La Rochelle Business School

BBA La Rochelle

PROMOTION 2018

How Artificial Intelligence is changing the banking sector?

End of study thesis presented by:
Steeve DA COSTA

Thesis director: M. Emmanuel RENAUD
La Rochelle Business School
June 2018

Acknowledgments

I would like to thank all the people who helped me in the realization of this thesis.

I wish to express my sincere thanks to Sir Emanuel Renaud, thesis professor at La Rochelle business school. He guided me in my personal work and helped me to find some solutions to move forward.

I am also grateful to Sir Gilles Duhr, assistant branch manager of ING Luxembourg. I am extremely thankful and indebted to him for sharing expertise, and sincere and valuable guidance and encouragement extended to me.

I take this opportunity to express gratitude to all the ING Luxembourg's team and more particularly the digital and costumer intelligence's teams for their assistance related to their experiences on the subject and explaining me their tasks and missions for ING and the link with the Artificial Intelligence.

I am also thankful to the ING Luxembourg Strassen branch's team for their support during my internship and for explaining me the banking operations in an overview but also more in detailed with seriousness and willingness.

Last but not least, I would like to thank my family: my parents and my girlfriend for supporting me spiritually throughout writing this thesis and in my life in general.

Abbreviations

AI – Artificial Intelligence

ML – Machine Learning

DL – Deep Learning

BD – Big Data

BS – Banking Sector

ES – Expert System

TS – Transversal skills

Abstract

According to the banking sector, the Artificial Intelligence is the new way to innovate and thus create the long-awaited breakthrough by companies in order to differentiate themselves but also by consumers in perpetual research of the better personalized products and services, with a shortened waiting time and by the easiest method.

We can thenceforth ask to ourselves the following question in linked with this thesis subject: “Artificial intelligence, a stepping stone in the evolution of the banking sector?” And more precisely: How can AI revolutionize this sector? And by which way?

Firstly, we are going to introduce the subject through a small presentation of the Artificial Intelligence following by his historical context.

Thenceforward, we will analyze the benefits of AI divided in two parts:

- The first part will be focus on the companies’ side.
- The second one will analyze the benefits on the costumer’s point of view.

Then, we will have a look on all the issues the AI can provide to the banking sector.

At the end, we are going to sum up all those previous analyses performed and provide some keys and a personal point of view concerning the evolution of AI in the banking sector.

Those analysis have been driven by some initial hypothesis which are the followings:

- The artificial intelligence will enable banks to identify the preferences of their customers through their knowledge (customer database) and emotional intelligence. It will strengthen the Bank-Client relationship and enhance the "customer experience" by offering products / solutions in a proactive manner.

- The emergence of Artificial Intelligence in the banking sector will replace the repetitive tasks of employees to take advantage of more commercial and advices tasks in order to generate an "added value" and it will allow banks to optimize their human resources.

- The implementation of artificial intelligence in the banking sector will generate a higher risk of cyber-attacks. Sector players will have to set up tools in order to increase their cyber security.

- The emergence of artificial intelligence in a sector in restructuration has led to the apparition of new forms of competition (fintech’s, telephone operators, technological companies ...) ready to do anything to obtain a larger market share against the giants of the banking sector.

Keywords: Artificial Intelligence - Digitalisation - Big Data - Customer Experience - Evolution

Summary

Introduction

A - What is Artificial Intelligence?

The current evolution of the new technologies, the evolution of the banking sector as well as the evolution of the customer's desires, led to the appearance and the development of over-developed computer tools which is called: Artificial Intelligence.

Nowadays, the term "IA" is omnipresent in our newscasts but not only related to the banking sector but also in any other sector with no correlation (e.g. the health and transport sector where the IA has also revolutionized the modes of operation thanks to the creation of algorithms creating a data empowerment as well as a form of intelligence able to replace the human being). In the banking sector, the emergence of this AI, allows players (banks and other non-traditional competitors) to move from repetitive tasks to value-added tasks.

In this study, it would be interesting to observe the evolution of the Artificial Intelligence through a retrospective from the appearance of this concept as well as its history that led the AI in the form as we know it today.

The idea of AI is not new. For many decades, some individuals had the goal of delegating certain tasks to machines. Very often we compare the errors relating to human beings. In this case, this comparison is absolutely true because the fact of delegating "human" tasks that may contain errors to machines that would not make mistakes, would be ideal for companies.
Repetitive, dangerous or very delicate tasks are mostly those that must be replaced by the machine.
Blaise Pascal was the inventor of the first calculator in 1642[1]. This is the premises of AI and the first time a machine did a work instead of a human being.
Since then, technology has involved and went from an arithmetic machine to an autonomous machine able to replace some tasks until then performed by human.

[1] Roux, D. (2017, May 24). La saga du numérique : de la machine à calculer à l'invention du transistor

B - The historical context of Artificial Intelligence

The term IA was born thanks to Alan Turing, a cryptologist. During the Second World War, he had the task of deciphering the codes of a machine (designed by the Germans) to communicate between them. For that, he created an "intelligent machine"[2]. Subsequently, he wrote, in 1950, an article entitled "Computing Machinery and Intelligence" in which he proposed a definition of computer intelligence with the "Turing test" which allowed to judge if the computer was able to understand and transcribe a human dialogue.

Nevertheless, in 1956, an event marked the true birth of the term AI[3].
Twenty researchers gathered at the Dartmouth campus. This congress influenced the future work and projects realizations of this discipline. During this conference, the term "artificial intelligence" appeared in a funding proposal delineating the boundaries of AI.
In the 60's, a psychologist and researcher: Frank Rosenblatt succeeded in imitating the functioning of the human brain by creating an artificial neural network called "perceptron"[4] and taking the form of a whole computer: The Mark I.
The particularity of this computer is that the relationship and the weight of the connection between the neurons could be adjusted if the computer made perceptual errors.
The invention of the perceptron allowed an important advance in the history of AI. The concept of machine learning was created.

Another huge invention and project designed in the 60's and 70's is called Shakey, the robot[5].
This project, set up by a researcher's team from the Stanford research institute, enabled them to create a mobile robot able to think and reasoning about their own actions and tasks.
This research program has had a significant impact in the evolution of AI and robotics. He managed to integrate different elements in coherent ways: the processing of language to understand human's instructions, to search algorithms to follow his evolution concerning his tasks realization, sensors and a computer vision to interpret his environment and a planning system to prepare his following actions.

[2] Berny, L. (2017, August 20). 1950 : Alan Turing imagine la machine intelligente.
[3] Verbeke, L. (2018, March 31). Aux origines de l'intelligence artificielle
[4] Henno, J. (2018, January 09). 1957 : le perceptron, première machine apprenante
[5] Retuerta Merino, J. (2017, December 21). Shakey, el primer robot de la historia capaz de razonar.

At the same period, Terry Winograd, a student of MIT, created a program called SHRDLU during his PhD. SHRDLU[6] is a virtual world made of coloured blocks, a box that can hold objects and a pliers that can grab and move these blocks.
This program is considered as a major breakthrough in the field of AI because it has improved the understanding of a natural language to the AI through a better understanding of the computer about the syntax, the semantics and the deduction rules that allowed it to understand and follow instructions in a common English and also to explain his reasoning about his way of doing things, if asked.

Sometime later, in 1973, MYCIN[7], one of the first "expert systems" was created by Edward Shortliffe, a doctor turned computer scientist.
Initially, this expert system was dedicated to the diagnosis and treatment of bacterial infections.
This system had 2 important features:
Firstly, it was possible to add rules to its database without having to modify its decision engine
Lastly, the program could explain its decisions, if requested.
MYCIN has become an inspiration for the next evolution of AI.

The same year, a mathematician explained in a televised broadcast, his doubts concerning artificial intelligence. This interview has generated a sudden stop of research on AI and a freeze of funding.
This technology was not enough successful and achieved as today, the AI was a revolution too advanced for that time[8]. For a few years the evolution of AI has been shelved until the end of the 80s and the appearance of a new IA system.

Another computer scientist: Yann LeCun[9], currently director of IA research at Facebook, has worked on image recognition and has created in 1989 a software called "LeNet". It consists of a neural network inspired by the human visual cortex, initially used to recognize postal codes written by hand on the letters of the American post office.
In that time, LeNet achieved a 90% success rate on a 2000 handwritten character test. Today, other systems derived from LeCun's work help banks to read checks.

[6] Guillot, A. (2018, February 19). Petite histoire de l'intelligence artificielle.
[7] Cristianini, N. (2016, October 29. The road to artificial intelligence: a case of data over theory.
[8] Verbeke, L. (2018, march 31). Aux origines de l'intelligence artificielle
[9] Larousserie, D. (2015, June 8). Yann LeCun, l'intelligence en réseaux

Another date which marks the evolution of the AI: 1997 with the birth of IBM's Deep Blue system. This AI able to defeat the chess master: Garry Kasparov[10].
Deep blue has shown to the world the superiority of the machine over man in a “limited” intellectual effort.
This system was designed using complex AI techniques to allow the machine to predict its movements in order to reduce the possibilities and focus on the most probable.

In the 2000’s, two major projects are considered as impacting in the improvement of the AI and allowed new technological evolutions: Stanley and Google brain.

The birth of the Stanley prototype was due to the creation of the challenge, in 2002, by the DARPA[11] (Defence Advanced Research Projects Agency) which rewards the autonomous vehicle able to travel 225 kilometers in the desert.
In 2005, Stanley won the race thanks to its lasers, radars, cameras, GPS receiver, 6 processors as well as a software allowing to connect all the data between them.
Stanley gave birth a few years later to the Google Car, which will launch in 2012 the firsts Google’s driverless cars and will navigate autonomously through traffic.

Google Brain[12] is a DL research project led by Google and launched in 2011.
In 2012, with the use of 10 million images from YouTube videos, this system has been tested to observe and train its deep neural network. It is called the "unsupervised learning".
After 3 days of training on 1000 servers, the network was able to recognize 16% of the 22 000 categories. That's 70% progress compared to the previous record.
Google through its system called google brain is actually revolutionizing AI since his appearance until today especially thanks to the research and the improvement in the DL especially on voice recognition as well as the creation of an assistant to interact with the human in order to clearly understand the user's request.

Like google, other tech giants are on the lookout for « the » system that can revolutionize the AI sector again. The GAFA’s (Google, Amazon, Facebook and Apple) have embarked for

[10] Molga, P. (2017, August 28). 1997 : Kasparov s’incline face à Deep Blue
[11] Orenstein, D. (2005, october 11). Stanford team’s win a robot car race nets $2 million prize.
[12] Tual, M. (2016, June 18). « Google a toujours été une entreprise d’intelligence artificielle ».

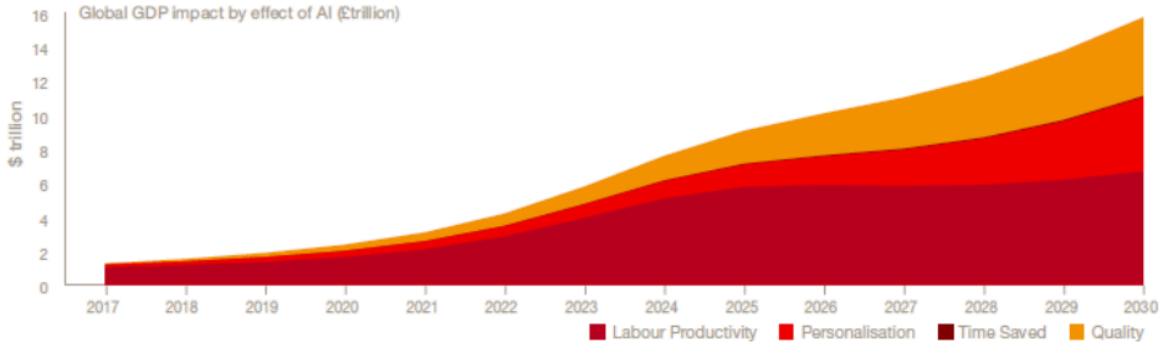
several years in the race for AI[13]. With massive buyouts of start-ups, these web's giants are trying to take the lead in a sector that will upset the economy[14].

In 2011, Apple launched Siri. Thenceforward, the appearance of a tough competition concerning the voice assistant's development with a revolutionary AI appeared.
An assistant able to dialogue with his user and manage his appointments, booking…
Nevertheless, Amazon still took a step ahead of its competitors through its "intelligent assistant" called Alexa. Amazon has recently decided to install its assistant in vehicles of the Toyota brand (it will play the role of intermediary between the driver and the vehicle and will can adjust the air conditioning, the GPS program, select a music ...) and also in refrigerators of the LG brand. Its competitors are all conquering an even more elaborate and finished version of their voice assistant: Apple with Siri, Microsoft with Assistant, Google with Cortana and Samsung with Bixby[15].

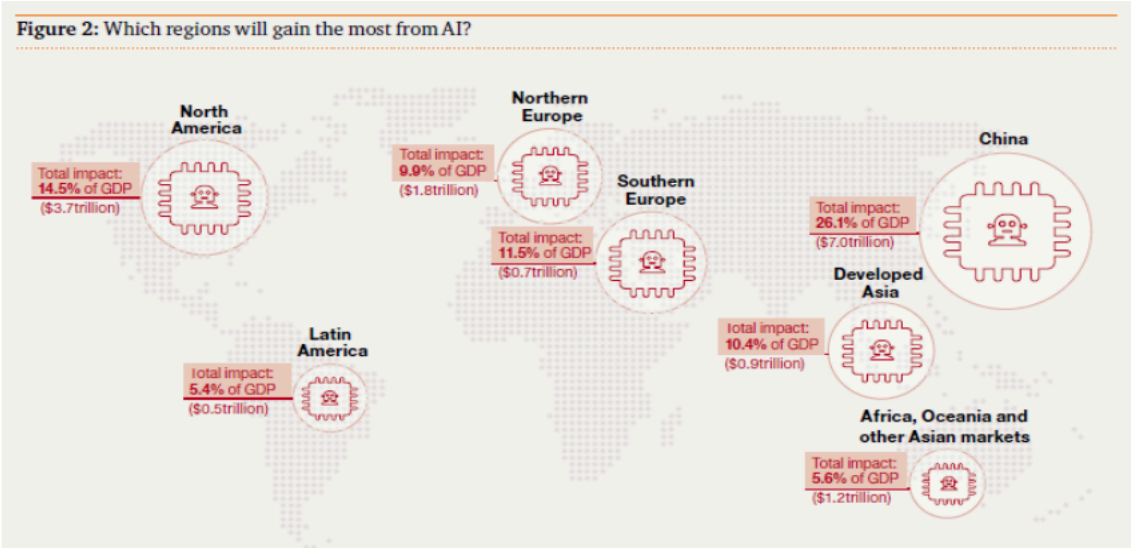
The connected speakers' segment is also very popular with customers and therefore GAFA who are in perpetual search of the most elaborate version of the AI no matter the connected object.

AI, known for its huge potential for growth, is currently the most popular technology from many companies including large companies like IBM, Amazon or Google. Major retailers are investing heavily in the development of AI. According to a study conducted by the PwC audit firm in June 2017, global GDP could increase by $ 15.7 trillion by 2030, only with AI[16].

Figure 1: Where will the value gains come from with AI?



[13] Méheut, C. (2016, August 10). GAFA : la bataille de l'intelligence artificielle fait rage.
[14] Molga, P. (2017, August 30). 2013 : Les GAFA se ruent sur le « machine learning ».
[15] Marquis, L. (2018, March 5). La bataille des assistants virtuels
[16] Gaillard, E & Gallinotti, S. (2017, July 10). Intelligence artificielle : un potentiel de 15 700 milliards de dollars de gains pour l'économie mondiale d'ici 2030.



From there, we can therefore analyse the main theme of this thesis, starting with a history of AI in the banking sector and continuing with forecasts of the evolution of this technology in the following years

Afterwards, we will see the AI approach by companies on the one hand and the contribution of this technology in the costumer's daily habits on the other hand.

Then, we will highlight all the issues related to the emergence and development of this AI in the banking sector.

Finally, we will conclude the subject on a global analysis, detailed and neutral on the true revolution of this famous advanced technology: Is the IA the most innovative tool for the renewal of the banking sector?

Part 1 - The evolution of Artificial Intelligence in the banking sector

As previously noted, AI has emerged since more than 60 years ago and has continued to grow and evolve. For some years now, companies have decided to incorporate this AI into their IT tools.

The banking sector is one of its sectors that has chosen to integrate this new technology allowing them to create the famous breakthrough with the concept "outdated" of traditional banks.

Chapter 1 - Artificial Intelligence's history in the banking sector

After introducing, defining and established the historical context of the AI concept, it would be wise to trace the historical content of this new concept since its appearance and its development in the banking sector.

A - AI: From the beginning […]

The IA in the banking sector appeared in the middle of the 50's as a result of the term's invention and the emergence of multiple studies and projects on this subject.
At this time the revolution of the ML allowed the development of a system able to calculate the risk of a loan through a scoring calculation called FICO.
The introduction, in France, of the credit score has been implemented by specialized credit institutions from the United States.
Unfortunately, this method of credit score has not been successful at that time.
In the 60's, due to new banking regulations in the United States, on one hand, and the appearance of French laws, on the other hand; the credit has been "standardized"[17][18],
and has created a change in the bank-customer relationship. At that time, the AI was constantly evolving, and Expert Systems[19] were in full emergence.

[17] Pell, N. (2015, April 13). A secret history of credit scores: who determined what matters and why.
[18] Lacan, L. (2009). Vivre et faire vivre à crédit : agents économiques ordinaires et institutions financières dans les situations d'endettement.
[19] Rowe, M. (1992, April 23). Solvabilité des entreprises : les banques se dotent de systèmes experts.

In the 70's, 80's and 90's, the credit scoring calculation has returned thanks to the emergence of its ES. Therefore, banks started to use that kind of systems (e.g. FICO credits scoring) in their methods of credit agreement but also in other expertise's fields to calculate a particular risk (e.g. calculation of profitability versus risk ...)
An expert system is directly related to the AI because it is a software developed to conduct financial analysis using a financial analysis knowledge base, enriched with previously performed analyses. The goal of ES is to develop reasoning methods which get closer of those of the human brain.
Nonetheless, there have been some issues concerning the real effectiveness of its scoring calculation systems. These issues have created a different point of view concerning ES among banks and the preservation or not of those tools and will mark for some a step back.
Furthermore, the emergence of ES has led the automation of certain tasks within central banks - still present today - such as economic and financial forecasts, expectations according to market developments or the definition of monetary policies. Some tasks have been made possible since the emergence of Big Data in the late 90s.

The 2010's marks a new revolution of the AI in the BS thanks to the appearance of new tools and systems: the recommendation's systems, the vocal assistants, the conversational agents or chatbots, the translation's system, the visual recognition's system etc… implemented and developed by GAFA's and jostling all sectors.
In addition, the banking sector has major characteristics (historical customers, advanced computerization, consistent data volumes) that make it a favourite playground for deploying AI-based tools[20].

By the way, states and governments have decided to implement AI in their strategies[21] and to study the impact of those new technologies on employments (e.g. Oxford project in 2013)[22].
In 2013, researchers Carl Benedikt Frey and Michael Osborne of Oxford University began a project on the impact of AI on employment titled: "The Future of Employment:
How Are Jobs Susceptible to Computerization? ". Their predictions were that 47% of American jobs were threatened by AI. This study provoked many conversations about the links between technological progress and risks to employment. 4 years after the results were

[20] Blanc, P. (2017). L'intelligence artificielle dans la banque : emploi et compétences.
[21] Verbeke, L. (2018, March 31). Aux origines de l'intelligence artificielle
[22] Morisse, T. (2017, October 30). Métiers menacés par l'IA : 4 ans après l'étude d'Oxford, le verdict.

not reflective of the study's prediction: the destruction of the job does not take place. On the contrary: overall, the number of jobs in these trades increased by 4.4% in 3 years. In 172 different businesses, 57% saw their workforce increase.

B - […] until Nowadays

Nowadays, the evolution of AI is currently used to overcome the limits of the human and anticipate market developments. Nowadays AI is widely used in forecasting systems, data analysis, algorithmic forecasts to facilitate business activity. In the banking field, the use of AI is useful in improving and changing the customer experience. With this technology, banks will have more time to focus on their customers and provide them with more proximity. Major banking companies such as BNP and HSBC are currently considering setting up virtual assistants to better meet the needs of customers, assisting them in their efforts and referring them to products that are better adapted to their needs.

A new form of DL aimed at the exponential growth of the AI is the chatbot and known as the conversational agent. Chatbots[23] are very present on some websites such as Ikea, Fnac, SNCF or Orange (and especially Orange bank). The chatbot takes the form of an animated character who communicates with the user in the dialog box for example. Phenomenon launched in the 1960s, chatbot has been a real success in recent years and has increased the proximity between brands and their customers.
the chatbot allows to interact with the client and subsequently to select the problems that require the direct intervention of an advisor and other problems, questions or claims should be solved by the algorithm.

Another revolution from IBM regarding AI[24]. Indeed, the company has designed an AI system called Watson which is a robot, and which is able to interact with the customer.
There are different big bank collaborations with IBM to install Watson, a robot.
The latter makes it possible to automatically process emails, exchange directly with customers or manage the employees' diaries.
This new computer tool is connected to a new type of marketing called: Conversational Marketing.

[23] Cuny, D. (2017, December 6). Banques : chacun cherche son chatbot.
[24] Perreau. C. (2017, May 15). Avec IBM Watson, la banque veut libérer les conseillers et capturer les clients.

To sum up, AI has existed in the BS for many years, since the creation of this new technology in the 1950s.
Sometimes later, the emergence of ES has contributed to the development of this AI in the sector around the world.
These ES have enabled the integration of tools and systems allowing: to calculate a scoring (credit, valuation of the loss or profits of an investment), to make forecasts or to implement a monetary policy.
Until the 2010's, the IA term was not so well mediatized, it is only since the appearance of the GAFA's as well as the huge evolution that known AI, that the world suddenly realized the impact of its new technologies especially from the companies' point of view.
The evolution of AI continues to grow faster than ever, how far will AI go in the short, middle and long run?

Chapter 2 - AI: Forecasts

Thenceforth, we can ask ourselves what the future transformation within the BS regarding the current evolution of the AI will be.
We will see in this chapter, "the logical evolution" of this technology according to multiple studies carried out by internal but also external actors of the sector.

A - In the short run: 2020's-2025's

The deployment of AI tools will be particularly noticeable in the daily tasks of the employee.

In a bank we find 3 distinct categories: the front office, the back office and the marketing & communication. We will observe which impact the AI will have on each of those categories.
Regarding the front office, the relationship manager will have an aspect even more commercial than its current aspect and even more than in the past.

He will be oriented in the exclusive search of its customers' needs.
Repetitive tasks will be subordinated by the IA, which will have the following tasks: to analyse all the regulatory developments and evolutions, to implement credit applications and to calculate the risk (e.g. FICO and the scoring calculations already used by banks) and to identify potential risks for the bank (e.g. fiscal fraud ...)[25].

