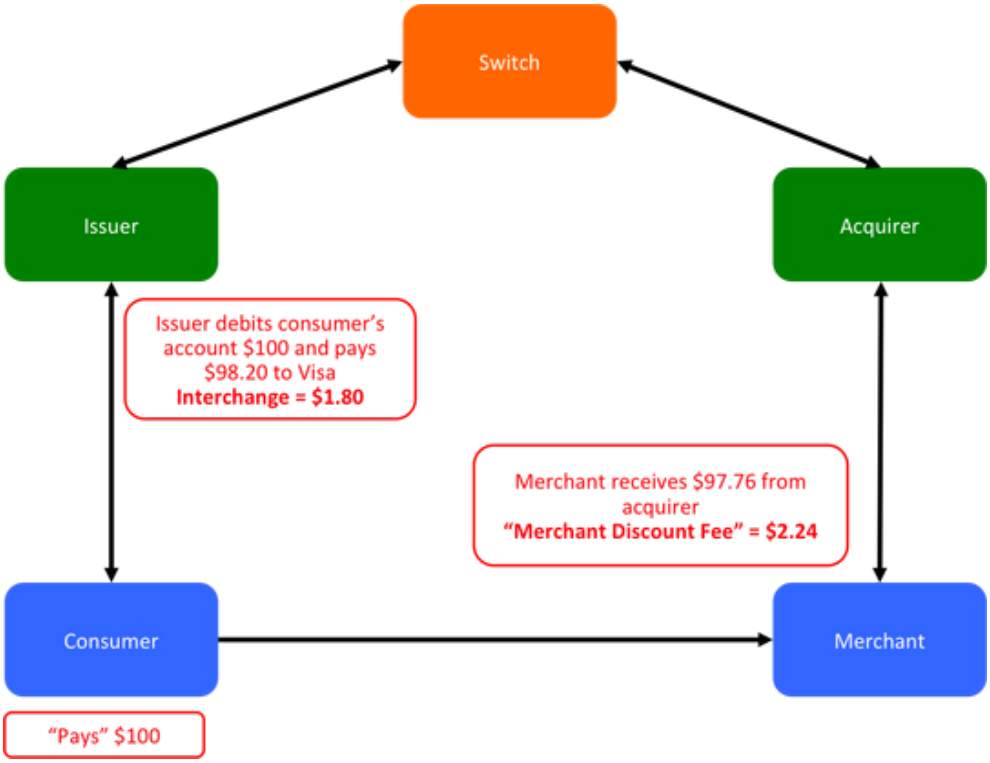


Figure 25*:* Interchange Fee (what the issuer gets) is €1.80

And the remaining 44 cent?

For our example, we have assumed the scheme is Visa and so we need to know much they charge. We have taken in consideration before a Visa Debit card so, according to that site, Visa's fee, which we call the "Assessment" is 0.11 (CardFellow 2017)

Payment Total: **€100**;

Visa assessment is 0.11% and therefore, Visa charges **11 cent**; so there is **€98.09** to pass on to the acquirer.

Moreover, if there is €98.09 to pass on to the acquirer and we know that the merchant receives €97.76, which must mean there is **33cent** left for Elavon.

At the end, each of the four party involved in the transaction obtain:

- Consumer pays €100;
- Issuer receives €1.80;
- Visa receives €0.11;

- Acquirer receives €0.33;
- Merchant receives €97.76 – overall fee €2.24.

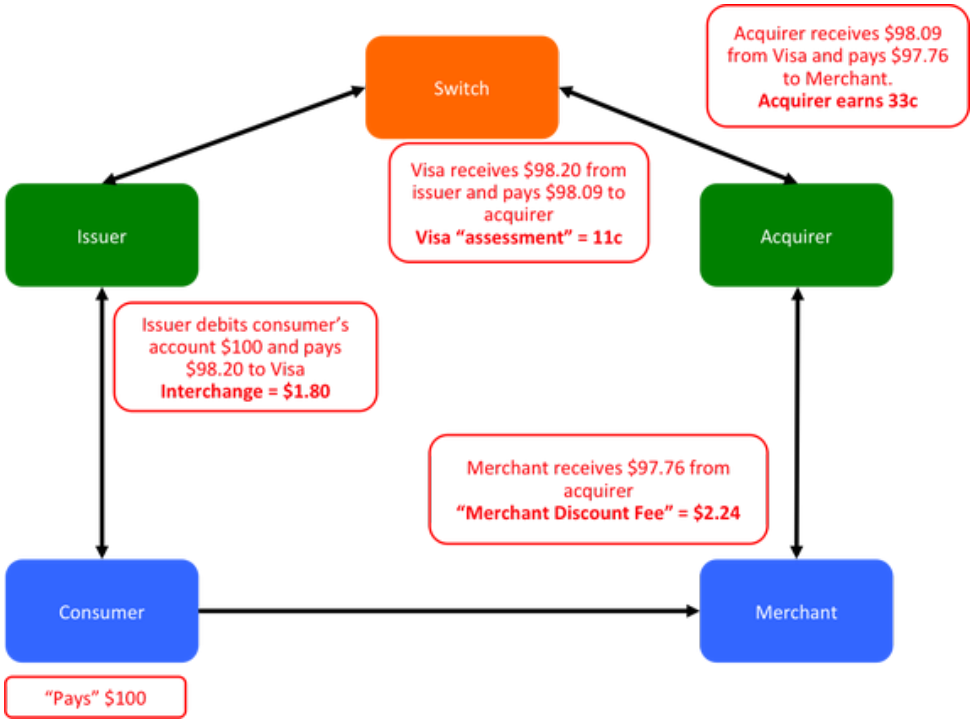


Figure 26: Final picture showing how the merchant's €2.24 fee is allocated

Fintech payment innovations

Most payment innovations do not disrupt the existing payment processes, but rather modify front-end processes to improve customer and merchant experience. Innovations will make payments more cashless and invisible in the future, while enabling data-driven engagement platforms for customers.

Today, there are different types of innovative payment solutions interacting with payment processes. They can be classified in two main categories:

1) **Open-loop mobile payments solutions**;
2) **Closed-loop mobile payments solutions**.

Open-loop mobile payments solutions

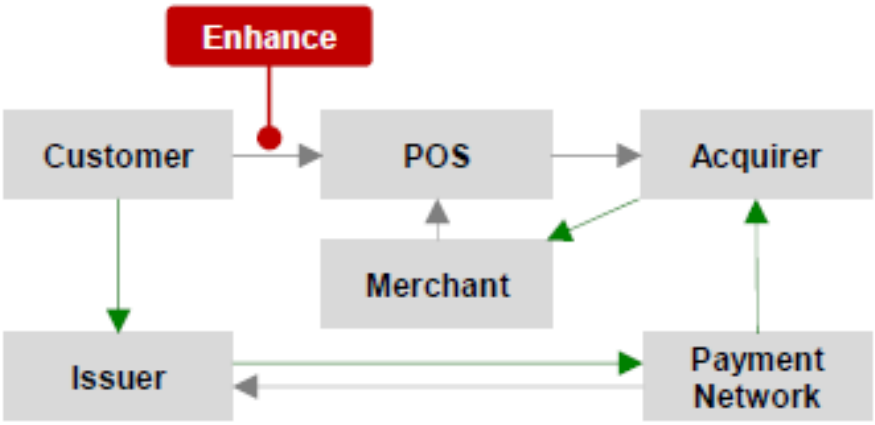


Figure 27: Open Loop Payment Infrastructure

Some examples of recently open-loop mobile wallet systems have been Google Inc. **Google Wallet**, MasterCard Inc.'s **MasterPass Inc.**, and **Square Wallet** from Square Inc. These applications can store information from a consumer's credit cards, normally multiple, and are designed to allow traders to pay through individual and securely transactions, provided such traders are able to accept mobile payments. Most open-

loop mobile wallets use a barcode or QR code system, although some rely on record-readers or Near Field Communication (NFC) technology. (Ingenico 2016)

Convenience is surely the greatest benefit that consumers get from open-loop mobile wallet systems. In fact, a single centralized digital portfolio that allows people to pay anywhere, for anything, directly from your smartphone, is much simpler and more intuitive than having to handle multiple fragmented applications for each single vendor. (ClearBridge 2015)

Google Wallet and Apple Pay Case Study

As anticipated, large telecom operators, operating system developers and Fintech startups, have been leaked in the mobile payment industry, adopting new competitive and international strategies and threatening banks to let them interfere with customers. It is certainly important to say that all these major entrants in the industry do not propose it as "executives" of the transaction: their purpose is certainly not the management of the transaction itself, since the transactions remain primarily in the hands of the issuer of the payment (bank or other suppliers). Innovative services designed and marketed by these new realities cannot therefore be considered as an "alternative product" to payment services provided by banks and other financial intermediaries (Visa, Mastercard); rather, as we have said before, they aim to remove the important interface with the customer from the traditional incumbent.

How can all this happen? Apple, Google, Amazon and Alibaba for example, are launching their portfolio for mobile proximity and remote payment, and some applications to facilitate P2P money exchange via mobile. The two examples that we will examine in our case study are:

- Google Wallet

- Apple Pay

Google Wallet has been launched into the payments industry in 2011 and **Apple Pay** exists since 2014, so surely the mobile wallet industry can be considered at an emerging stage. The two companies are so colliding, even on this front, for positioning in a fragmented market. Certainly, consumers cannot be excited about adopting these

new payment systems. However, since mobile phones, tablets and any other mobile device are becoming more and more present in people's daily lives, it is assumed that their use in commerce will be inevitable.

The Times highlighted why the level of adoption of these new technologies, such as the digital portfolio, is still quite low: debit cards, prepaid cards and credit cards have a fairly universal acceptance both from the point of view of customers from both merchants. That is why Google and Apple are both trying to find some innovations to offer consumers a clear and obvious advantage to using their systems rather than their existing ones.

Apple Pay Case Study

Apple cannot be considered the inventor of mobile payments, because obviously it is not... but its arrival in the industry has revolutionized them overwhelmingly. Apple made using a computer easy for everyone, it makes extremely easy to listen to music and communicate on the go. Thus, Apple Pay wants to do the same for the purchase of goods and services, online and offline. Every financial innovation from the invention of money to the credit card has reduced the friction in the commercial exchanges and has accelerated the rhythm of the commerce. Apple Pay works automatically when it is approached to a payment terminal, without the need to open an app, as it happens when consumers want to use services like Google Wallet or PayPal. Apple Pay has also eliminated the need to remember a PIN and type it to complete the transaction, making it extremely fast. It does not matter if you are booking your next holiday on Booking.com or you are buying a t-shirt in some shops in the center of your city. Apple was able to combine the virtual and physical world of commerce in a way no other payment system had ever done. (Tribune Content Agency n.d.)

None of the individual technologies it contains is new, but the extension of Apple's control over both the software and the iPhone hardware - which exceeds what Google can do for Google Wallet on Android phones - has allowed us to combine these technologies in a service that is demonstrably easier to use than any other.

Tighter Security

When you swipe a credit card at a POS or you are buying something online, you are giving the merchant the card number so that the store can request approval from the card provider. Stores often maintain those numbers on their servers, which have often been subject to hacker attacks due to a low level of security. It is obvious that a normal merchant cannot have the IT knowledge to protect a server from potential cyber-attacks, unless this is disconnected from the network, but then it would no longer guarantee its operation for transactions.

