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CXO INSIGHTS

CXO TECH BRIEF FOR BANKING

1. SECTORAL EXEC SUMMARY

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COVID-19 HAS ACCELERATED SHIFTS IN CONSUMER BEHAVIOR AND CAUSED SIGNIFICANT EARNINGS CHALLENGES GIVEN THE TOUGH MACROECONOMIC CONTEXT AND EXTENSIVE RISK OF FINANCIAL DISTRESS FOR BOTH CONSUMERS AND ENTERPRISES

The banking Industry is facing profitability challenges and must innovate to maintain and grow its business

- **Low interest rates**
- **Changing regulatory landscape**
- **Pressure from fintech companies that leverage technology to offer new services**
- **Initiatives for green banking products**

1. SECTORAL EXEC SUMMARY

5 CORE CHALLENGES OF THE BANKING INDUSTRY

1. **COVID 19 HAS ACCELERATED DIGITAL ADOPTION FOR BOTH CONSUMERS AND BANKS** with a shift in behaviors, expectations and ways of working:
   57% of consumers now prefer internet banking (up from 49% in pre-COVID days)
   Businesses and functions that were previously unsuitable for remote working had to embrace it.

2. **CONSUMERS ARE ADOPTING NEW SERVICES** (Digital Financial Planners, P2P Lending, Robo-investment solutions, POS financing, etc.), generating new sources of revenues for banks
   60% of millennials are willing to use payment methods other than credit cards to finance their e-commerce purchases[(1)]

3. **GROWING EMERGENCE OF NEW BUSINESS MODELS** (Bank as a Service, Platform as a service, from Open banking to Open X, disintermediation, tokenization) not only in retail banking but also in investment and private banking
   60% of bank executives plan to scale their firm's API infrastructure to boost BaaS [(1)]

4. **A CHANGING INDUSTRY LANDSCAPE WITH NEW COMPETITORS** (fintech, big tech, etc.) raising consumer expectations for innovative services
   36% of customers discovered a new financial provider during the pandemic and plan to continue with them post-pandemic as 55% of fintech customers were satisfied with their provider's offerings[(1)]

5. **COMPLIANCE WITH NEW REGULATIONS** has become increasingly expensive leading to operational cost overruns and high capital lock-ins (Basel IV, AML Act, PSD2, IFR/IFD)
   With Basel IV, the capital shortfall for European banks is expected to reach a **€120 BILLION**[(2)]

SPECIFIC CHALLENGES AND OPPORTUNITIES TO BE FACED BY INDUSTRY SEGMENTS

1. RETAIL BANKING

- Operational excellence and process automation
  - *Services must be customer-centric by providing immediacy, personalization, connectivity and transparency*
- Increased competition affecting the market in which customers are less and less loyal
  - *60% choose their primary bank for their first mortgage, but just 32% use it for their next home loan [(3)]*
- New age players (Neo-bank, FinTech, Green banking) are looking to seize more market share
  - *Amazon/Alibaba/Apple have ventured into the payment services space (Amazon and Alibaba Pay…), offering new services like micro lending, card solutions, payment instalments, etc.[(1)]*
- Banks are having a hard time collecting data to make business decisions (anticipating customer needs and life events, risk of failure and fraud)
  - *Only 24% of banks use data effectively for hyper-personalization, according to Capgemini's World Retail Banking Report of 2020 [(1)]*
- Low interest rates are pushing banks to seek new growth opportunities "beyond the traditional realm of banking"
  - *For example, providing digital marketplaces around themes such as real estate, mobility and dependency*

2. PRIVATE BANKING – PURE PLAYERS

- An unprecedented era of transparency and scrutiny imposed by regulators (AML, KYC, CTF). Grasping the complexity of local regulations can help seize the inherent growth opportunities
  - *Regulatory compliance is cited as one of the major challenges by private banking practitioners*
- Cost reduction (operational efficiency, back-office processes and the strategy to outsource IT and support functions – Platform as a service)
- Omnichannel digital customer journey
  - *Private banks have an opportunity to catch up with customer journey offered by retail and FinTech companies*