On the back-office side, the implementation of the IA will change the contents of their actual tasks and missions.
IA tools are going to manage all the operations on the financial market, by selling or purchase stocks, bonds or securities. The system will also take care of all the "recovery and litigation procedures".
The manager will therefore be responsible for controlling the tasks performed by the machine and for recording any incidents that may occur. In addition, he will be able to inform the clients of the operations carried out by the IA and will have the role of administrative and accounting manager of the activities performed by the AI.

Concerning the marketing & communication's tasks and missions within a bank,
The IA evolution will allow professionals to focus on the communication plan for the bank, to keep informed about "the evolution of techniques and tools of communication" and marketing.
However, the implementation of IA tools will create a need in terms of experienced employees in IT and able to do the maintenance support concerning the networks and systems related to AI.
On this side, the IA will have as tasks the gathering of statistical data, the evaluation of the communications actions carried out by the bank to customers and potential consumers as well as the realization of marketing and communication support.
Theoretically, AI should take the humans' place in certain predefined tasks and during the development and the execution of procedures or rules.
Unfortunately, feedback shows us that the AI is not up to date and is not currently able to be autonomous. Certainly, the machine, thanks to his ML and DL, learns from his mistakes and will have a good knowledge of the tasks to be performed in a short time but there remains the unexpected and incidents that may occur at any time that cannot be planned in the machine.

[25] Blanc, P. (2017). L'intelligence artificielle dans la banque : emploi et compétences

Therefore, we can divide the degree of automation of tasks to observe which are likely to be fully automated by the AI (e.g. « Activities standardized, described, in a predictable environment and regulated, », which ones can be managed with a relationship between the machine and the human (e.g. Activities requiring controls consistency and manipulation of massive data to help to make a decision), and which ones cannot be automated at all by the AI , at least in the short run (e.g. activities requiring a control ability and clear and precise objectives).

Regarding the impact that the AI will have on the work, we could expect a reduction of the workforce[26].
However, the reduction of functions directly related to repetitive tasks and dealing exclusively with operations, would be filled by the increase of a qualified workforce related to the AI and all the complexity that this new technology entails in term of IT.
The sector will know a redeployment of their workforce within the structures and not a decrease as previously mentioned, except in certain cases which will be due to the overall development of their structures and their own strategies (e.g. hybridization of companies) and not because of the implementation and the development of AI in our daily lives.

The most obvious change that the sector will experience in the coming years will be the adaptation skills within the banking professions. Indeed, the emergence and the progression of AI tools will revolutionize the business case-by-case. They will not be as much focused on knowledge and technical skills but rather on transversal skills. This term of TS means that people will have to be able to bring skills that will be appreciated by the bank and not only in link with their positions but also on skills more diversified and varied than those currently required. Banking skills will always (in a short term) be an asset for the employee but some of his skills (related to knowledge of banking programs, regulations and banking processes) will gradually be replaced by intelligent machines that will make processes and the repetitive tasks easier. TS are linked with some skills needed to be more polyvalent: to speak several languages, be adaptable, be independent and autonomous, the relationship with the client… are some of TS asked by banks to their workforce. TS will create a complementarity between the AI and the human and it should improve the vision of humans towards this new technology.

[26] Lorge Parnas, D. (2017). The real risks of Artificial Intelligence.

As the IBM's CEO, Virginia Rometty said: "Some people call this artificial intelligence, but the reality is this technology will enhance us. So instead of artificial intelligence, I think we'll augment our intelligence."

B - In the middle & long run: 2025's-2050's

Over time, the AI will take an increasingly important place in the banking sector, particularly due to all its characteristics favouring the implementation of new technologies automating banking processes.
The progression will be linear with a logical follow-up of past events.
Furthermore, we will hear about cognitive analysis: the AI related to a cognitive approach[27] and the human related to this concept[28].
First of all, what cognitive analytics means? and why is it important and valuable for the AI evolution?

According to a study made by Deloitte in 2016, Cognitive analysis is a new approach to information. In fact, the IA will be able to understand issues in the future, analyse its environment and subsequently make decisions.
The goal of this cognitive analysis to implement in AI tools will allow the machine to operate on the similar basis of a human brain.
Since the creation of the AI, the development of some systems: ML, DL, ES, image recognition etc ... contributed to the appearance of this cognitive analysis of AI and therefore to the development of a tool that can think, act and feel.

The main opportunities for Cognitive in the banking sector can be divided into two main categories:
On the one hand, the "Cognitive engagement" to improve the customer experience and on the other hand the "Cognitive: Sensing & Shaping Strategies" in order to obtain a better knowledge and understanding of the business to build strategies.

[27] Deloitte. (2016). Banking on the future: Vision 2020.
[28] Blanc, P. (2017). L'intelligence artificielle dans la banque : emploi et compétences

Cognitive analytics is also used and will be even more used by companies (HR department) for the humans.
Indeed, the use of certain specific skills to seek employees able to realize transversal and general tasks will not be easy for the Human Resources department.
The approach that would seem the most coherent and in adequacy would be the cognitive analysis' approach. This approach would mark a revolution in hiring practices and allow banks to retain profiles that correlate with their needs.
As a reminder, the cognitive approach is a set of human functions related to knowledge (e.g. perception, language, memory, reasoning, decision, movement ...).

To Sum up, the term "cognitive analysis" will be increasingly present within companies because it will be used in the evolution of the tools IA to increase their faculties of comprehension, apprehension and decision-making but also during employee recruitment processes in order to meet the needs of the company with the qualities and skills of the person.

In the long run, the real issue and problematic that we should to ask ourselves is: will the AI be effectively implement and outperform in the banking landscape or will it become obsolete?

Obviously, we can suppose that AI will positively contribute to the financial performance within the BS and will help to create a customer experience much better than before linked to their needs and expectations.
However, the contrary can happen. Faced to a tightening of bank regulations, a contradiction between AI and government standard concerning several topics such as the private freedom and the use of AI tools ... this technology can be very quickly limited and be unusable for the BS.
In addition, consumer's fears concerning new technologies can be a huge problem and could damage the AI efficiency and, at the long run, lead to his disappearance.

According to a French study made by "l'observatoire des metiers de la banque"[29], we can expect 3 main scenarios:
The first one refers to the regulations.

[29] Blanc, P. (2017). L'intelligence artificielle dans la banque : emploi et compétences

This scenario is based on a sudden rise in regulations related to massive piracy of the intelligent systems of the BS.
In this context, the massive piracy of banking tools will lead to an increase in government regulations, a logical decline in consumer confidence towards those technologies and a slowdown in the AI development.
This prediction would be the worst for AI who will struggle to recover.

The second one is linked with a customer's acceptability related to AI tools.
Indeed,
the linear growth of the AI in the BS as well as a growing media coverage concerning this technology will encourage its acceptance by consumers. In addition, the GDPR (regulation concerning the personal data's protection) will increase consumer's confidence. In the coming years, the AI will be optimized but will not know any real evolution.

The last scenario is focus on a global change of the banking landscape thanks to the AI.
Regulatory constraints have been relaxed as governments have introduced new AI technology guarantees.
The AI has progressed exponentially and is present at all departments and stages within banking processes.

To sum up briefly about the AI forecasts in the coming years, we can deduct that the implantation of these revolutionary systems will allow a roughly transformation in the BS.
The appearance of chatbots and the current introduction of robots such as Watson will improve the proximity between banks and customers.
Subsequently, the massive emergence of these new technologies in the BS will lead to a restructuring of the bank's tasks and activities. The approach of recruitment processes will be different, consistent with the new banking environment but also in line with the implementation of intelligent systems.
In the long term, we can only rely on scenarios and theories that, each of them, will affect the future of AI.

Part 2 - AI: technological tool needed by banking sector players

AI, currently appearing in the banking landscape, banks have no longer choice than to enter this field related to new technologies. However, is AI the key to success concerning the BS transformation that has been established so far by traditional banks?

Chapter 1 - Artificial Intelligence: Key of success

AI is considered as the most successful concept for transforming the BS. Thanks to its efficient and intelligent systems, AI is coveted by all sector's players.

We have previously observed that Banks have used some of its systems to improve their performance and, obviously, lower their costs.

However, we will see in this chapter that the AI has been able to develop itself thanks to other revolutionary computer tools (e.g. the Big Data and the Digitalisation), allowing it to improve its performances and to be even more evolving than ever.

A – Automation of banking processes

The data mining[30]: one of the most important things for banks.
Since then, AI is involved in the process of understanding and analysing data.
This new intelligence is a valuable asset for the BS because it allows to build a "360 ° vision" of their customers.
The AI can currently, through its ability to analyse and transcribe data in a short time[31], evaluate the reputation of a financial institution by searching each data on the internet. It is also designed to respond more quickly to customer queries (e.g. Chatbot[32]).

[30] Biancardi, A. (2017, July 20). Comment l'intelligence artificielle investit le secteur bancaire
[31] Duproz, H. (2017, November 7). Intelligence artificielle : quelles applications pour la banque ?
[32] Cuny, D. (2017, December 6). Banques : chacun cherche son chatbot.

The system can also conduct a market study by analysing the products and services offered by competitors but also their advertising's channels used, or the type of relationship set up by other financial institutions and thus adapt the right strategy[33].
Another asset very appreciated by banks: AI may also be able to reduce operational risks in the context of financial operations and especially in the case of fraud (e.g. money laundering).

Thanks to its increased analysis capacity, AI is able to automate various process in the BS.
Indeed, some tasks must be automated such as some claims or requests: theft/loss of credit cards… in order to reduce administrative costs, reduce file processing by half, improve productivity and to be focus on the main task for banks: to satisfy the costumer.

As a reminder, AI can analyse information, files or data, then perform the tasks of understanding and subsequently diagnose the percentage of risk or given specific information.
It means that the AI performs administrative tasks and requires personal work, in a short time, and allows the human to focus on decision-making tasks and having a direct impact on consumer satisfaction. The aim is to optimize banking processes, improve the time / productivity ratio, focus on customer's expectation and reduce the human error.

Briefly, the automation has shifted from a basic rule based on understanding the environment to an automation of an AI with a much more advanced cognitive analysis[34].
The Robotics Process Automation (RPA) is an advanced tool being part of the automation process.

According to the Deloitte study, there are four stage which compose the evolution of the automation spectrum:
Firstly, the RPA stage which is roughly considered as the first step of automation nowadays.
This automation form is used to "mimics human actions".
Concretely, this form is actually used by banks in their banking process. It allows to reduce costs and time to companies (as previously mentioned).

[33] Struhl, S. (2017). Artificial Intelligence marketing and predicting consumer choice: An overview of tools and techniques (Ed.1).
[34] Deloitte. (2016). Banking on the future: Vision 2020.

Secondly, the Intelligent Automation stage. This step reproduces to AI the “mimics human judgement”. At this stage, the AI is able to give judgments to the processes analysed by itself. The term ML is used in this intelligence form.

Thirdly, the cognitive intelligence stage.
In this form, the AI is able to take some "predictable" decisions (e.g. granting loans to solvent customers without any problem, with bank guarantees and adequate capital).
In addition, the AI becomes adaptable and manager to the tasks, in the whole process, that be entrusted to itself.
This form is called "Augments human intelligence".

Lastly, the most achieved stage of AI is called “mimics human intelligence”.
This AI is able to act as the human brain. It can think and can make decisions.
Nowadays, this kind of smart machine is not yet developed, and it will take time to develop something really advanced and intelligent able to replicate the human brain.

Actually, the global market is looking for the first stage of automation: the RPA, in line with the current trend: emergence of AI, product’s acceptability and product’s confidence from the consumer’s point of view and productivity gains, lower costs, lower human errors from the companies’ point of view.
However, the potential value creation associated with artificial intelligence, at the most advanced stage for companies, will be much greater than that induced by the current automation and therefore the RPA.

B - Artificial Intelligence & Big Data

AI has been introduced in the 1950s but has only really emerged exponentially in recent years.
This emergence is due to the evolution of certain tools, other than AI tools, in the IT and technology sector that has allowed and still currently allows the AI to perform and to growth.
One of the most important tools in the AI evolution is the Big Data[35].

[35] Bastien,L. (2018, march 21). Intelligence Artificielle et Big Data : une convergence révolutionnaire

Why and how are big data and AI complementary?

As previously mentioned, companies in all sectors are currently changing with the arrival of AI.

The goal would be to automate repetitive and administrative tasks and thus store as much data as possible on computers or servers.

Unfortunately, we still find far too much data in paper form because the storage spaces are not large enough to accommodate all the data.

This problem can be partly solved thanks to this tool, complementary to the AI, called Big Data.

This tool, appeared in the late 90's and developed in the 2000s, is used to store massive data in "big data" as the name suggests.

More precisely, it is the overabundance of data related to the acceleration of their production.

To get an idea: it is estimated that 90% of the data since the beginning of humanity have been harvested in the last two years.

The 3 characteristics of Big data are: the velocity (the speed of information exchange), the volume (of data collected) and the variety.

Big data must and should be used in convergence with the AI in order to connect its two tools together to simplify data sharing.

Automated banking systems will become even more efficient with this connection between intelligent tools and big data tools to collect, catch and transfer massive data then extract its data, analyse and make decisions more quickly with the Artificial intelligence.

In addition, the advantage of big data is the data processing in real time. This characteristic is very advantageous for marketing teams who wish to follow, in real time, a trend evolution or to carry out retargeting by tracing the consumer habits closer to real time.

Collecting as much data in an instantaneous time also allow to make some forecasts more and more predictive with data closer to reality.

All of this allow the AI - which is endowed with an intelligence through ML and ES - to take its information, to analyse and schematize, to make decisions or to predict the future using forecasts.

Several companies have currently integrated big data into their strategies: Amazon and its predictive logistics[36] method that predicts where and when its customers will order; PayPal that detects credit card frauds[37] through a calculation of "scoring suspicion"; or Accor Hotel, which uses big data as a customer loyalty strategy[38].

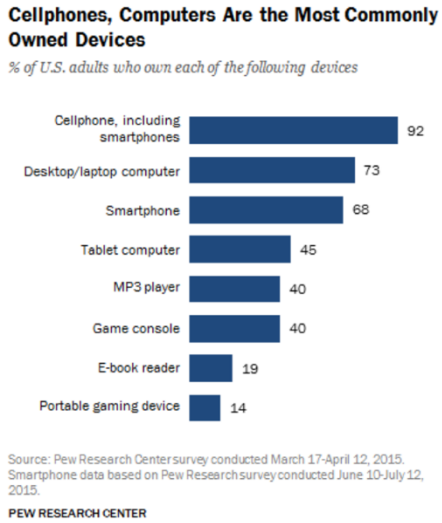
Big data and AI: the perfect combination to create a system capable of automating delegative tasks, the current willingness of companies.

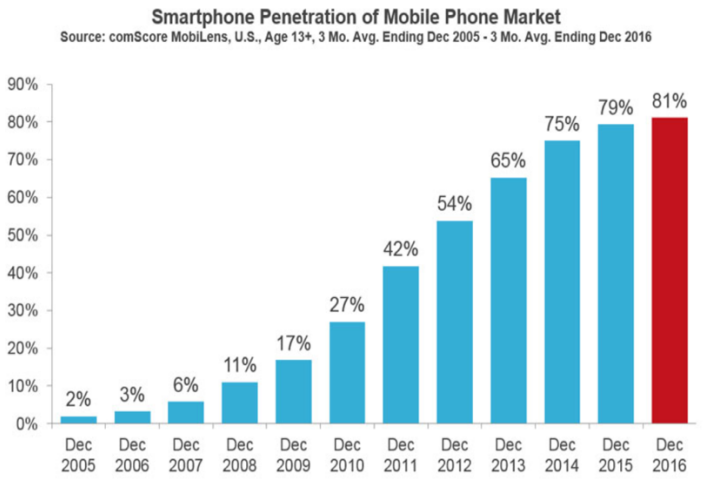
C - Artificial Intelligence & Digitalisation

In 2017, approximately 81% of Americans and 73% of French[39] population owned a smartphone.

Respectively 73% and 81% owned a desktop/laptop computer and almost half of American and French population owned a Tablet.

These percentages show us the degree of digitization present in the American and French populations without mention the other developed countries (Europe, North America, East Asia ...).





[36] Legalès,Y. (2014, August 30). Le Big Data révolutionne le commerce.
[37] Christensen,A. (2016, January 5). Doing Big Things with Big Data at PayPal
[38] Dupin,L. (2013, September 24). Accor chouchoute ses clients grâce à son « big data ».
[39] Arcep. (2017) équipements et usages du numérique, Baromètre du numérique : publication de l'édition 2017

Even more surprising, according to a French study[40], 23% of people who have been interviewed by a survey, declare they consult their bank accounts on waking, ahead of weather apps (21%) and social networks (20%).

Digitization allowed users to consult their accounts through their banking applications and thus to obtain a certain bank-client proximity. 88% of those interviewed affirm tracking their daily accounts statements.

The consumer has become "multi-channel". He uses his computer but also his tablet and especially his smartphone. Banks have had to adapt to this new consumer habit. Today, they offer numerous mobile and dedicated digital applications. Digital has also changed consumer expectations. Nowadays, the customer is looking for an almost permanent interactivity with his bank. An advisor must be able to answer him every day of the week and at any time.

Some tools have been implemented to meet this need (e.g. remote service, chats, FAQ)

The digital transformation of financial institutions has already begun in recent years and is currently part of the banking landscape.

Therefore, to obtain the leadership in the new technologies' field, able to revolutionize the BS, banks are ready to differentiate themselves from other competitors and to evolve even faster than the market.

Thenceforth, financial institutions have implemented AI to their digital evolution in order to automate the BS and meet customer expectations.

A concrete example of a new system created in a digital tool set up by an AI: MIA[41].

MIA is a new tool introduced by a Luxemburgish Bank, the BCEE. This tool has been set up in the mobile application and on the website, in the client access.

It assists consumers in managing their daily accounts and anticipates the future budget based on their past expenses / earnings; it analyses and classifies revenue and expenses intelligently and it also can be used as a virtual advisor in achieving a particular personal goal (e.g. saving 1000€ in 3 months).

[40] Ladepeche. (2015, May 27). Les applications bancaires dans le top 3 des plus consultées au réveil.
[41] BCEE.lu

Artificial intelligence can also be seen as an accelerator of digital transformation that allows better data exploitation proactively in the BS. It optimizes the customer relationship by providing new services.

To conclude with this chapter, we can say that AI will bring a real evolution in the BS mainly through a standardized form of automation (RPA), which has the ability to analyse and understand the risk and tasks to carry out.

AI, thanks to tools such as Big Data or banking digitization - already operated in recent years - will have a much higher evolution margin because there is a complementarity between all its technological tools. The AI revolution is just beginning…

Chapter 2 - Field study: Acceptability's degree and AI contribution within banks

In this part, we will observe and interpret in the field, various information from different employees of ING Luxembourg's bank.

In this study, three employees were interviewed: one private banker, one relationship manager and one assistant branch manager specialised in loans and companies lending. The aim of this field study was to observe the divergences between individuals concerning the evolution of the BS and especially the appearance of AI.

A – Methodology

For those interviews, an interview guide specific linked to the thesis subject has been developed.

We decided to interview persons exclusively from ING Luxembourg's bank, but in different positions, although they are all working in a retail banking.

Only their expertise on a specific field changes (e.g. investment, credit, generalist).

The banking process, tools deployed by each of them are the same. Each department works transversally between them (e.g. a client wishing to borrow and at the same time, invest in an investment fund).

The interview process was conducted in the same way for each participant. The interviews were done face to face in a private office of the branch. As part of this qualitative study, a guideline with open questions was conducted, allowing the different professionals to express themselves on each particular question. This interview allowed to obtain detailed and precise answers on the subject. The transcripts were made using a mobile phone, to record the interview.

Two major drawbacks of this qualitative study were:

The number of professional participants in this study. Indeed, it would probably have taken more people to get a predominance of a particular thought on the subject.

The diversity within banks: only employees of ING Luxembourg were interviewed, lack of time to interview any other professionals in France, despite having tried.

Table showing the employees interviewed:

Name	profession	Company
Duhr Gilles	Assistant branch manager	ING Luxembourg
Pant Raju	Relationship manager	ING Luxembourg
Habay Sebastien	Personal banker	ING Luxembourg

Questions for qualitative studies were based on four hypotheses. Indeed, thanks to the observed theories, which are related to the initial problematic “Artificial intelligence, a stepping stone in the evolution of the banking sector?”, and which allowed us to study and analyse these qualitative and quantitative (present in the next part) study field. At the end, these hypotheses will be interpreted and confirmed or refuted.

Hypothesis n°1: The artificial intelligence will enable banks to identify the preferences of their customers through their knowledge (customer database) and emotional intelligence. It will strengthen the Bank-Client relationship and enhance the "customer experience" by offering products / solutions in a proactive manner.

Hypothesis n°2: The emergence of Artificial Intelligence in the banking sector will replace the repetitive tasks of employees to take advantage of more commercial and advices tasks in order to generate an "added value" and it will allow banks to optimize their human resources.

Hypothesis n°3: The implementation of artificial intelligence in the banking sector will generate a higher risk of cyber-attacks. Sector players will have to set up tools in order to increase their cyber security.

Hypothesis n°4: The emergence of artificial intelligence in a sector in restructuration has led to the apparition of new forms of competition (fintech's, telephone operators, technological companies ...) ready to do anything to obtain a larger market share against the giants of the banking sector.

This qualitative study provides an overview of the retail banking sector, understands the point of view of each professional questioned, analyses ideas around the four hypotheses, retrieves relevant answers and interprets the results given.
This study did not focus on knowledge of financial institutions' strategies but rather on the impact of new technologies and their acceptability of the first concerned part: employees.

Thenceforth, we will analyse the data collected by his three ING Luxembourg professionals and correlate its answers to the four hypotheses previously mentioned:
As a reminder, this interview is focused on the emergence of AI in banking processes and therefore from the point of view of the bank and not customers.
Regarding the consumer point of view, a quantitative study will be carried out and analysed in the next part entitled: AI-Changing customer habits.

B - Analysis

Before analysing the 3 ING Luxembourg professionals' answers and the link with the 4 initial hypotheses formulated, we will summarize in some words what the AI means according to them.
According to Sebastien Habay, AI is a machine composed of algorithms and systems and which makes decisions by himself without any human intervention.
For Gilles Duhr, based on logarithms – which composed AI - we try to find answers. On something existing we make an estimate of the future. through forecasts, pro-actively, we will be able to propose a range of product to a customer by scientific calculations based on lived experience.
From Raju Pant's point of view, AI is a program, which once created, learns from itself.
We find that their definitions are different from each other, but the initial idea of an autonomous high-performance machine able, in the long term, to replace the man is omnipresent and understood by the 3 professionals.

Therefore, we can analyse the thoughts and reflections of each - based on the hypotheses initially formulated - on the emergence of AI in the internal environment of the bank and from the employees' point of view and not from the consumer's point of view.

Hypothesis n°1: *The artificial intelligence will enable banks to identify the preferences of their customers through their knowledge (customer database) and emotional intelligence. It will strengthen the Bank-Client relationship and enhance the "customer experience" by offering products / solutions in a proactive manner.*

In the short term, everyone seems to agree that the AI will improve the customer experience and the relationship between the customer and his bank.
However, at the long term, this hypothesis creates discrepancies between the interviewees:

On the one hand, those who consider that it will improve - in a way - the customer experience. According to Mr Pant, depending on how the AI filters things. He will analyse and respond automatically to customer requests especially by mail.

