

A work project presented as part of the requirements for the Award of a Master Degree in Finance from the NOVA – School of Business and Economics

**DISRUPTIVE TECHNOLOGIES TO HELP BANKS BUILD A SUSTAINABLE COMPETITIVE  
ADVANTAGE – CUSTOMER AND EMPLOYEE PERCEPTION**

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## ABSTRACT:

Institutions are recovering from the financial crisis and show high resilience and liquidity levels to develop their own perspective of tendencies to explore. The current and most strong tendency is technology, a key driver of change across all banking dimensions. Banks investments in disruptive technologies impact both the customer experience and the financial labour market. In customer experience, traditional institutions are required to shift to a seamless, convenient and tailor-made user experience. Ultimately, the development of Artificial Intelligence empowers job creation and increased productivity while replacing positions where the core value activity does not require cognitive and interactive skills .

## KEYWORDS:

- Artificial Intelligence (AI)
- Automation
- Advanced Analytics
- Banking



# 2. Banking Revolution

2.1 Banking overview

2.2 Repercussions on the Labour Market

2.3 Changes in Customer Experience

## 2.1 Banking overview

Financial Services landscape is being totally reshaped and technology disruption poses a massive challenge to institutions

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<b>2.1</b> Banking Overview	<b>Banks Performance</b>	<ul style="list-style-type: none"><li>- Institutions are recovering from the financial crisis and show resilience and liquidity to create their own perspective of tendencies to explore</li><li>- The current and most strong tendency: Technology. A key driver of change across all its dimensions in banking</li></ul>
	<b>Tendencies influencing banking</b>	
	<b>Outcomes</b>	
<b>2.2</b> Changes in Customer Experience	<b>Challenges</b>	<ul style="list-style-type: none"><li>- Growing digitalization and changing demographics reveal the need to tackle customer loyalty issues</li><li>- Financial Institutions need to provide, at the speed and scale required, the expected level of customized experiences and services</li></ul>
	<b>Personalization</b>	
<b>2.3</b> Repercussions on the Labour Market	<b>Job cuts</b>	<ul style="list-style-type: none"><li>- Artificial intelligence to replace positions where the core value activity does not require cognitive and interactive skills</li><li>- Technology transformation impact in the job market is changing the ground where financial services jobs were built</li><li>- Ultimately, the development of Artificial Intelligence empowers new job creation in the financial labour market</li></ul>
	<b>Job improved efficiency</b>	
	<b>Job creation</b>	

## 2.1 Banking Overview

Institutions are recovering from the financial crisis and show resilience and liquidity to create their own perspective of tendencies to explore

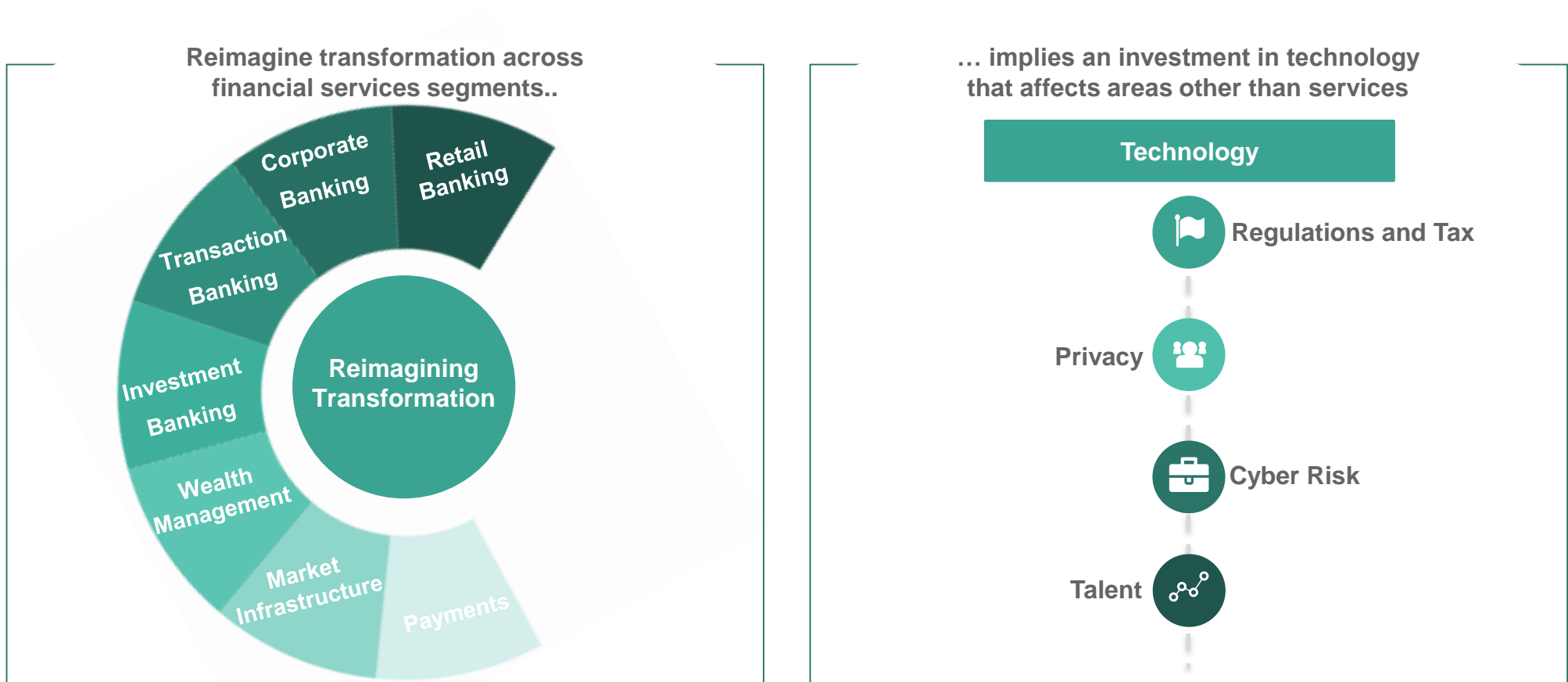
Banks Performance



## 2.1 Banking Overview

Current trends are influencing the way banking organizations invest their resources across the different financial service segments

Tendencies influencing Banking



Services need to rethink their strategic transformation across four areas that impact people and organizations overall

## 2.1 Banking Overview

### Technology is at the core of the evolving trends influencing the Banking sector

#### Tendencies influencing Banking

##### Regulation

*Serious question on data management*

- **Regulatory Divergence:**
  - PSD2 to make banks customer data accessible to third parties
  - GDPR to ensure the privacy of banks customer data
- **Consequences:**
  - Increase bank operational risk
  - Compliance issues

##### Technology

*Banking Digital Transformation*

- **FinTech's** as partners in Financial Innovation
- Double-down on **internal technology**
- **Challenge:**
  - Data as an asset to generate great value
  - Blockchain technology and quantum computers, crucial for data modelling and advanced analytics, requiring high CAPEX

##### Human Talent

*Learning How to Learn*

- Shape employees to be creative and problem solvers
- Capacity to **anticipate change and evolving trends** to promote desirable training on required skills
- **Scale Learning** to create competitive advantages: intuition, persuasion, and empathy could command a premium in a machine-dominated world.

##### Privacy

*Privacy Policies are short-term solutions*

- **Consumers sensitive on privacy issues:**
  - Transparency on the know how of data processing and data shared
- **AI, Advanced Analytics** and other new technologies to **increase the complexity of banks privacy policies**
- Insecurities on data protection when data itself is a competitive advantage

##### Payments

*Reshaping the Industry Landscape*

- Increased competition between banks and FinTech's lead to new digital solutions for payment services:
  - **Contactless in-store payment** are expected to reach \$2 Trillion by 2020
- Increase in consumer relations and expectations due to simpler processes
- Lower fees for card payments
- Security strengthening