Apple Pay eliminates that exposure of your card number. When you sign up, you can use your phone’s camera to take a picture of your card. Apple confirms the card with your bank, but then it deletes the photo, and the card number is not stored on the

phone or by Apple. Instead, Apple Pay creates an encrypted string of data called a device account number that stands in for your card. It gets stored on the phone in a special chip known as the Secure Element. The device account number cannot be accessed by any application on the phone other than Apple Pay. When it's time to buy something, The Secure Element coughs up the device account number and combines it with data about the transaction to create a unique code for that sale. A payment processor such as Visa or MasterCard is able to recognize the device account number and the unique code, and it uses them to approve or reject the transaction. The merchant never sees your actual card number. (Tribune Content Agency 2015)

As a result, Apple is radically changing standards for the payment industry. Merchants have been arguing for a long time whether barcodes or radio communication technology (NFC), for example, are the best solution to use on a telephone to forward payment information during a transaction. However, the choice of Apple to implement the NFC system in the iPhone clearly reveals which will be the direction to follow: many stores will feel compelled to get terminals with NFC support if they want to maximize their appeal to millions of iPhone owners. (Hof 2015)

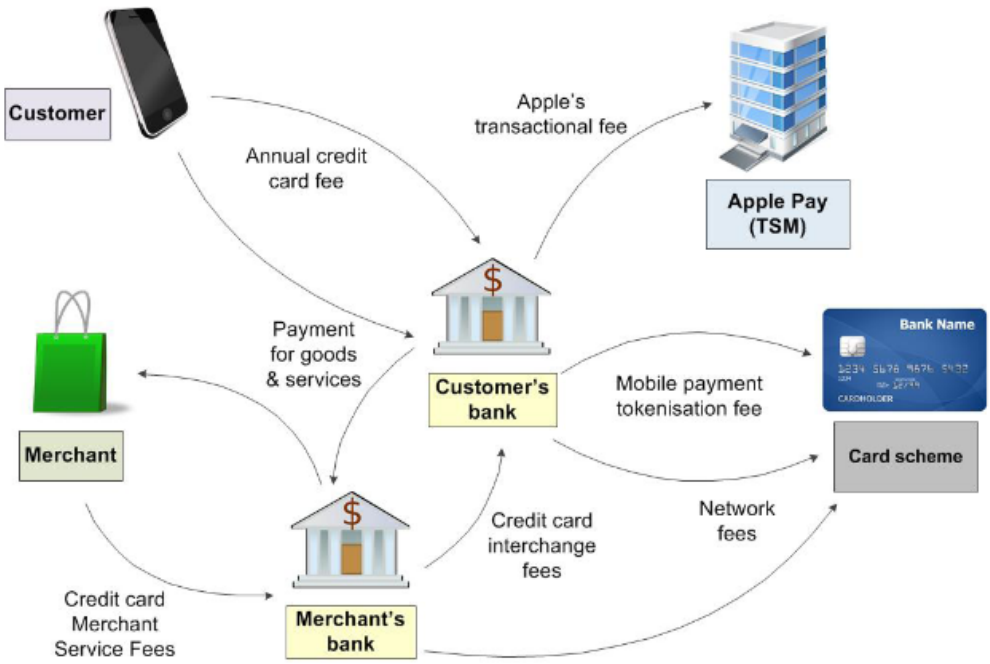
In addition, Apple's timing was impeccable. The card networks, such as Visa and Mastercard, have set October 2015 as expiration date for merchants to adapt their terminals to new credit cards with integrated chips for security reasons. Most of the terminals that will be installed will have integrated NFC technology and traders who do not upgrade will be forced to pay large fines if the authorities discover them. "The update cycle will last a few years to reach the entire network of shops, but Apple Pay has the potential to speed it up considerably," says Keith Rabois, manager of PayPal and Square. "Apple Pay will remove most of the barriers to adopting mobile payments".

How does Apple make money from Apple Pay?

To answer this, it is important to identify the players involved in each Apple Pay transaction. In general, mobile payments have introduced two new players to the payments space: Telco's and Trusted Service Managers (TSMs). TSMs act as the neutral intermediaries between providers (banks, merchants) and telco network

operators. TSMs exchange and manage the secure elements necessary for a safe mobile payment to take place. The TSM could be fully independent, or a joint venture between market participants. Normally they use the Semble's model, in which credit card data is stored on the Secure Element of the SIM cards provided by these Telco's. (Wigley + Company 2015)

Under Apple's model, however, the Secure Element is part of the iPhone device, as we said before, not in the telco-provided SIM. Apple also manages data by acting as its own independent TSM, greatly reducing the role of Telco's in the Apple Pay process.



In the Apple Pay model example, we can notice how many participants have been introduced in the mobile payments industry. Therefore, the difficulty of possible commercial relationships and monetary flows is increased so much.

Apple users incur no additional fee to use Apple Pay, but Apple, acting as its own TSM, has other options to obtain revenues from Apple Pay transactions.

Apple is reportedly collecting a credit card transactional fee from financial institutions, in addition to (a) existing "interchange fees" (although in various countries the Apple fee may be taken off the normal interchange fee), and (b) the new fees charged by

credit card networks to tokenise card data for secure mobile payments. The banks do not pay Apple directly – these fees are collected by card schemes, who then pass on Apple's share. (Wigley + Company 2015)

Google Wallet Case Study

As we mentioned in the previous chapters, mobile payments will be the key to getting more and more benefits from online sales. In 2015, mobile devices accounted for 60% of e-commerce traffic, but when consumers reach the point of buying online, about 80% of users moved on their personal computers. Why this behaviour? People avoided making purchases on their smartphones especially for security reasons but also because of the difficulty of entering personal and credit card data each time using a touch-screen interface.

Electronic wallets have been a smart solution for these kinds of problems, simplifying the mobile payment process in a safe and simple way. Users can now simply click to purchase a product and all credentials and payment information are ready in the digital wallet for the checkout. (Business Wire n.d.)

Google Wallet is one of the most important example of mobile payment system that acts as a virtual wallet, allowing users to make payments and transfer money directly from their phones. It is an NFC payment technology that differs from what was described above because the Secure Element is not in the phone as for Apple Pay, but within a Cloud (hence, we can describe it cloud-based solution).

The business model for Google's portfolio is certainly one of the most interesting: Google will not charge any commission to banks, merchants or consumers for the service since the Mountain View company is mainly interested in the data it will get through the management of the service of payment. Considering that Google is a company that is based on data analysis, it does not sound so strange. Google Wallet is available to anyone with a newer Android or Apple smartphone and offers consumers an alternative and quick way to make payments at e-commerce stores that accept it.

Google Wallet also offers merchants the ability to create special offers or discounts from their websites directly to the end user through the app. According to Forrester Research, payments made with Google Wallet and other similar services are expected to reach $ 140 billion by 2019. (Forrester 2014)

How does it work?

Google Wallet is a quick and free way to send money through the app, in Gmail, through the Google Card in a physical store, or on the web at wallet.google.com. Google Wallet allows you to send money to someone using only their email address or phone number and you do not need to have the Wallet app. All financial information in Google Wallet is encrypted and stored on secure Google servers in secure locations. Google Wallet comes with 24-hour fraud monitoring and covers 100% of all verified unauthorized transactions. (Google 2017)

It works somehow like a gift card: users insert a quantity of money into the wallet, which they can then spend as desired. Regarding the user's bank, the transaction is identical to any other debt or credit, only the transactions are made exclusively through Google rather than the dealer's point of sale.

How does Google Wallet stack up to other options?

Google Wallet's main competitor is Apple, although other companies such as Samsung and PayPal have their own digital payment systems as well (Samsung Pay and PayPal Wallet, respectively). While the products may have a few differences when it comes to the user, they offer similar features from the perspective of an online store owner. Both want to make it as easy as possible to facilitate transactions.

The main competitor of Google Wallet is definitely Apple Pay, but also other companies have decided to compete in the payment industry with their digital payment systems: respectively Samsung with Samsung Pay and PayPal with PayPal Wallet for example. The technologies used by different companies can be different as regards the features that are offered to the consumer, but in general, the technology is very similar for everyone. The main purpose of these services is to make transactions as simple as possible. Here are some of the main features that distinguish them:

- Neither charge fees.
- Liability rules are the same as regular card transactions.
- Both can support rewards programs.

- Both make the purchasing process much faster.
- Both utilize NFC (near field communications) for in-store purchases.

The main difference between the two initiatives is the companies behind them. Google pioneered NFC technology years ago, which allowed users to pay with a mobile device at a point of sale using a secure, short-range signal. However, the technology was not widely adopted at the time, which put Google on the back foot, giving Apple an opening to push their Apple Pay model.

Apple, having an established and loyal user base, was able to roll out its system a great deal more effectively, coupling it with specific technology offerings, such as the Apple Watch. Seeing an opportunity to collaborate with the high-prestige Apple brand, retailers and banks have been a great deal more eager to adopt the technology now.

Google, however, is retooling its wallet to take advantage of their more flexible and open system. Unlike Apple, Google is allowing other developers access to its API in hopes that other companies will create innovative new ways to use the technology. With 80 percent of global market share for the Android platform, payment processors and merchants have good reason to support Google's initiatives.
When compared with other virtual wallets, Google Wallet and Apple Pay stand above most for online transactions. The focus of many other virtual wallets is in-store purchases. Most of them, like Samsung Pay, can only process offline purchases and PayPal Wallet is not widely supported.

The limitations of Google Wallet

According to Business News Daily, Google is discontinuing the processing of payments for certain digital goods such as e-books, subscriptions, online games and music. They are, however, hoping to expand Google Wallet's influence on ecommerce with increased support for physical goods merchants.

In conclusion, Google Wallet is not yet the best payment option for ecommerce; but as time goes on, it is likely to become a viable and even essential financial service. In The Economist, Jennifer Schulz, Visa's global head of ecommerce, thinks that there will

be a period of time where virtual wallet companies will pop up and then fail, eventually leaving a few wallet providers left. While there is no way to predict which virtual wallets will endure, there is a good chance Google Wallet will be one of them. (Bigcommerce 2016)

Companies behind them represent the main difference between the payment services of the two American giants, Big G and Apple. Google paved the way for NFC technology years ago, allowing users to pay with a mobile device at a store using a secure, short-range signal. However, in the past, the NFC technology was not widely adopted, a factor that put Google a step back in the years, paving the way for Apple to launch the Apple Pay model.

Apple, thanks to its consolidated and loyal user base, has been able to implement its system much more effectively, combining it with specific technological offers, such as Apple Watch. In addition, as mentioned earlier, the Cupertino company was able to launch its payment technology with a perfect timing compared to Google, just when the new regulations forced merchants to change their POS for updating them in step with new technologies. Thus, seeing the opportunity to collaborate with the prestigious Apple brand, retailers and banks have been much more eager to adopt the technology now.

Google, however, is trying to reorganize its digital portfolio to exploit its system more flexibly and openly. Unlike Apple, Google allows other developers to access its APIs in the hope that other companies can create new, innovative ways to use the technology. With 80% of the global market share for the Android platform, payment processors and merchants have good reason to support Google's initiatives.

With respect to the other virtual portfolios, Google Wallet and Apple Pay stand out because they allow transactions to be carried out both online and offline. The goal of many other digital portfolios is mainly to facilitate shopping in stores. Samsung Pay, for example, can only process offline purchases and PayPal Wallet is not widely supported.

In conclusion, we can say that Google Wallet is not yet the best e-commerce payment option; but over time, it is likely that it becomes a vital and even essential financial

service. In The Economist, Jennifer Schulz, the head of E-commerce at Visa, thinks there will be a period when virtual portfolio companies will pop-up and then fail, leaving a few wallet providers at the end. While there is no way to predict which virtual portfolio will endure, there is a good chance Google Wallet is one of them. (Bigcommerce 2016)

Closed Loop Mobile payments solutions

Closed Loop Mobile systems consolidates the POS, the acquirer and payment network as a single entity to create a more flexible experience, requiring consumers, issuers, and merchants to participate. Often allows consumers to fund transactions via the traditional payment network ecosystem.

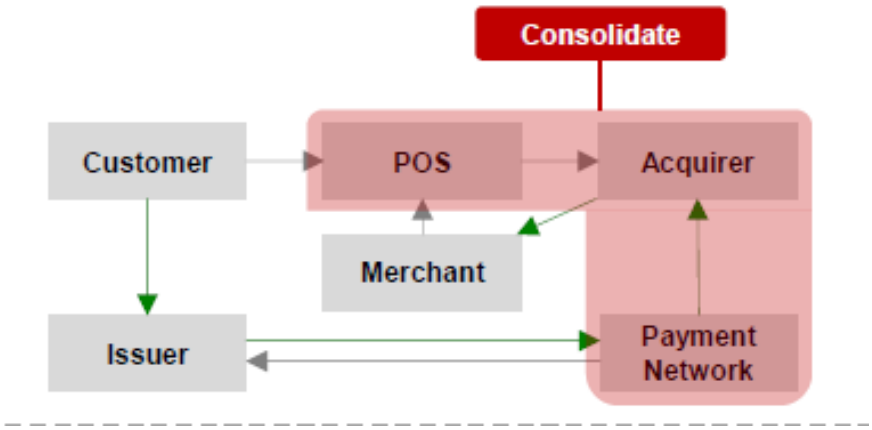


Figure 29: *Closed Loop Payments Infrastructure*

Closed circuit mobile wallets are ideal for merchants. For example, Starbucks offers a closed-loop mobile wallet, as well as Zara and McDonald's. These closed-loop payment systems can be downloaded directly from Apple, Android and Windows stores. (Ingenico 2016). These portfolios are not interoperable (it is not possible to pay for a cappuccino from Starbucks with funds in Zara's digital wallet of course) and it is therefore necessary to manage multiple account at the same time.

