

CHANGE IS NOW...

Innovation Forging Forward

SADIA HALIM

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Rethink our positioning with our “Ambition 2020 Plan”

“To ensure our success as one of the most powerful banking groups in the world in 2020, we must not only focus on our ROE, but continue to build our businesses by reinforcing our customer franchise.

*We shall do this by strategically focusing on **digital transformation and customer advocacy** and ensuring a level of customer satisfaction that results in increased customer loyalty.”*



Jean-Laurent Bonnafé,
CEO BNP Paribas Group
Leadership for Change Seminar
11 July 2016, Paris



AN AMBITIOUS PROGRAM OF DIGITAL TRANSFORMATION

~ €3bn in transformation costs between 2017 and 2019...

New customer
experience



Digital
transformation

Operating efficiency

... self-financed by ~€3.4bn in savings during the same period



Focus on Innovation – News ways to conduct business



Working with fintechs

Exploring new and emerging technologies

Collaboration, acceleration and execution of activities to promote an innovative mind set across the platform



Realized Benefits



Client Satisfaction



Efficiency



Risk Reduction



Employee Satisfaction

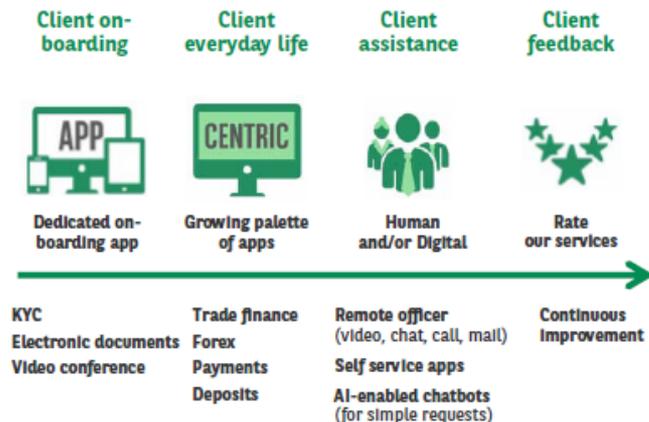


Enhance the Client Journey and Provide Seamless Experience

Towards a new digital user experience

- **Single digital access point**
- **Omni-channel** relationship model, including through non-proprietary platforms (e.g. Multi-Dealer Platforms)
- **Real time and 24/7** servicing
- **Personalised** working environment
- **Self-service** transactions
- **Customised** reporting potentially integrated in client systems
- **Feed with intelligent content** notably thanks to data analytics

Case study: revisited corporate client journey through digital tools



Build the services for tomorrow



Industrialise our processes



Improve Client and Employee Experience



Further increase client satisfaction and engagement



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Harnessing new and emerging technologies



Artificial
Intelligence



Blockchain

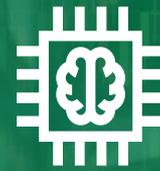


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Last	Chg	%Chg	Vol	Bid	Offer	Vol O	Close	Total Vo
58.75	+4.00		1306600	58.75	59.00	1306600	54.75	43672
30.50			4834200	30.50	30.75	4834200	29.75	57421
34.00	-0.25		1871500	34.00	34.00	1871500	34.25	48365
185.00	-1.00		600200	185.00	185.00	600200	186.00	4391
8.10			5239800	8.10	8.10	5239800	8.05	9642
37.00			2458500	37.00	37.00	2458500	35.75	21999
45.75			803700	45.75	45.75	803700	47.75	11349
16.20			6182200	16.20	16.20	6182200	16.20	15133



Artificial Intelligence



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AI Past and Present

1st AI boom: the age of reasoning
– *Prototype AI developed*

Kunihiko Fukushima publishes the theory of CNN – *Neural Networks*

Machine learning/deep learning –
➤ *Expansion of the Web and big data*
➤ *Improvement of computer performance*