##### Cyber Risk

*Risk Management disruption*

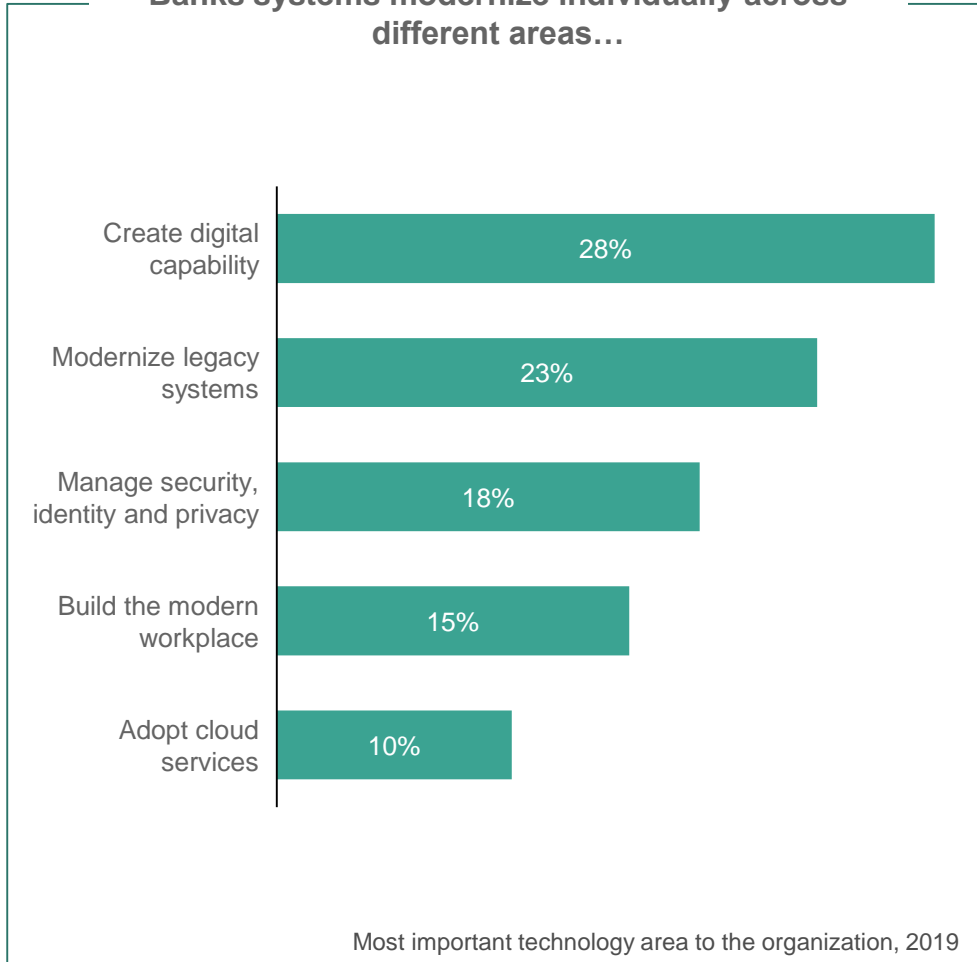
- Technology as the disruptor:
  - **Account takeover frauds** have replaced the counterfeit card fraud has the top fraud
- Banks risk profile to escalate:
  - High levels of data used by AI and algorithm systems raise concerns over data protection and privacy
  - Missing stronger IT infrastructure, regulation and Applying AI and advance analytics at scale

## 2.1 Banking Overview

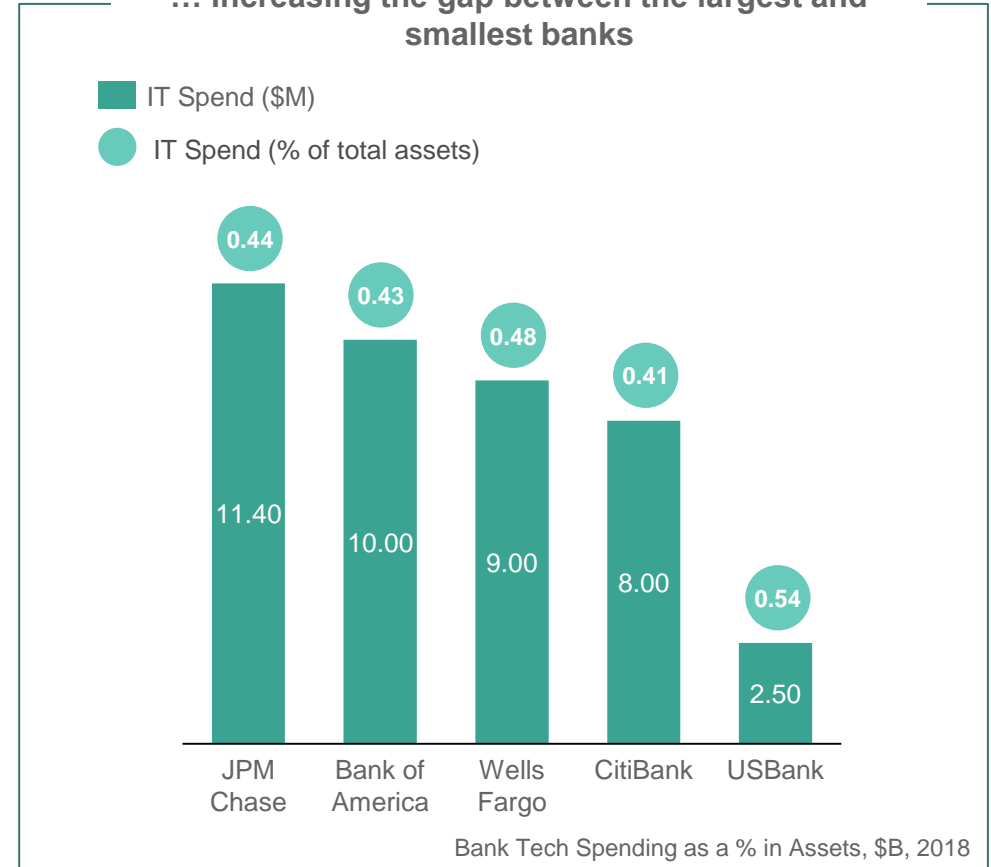
In the technology landscape, banks accelerate their digital transformation efforts as the digital revolution approaches the Financial Sector

Outcomes

Banks systems modernize individually across different areas...



... Increasing the gap between the largest and smallest banks



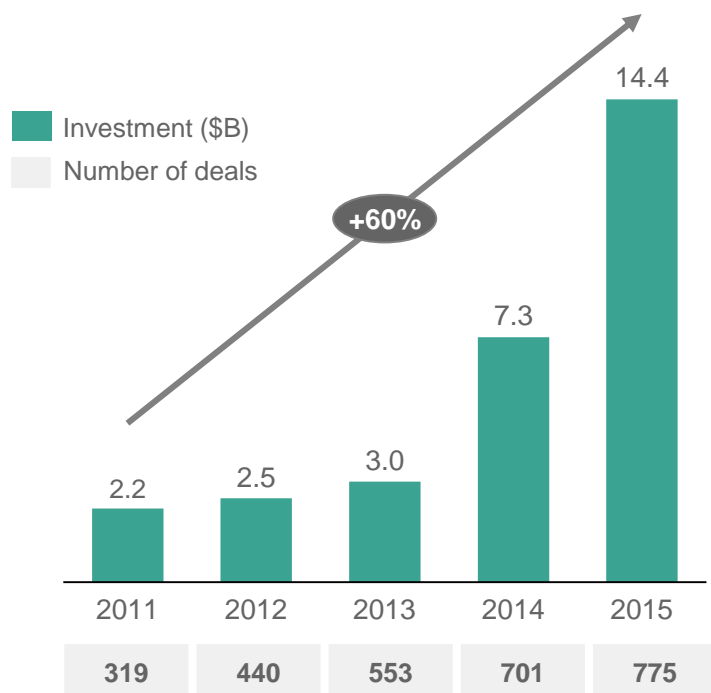
Regional Institutions at a competitive disadvantage

## 2.1 Banking Overview

As FinTech's become part of the mainstream of financial services industry, banks drive their investments towards the emerging players

Outcomes

Goldman Sachs, Citi and Santander were the most active investors among banks...



Annual Global VC Investment in Fintech, \$B

...to invest in FinTech's from different service lines



1. Savings marketplace that offers clients access to higher-interest saving products. **Goldman Sachs** invested **€25 million**



2. Fintech that powers payments for crowdfunding platforms and provides payments infrastructure to any business making transactions online. **JPM** invested **€400 million**