Closed loop mobile payment systems can be beneficial for both consumers and traders, which is why many companies have not only succeeded in implementing this type of system but have also benefited from it. From a merchant's point of view, closed-loop payment systems can bring these advantages:

- Ability to capture large amounts of customer transaction data, including customer insights, buying habits, popular items, and even ROI on mobile marketing campaigns;

- Processing of payments within the company. This process can reduce business costs exponentially;
- Increase customer loyalty through the integration of loyalty programs within the application (ClearBridge 2015)

From a customer perspective, closed loop mobile payments systems also offer significant benefits, including purchase/loyalty incentives, pre-ordering and balance top-up ability and faster time to check-out. They make the customer experience with a particular merchant that much more convenient.

Starbucks Case Study

"No single competency is enabling us to elevate the Starbucks brand more than our global leadership in mobile, digital, and loyalty. Starbucks is a clear leader in mobile payments and we are encouraged by how consumers have embraced mobile apps as a way to pay. ***This is a story about how Starbucks became, quietly and then all at once, the worldwide leader in mobile payments at a time when Apple, Google, and other giants of technology struggled.*** *" - Howard Schultz, 2013*

Howard Schultz, CEO of Starbucks, is the testimony of how a coffee provider has become a leader in mobile payments - and not a technology company like Google Inc. or Apple Inc. In 2011, technology companies like Google, were trying in every way to convince consumers to use new and complicated mobile payment systems. Starbucks instead introduced an app on the market that simply used QR codes. And perhaps equally important, the chain offered prizes like free coffee and snacks to encourage users to use the app. (DigitalCommerce360, 2015)

Why this kind of innovation? Starbucks had discovered that people did not really want a chain store in every corner of the globe. Starbucks had grown too much and it had

become extremely difficult to manage. Schultz, understood that the user experience had to be renewed, in order to provide customers with a new stimulus towards the American Coffee giant. The cornerstone of the whole enterprise would be a reward card, which would be tied to a regular gift card

In the past, it was very unusual to link prizes to a prepaid gift card. Nevertheless, the new Starbucks gift card program was a little bizarre: by analyzing customer data from purchases, data scientists realized that the original purchaser used most of the prizes and gift cards within a year for himself. Therefore, this meant that the clients used these gift vouchers to buy coffee, snacks and sweets for themselves. In this way, when customers used their registered cards, they earned free cappuccinos, mocaccino, refills and more. In addition, Starbucks had also announced a new gold card, through which customers, paying an annual fee of $ 25, received 10% discount on all their purchases and in every Starbucks on the face of the Earth.

Somehow, all these types of loyalty programs meant: "The more you come to Starbucks, the more we will reward you." The simplicity of this program encourages participation "(Hanover Research 2014)

The Technology

In the end—and even in the beginning—requiring participants to load up their cards to receive rewards (which could have hindered adoption) made an enormous difference. Starbucks could account for the revenue when the customer loads the card, as well as deter customers from using credit cards—sparing Starbucks from expensive interchange fees. (Allison 2014)

It was not long before Schultz and his team began dreaming up ways to put the gift card at the center of even more transactions—and of people's lives. Therefore, the Starbucks Card Mobile app was born in 2009.

Not typically one to outsource, Starbucks nevertheless contracted mFoundry Inc., based in Larkspur, Calif., to help its internal team develop the app for iOS, Android, and Blackberry. The lead developer was Benjamin Vigier, who now works on mobile payments at Apple.

The team envisioned customers being able to pay by displaying a 2D barcode from the app, which would be read by a scanner connected to the POS. According to American Banker, mFoundry provided the client-side solution, server-based wallet, and other technology in a private cloud that integrates into Starbucks' back-end processing system.

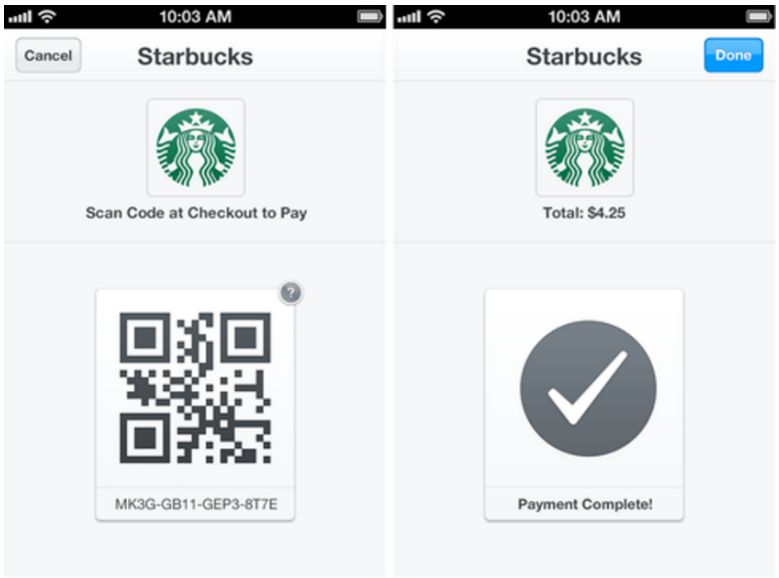


Figure 30: Payment Barcode on Starbucks Mobile App

Starbucks' approach shifted the technology burden from the app to the POS system and barcode reader—which meant that the functionality of the wallet could be pretty simple. It needed only to display a custom 2D barcode.

This stood in contrast to the typical focus of mobile payment innovations at the time, which required massive hardware changes. Starbucks' reliance on a software-based barcode system meant it could more easily be rolled out.

The Rollout

The rollout of the Starbucks Card Mobile app was gradual, a strategy the Starbucks leadership team said was meant to put the customer first.

The Seattle-based coffee chain debuted the pilot in September 2009 to 16 West Coast stores. In April 2010, it expanded to locations in Target stores, and expanded to 300

stores in and around New York City six months after that. By January 2011, Starbucks had rolled out support for mobile payments at some 6,800 company-operated stores in the U.S.

By 2015, the coffee chain was processing more than nine million mobile app payments per week. So while the broader tech industry has spent years puzzling over how to get consumers to reliably use a mobile wallet, it was a firmly non-technical company that managed to take it mainstream — and keep it there. In late 2016, seven years after its mobile app debit, Starbucks reported having 12 million Starbucks Rewards members and 8 million customers who check out on their phones, making it the retailer with the largest mobile ecosystem in the world.

The Future

It is clear that innovation is an integral aspect of Starbucks' ethos, as the company didn't stop with winning the mobile payment game.

A key part of the company's most recent five-year plan involves a new app feature called My Starbucks Barista, which uses artificial intelligence and voice computing to allow users to place their orders via voice command or messaging interface. Once the order's been placed, the virtual assistant can confirm pickup location as well as facilitate payment. (Pratini 2016)

In addition, consumers will also soon be able to take advantage of Amazon Alexa's "Starbucks Reorder Skill", which leverages the Alexa platform to further simplify the ordering process. In its current iteration, Alexa can only order a user's "usual" items — likely a strategic move to serve the company's most loyal customers — but who's to know what Starbucks has up its sleeve next.

Reshaping Cafes

Starbucks Corp., a pioneer in getting consumers to pay for products with a mobile phone, is boosting spending on digital ventures this year as it enhances the capability of its app in Asia, Europe and Latin America.

The coffee chain is promoting a new feature, introduced last year nationwide at U.S. stores, that lets customers order and pay for beverages in advance and pick them up

without waiting in the cashier line. It plans to bring the Mobile Order & Pay program to China and Japan in 2016. Starbucks is also testing delivery through the app this year in the U.S., where it will roll out features such as personalized food recommendations. (DigitalCommerce360 n.d.)

Within a few years, Starbucks' mobile app will account for more than 50% of all transactions in company-owned U.S. stores, Brotman said. That means it may even help reshape how cafes look, putting Starbucks on track to become a mobile-first company, akin to Facebook Inc. and Uber Technologies Inc. (DigitalCommerce360 2016)

More than 21% of transactions at company-owned U.S. stores now come through the app. In February, about 7 million orders were placed through mobile devices in U.S. cafés, the company said. The order-ahead feature already accounts for about 15% of those payments, and 3% of total transactions. (Allison 2014)

Chapter 7 - Banks reaction to Fintech

Enhancing bank competences

Banks are subject to a lot of noise about FinTech's today. Optimism regarding technology is at a high, mobility is widely regarded as a game-changer, and vast amounts of capital are being deployed in FinTech's. Banks may be tempted to dismiss the noise entirely, or they may panic and overreact. They have to react on a middle ground that focuses on separating the signals that are truly important from the noise. Specifically, this means that banks should be less preoccupied with individual FinTech attackers and more focused on what these attackers represent – and build or buy the capabilities that matter for a digital future. (McKinsey&Company 2016)

Banks should be focused on building an extensive set of distinct digital capabilities

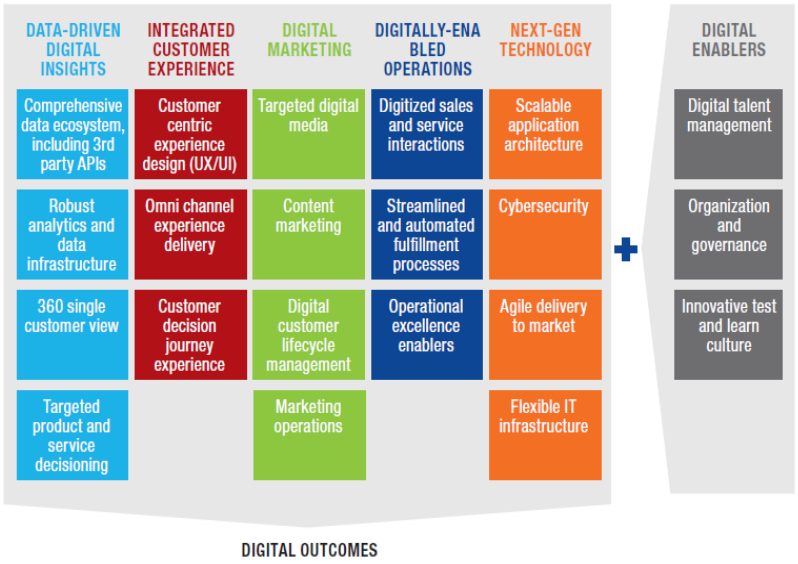


Figure 31: Bank capabilities to develop in order to react FinTech (McKinsey,2016)

What can banks do in order to react at the Fintech paradigm? For example:

- **Use data-driven insights and analytics holistically across the bank.**

FinTech competitors, technology giants (such as Facebook, Google, Apple) and some of the most progressive financial institutions - are opening up new battlefields in areas such as customer acquisition, customer support, credit disbursement and customer retention. All this thanks to the analysis of data and to more and more efficient Analytics systems. Consider, for example, credit provision - one of the biggest problems facing banks today. Access to large amounts of transaction data, the subscription of customers with personalized credit score, understanding and managing through credit and economic cycles: all of these are unique resources and capabilities that banks have built and exploited during the course of the centuries. But now, the large-scale availability of new and ever larger datasets (and the fact that banks no longer have a monopoly on such data) is pushing banks to radically transform themselves just to keep up. (McKinsey&Company 2016)

Therefore, these are different solutions that banks can adopt for the future:

- Building a comprehensive data ecosystem to access customer data from within and beyond the bank
- Creating a 360-degree view of customer activities;
- Creating a robust analytics and data infrastructure;
- Leveraging these to drive scientific decisions across a broad range of activities from customer acquisition to servicing to cross-selling to collections

- **Create a well-designed, segmented and integrated customer experience, rather than one-size-fits-all distribution.**

Times when the banking system was dominated by physical distribution are inexorably coming to an end. The increasing popularity of mobile devices has led customers to want more and more services in real time. Physical distribution will still be significant, but many less important, and banks must be a service with an attractive design and an experience that knows how to satisfy the needs of its customers.