AI coined in '56
by *John McCarthy*

50's-
60's

1947

Alan Turing
proposes the
concept of AI

AI
Winter

1979

Deep Learning
coined in 2006

80's-
90's

AI
Winter

2010-
now

2011

2012

2016

2nd AI boom:
the age of knowledge representation
– *Appearance of expert systems
capable of reproducing human
decision making*

- '11: IBM's Watson won Jeopardy
- '12: AI beat retired Japanese Shogi master
- '16: Go Software based on deep learning beats European champion



WHAT'S DIFFERENT NOW

Data Availability

- ▶ More data being collected at a faster rate
- ▶ Mandates requiring longer retention of data

Infrastructure Availability

- ▶ Huge storage
- ▶ Cloud and elastic processing

Technology Advances

- ▶ Parallel fast processing
- ▶ Advanced algorithms

Great Impact
Potential across
industries,
including
Finance



- Algorithmic trading
- Risk management
- Wealth management



- Fraud detection
- Security
- Talent acquisition

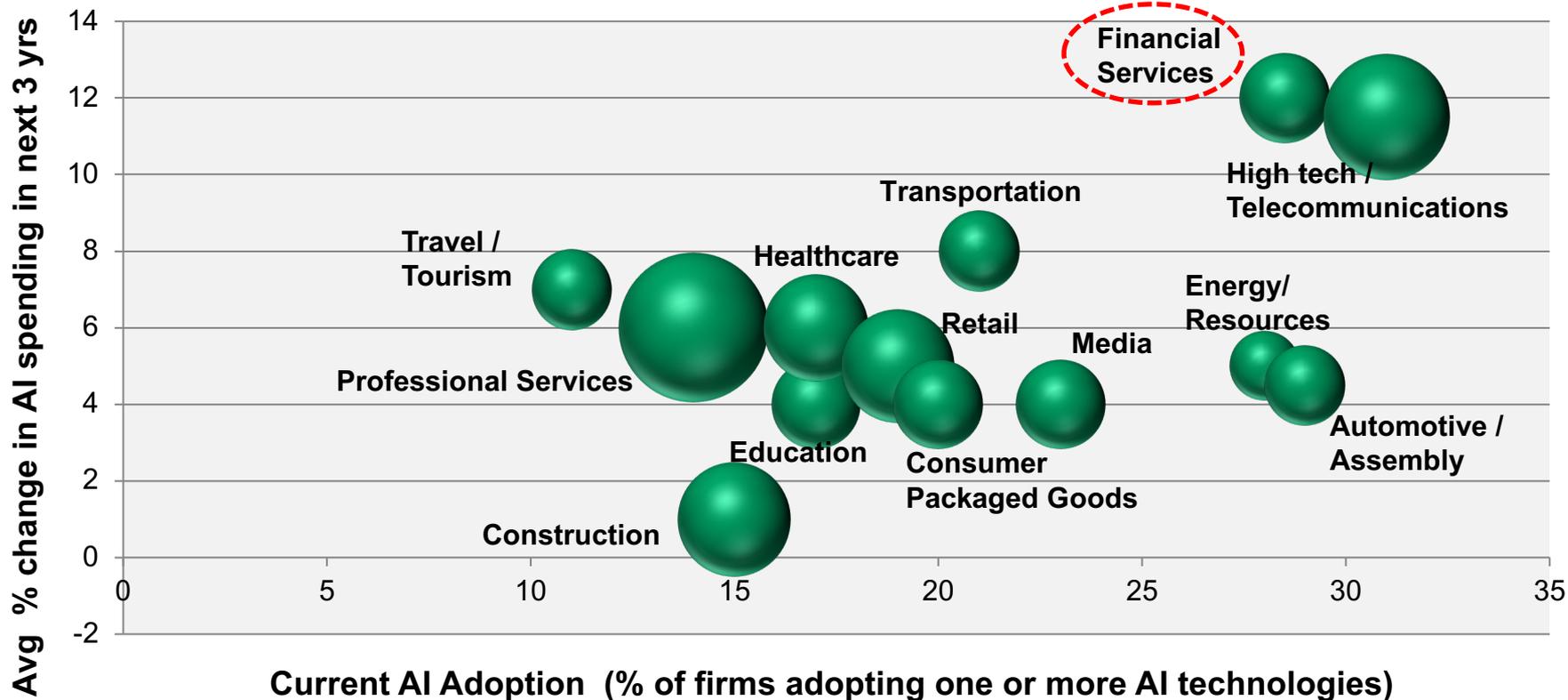


- Customer support/helpdesks
- Targeted customers Acquisition
- Customer analysis