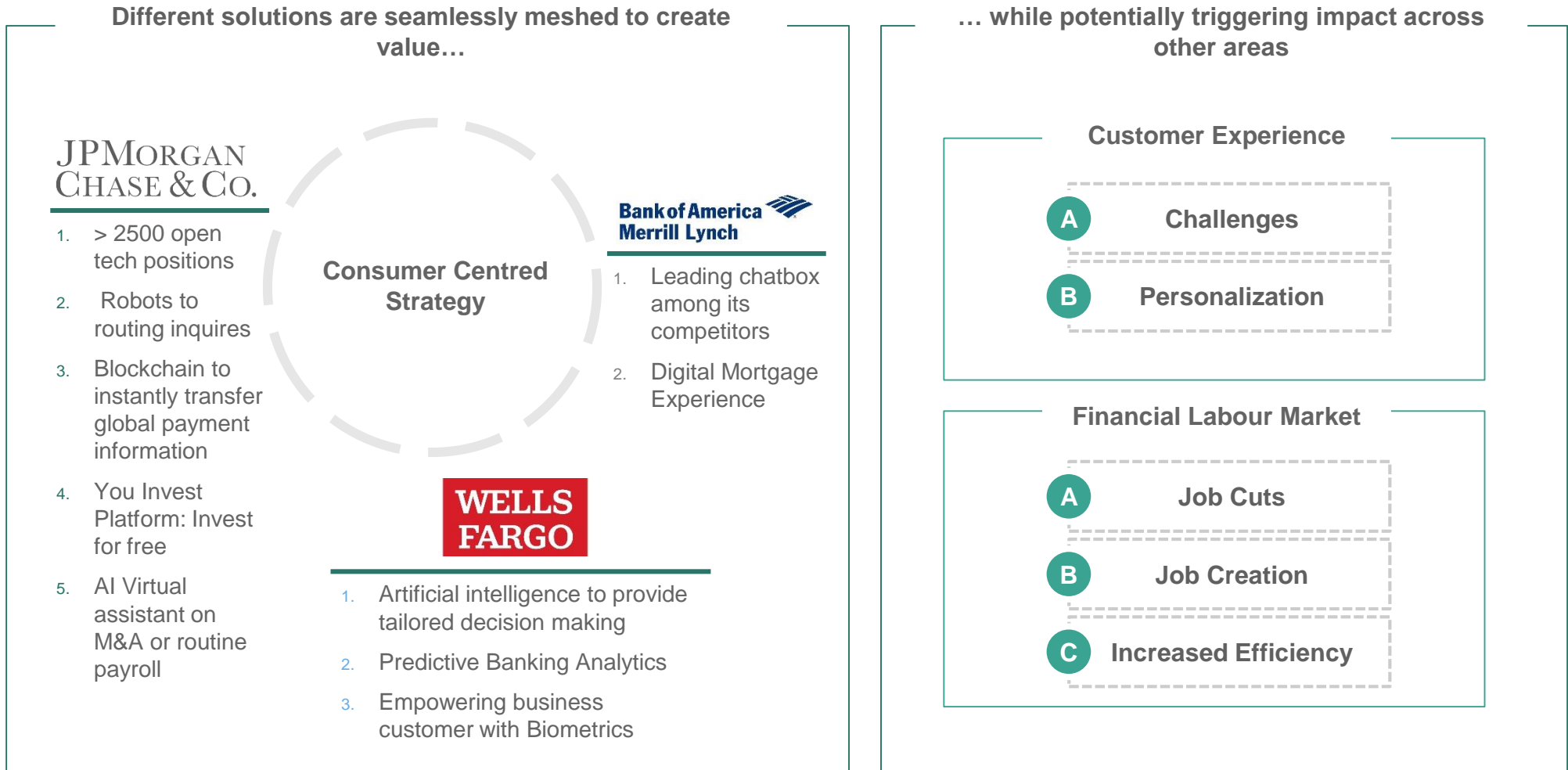


3. Service provider: i) foreign exchange, ii) cash management, iii) trade finance (small and medium businesses). **Santander** invested **€408 million**

## 2.1 Banking Overview

Such high-volume investment drives institutions to create specialized teams in technology solutions that capture value

Outcomes



## 2.2 Changes in Customer Experience

The impacts of technology disruption in the current banking structure is changing drastically as a result of dynamic market conditions

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	Tendencies influencing banking	
	Outcomes	
2.2 Changes in Customer Experience	Challenges	<ul style="list-style-type: none"><li>- Growing digitalization and changing demographics reveal the need to tackle customer loyalty issues</li><li>- Financial Institutions need to provide, at the speed and scale required, the expected level of customized experiences and services</li></ul>
	Personalization	
2.3 Repercussions on the Labour Market	Job cuts	<ul style="list-style-type: none"><li>- Artificial intelligence to replace positions where the core value activity does not require cognitive and interactive skills</li><li>- Technology transformation impact in the job market is changing the ground where financial services jobs were built</li><li>- Ultimately, the development of Artificial Intelligence empowers new job creation in the financial labour market</li></ul>
	Job improved efficiency	
	Job creation	

## 2.2 Changes in Customer Experience

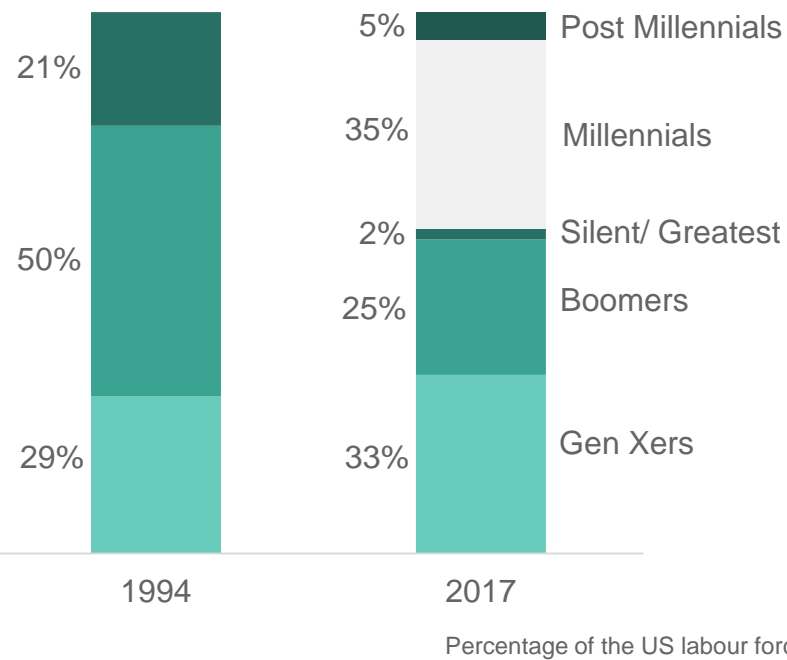
Understanding the problem to adapt the Bank's business strategy, shortening the gap between the customers expectations and the service experience provided

Introductory

Changing demographics requires banks to rethink their strategy

"The pace of change has never been this fast, yet it will never be this slow again"

Justin Trudeau



Digitalization changes what customers expect from their banks

- Consumers expect **seamless, fast and hassle-free** digital solutions

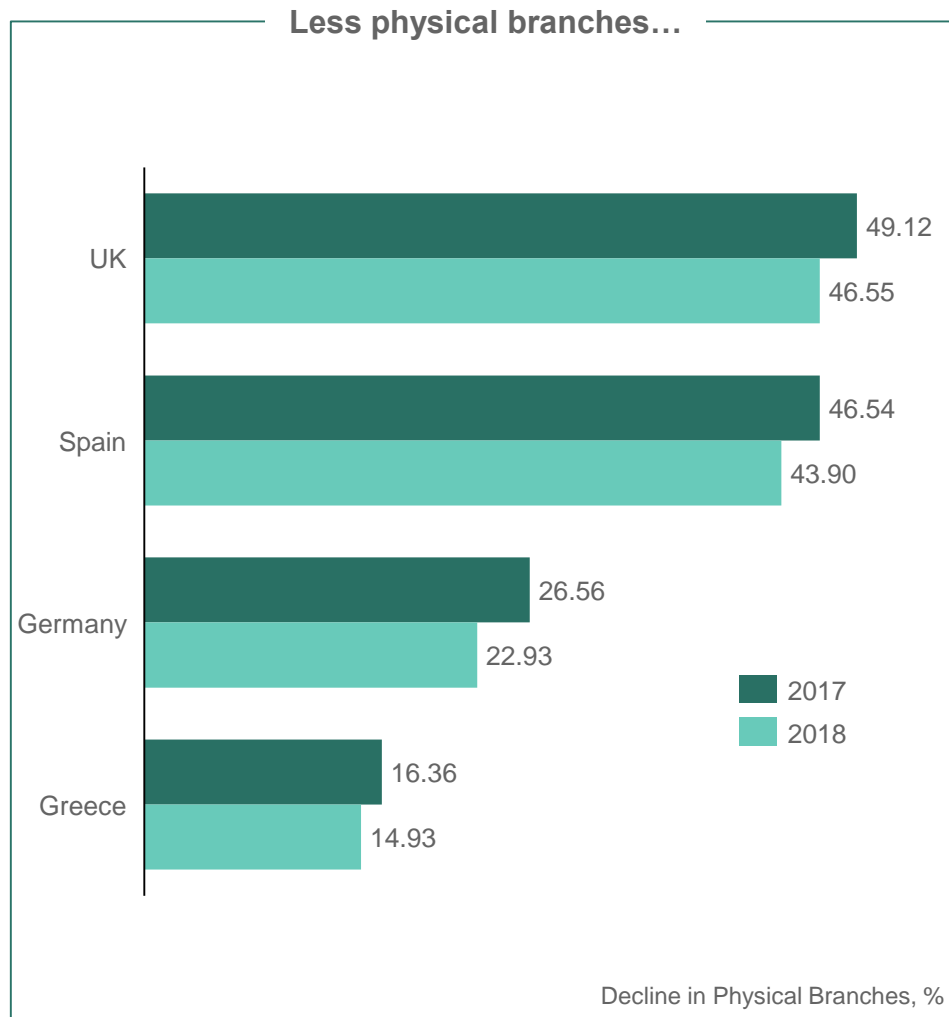
How should banks react?