Why does a mortgage application take weeks to be processed? Why does it take a week longer (or due) to get a debit card online than a branch? Why can not a customer make a real-time payment from their phone to split a dinner allowance? Banks have to improve the customer experience of its clients, meeting their particular expectations. (McKinsey&Company 2016)

- **Build digital marketing capabilities equal to eCommerce giant.**

Today, banks are fighting for the customer, not only with other banks but also with all those non-banking institutions that are trying to grab the interface with the consumer. The barriers that have historically protected banks are no longer able to offset the wide gap in marketing skills currently existing between e-commerce players and banks. The big data and advanced analysis capabilities described above are just the foundation of digital marketing. Mastering digital media, content marketing, digital customer lifecycle management and marketing operations will be critical to the success of the banks. Building these skills, recruiting and retaining digital marketing talent will require considerable time and investment. This is one the most difficult challenge for banks in order to stay alive versus the growth of Fintech (McKinsey&Company 2016)

- **Aggressively mitigate the potential cost advantage of attackers through radical simplification, process digitization and streamlining.**

After the last dot-com boom, banks successfully electronify core processes. Now they must digitize them. The difference is crucial – an electronic loan processing and fulfilment process at a bank largely implies the sharing and processing of PDF files of paper documents. We estimate that the majority of the cost of processing a mortgage is embedded in manual loops of work and rework. Digitizing a mortgage application would involve creating and manipulating data fields in a largely automated manner in the cloud, e.g., borrower income and liabilities.

This will be a multi-year process for banks, as it will require the integration of multiple legacy systems and potential re-platforming to enable truly digitized processes.

Simplification, digitization and streamlining opportunities exist across large swaths of banking operations. The sooner banks attack these opportunities, the more prepared they will be to compete with FinTech attackers that have a structurally lower cost base. New technologies will offer banks opportunities to test and scale to achieve efficiencies. (McKinsey&Company 2016)

- **Rethink legacy organizational structures and decision rights to support a digital environment.**

The typical organization chart of any bank will show a matrix of products and channels, with physical distribution usually leading in size and scope. The P&Ls that accompany these matrices vest power in the owners of the channels and products that are most likely to be in the firing line of FinTech attackers.

These attackers are typically oriented to customer metrics tied directly to their financial performance. In contrast, most banks have consensus-oriented cultures that require a long time to build alignment. Banks must complement their existing P&Ls with approaches that enable faster adaptability to external changes and foster cultures that support speedier decision-making. Banks must think hard about how best to organize to support the five preceding imperatives, i.e., what organizational structure and decision rights will most effectively support a data and insight driven operating model, a distinctive customer experience, digitized processes for greater efficiency, and next-generation technology deployment? What innovations should take place within the bank?

What should be developed in incubators or even in separate digital banks under separate brands? Should the bank have separate laboratories or a VC-like investment vehicle to be able to experiment with new technologies? (McKinsey&Company 2016)

New banking business models

There are a number of approaches that can be taken by incumbent companies in reaction to fintech emerging within the industry – we have outlined the five predominant business models below. (Grant 2016)

Collaborate

Cross-collaboration between traditional providers, fintech companies, new banks and external technology companies is becoming increasingly common. There are several examples of large firms collaborating with fintech providers to bring apps and mobile banking to the consumer (Santander, for example, working with Startupbootcamp). Coupled with the growing 'API universe', this approach is leading to the prevalence of increasingly collaborative platforms and ways of working.

Imitate

Often when an idea enters the public consciousness, all other parties in an industry clamour to get on board, and the financial services industry is no exception. A popular example in this context is mobile payments – bPay, Apple Pay and Android Pay – all forms of Fintech advancements. Furthermore, these ideas can displace part of the traditional value chain, disrupting the industry and becoming new 'best practice' and the market leader. This then leads to imitation from other firms.

In this case, Unicredit, for example, has just announced the birth of a new fully mobile and digital bank, BuddyBank.

Innovate

Staying one-step ahead of new entrants requires traditional players to bring innovative ideas to the table before fintech start-ups. This is often possible by leveraging an existing customer base or via access to resources that are constrained for start-ups. For example, many major financial institutions, including Lloyds Banking Group and the Royal Bank of Scotland, have their own 'innovation labs', which allow them to rapidly experiment with radical ideas and leverage on existing data and information.

In Italy, the main banking and financial groups have been moving for some time to open their own R&D to the startup and technological innovation world.

- **Unicredit** – The Gae Aulenti Square Group - launched a new acceleration program (**Unicredit Start Lab**) to boost entrepreneurial ideas through

mentoring, corporate and investor relations, targeted training, ad hoc bank services, granting funds exc. (EconomyUp 2016)

- Instead, **Intesa San Paolo** is carrying on an end-to-end acceleration and coaching program, the **Startup Initiative**, for new start-ups in FinTech.
- Banca Sella and CheBanca! embarked on the path of vertical innovation, entirely dedicated to Fintech, the former with SellaLab, the co-working of Biella for fintech startups and the latter with a call, the **Italian Fintech Awards**, activating a special team dedicated to **Upstream Projects**. A sort of incubator for startups and disruptive technologies, where "every day we define and update the strategic strands (the so-called" upstream ", in fact), looking for innovative ideas and solutions for the medium-long term needs of the bank, starting from startup ». (StartupItalia 2016)

Invest

One of the classic ways to enter a market, and indeed something at the heart of the start-up model is venture investing. By investing in fintech, firms gain skills, expertise, technology and market share.

BBVA, for example, has been involved in building a fintech portfolio by performing a number of acquisitions internationally, including: Holvi, a Helsinki-based online-only business bank, for approximately $100 million; Simple, a US banking start-up, for $117 million; and a portion of Atom, a UK based online-only bank, for $67 million. This appears to be a canny response to select a series of the best-of-breed players with the eventual ability of linking them together to build their own ecosystem of innovative financial services with an international footprint.

Regarding Italian panorama, also Banca Sella in these years, invested in the Fintech sector, acquiring for 75000$ the company Taplend, which is a financial help platform, giving an access to fast, safe and 100% online loans, provided by people or financial institutions. They also invested 1 million $ on Digital Magics, an incubator/accelerator of digital projects that provides consulting services and acceleration services. (CrunchBase 2016)

Also Intesa San Paolo has reacted to the emergence of FinTech both investing and collaborating with new start-ups: ELSE Corp has been funded by the bank for €500.000 and this can be a strategical investment in order to update customer interface and customer experience of the bank. Oval Money also, has been funded by Intesa San Paolo and it is an app for financial coaching, that helps people to save according their desires. (CrunchBase, 2017)

Specialise

The financial services industry is moving from a 'one bank for all purposes' model to a much more focused one, with an increase in companies focusing on specific parts of the supply chain (payments, current accounts or back office services, for example). There are still opportunities for companies to divest parts of the supply chain that they do not feel fit with their future core business.

The incumbent financial services players can view the rise of the fintech industry as either a threat or an opportunity. Irrespective of viewpoint, they should be taking the time now to establish a clear strategy of deliberate engagement.

Success will require a strategic response by proactively choosing a business model, or more likely, a combination of them. By engaging with the Fintech industry in a way that future-proofs their core propositions, operating model and digital strategy, financial services can adapt and take advantage of innovation. Those that make the mistake of not addressing this seismic shift in the industry are likely to find their ability to influence this choice entirely eroded.

Here is an analysis that potentially highlights trends on how major banks across the globe are reacting to the FinTech phenomenon. The analysis is based on publicly available news articles and press releases from banks and FinTech companies in 2013 and 2014. (IRIS 2015)

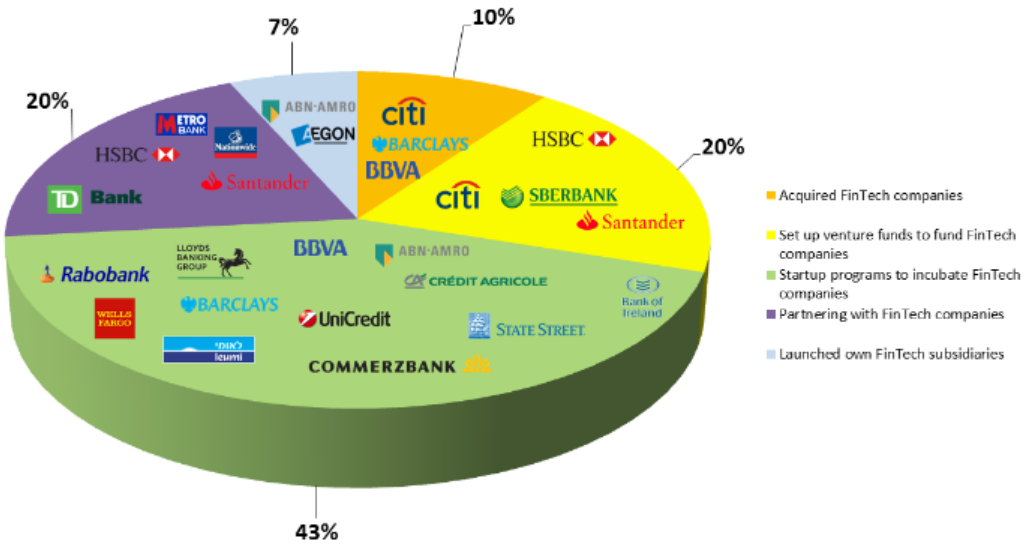


Figure 32: How are Banks reacting to Fintech? (Iris, 2016)

- The preferred strategy for most banks is to create startup programs to incubate FinTech companies with just under half of them doing so or to set up venture funds to fund FinTech companies with 20% of them choosing this strategy.
- Alternatively, 20% of the banks analyzed have adopted to collaborate with FinTech companies directly.
- Only few banks have adopted the strategy of launching their own FinTech subsidiaries. This demonstrates the difficulty for incumbents to react versus a new complete paradigm.
- Approximately 60% of the FinTech companies that the banks engaged with, offer technology solutions to banks while the other 40%, offer financial services on their platforms directly to the retail and small business market.
- European banks dominate FinTech related engagement with over 80% of the banks analyzed headquartered in Europe. North American banks account for only 20% of the banks.

Chapter 8 - Future scenarios of Payment Fintech

How will changing customer needs and behaviours in an increasingly cashless world change the payments landscape? This is certainly a question, which cannot have a defined answer today, but we could imagine six possible trends that will affect and modify the payment industry in the future:

1) Generation Z Rising
2) The Importance of UX
3) Global diffusion of mobile payments
4) The Reward War
5) Payments Everywhere
6) The Code Revolution

Generation Z Rising

The Gen Z is the generation behind the much-talked “Millennials”. The oldest of them are teenagers and young people today, but Gen Z consumers are the future customer base of the payments industry. This group is designed to make up 40% of all consumers by 2020. (Fast Company 2015)

While these future consumers share some traits with their older siblings, Gen Z is very different from their parents and grandparents. They have never lived without Google, Apple, Whatsapp and Instagram. Eighty percent give up on television for a day - and an astonishing 28 percent would like to give up on friends - to keep their mobile phone ("Trends in Consumer Mobility Report"). This generation of "seeing now, buy now" craves immediacy. Devotees of Snapchat and Instagram, their average attention span is a few seconds. As they move fast, GenZers still requires personalized and highly relevant experiences as consumers.

