



Beyond Fintech: A Pragmatic Assessment Of Disruptive Potential In Financial Services

Part of the Future of Financial Services series | Prepared in collaboration with Deloitte

August 2017

Foreword

Consistent with the World Economic Forum's mission of applying a multistakeholder approach to address issues of global impact, creating this report involved extensive outreach and dialogue with numerous organizations and individuals. They included the Forum's Financial Services, Innovation and Technology communities, professionals from academia and the public sector. The outreach involved over 150 interviews and 10 international workshop sessions, encouraging collaborative dialogue to discuss insights and opportunities concerning fintech disruption within the financial services industry.

The holistic and global perspective of this report would not be as enriched without the support and contributions from the subject matter experts who assisted in driving our thoughts forward about the future of the financial services industry. In particular, we thank this project's Steering Committee and Working Group, introduced in the Acknowledgements section, which played an invaluable role with their expertise and patient mentorship. Also critical has been the ongoing institutional support for this initiative from the Forum and the leadership of our chairman, whose vision of the Fourth Industrial Revolution has been inspirational to this work.

Finally, we are grateful to Deloitte Consulting LLP in the United States, an entity within the Deloitte¹ network, for its generous commitment and support in its capacity as the official professional services adviser to the Forum for this project.

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The following senior leaders from global financial institutions provided guidance, oversight and thought leadership to the Future of Financial Services series as its Steering Committee:



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Editors' Note

The Disruptive Innovation in Financial Services project was launched at the World Economic Forum Annual Meeting 2014 in Davos-Klosters, in a world still consumed with navigating the aftershocks of the global financial crisis. But in the wings, a new challenge for the financial system was growing in the form of fintech – new entrants that promised to rapidly reshape how financial products were structured, provisioned and consumed.

Nearly four years later, as this initiative draws to a close, we take the opportunity to reflect on the changes to the financial system – taking stock of the impacts that fintechs have had and considering their evolving relationships with both incumbents and regulators. More importantly, it presents an opportunity to consider what lies beyond the horizon for financial services. The technologies of the Fourth Industrial Revolution have triggered a seismic shift in the financial system, the implications of which will extend far beyond the fintechs that pioneered their use in financial services. Value chains that have characterized the industry for decades are being disrupted and reshaped with implications for customers, regulators, incumbents and every other stakeholder in the financial system.

In this fourth report of the Future of Financial Services series, we hope to build upon our previous work and provide the many stakeholders of the financial system with a better understanding of the forces transforming financial services, as well as an outlook for its future.

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Contents

1. Context and Approach.....	7
2. Key Findings and Uncertainties	11
3. Sector Deep Dives	
3.1 Payments.....	35
3.2 Insurance.....	59
3.3 Digital Banking.....	84
3.4 Lending.....	105
3.5 Investment Management.....	126
3.6 Equity Crowdfunding.....	147
3.7 Market Infrastructure.....	168
Acknowledgements.....	189
Contact Details.....	195

Section 1

Context and Approach

This report represents the culmination of three phases of research into the transformative role of fintechs on the financial services ecosystem

Since December 2014, the World Economic Forum has strived to understand the impact of innovations on the financial services ecosystem, and to determine how all stakeholders would be affected

PHASE 1

Phase 1 laid out a foundation for understanding the transformative potential of new entrants and innovations on business models in financial services. It focused on:

- Establishing a clear taxonomy for understanding which fintech innovations are the most relevant
- Mapping possible futures for the evolutionary paths of emerging fintech innovations
- Exploring the implications of fintech on key stakeholders (consumers, incumbents, regulators, etc.)

Phase 1 outcomes are captured in the report, [The Future of Financial Services](#)



PHASE 2

Phase 2 aimed to illustrate the role of financial infrastructure in enabling the future of financial services. It focused on:

- Understanding the transformative power of blockchain on shaping the future capabilities and characteristics of financial infrastructure
- Defining a high-level blueprint for fully digital identity protocols that simultaneously empowers users, and simplifies and de-risks identity transactions

Phase 2 culminated in the release of two reports, [The future of financial infrastructure](#) and [A Blueprint for Digital Identity](#)



What is a Fintech? In this document we define a fintech to be a small, technology-enabled, new entrant to financial services. This definition does not include large technology firms that enter financial services (e.g. Apple with Apple Pay), or incumbent financial institutions who increase their focus on technology

The final phase returns to the structure of the 2015 report, conducting a broad exploration of the forces reshaping the financial services ecosystem

This report builds on the work of the previous reports, exploring the forces reshaping the structure of the financial system. It also considers evolutionary paths for the future of the system, as well as their implications for stakeholders