1. Understand trends shaping customer expectations
2. Identify dimensions of concern
3. Propose a strategy to leverage disruptive technologies
4. Define key strategic deliveries from banks to customers

## 2.2 Changes in Customer Experience

### Internet penetration unleashes new challenges to the interaction between Banks and consumers

Challenges 



...and less human interaction



#### Business Relationships

- By 2020, people will manage **85%** of business relationships without human interaction



#### Branch visits

- By 2022, a typical consumer will decrease the number of visits to a bank branch **from 7 to 4** times a year



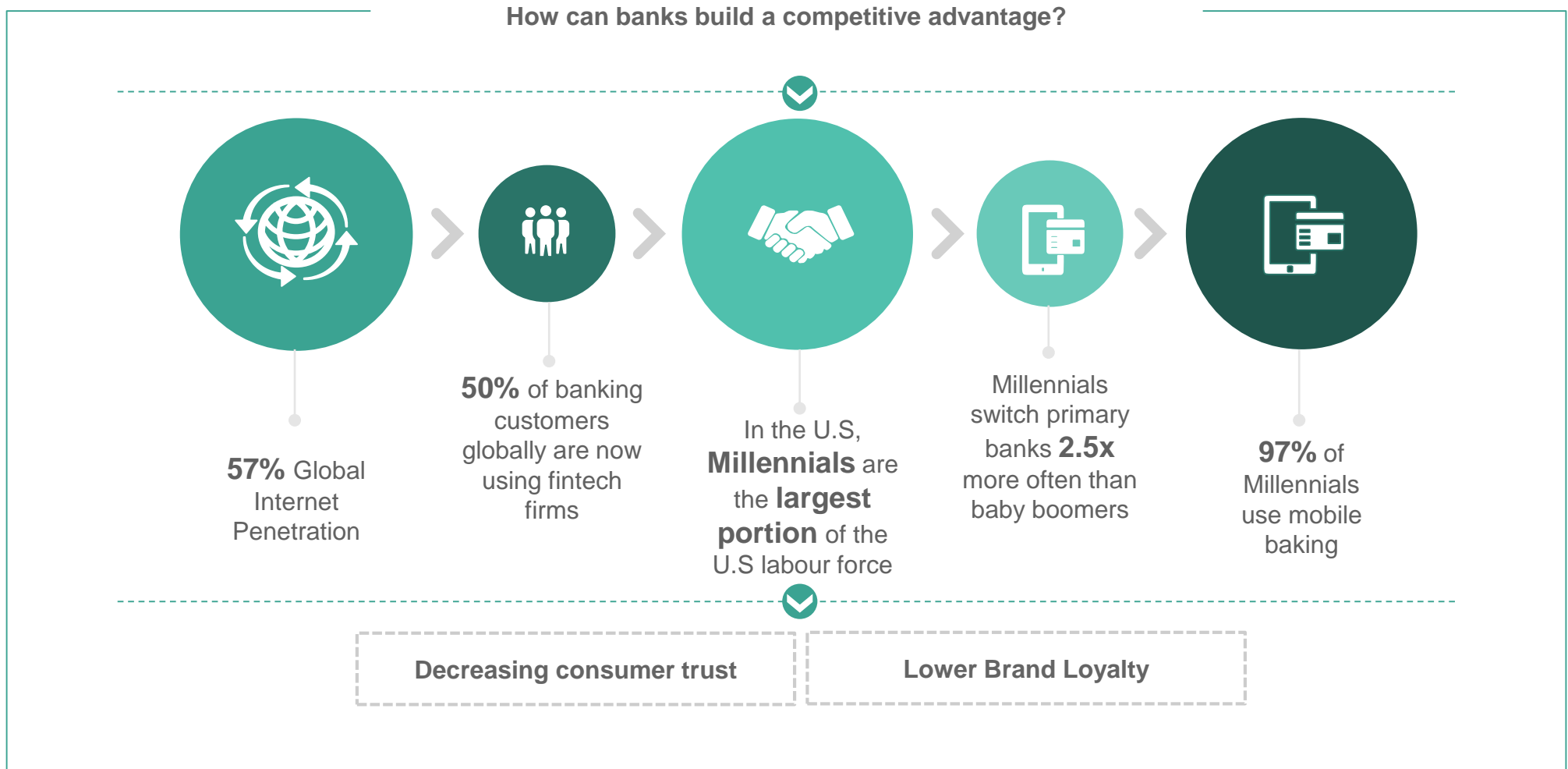
#### Mobile Transactions

- By 2022, mobile transactions and accesses will rise **121%** via apps and secure sites

## 2.2 Changes in Customer Experience

Additionally, growing digitalization and changing demographics reveal the need to tackle customer loyalty issues

Challenges



## 2.2 Changes in Customer Experience

### Decreasing consumer trust from the financial crisis era is still an issue in the current market environment, endangering Banks' client portfolios

Challenges 

Earning consumers loyalty is harder than ever for banks as BigTech companies emerge with financial products

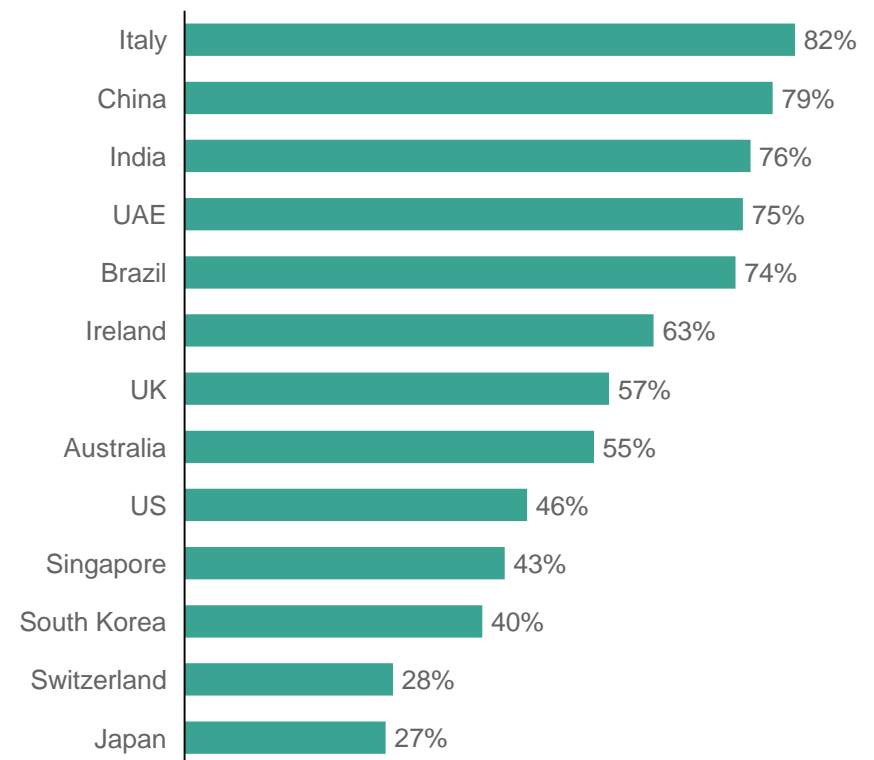
**Shift towards other players:** decreasing brand loyalty

- Increased demand on non-traditional banking channels for financial transactions
- Deliver seamless and convenient services
- Significant increase in the number of neo-banks across the globe, competing with banks across the consumer banking products.