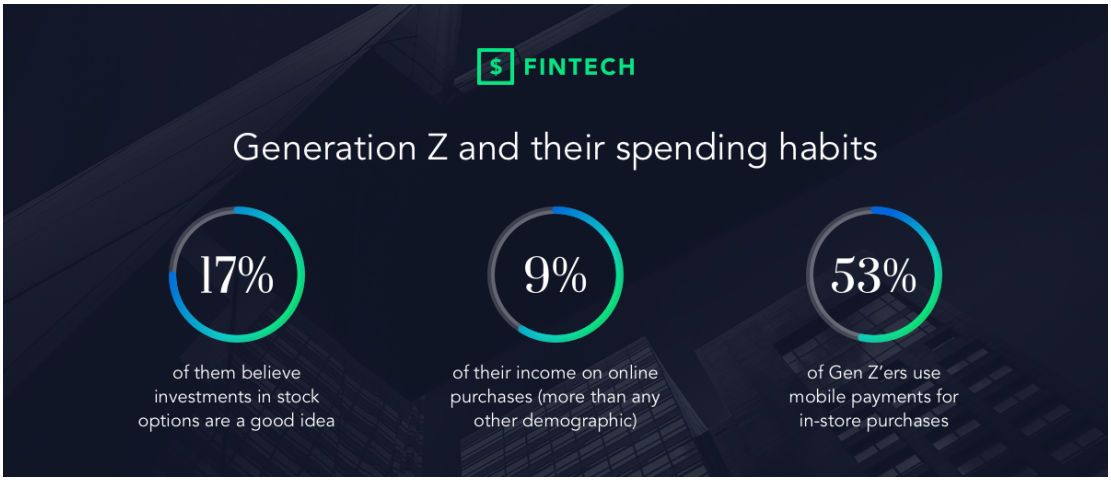


Figure 33: Generation Z Habits

While online banking is the banking channel most frequently used by all consumers, Generation Z gravitate on mobile banking apps. Sixty-nine percent use them daily or weekly. This confirms an enormous generational gap in access to banking services that will continue to widen. Intrigued by the digital tools that manage payments, invoices, expenses and personal finances, they wants their mobile wallets to think of them. An example would be a portfolio that automatically chooses the card that offers the best rewards or savings. Surprisingly, while the GenZers are mobile first, they have not left the traditional channels.

As the GenZers enter the world of work and their financial needs become more complex, they will radically change payments. It will probably be the first generation to give up the leather wallet for the digital wallet. Their wishes will tear down the walls between social media and payments in ways that have yet to be imagined. They will also force traditional players to raise the value of mobile payments as a matter of survival. The same trendsetters, Gen Z will influence other consumers, overturning what the industry thinks it knows of its customers. (Accenture 2017)

The Importance of UX

As the pay-as-you-go universe expands, the customer experience is becoming the main differentiator of competition. The irony - and the danger - for traditional players is that the customer experience is at the centre of attention just as they are losing

control of customers. Less contact points mean less opportunities to interact with people. Therefore, when companies have customers' attention, they begin to have a crucial role.

Think about how Google makes a fortune as the favourite destination to find something. The genius is that, owning the search, Google collects billions of advertising revenue. Even if people have no interest in ads, the times they actually do are pure gold. The same applies to payments. Providers that are present across the payments journey in the moments that matter to consumers—not just if or when a transaction occurs—are golden. (Accenture 2017)

With digital, payment providers can connect with customers in these moments like never before. Around 70 percent of Millennials and GenZers - are interested in consulting and management services for digital payments that can give them a better understanding and control of their personal expenses. This is a clear signal that payments have gone beyond the transaction. The experiences of customers are more important than ever. Experiences that align not only with the way people pay, but with moments of influence in their lives. To provide them, the industry must design payment experiences around human needs. For example ZapBuy from Omnyway allows consumers to keep their smartphone on any display ad on any channel, including print, television and online, and make a purchase immediately. (Accenture 2017)

Nowadays, banks have the monopoly of the data in order to offer meaningful experiences to customers. But with more than half of Millennials and Gen Z consumers willing to share online bank account credentials with third parties, this monopoly is vulnerable. Not to mention that this is the era of open banking. PSD2 in the European Union allows third parties to access customer account information through the API (Application Programming Interface). Already, large banks in have started to open their data to third parties. The battle over customer experience has begun, and it is anyone’s to win.

The Global Diffusion of Mobile Payments

Payments for mobile devices are ready to finally emerge and develop worldwide thanks to APIs and open banking. These advances allow payment players to deliver more accurate, consumer-centric payment experiences - with instant rewards and proactive balance alerts- that bring the power of mobile, ecosystem and data sharing to life. It is about finding compelling ways to deliver true value beyond the transaction itself.

Consumers are desperate for a different type of mobile payment options. One of the value-added services we can imagine will gain traction in the next few years is a unique view of account information. This is possible with a mobile banking app that allows consumers to view all credit and credit card balances simultaneously. The risk here for banks, considering the automatic functionality of their mobile payments apps, is that aggregators will begin to disintermediate banks into mobile payments by providing this unified view of increasingly consumer finance. (Accenture 2017)

Offering this unified mobile payment experience will become extremely important in the battle for the customer experience between traditional players and third-party payment providers. Today, mobile banking portfolios have lower consumer penetration, 28 percent, than Apple Pay, Android Pay and Samsung Pay, 49 percent, and merchant portfolios, 39 percent. (First Annapolis 2017) As we said many times in the other chapters, if traditional players do not think beyond the functional aspects of their mobile payments apps to create mobile experiences that engage consumers to do more, to get more value, Google, Apple, Facebook, Amazon and others they will do for them. (Accenture 2017)

The Reward War

Consumer spending on reward cards since the Great Recession has increased exponentially. Last year, consumers received $ 15 billion worth of premiums through cash back, miles and points. But there is a problem: the awards are hitting new highs while the exchange remains relatively flat or reduced in many countries of the world. This has been intensified in recent years. Banks, card companies and retailers are

introducing one-up prize award cards that extend the value of premiums. (Accenture 2017)

This unsustainable friction between interchange commissions and rewards commissions means two things. First, the traditional rewards model is close to the peak. Secondly, it is time for a new type of prizes. In other words, consumers want more rewards. They are more likely to trade their main rewards cards for large signing bonuses forward or more points or cash back on their purchases. In addition, convenience is fundamental. Seventy-six percent of consumers would like to receive their card for swiping at the point of sale. Google's Smart Tap technology already makes it possible to pay and redeem a loyalty card at one time. Even consumers crave personalized rewards. (Accenture 2017)

Players will have huge opportunities to offer next-generation rewards. Innovation will start with a clean blackboard and will have many aspects. Digital ecosystems will find ways to expand the relevance and reach of prizes. Prizes will go beyond the paper as consumer products companies work together with payment service providers to digitize their coupons and offers. In essence, tomorrow's awards will go beyond payments and will become more based on experience. They reflect the lifestyle needs of consumers and will be delivered seamlessly in real time. (Accenture 2017)

Payments Everywhere

Payment players once checked their fate in accepting payments. Now there is a proliferation of acceptance of payments at the POS, online and on the road. Location-bound payments are now enabled for devices. This shift indicates a future of universal acceptance that will alter the relationships between merchants, consumers and payment intermediaries.

In a world of PayPal, Venmo, Stripe and Square, there are countless ways in which individuals and small businesses can accept payments. Take Stripe, which is behind the billions in online transactions every year. Companies of all sizes use it: from entrepreneurs, artists, restaurants and bar to companies like Lyft, Uber and Amazon. Not just anyone can accept cards now, but they can do it from anywhere. All you need is connectivity and a portable card reader to create the next-generation POS.

As a result, there will be a recalibration of the payments network as we know it. Get the relationship between cards and places of acceptance in Europe. Recently, the trend has been that the growth of cards has surpassed the growth of commercial outlets. In other words, there are more cards than shops that accept them. This problem will begin to fix itself if universal acceptance becomes reality.

The Code Revolution

A string of numbers identifies bank accounts. However, with **EMV**, every credit card account becomes a code. A software code that works safely and can produce a different number every time and for every transaction. Combine this with the advance of digital payment technologies, and the potential is incredible. In the coming decades, this change will disrupt almost every aspect of payments.

The sector is already experiencing the first wave of this type of disruption thanks to tokenization. It allowed Apple Pay, Android Pay and Google Wallet - a turning point because it was the first time that banks gave control to external third parties. Nevertheless, it is just the beginning. Tokenization allows you to customize the account number code on a single website. If the code is stolen, it is useless for any other transaction. This alone could change the face of credit card security, which consumers worry deeply.

In addition, the code will kill the physical card and increase the payment infrastructure as the credentials become virtualized and can be incorporated anywhere. The processing part changes completely if card providers become token suppliers and cut the level of service. This is an unexplored territory. To overcome this change, traditional players will need very different approaches to innovation and payment credential management. First movers will not only continually push the limits on the art of the possible in the code, but they will invest and develop rapid innovation skills to bring ideas to the market before anyone else does.

The broad impact the code will have on the sector illustrates how much and to what extent technological advances affect payments. From Blockchain and augmented reality to advanced biometrics, the deluge of so much fast technology can be unnerving. However, the value for the industry is not about the "thing" of the latest

and best technology, but "how" it will reinvent customer experiences, standards, regulations and security and protection measures.

Chapter 9 - Satispay Case Study

Having already adopted our phones to complete almost every imaginable task, in 2012, Alberto Dalmasso (CEO of Satispay) and Dario Brignone questioned themselves why there still was no simple and convenient mobile payment app. Meanwhile, analyzing and investigating the processes involved in payments, a huge development took place on a European level. The Payment Services Directive meant that all payments within the SEPA countries would share the same new standards. For the traditional operators, this meant a struggle to change processes in order to "adapt." For Satispay, it meant opening the floodgates and designing a totally new business model.

In this way, born Satispay. Satispay is an application that has not only revolutionized mobile payments but has done so without involving traditional suppliers such as Visa, MasterCard and Amex. Allowing its users to transfer money with phone contacts and pay in stores (both physical and online), Satispay has caught the attention of consumers, retailers and big brands alike.

Figure 34: Satispay App

During the first half of 2015, the startup focused on making the platform scalable, building a strong team (now more than 35) and finalizing the second round of investment. We advanced strongly with the in-store feature in September of 2015. Since then, the system is growing at a rapid pace. Today Satispay has over 400.000 downloads, half of which are active users. In terms of affiliated businesses, it has have 4,500 stores, most of which signed up autonomously. The market has confirmed that Satispay meets real needs. While stores are growing at a steady pace of 50 per day, they are set to grow more than exponentially thanks to a groundbreaking integration that the Italian startup announced with Ingenico terminals. ICCREA Banking Group, the first corporate investor and main industrial partner, has introduced Satispay to more than 83,000 of its business customers with Ingenico POS terminals. The integration with Ingenico is an important venture not only by making Satispay the first mobile payment system in Europe to reach such a high number of payment terminals, but also because it confirms the effectiveness of Satispay's strategy. That is: integrate with any device that is readily available in stores. Smartphone or tablet, PC, cash register, POS, Satispay does not require new tools; it integrates with what is there and lowers costs.(Let's Talk Payments - Medium 2016a)

How does Satispay functions?

Satispay is a FinTech startup with its own payment gateway and it is definitely a big advantage being an IT company that focuses entirely on payments. While others tend to view apps simply as a new platform for credit cards, Satispay has decided that innovation in the mobile payment sector should involve a more radical change: the Italian startup developed an entirely new system that is independent of the payment card circuits. The model is directly linked to the interbank network allowing them to bypass all of the intermediary payment processors that are traditionally involved with payments.

"We can be used by any user of any bank: our platform is based on a European Directive active since February 2014 that allows us to credit all current accounts without having to make one-to-one agreements. In short, everything you need is an active account with your IBAN " - Satispay CEO, Alberto Dalmasso.

As we can read in the interview above released by the CEO of the Italian startup, the strength of the Satispay system, compared to the current supply chain, for example the one of credit card circuit, is that the platform works in a direct way: from current account to current account, jumping intermediaries. If the credit card system is used, the supply chain can be quite intricate. We have already described in an example in the previous chapters, how the parties share the transactional fees: summing up briefly, there is the bank on which the account of the buyer resides (Issuer), the company that issued the credit card and normally manage also the payment system with its electronic transaction (Visa, Mastercard, Chase, Discover, AmEx), the company who give POS or terminals to merchants (Acquirer), such as Ingenico, and finally the merchant's bank that receives the credit.

Satispay skips these steps using wire transfers at the European level: there is an agreement in 34 European countries for a single payment area, called SEPA. This agreement equates the bank transfer, carried out for example by a bank of Rome to one of Milan, even in the case of accounts on foreign banks. This is why, among the future objectives of the company, there is the growth of the application outside Italy.