REPORT QUESTIONS

1

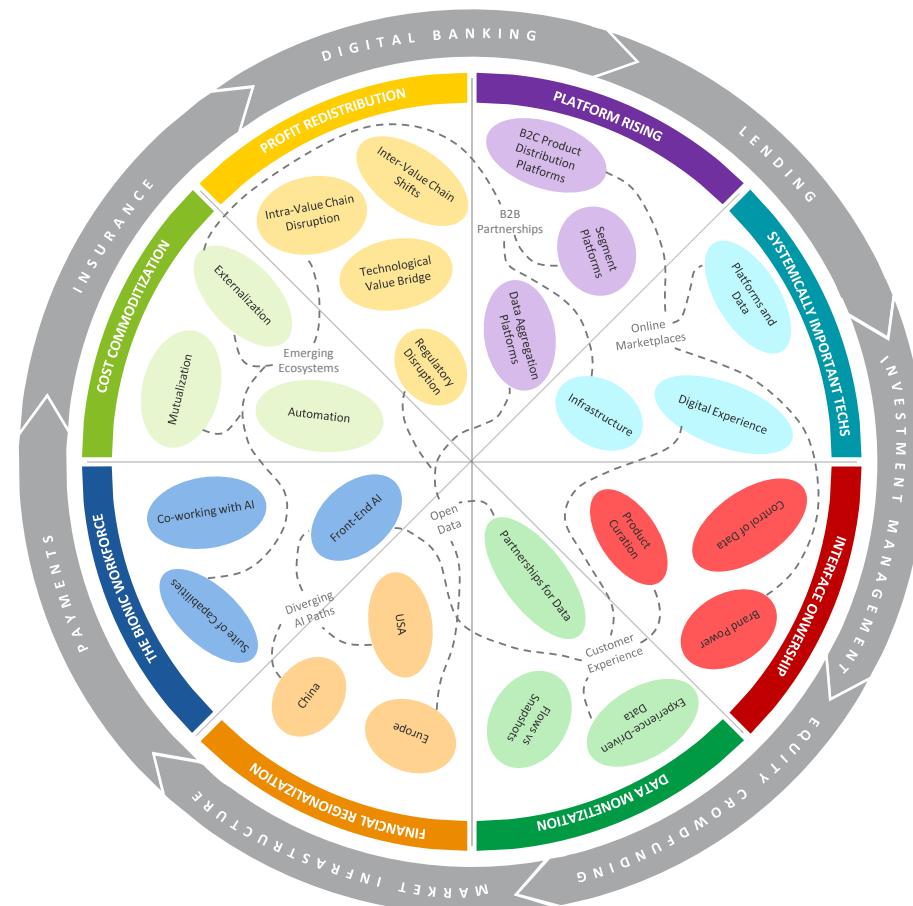
What are the innovations that have made the most impact on the financial ecosystem since the 2015 report, and what are the ideas that have failed to produce impact?

2

How will these innovations impact the ways in which financial services are structured, provisioned and consumed in the future?

3

What will be the implications of these innovations on the broader financial system?



Over the last 10 months, the project team engaged with over 150 experts and held 10 workshops in order to answer pivotal questions

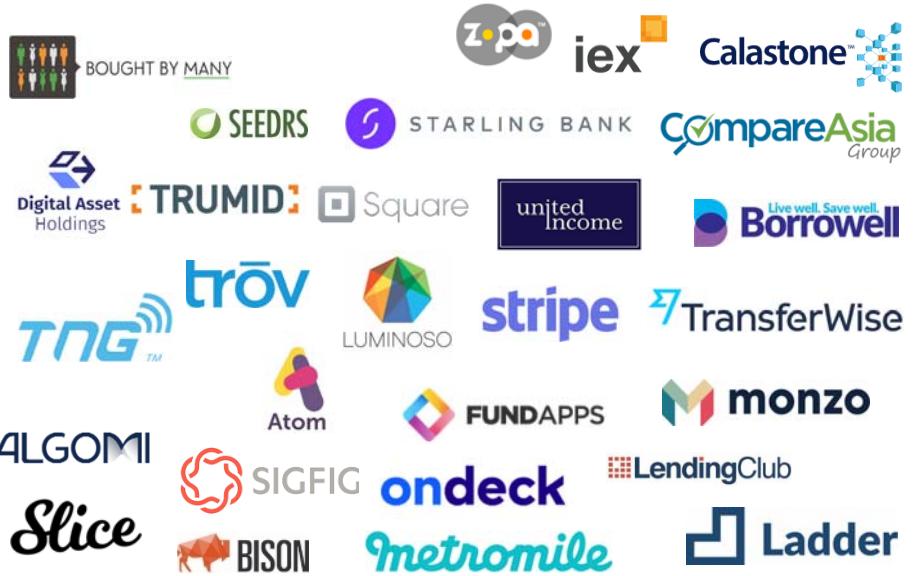
Industry Leaders

- Gained oversight, guidance and thought leadership from **C-suite executives, operating unit leaders of global financial institutions, and industry regulators**



Innovators

- Held in-person and phone interviews with **over 100 innovative new entrants and subject matter experts**



Global Workshops

- Facilitated **10 multistakeholder workshops at six global financial hubs** with over 300 total participants, including industry leaders, innovators, subject matter experts, and regulators



Davos-Klosters, Switzerland
January 2017



London, UK
February 2017



New York, USA
March, April 2017



San Francisco, USA
March 2017



Shenzhen, China
April 2017



Toronto, Canada
May 2017



Section 2

Key Findings and Uncertainties

Fintechs have changed how financial services are structured, provisioned and consumed, but have not successfully established themselves as dominant players

Many fintechs (small, technology-enabled new entrants) came into existence with the goal of overtaking incumbents as the new dominant players in financial services – but have shifted to building partnerships as they struggle with scale and customer adoption

WHERE FINTECHS HAVE SUCCEEDED



Fintechs have seized the initiative – **defining the direction, shape and pace of innovation** across almost every subsector of financial services – and have succeeded as both stand-alone businesses and crucial parts of financial value chains



Fintechs have reshaped customer expectations, setting new and higher bars for user experience. Through innovations like rapid loan adjudication fintechs have shown that the customer experience bar set by large technology firms, such as Apple and Google, can be met in financial services

WHERE FINTECHS HAVE FALLEN SHORT



Customer **willingness to switch away from incumbents has been overestimated**. Customer switching costs are high, and new innovations are often not sufficiently material to warrant the shift to a new provider, especially as incumbents adapt*



Fintechs have struggled to create **new infrastructure and establish new financial services ecosystems**, such as alternative payment rails or alternative capital markets. They have been much more successful in making improvements within traditional ecosystems and infrastructure

CONCLUSION

Fintechs have materially changed the basis of competition in financial services, but have not yet materially changed the competitive landscape

***Caveat:** In geographies where incumbent service providers did not exist and in segments where incumbents were not meeting customer segments' needs, new entrants to financial services have been able to build significant scale

Although fintechs have failed to disrupt the competitive landscape, they have laid the foundation for future disruption

The success of fintechs in changing the basis of competition, as well as the increasing pace of technology, means that while financial institutions have the potential to improve rapidly, they face rapid disruption both now and in the future

SOME FINANCIAL INSTITUTIONS HAVE TURNED THE THREAT OF FINTECHS INTO AN OPPORTUNITY...