3. INVESTMENT BANKING

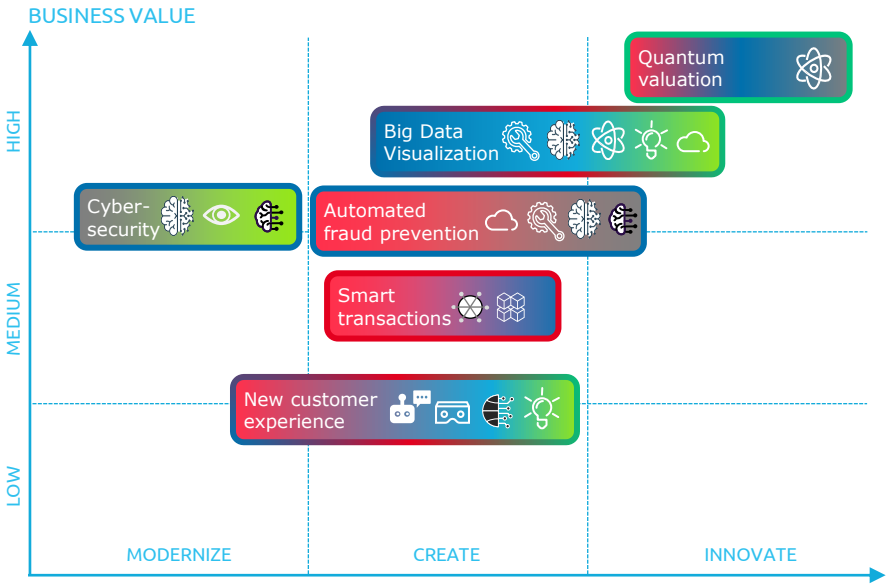
- Pressure on revenues due to low/negative interest rates, margin/fee compression and global recession
  - *European CIBs have a high cost to income ratio and that is one of the biggest challenges (EU 10% higher than the USA)*
- Investment is more and more a data game with firms increasingly using alternative data
  - *72% of investment firms now use alternative data (a 535% increase in the past 4 years)*
- Increasing costs due to necessary investments in IT/OP platforms and regulatory compliance
- Increasing challenges in terms of building "Greener" portfolios and facilitating corporate clients in their transition towards low-carbon business models

(1) *Retail Banking Trends: 2021 - Capgemini*
(2) *McKinsey*
(3) *Oracle Retail Banking Consumer Trends*

2.1 HOW TECH DISRUPTS BANKING ACTIVITIES

Operations	Asset Management	Risk Management	Products & Services	Distribution
		CHALLENGES		
• Time-to-service optimized • Process automation	• Managing capital in accordance with contract rules • Getting the best possible ROI with less risks	• Reducing and dealing with potential losses (credit, market and operational risks) • Ensuring compliance and conformity (money laundering, etc.)	• Providing B2B or B2C products that meet the changing customer needs • Providing financial derivatives that meet the market changes	• Optimized local bank branches • Delivering an omnichannel experience to customers
		TRENDS		
36%[4] of banks see the use of IoT as a critical priority to improve operational efficiency	**46%**[1] of clients want to use data insights in business decision-making	**34%**[1] of clients see security and privacy capabilities as a critical priority	**8%**[2] increase in customers demand for new digital products and services	**30%**[3] increase in the use of mobile banking during COVID-19

2.2 FOCUS ON TECH DELIVERY MATURITY & BUSINESS VALUE



Activities addressed

Operations | Asset Mgmt. | Risk Mgmt. | Products & Services | Distribution

Timeframe — < 2 years — 2-3 years — > 3 years

Machine Learning · Chatbots (simple and complex) · Predictive analytics · IoT
Quantum · Blockchain · Computer vision · RPA
Artificial intelligence · Distributed ledger technology · AR/VR
Cloud

TAKEAWAYS FROM TECHNOLOGY ROADMAPS

From a technology perspective, we identify 3 main groups:

- **MODERNIZE:** Technologies that enter this first group are high priorities and considered to be mature enough to be deployed in the banking industry within the next 2 years.
- **CREATE:** Technologies that enter the second group are near-term investments to be launched within 2 to 3 years.
- **INNOVATE:** Finally, technologies in this third group are ground-breaking ones which may disrupt the industry in the long term.