Improve the client journey, enhance revenue, increase efficiency



Sectors leading in AI adoption and future trajectory



The Value Proposition

New Challenges



10,000
Funds

2
million rules

BNP PARIBAS scope

Benefits

Efficiency Gain



Uplift client experience



1
Week



Before

2
Hours



Now

Fund Compliance

Live Q2 2018



Business
Opportunities



- AML & KYC
- Legal
- Front Office



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Investigating Artificial Intelligence technologies to improve both our internal processes and external services



**Reduce
repetitive tasks**



**Reduce
risk**



**Improve client
satisfaction**



Towards enriched offer and enhanced efficiency

- **Client applications to enrich solutions offer**
 - Automatically generated fund reporting
 - Analyze trades and monitor inventory to anticipate client interest
 - Research: anticipate market volatility and swings due to macro events
- **Internal applications to enhance operating effectiveness**
 - Automated risk analytics, controls and compliance, e.g. automated risk reporting, automated fund prospectus analysis and compliance enforcing
 - Internal “smart selling” tools, e.g. client meeting preparation, next product to buy, business opportunities and at risk
 - Human resources prospective management, e.g. skills/ position/ training/ matching/ workforce planning

Case studies

CORPORATE BOND SECONDARY TRADING ANALYTICS

INPUTS

Client Holdings

e-platform info

Voice info

Trading Axes



OUTPUTS

trade suggestions

Connecting flows

Connecting info

Alerting (soon)

AUTOMATED DEPOSITORY CONTROLS

“BNP Paribas takes stake in regtech firm Fortia...[and]... plans to implement Fortia’s compliance platform Innova with its depository business, allowing clients to enhance operational efficiency and access data and analytics”



FORTIA: compliance and regulatory requirements



A Regtech start-up founded in 2012, using artificial intelligence, machine learning and business process monitoring



Allows asset managers and asset owners of the fund industry to meet rising compliance and regulatory requirements and manage mounting volumes of data

Innova : Fortia's tool to help asset managers and asset owners ensure they have the right controls in place to systematically and efficiently monitor the compliance of their funds with local and international regulatory requirements



▶ **Enhance client controls and operational efficiency**

▶ **Transform investment into an asset**

▶ **Build new services on top of investment compliance**



Raising industrialisation to the next level in the sphere of fiduciary oversight



Ambition

- Re-invent our depositary control and contractual investment compliance processes around artificial intelligence, machine learning and Natural Language Processing
- Invent new services for asset managers, asset owners and fellow depositaries around such solutions

Realisation

- Partnership with a leading FinTech firm to develop an innovative and comprehensive depositary control and investment compliance outsourcing solution incorporating **real technological breakthrough** capabilities in terms of data capture, artificial intelligence, workflow and activity management as well as advanced reporting Dashboards for risk assessment
- Allowing us to **Reinforce our Depositary Leadership position** while in tandem opening new types of business opportunities.



Natural language processing at the basis of our new compliance offer



BNP Paribas Depository & Fiduciary Services ranges from the highly-regulated activity of **fund depository** to un-regulated **post-trade investment compliance monitoring** on behalf of institutional investors

- User requirements evolve fast
- Regulatory-driven complexity will keep increasing
- DFS is one of the most fastest growing product ranges of BP2S: volumes have doubled in just 4 years, putting substantial pressure on our systems



1. Replace our application system with a **new-generation solution** and re-engineer our processes for greater efficiency
2. Introduce new technologies (AI and Machine Learning, Text mining) to **design new funds compliance solutions**