The rapid growth of the fintech ecosystem **allows firms to externalize parts of their innovation function**, as they wait and see which new offerings gain traction before deploying their own solutions



The proliferation of fintechs **provides financial institutions with a “supermarket” for capabilities**, allowing them to use acquisitions and partnerships to rapidly deploy new offerings

...BUT THE ACCELERATING RATE OF CHANGE REPRESENTS A SERIOUS THREAT



The accelerating tempo of the innovation cycle in financial services means that a financial institution's **success is predicated on business model agility and the ability to rapidly deploy partnerships**, neither of which are traditional core competencies of these institutions



The ability to shop the fintech landscape for capabilities is not limited to incumbent institutions; **today, new entrants face significantly lower technological barriers to entering financial services**, with potential long-term implications for the competitive landscape

The project team has identified eight forces that have the potential to shift the competitive landscape of the financial ecosystem

DISRUPTIVE FORCES

- 1 Cost Commoditization:** Financial institutions will accelerate the commoditization of their cost bases, removing them as points of competition and creating new grounds for differentiation
- 2 Profit Redistribution:** Technology and new partnerships will enable organizations to bypass traditional value chains, thereby redistributing profit pools
- 3 Experience Ownership:** Power will transfer to the owner of the customer interface; pure manufacturers must therefore become hyper-scaled or hyper-focused
- 4 Platforms Rising:** Platforms that offer the ability to engage with different financial institutions from a single channel will become the dominant model for the delivery of financial services
- 5 Data Monetization:** Data will become increasingly important for differentiation, but static data sets will be enriched by flows of data from multiple sources combined and used in real time
- 6 Bionic Workforce:** As the ability of machines to replicate the behaviours of humans continues to evolve, financial institutions will need to manage labour and capital as a single set of capabilities
- 7 Systemically Important Techs:** Financial institutions increasingly resemble, and are dependent on, large tech firms to acquire critical infrastructure and differentiating technologies
- 8 Financial Regionalization:** Diverging regulatory priorities and customer needs will lead financial services in different regions of the world down distinct paths

Financial institutions will accelerate the commoditization of their cost bases, removing them as points of competition and creating new grounds for differentiation

Facing enormous pressure to reduce their cost base, incumbent financial institutions are embracing new technologies, as well as working with long-time competitors and new entrants alike, to commoditize cost drivers that do not provide competitive differentiation

ARCHETYPES



Mutualization

Incumbents are exploring the creation of new utilities and the expansion of existing utilities' roles, in order to standardize processes and avoid duplicating work between companies


Monetary Authority of Singapore

Example: The Monetary Authority of Singapore is working with several banks to build a national Know Your Customer (KYC) utility, which will reduce duplication and lower costs for all financial institutions



Externalization

The range of activities that financial institutions are comfortable with externalizing has expanded significantly, creating opportunities for both fintechs and incumbents to serve these needs

BLACKROCK

Example: BlackRock's Aladdin platform provides risk analysis, portfolio construction and compliance tools for institutional investors and retail wealth managers. The platform provides technology and support for industry-standard processes



Automation

Seeking to preserve margins, incumbents are turning to process automation tools to streamline processes and lower internal costs of activities, such as error handling



Example: Automation Anywhere is working with a wide range of banks to automate processes such as loan origination, audit compliance and account reconciliation

Sharing costs among peers and utilizing industry-standard automation tools will de-verticalize the value chain

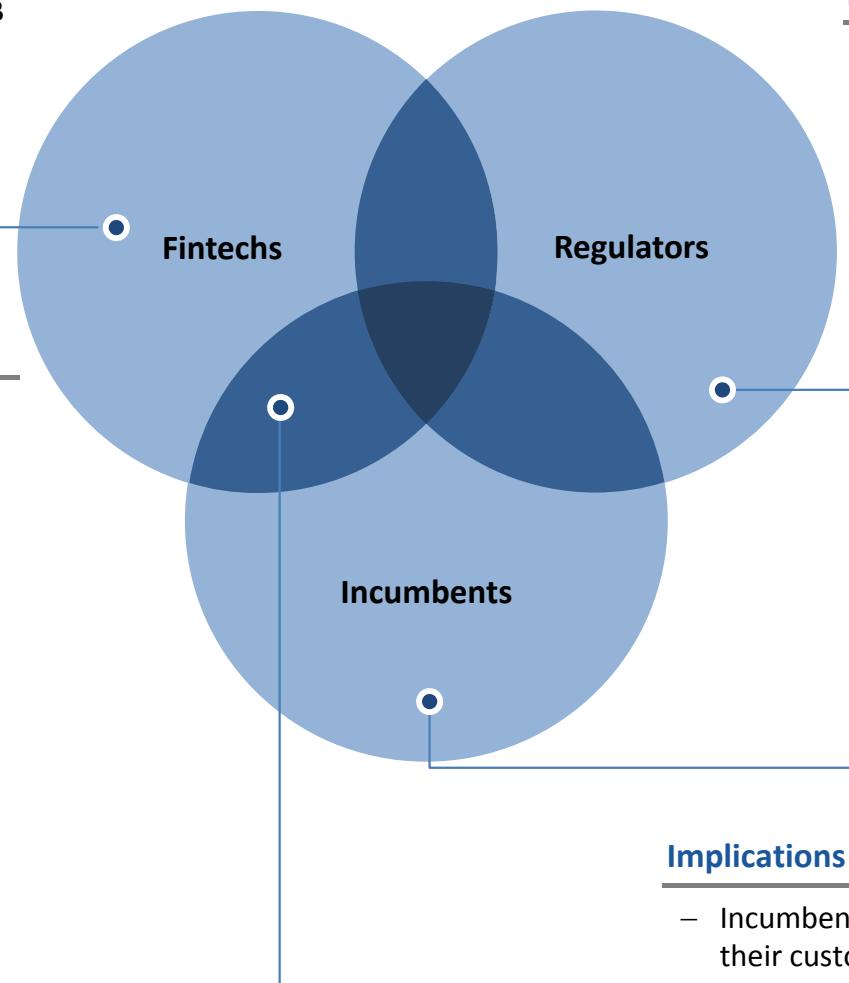
Implications for Fintechs

- The rise of cost-sharing utilities and B2B providers lowers the barriers to entry for new entrants