[1] *Forrester, "The Digital Transformation of Corporate Banking", Feb 22, 2021*
[2] *Gartner, "CIO Agenda: A Banking Perspective", Nov 10, 2020*
[3] *BCG, "The Front-to-Back Digital Retail Bank", Jan 2021*
[4] *Forrester, "The Top Emerging Technologies In Banking In 2021", Jan 28, 2021*

3. FOCUS ON SPECIFIC BLOCKS ALONG WITH USE CASES

OPERATIONS

- 27.6% of bank employees work on transaction processing
- Smart back-office management
- Faster and cheaper transactions
- Blockchain, DLT, Cloud, Bots, RPA

New Business Stakes

In the banking sector, back and middle offices are a real cost center because of the human capital mobilized to process and manage financial transactions or customer requests (for example, request for a new checkbook). Some banks (especially in Private Banking) have not yet initiated their digital transformation, which can cause operational bottlenecks that highly impact efficiency.

How can tech disrupt business models?

Thanks to technologies such as Blockchain, Chatbots or RPA, banks will be able to reduce employee-managed operations by automating them, or by enabling real-time transactions. It could give them a real competitive advantage by refocusing their human capital on less repetitive and higher value-added activities.
Operations could be more efficient thanks to digitization and cloud virtualization (Electronic Document Management).

Examples of emerging use cases

The Monetary Authority of Singapore, through a project named “Ubin”, has explored the use of blockchain and Distributed Ledger Technology to better understand the benefits it may bring. This is with the eventual goal of developing simpler to use and more efficient alternatives to today’s systems based on central bank issued digital tokens.

ASSET MANAGEMENT

- 89% of banks want to increase or maintain their ML investments
- Leveraging Big Data
- Insights-driven business decision-making
- Quantum Computing, RPA, ML, Predictive Analytics

New Business Stakes

Digitization has made it possible to transfer very large amounts of data, and the advent of the Internet has opened a new paradigm based on insights-driven business decision-making. Leveraging data to make business decisions is emerging as a critical priority for corporate clients and consumers alike.

How can tech disrupt business models?

Leveraging technology to meet the needs of data visualization. The goal is to use technologies such as Quantum or RPA to aggregate and process large amounts of data, with the aim of increasing data-driven decision-making. In the banking sector, this decision-making is related to investment decisions and efficiencies and would also allow banks to find the best way to maximize profits.

Examples of emerging use cases

Bank of America’s CashPro platforms help visualize, identify and automatically generate liquidity and efficiency forecasts thanks to machine learning and predictive analytics.

RISK MANAGEMENT

- 36% of corporate clients see security and privacy as a critical priority
- Reinforcing risk management
- Automating risk analysis and management
- RPA, Quantum, AI, Cloud

New Business Stakes

Digitization has opened new horizons in terms of risk management, particularly through the increase in data flows between banks and customers. This digitization represents a transformation lever for banks, in the way they manage and prevent risks. Furthermore, the increasing amounts of data shared between banking regulators (BCE, FED, …) and the increasingly stringent regulatory rules are compelling banking institutions to aggressively rethink and strengthen their approach to risk management.

How tech can help:
Leveraging automated risk detection processes (default risks, fraud risks or even financial risks related to investment strategies) for analyzing greater volumes of data and ensuring better reliability, thanks to RPA, Quantum Computing and Artificial Intelligence. Cloud computing will be useful here for combining data analytics for AML purposes.
Technologies can also help adapt to new regulatory rules by adopting a proactive approach to managing way, by predicting it rather than reacting to it.

Examples of emerging use cases:

JP Morgan Chase is currently working with IBM and Samsung to build a risk prediction model based on Quantum Computing technology.