To do so, we have selected and invested in the startup Fortia



- ▶ **Reduced regulatory risk**
- ▶ **Cost-effective, flexible and timely reporting**
- ▶ **Increased operational efficiency**



Predictive Analytics for failed settlements



Objective

- Speed up and simplify the post-trade process
- Automate the trade settlement exception process
- Provide analytics for root cause analysis



Our offer

- A machine learning based dashboard that calculates a Key Risk Indicator based on the probably of non settlement
- Random forest models are run on a daily basis on the last 3 month population of trades



- ▶ Decrease costs of trade management
- ▶ Provides better insight on the performance of the trade management actors
- ▶ Increase performance of trade processing
- ▶ Lowers the risk of failed settlements

“Introducing artificial intelligence and machine learning technologies into the asset servicing business for a steep performance uplift”



Streamlining the process



The manual workload left in the Middle Office trade processing teams is mainly related to the management of exceptions. These exceptions are managed by the teams through email communication with the brokers and the clients and human decisions



Predict the likelihood of a trade break

Provide the contributors with the prediction

Propose email templates depending on the prediction

In a second phase,

- Read and associate counterparty with the relevant trade
- Predict the type of issue raised by the counterparty email (Trade missing, trade mismatch, manager escalation, claim investigation...)
- Propose email templates and business decisions depending on the prediction
- Update the business tools with the information received from the counterparties



▶ **Decrease costs of trade matching**

▶ **Increase settlement efficiency**

▶ **Decrease error rate**



Automatically generated commentaries



Time pressures on fund managers:

- Busy investment professionals often lack time to write market commentaries.
- Hiring additional qualified talent is costly.



Allow your fund managers to generate descriptions and diagnostics

Using well-defined rules, Natural Language Generation engines transform structured data – market statistics, fund performance and risk metrics – into meaningful narratives.



▶ **Productivity**

Investment managers are free to focus on higher value work and analysis.

▶ **Consistent standards**

All fund commentaries follow a set corporate style, tone and format

▶ **Fast turnaround**

Commentary is available quickly after period-end, regardless of time of year or volume variations.

COMMENTARY



Corporate actions Use Case



Language Translator



State-of-the-art AI technologies: open-source framework offering the latest advances in machine translation and maintained by a Harvard group of researchers

Home data & infrastructure : model is enriched by internal data to learn specific conventions & translation patterns

User-friendly interface: Google alike straightforward interface was built



Develop a self-learning translation web portal tailored for Corporate Actions

Translation memory & language detection and typos identification



► **In-house and secure translation protecting sensitive data**

► **Tailored for corporate actions with language detection and typos identification**

TRANSLATE



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Meaningful comments on global activity



Our Clients today face a challenge in monitoring their global activity. While the Client's booklet offers comprehensive data, it is **difficult to grasp, tedious to analyze** with **no trend detection** support. **Inflexible** in its format, it fails to offer a high level summary



A value-added **coversheet in human language** generated by the **NLG engine** utilising the data and fact set in the Client's Booklet would prove helpful to the client. It would not just give a **high level summary** necessary for the senior management, but also allow for **comparison, alerts, monitoring** and **benchmarking**.

This would enable **productivity gain** while also guaranteeing a richer client experience with text commentary and analysis **tailored** to the Client's activity



▶ **Easy to understand**
enriched, monthly updated data compilation and translation of figures into natural language

▶ **Faster access**
to latest trends and indicators with event trigger alerts to better anticipate their work

▶ **Reduced workload**
reduced effort to produce high value reporting to senior management and easily connect to BNP Paribas tools and expertise



Amelia, the virtual assistant



A presence of a virtual agent will not only free up the productive hours of an employee but also provide clients with 24x7 comprehensive support