Implications for All Financial Institutions

- Organizations must view partnerships and ecosystem management as a company-wide strategic focus
- Organizations will have to start thinking of security and permissions as a jigsaw – each “piece” will have to be treated separately to minimize the threat from any new external connection
- Organizations will need to improve tracking of data flows to protect users, as information is shared with external companies



Implications for Regulators

- Regulators need to monitor the growth of utilities and business-to-business (B2B) service providers, and consider their potential systemic risks



Implications for Incumbents

- Incumbents will need to differentiate their customer-facing processes, as middle and back offices become commoditized

Technology and new partnerships will enable organizations to bypass traditional value chains, thereby redistributing profit pools

The location of profit pools within and between value chains will shift as technological catalysts enable companies to change their positions and relationships

ARCHETYPES



Intra-Value Chain Disruption

Existing value chain participants are bypassing traditional intermediaries and seeking partnerships directly with customer-facing start-ups, thereby becoming direct competitors with past partners



Example: Munich Re, a large reinsurer, is partnering with product start-ups – including Bought By Many and Trôv – to directly compete with their traditional insurance partners



Inter-Value Chain Shifts

Technology is allowing consumers to easily switch between products in different value chains, migrating profit pools to new organizations



Example: Investment firms such as Vanguard and Betterment have started proposing exchange-traded funds (ETFs) as an alternative to savings accounts, shifting customers from bank deposits



Technological Value Bridge

New technologies can simplify connections within large and complicated networks, making companies that focused on connecting participants more vulnerable to disruption



Example: Stripe offers online merchants an easy and cost-effective way to process payments online, which was previously only accessible to large merchants with merchant bank accounts

As profit pools shift due to value chain movements, intermediaries will face competitive pressure from all sides

ARCHETYPES (CONTINUED)



Regulatory Disruption

Regulators are curtailing financial institutions' control over access to infrastructure, lowering market power and shifting profits away from firms that oversee infrastructure



Example: The European Union's revised Payment Services Directive (PSD2) threatens to disintermediate payment networks by mandating that banks allow open, secure connections between merchants and user accounts

Implications for Fintechs

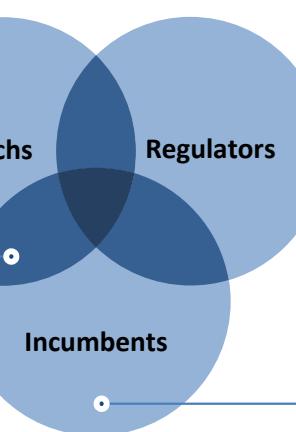
- The pool of potential partners that can provide scale, capital and customer reach will expand beyond traditional adjacencies

Implications for Regulators

- Regulators must monitor the shift in profit pools in order to identify the new value chain, as long-regulated companies become less relevant and new companies grow in importance

Implications for All Financial Institutions

- Technology will reduce the cost of bypassing value chain intermediaries and reaching the end customer
- Companies will need to monitor their adjacencies for potential pressures/shifts from partners



Implications for Incumbents

- Intermediaries that derive value from their position on the value chain will struggle to be profitable – scale will be necessary for survival

Power will transfer to the owner of the customer experience; pure manufacturers must therefore become hyper-scaled or hyper-focused

The rise of platforms means incumbents can no longer rely on controlling both product manufacturing and distribution, allowing product distributors to leverage control of their customer experience and place pressure on manufacturers

ARCHETYPES



Brand Opportunity

Distributors' ownership of the customer relationship places them in a position to grow their brand while de-emphasizing that of the manufacturer, particularly in cases where products are commoditized



Example: Customers of robo-advisors such as Wealthfront purchase ETFs from a wide range of companies, but likely have limited awareness of the assets in their portfolio



Product Curation

Distributors control which products are distributed and how customers view products, and can even steer customers towards certain products via recommendations



Example: The Apple App Store allows almost all apps that pass a set of rules, but stringently controls the front page – crucial for visibility, with over 1,600 apps launched per day



Control of Data

The distributor's location in a value chain allows it to collect data that is both deep (across the entire value chain) and broad (data on all product manufacturers)



Example: Mastercard offers retailers advisory services with benchmarks and recommendations, drawn from its visibility into data collected from comparable retailers

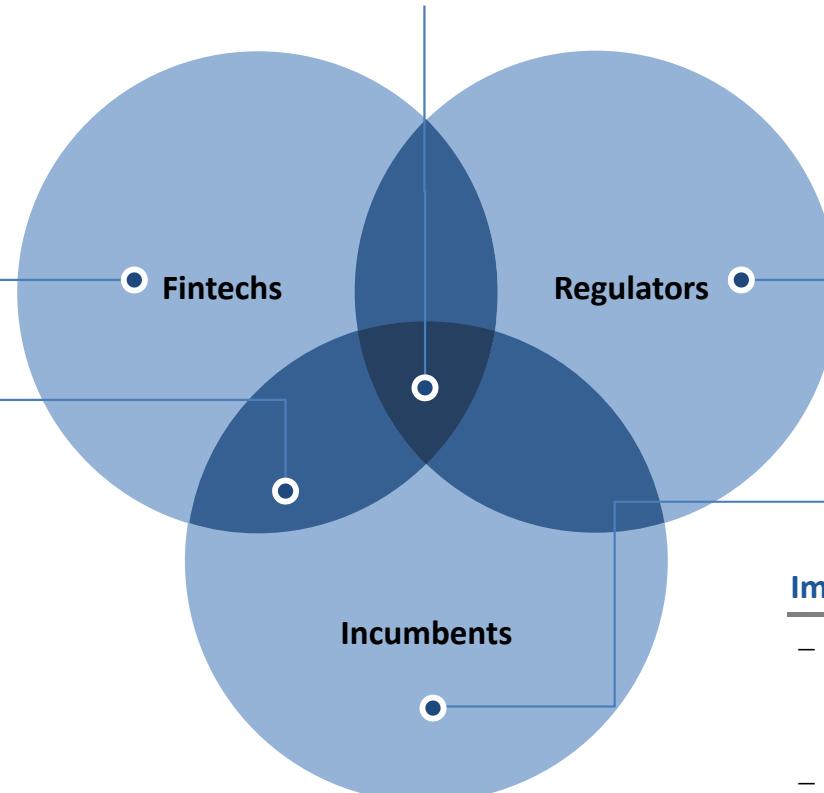
Customers will interact with fewer and fewer distributors in the future, as the market consolidates and major firms gain market share