For their side, customers will have the opportunity to be in constant contact with their banks through their mobile applications and the AI will be able to respond to them on different digital channels.
For Mr Duhr, AI will improve the customer experience but not for everyone.
According to him, some customers are looking for a banking partner permanently. Which is not the case with AI. However, AI can help in the completeness of the relationship.
If we focus only on AI, it can be dangerous.
There is also customers and employees' education to do and which will be very important in the AI evolution in the banking sector, because we have to learn – gradually - the technological change brought by AI that is not easy for everyone.

On the other hand, those who consider that it will decrease the customer experience.
Mr Habay says that there will be a breakthrough with the emergence and the current trend of new technologies and obviously the AI which keeps banks away from customer, in physical term.
Customers will want the comeback of the traditional bank and local advisers.

Hypothesis n°2: *The emergence of Artificial Intelligence in the banking sector will replace the repetitive tasks of employees to take advantage of more commercial and advices tasks in order to generate an "added value" and it will allow banks to optimize their human resources.*

AI can be an interesting tool in the development of certain tasks, but it is not a tool that would replace repetitive tasks and let employees perform value-added tasks because the added value - in the banks – are consumers. Without consumers there would be no value. Moreover, in the repetitive tasks, there are mostly administrative tasks related to the new regulations implemented in order to protect personal data against the emergence of this famous AI, deduces Mr. HABAY.
For Mr Pant, this hypothesis is the direction in which we are going. In the future, the relationship managers will have to work with an AI capable of analysing and performing all the administrative tasks in order to give to the employee the decision-making power and the relationship aspect with costumers.
It depends on the tasks, there are some where it is better to have a double vision with a "double check" and therefore have some flexibility but certainly that it can help.

For business processes, even if it's value-added, if there are automatic campaigns, it's always advantageous and it saves us time, replied Mr. Duhr

Hypothesis n°3: *The implementation of artificial intelligence in the banking sector will generate a higher risk of cyber-attacks. Sector players will have to set up tools in order to increase their cyber security.*

For everyone, the technological progress and the increase in personal data generated by the emergence of AI will generate a growth in term of cyber-attacks.
According to Mr Duhr, there will always be hacking attempts, especially with the exponential increase of confidential data.
Hackers, thanks to new techniques and methods, will try to circumvent the system in an unknown manner concluded Mr Habay
Mr Pant, Relationship manager think that all depends on the security implemented by banks. Obviously, there will be cyber-attacks' risk because of the important and confidential data saved within banks 'servers. It will always be up to date in terms of security or even ahead of the hackings' methods.

Hypothesis n°4: *The emergence of artificial intelligence in a sector in restructuration has led to the apparition of new forms of competition (fintech's, telephone operators, technological companies ...) ready to do anything to obtain a larger market share against the giants of the banking sector.*

Regarding Mr Pant's point of view, there will surely be a burst of the financial market with the appearance of new technological companies. We often talk about Fintechs. There also will be a change of consumers' habits and we will have to make sure not to be trapped by the appearance of new competitors who will surely be better off - in term of technological tools - than us in this new market. In addition, a very important issue Before implementing all this AI will be all the European or national regulations that will have to correlate with the AI.

The potential emergence of new competition in the banking sector can comes from Technological companies like Google or Amazon which can be potential direct competitor for traditional bank because of their important data base, their technological tools and their colossal financial resources.

We have face to other issues in this banking sector: All the development of new technologies cost a lot. Furthermore, regulation is also ubiquitous: if we trust more and more the AI must know the regulated then there is also the fact of complying with existing legislation. Then we have to find a legal framework: how far can we go with AI? Asked Mr Duhr.

According to Mr Habay' point of view, there will be the emergence of companies able to catch huge market shares from the current banks. Especially technology companies, which have the advantage of being ahead in terms of technology. As the current trend is technological change, traditional banks are already late concerning this technological area. Nevertheless, the customer experience passes and will always goes through a bank advisor in the banks-consumer exchanges.

To conclude with this qualitative study field, we decided to asked professionals concerning their opinions on AI, is the AI the best solution to change the banking market and is this the key to success? Obviously, answers were not the same and the opinions differ from each other.

For some, the emergence of AI with technological news would be the best solution and a key of success for the BS, depending on national markets. However, banks must also offer an alternative. You cannot just delete the branches and leave consumers without "physical contact".

For others, this is not the best way in the long run. It is even necessary to return to the old banking method, the one that worked and that was based on the respect of the advisor profession, the proximity banks presence and the trust between banks and its customers.

Others, think that it is a solution because there are no real other solutions or, at least, for the moment. and would surely be the key of success if it provides all the AI expected qualities.

Part 3 - AI: changing customer habits

As previously mentioned, AI is a great asset for companies that want to automate their repetitive and costly tasks in order to focus exclusively on value-added tasks. What about consumers' point of view regarding their acceptability of new technological tools? and, more precisely, is the IA the right tool for consumers' willingness to change the banking sector?

Chapter 1 - The customer-bank relationship

Currently, the banking sector is changing. The emergence of new tools and systems that are increasingly autonomous and able to replace certain human tasks, enhances this transformation.

A fierce competition has emerged to know whoever will implement AI perfectly and thus differentiate itself or themselves from the rest of the BS.

But what about the consumer? real added value of financial institutions, is the IA also for him, the long-awaited renewal, allowing him to regain confidence and proximity with his bank?
Or, on the contrary, is it a widening gap between himself and his bank through a digitization more and more present and with smaller staff?

A - Identifying customer preferences

The emergence of this AI generates and will generate a considerable asset for the BS.
In theory, for the consumer, this intelligence should also become indispensable and be advantageous.
Indeed, the AI is able to solve problems, to speak in human language and provide some information, will improve the costumer-bank relationship.

This relationship will be improved through the facility provided by the bank to the customer to establish a contact with his bank via several media channels: through his mobile application, on his client access on the bank web page or by moving to the bank branch.

In addition, customers will also be supported faster by the intelligent tool, especially when sending mails. Indeed, the AI will be able to handle a massive mailing of customers and respond to them proactively and intelligently, quickly. If the AI is not able to answer to a specific question that requires the help of a specialist advisor, then the machine will forward that email to the appropriate available advisor.

Another example, the evolution of its new technologies allowed the growth of AI and especially the emergence of virtual assistants.
More and more financial institutions are using this type of very advanced system.
In France, this system is used in particular by Crédit Mutuel[42], which is an operational system, and which is able to answer to several general and daily questions (e.g. savings, insurance, etc.). It is also able to help advisors to find the most appropriate product for the customer thanks to its ability to analyse the personal data of each client of the bank.

this system brings a lot to the customers[43] because it looks for the solution most adapted to the personal desires of the consumer and transmits to him the appropriate product or service under different digital channels (e.g. by mails, on his mobile application in the form of personalized banners ...)

The recent appearance of chatbot also help to bring customers closer to their banks.

These connected chats available in some of financial institutions' websites and which allows to interact with the machine nicknamed "chatbot". This system brings a lot to consumers, there is no need to move to a bank branch or to call the banks' call centres in order to obtain some information, request or merely the procedure to follow for any encountered problem.

Everything can be done remotely, from the living room, at work or during the daily commute.

On the other hand, some people do not want to digitize. They are not familiar with new technologies and have no confidence in terms of security and fraud risks.

For these consumers, banks cannot be transformed into 100% digital banks (e.g. ING Direct) and must not, in any case, close and reduce their bank branches in order to keep the proximity with this kind of consumers.

[42] Cassel, B. (2018, March 29). Intelligence artificielle : bientôt, votre banquier sera un robot.
[43] De lacoste, A. (2018). What if artificial intelligence could make us more human?

The goal of the BS is to make a slower transition, in line with consumer regulations and consumers' habits.

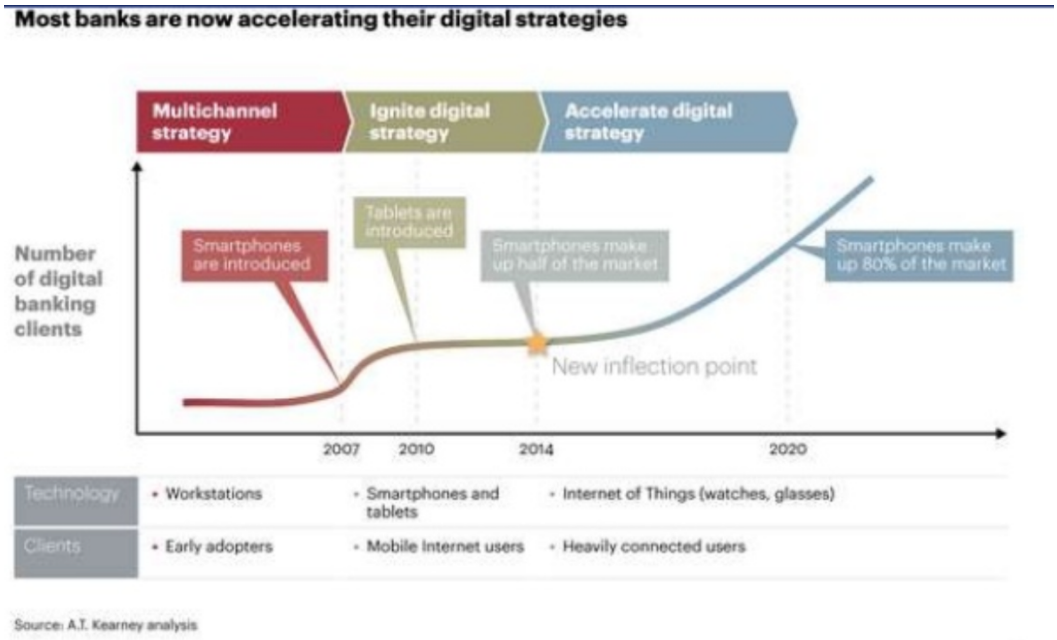
The main objective for financial institutions is to educate their clients to any change and this goes through different steps: the understanding and listening step made by the relationship manager or by the banking officer and the explanation step by learning the new banking methods and processes to consumers.

B - The customer experience's transformation

All of the AI-related systems that emerged in the BS have helped improve the bank/customer relationship - except in some cases - and have changed the customer experience[44].

It should not be forgotten that the current evolution of financial institutions is not only due to a transformation of IT tools and the emergence of systems and methods able of - on a large scale - storing and using massive data and then analyse through autonomous systems to obtain a synthesis or a calculation of the risk incurred.

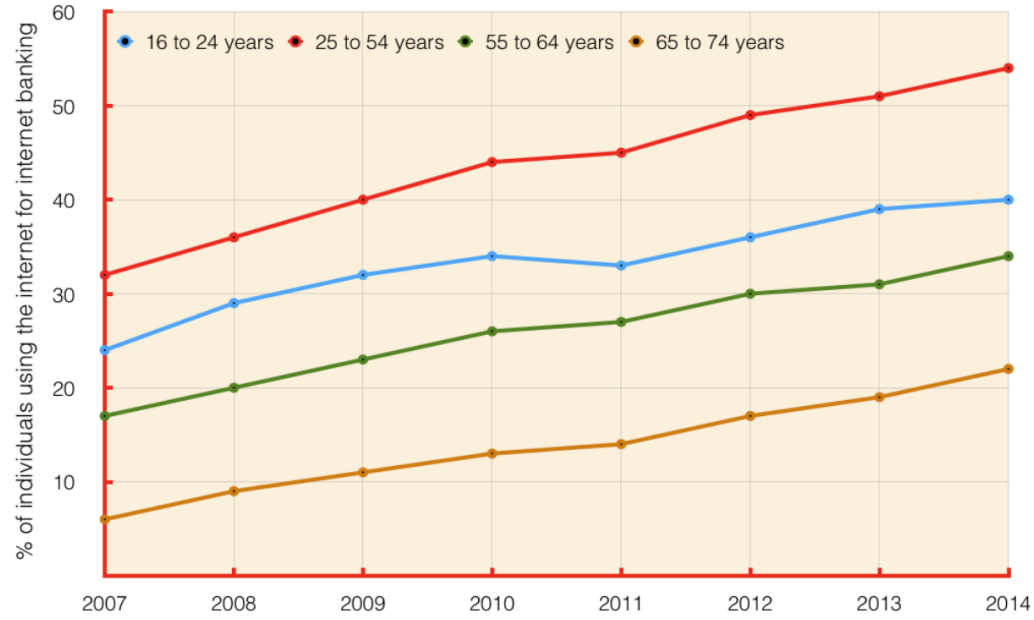
We have note that technological evolution is also carried out in individuals through the appearance of smartphones, tablets and of course the computer in new forms as laptops.



[44] Biancardi, A. (2017, July 20). Comment l'intelligence artificielle investit le secteur bancaire.

This form of evolution may have generated the current emergence of AI that later transformed the customer experience.
By the way, the first people who have been targeted and who have been initially interested in integrating digitization by financial institutions are young adults but also people between 25 and 54 years old, who were even more numerous in the internet use to consult their bank accounts online.

Trend requires, banks are digitizing even more with time and consumers have to adapt themselves with this evolution and have to evolve with their environments. Obviously, the number of users viewing their mobile app increased dramatically.



European Union countries. Source: Eurostat.

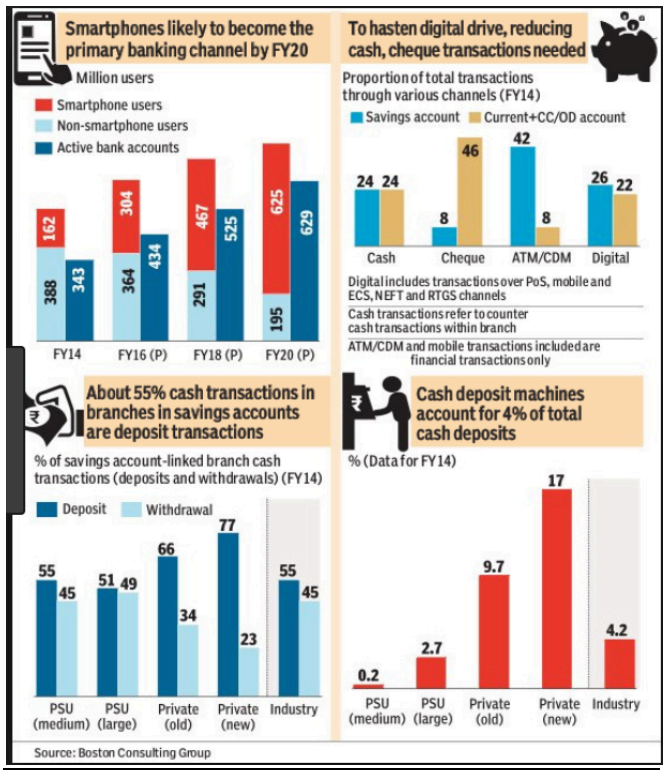
As previously mentioned, trends have changed. The consumer is gradually getting used to the growth of this new technology. The transition to AI will work to the same way. The goal is to change the customer habits at the same time as the BS and leaving no one behind the trend. Automation is the predominant current stage in the industry.

Nevertheless, automation already exists in the BS. ATMs are intelligent, human-made machines that collect - through their program and data - cash from consumers, count it, store it and credit it to the customer's account. Same process during a withdraw.

The machine has similar characteristics to stage one of AI: the RPA system (according to the deloitte study).

ATMS also played a role in improving the customer experience a few years ago. If a person wanted to withdraw cash at any time of day and 7 days a week, ATMs were there to provide a banking presence to customers and thus facilitate and improve the customer experience.

The transfer made by internet is currently the new stage that will allow banks to lighten certain daily banking tasks. On the consumer's side this method allows him to have a permanent accessibility for the purpose of making a transfer - free - and much faster than before.
We can also mention the high security of transfers in this form. Indeed, during an internet transfer, the bank performs a verification of the consumers, thanks to a secret code request given by bank through SMS or any other digital channels. This method has increases the security of transfers, unlike paper transfers that could be stolen, copied or lost.



As a brief conclusion, we can say that the digitalization contribution in the trend evolution related to new technologies as well as the current emergence of AI, has simplify the daily lives of consumers of the BS.
This sector is undergoing a profound transformation with the appearance of tools capable of automating banking processes.
The acquisition of new technologies by individuals has fostered this technological transformation.

The bank-customer relationship has changed: some would say for the better and others would say for the worst.
The current banking structure has improved and fostered a permanent contact between customers and their banks - through mobile applications, chatbots - but has reduced the human link.

Chapter 2 - Field study: AI's trust and acceptance on the consumer

To understand and to analyse the AI's trust and acceptance on the consumer, we decided to make a quantitative field study.

A – Methodology

To carry out this quantitative study, an online survey has been designed and sent by different kind of digital channels, mainly by Mail and by Facebook. The questions have been set up to be able to obtain a maximum of answers from the respondents by establishing simple questions, easy to understand but also in connection with the thesis.
This questionnaire has been divided into 3 parts:
Part of general questions, one part related to trust in new technologies and the last part related to the protection of private data.

These different steps allowed respondents to know in advance in which subject the question have been focused on. The objective was to avoid confusion for the respondent.

103 respondents have answered to the survey.

This quantitative study is not directly related to the qualitative study previously studied and analysed.

Indeed, we decided to carry out a big analysis on the field for each stakeholder of the BS and, subsequently to all the main recipients / actors and particularly concerning the emergence of AI tools: banks through employees of a side and consumers of the other side.

The main objective was to know, the global evolution of consumer habits through their responses, and thus, get an overall trend.

Other interesting information has emerged in order to be more precise in our analysis about the likely relationship between the AI and humans. We received some feedbacks concerning the potential confidence which individuals have towards AI but also the human perception concerning the use of personal data implied by the emergence of its intelligent tools.

Furthermore, the survey guide was based on the initially and previously mentioned hypotheses.

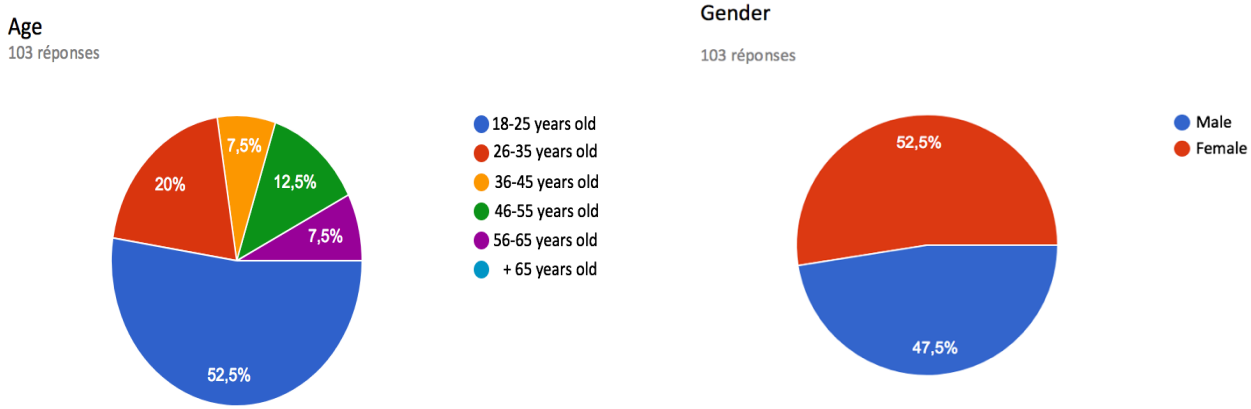
This survey was designed for consumers in financial institutions that cover - logically - all individuals.

It was not focused on bank employees at all. Hence the creation of a specific field study through an interview to obtain more detailed and concrete information on various topics (e.g. the improvement of the customer experience, regulations and their impacts, the breakthrough of the banking sector, opportunities and threats that the AI brings ...)

This survey helps to understand the current trend of individuals according to various data: the age, the gender, the educational background, the profession and subsequently to deduce a potential correlation between those variables. It was also used to observe the potential impact that AI could have in daily life.

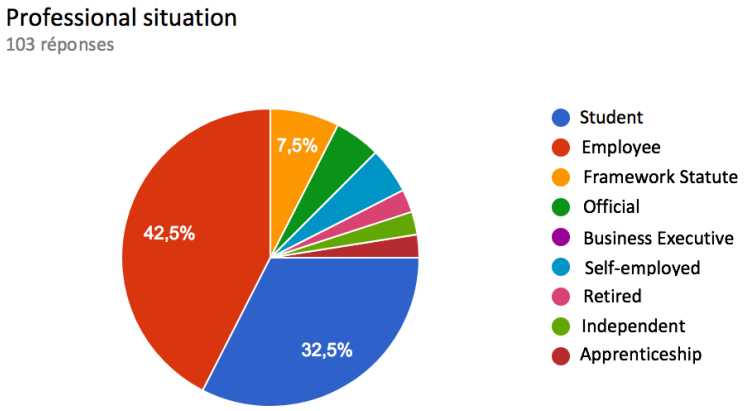
B - Analysis

Thenceforth, we can analyse the results of the survey to get more information on consumer trends and habits.



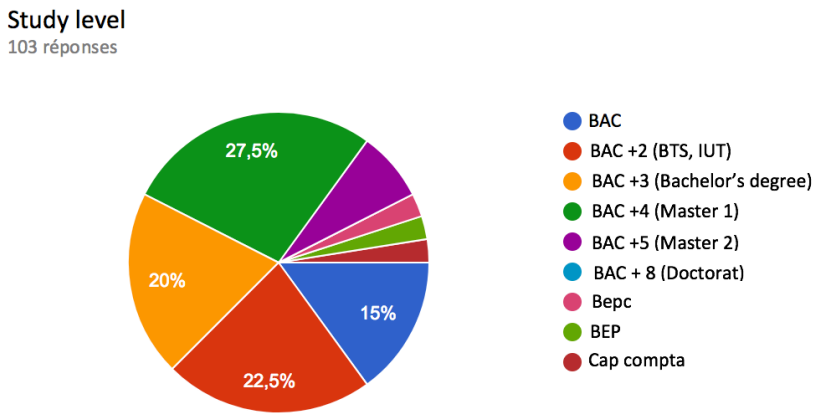
First of all, we can observe that our sample is mainly composed of young adults: about 75% of respondents are under 35 years old.

Concerning gender, there is very representative of our actual society, namely 52% of female and 48% of male.



As your sample is mainly young, the students represent a third of respondents, against more than 40% of employees (also due to the high proportion of 26-35-year-old).

Another general analysis, about 75% of the respondents have studied, generally between 2 and 4 years of study after the high school diploma.