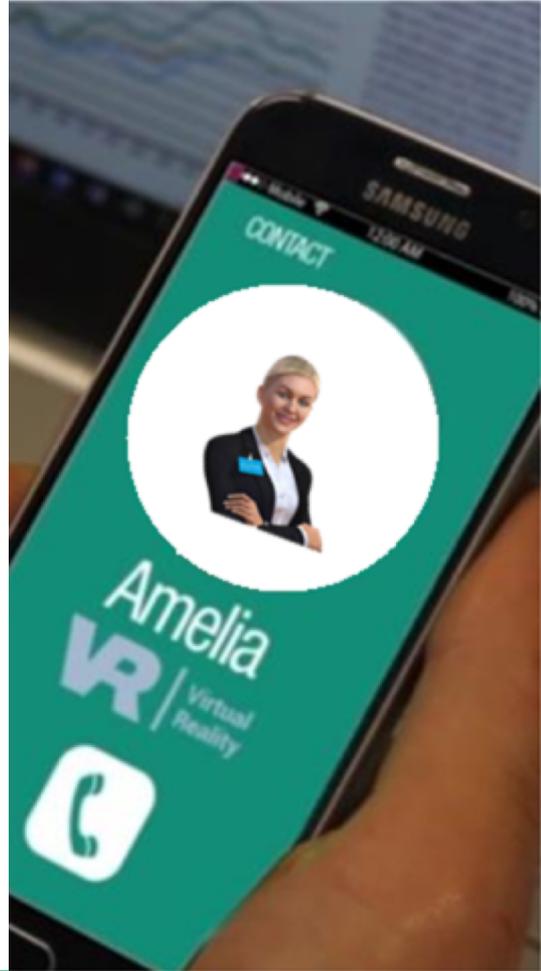
Amelia, co-created with Ipssoft, will be able to :

- Access back-office systems to obtain specific **information** or **trigger transactions**
- Provide **expert recommendations**
- Dynamically learn **business rules** or **processes** through observation and keep track of provided information in the context of the wider conversation

Amelia will have dynamic and unscripted conversations through natural language processing and recognize emotional state of her interlocutor, allowing her to adapt her responses.



- ▶ **Accurate support you whenever you need it**
Amelia accesses a wide range of data sources to answer your queries, in real time, 24/7
- ▶ **Greater compliance**
Expert recommendations
- ▶ **Deeper insight to improve our products and services**
In-depth understanding of your policies and legal structures and auto-learning capabilities





“If you don’t have an AI strategy, you are going to die in the world that’s coming.”

Devin Wenig
CEO, eBay





Blockchain



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Technological solutions continue to evolve



November 2008 – a paper was posted on the Internet under the pseudonym **Satoshi Nakamoto** entitled

- *Bitcoin: A Peer-to-Peer Electronic Cash System*

January 3rd 2009 – the Bitcoin genesis block was created and decentralized money was born



Bitcoin: A Peer-to-Peer Electronic Cash System

Satoshi Nakamoto
satoshin@gmx.com
www.bitcoin.org

Abstract. A purely peer-to-peer version of electronic cash would allow online payments to be sent directly from one party to another without going through a financial institution. Digital signatures provide part of the solution, but the main benefits are lost if a trusted third party is still required to prevent double-spending. We propose a solution to the double-spending problem using a peer-to-peer network. The network timestamps transactions by hashing them into an ongoing chain of hash-based proof-of-work, forming a record that cannot be changed without redoing the proof-of-work. The longest chain not only serves as proof of the sequence of events witnessed, but proof that it came from the largest pool of CPU power. As long as a majority of CPU power is controlled by nodes that are not cooperating to attack the network, they'll generate the longest chain and outpace attackers. The network itself requires minimal structure. Messages are broadcast on a best effort basis, and nodes can leave and rejoin the network at will, accepting the longest proof-of-work chain as proof of what happened while they were gone.



Blockchain: Next generation database

Consensus Driven



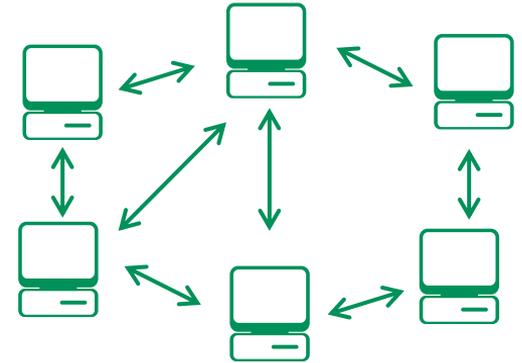
A **block** is a set of transactions that have been validated by peers on the network.