Implications for Fintechs

- Fintechs, lacking both an existing customer base and the ability to scale quickly, will have to find niches if they wish to become distributors
- In contrast, distributors may help fintechs compete with incumbents as manufacturers of specialized financial products

Implications for All Players

- Product distribution represents a likely point of entry for large tech firms, due to their expertise



Implications for All Financial Institutions

- All firms will seek to be distributors of both their products and those of others; their success will depend on the existing market and whether they can capture mindshare
- Product distributors may struggle to achieve ubiquity and consistency of experience across an increasingly fragmented universe of connected devices

Implications for Regulators

- Regulators will have to guard against product distributors abusing their market power, especially in open platforms where distributors control the customer shopping experience
- Questions about how distributors and manufacturers share liability will have far-reaching consequences

Implications for Incumbents

- Incumbents will have advantages in the race to become distributors due to their existing customer base
- However, incumbents that fail to become product distributors will see a decline in product profit margins due to cost commoditization

Platforms that offer the ability to engage with different financial institutions from a single channel will become the dominant model for the delivery of financial services

The shift to multiple-provider platforms as a channel to distribute and trade is gradually emerging across geographies and throughout a wide range of financial products – here are just a few examples of what has been developed

ARCHETYPES



B2C Product Distribution Platforms

Retail distribution of financial products will take place within digital platforms, either open or curated, where customers will have the ability to choose between multiple providers

Tencent 腾讯

Example: Tencent's Webank platform acts as a storefront, allowing retail customers to purchase products from multiple competing vendors of credit and asset management services



Segment Platforms

Pre-existing platforms that cater to specific business needs and audiences will add financial products, in effect becoming distribution channels for financial services

WAVE

Example: Wave's accounting, invoicing and reporting platform for small businesses offers key financial services such as payments or lending directly, as well as through partners like ADP and RBC



Data Aggregation Platforms

Platforms that aggregate customer data from different financial institutions will increase in number and scope, reaching all sectors and allowing customers greater control over their data



Example: The United Kingdom is developing a “pensions dashboard”, aggregating information from insurers and asset managers to allow customers to view and manage all their savings in one location

The rise of customer choice will have profound implications on the design and distribution of products, and will force companies to shift roles

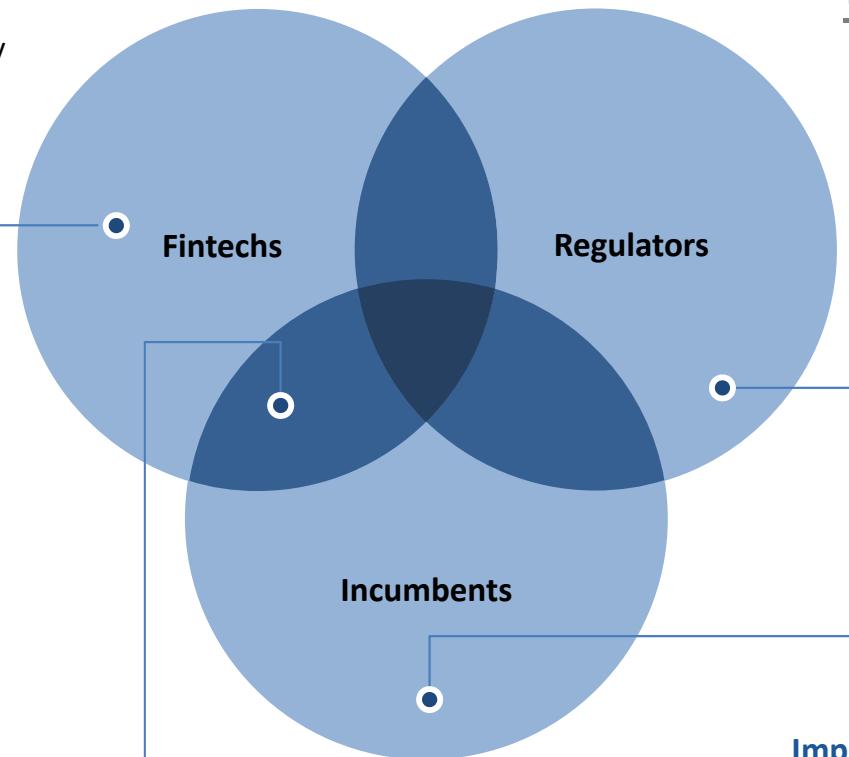
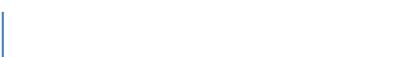
Implications for Fintechs

- Platforms allow product-focused fintechs the opportunity to scale quickly



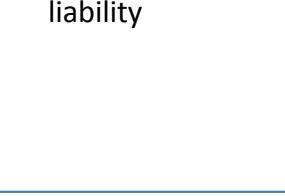
Implications for All Financial Institutions