...of customers globally would consider switching their accounts to BigTechs, if they offered financial products

Consumer willingness to try financial products offered by tech companies is increasing



% of respondents who trust at least one tech company more than banks in general, 2019

## 2.2 Changes in Customer Experience

### Decreasing brand loyalty coupled with emerging financial players, increase market competition and pressure on Banks' margins

Challenges

#### Consumer banking revenues at risk of price disruptions from tech-enabled competitors

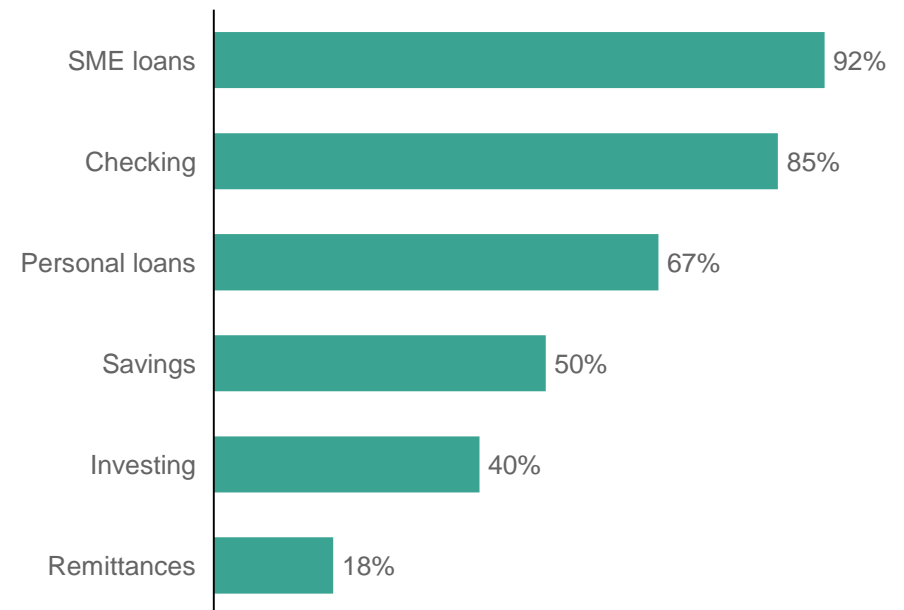
##### Pricing and margin pressure for incumbents is rising

- Low cost models of the tech-based players
- With competitive deals available through disruptors, banking customers have become price-sensitive
- Services with higher propensity for automation and limited differentiation continue to face most disruption and pricing pressure
- The threat from payment apps is more accentuated compared to digital banks

##### Banks efforts in upgrading consumer experience are crucial to overcome this threat

- Upgrade to a seamless, convenient and tailor-made user experience

#### Checking and personal loans at most risk of price disruption



Product price offered by Disruptor as % of traditional bank pricing, 2018

## 2.2 Changes in Customer Experience

The locus of brand loyalty has shifted, in recent years, from a friendly service at branch level to the simplicity and convenience of a digital service

Challenges

### Migration of customers to self-service mobile and online...



#### 50% higher loyalty scores

- by mobile-first consumers relative to low-digital customers to their banks



- Features depend largely on strong digital channels and the ability to teach customers to use them
- Earn greater customer loyalty by developing simple, digital channels that customers embrace

- **Investments in digitalization** to achieve the high-quality service experience, necessary to **retain customer loyalty**

### ... requires a strategy to persuade customers to go digital

#### At first, banks can adopt certain measures...

- Actively marketing digital services
- Convince about safety of online banking
- Customized & improved digital services
- Offer fee reductions

#### ... followed by stricter policies to force digital adoption

- Higher fees for offline services
- Introduce longer wait times
- Eliminate paperwork & physical transactions

## 2.2 Changes in Customer Experience

### Banks investments in disruptive technologies are crucial for service digitalization but physical interaction with clients is still a relevant factor in service personalization

Personalization

Customers prefer Banks that offer convenience of engagement...

#### Customer interaction

- Mobile apps and online interactions are key, but banks cannot solely depend on driving digital interactions

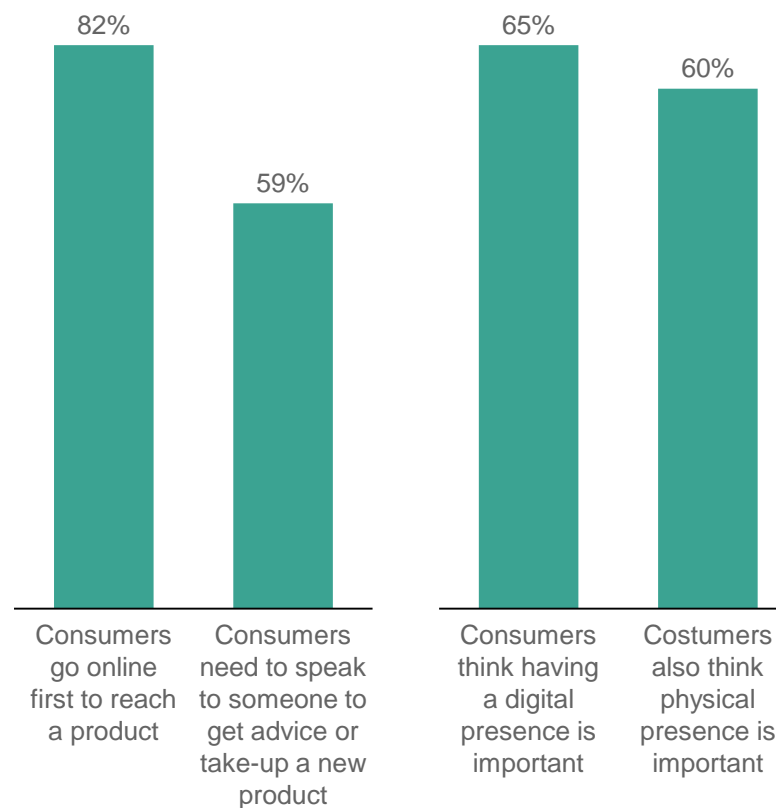
Investing in omni-channel experience coupled with enhanced digital offerings

#### Distribution Channels

- Multiple channels can increase complexity and cost: regarding banks' data management and customer experience design

Develop a single customer view and face multiple challenges in gathering, standardizing and analysing customer data

... and appreciate the alignment between digital service and physical branch benefits



% of respondents to the 2016 EY consumer banking survey

## 2.2 Changes in Customer Experience

Financial Institutions need to provide, at the speed and scale required, the expected level of customized experiences and services

Banks need to deliver meaningful and powerful tailored experiences...



### Personalize customer interactions

- Every \$100 million in assets can return as much as **\$300** million in revenue growth



- Deliver the right individual experience through the right channel at the right time
- Leverage banks competitive advantage:
  - Existing data
  - Everyday customer touchpoints
  - Scale

### Revolutionary changes

- Deliver personalization across the stages of customer prospection, engagement and retention
- Develop a new infrastructure and culture according to digitalization trends

... across all service channels, based on four core elements



### Customer DNA

- Single and dynamic view of each customer at any given moment



### A personalized curriculum

- Service offerings that define desired behaviours and create a strategy to motivate customer consumption



### An analytics engine

- Analytics enables banks continuous learning on costumers' behaviours
- Enables flexibility to create customized offers



### Scale

- Scale across all the ways they engage with customers



Ultimately, personalization can provide:

- Lower customer churn rates
- Higher sales

## 2.2 Changes in Customer Experience

Artificial Intelligence is the key to client customized services and lower friction throughout the customer journey

Personalization

Increasingly seen as competitive advantage...



### Enhance efficiency

- Seamless and automated user engagement
  - Robot advisory **80%** more cost effective than traditional models
- Notify clients in real-time in unsustainable spending levels given typical income and expense



### Scale nonlinearity

- Enhance human interactions
  - Virtual agents to handle **1.5-2** million more customer queries



### Accelerate & Enhance decision insights

- Increase the quality of financial advice and targeted insights
  - Increase targeting returns by **2x**



### Security

- Secures the accounts by detecting any anomalies and fraudulent activities

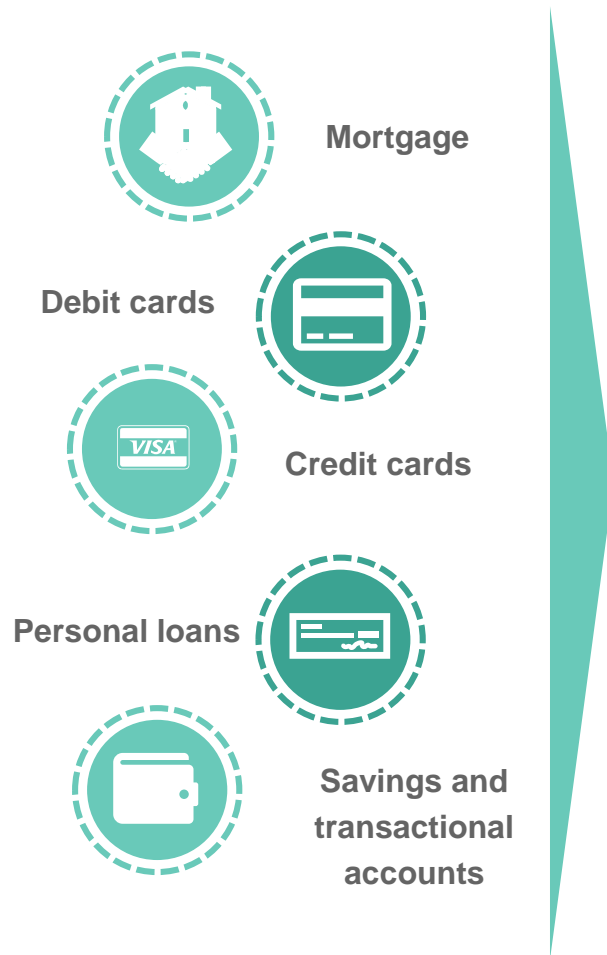
... and as an enabler of growth to simplify day-to-day transactions

Banking Segment	AI use-cases	Case in point
Consumer Banking	Chatbots/ Digital agents	HSBC
	Automated spend and Investment advisory	
	Target & personalize customer offers across channels	CHASE
Treasury and Trade solutions Banking	AI based analytics for liquidity optimization	J.P.Morgan
Investment Banking	ML-based high frequency/ automated trading platforms	

## 2.2 Changes in Customer Experience

The primary banking services provided to individual costumers will experience the biggest impact in service augmentation

Personalization



### Digital capabilities already showing presence



#### Virtual credit and debit cards

- Developed 100% virtual contactless card, *Moey*. Enables money transfers, payments and savings in a seamless and convenient way.