Encrypted and Immutable



The **blockchain** is a chain of blocks linked to one another, constituting a **time stamped, shared, non-repudiable database** that contains the entire logged history of the system.

Distributed Ledger



Each transaction processor on the system maintains their **own local copy of this database** and **consensus formation algorithms enable every copy to stay in sync** increasing efficiencies.



Long term impact on the Securities Services market

The rise of new asset classes and new roads for finance and capital markets with public Blockchain networks

New market infrastructures with the redefinition of the custodian roles with technology integration

Impacts/ Opportunities

- ✓ New ways of financing projects and potentially corporates (ICO)
- ✓ New entrants in CSD, settlement, clearing or custody space (Setl, DAH, Paxos)
- ✓ New infrastructure for the fund admin / TA activities
- ✓ Adapt Fund administration business to crypto assets
- ✓ Custody and asset servicing of assets recorded on blockchain (tokens, contracts)
- ✓ Opportunities to be administrator of hedge fund investing in crypto

We believe that Blockchain will not remove the need for intermediaries but **challenge the status quo**

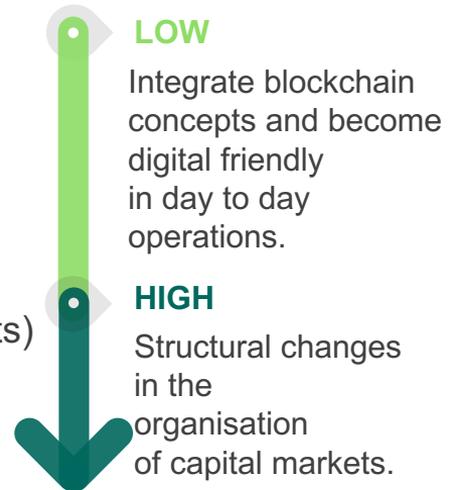


The range of applications and disruption

IDENTIFIED IMPACTS OF BLOCKCHAIN

- Open source development model for software
- Improve of operational efficiency in reconciliations and distribution of information
- 24/7, Worldwide infrastructure, Instant Payments
- Move to T+0 when relevant or Straight Through Settlement
- Automatic calculation and enforcement of contractual obligations (Smart Contracts)
- Distributed trading and clearing
- Distributed network to record and trade financial assets

DISRUPTION SCALE



Challenges

- Technology still immature
 - Number of protocols
 - Scalability
 - Reliability
 - Interoperability
 - Public versus private, permissioned versus permission less
 - Consensus
 - Integration with legacy systems, distributed privacy...).
- Identity framework
- Regulatory landscape
- Legal implications
- Cooperation amongst different players and regulators beyond POC for play

An overview of our Blockchain initiatives

Design &
launch new
business

- **Liberty** - Non listed securities
- **Fund distribution ecosystem** revamping clients and partners – Funds on Blockchain

Take
significant
participation in
industry
initiatives

- **Digital Asset Holding / ASX settlement** infrastructure initiative in Australia
- **Launch of LiquidShare**, the European blockchain fintech for SME post-trade
- R3
- Hyperledger Foundation

Participate in
workgroups &
Think Tanks

- Part of **LabChain** (French Blockchain Think / Do Tank)
- Part of **FundDLT (Luxembourg)**
- Contact with **regulators** (ESMA, AMF, Tresor)

Explore
internal use
cases of
blockchain

- **Corporate Event Connect**. A platform to streamline the distribution of corporate event information between



ASX will use blockchain technologies of DAH as a Market Infrastructure

Australian Stock Exchange (ASX)

DAH is partnering with the Australian Stock Exchange to **bring Australian stock settlement into “the digital age” through the use of permissioned DLT** to cut costs, reduce capital and risk and improve regulatory compliance

December 6th 2017

The Australian Securities Exchange is planning to use blockchain technology to manage the clearing and settlement of equities.