Therefore, we can consider Satispay a closed-loop platform, as the payment system is managed entirely by the platform itself, which in turn allows connecting customers and merchants. There is no presence of banks or financial intermediaries within the model, as the change of regulation as previously mentioned and access to the banking APIs, allowed to interact directly on the respective client and merchant accounts through IBAN. This obviously means less transaction costs, less interchange fees etc. Therefore, Satispay is able to offer a completely free service for consumers and significantly cheaper for businesses.

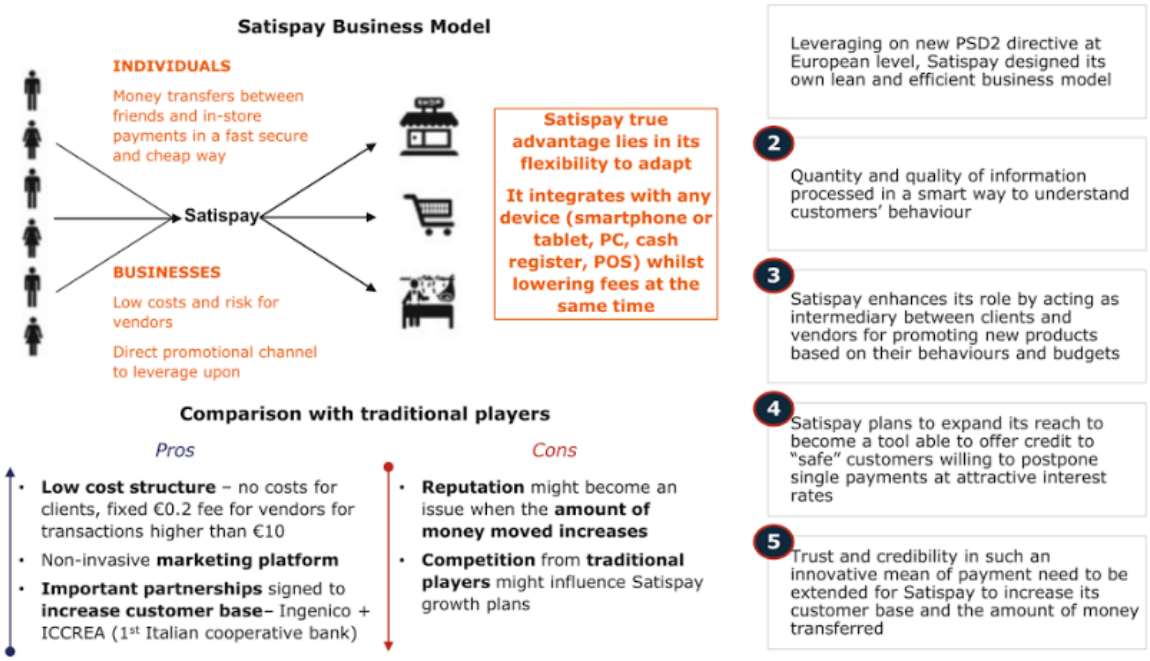


Figure 35: Satispay Business Model (Scardovi,2015)

Removing the traditional external supply chain, has been possible to increase efficiency in managing payments allowing for an extremely lean cost structure. Creating a Satispay account is as simple as downloading the app and providing your IBAN code and ID. Once active, you can top up your account by choosing a budget, the maximum amount you would want to spend during the week; this is modifiable at any time. The money is then transferred from the bank account enabling you to send money to friends or start spending in stores and online. With no signup fees or transaction costs for consumers, the experience is completely free. Businesses, on the other hand, are only charged 0.20€ for payments above 10€ while payments up to 10€ are free. Aside from offering an inexpensive payment solution for businesses, the app also provides a significant, non-invasive marketing platform. Stores are able to create promotions for clients, which are easily discoverable through Satispay.

Security

The choice to exploit the 27-character code that identifies bank details also meets precise security requirements. "Even if an account were to be hacked", explains Dalmasso, "there are no risks for the customer: the IBAN, unlike the credit card

number, cannot be used by hackers to make payments. This is a very remote event, since each account is protected by two security keys: a secret code associated with the service and a unique code association with the user's telephone number ".

The mechanism in practice is similar to that of chat as WhatsApp. The specific phone number of the user, acting as a real token, authorizes each transaction. "By changing the phone", the manager concludes, "the app no longer works".

Satispay Growth Strategy

Satispay was launched in January 2015 in the Italian market and the reception exceeds expectations. Being a two-sided platform, the need was to create a network of users from both the client and the merchant side, in order to increase the indirect externalities that characterize a platform of this kind. The strategy used was twofold: on the one hand, working in a member-get-member perspective, every user had and still has the possibility to invite his contacts that, once registered, will allow him to receive 5 euros for every contact that use the payment service. Obviously, this second wave of users will have the same opportunity and so on. In addition, numerous promotions have been added to Satispay to encourage clients to use the new system: for example the "**Cashback**" service, characterized by the return of a percentage equal to 10%, 20% or even 50% on the purchase of new users. Sometimes, some promotions (always) related to new registrations have been included within the platform, giving away credit to spend with Satispay at the affiliated merchants.

When merchants accept payment via Satispay app, they are required to pay a percentage of the transactional amount as a fee to the Italian startup. This percentage is certainly lower than the ones requested by credit card companies, but it is anyway important to explain how these kind of incentives and promotions are possible. If the client, using its smartphone, has a participating cash-back rewards program, it means that Satispay is simply sharing some of the merchant fees with the consumer. The goal is to incentivize people to use the payment platform when making payments rather than cash, which earns them no rewards. The more that a consumer uses the app as means of payment, the more merchant fees Satispay can earn. (Hayes 2016)

On the other hand, an increase in customers on a two-sided platform is profitable as long as the merchant network grows. Regarding the introduction of new merchants into the Satispay system, no particular promotions have been made, given that the competitive advantage linked to being a low-cost solution for them, is sufficient and moves forward to persuade them to join. The more users download the app and open a Satispay account, the more profitable it is for merchants to join the network. What Satispay is trying to do is tighten business partnerships, not only with small retailers and shops in the food & beverage sector, but also with large supermarket chains such as the PAM, Coop and Esselunga group and with chains of fuel distributors like TotalErg.

Satispay does not want to be just one of the many payment systems accepted by TotalErg but a real breakpoint with a certain way of understanding the payments of small-medium amounts. The aim in the short term is to arrive at a fully automated payment method, in which the user can complete all phases of the process - from the choice of the gas station to the petrol pump, to the actual transaction on his own - without getting off the 'car.

Competition in the mobile-payment industry

The technology giants are focusing strongly on the mobile payments market. Facebook has integrated them into Messenger, Apple through the application "Apple Pay", Google through the digital wallet "Google Wallet" etc.

The entry of these players on the market will help a lot to make digital payments a real habit. In this scenario, Satispay is the only actor that have not created a simple application that is based on old and expensive payment circuits, such as those of credit cards, but a real payment circuit, innovative and efficient, that does not aim to battle with Facebook and Apple, but with Visa and MasterCard. Big tech companies never enter into regulated sectors such as payments, because they are complex and excessively bureaucratic. What they do is rely on external subjects who take care of this part. For this reason, Apple Pay and Google Wallet are all mobile payment services that are structured on an open-loop payment model, managed by payments circuits

such as Visa and Mastercard. As mentioned in previous case studies, Apple Pay retains commissions on payments made by users who use the app, while Google Wallet does not. The purpose of Google is to obtain data, information, preferences and interests of its users and the business model linked to its digital wallet does not include transactional fees.

Satispay, on the other hand, has been able to take advantage of regulatory changes within the payment industry to create a payment system capable of both managing transactions and offering an easy-to-use and innovative payment platform to its users (both clients and merchants). For this reason, the real competitors of the Italian startup are the traditional payment circuits and not the hundreds of startups offering mobile payment services, but always based on the classic payment systems.

Chapter 10 – Innovation in FinTech payments

Technology push and demand pull

When it comes to technological innovation, the first question to be answered is related to its causes or determinants. Over the years, two possible and conflicting factors have been identified. According to the proponents of **technology push**, innovation happen when a technological development is generated independently of a specific market need and is eventually distributed in a given sector, thus combining a latent demand. This technological development can be generated internally by innovative companies or can take place elsewhere, in which case innovative companies will realize the potential behind technology and incorporate it into products and services. On the other hand, **demand pull** make companies observe the demand for improved products that come from the market and society in general and explicitly direct the development of technology to meet these needs. The debate between these two determinants was quite active, until the scholars have understood that technological innovation may be due to one of the two, depending on the stage and type of innovation. (Cantamessa and Montagna 2016c)

This conclusion derives from the observation that technology does not follow a linear process, but is subject to distinct and alternating phases of evolutionary and revolutionary progress (Tushman and O'Reilly 1997, Iansiti 2000). If we select a sector and identify a relevant performance indicator for its products, the evolution of this indicator will not proceed in a straight line, but will follow a sequence of S-curves.

S-curves show that when a technology emerges, performance is generally quite low, until a sufficient degree of maturity is achieved. At this point, performance starts to grow at a significant speed, until a technological limit is reached, i.e a level of performance that cannot be overcome due to inherent limitations in technology

Once the limit is reached, companies that want to improve their products will have to adopt new technical solutions. In this way, companies must choose from a range of new candidate technologies available and decide when to do so. The first aspect is fundamental, since only one technology will prove to be generally suitable and will

emerge (the concept of paradigm and dominant design will be explained in the next section).

In general, evolutionary progress occurs when moving along an s-shaped curve, while a sector will experience revolutionary progress during the transition from an old S-shaped curve to a new one. The push of the demand will be the prevailing determinant of the innovation that accompanies the evolutionary progress, during which a certain technology is improved and fine-tuned according to the client's needs. Vice versa, the technological drive will take place mainly in the revolutionary phases, when companies are forced to "look around" to find new solutions that can overcome the technological limit that characterizes the current technology. (Cantamessa and Montagna 2016c)

Satispay: Technology Push or Demand Pull?

Satispay has made its appearance in the payment industry for a lack that many of the current payment platforms and payment systems did not fill: micropayments and transactional fees. In fact, Satispay has been able to identify and understand the discontent of the other side of the market, that of merchants, due to high transaction costs on sales.

Therefore, we can definitely define the Satispay payment platform as an innovation due to a market demand-pull, a need for consumers to make micropayments without transaction costs but also a need for merchants to reduce costs and increase their percentages of revenues on electronic transactions.

If the transition from one S-Curve to another, can be defined as a revolutionary phase, the fact of simply exploiting users' IBANs to make micropayments, without the involvement of bank intermediaries or third parties, can be defined as such. At the moment, we can consider Satispay as a platform that has introduced a revolutionary innovation in the payment services industry.

Where could Satispay technology be placed on an S-Curve?

Surely, since this is a new S-Curve for the payment service industry, the performance of the product cannot be very high, considering also the lack of users in the initial stages to experiment and improve the product offered. In this kind of two-sided platforms, the performances begin to increase when the critical mass of users (both clients and merchants) is reached and Satispay is doing everything to involve as many people as possible within its platform.

Also regarding the time spent, or the R&D expenses for the development of the new technology integrated into the Satispay platform, we have to place it at the beginning of the S-Curve, being the Italian startup born two years ago.

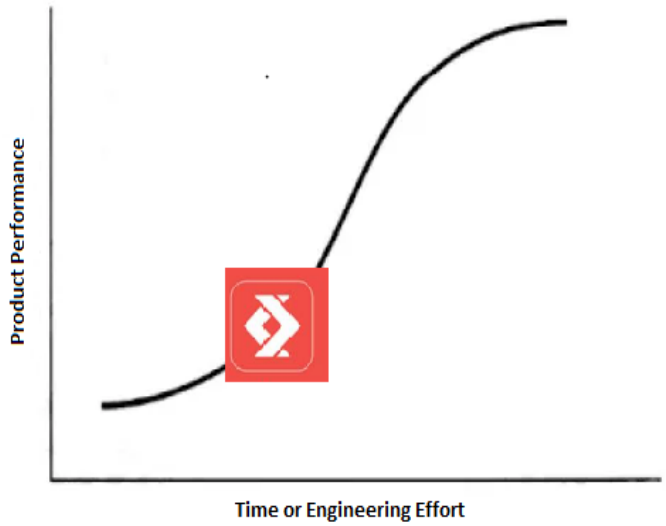


Figure 36: Satispay S-Curve

The Role of the Dominant Design

When observing s-curves, a question may arise on the shape of s-curves. Why is progress not linear, and what causes the initial incubation phase, typified by a hesitant start, followed by rapid performance growth and diffusion?