3. FOCUS ON SPECIFIC BLOCKS ALONG WITH USE CASES

PRODUCTS AND SERVICES

86% of banks have predictive analytics solutions in place or will implement them within 12 months

Launch of new products and services that meet the changing market and customer needs

Data is the oil of the 21st century

AI, Big Data, Predictive Analytics

New Business Stakes

To meet the constantly changing market and consumer needs, companies need to constantly adapt themselves by offering new products and services. Capital markets have experienced a dramatic transformation, especially with electronic and automated trading while the amount of data is exploding. New generations are increasingly driving the demand for greener products.

How can tech disrupt business models?

New methodologies and advances in computing power are now making it possible to harness the power of Big Data and Predictive Analytics for product personalization. Leveraging technologies for predicting crucial life events and potential changes in customer demand or needs could enable banks to provide better product and service personalization and thus help them win customer loyalty.

Examples of emerging use cases

Green-Got, a green neobank, leverages technology for making carbon footprint predictions for a various products. Customers thus can make green-related decisions.

DISTRIBUTION

1/5th of the French population might turn away from their traditional bank after the pandemic

Customized services

Enhancing customer services

AI, API, Data, Visual Recognition

New Business Stakes

After years of incremental changes and digitization, banks that have not yet initiated their digital transformation must plan for a fundamental rethink of operations in order to thrive in a rapidly digitized and data-driven world. With the COVID-19 pandemic, the need for better digitized customer experiences has only crystallized and accelerated. Fully digitized banking players have already gained a huge competitive advantage that the more traditional players need to catch up to.

How can tech disrupt business models?

Leveraging technologies to offer a flexible and personalized experience to the end user by allowing a multichannel experience. Changing the paradigm, thanks to technology, by moving to a client self-care model in order to offer more autonomy to the customer would greatly improve the user journey.

Examples of emerging use cases

Bank of America has developed Erica, a virtual assistant, specifically for banking operations. These smart machines are beginning to act as digital concierges for customers for interacting with banks as well.

4. FOCUS ON USE CASES AND ASSOCIATED TECHNOLOGIES

NEW CUSTOMER EXPERIENCE



OPERATIONS | **PRODUCTS AND SERVICES** | **DISTRIBUTION**

Providing a new customer experience has become a core challenge for the banking industry, accelerated by Covid-19. Customer demands are evolving and need to be addressed with the help of technology in multiple areas:

- **Product optimization** for offering more personalization to customers using Predictive Analytics and AI. Banks can predict the future needs of customers based on previous behaviors and therefore adapt the product offering, or even build marketplaces with non-financial services to address specific customer needs. It could also enable them to offer "greener" products by better analyzing customer needs.
- **Smart branch:** the use of IoT could enable banks to provide fully automated bank branches to their customers, allowing the smartest and fastest distribution of banking products and services. It could also help reduce the risk of ATM frauds or incidents, by sending alerts to banks in real time.
- **Virtual experience**: the use of AR/VR could allow banks to totally reinvent the user experience. For instance, Deutsche Bank has already used AR for marketing purposes, but it can also be adapted to target distribution or customer service.
- **Process automation** is essential for reducing cumbersome administrative tasks. This automation of operations can be addressed using simple chatbots that can help in automating tasks that are not too complex. In the future, the emergence of sophisticated chatbots (based on natural language processing) could handle human-like tasks and become the main workforce/backbone for back-office operations.

MARKET | TECHNO | IMPACT

Market and techno rationale:

- "*A la carte*" and automatic banking (automated processes) has become more and more essential for customers.
- The State Bank of India already uses IoT for ATM-related incidents.