- Product differentiation will become critical where institutions do not control the sales/distribution channel
- Platform owners will need to become capable ecosystem managers, balancing the needs of the product manufacturers with customer demand
- Platforms will naturally capture market data from all participants, adding to the platform owner's market power
- Platform owners and product owners will need to address open questions about the liability of products placed on platforms



Implications for Regulators

- Uncertainties around who is the responsible party will need to be resolved in both B2C and B2B markets for issues such as product suitability and liability



Implications for Incumbents

- Products will need to be stand-alone profitable to be sustainable in a platform environment (no more loss leaders)
- Improved price comparability will favour large incumbents where product economies of scale exist

Data will become increasingly important for differentiation, but static data sets will be enriched by flows of data from multiple sources combined and used in real time

Organizations will have to use a combination of data strategies to collect the depth and breadth of data needed to follow the lead of tech firms in data monetization

ARCHETYPES



Flows vs Snapshots

Institutions are starting to collect real-time data flows in order to utilize advanced analytics and target customers who change their behaviour (and needs) over time



Example: Visa Mobile Location Confirmation, which is optional and offered through participating financial institutions' mobile banking apps, uses mobile geo-location information as an addition to Visa's predictive fraud analytics



Experience-Driven Data

In order to expand their customer data sets to collect new streams of data, institutions are designing their digital experience to offer more customer value, thus engaging customers more frequently



Example: Facebook continually improves and adds features to its mobile app to increase customer engagement and collect more data points



Partnerships for Data

Partnerships with other companies solely for the purpose of data collection will increase, allowing banks (and nonbanks) to collect complementary data they otherwise would not have access to

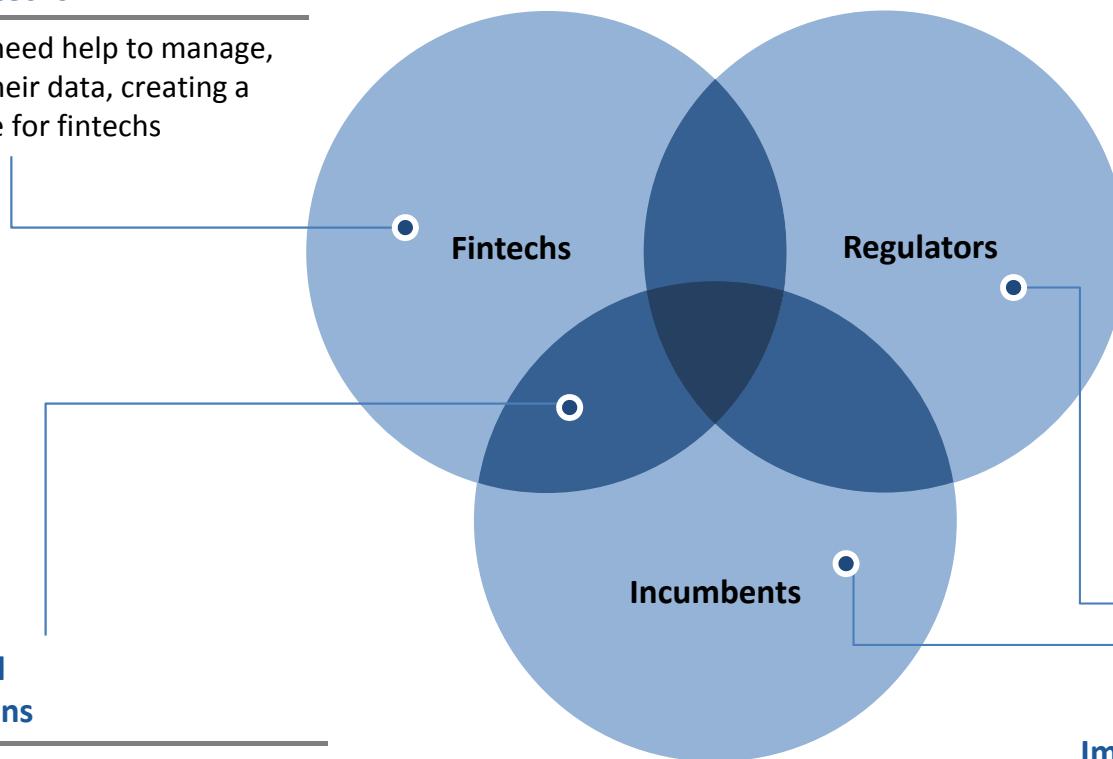


Example: AIB is partnering with retailers to offer cashbacks to customers; in return, retailers receive customer data, which they can use to provide targeted offers

As financial institutions seek to increase the amount and variety of data they collect, ownership and control of data will become a key issue for all stakeholders

Implications for Fintechs

- Incumbents will need help to manage, use and secure their data, creating a new business line for fintechs



Implications for All Financial Institutions

- Data security will be crucial in establishing and maintaining trust with the customer
- New partnerships based on data will create an imperative for a company-wide partnership strategy
- National data regulators will play a larger role in financial services

Implications for Regulators

- Regulators must carefully monitor the sharing of data to ensure that the risk of hacking is as low as possible
- Regulators must also be aware of how banks use the additional data they collect, and whether customers understand the impact of sharing their information
- Regulators must decide how much consumers can control their own information that they have shared with institutions

Implications for Incumbents

- Incumbents will have to decide on the value of migrating existing data in legacy systems to environments where it can be more effectively maintained, versus implementing tools and strategies for collecting new data

The arrival of new technologies, such as artificial intelligence, will mean major shifts in financial institutions' workforces as the definition of "talent" evolves

Organizations will need to manage talent as a collective set of employees and machine-enabled solutions, especially as cognitive technologies continue to develop and increase in relative importance

ARCHETYPES



Front-End AI

The public face through which customers interact with financial organizations will be AI, similar to the AI now dominating interactions between customers and tech firms



Example: Bank of America is launching Erica, a chatbot, in order to engage with customers and offer answers in the mould of Apple's Siri or Amazon's Alexa