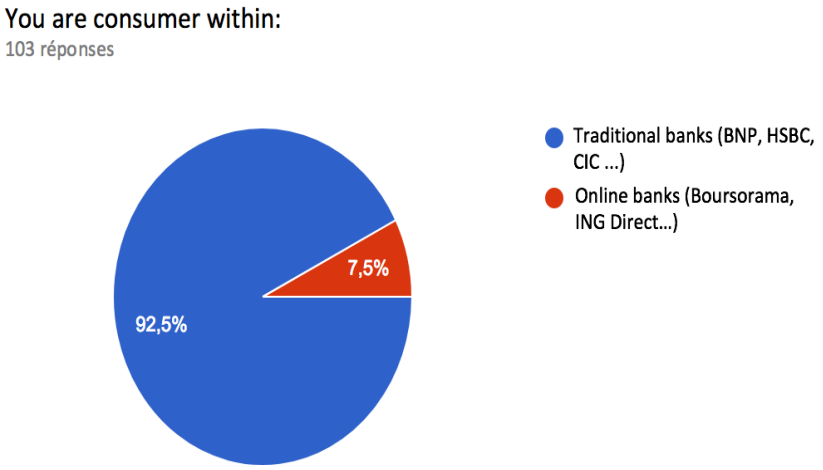


We can now perform a deeper and more detailed analysis of our sample in relation to the responses obtained.

As previously mentioned, when we designed the survey, we have separated the questions between them, with parts. We will therefore perform the same composition to improve our analysis.

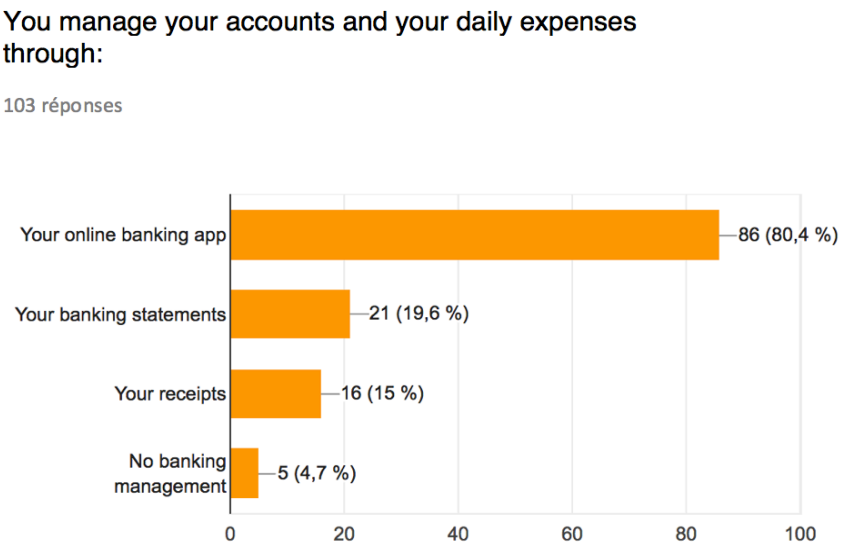
Part 1: Basic questions

In this part, we wanted to know the consumer habits concerning the basics. The other analysis concerned the actual trend based on online banking and digitalization.



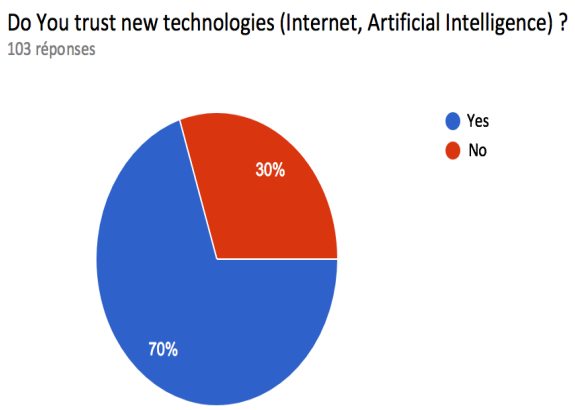
Despite the appearance - in recent years – of online banks, which have seduced some consumers with their reduced prices and their "virtual proximities", only 7.5% of respondents are currently using those kinds of banks. A large majority stay in their "traditional" banks: 92.5%.

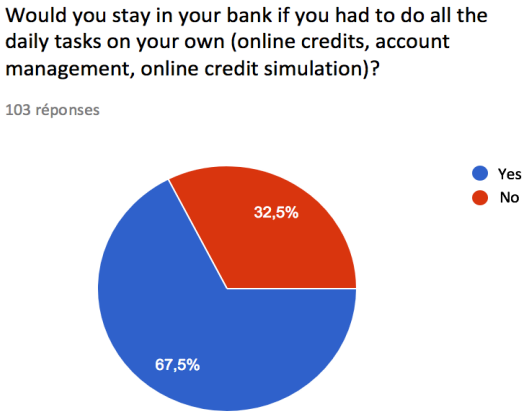
We can therefore deduce that individuals are not yet ready for the disappearance of their advisors and the digital and technological barrier between online banks and consumers. However, more than 80% of the sample, use the online banking app of their banks to handle all the tasks related to the proper management of their bank accounts.



Part 2: confidence Degree in the new technologies

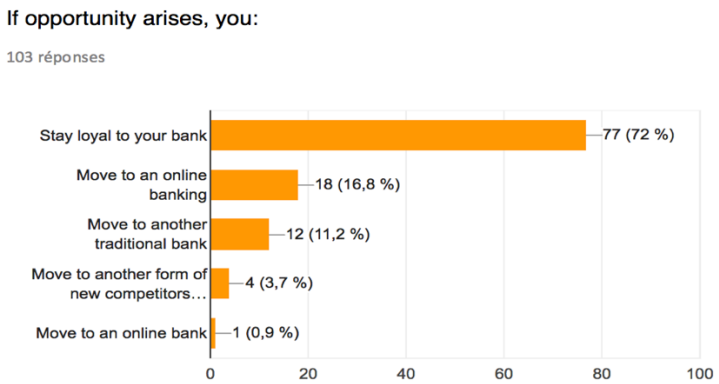
In this part, we are going to know and to understand the confidence that humans have towards the AI.

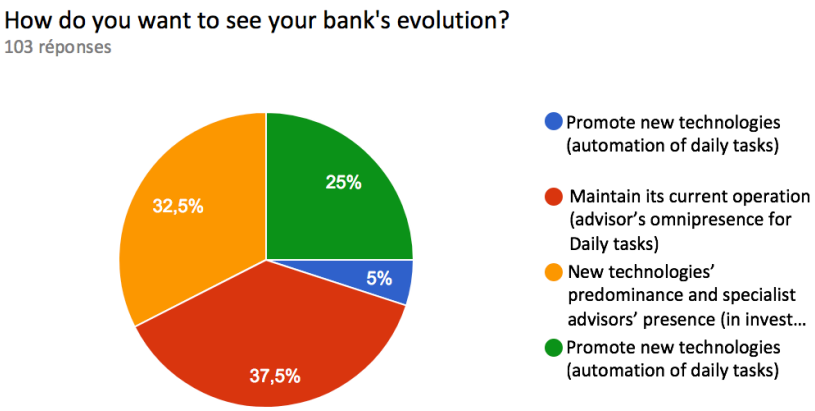




As we can observe in its two diagrams above, people are more and more willing to manage, by themselves all the tasks related to the management of their bank accounts (70%).
Alternatively, these same individuals are equally confident in the development and the emergence of new technologies.

Another variable to take into consideration, people are confident about new technologies but mainly when their banks innovate and improve this virtual customer experience. Indeed, we observe that 72% of respondents remain and will remain loyal to their banks. However, almost 40% of the sample prefers that their banks maintain their current operations, against 32% who would like to see a new technologies' predominance but with the presence of specialist advisors (e.g. investment and real estate advisors).



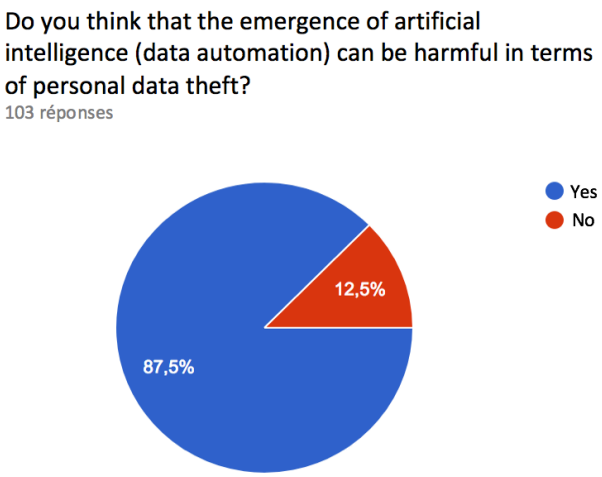


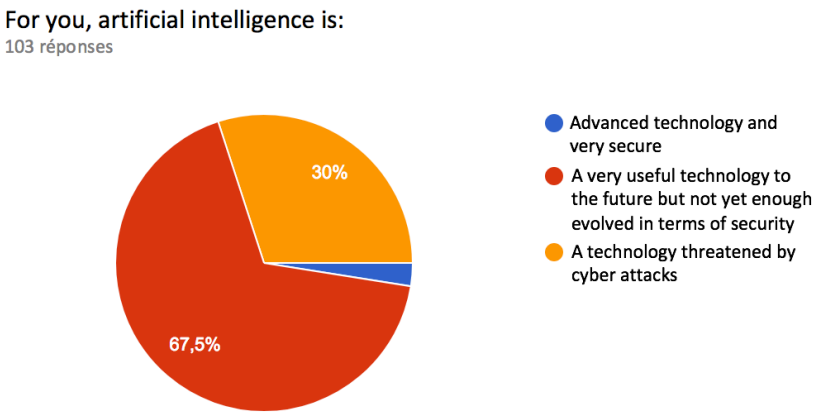
Part 3: private data's protection

In this last part, we will try to understand the consumers' trend concerning their confidence towards AI and private data's protection.

Previously, the sample was - mostly - for an evolution of new technologies. Nevertheless, as soon as we talk about security, humans have no confidence anymore about AI. Indeed, 87.5% of respondents believe that the emergence of AI can increase hacking and theft of personal data.
Moreover, almost 70% of the respondents think that AI will be very useful for the future but not evolved – for the moment – in terms of security.

Even worse, 30% of the sample think that AI is tool which is hacked very easily and not at all developed. Only 3% think that AI is a high-performance technology.





To finish with this study, we were able to note that the answers could be influenced by the different parties present in the survey and which grouped specific questions.

Indeed, during the part titled "confidence degree in the new technologies" the sample showed its willingness to trust the development of new computer tools including the appearance of AI.

Despite these good results, trust was totally lost when security issues emerged.

Only 3% of respondents believe that AI is a tool - currently - reliable. Only 12.5% think that AI is not so easily attackable by cyber-attacks. Figures still representative of the current society who fear that their personal data could be stolen.

Part 4 - Issues related to the emergence of AI in the banking sector

The AI introduction into the BS creates a multitude of issues that slow down the evolution of its new tools.
The protection of personal data, the risk of fraud and hacking, the emergence of external competitors as well as the fear of the appearance of an AI able to replace the human are the most controversial topics slowing the development of AI at the most advanced stage.

Chapter 1 - Banking regulations

The technological transformation that the BS has known since the last decade has created issues related to the protection of consumer data. The old regulations were not designed to assimilate rules relating to the emergence of AI, digitalization, target marketing and other technological tools. Governments have had to review and strengthen the regulations.
In addition, the BS has known - 10 years ago - one of the most important financial crises since its creation. Regulations have also been set up to prevent financial institutions from recreating a crisis that would once again paralyze the world.

The primary objective of regulation is to protect consumers from their personal data present within financial institutions. However, this implementation of various regulations slows down the evolution of the BS.
The two most relevant reasons for this slowdown are:
On the one hand, the administrative cost of creating banking regulatory documents and developing systems in linked with the regulations set up by governments.
On the other hand, the implementation of certain constraints related to regulations that prevent banks to move forward in their technological progress.

Currently, the BS has 4 banking regulations recently updated and other regulations are coming as the Basel III agreement or e-privacy.

Why are there so many regulations?

Regulations has always considered as able to avoid crisis[45]. In the 2000s, governments decided to relax banking regulations. As a result, eight years later, one of the world's two biggest economic crises was occurring - in part - because of banks.

Currently, the US government has decided to relax banking regulations.

There are different regulations, each one focused on a specific area.

Nowadays, BS must be face to four major regulations:

The "General Data Protection Regulation" (GDPR) which allows to strengthen and protect personal data throughout Europe but also - for consumers - to obtain an inspection right on his data owned by his bank in full transparency.

The "Payment Services Directive 2" (PSD2) which is used to fight and avoid fraud during each monetary transaction (e.g. cash, check, credit card, transfer).

The "Markets in Financial Instruments Directive II" (MIFID II) exclusively concerns the European financial instrument market and is focuses in a desire to evolve the competitive environment and increased diligence of bankers to their clients.

The "Foreign Account Tax Compliance Act" (FATCA) implemented by US in order to reduce and avoid fiscal evasion from the US abroad and concerning an US person.

Last but not least, the "Common Reporting Standard" (CRS) which is similar to FATCA for the European countries and fighting against fiscal evasion.

To conclude with the regulation chapter, we can therefore say that the regulations implemented by governments to financial institutions are necessary for the maintenance of the financial economy and in particular to avoid an economic crisis' reproduction as 2008.

In addition, consumers have limited confidence in BS and the emergence of AI. It is therefore wise - within the framework of the protection of individuals - to set up regulations that will limit or reduce to zero the risk of data fraud or mishandling with.

However, regulations add a huge cost to banks and delay their technological evolution.

From the point of view of European governments - unlike the US - the future is not about relaxing banking regulations.

[45] Berger,K. (2014). La régulation bancaire et financière face aux crises : Roosevelt et aujourd'hui.

Chapter 2 - The emergence of a new form of competition

The hasty evolution of AI - intelligent tools - has obviously attracted some companies not being part of the BS.
The majority of its companies are among those specialized in the field of new technologies and have therefore taken part of this trend and the emergence of AI to integrate the BS.
Other companies have been able to take advantage of the evolution of this technology despite the fact that they are not initially specialised in this area, to generate a solid foothold in the banking landscape (e.g. Orange bank).

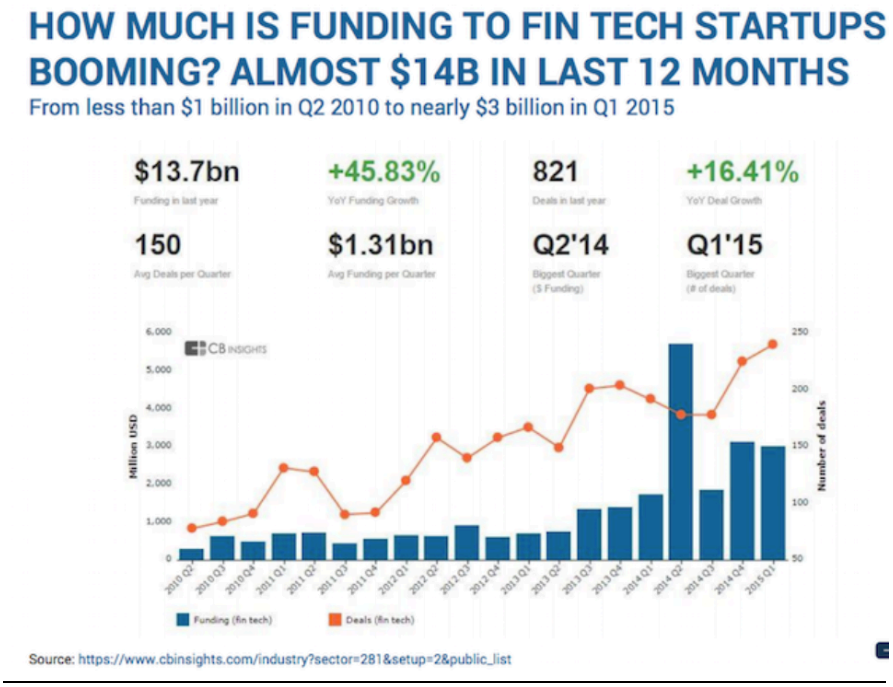
The first to take advantage of this AI evolution are Fintechs. First of all, what is a Fintech? The word "Fintech" is born thanks the grouping of two words: Finance and Technology.
Typically, these types of companies are very often start-ups that bring new technologies into the financial world.
"Fintechs operate in the retail banking sector in specific fields: loan & credit, savings and day to day banking"[46].

The financial deregulation of recent years favouring economic liberalism and therefore the introduction of new competitors in the markets, has allowed the emergence of its companies specializing in new technologies and their establishment in the banking sector.

These technological companies specialized in the financial field, brought the AI into the BS. In particular, they have revolutionized and revolutionize the sector. An example of a revolution brought by the Fintechs: the robo-advisor. In concrete terms, it is an automated investment consulting platform, which offers users to build and manage their portfolios for extremely low costs.

A "new banking business model"[47] has emerged with the appearance of a "disruptive" form of competitors: Fintechs. Banks did not appreciate their hasty banking market penetration.

[46] Mignot, V. (2018, April 04). Les fintechs de l'épargne, du crédit ou de la banque au quotidien.
[47] De Vauplane,H. (2015, April 22). La Fintech ou l'apparition d'un nouveau business model bancaire.



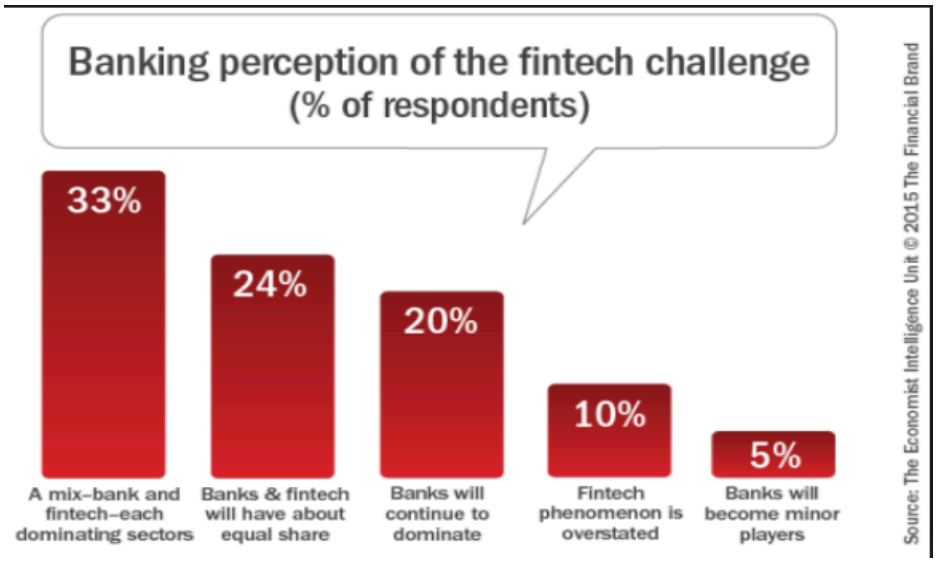
Despite the growth of the Fintechs, banks have decided to consider these new companies - start-ups - specializing in new technological tools and knowing the financial market, as a huge asset for the future of the BS and their own potential growth, looking for new opportunities.

Partnerships are created between banks and fintechs to help each other. On the one hand, the fintechs will allow the bank to give it the necessary tools in the development of a new digital strategy and linked to the AI. On the other hand, the bank will finance Fintech projects and also have all the necessary current resources of the bank.

Several examples of partnerships between banks and fintechs[48]: Pumpkin and mutual credit, account Nickel and BNP Paribas Dalenys and Natixis ...

To be in the current BS evolution (in linked with the IA evolution), banks have no longer choice than to be accompanied by a Fintech able to give him technological tools to take a step ahead of its competitors, in a transitional sector and highly competitive.

[48] Soubranne, Q. (2017, August 7). Fintech : chaque banque cherche sa start-up.



Furthermore, the emergence and evolution of GAFA can have a direct impact in the BS. Through their skills, their technological knowledge acquired since several years and their massive user data collected, the GAFA's are dangerous potential competitors for banks to be taken into consideration in the coming years.

Nowadays, present in a minority of financial services, the GAFA's could be interested tomorrow in other financial services such as credit or financial management.

"Endowed with a colossal financial force"[49], they would then be enough to buy Fintech to become redoubtable rivals in the BS. Taking advantage of their high popularity, they could then offer tailored and personalized financial services.

Another form of competition has also emerged lately: companies specializing in other sectors (e.g. the mobile telephony market) and who have the necessary resources and capabilities to penetrate the banking market.

The perfect example: Orange bank.

[49] Olmi,S. (2016, May 10). Banque et Fintech : la nécessaire alliance face aux GAFA

Orange bank[50], the new online bank of the French leader in mobile telephony with more than 25 million mobile costumers, was launched in October 2017.

As stated by the CEO of Orange Bank - André Coisne - "From our point of view, to launch a bank in 2017 without boarding the AI, would have been a fault".

Indeed, the AI is fully integrated in the banking process but also in the customer experience through some smart tools present such as the chatbot.

Able to respond instantly to customer questions and perform certain tasks instead of advisors or banking officers - 24 hours a day, 7 days a week – the chatbot called Djingo is a very valuable tool in the consumer-bank relationship and in the positive impact in the customer experience.

Likewise, Djingo is currently operational and is able to understand 85% of consumer inquiries and questions.

Thanks to its national fame[51] - especially due to the millions of users of the orange mobile operator - and the customer experience that provides AI, Orange Bank attracted nearly 100,000 customers in - barely - four months.

To finish, the BS must face to the emergence of a new form of competitors coming from many horizons and taking advantage of the AI success in the actual banking transformation.

Fintechs, first competitors of the traditional banks and bringing the modernity in this sector thanks to their revolutionary technological tools, will allow the banks - through a bank/fintech partnership - to face another form of competition which should arrive in the coming years: the GAFA's. Finally, we also observe that any competition from any horizon could appear and take market share in this sector with multiple opportunities, as did Orange with Orange bank in France. IA and BS: a changing sector.

[50] Huguen, P. (2018, March 29). Nos banques se convertissent à l'intelligence artificielle.
[51] Nora, D. (2017, November 6). Banque en ligne : Orange Bank fera-t-elle la révolution ?

Chapter 3 - Humans fears

The precipitous evolution of new technologies has created fears from governments but also from consumers. They are not familiar and do not trust the reliability of its new technologies.

The story has repeatedly shown that the machine was created by the human and therefore can be diverted from its task by the human.

A - Cyber-attacks

The biggest problem related to new technologies' security are cyber-attacks. New technology is never fully developed at launch. It must be tested in real conditions, observe its flaws and improve its security consequently. Technological tools were created to avoid human errors, but they were created by humans.

The exponential growth of data generated by new technologies, creates new security risks. The development of Big Data[52] in order to obtain massive data and used it in a professional context (e.g. banks), can be used for malicious purposes by an ill-intentioned person, who would be able to take advantage of all those personal data.

For example, in 2013, three billion Yahoo accounts were hacked. 3 years later, in October 2016, Uber was targeted by a cyberattack, offering hackers data from 57 million drivers and passengers, specifically their names, email addresses and phone numbers.

As a result of the cyber-attacks, the data will be sold to the highest bidder and especially to companies wishing to obtain a multitude of personal data on their customers in order to improve their marketing and marketing strategies.

The rapid evolution of new technologies and therefore the place of big data in daily life implies an improvement and a reinforcement of security against hackers.

[52] Thibout, C. (2017, December 12). Quand le Big Data s'allie à l'intelligence artificielle.

Everyone is concerned: each individual but also the government, which must be able to protect its citizens' data.