An answer to this question can be given by the theory of Abernathy and Utterback (1975), which has served as the basis for a number of other contributions (e.g Tushman and Rosenkopf 1992). We will initially introduce the Abernathy-Utterback

theory with discrete products (i.e products made up of component and for which it is therefore possible to define an architecture). Subsequently, the theory will be adapted to the case of continuous products and services such as Satispay.

The main elements of the theory in the case of assembled products are shown in the following figure:

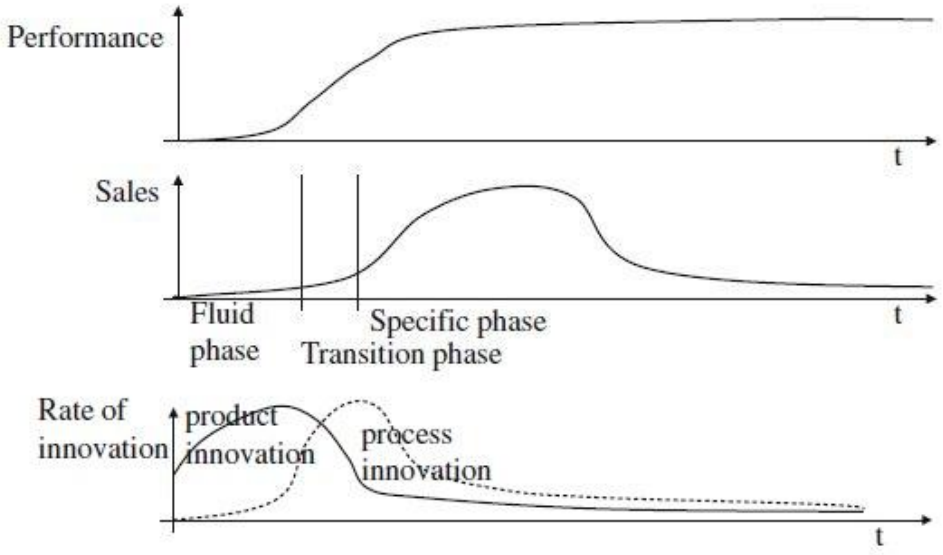


Figure 37: Abernathy and Utterback Model (Cantamessa, Montagna,2016)

According to this theory, the initial or fluid phase is characterized by a still immature technology with low performance, so that the demand will be consequently low. Although it is difficult to make a profit at this stage, the number of companies entering the industry is normally high and continues to grow, as the industry is considered to be very promising in prospect. The rate of innovation of the product is also very high but, rather surprisingly, it does not lead to significant progress. This occurs because companies are not concentrating their efforts in the same technical direction and cannot therefore generate cumulative progress based on the imitation and improvement of competitors' inventions.(Cantamessa and Montagna 2016b)

At some point, the industry enters what is called the **transition phase**, during which a product architecture emerges as a leader and is recognized as the dominant design.

The dominant design defines the technical solutions, components and features (the architecture) that are widely accepted as the "normal product" in that industry, surpassing other competing designs. The emergence of the dominant design triggers a sort of effect, which determines the growth segment of the S curves. Product performance takes off as shared design now allows competitors to mimic each other and generate cumulative progress. In turn, improved performance and a recognizable product induce more customers to adopt, which increases sales. At the same time, the number of active companies begins to decline, at first because companies whose resources and skills do not correspond to the dominant design are forced to leave the sector or retreat into specific niches where they can still be competitive. Increasing sales and this initial shock of the industry means that the growth rates for a surviving business will be higher than the market as a whole. While this may seem like good news for them, it is also a significant challenge, and not all companies will be able to sustain such high growth rates. Among the problems to be faced are the raising of capital to finance production plants and working capital, the management of a growing workforce and the creation of a sustainable and formalized organization, the search for managers to manage it and so on. Many companies will therefore fail in this effort, continuing to shake and further stimulate the growth of survivors. (Cantamessa and Montagna 2016b)

As this process continues, the life cycle enters the so-called **specific phase**. During the specific phase, companies strive to compete on costs and quality in a scenario characterized by an increase in demand. Then they shift their attention from the product to process innovation. Before the emergence of dominant design, uncertainty in the product and limited sales discouraged companies from worrying too much about production. However, with a dominant design now stable in the product and a growing demand, it becomes technically possible and strategically important to innovate the process. Companies therefore develop optimized, product-specific and capital-intensive machines, allowing higher quality and significant economies of scale. In turn, this leads to lower product costs, lower prices and higher demand.

Dominant Designs in Process Industries and in Services

As mentioned above, the model discussed above applies to discrete products. The model can also be adapted to the case of the continuous process and the service industry, which is more the case with Satispay.

In these latter cases, the roles covered by product and process innovation are simply reversed compared to what happens for discrete products. The fluid phase and the transition phase will be characterized by an intense process innovation, during which companies will experiment with alternative technical solutions, and until a dominant project for the process will emerge, thus leading to the specific phase. During the specific phase, companies will slow down the pace of process innovation and start working on product innovation in an attempt to exploit previously developed processes and infrastructures.

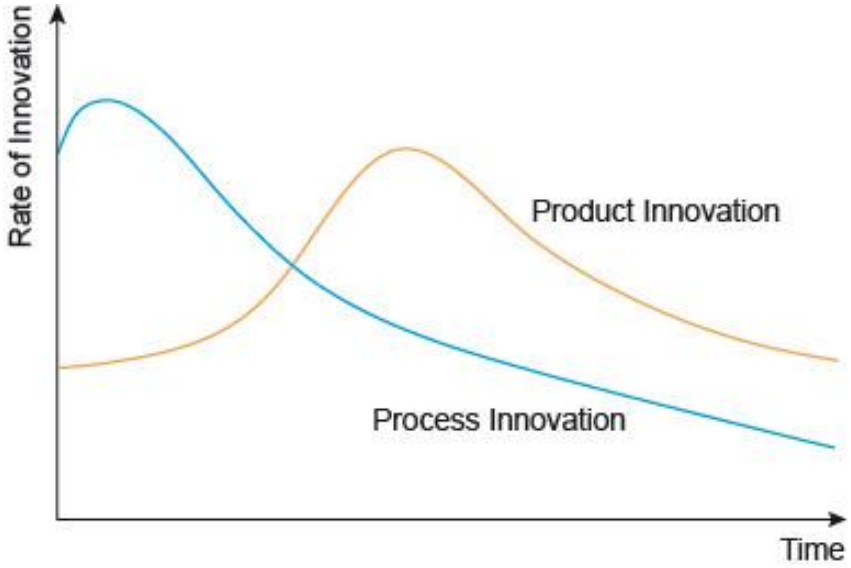


Figure 38: Phases of Product and Process Innovation

Also in this case, due to the dominant investments in design that have been sunk in the process and related infrastructure, the dominant design will tend to be stuck and remain stable for years. This raises an important compromise linked to the openness and cost of the processes. Knowing that infrastructure and processes will remain unchanged for years, if not decades, decision makers can on the one hand decide to invest more money in open and flexible processes, considering the many potential

products that could be developed and produced on it. However, this is a risky choice, since this variety of products may not occur, thus offering disappointing financial returns. On the contrary, companies can make a conservative investment, but they risk that a limited infrastructure is not able to accommodate future products with a high demand. This would result in significant opportunity costs and a clear disadvantage compared to competitors who made a more forward-looking choice.

Regarding Satispay, we could place the Italian start-up between the "fluid phase" and the "transition phase". As mentioned earlier, the bigger initial problem of two-sided platforms is to reach the critical mass level that allows users to have positive externalities. Users use the platform if there are shops that accept Satispay as a means of payment, otherwise they would continue to use the classic payment systems such as credit cards, debit cards and cash. Therefore, the main difficulty is to create both a group of consumers who use the payment system and a group of merchants that accept it. For this reason, the platform's performance cannot be considered high and Satispay must be placed between the initial phase and the intermediate phase.

Even the number of companies competing in the mobile payments market, it makes us understand that the hypothesized location (between fluid and transition phase) may be the right one. These competitors are trying to offer consumers a universally accessible payment system without the burden of expensive commissions.

For example, **Venmo** allows users to send money to their Facebook contacts without having to switch from current accounts or credit cards every time. This allows users to avoid high transaction costs just like Satispay. **Dwolla** is also based on the same principles of Satispay to create a fast, low-cost and fast payment system: using this circuit, in fact, we will pay $0.25 for each transaction above $10, and no commission for lower amounts.

Square Cash is slightly different, the method for sending money by email. Sender, recipient, subject: this is all you need to send a payment or simply transfer an amount from one end of the world to another.

There are also those who have chosen to join mobile payment to social networks, as **Stripe** is doing thanks to the partnership with Twitter, it is ready to launch payments via tweets in the near future.

It is clear that we are not yet in the transition phase, where we have the presence of a clear dominant design and companies that fail to implement a product / service / technology in line with it, find themselves out of the market. For this reason, the number of companies operating in the mobile payments sector is very high today and continues to grow.
Only with the emergence of a dominant design we will be able to understand which companies will dominate the market and whether Satispay will be able to remain on the market, perhaps adapting its product, or not.

Technological Paradigms

The S curves described in the previous section are not simply a technology, but a broader concept that can be defined as a **technological paradigm**. As shown in the figure below, a technological paradigm is a mixture of supply-side and demand-side elements that merge into a coherent whole and give life to a technological trajectory (called s-curve) that is at once profitable for companies and appreciated by the market.

On the supply side, a paradigm is made up of theories, knowledge and methods that transform a technology into real products and services, around which it is possible to establish a sustainable business model. In order for a new paradigm to emerge, industry must therefore be able to master the new technology and must also be able and willing to forget the concepts and know-how that were attached to the previous one. The emergence of a paradigm requires the coherent union of a number of actors. The producers and their suppliers obviously cover the main role.

On the demand side, a paradigm is defined by the beliefs, needs, objectives, rules and meanings that customers attribute to the product. If these are satisfied by technology, customers will choose it and the paradigm will emerge. Instead, if the characteristics of the product conflict with what customers believe or need, the paradigm will not emerge or, at least, be delayed. (Cantamessa and Montagna 2016a)

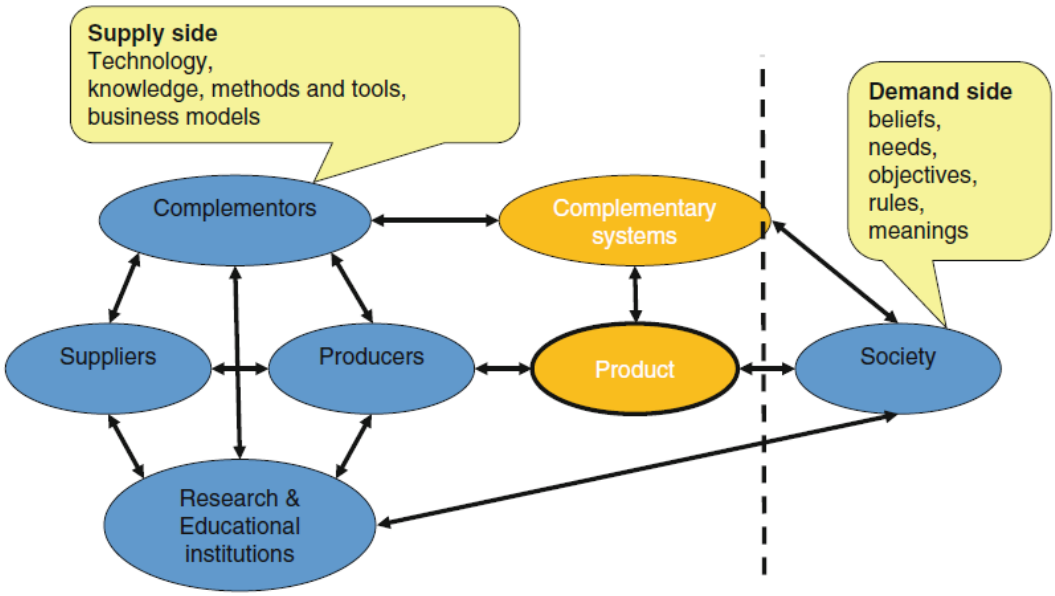


Figure 39: Technological Paradigm (Cantamessa and Montagna,2016)

The concept of paradigm and the interaction between supply and demand side elements that define it can help understanding why a particular technology can overcome an existing one, without the latter actually reaching its limit, but simply because the first offers higher performance and / or a combination of features that the market considers superior. In this case, we can talk about "**discontinuous technology**" (Schilling 2009). Very often, discontinuous technology does not simply lead to the progress of a specific technical performance, but to a drastic change in the way the market understands and ultimately uses the product. In this sense, discontinuous technology can lead to a new technological paradigm.