TECHNOLOGIES CHATBOT AR/VR IOT PREDICTIVE ANALYTICS

Why now

- Technology has been tried, tested and proven
- Help employees find meaning in their work, with added value

Key success factors

- Process analysis to choose the processes that should be automated
- Adapt to customer needs in an agile way

QUANTUM VALUATION



OPERATIONS | **ASSET MANAGEMENT** | **RISK MANAGEMENT**

Quantum Computing will enable us to carry out highly complex calculations that are currently impossible with existing computing technologies. For instance, a calculation that is carried out in 3 minutes by a Quantum Computer would take a classic computer 10,000 years for certain types of algorithms. Considering this, we can think of three main Quantum Valuation use cases that address today's challenges related to:

- **Back-office operations:** Quantum Computing could also help reduce back-office processes, by better identifying correlations between different pieces of information and and by deleting irrelevant ones. Thus, for credit default risk, Quantum Computing could help automate processes for risk detection.
- **Asset management:** With Quantum Computing, many randomly generated scenarios can be produced and used to evaluate the potential distribution of investment results. It could thus not only lead to risk reduction, but also to more profitable investments, especially in algorithmic trading. Quantum Computing could also help build prediction and simulation models with an accuracy that is currently unachievable with existing technologies, and which will also help optimize the decision-making process.
- **Risk management:** Quantum Risk Valuation in Risk Management relies on the fact that Quantum Computing can not only execute calculations faster but can also make them more reliable. With Quantum Computing, it will be possible to build a leaner risk monitoring model by detecting potential risks based on complex data.

MARKET | TECHNO | IMPACT

Market and techno rationale:

- **JP Morgan Chase** is working with IBM and Samsung on a risk prediction model using Quantum Computing.
- The annual growth rate of the Quantum Computing market is expected to be 37.3% and the banking sector will probably be the one to benefit the most from this technology as it requires highly complex calculations and prediction models.

TECHNOLOGIES QUANTUM

Why now

- The market potential is sky rocketing
- Real first-mover advantage

Key success factors

- High level of investment required
- Use cases must be built before investing

4. FOCUS ON USE CASES AND ASSOCIATED TECHNOLOGIES

AUTOMATED FRAUD PREVENTION

OPERATIONS **RISK MANAGEMENT**

- Fraud prevention represents a great challenge for the banking industry and must be tackled down. Currently, fraud detection is mostly done manually and requires human resources that can't be deployed elsewhere and that represents a real cost center.
- Using **Robotic Process Automation** (RPA) to address this challenge could help banks gain a competitive advantage by reducing fraud risks and by restructuring the human capital. RPA can deliver automation at a tactical level by handling repetitive business processes. Some technologies can add efficiency to the RPA process:
  - **Cloud computing** could help combine data analytics for improving risk simulations and thus support RPA in fraud prevention processes.
  - **Artificial Intelligence** and **Machine Learning** could help automate document screening via natural language processing and optical character recognition (OCR). It could also help build algorithms that detect irrelevant data, thereby reducing the risk of false positives.
- Automating fraud prevention using RPA, AI and ML could thus
  - Allow banks to **reduce** back-office operations that are administratively cumbersome and that represent a cost center for the banking industry
  - **Industrialize** fraud detection by handling a significantly higher quantity of data
  - Ensure greater detection **quality** as robots are more reliable than humans
  - **Reduce** false positive rates

MARKET TECHNO IMPACT

Market and techno rationale:

- Before the Covid-19 crisis, 65% of banks had already invested in RPA.
- Regulatory compliance is highly expensive as it represents 48 million dollars in costs according to Forbes.
- According to the UNODC, the total amount of money laundered represents 2-5% of the global GDP.

TECHNOLOGIES RPA CLOUD MACHINE LEARNING ARTIFICIAL INTELLIGENCE

Why now

- The Covid-19 crisis has increased the risk of fraud because of the massive recourse to remote working
- RPA technology is mature enough to represent a potential competitive advantage for banks