The contribution of AI as data protector:

Indeed, the AI - through its intelligent systems - combined with the Bigdata, "will offer an automated processing of heterogeneous data extracted from various sensors"[53]such as surveillance cameras, satellites, drones, social networks or connected objects.

Alone, the AI and the bigdata do not offer the adapted security or the optimization of their potential growth but together the two technological tools complement each other. The AI as intelligent tools and the Bigdata as a component allowing the improvement of the AI by offering an infinite amount of information and data.

The problem of this complementarity is the following:

To achieve complete protection against the risk of hacking, the AI must use all the personal data of each users and governments available.

However, the regulations implemented by the governments against the fraudulent use - on the companies' side – of personal data, thus prevent the AI to play a role of data's protector.

To conclude with cyber-attacks' risk, we can affirm that the massive data collected in bigdata are likely to be hacked by criminals wishing to resell its data to the highest bidder, including companies. The complementarity between AI and bigdata could be the solution to increase security through an intelligence research of AI systems in bigdata servers. Unfortunately, this option is currently not feasible and adaptable considering regulations established by governments to protect the individuals' privacy.

[53] Thibout, C. (2017, December 12). Quand le Big Data s'allie à l'intelligence artificielle.

B – AI and humans: daily life problematics

AI is a complex and highly evolved machine[54]. Nevertheless, it has been created by humans and continues to evolve through the implementation of data by humans to be able to think by itself.
But can AI be impartial, or can it be influenced by humans? can it goes beyond humans and dictate the rules of daily life?

Several issues arise regarding the likely evolution of AI in our daily lives[55].
First of all, AI - designed and developed from huge database and developed by the human - could be, indirectly or directly, impacted in its operating mode.
Obviously, an AI using a massive database that puts forward racist or sexist information would make him believe a false reality.
A concrete example[56]: in March 2016, the Microsoft AI called Tay- considered the most advanced AI of the moment - which was set up in touch on a chat platform, became in just 24, racist and sexist.
Unfortunately for Microsoft and the evolution of AI, this new technology is not yet ready to be developed and made available on a large scale.

Another problem that may be relevant: the hacking of the human mind by AI.
The goal of new technologies is to give them free access to all our personal information, then analyse it and extract concrete, adequate without the human errors possibility.
however, by giving them this free access, the AI - through the implementation of algorithms implemented by humans - will be able to exploit our personal data and subsequently influence our way of thinking.
An example: Companies using the current methods of targeting marketing can even go further in their strategies and send us mails or information by other digital channels in order to influence us.

The appearance of intelligent software like the DL to revolutionize the AI.

[54] Ganascia, J-G. (2017). Intelligence artificielle vers une domination programmée ? (Ed.2).
[55] Tual, M. (2017, August 8). Au-delà des fantasmes, quels sont les problèmes concrets que pose l'intelligence artificielle ?
[56] Tual, M (2016, March 26). A peine lancée, une intelligence artificielle de Microsoft dérape sur Twitter

It is now able to recognize images, use surveillance cameras and be made available in cases of government surveillance.
Nevertheless, as indicated previously with the fight against hacking, there is unconformity between the evolution of AI in its methods of observation and analysis on the one hand and on the other hand, the personal data' protection and individual freedom.

Other issues are also present such as the manufacture of autonomous military weapons and the lack of information on all the "artificial neurons" present in the AI systems.

the main objective of the human will be to educate himself in the face of the massive integration of the intelligent machines that will be at the heart of our society in the years to come.
As Eric Schmidt, executive chairman of Google's parent company, Alphabet, said, "we need to better prepare our societies for these changes and ensure that they will not be destabilized."
"The challenge is education, increasing the IQ of humanity"[57].

To conclude with this chapter linked to the human fears, we observed that the complementarity between IA and big data could strengthen and avoid computer hacking. However, this technique would require a relaxation of the private data protection from consumers but also from governments.
In addition, this data protection relaxation would allow the AI to spy on us and influence our thoughts through an even more advanced targeting marketing strategy used by companies.
This would bring us to the end of our individual freedom.
Other issues highlight the reliability of this AI as the experience lived by Microsoft in 2016, where the AI had been influenced by its users and had become racist and sexist in less than 24 hours.
AI is a fascinating tool but not sophisticated enough to live independently and in contact with the humanity.

[57] Mabille,P. (2017, February 15). Face à l'intelligence artificielle, augmenter le QI de l'humanité.

Conclusion

The study was set out to consider the extent that the emergence of new technologies and particularly AI, have in the BS and the breakthrough caused by those technologies.

AI has existed in the BS for many years, since - almost - the creation of this new technology in the 1950s.
Sometimes later, the emergence of ES has contributed to the development of this AI in the global banking landscape.
Since the appearance of the GAFA's as well as the huge evolution that known AI, we realized the impact of its new technologies especially from the companies' point of view.
Furthermore, it is able to innovate the BS through a standardized form of automation (RPA), which has the ability to analyse and understand the risk and tasks to carry out.
Big data or banking digitization - already operated in recent years - are some tools, which combined with AI, will obtain a certain complementarity and have a much better evolution.

In this study, we brought some study field in order to understand and analyse the individuals' behaviour regarding the evolution of AI. On the one hand, a qualitative field study focused on the methods of the AI within the banks and the feeling of the professionals
on the other hand, a quantitative field study based on the behaviours and evolution of customer habits with the current breakthrough of banks and the appearance of new competitors and digital tools.

According to the qualitative study, we asked professionals concerning their opinions on AI.
For some, the emergence of AI with new technological tools would be the best solution and a key of success for the BS. However, banks must also offer an alternative.
For others, this is not the best way in the long run. It is more appropriate and necessary to come back to the old banking method, based on the proximity banks presence and the trust between banks and its customers.
Others, think that it is a solution because there are no real other solutions or, at least, for the moment. The AI is a controversial tool according the thinking of banks' employees.
According to the quantitative study, we asked a sample of 103 people to answer a questionnaire focused on the emergence of AI.

Several variables appeared, and we noticed that some answers do not seem to complement each other despite the fact that there is a degree of complementarity between them.
Indeed, the sample showed its willingness to trust the development of new computer tools including the appearance of AI: 70% favourable opinion.
Despite these good results, trust was totally lost when security issues have emerged.
Only 3% of favourable opinion about the reliability trust of AI.
Figures still representative of the current society and the mistrust of AI implementation in our daily lives.

Otherwise, the digitalization contribution in the trend evolution related to new technologies – and mainly AI - has simplify the daily lives of consumers of the BS (confirm by the overall trend of the quantitative study).
The acquisition of new technologies by individuals has fostered this technological transformation.
The bank-customer relationship has changed: some would say for the better and others would say for the worst.
The current banking structure has improved a permanent contact between banks and their customers but has reduced the human link.

However, the implementation of some regulation slowdown the growth of the AI, which needs more freedom to exercise all its knowledge and release all its capacity.
In the other hand, the regulations implemented by governments to financial institutions are necessary for the maintenance of the financial economy and in particular to avoid an economic crisis' reproduction.
By the way, consumers have limited trust in BS and the emergence of AI. It is wise to set up regulations that will limit or reduce to zero the risk of data fraud and theft.
In addition, regulations add a huge cost to banks and delay their technological evolution.

Another issue from banks, the BS must face to the emergence of a new form of competitors coming from many horizons and taking advantage of the AI success in the actual banking breakthrough.
Fintechs, first competitors of the traditional banks and bringing the modernity in this sector thanks to their revolutionary technological tools, are currently partnering with the banks to face another likely form of competition which should arrive in the coming years: the GAFA's.

Any other form of competition could come from any horizon and take market share in this sector with multiple opportunities (e.g. Orange bank).

Unfortunately, there also other issues linked with the human fears toward the AI.
For the AI to grow, it should be allowed more freedom in its scope.
However, giving it more freedom means taking freedom from humans. This AI will be able to take all available data from all available databases and then analyse each of them.
So, there is a discrepancy between freedom of the human being and freedom of the AI to be able to act as the companies would like it to act.
Moreover, if the government decided to relax the regulations. The AI would have the faculty to take our personal data and use it - through companies - for marketing purposes and in the long term, to influence – voluntarily - the human mind.

Concerning AI forecasts in the coming years, we can deduct that the implantation of these revolutionary systems will allow a huge transformation in the BS.
The appearance of intelligent systems will improve the - virtual - proximity and therefore the bank-customer relationship.
Subsequently, the massive emergence of new technologies in the BS will lead to a restructuring of the bank's tasks and activities. The approach of recruitment processes will be different, consistent with the new banking environment.
In the long term, we can only rely on scenarios and theories that, each of them, will affect the future of AI.

As a reminder, we have emitted some hypotheses that could be correlated with the real trend of the BS.
We can therefore say that - depending on the vision of the individual - hypotheses can be affirmed but also refuted.
AI is an over-mediated technology. The human thinks that this technology is over-developed that it will exceed the human in a few years. However, we have found that AI is currently not at all able to take decisions and going beyond the human.
The real risk is the influence of the human on the machine. The machine was created by humans and is therefore likely to be hacked by humans for malicious purposes.

For this reason, governments are currently regulating the machine, but they prevent it from evolving.

To finish, we can affirm that: if we want to see the machine evolve, we will have to relax the regulations, but we will lose our personal freedom. On the contrary, if we retain our personal freedom, the AI will never evolve as the human hopes.
This discrepancy can only be solved if we choose which variable is the most important and able to reflect the current evolution of our society.

Appendices

Questionnaire for interviews

The following questionnaire was used during the development of my qualitative study.

1. What means artificial intelligence to you?
2. What impact does artificial intelligence have on your job?
3. Could artificial intelligence be essential for your job? and why?
4. Are you for or against the emergence and improvement of technological tools such as artificial intelligence?
5. How do you see the future of your job?
6. Would you have predicted the current evolution of the banking sector?
7. For you, is the emergence of its new technologies harmful for the future of thousands of jobs in the sector?
8. Do you think that your job becomes more complex with the appearance of AI?
9. Can you say that AI automates repetitive tasks and will allow employees to focus exclusively on "value-added" tasks?
10. For you, what are the future issues that banks will have to face?
11. For you, does artificial intelligence improve the bank-customer relationship as well as the "customer experience"?
12. Do you think that automating client data stored in servers will improve security against hacking? Or, on the contrary, will it promote the growth of cyber-attacks?
13. Do you think AI is the best way to perform a "breakdown" from traditional banks and face to a regulatory more and more stronger and will reduce retail banks cost?
14. Are you agree with this sentence: Artificial Intelligence - Key of success?

Transcript of interviews

First Interview: Sebastien Habay – Personal banker: More than 20 years' experience in the banking sector in different countries (Belgium and Luxembourg), banks and trades.

Q1 : Qu'est-ce que signifie l'intelligence artificielle pour vous ?

Pour moi l'IA c'est une machine composée d'une multitude d'algorithmes et de systèmes permettant de prendre des décisions par lui-même sans aucune intervention humaine et de fonctionner comme le cerveau humain en quelque sorte.

Q2 : Quel impact l'intelligence artificielle a sur votre métier ?

Actuellement L'IA n'a aucun impact sur mon métier. Qu'est-ce qu'un personal banker ? c'est une personne ayant une double casquette : technique et relationnel. Sur la phase relation, l'AI ne pourra pas prendre la place du personal banker car les clients recherchent une personne de contact, de confiance en qui ils pourront confier leurs épargnes.
Côté technique, pour le moment, il n'y a pas d'IA présente dans le système bancaire d'ING et notamment dans les processus d'investissements.

Q3 : Est-ce que l'intelligence artificielle est ou pourrait-être indispensable pour votre métier ? et pourquoi ?

L'IA pourrait être indispensable dans le métier de personal banker car elle permettra une automatisation complète des processus liée à la vente/ achat des fonds proposées par la banque. L'ordinateur sera capable de prendre des initiatives à la place de l'humain. Seule la dimension relationnelle avec le client ne pourra pas être complétement délégué à la machine.

Q4 : Est-ce que vous êtes pour ou contre l'émergence et l'amélioration d'outils technologiques tel que l'intelligence artificielle ?

Personnellement je suis contre l'émergence et l'amélioration de ses outils technologiques qui progressent de façon exponentielle dans le secteur.
Actuellement chez ING, on est plutôt à un stade de digitalisation de certains processus et tâches liées au « daily day to day banking » mais également à la souscription de fonds grâce à un formulaire capable d'analyser le profil de risque de l'investisseur.
Néanmoins, le client viendra toujours vers nous pour prendre conseil et pour être aiguillé.
Je trouve que la digitalisation de certaines tâches qui permettent aux clients de suivre et de gérer leurs comptes bancaires à distance, même le week-end est dans l'air du temps mais l'apparition de l'IA n'est à mon goût pas la meilleure méthode.

Q5 : comment voyez-vous le futur de votre métier ?

L'avenir de mon métier je le vois très clairement en déclin. En tant que personal banker avec un portefeuille clients réparti en 100 000 et 1 million, je suis une cible vulnérable pour l'IA.
Ce type de clients auront toutes les informations nécessaires et la possibilité d'investir via des plateformes bancaires régi par des IA. Les banques supprimeront les personal banker.

Q6 : Auriez-vous prédit l'évolution actuelle du secteur bancaire ?

Est-ce que j'aurais prédit l'évolution actuelle du secteur bancaire ? Bien sûre que non ou en tout cas pas dans cette ampleur. A l'époque, quand j'ai commencé à travailler, dans les années 90, il n'y avait ni digitalisation, ni nouvelles technologies. Simplement des ordinateurs programmés pour effectuer quelques tâches. Le reste était fait avec une multitude de formulaires et de documents à envoyer chaque jour aux départements de la banque concerné.
La majorité de notre travail était relationnel mais la technicité des processus était également très présente.
L'apparition de la digitalisation a ralenti les consommateurs dans leurs passages en agences. Actuellement ils font tout à distance ou presque…
L'apparition des régulations visant à protéger les données personnelles ont également contribué à cette diminution en termes de possibilités bancaires et de libertés individuel au sein de la banque.
L'évolution a été tellement rapide et pousser que jamais je n'aurais prédit cette évolution, en 25 ans de carrières.

Q7 : Pour vous, l'émergence de ses nouvelles technologies est-il néfaste pour l'avenir de milliers d'emplois dans le secteur ?

Oui, l'émergence de cette nouvelle intelligence artificielle capable d'agir comme le cerveau humain, d'analyser et d'agir en conséquence, sera néfaste pour l'avenir de beaucoup d'emploi dans le secteur. C'était déjà le cas avant même son apparition. L'exemple de ING Belgique qui a licencié des milliers d'employés. ING Luxembourg qui n'a pas renouveler sa ressource humaine dans les agences lors de départs en retraite ou de changement de poste hors de la banque… aujourd'hui nous nous retrouvons en effectif tendu.
L'objectif des banques est de réduire son effectif, l'IA n'est qu'une façon économique, intelligente et novatrice pour arriver à cet objectif.

Q8 : pensez-vous que votre métier se complexifie avec l'apparition de l'IA ?

Il n'y aura pas de complexification de mon métier ou pas. Il y aura disparition claire et nette de mon métier si l'évolution actuel continue de façon exponentielle.
Quand je parle de mon métier je parle de personal banker, conseiller en placements financiers et fonds pour les clients possédant entre 100K et 1Million.
Concernant les private bankers, dont leurs clients ont un disponible supérieur à 1million, ces personnes-là ne seront pas concerné par cette disparition car ce métier est plus complexe, plus large et en relation avec des clients qui ont besoin d'être mis en contact avec des conseillers expérimentés pour optimiser au maximum leurs patrimoines.

Q9 : est-ce que pouvez affirmer que l'IA automatisera les tâches dites répétitives et vous permettra de vous consacrez exclusivement sur des tâches dites de « valeur ajoutée » ?

Je réfute cette affirmation comme quoi l'IA automatisera les tâches répétitives et administratives et nous permettra de nous consacrez à des tâches de valeur ajoutée car la définition propre de la banque est axée sur l'Humain et la relation de confiance et l'employé bancaire et son client. Si l'IA remplace les humains, il n'y aura plus de relation confiance entre banque et clients mais une relation virtuelle entre la banque et ses clients à travers des outils informatique automatiser et intelligents.
Elle peut être utile à petite dose et en complément mais pas à un stade avancé comme elle devrait être utiliser. L'augmentation des régulations est dû au bousculement du paysage bancaire actuel. Si l'IA n'émergerai pas à ce point, les régulations n'auraient pas été aussi importante et les coûts pour implémenter ses régulations n'auraient pas été aussi élevé.

Q10 : pour vous, quelles sont les futures problématiques auquel les banques vont devoir faire face/se confronter ?

La future problématique MAJEURE auquel fera face les banques dans les années à venir sera l'envie, de la part du consommateur, de revenir en arrière. De revenir au fonctionnement basique des banques, c'est à dire avec la présence d'un conseiller, disponible pour les clients et sur qui ils pourront faire confiance, s'exprimer librement et se référer en cas de problème.
Pour moi c'est la principale et la plus importante problématique. D'autres problématiques tel que le développement des régulations et de l'IA sont d'actualités mais celle qui marquera une rupture avec le développement actuelle du secteur bancaire sera celle-ci.

Q11 : tu n'as pas mentionné l'émergence de nouvelle forme de compétition, que pense-tu de cette problématique dont les banques traditionnelles vont devoir également faire face ?

Bien évidemment il y aura l'émergence de compagnies capable de prendre des parts de marchés énormes aux banques actuelles. Notamment les sociétés technologiques, qui ont l'avantage d'être en avance sur nous en terme technologique. Étant donné que le trend actuel est l'évolution technologique, nous sommes déjà en retard de ce point de vue-là.
Mais comme je l'ai déjà dit, ce n'est qu'un détail, pour moi l'expérience client passe et passera toujours par l'intermédiaire d'un conseiller bancaire entre les échanges banques-consommateurs, mais ce n'est que mon point de vue.

Q12 : Est-ce que pour vous, l'intelligence artificielle améliorera la relation banque-client ainsi que « l'expérience client » ?

L'IA améliorera la relation banque-client et l'expérience client à court terme et pour une partie des consommateurs, ceux qui sont familier avec les nouvelles technologies.
A long terme, non, au contraire. Comme je l'ai dit précédemment il y aura une rupture et un ras le bol de la part des clients.

Q13 : Pensez-vous que l'automatisation des données clients stockés dans des serveurs ainsi que l'échange banque-client, effectué de plus en plus sur internet, améliorera la sécurité contre le piratage ? ou au contraire, favorisera-elle l'accroissement des cyber-attaques ?

Pour moi, l'apparition et l'émergence des nouvelles technologies à toujours attiré la convoitise des cyber-attaques. Il y aura toujours des gens qui essayeront de pirater le ou les systèmes de manières « inconnu ». De plus, l'accroissement des données clients dont possèdent les banques, sera vraiment attrayant pour les pirater et ensuite les revendre sur au plus offrant.
Pour répondre à votre question, ça favorisera l'accroissement des cyber-attaques.

Q14 : pensez-vous que l'IA est la meilleure solution pour effectuer une « rupture » des banques traditionnelles et faire face à une régulation de plus en plus forte et diminuer les coûts des banques de détails ?

Comme vous avez pu le comprendre au fil de l'entretien, je ne suis pas une personne attirée par l'émergence de ses nouvelles technologies donc je dirai que non ce n'est pas le meilleur moyen ou du moins, à court terme peut-être, mais à long terme non.
Il faut revenir à l'ancienne méthode bancaire, à celle qui marchait qui était le respect du métier de conseiller, la présence des banques de proximités et la confiance entre la banque et ses clients.

Q15 : l'IA : clé du succès ?

Non. L'IA est un outil utile dans l'élaboration d'un ensemble de méthodes menant à la clé du succès, oui mais un outils unique constituant à elle seule la clé du succès, non.

Second Interview: Gilles Duhr – Assistant branch manager: 8 years' experience within ING Luxembourg as banking officer and assistant branch manager.

Q1 : Qu'est-ce que signifie l'intelligence artificielle pour vous ?

Sur base d'un logarithme on essaye de trouver des réponses. Sur quelque chose d'existant on fait une estimation du futur. (Exemple : évaluation de l'âge et du pays de résidence du client et cela permet d'évaluer notre potentiel futur car on évalue que sur notre clientèle future X % doit avoir ce produit-là, pro activement on pourra proposer une gamme de produit à un client en particulier par des calculs scientifiques par base d'expérience vécu.

Q2 : Quel impact l'intelligence artificielle a sur votre métier ?

En agence on travaille sur deux points bien précisément : on doit être direct là où on peut et on doit pouvoir fournir un conseil là où on peut.
L'IA peut prendre en charge un certain volet déjà pour avoir une partie de la vente qui est automatiser (E.G : type comme « next best offer » (logiciel permettant…) ,on possède une expérience et des données sur notre cible et on l'a contact pour tel ou tel produit adapté à cette cible), donc je pense que cela peut nous économiser pas mal au niveau coût, ressource humaine,

perte de temps. Prendre le temps d'appeler les clients sur une journée prend énormément de temps et en plus aujourd'hui, les gens travail, sont moins accessible par internet, mais pendant leurs pauses ils regardent leurs téléphones. Je pense au niveau administratif l'IA permet d'aider au niveau des coûts, le développement – de l'IA - coûte au début un peu plus mais avec le temps si l'IA arrive à prendre l'intégralité de ce volet là ça sera très bien pour les banques.

Q3 : Est-ce que l'intelligence artificielle est ou pourrait-être indispensable pour votre métier ? et pourquoi ?

Oui ça sera toujours plus dans ce sens. Toutes les boites ou banques travaillent de plus en plus sur l'automatisation. Effectivement, si on veut réduire les coûts, l'automatisation sera indispensable dans le futur, au moins partiellement. Les ressources humaines resteront toujours importantes mais y a des tâches qui peuvent être pris en charge par cette IA.

Q4 : Est-ce que vous êtes pour ou contre l'émergence et l'amélioration d'outils technologiques tel que l'intelligence artificielle ?

Je suis plutôt pour car comme précédemment indiqué, je pense que cette IA permettra d'automatiser des tâches administratives et quotidienne et donc baissera le coût administratif mais également laissera plus de temps aux employés de se concentrer sur d'autres tâches plus pertinentes et dans l'objectif de la banque qui est de conseiller et satisfaire le client en lui offrant des produits et services financier en adéquation avec ses désirs et volontés.

Q5 : comment voyez-vous le futur de votre métier ?

Mon métier ne va pas réellement changer énormément car même si aujourd'hui on met en place des outils performants qui permettent au client de faire beaucoup plus de choses à distance. Exemple : aujourd'hui un client peu encoder une demande crédit logement lui-même, à la maison, le soir et annexé toutes les photos et pourtant très peu de gens l'utilisent car même s'ils ont accès à ça, ils aiment toujours avoir le contact humain. L'être humain, pour ce qui est des montants basiques (on va dire pour des montants inférieurs à leurs salaires ils veulent bien automatiser et utiliser des outils. Cependant, dès que les montants sont supérieurs, ils préfèrent avec un contact humain (au moins un appel téléphonique au la présence en agence d'un conseiller). Donc mon métier en soi ne changera pas mais je pense que certains métiers dans la banque vont disparaître voire changer fortement. C'est simplement le trend de notre société aujourd'hui, les gens ont moins le temps de venir à un guichet ou à une caisse. Ils peuvent venir le soir et faire ses opérations sur l'ATM s'ils ont besoin de faire un retrait car ils peuvent également faire un virement ou utiliser l'application « Digicash ».