#### Authentication and security

- Biometric authentication like eye recognition allowing customers to check account balances, approve payments, sign in without a password



#### New payment methods

- High speed networks allowing real time payments at a global scale



#### Tailored wealth management services

- Analyses user's bank accounts and their spending to calculate how much to save without affecting day to day spending

## 2.2 Changes in Customer Experience

Despite its extreme importance, a unique customer service experience is not enough to tackle the challenges of the digital banking revolution

Personalization

### Educate the consumer and create supervisory regulation...

“I believe in consumer education and teach people how to defend themselves. Good investment is not enough without any customer awareness”

João Andrade, BIG



#### Data Protection

- Improved client consent policies
- Banks infrastructure to storage client data
- Regulatory authorities to protect data and oversee banks data management according to the client requirements



Enable cyber-security

### ... to create a win-win scenario for banks and customers



#### Banks

- Customer Loyalty
- Performance Gains
- Powerful barrier to disintermediation



#### Customers

- Real time personalized recommendations
- Seamless and effortless day-to-day transactions
- Wealth management personalized to customers



Fully automated experience

## 2.3 Repercussions on the Labour Market

Technology transformation impact in the job market is changing the ground where financial services jobs were built

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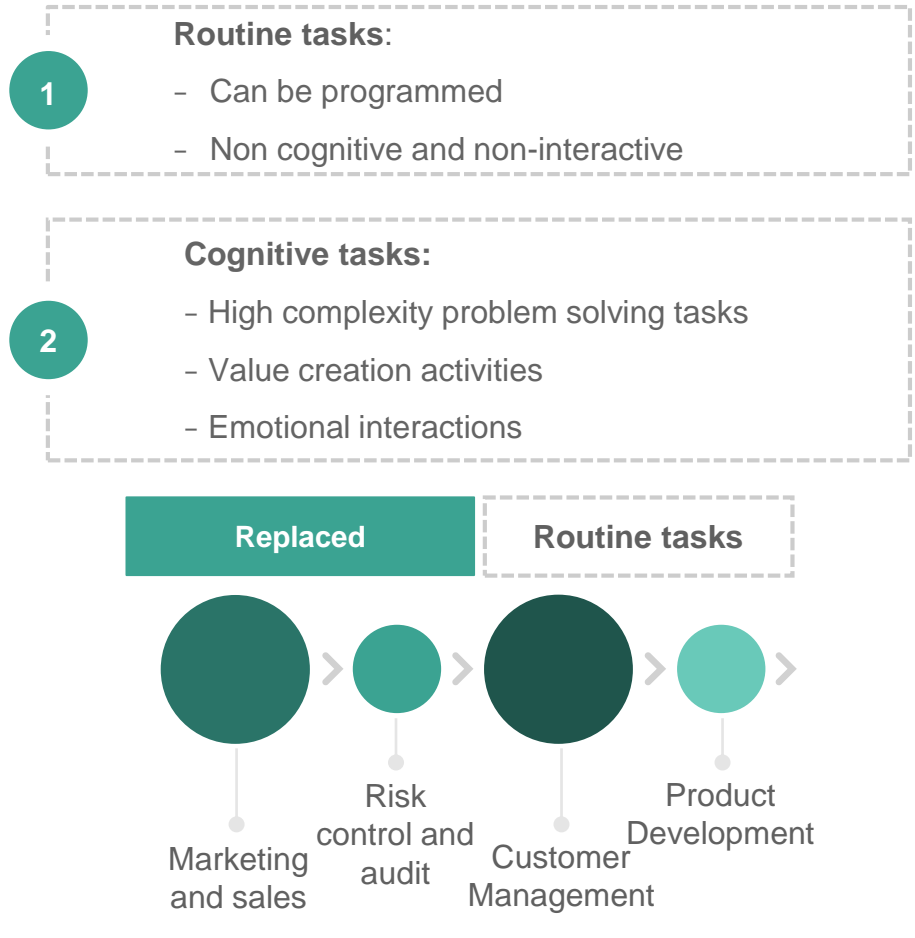
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	Job improved efficiency	
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## 2.3 Repercussions on the Labour Market

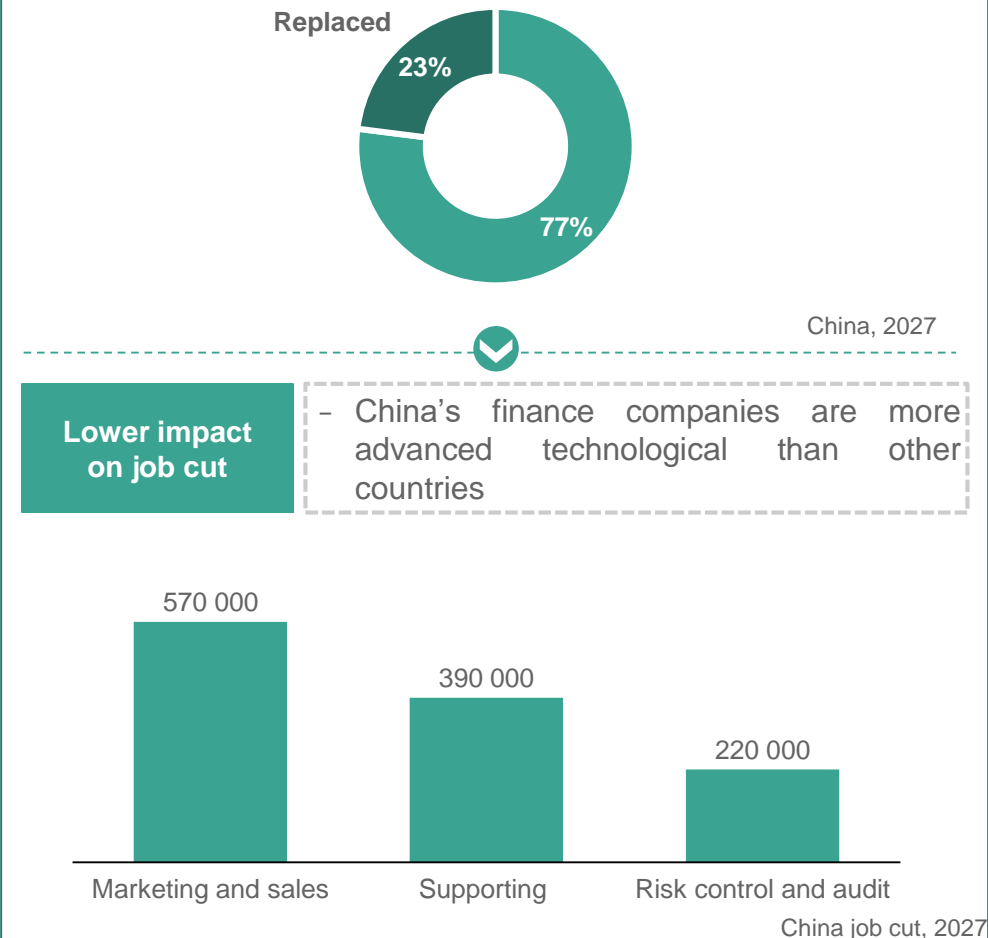
### Artificial intelligence to replace positions where the core value activity does not require cognitive and interactive skills

Job Cuts

Task segmented between routine or cognitive tasks...