Coworking with AI

Humans and computers working together will have a "force multiplying effect" compared to humans or AI alone, given enough training and role definition



Example: Ayasdi worked with a major bank to improve its stress testing, from a nine-month process requiring hundreds of employees to a three-month process using less than 100 specialists



Suite of Capabilities

As an organization's workforce shifts from being solely human to a human-AI mix, leadership will shift its focus from managing teams of people to managing suites of capabilities

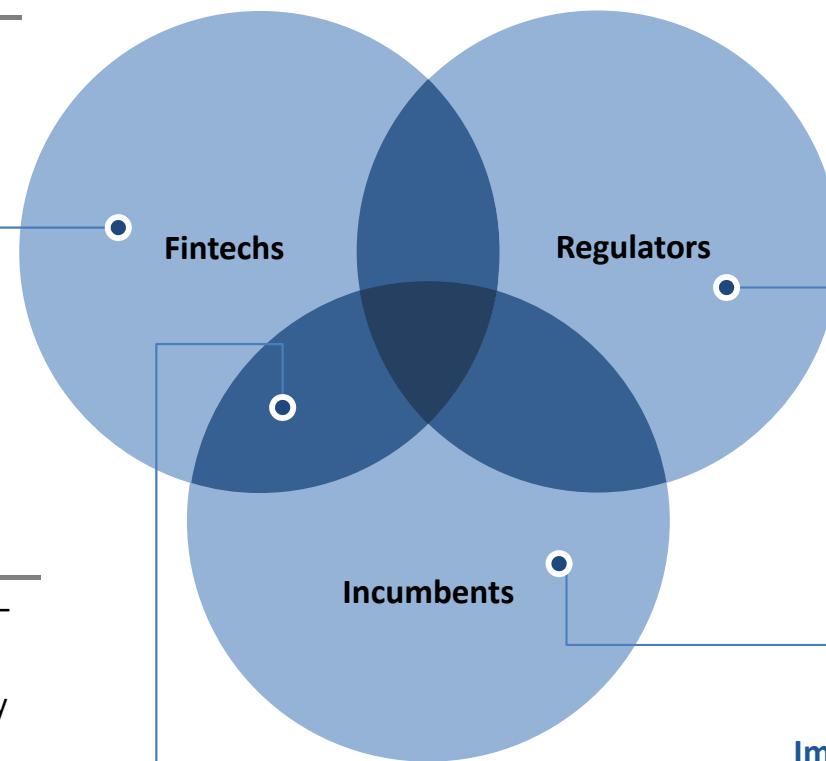


Example: While this idea has yet to be tested, academia is gradually accepting the need to manage AI similarly to humans^{4,5}

The evolution of talent will fundamentally shift the role of human capital within financial institutions

Implications for Fintechs

- AI and automation-focused fintechs will be in demand as companies seek to quickly gain expertise



Implications for All Financial Institutions

- AI risk management will be a priority – AI represents a single point of failure
- Technological improvements are likely to come in waves, meaning that changes from AI will impact some parts of the organization at different rates than others
- Companies will need to manage the balance between human-AI interactions, and train their employees to effectively coexist with AI

Implications for Regulators

- Regulators will need to develop new strategies for dealing with AI, including enforcement and punishment of non-compliant actions by AI

Implications for Incumbents

- Incumbents will have to figure out how to communicate their culture through customer-facing AI
- Incumbents will need to have a strategy on how to acquire AI expertise

Financial institutions increasingly resemble, and are dependent on, large tech firms to acquire critical infrastructure and differentiating technologies

The rise of digital interfaces and data in financial institutions means that those institutions increasingly focus on developing large tech capabilities, which is accompanied by an increased reliance on large tech firms

ARCHETYPES



Infrastructure

Financial institutions of all sizes are increasingly dependent on large techs' cloud-based infrastructure to scale and deploy processes and to harness artificial intelligence (AI) as a service



Example: Amazon Web Services (AWS) is forming the backbone of the financial services ecosystem, with a diverse set of firms – from JP Morgan to start-ups such as Xignite – adopting AWS for data storage and processing

Sources: 3. FT 4. CMO



Platforms and Data

Financial institutions have used the example of large techs successfully unlocking data and revenues from customer platforms to guide and shape their own efforts

JPMORGAN CHASE & CO.

Example: JP Morgan is investing in the collection and analysis of its customers' data with a new customer management and analytics tool, enabling cross-selling – "a little bit like how Amazon suggests what you might like to buy next"²



Digital Experience

Large techs have focused for years on making their customers' digital experience simple and pain-free, and financial institutions are now moving to match this standard