In the case of Satispay and the world of digital payments, everything has changed with the introduction of new legislative directives such as SEPA, which have given considerable impetus to innovation. In the previous chapters, we have explained in detail what happened, legally speaking, to the payment industry with the emergence of hundreds of Fintech startups that have stimulated more and more technological innovation in the sector.

The concept of technological paradigm or technological trajectory is very important in order to understand better how Satispay it can be placed inside an S-Curve.

Previously, we treated the platform technology as a further innovation compared to current payment platforms, microlending, etc. On the other hand, we cannot consider Satispay as a disruptive innovation in payments, which could even generate a new S-Curve.

I prefer to consider Satispay as a possible "**discontinuous technology**" that creates evolutionary innovation within the industry. The technological paradigm does not change because as explained above, the technology does not "disruptively" affect the entire sector. An example of disruptive innovation can be the electric car, which totally revolutionizes the automotive context in many sectors such as production, suppliers, refueling, sales and even repairs, etc. The electric car is an innovation that radically changes everything, both on the supply side and on the demand side.

Satispay technology cannot be considered a disruptive innovation because it does not create such a drastic change within the payment industry. Therefore, if we analyze the technological paradigm of payments in recent years, we can place Satispay on an S-Curve (considering the technological trajectory) characterized by very high performance and almost at the end of the technological paradigm that has characterized payments in recent years.

The Blockchain will probably be the next disruptive technology that will totally change digital payments, giving rise to a new technological paradigm, new knowledge and theories (supply side), new interests and expectations from consumers (demand side). For this reason, I preferred to place the Satispay technology still in the current technological paradigm.

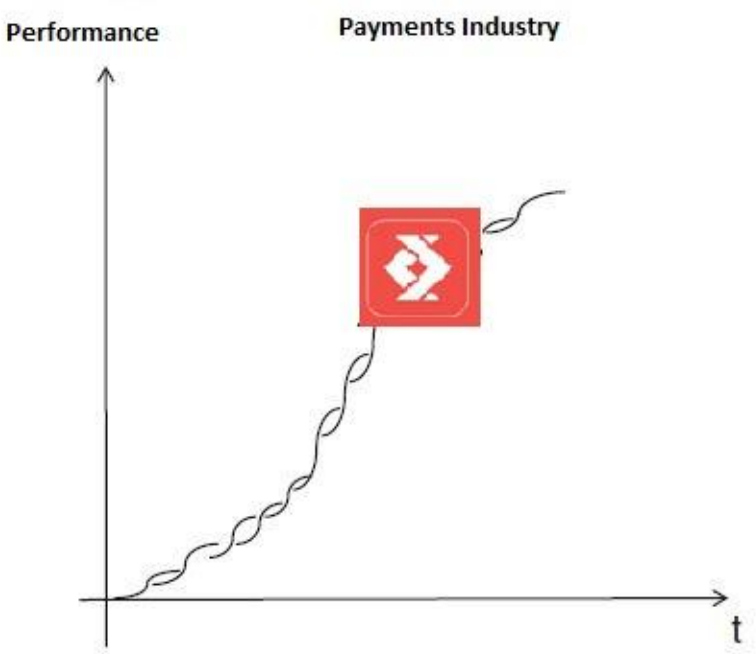


Figure 40: Satispay and the new technological paradigm

Diffusion S-Curves and Customer Segments

Diffusion s-curves tell us that customers adopt at quite different moments along the product life cycle. One can therefore wonder whether customers are all similar to each other, and differences in time to adoption are purely due to chance, or whether customers are individually different in their propensity to adopt, and this propensity determines whether a specific customer will be an early or a late adopter.

The most popular segmentation has been proposed by Rogers (1962) and is shown in the picture below:

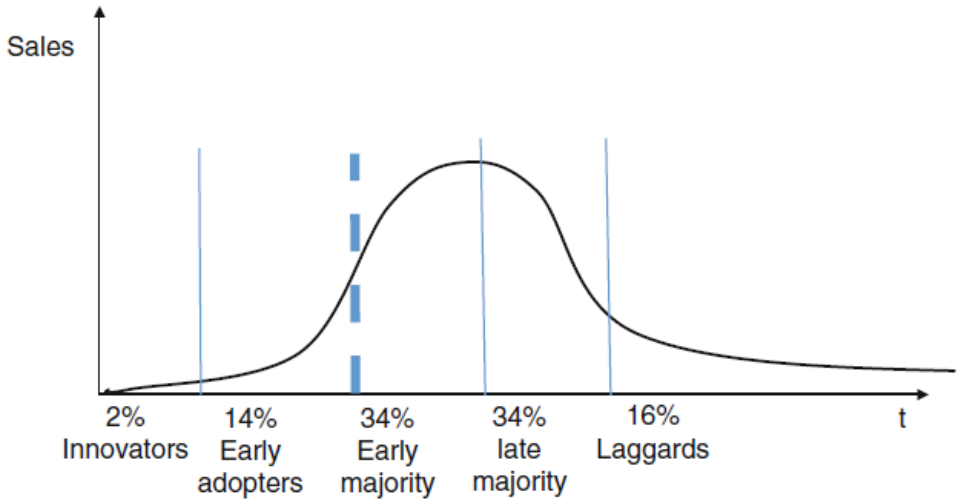


Figure 41: Moore Segmentation (Cantamessa and Montagna, 2016)

By studying this segmentation, Moore (1991) proposed the existence of a very significant gap (or chasm) between the early adopters and the early majority segments. Customers in the former segment adopt because they "look into the future", and are therefore ready to accept a relatively immature technology. Conversely, the latter will only adopt a mature product that fully satisfies them. Therefore, a product that is highly successful with early adopters is likely to be unsuccessful when the early majority segment kicks in. Firms that are market leaders in the early phases of the product lifecycle may therefore fail to understand the new user requirements that characterize the early majority segment, and fall behind when attempting to "crossing the chasm".

The main characteristics of these customer segments are: ("Understanding the Technology Adoption Life Cycle" 1991)

- **Innovators** are lovers of technology. They are always looking for new technologies, new products and are able to understand when an innovation can do for them or not. The probability of trying something new is very high. They are also few, therefore, for marketers, they represent an important source of references and references.

- **Early adopters** are visionaries, not innovators. They find it easy to imagine, understand and appreciate the advantages of the new technology. When it comes to high-tech products, they look for fundamental innovations, not small improvements.

They worry about ROI and see new technologies as helping them reach a business goal quickly, before their window of opportunity closes.

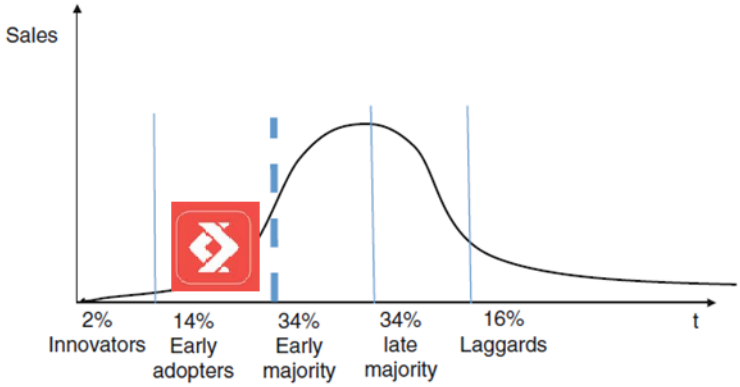
- **Early Majority** segment is pragmatic. They are ready to buy when someone else has taken the risk and fixed the bugs. Their goal is to make a percentage improvement rather than a qualitative leap. They see a technological decision as something they will have to live with for a long time, so service is important. Once you win them, they are extremely loyal.

- **Late Majority** are conservative. They are content to be followers and often do not feel comfortable in their ability to manage new technologies. They will not buy until many others will not have the product, and instead what they are using has become uncomfortable. They are extremely service oriented and want a lot of support. They will not support high price margins.

- **Laggards** are skeptical. They are very late users and could never, under equal conditions. In fact, their main role in the market is to block purchases by emphasizing that the new systems do not keep the promises made at the time of purchase.

About 300 thousand downloads, 160 thousand users and a network of 18 thousand stores, at a rate of 70 new merchants per day. These are the numbers declared by Satispay. Today the system manages a 5 million euros/month of sales figures and the exponential growth in recent months has been possible thanks to the partnership with some important brands. One of the last in terms of order is the Esselunga supermarket, which started to activate payments with the app in all stores. Expansion expectations are becoming more ambitious on the user base, given that the system expects to reach 1 million users and 120,000 merchants in the future.

Considering this information, according to Roger's classification, Satispay could now be placed between the "**Early Adopters**" and the "**Early Majority**" segments. Soon, Satispay will have to face the "Crossing the Chasm" phase, characterized by the need to modify the offered product and its technology to make it accessible and adequate to the requests of the majority of the population. This step is not easy, as the two customer segments mentioned above are very different as regards the expectations on the product offered.



The Early Adopters, as mentioned earlier, are lovers of technology, have a real need that is filled in full by the features offered by the platform. Therefore, they need the Satispay technology and despite the offered product is in the initial phase, they would not stop using it. The Early Majority segment could also live without a platform to carry out micropayments without transaction costs, so they are a much more difficult clientele to reach and convince.

How to solve this problem? Satispay is introducing more and more preponderant incentives, discounts, partnerships and cashback offers on both the client and the merchants, in order to increase the number of users using the platform, consequently increase the externalities network and reach the critical mass of users to make the service work better. The initial product offered by the Italian startup to the first customers has changed and has evolved over time to allow the spread of the product in a homogeneous and exponential way also to other customer segments.

Conclusions

The aim of my thesis was, first of all, to describe the Fintech paradigm in a general but complete way, clearly defining the boundaries within which the Fintech term fell into everyday operations.

Secondly, another goal of my work was to analyse and understand the changes that were behind the emergence and spread of this new paradigm and how the traditional financial intermediaries were reacting to this wave of novelty. To do this, I have analyzed in particular the mobile payments area, simplifying and concretising the analysis versus a single market of the Fintech world.

The identification of the new trends in the sector required, above all, a careful analysis of the internal problems of the banking industry after the financial crisis; this was followed by the creation of a "Fintech Taxonomy", able to identify the main new entities entering the sector and the innovation processes that these have brought within the financial sector.

The cultural change taking place is certainly the most important factor that emerged in my dissertation. Especially the new generations, the Millennials and the Generation Z, will be the customers of the future both for startups and for traditional banks. And the differences that emerge from the current clientele are obvious: they are subjects who grew up in the Sharing Economy (eg Google, Foodora, Flixbus, BlaBlaCar etc.), who live daily with their smartphone, always connected to social networks and accustomed to User Experience totally digitized in every area of their day.

It is therefore intuitive that, on the one hand, this "generational shift" offers a great opportunity for all the new Fintech startups that, without legacy and through the exploitation of technology, aim to provide a specific financial services offer for these new customers. But also for the banks, as analyzed in Chapter 7, it may be the opportunity to transform their core competencies through a digitization process, to update their product package and the underlying processes, and targeting these new customer segments.

To conclude, it is possible to summarize what was expressed in the discussion, in two key concepts: **technology** and **cultural change**.

Every strategic and investment plan that startups and traditional financial intermediaries will have to adopt, both short and medium-long term, will necessarily have to focus on these two elements, which are now essential, in order to exploit them for their own benefit: to do so, banks will be forced to adopt a proactive and open approach to collaboration with new entrants, better end-user knowledges and technology holders and innovative business models, not rapidly adoptable by incumbents due to their legacy. Only in this way, in fact, financial institutions can remove the threat of new entrants, and at the same time make it an opportunity for a profound rethinking of their products and processes.

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