Q6 : Auriez-vous prédit l'évolution actuelle du secteur bancaire ?

Non pas sur une telle rapidité en tout cas. On s'imaginait depuis un moment que ça allait changer mais ça évolue mais pas seulement ; ça évolue de façon exponentielle j'ai l'impression. Quand on s'imagine que en 2011, on n'était pas capable d'envoyer une demande de crédit par ordinateur (la demande seule oui mais pas le dossier papier crédit pour analyse et validation et donc il y avait un gaspillage papier et encre. Autre exemple en 2011, on a instauré le FAX dans les banques et aujourd'hui on est prêt à accepter des photos.

Q7 : Pour vous, l'émergence de ses nouvelles technologies est-il néfaste pour l'avenir de milliers d'emplois dans le secteur ?

Je pense qu'en partie les banques doivent ce réorganisé mais c'est également la volonté des banques. Quand on regarde au Luxembourg, 1/3 des coûts d'une banque sont liée aux ressources humaines d'une banque, donc si les banques souhaitent diminuer leurs coûts de par exemple 10%, le plus facile serait d'agir sur les salariées. Maintenant, il faut des ressources humaines, des gens expérimentés et surtout des spécialistes dans leurs domaines mais également des généralistes. L'IA aura un impact mais il y aura des solutions pour garder certains employés sur d'autres tâches ou bien de les muter ailleurs dans d'autres services et départements de la banque. Le secteur évolue mais, quelque part, on crée des besoins sur d'autres niveaux, par exemple le coût règlementaire qui augmentent (contraintes vis-à-vis des reportings vers les administrations fiscales, la GDPR et la protection des données personnelles, FATCA/CRS…) Quelque part il faut des ressources humaines dans ce domaine même s'il pourrait y avoir des machines qui visualisent tout simplement les clients qui sont en CRS out (évasion fiscale) et on pourrait dire que ce genre de personne là seront automatiquement mise à la porte.
De l'autre côté, il y a cette souplesse d'avoir un Relationship manager qui évalue si la relation est rentable. Ces personnes-là travaillaient avant dans les caisses, qui maintenant ferment à cause/ grâce à l'apparition d'ATM permettant d'effectuer des dépôts et retraits de manière autonome.

Q8 : pensez-vous que votre métier se complexifie avec l'apparition de l'IA ?

Non je pense en tout cas, tout le monde doit aller avec le trend. Il y a des employés à la banque qui ont du mal à télécharger une application mobile, de l'autre côté il y a des gens qui ont du mal à télécharger des applications de web-banking mais pas pour télécharger le nouveau jeu à la mode sur leurs smartphones.
Ça se complexifie d'une certaine manière. Par exemple, à une époque, on utilisait le TOKEN ING : on avait une enveloppe, c'était le mot de passe et les clients pouvaient utiliser le token dans son utilisation normale. Par la suite, Luxtrust est venu « simplifier » l'utilisation et la mise en place de ce TOKEN pour favoriser le service client, et éviter au client de n'avoir qu'un seul TOKEN pour plusieurs banques. Malgré tout cette facilité à créer une complexification, de la part des employés, dans les procédures.
La modification des procédures et des méthodes requiert de l'éducation des employés mais également de l'éducation des clients.
Il y a d'un côté, une grande masse qui va vers l'évolution de la technologie et l'IA mais il y a quand même – à mon avis – 30 à 40% des personnes qu'il faut prendre par la main et les guider, éduquer.
Un exemple : l'annonce de la nouvelle application sur MYING qui permettait d'effectuer une libération de fonds, qui est vraiment très simple à faire et malgré le fait de l'avoir montré plusieurs fois, certains employés ne savent pas le faire…

Q9 : est-ce que pouvez affirmer que l'IA automatisera les tâches dites répétitives et vous permettra de vous consacrez exclusivement sur des tâches dites de « valeur ajoutée » ?

Oui je pense vraiment ça. Ça dépend des tâches, il y en a certaines où on préfère avoir une double vision et vérifier avec un double- check et donc avoir une certaine souplesse mais je pense certainement que ça peut aider.
Pour des démarches commerciales, même si c'est à valeur ajoutée, s'il y a des campagnes automatiques, c'est toujours avantageux et ça nous économise du temps.

Q10 : pour vous, quelles sont les futures problématiques auquel les banques vont devoir faire face/se confronter ?

Tout le développement des nouvelles technologies, c'est un coût énorme.
La réglementation également, si on fait de plus en plus confiance à l'IA il faut savoir l'a règlementé puis il y a également le fait de se conformer à la législation existante.
A mon avis, il y a déjà ça puis trouver un cadre : jusqu'où pouvons-nous aller ?
Ensuite il y a également l'éducation des clients et employés qui seront importante dans l'évolution de cette IA dans le secteur bancaire.
Une autre problématique également intéressante est l'apparition d'une nouvelle concurrence dans le secteur bancaire. Les entreprises technologiques comme Google ou Amazon peuvent être de potentiel concurrent direct pour nous, banque traditionnelle.

Q11 : Est-ce que pour vous, l'intelligence artificielle améliorera la relation banque-client ainsi que « l'expérience client » ?

Oui ça peut clairement améliorer l'expérience client.
En termes de relation, ça dépend : certains clients recherchent un partenaire bancaire peu importe la couleur ou le nom mais la personne de contact qu'il souhaite avoir en permanence qui n'est pas le cas avec l'IA. Cependant, je pense que l'IA peut aider avec ses petits plus, avec la complétude de la relation.
Si on se concentre uniquement sur l'IA, ça peut être dangereux, et pour certaines personnes « old-school ».
Personnellement, si j'avais encore un compte ouvert dans une autre banque et que le conseiller m'appellerait tous les jours pour me proposer ses produits, ça m'ennuierait mais à côté recevoir de temps à autre un mail avec des produits qui sont sur mesure, je jette un coup d'œil.

Q12 : Pensez-vous que l'automatisation des données clients stockés dans des serveurs ainsi que l'échange banque-client, effectué de plus en plus sur internet, améliorera la sécurité contre le piratage ? ou au contraire, favorisera-elle l'accroissement des cyber-attaques ?

Le degré de sécurité doit être plus important, même si aujourd'hui les banques sont équipés à ce niveau-là. Cela étant, le plus d'informations nous possédons, le plus on est susceptible d'être attaqué donc quelque part il y a un risque permanent.
Si on peut aller tellement loin : analyser ce que le client achète et pourquoi, pour quel bien et service le client dépense ça sera des informations très recherchés par les pirates.
Exemple : lors des achats, avec la mise en place de codes commerçants, on pourrait avoir des statistiques simplement sur leurs méthodes d'achats, leurs nationalités, leurs préférences en termes de magasins et marques et ça serait très intéressant pour sociétés.
Les données posséder par les banques deviennent de plus en plus intéressante et plus les données sont recherchées et plus le risque est élevé et donc la sécurité doit être renforcé.

Q13 : pensez-vous que l'IA est la meilleure solution pour effectuer une « rupture » des banques traditionnelles et faire face à une régulation de plus en plus forte et diminuer les coûts des banques de détails ?

Ça dépend des marchés, au Luxembourg ça sera difficile. Par exemple en Allemagne ou en France, ING est une banque en ligne et non une banque de proximité.
Au Luxembourg, on a des outils bancaires en ligne mais les consommateurs ont la volonté d'avoir une proximité avec leurs banques. En France ou Allemagne, la part de marché est très élevé et simplement par Internet donc je pense que ça dépend du marché ou ne serait-ce la taille du pays.
Ex : le Luxembourg est un petit pays et donc tout est à proximité.
Mais je pense que l'émergence de l'IA avec les nouvelles technologique serait la meilleure solution.
Cependant, les banques doivent proposer une alternative. On ne peut pas simplement supprimer les agences et laisser une partie des consommateurs non familier avec les nouvelles technologies, seuls.

Q14 : l'IA : clé du succès ?

L'IA est certainement la clé du succès mais il faut voir ça sur le long terme.
Les plus grosses problématiques seront au niveau réglementaire et au niveau des coûts et donc pour moi, il faudra d'abord amortissez ses coûts pour ensuite en faire « la clé du succès ». Si un banquier parle de succès, il parle de coût.

Third Interview: Raju Pant – Relationship manager: 5 years' experience within ING Luxembourg as VISA department employee, contact center officer and Relationship manager.

Q1 : Qu'est-ce que signifie l'intelligence artificielle pour vous ?

Une IA est un programme, qui une fois créer, apprend de soi-même. Qui arrive à apprendre de soi-même c'est à dire qui arrive à filtrer certaines informations qui ne sont pas prenable.

Q2 : Quel impact l'intelligence artificielle a sur votre métier ?

Sur mon métier, ça me facilite les tâches. L'IA effectue et effectuera, dans mon métier, des tâches administratives à faire au quotidien. On peut dire qu'elle aura un impact partiel.
C'est à dire qu'elle sera affiliée aux tâches « répétitives » et me permettra de me concentrer sur d'autres tâches plus bénéfiques dans ma relation avec les consommateurs.

Q3 : Est-ce que l'intelligence artificielle est ou pourrait-être indispensable pour votre métier ? et pourquoi ?

Oui dans le sens ou l'intelligence artificiel pourrait m'aider – comme je l'ai dit précédemment- dans mes tâches en effectuant des tâches dites répétitives. En effet, dans mon métier il y a beaucoup d'administratif et l'IA me soulagerait dans l'encodage de mes dossiers clients.

Q4 : Est-ce que vous êtes pour ou contre l'émergence et l'amélioration d'outils technologiques tel que l'intelligence artificielle ?

Je suis plutôt pour car d'un côté, l'IA permettra de substituer l'humain dans différentes tâches présentes dans les institutions financières.
De l'autre côté, il faudrait absolument avoir un suivi humain de cette IA car elle a été créée par l'humain et peut donc être pirater, contrôler et utiliser par des humains à des fins différentes de celles initialement mises en place dans le cadre du système bancaire.

Q5 : comment voyez-vous le futur de votre métier ?

Je vois mon métier évoluer avec le trend actuel. C'est à dire qu'aujourd'hui chaque chose s'informatise et ce digitalise. Je pense donc que mon métier s'informatisera de plus en plus et la plupart de mes tâches s'effectuera numériquement parlant.
Seule la partie relationnelle restera présente dans mon métier car la relation entre le consommateur et sont Relationship manager est une variable très importante pour eux. Ils veulent se référer à une personne réelle et non virtuelle en cas de problèmes ou questions personnels, la confiance est le maître mot de la relation avec le client.

Q6 : Auriez-vous prédit l'évolution actuelle du secteur bancaire ?

Il faut aller avec son temps donc oui, l'évolution est prédictible d'un certain sens avec l'accroissement exponentiel des nouvelles technologies dans notre vie quotidienne.
Prenons le Luxembourg, c'est un pays en retard du point de vue avancé technologique dans le secteur bancaire. D'autres pays ou régions du monde sont très avancées comme les pays asiatiques de l'est notamment la chine et le japon.
Nous faisons que subir les avancées technologiques implémenter dans ses pays-là.

Q7 : Pour vous, l'émergence de ses nouvelles technologies est-il néfaste pour l'avenir de milliers d'emplois dans le secteur ?

Pas forcément. En effet, il y aura une causalité entre émergence de l'IA et réduction des effectifs des banques mais je pense que cette perte d'effectif provoquera par la suite l'augmentation d'emplois dans le secteur, différent de ceux qui disparaitront, et en lien avec l'implémentation de ses nouvelles technologies qui basculeront le paysage et le fonctionnement interne des banques.

Q8 : pensez-vous que votre métier se complexifie avec l'apparition de l'IA ?

Non je ne pense pas. Un programme n'est pas toujours implémenté d'un jour à l'autre pour qu'il soit ergonomique. L'IA doit faciliter les tâches et non l'inverse.

Q9 : est-ce que pouvez affirmer que l'IA automatisera les tâches dites répétitives et vous permettra de vous consacrez exclusivement sur des tâches dites de « valeur ajoutée » ?

Oui, je suis d'accord. Pas d'un jour à l'autre mais c'est la direction auquel on va.
Comme je l'ai dit précédemment, dans le futur, je devrais surement travailler en collaboration avec une IA capable d'effectuer toutes les tâches administratives et j'aurai le pouvoir de décision par la suite pour vérifier si tout le processus a été correct et cohérent.

Q10 : pour vous, quelles sont les futures problématiques auquel les banques vont devoir faire face/se confronter ?

Avant d'implémenter toute cette IA, il y aura les réglementations européenne ou nationales qui devront être en corrélation avec l'IA.
Il y aura surement un éclatement du marché financier avec l'apparition de nouvelles sociétés technologique. On parle souvent de Fintechs. Pour moi, il y aura un changement d'habitudes de la part des consommateurs et il faudra faire en sorte de ne pas se laisser prendre au piège par l'apparition de nouveaux compétiteurs qui seront surement plus avantagé que nous dans ce nouveau marché.

Q11 : Est-ce que pour vous, l'intelligence artificielle améliorera la relation banque-client ainsi que « l'expérience client » ?

Oui. Pour l'instant ça dépend comment l'IA filtre les choses. Il n'y aura plus de personne derrière qui devra répondre à des mails ou effectuer des tâches basiques.
L'IA analysera correctement et répondra automatiquement aux mails des clients.
De leurs côtés, les clients auront la possibilité d'être en contact en permanence avec sa banque à travers son application mobile et l'IA capable de lui répondre dans certaine circonstance.

Q12 : Pensez-vous que l'automatisation des données clients stockés dans des serveurs ainsi que l'échange banque-client, effectué de plus en plus sur internet, améliorera la sécurité contre le piratage ? ou au contraire, favorisera-elle l'accroissement des cyber-attaques ?

Tout dépend de la sécurité mise en place. Bien évidemment c'est tentant pour les hackeurs de pirater les bases de données bancaires. Donc ça dépendra de la sécurité mise en place. Il faudra toujours être à la page. Jour par jour, heure par heure, au quotidien il a de nouvelles technologies et encodages qui est mise à jour donc si les systèmes de sécurité des banques ne sont pas à jour, alors il y aura bien évidemment des piratages.
Il faut donc être à jour voire en avance sur les méthodes de piratages.

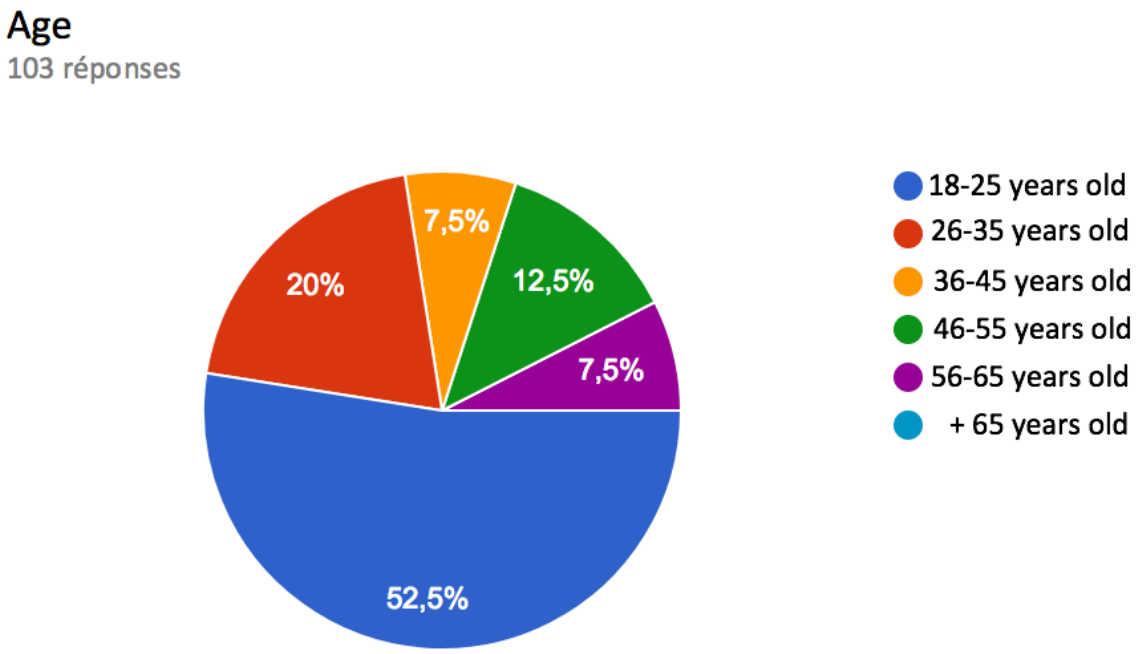
Q13 : pensez-vous que l'IA est la meilleure solution pour effectuer une « rupture » des banques traditionnelles et faire face à une régulation de plus en plus forte et diminuer les coûts des banques de détails ?

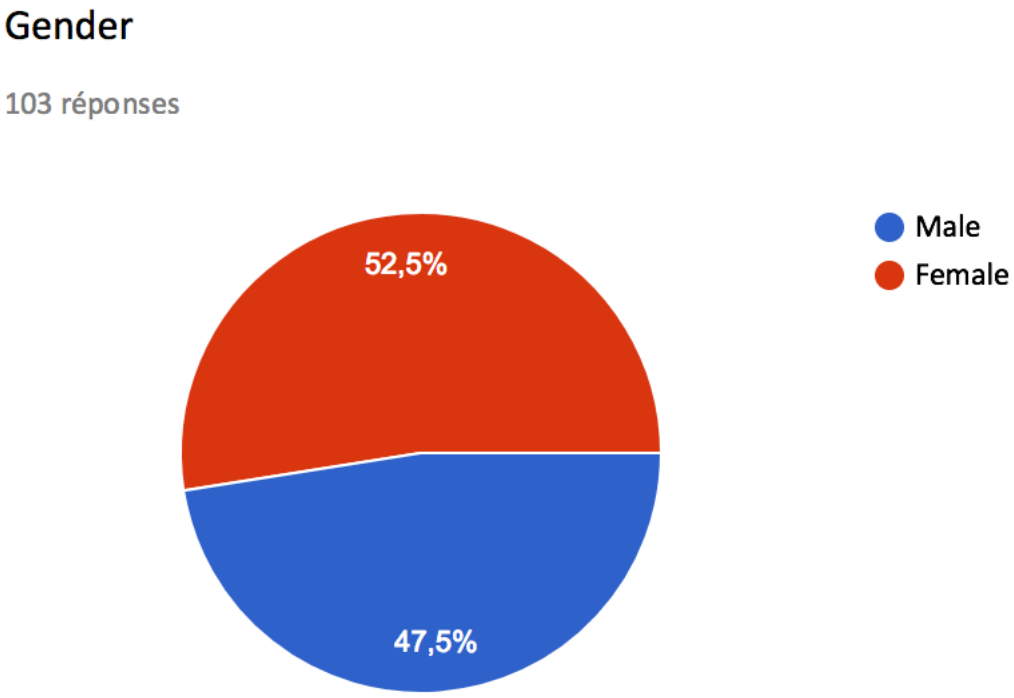
Est-ce qu'il existe une deuxième solution ? la question est également là.
Mais pour revenir à la question, ça sera une bonne solution. La meilleure, à voir, mais si le service que l'IA propose est vraiment au point et ergonomique, alors oui.

Q14 : l'IA : clé du succès ?

L'IA fait partie de l'évolution mais de là à la considérer comme clé du succès.
Un exemple : Microsoft avait implémenté son IA sur twitter au contact des internautes, en l'espace de quelques heures, avec les échanges effectués avec certains internautes, l'IA était devenue raciste et sexiste et en accord avec les propos de Hitler.
Il faut donc contrôler son IA car s'il n'y a pas de contrôle de l'IA, je ne dirai pas qu'il est très facile de la manipuler mais manipulable. C'est quelque chose qui pourrait arriver dans le secteur bancaire si les contrôles ou si les suivies ne sont pas fait.