...where jobs described as manually repetitive will be replaced

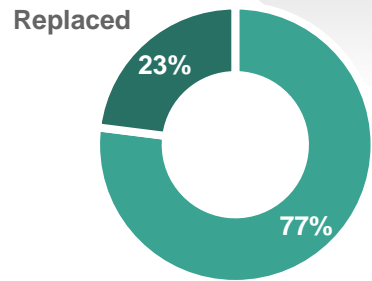
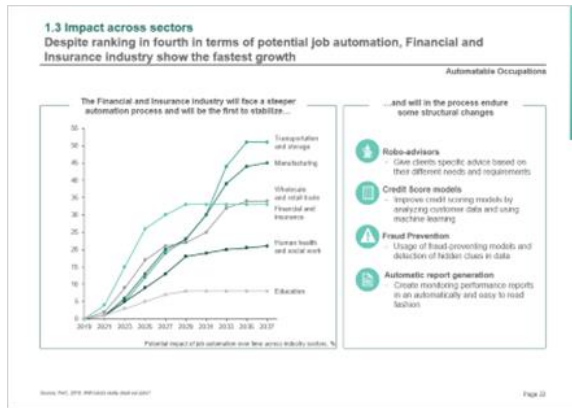


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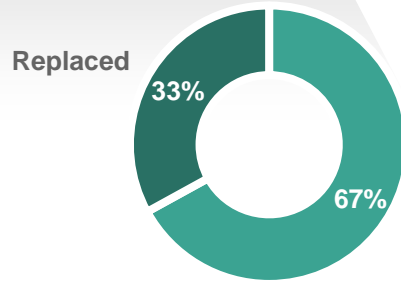
China's financial industry estimation may not be as severe in percentage terms as other countries with lower employees in the industry

Job Cuts 

While China impact in relative terms is not as alarming as other countries

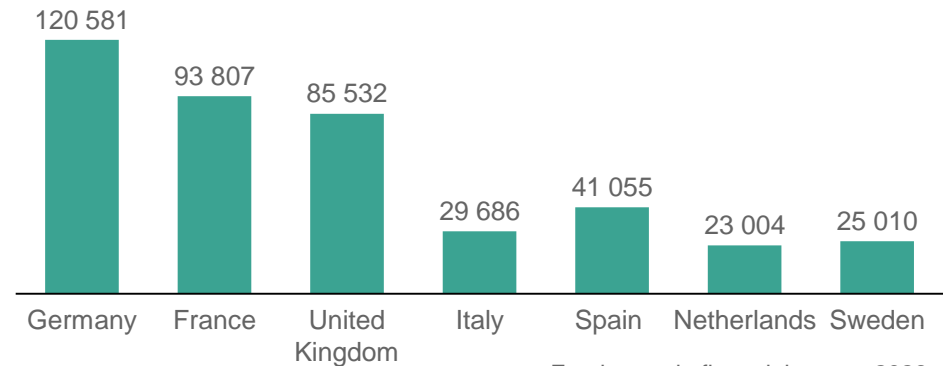


China, 2027

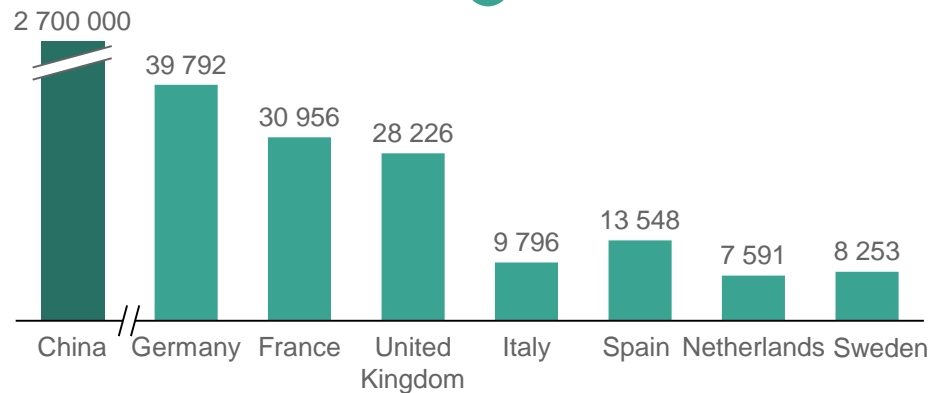


World, 2029

China's financial services sector shows much more employee loss in absolute terms



Employees in financial sector, 2029



Job cut loss, 2029

## 2.3 Repercussions on the Labour Market

Eventually, some job positions become obsolete with the rise of robot-advisers, automated online advisory platforms and processing data machines

Job Cuts 

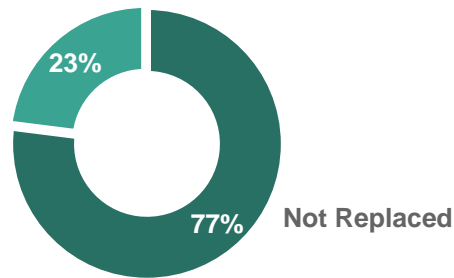


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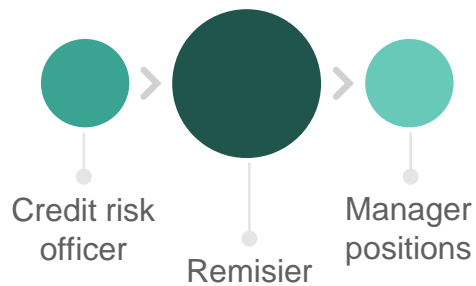
### Despite its role in job replacements, artificial intelligence will improve significantly the efficiency in jobs of the financial sector

Job improved efficiency 

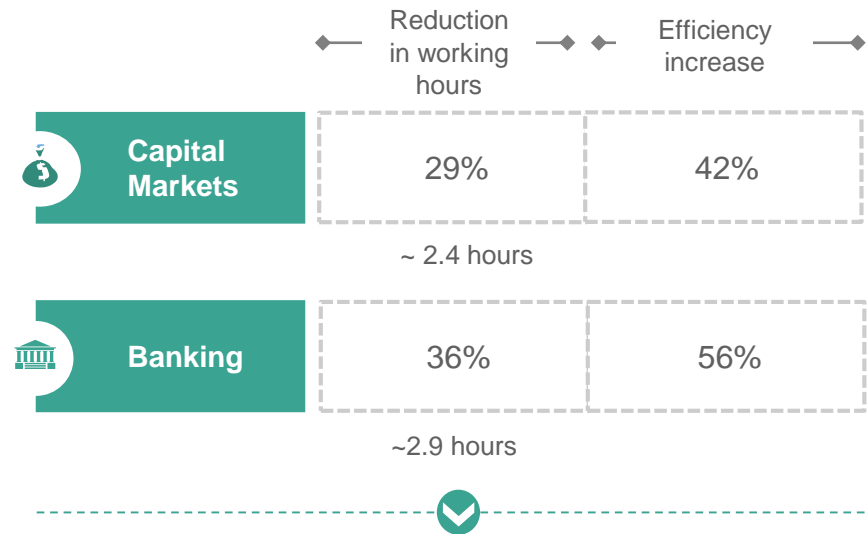
AI plays an auxiliary role to redefine the skills leveraged...