The decision to replace its ageing clearing and settlement system, known as Chess, with distributed ledger technology makes it one of the world's first global exchanges to commit to the technology.

The ASX said it had **been testing the new software for equities clearing and settlement over the past two years.**



Digital Asset Holdings



BNP PARIBAS



J.P.Morgan



Broadridge



Santander



CME Group
A CME/Chicago Board of Trade Company



ABN·AMRO



DTCC



DEUTSCHE BÖRSE GROUP

accenture



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Real-time cross-border payments between BNP Paribas entities on behalf of clients

Corporates should experience **seamless transfers** from one account to another **within the BNP Paribas group**, in much the same way they currently experience transfers between accounts within the same branch.



Timeliness

- Processing executed in max 1 hour:
- From debit execution to beneficiary credit in 45 min
 - From debit execution to your reporting to 1 hour (via mT942)



Service Availability

- 24/7 clearing and settlement (credit value date dependent on currency RTGS COT)
- Improved Client cut-off subject to back end system closing times (exact times per entity TBC)



Costs

- Billing applied as standard international payment.
- No benededuct fees deducted



Corporate Event Connect



A **Blockchain platform** in collaboration with TCS Quartz **to collect and disseminate announcements** for corporate events



Presence of **Intermediaries** in the dissemination of corporate actions results in **delayed information, tampering, task duplication and heterogeneous message structure at an international level**. The Corporate Event Connect counters this.

Thanks to the **Blockchain platform** it now integrates seamlessly across our portals. Data scrubbed from official sources on 90+ markets is **Acquired** and **Stored** in resiliently in a distributed infrastructure and **Disseminated** instantaneously



▶ **Customizable SWIFT format messages with seamless integration**

▶ **Instantaneously disseminated through APIs**

▶ **Tamper proof and official data**



The next-generation digital fund distribution platform

BNP Paribas Securities Services is developing a "next-generation digital fund distribution platform" with AXA IM, which will use Blockchain and smart contracts technology to facilitate the flow of information between fund buyers and sellers



BNP Paribas PlanetFunds also aims to improve the process of buying and selling funds. This will allow for efficient control and transparency of the distribution chain while removing unnecessary delays and reconciliation costs.

PlanetFunds' analytics tools will help investors explore fund data to compare and select funds, and fund managers to fine-tune their distribution

▶ **Speed up onboarding for both fund buyers and managers**

▶ **Provide Fund Analytics**

▶ **Make investments easy, transparent and secure**



Provide clients with value added services

Fund Link contributes to the fund distribution current offer by :

- ✓ Leverage on **Blockchain** to **remove trade barriers** and **simplify the operating model**
- ✓ Create **synergies** on **systems, process** and **data**
- ✓ **Increase scale**, by developing a platform fee model
- ✓ **Improve time to market by co-designing** the solution with client Partner

BP2S current product offers

BNP Paribas Securities Services' platform is today close to Infrastructures fund processing platforms specialized in:

- Fund order processing
- Fund units custody
- Settlement
- TA, RTA and LTA
- Investor Servicing
- Distributor onboarding
- Trailer fee processing
- Intelligence for fund distribution