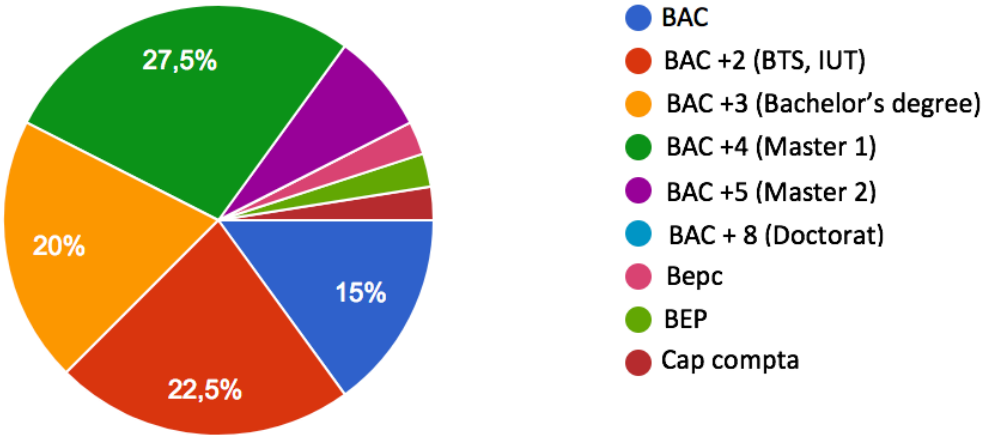
Results of quantitative study





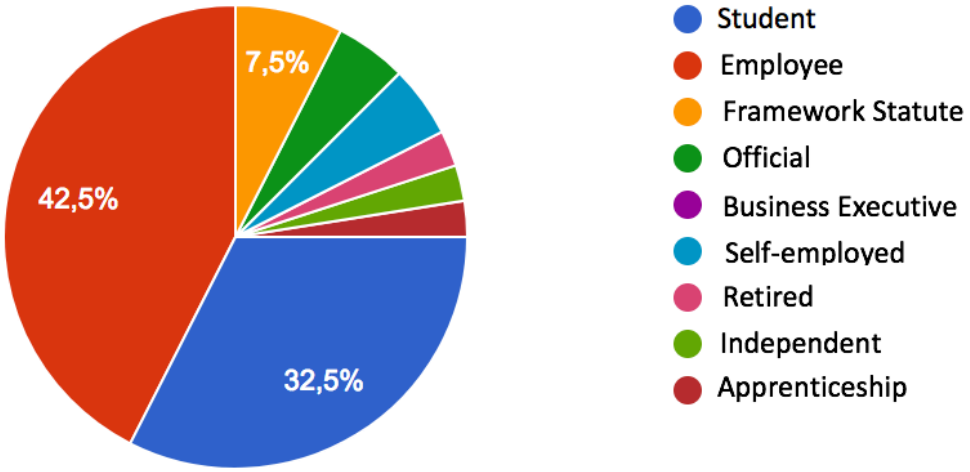
Study level

103 réponses



Professional situation

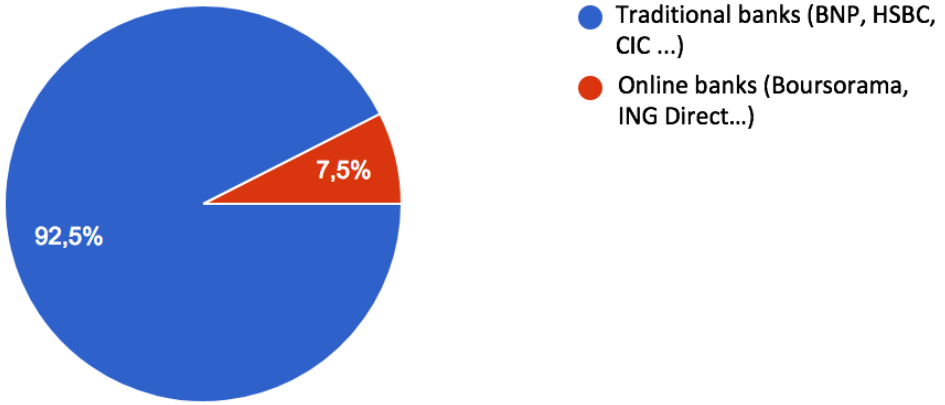
103 réponses



Part 1: Basic questions

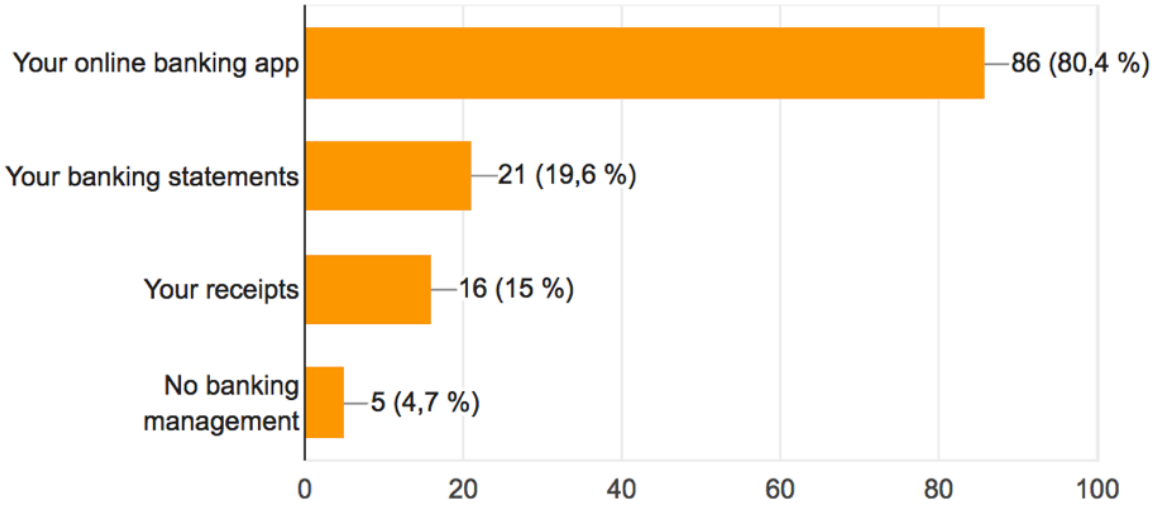
You are consumer within:

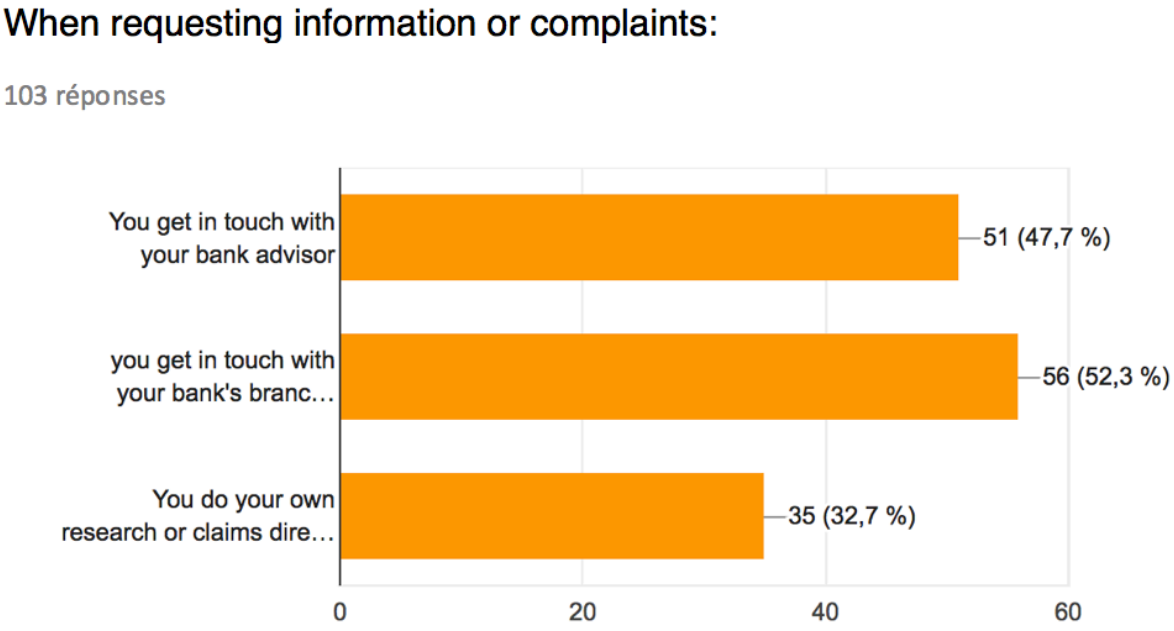
103 réponses



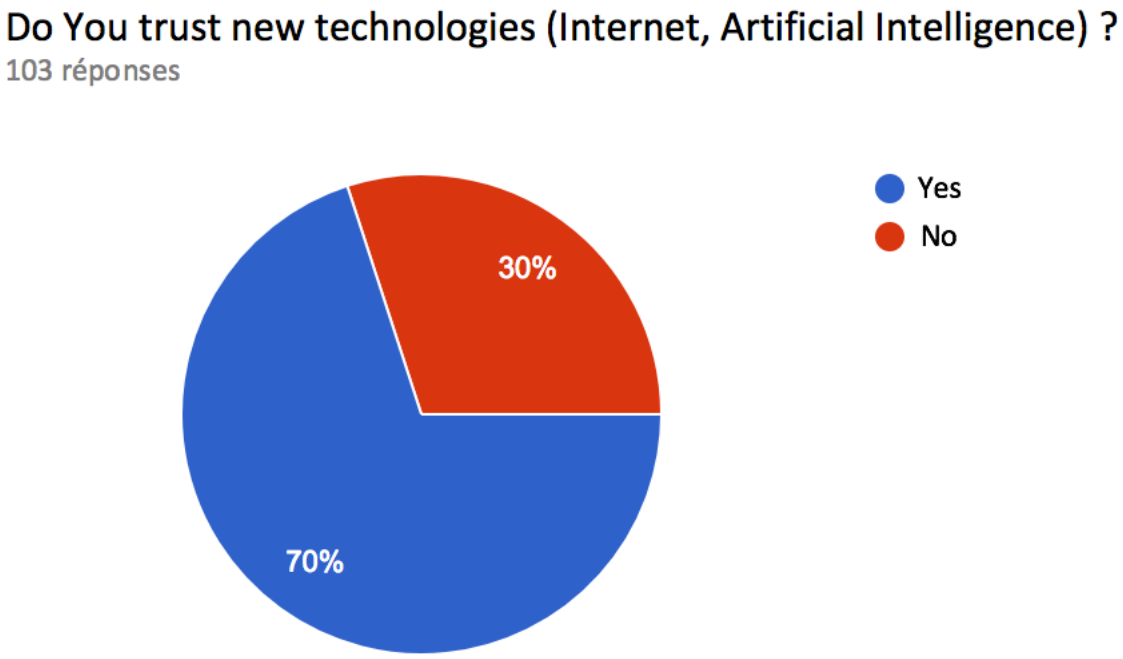
You manage your accounts and your daily expenses through:

103 réponses



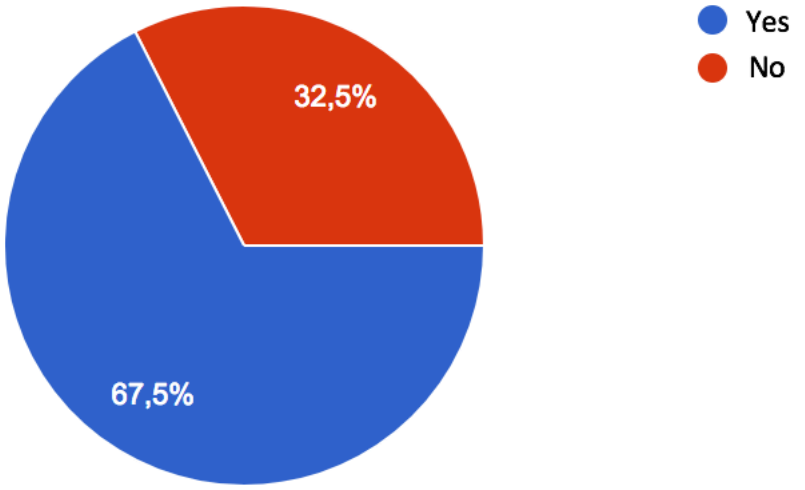


Part 2: confidence Degree in the new technologies



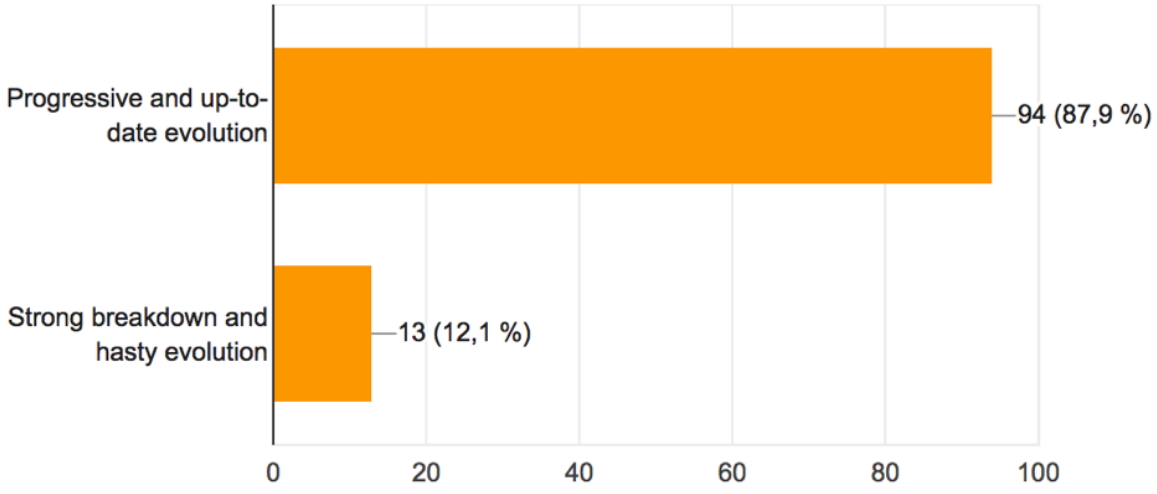
Would you stay in your bank if you had to do all the daily tasks on your own (online credits, account management, online credit simulation)?

103 réponses



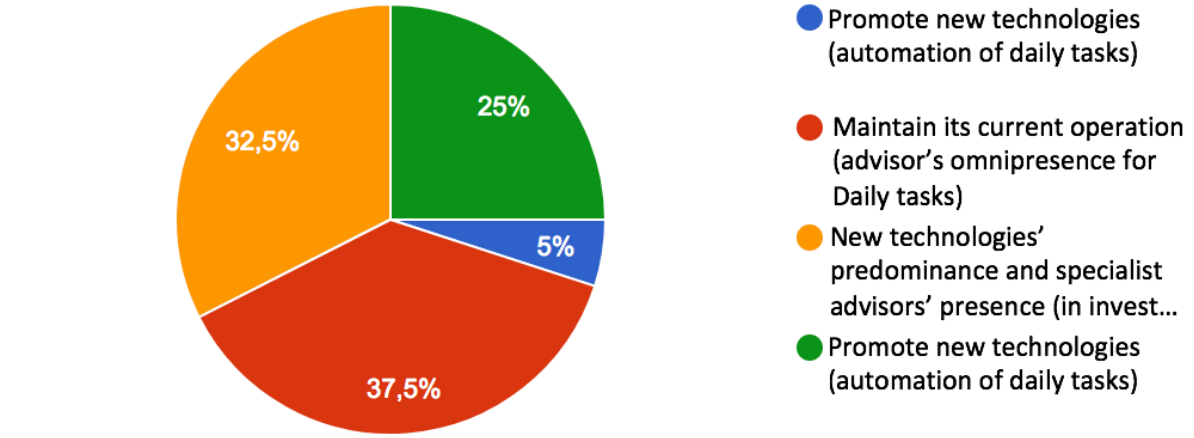
How do you perceive the current evolution of the banking sector?

103 réponses



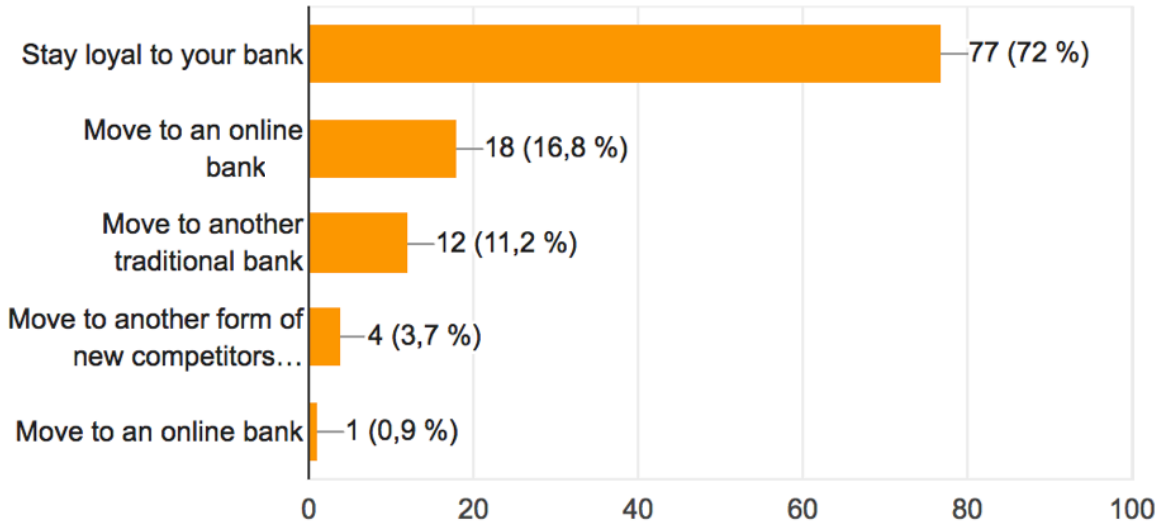
How do you want to see your bank's evolution?

103 réponses



If opportunity arises, you:

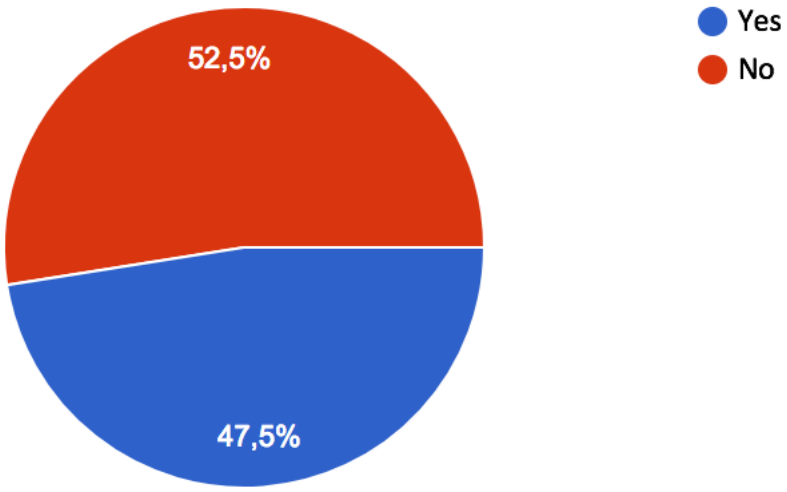
103 réponses



Part 3: private data's protection

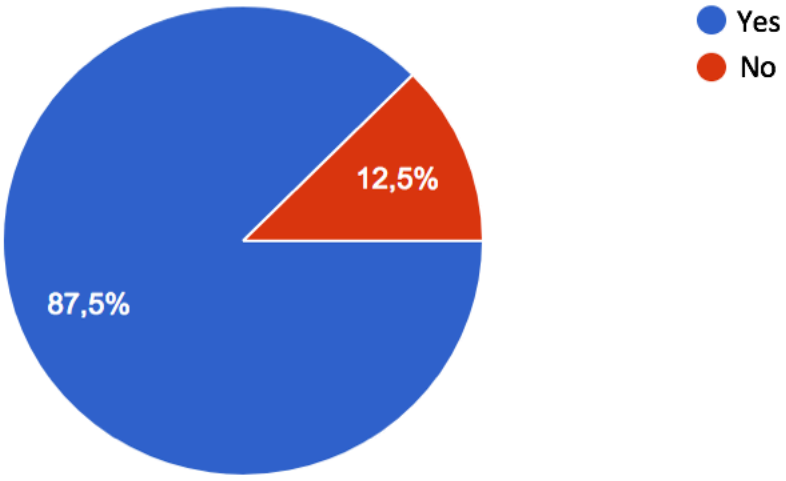
Do you think AI will reduce the risk of cyber-attacks?

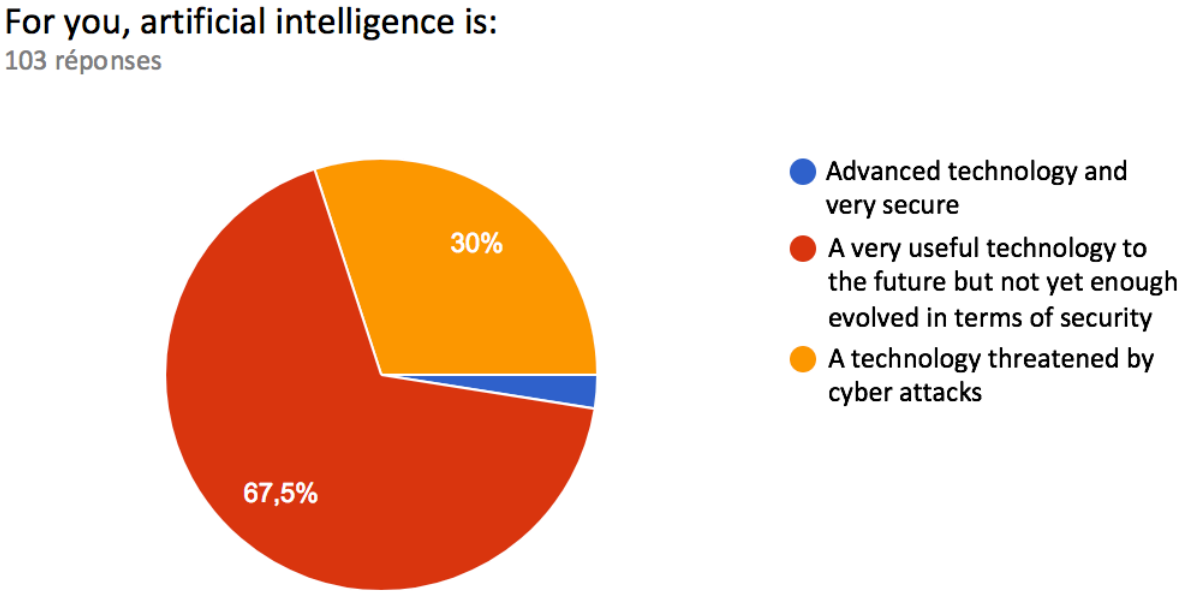
103 réponses



Do you think that the emergence of artificial intelligence (data automation) can be harmful in terms of personal data theft?