**Most required skill** - Data interpretation and analysis



... and improve efficiency and the productivity along the value chain

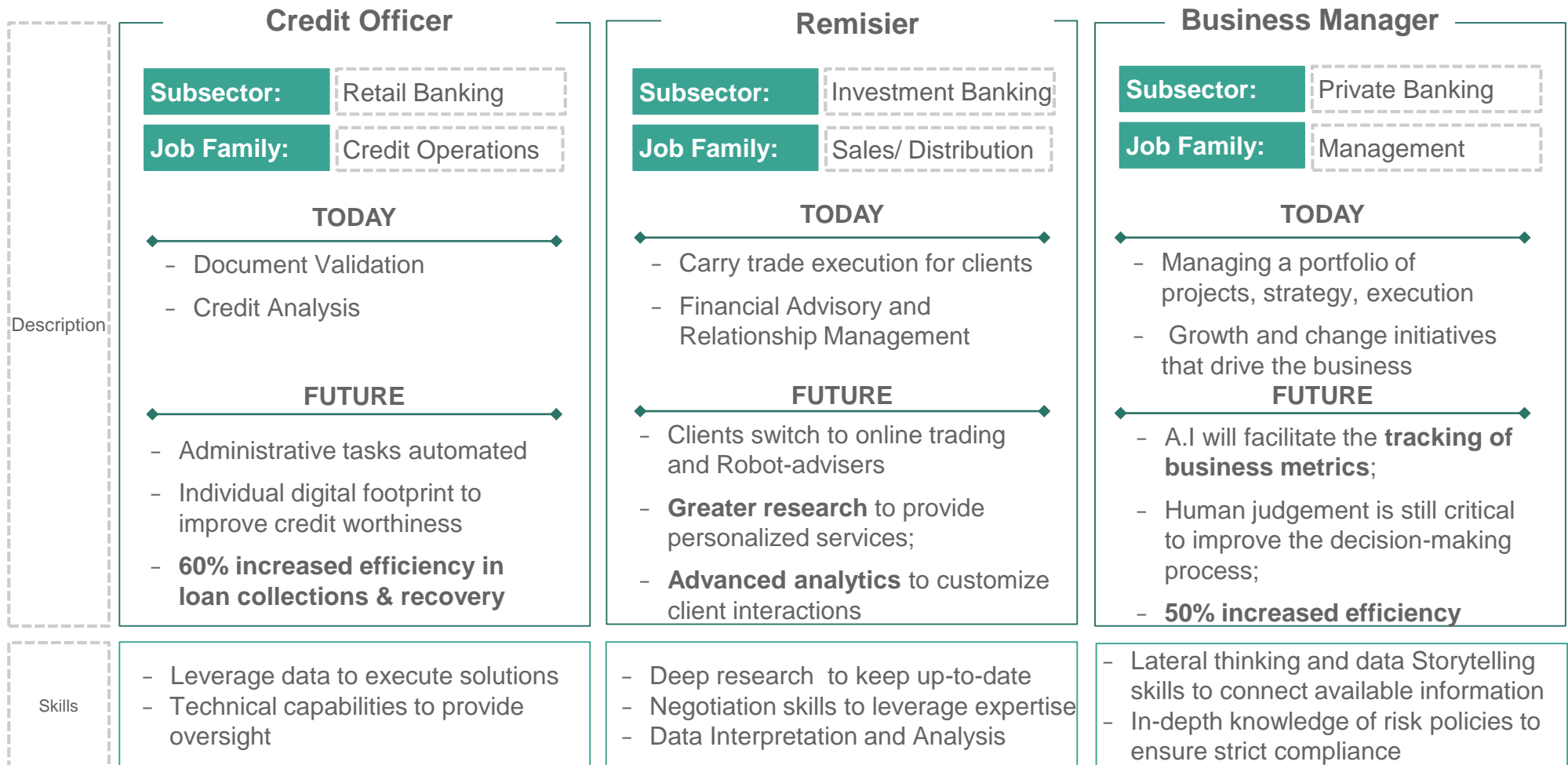


- HOW?**
-  Reduce number of hours working
  -  Improve client's manager efficiency
  -  Provide customized service

## 2.3. Repercussions on the Labour Market

Improved efficiency redefines and requires transformation of many jobs in the banking industry while still delivering traditional complex problem solving

Job improved efficiency 

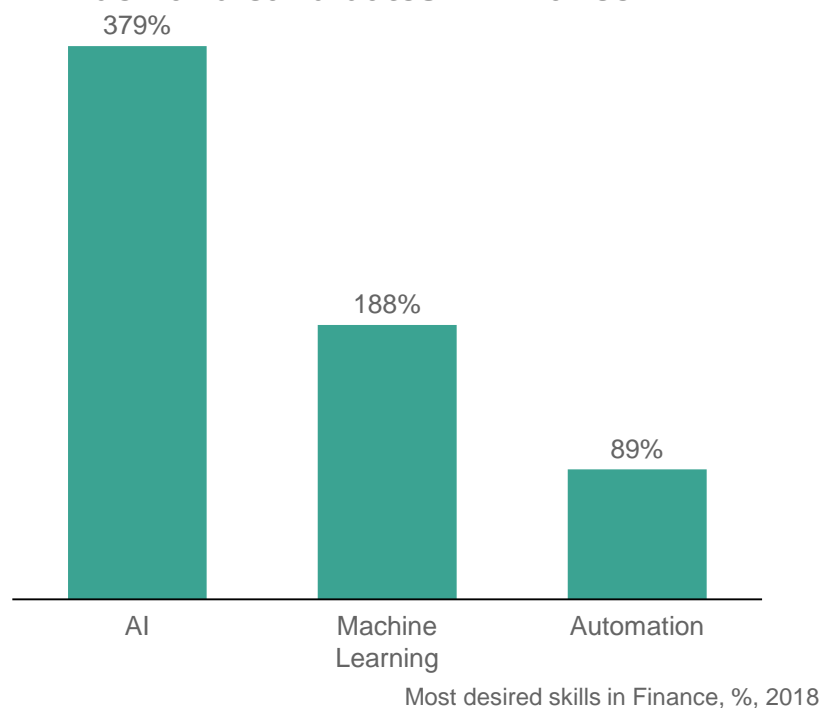


## 2.3. Repercussions on the Labour Market

Ultimately, the development of Artificial Intelligence empowers new job creation in the financial labour market

Job creation 

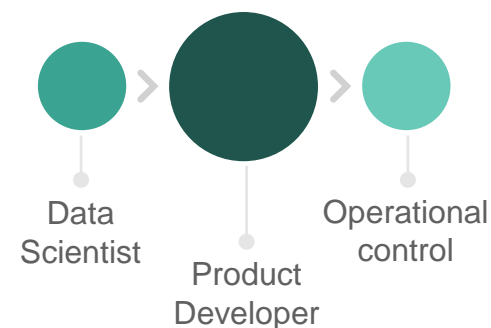
Experts in AI are among the most in-demand candidates in Finance...



Demand expected to increase and escalate in the Future

... to redefine jobs across three dimensions

Technical	Operational	Business
<ul style="list-style-type: none"> <li>- Data scientists</li> <li>- System architectures</li> <li>- Development engineers</li> <li>- System testers</li> </ul>	<ul style="list-style-type: none"> <li>- Operations and maintenance of systems</li> <li>- Ensure compliance, legal and quality of systems</li> </ul>	<ul style="list-style-type: none"> <li>- Articulate technology and traditional business activities:</li> <li>- Algorithm analysts</li> </ul>



## 2.2. Repercussions on the Labour Market

### New technologies unleash new demand for talent across three subsectors affecting banking Industry as a whole

Job creation 

	Data Scientist	Product Developer	Operational
	<p><b>Job Family:</b> Information Technology</p> <p><b>TODAY</b></p> <ul style="list-style-type: none"> <li>- Model development &amp; Project Management (i.e. Algorithms)</li> <li>- Data collection</li> </ul> <p><b>FUTURE</b></p> <ul style="list-style-type: none"> <li>- Technological skills aligned with increased business knowledge</li> <li>- Improved data capabilities through A.I. technology</li> <li>- <b>Increased time management:</b> focus on complex tasks that require human judgment</li> </ul>	<p><b>Job Family:</b> Operations</p> <p><b>TODAY</b></p> <ul style="list-style-type: none"> <li>- Internal &amp; external client interaction</li> <li>- <b>Product Design &amp; Enhancement:</b> Identifying market trends and opportunities</li> </ul> <p><b>FUTURE</b></p> <ul style="list-style-type: none"> <li>- A.I tools will <b>speed up</b> the process of data collection</li> <li>- Digital platforms to provide assistance in customer service &amp; problem solving</li> <li>- AI &amp; Advanced Analytics enhance “what-if” analysis and scenario testing to better test product effectiveness</li> </ul>	<p><b>Job Family:</b> Risk Management</p> <p><b>TODAY</b></p> <ul style="list-style-type: none"> <li>- <b>Quality controls:</b> Finding &amp; reporting bugs and glitches</li> <li>- <b>Time consuming:</b> manual and automated testing &amp; monitoring</li> </ul> <p><b>FUTURE</b></p> <ul style="list-style-type: none"> <li>- Complex cases that are escalated by automated systems</li> <li>- A.I. and RPA tools will run tests more quickly and accurately</li> <li>- <b>Increased efficiency:</b> lower manual testing efforts</li> </ul>
Description			
Skills	<ul style="list-style-type: none"> <li>- Data storytelling</li> <li>- Stakeholder Engagement</li> <li>- Business and Financial Acumen</li> </ul>	<ul style="list-style-type: none"> <li>- Customer mindset</li> <li>- Data storytelling</li> <li>- Influencing and negotiation</li> </ul>	<ul style="list-style-type: none"> <li>- Automation management</li> <li>- Data interpretation &amp; Management</li> <li>- Process Excellence</li> <li>- Risk Awareness</li> </ul>

## 2.3. Repercussions on the Labour Market

Despite the generalized impact of automation in Banking job market, stakeholders are still to agree on the dimension and repercussions of the impact

Financial Market post impact

### The Present

- Banks **recovered financial strength** step by step after the financial crisis.
- Banks **bet on new technologies**, Artificial Intelligence and automation to improve cost structure and upgrade customer experience
- **Improvement in cost structure:** i) reduce labour force ii) improve productivity

The net result in the financial labour market is yet to be determined



#### Increase in jobs

- *“Data Scientist as the Sexiest job of 21st century by Harvard Business Review”*



#### Decrease in jobs

- People must adapt to new skills required by the financial labour market

Regardless the outcome...

● Job Cuts ● Job Creation ● Job Efficiency

“Artificial Intelligence and Automation will both help banks performance and productivity while replacing various jobs”

Simão Cruz



- How can the Government and Education institutions help workers adapt to changes in the financial labour market?