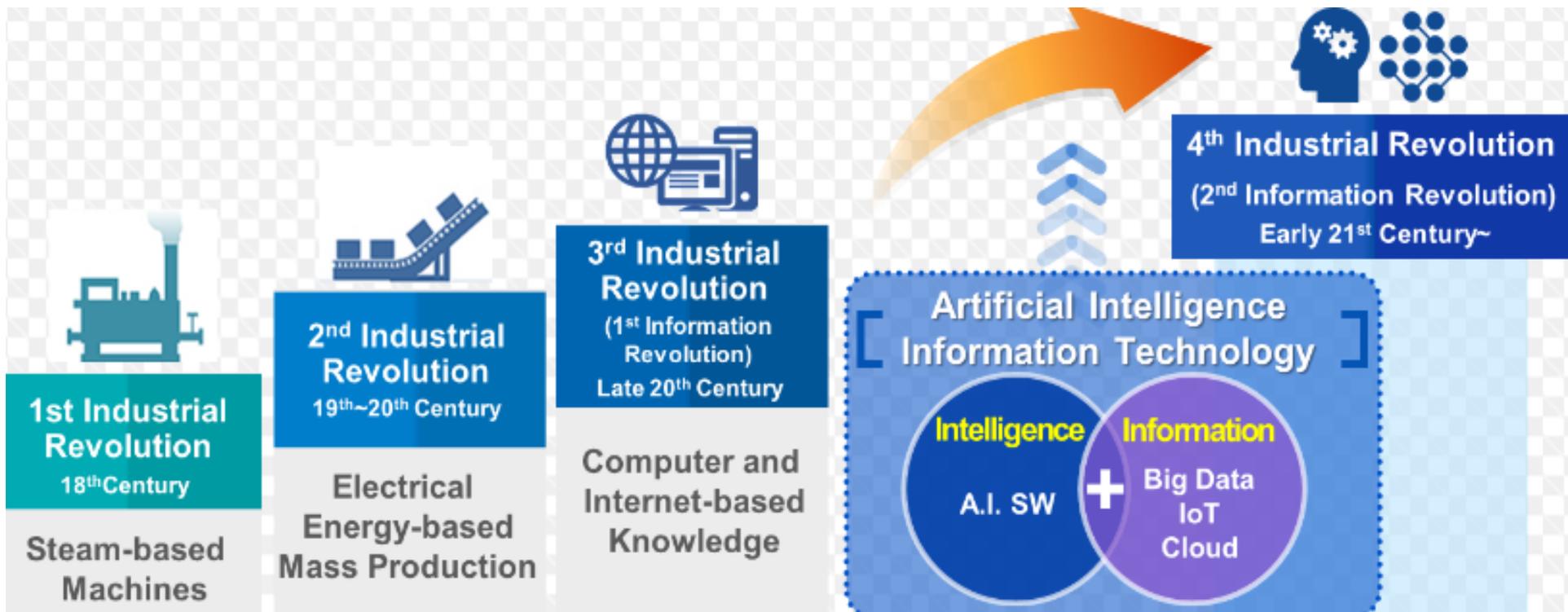


Planet Funds added value proposition

- **Seamless onboarding user journey** avoiding redundant operations
- **Clearer and simpler process** relying on a **Blockchain** based **digital fund buyer profile**
- **Central fund database** for fund buyers and sellers leveraging on:
 - BP2S Internal data (when BP2S is TA)
 - Web scraping
 - Market data vendor feeds
- **Wider distribution network** with lower fees for internal consumption services
- Improved method for **buying and selling funds using Blockchain** and able to interact with other market initiatives
- Support fund buyers and sellers with **strategic decision making based on deep analytical insights**
- **Portfolio modeling and analytics** services on distribution
- Digitalized and **automated distribution agreement and rebate fee management** using Blockchain smart contracts



WHAT'S NEXT...



GRACIAS
ARIGATO
SHUKURIA
JUSPAXAR
DANKSCHEEN
TASHAKKUR ATU
YAQHANYELAY
SUKSAMA
EKHMET
THANK
YOU
BOLZIN
MERCI
BIYAN
SHUKRIA
GRAZIE
MEHRBANI
PALDIES
GOZAIMASHITA
EFCHARISTO
CHALTY
SPASSIBO
SNACHALHUYA
NUHUN
WABEEJA
MAITEKA
HUI
YUSPAGARATAM
DHANYADAD
ANHA
ATTU
SPASIBO
DENKAU-JA
NENACHALHYA
UNALCHESIN
HATUR GU
TINGKI
EROUJ
SIKOMO
MAKETAI
MINMONCHAR
MAAKE
LAH
KOMAPSUMNIDA
MERASTAWHY
GAEJTHO
AGUYJE
FAKAUJE
TAVTAPUCH
MEDAWAGSE
BAIKA
SIMCO

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