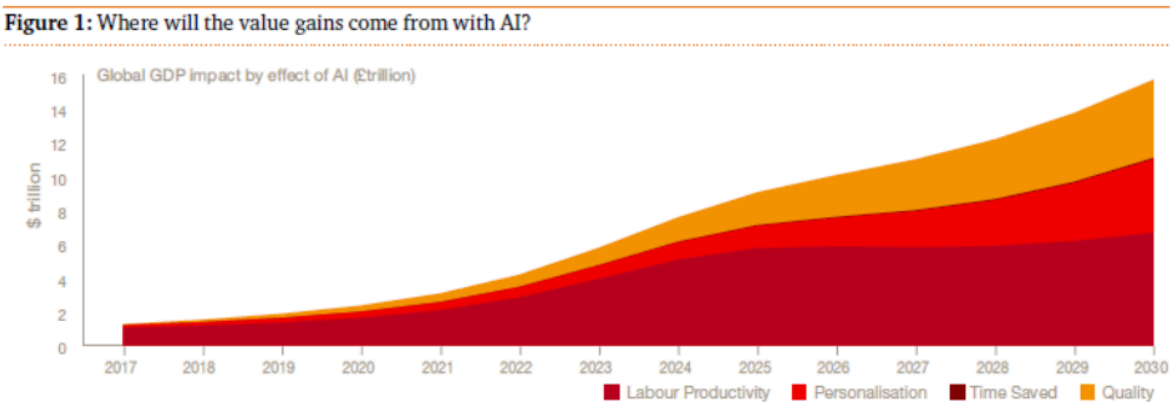
103 réponses





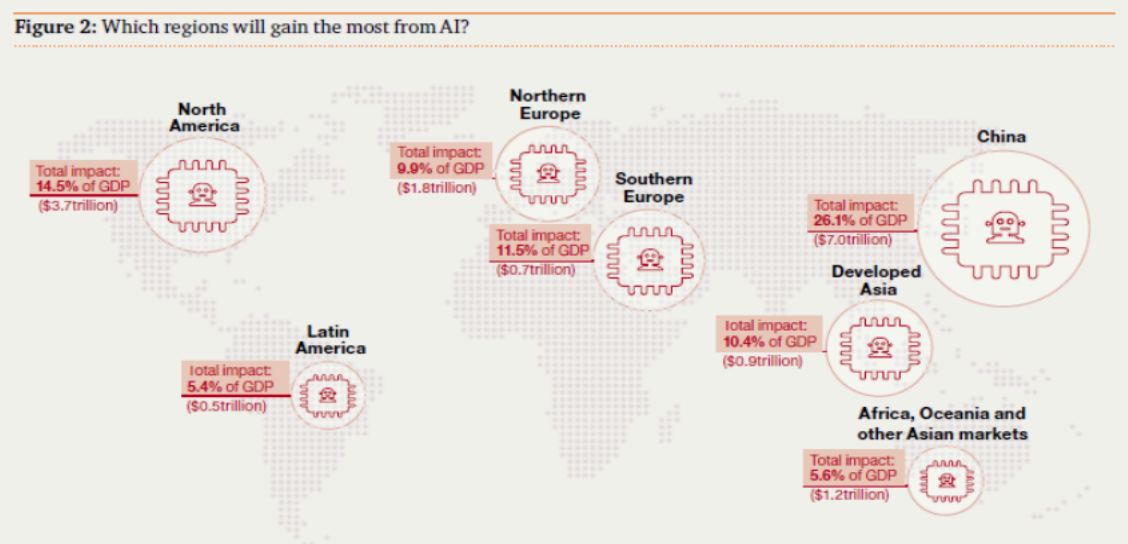
Figures and graphics' Index

Figure 1: forecast of AI growth on global GDP



Source: Gaillard, E & Gallinotti, S. (2017, July 10). Intelligence artificielle : un potentiel de 15 700 milliards de dollars de gains pour l'économie mondiale d'ici 2030. https://www.pwc.fr/fr/assets/files/cdp/2017/07/pwc-cp-ai-impact-index.100717.pdf

Figure 2: Expected GDP growth by regions



Source: Gaillard, E & Gallinotti, S. (2017, July 10). Intelligence artificielle : un potentiel de 15 700 milliards de dollars de gains pour l'économie mondiale d'ici 2030. https://www.pwc.fr/fr/assets/files/cdp/2017/07/pwc-cp-ai-impact-index.100717.pdf

Figure 3: Ranking of the Devices most commonly owned in the US

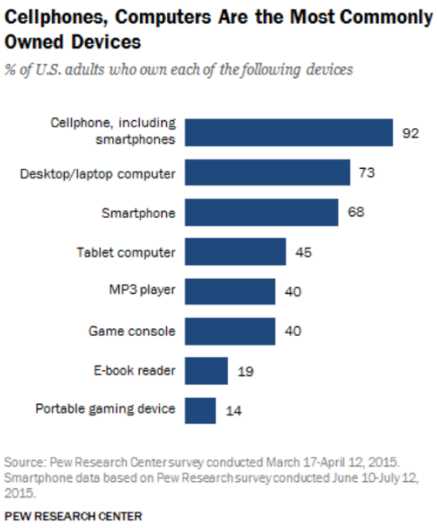


Figure 4: Growth of smartphone' shares in the mobile phone market in the US

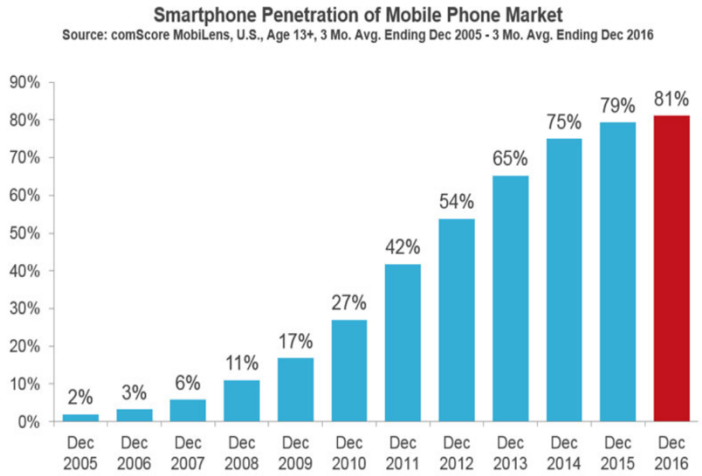


Figure 5: Evolution of banks' digital strategies

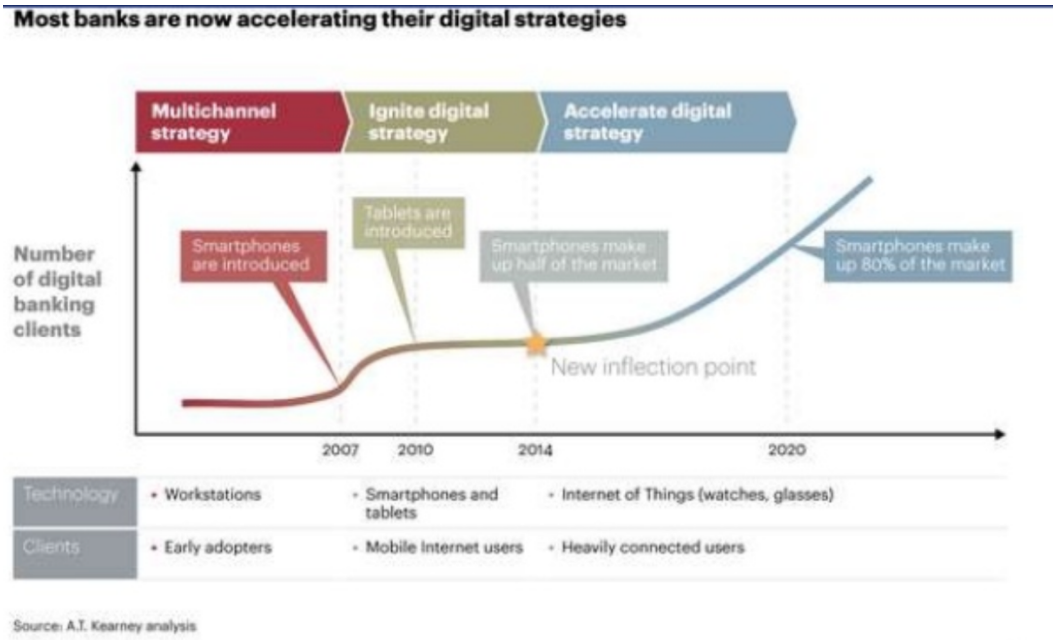
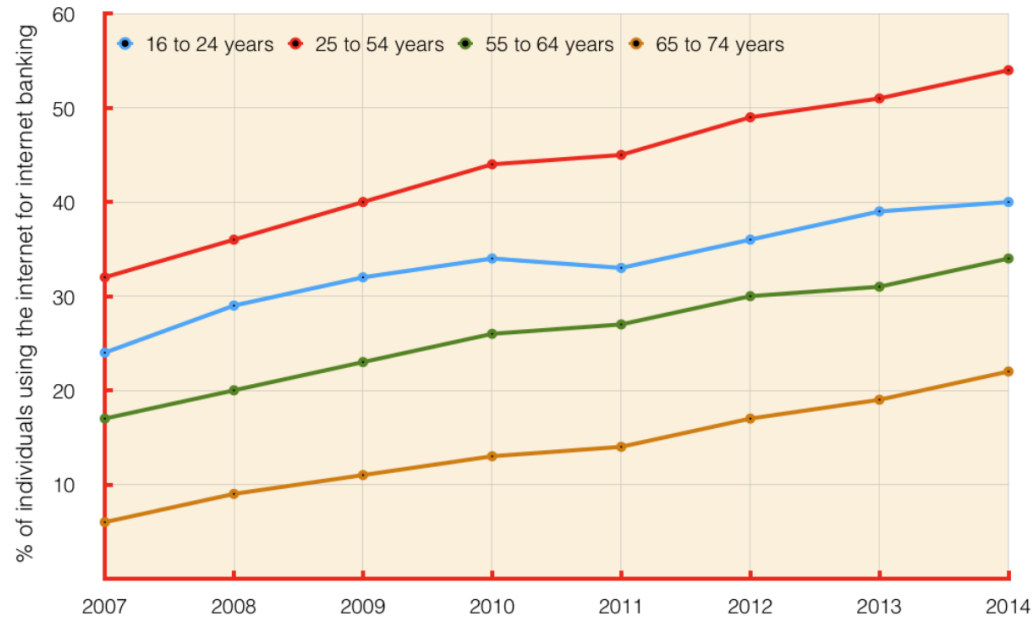


Figure 6: Graph showing the growth in term of internet use for internet banking depending the age.



European Union countries. Source: Eurostat.

Figure 7: Figure showing some information concerning the evolution of the banking sector

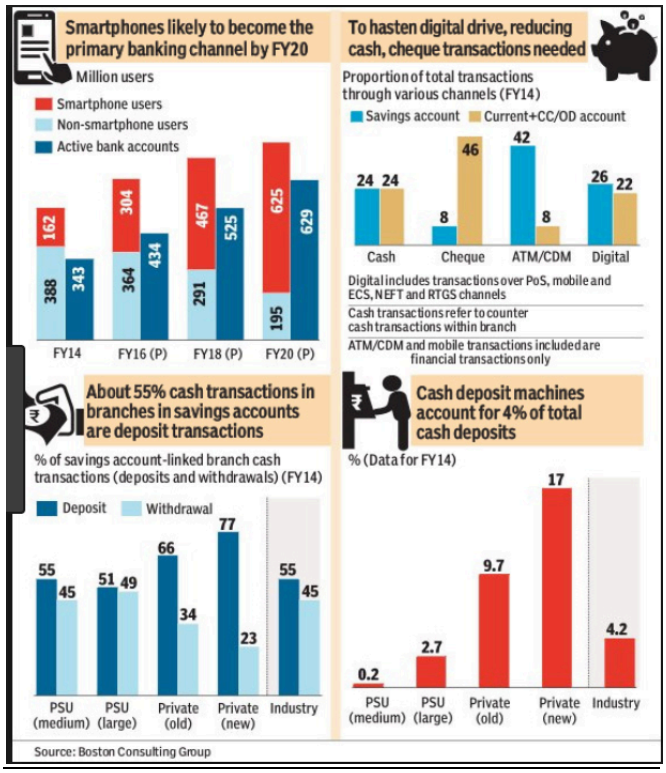


Figure 8: Fintech's growth over 5 years

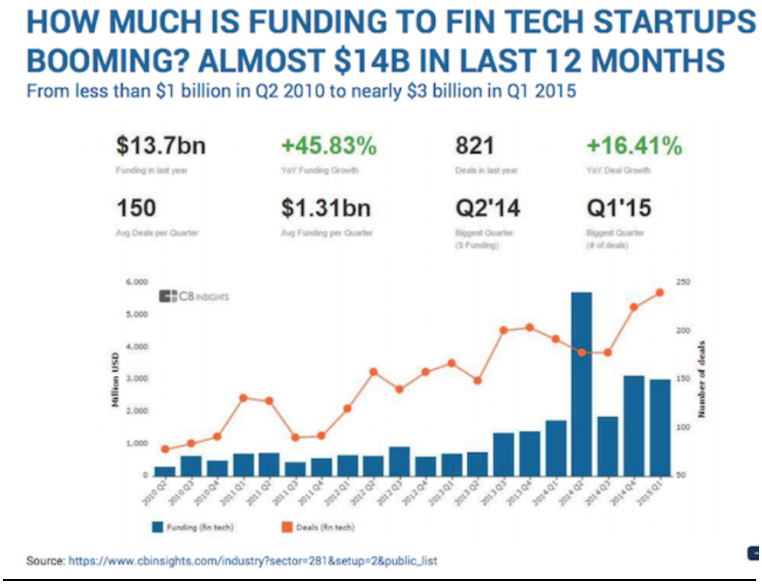
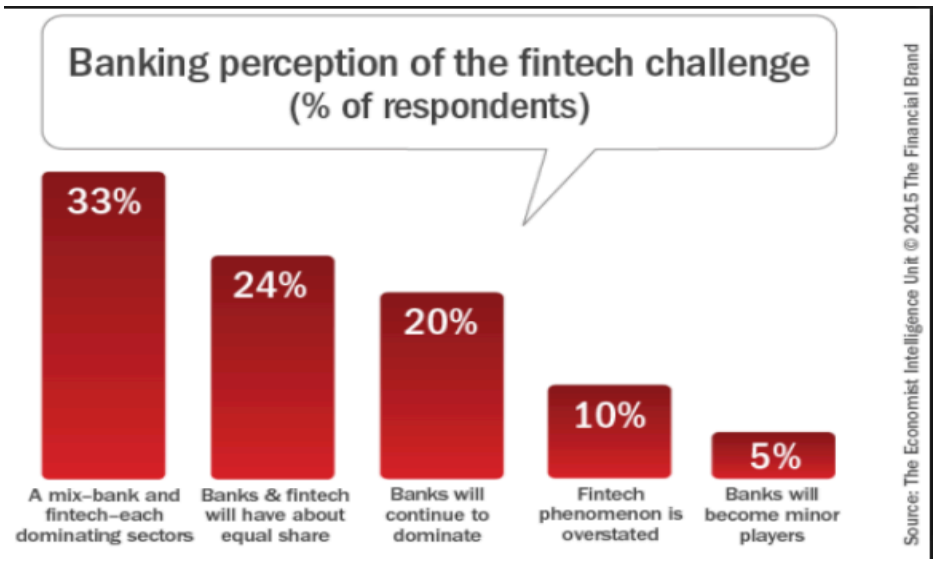


Figure 9: Banking perception of the fintech challenge



Bibliography

Publications

- Struhl, S. (2017). Artificial Intelligence marketing and predicting consumer choice: An overview of tools and techniques (Ed.1). Kogan page.

- De lacoste, A. (2018). What if artificial intelligence could make us more human? Editions Débats Publics.

- Ganascia, J-G. (2017). Intelligence artificielle vers une domination programmée ? (Ed.2). Le cavalier bleu éditions.

- Lorge Parnas, D. (2017). The real risks of Artificial Intelligence. Communication of the ACM. Vol.60, N°10, 31 pages. DOI: 10.1145/31322724.

- Berger, K. (2014). La régulation bancaire et financière face aux crises : Roosevelt et aujourd'hui. Le seuil. N°150, 176 pages. DOI : 10.3917/pouv.150.0077

- Lacan, L. (2009). Vivre et faire vivre à crédit : agents économiques ordinaires et institutions financières dans les situations d'endettement. Presses de Sciences Po (P.F.N.S.P). N°76, 162 pages. DOI : 10.3917/soco.076.0005

Articles

- Duproz, H. (2017, November 7). Intelligence artificielle : quelles applications pour la banque ? Recovered on April 14, 2018, from https://www.bankobserver-wavestone.com/intelligence-artificielle-applications-banque/

- Méheut, C. (2016, August 10). GAFA : la bataille de l'intelligence artificielle fait rage. Recovered on May 6, from https://www.latribune.fr/technos-medias/informatique/gafa-la-bataille-de-l-intelligence-artificielle-fait-rage-591641.html

- Berny, L. (2017, August 20). 1950 : Alan Turing imagine la machine intelligente. Recovered on April 15, from https://www.lesechos.fr/idees-debats/sciences-prospective/030499036890-1950-alan-turing-imagine-la-machine-intelligente-2108541.php

- Henno, J. (2017, August 21). 1956 : et l'intelligence artificielle devint une science. Recovered on April 25, from https://www.lesechos.fr/idees-debats/sciences-prospective/010174900737-1956-et-lintelligence-artificielle-devint-une-science-2108749.php

- Henno, J. (2018, January 9). 1957 : le perceptron, première machine apprenante. Recovered on April 5, from https://www.lesechos.fr/idees-debats/sciences-prospective/010175528502-1957-le-perceptron-premiere-machine-apprenante-2108927.php

- Molga, P. (2017, August 28). 1997 : Kasparov s'incline face à Deep Blue. Recovered on April 25, from https://www.lesechos.fr/idees-debats/sciences-prospective/030475334820-1997-2109945.php

- Molga, P. (2017, August 30). 2013 : Les GAFA se ruent sur le « machine Learning ». Recovered on April 22, from https://www.lesechos.fr/idees-debats/sciences-prospective/030477331969-2013-2110387.php

- Marquis, L. (2018, March 5). La bataille des assistants virtuels. Recovered on April 25, from https://www.ecoreseau.fr/tech/decryptage/2018/03/05/la-bataille-des-assistants-virtuels/

- Tual, M. (2016, June 18). « Google a toujours été une entreprise d'intelligence artificielle ». Recovered on April 19, from https://www.lemonde.fr/pixels/article/2016/06/18/google-a-toujours-ete-une-entreprise-d-intelligence-artificielle_4953195_4408996.html

- Larousserie, D. (2015, June 8). Yann LeCun, l'intelligence en réseaux. Recovered on April 26, from https://mobile.lemonde.fr/sciences/article/2015/06/08/yann-lecun-l-intelligence-en reseaux_4649831_1650684.html

- Cristianini, N. (2016, October 29). The road to artificial intelligence: a case of data over theory. Recovered on April 25, from https://www.newscientist.com/article/mg23230971-200-the-irresistible-rise-of-artificial-intelligence/

- Roux, D. (2017, May 24). La saga du numérique : de la machine à calculer à l'invention du transistor. Recovered on April 20, from https://www.franceculture.fr/emissions/les-cours-du-college-de-france/decouverte-fondamentale-invention-technologique-1

- Guillot, A. (2018, February 19). Petite histoire de l'intelligence artificielle. Recovered on April 18, from https://www.futura-sciences.com/tech/dossiers/robotique-robotique-a-z-178/page/3/

- Retuerta Merino, J. (2017, December 21). Shakey, el primer robot de la historia capaz de razonar. Recovered on April 27, from https://nonstoppeople.es/shakey-primer-robot-capaz/

- Orenstein, D. (2005, October 11). Stanford team's win a robot car race nets $2 million prize. Recovered on April 28, from https://news.stanford.edu/news/2005/october12/stanleyfinish-100905.html

- Rowe, M. (1992, April 23). Solvabilité des entreprises : les banques se dotent de systèmes experts. Recovered on May 2, from https://www.lesechos.fr/23/04/1992/LesEchos/16125-112-ECH_solvabilite-des-entreprises--les-banques-se-dotent-de-systemes-experts.htm

- Pell, N. (2015, 13 April). A secret history of credit scores: who determined what matters and why. Recovered on May 7, from https://www.thestreet.com/story/13097739/1/a-secret-history-of-credit-scores-who-determined-what-matters-and-why.html

- Morisse, T. (2017, October 30). Métiers menacés par l'IA : 4 ans après l'étude d'Oxford, le verdict. Recovered on May 7, from https://www.fabernovel.com/insights/economie/metiers-menaces-par-l-ia-4-ans-apres-l-etude-d-oxford-le-verdict

- Verbeke, L. (2018, March 31). Aux origines de l'intelligence artificielle. Recovered on April 24, from https://www.franceculture.fr/numerique/aux-origines-de-lintelligence-artificielle

- Cuny, D. (2017, December 6). Banques : chacun cherche son chatbot. Recovered on May 6, from https://www.latribune.fr/entreprises-finance/banques-chacun-cherche-son-chatbot-759166.html

- Legalès, Y. (2014, August 30). Le Big Data révolutionne le commerce. Recovered on May 12, from http://blog.lefigaro.fr/legales/2014/08/big-data-radioscopie-dun-nouveau-gisement-dopportunites-pour-la-grande-distributio.html

- Christensen, A. (2016, January 5). Doing Big Things with Big Data at PayPal. Recovered on May 12, from https://www.paypal.com/stories/us/doing-big-things-with-big-data-at-paypal

- Dupin, L. (2013, September 24). Accor chouchoute ses clients grâce à son « big data ». Recovered on May 12, from https://www.lesechos.fr/24/09/2013/LesEchos/21528-145-ECH_accor-chouchoute-ses-clients-grace-a-son---big-data--.htm

- Ladepeche. (2015, May 27). Les applications bancaires dans le top 3 des plus consultées au réveil. Recovered on May 20, from https://www.ladepeche.fr/article/2015/05/27/2112894-applications-bancaires-top-3-plus-consultees-reveil.html

- Bastien, L. (2018, March 21). Intelligence Artificielle et Big Data : une convergence révolutionnaire, Recovered on May 10, from https://www.lebigdata.fr/intelligence-artificielle-et-big-data

- Biancardi, A. (2017, July 20). Comment l'intelligence artificielle investit le secteur bancaire. Recovered on April 18, from https://www.challenges.fr/finance-et-marche/comment-l-intelligence-artificielle-investit-le-secteur-bancaire_488342

- Mignot, V. (2018, April 4). Les fintechs de l'épargne, du crédit ou de la banque au quotidien. Recovered on May 07, from https://www.cbanque.com/banque/fintech.php

- Soubranne, Q. (2017, August 7). Fintech: chaque banque cherche sa start-up. Recovered on May 07, from http://www.lepoint.fr/economie/fintech-chaque-banque-cherche-sa-start-up-05-08-2017-2148261_28.php

- Olmi, S. (2016, May 10). Banque et Fintech: la nécessaire alliance face aux GAFA, recovered on April 25, from https://www.latribune.fr/opinions/tribunes/banque-et-fintech-la-necessaire-alliance-face-aux-gafa-609436.html

- De Vauplane, H. (2015, April 22). La Fintech ou l'apparition d'un nouveau business model bancaire. Recovered on May 13, from https://blogs.alternatives-economiques.fr/vauplane/2015/04/22/la-fintech-ou-l-apparition-d-un-nouveau-business-model-bancaire

- Huguen, P. (2018, 29 mars). Nos banques se convertissent à l'intelligence artificielle. Recovered on April 23, from https://www.capital.fr/entreprises-marches/france-les-banques-de-detail-se-convertissent-a-lintelligence-artificielle-1280232

- Nora, D. (2017, 06 novembre). Banque en ligne : Orange Bank fera-t-elle la révolution ? Recovered on May 13, from https://www.nouvelobs.com/economie/20171103.OBS6902/banque-en-ligne-orange-bank-fera-t-elle-la-revolution.html

- Thibout, C. (2017, December 12). Quand le Big Data s'allie à l'intelligence artificielle. Recovered on May 11, from https://chronik.fr/big-data-intelligence-artificielle-vers-tournant-securitaire.html

- Tual, M. (2017, August 08). Au-delà des fantasmes, quels sont les problèmes concrets que pose l'intelligence artificielle ? Recovered on May 02, from https://www.lemonde.fr/pixels/article/2017/08/03/au-dela-des-fantasmes-quels-sont-les-problemes-concrets-que-pose-l-intelligence-artificielle_5168330_4408996.html

- Tual, M (2016, March 26). A peine lancée, une intelligence artificielle de Microsoft dérape sur Twitter. Recovered on May 15, from https://www.lemonde.fr/pixels/article/2016/03/24/a-peine-lancee-une-intelligence-artificielle-de-microsoft-derape-sur-twitter_4889661_4408996.html

- Mabille, P. (2017, February 15). Face à l'intelligence artificielle, augmenter le QI de l'humanité. Recovered on May 15, from https://www.latribune.fr/opinions/editos/face-a-l-intelligence-artificielle-augmenter-le-qi-de-l-humanite-639007.html

Reports:

- Gaillard, E & Gallinotti, S. (2017, July 10). Intelligence artificielle : un potentiel de 15 700 milliards de dollars de gains pour l'économie mondiale d'ici 2030. Recovered on May 10, from https://www.pwc.fr/fr/assets/files/cdp/2017/07/pwc-cp-ai-impact-index.100717.pdf

- Blanc, P. (2017). L'intelligence artificielle dans la banque : emploi et compétences. Observatoire des métiers de la banque.

- Deloitte. (2016). Banking on the future: Vision 2020. Confederation of Indian Industry.

Website:

- La banque BCEE. https://www.bcee.lu/fr/mia/

- Arcep. (2017) équipements et usages du numérique, Baromètre du numérique : publication de l'édition 2017. Recovered on May 16, from https://www.arcep.fr/index.php?id=8571&no_cache=0&tx_gsactualite_pi1%5Buid%5D=2097&tx_gsactualite_pi1%5Bannee%5

Table of content