BIG DATA VISUALIZATION

ASSET MANAGEMENT **PRODUCTS AND SERVICES** **DISTRIBUTION**

- Big Data Visualization enables banks to have access to high quality and reliable data which helps increase insights-driven business decisions at 4 levels:
  - **Data aggregation for business decision-making:** thanks to Machine Learning and RPA, there is an increasing possibility of ingesting large amounts of data and taking decisions based on that. For instance, visualizing and forecasting cash and liquidity positions is made possible thanks to these technologies, but also thanks to predictive analytics which enables banks to serve their customers more seamlessly by allowing for more service personalization.
  - **Data circulation for business decision-making:** the use of Cloud computing could also help identify cross-selling opportunities, in terms of operational efficiency or in terms of investment possibilities, by circulating data between the different bank entities (Retail and Private Banking, CIBs).
  - **Data platform for greener governance:** the process of calculating and monitoring ESG metrics will be facilitated within the industry thanks to data and data visualization.
  - **Smart investment strategies:** thanks to quantum computing, identifying the optimal path for making the highest profits will soon be possible. This technology will enable us to carry out highly complex calculations that are currently impossible with existing computing technologies.

MARKET TECHNO IMPACT

Market and techno rationale:

- Even during the Covid-19 pandemic, investing in data and analytics technologies was seen as a high or critical priority by 32% of banks.

TECHNOLOGIES MACHINE LEARNING QUANTUM RPA PREDICTIVE ANALYTICS CLOUD

Why now

- Data-based business decisions are highly reliable
- To gain a competitive advantage by making more reliable decisions

Key success factors

- Having smarter predictive capabilities

4. FOCUS ON USE CASES AND ASSOCIATED TECHNOLOGIES

CYBER - SECURITY

RISK MANAGEMENT

DISTRIBUTION

- Biometric authentication is widely used nowadays in retail banking, enabling customers to have a seamless user journey, while ensuring a high level of security. Corporate banking should use it as an example and apply these methods to corporate customers.
  - **Computer vision:** this Artificial Intelligence technology brings a high-level capability of understanding images and videos.
  - **Deep learning**: a method used to train your AI algorithms to have a sharper understanding of images.
- The use of Artificial Intelligence combined with machine learning could also help resolve external threats before they even occur. In fact, **CybelAngel**, a French cybersecurity company, fights against the breach of potentially sensitive data on the Internet and warns the victim companies so that they can take the necessary measures:
  - **Artificial intelligence** for scanning the Internet (visible and darknet) and any connected objects that could carry sensitive information
  - **Machine learning** for better recognition of potential data leaks and threats
- Leveraging technology for Cybersecurity could allow us to change the paradigm in risk management, moving from a reactive approach to a proactive one.

MARKET TECHNO IMPACT

Market and techno rationale:

- Cyber attacks increased by 238% between February and April 2020, partially due to Covid-19.
- Bank of America is already using biometric authentication with its corporate customers.

TECHNOLOGIES COMPUTER VISION ARTIFICIAL INTELLIGENCE MACHINE LEARNING

Why now

- The Covid-19 crisis has increased cyber risks by weakening the security barriers of companies
- Data is the black gold of today

SMART TRANSACTION

ASSET MANAGEMENT

OPERATIONS

- According to the **OECD**, *"Tokenization of assets involves the digital representation of real assets on distributed ledgers, or the issuance of traditional asset classes in tokenized form"*. Tokens would be recorded on "*decentralized ledgers powered by DLTs"*.
- It comes with four main benefits for the industry that are related to operations:
  - **More liquidity** by allowing the token to be exchanged between different markets and thus to have access to a larger base of potential investors.
  - **Faster and cheaper transactions** via the use of smart automatic contracts to reduce administrative actions nowadays needed in operations agreements.
  - **More transparency** as the token can carry a record of beneficial ownership making it possible to closely monitor and trace the "journey" of the token. This could help reduce information asymmetries between vendors and investors.
  - **More tradability** as tokens would reduce barriers to investment.

MARKET TECHNO IMPACT

Market and techno rationale:

- Tokenization of assets can be seen as the sector with the highest growth potential in the coming years.
- Tokenization of assets carries risks and challenges that need to be overcome such as AML, data privacy, and compliance

TECHNOLOGIES DLT BLOCKCHAIN

Why now

- Crypto currencies

Key success factors

- Establishing a dedicated central bank for regulatory compliance

Capgemini invent

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