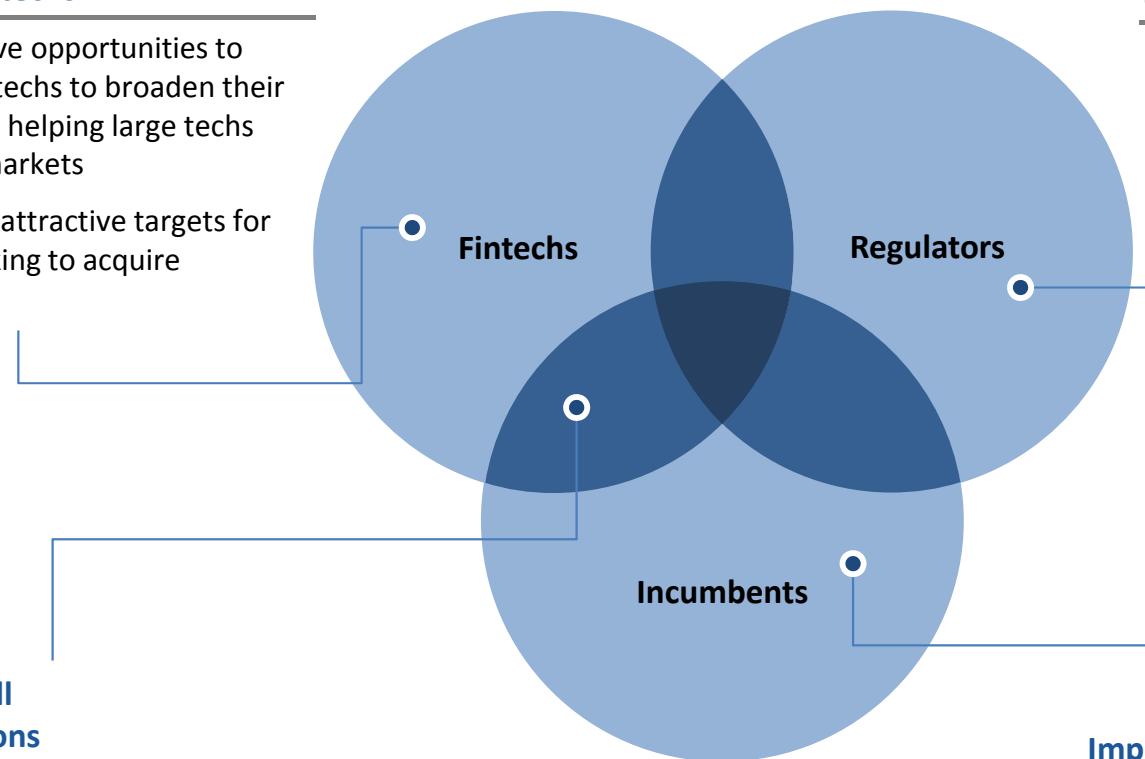


Example: Macquarie Bank is using Uber and Google as guides for its digital experience: "You as a customer should be interacting with a bank in the same way you interact with the rest of your life"³

The coming collision between financial institutions and large techs leads to tough choices for all firms: become dependent on large techs or risk falling behind

Implications for Fintechs

- Fintechs may have opportunities to work with large techs to broaden their reach, while also helping large techs enter financial markets
- Fintechs may be attractive targets for incumbents seeking to acquire technical talent



Implications for All Financial Institutions

- All financial institutions will need to find ways to partner with large techs without losing their core value proposition
- All firms risk becoming dependent on large techs, which necessitates the loss of some control over both costs and data

Implications for Regulators

- How large techs are treated under traditional regulatory frameworks will have a large impact on their interactions with financial institutions

Implications for Incumbents

- Incumbents will have to compete with large techs for talent, driving up the cost of technology talent
- Incumbents risk falling far behind on technological offerings if they minimize engagement with large techs to protect independence

Differing regulatory priorities, technological capabilities and customer conditions are challenging the narrative of increasing financial globalization

The trend towards financial globalization is giving way to regional models of financial services suited to local conditions, led by the complexity of differing customer needs and differences in solutions around the world

ARCHETYPES



Europe

A strong regulatory impetus for open data and consumer protection is driving the development of platform ecosystems in many verticals, with incumbents under growing pressure



Example: The European Markets in Financial Services Directive is designed to introduce more transparency to capital markets; trade execution firms must show clear evidence of "best execution"



China

A mobile-based connectivity ecosystem, the absence of major consumer-focused bank offerings and a largely innovation-friendly regulator all lead to large techs capturing significant market share



Example: In the absence of a mature payments system, the Alipay mobile payment app now owns over 50% of the \$5.5 trillion Chinese mobile payments sector, with tech giant Tencent as its only major competitor



USA

Unclear regulatory direction, as well as the presence of a mature financial ecosystem and well-served customers, means that changes to the current ecosystem will likely be incremental

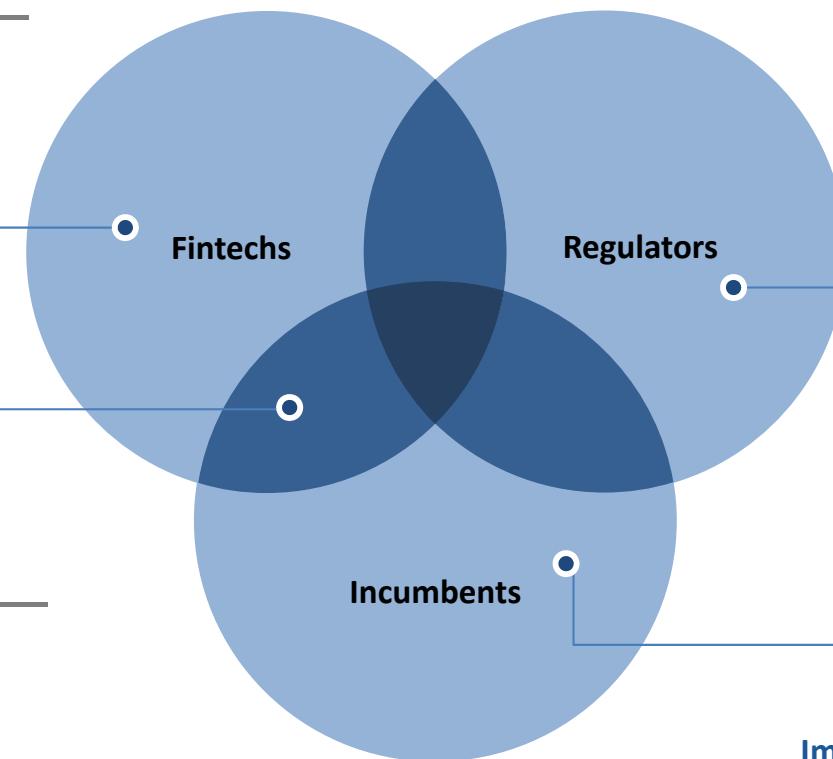


Example: The Automated Clearing House (ACH) Network is moving to same-day payments, but progress remains slow compared to other countries (such as the United Kingdom, which adopted real-time payments over a decade ago)

Increasingly divergent regional financial systems mean that local players could quickly gain market share, but international growth is difficult

Implications for Fintechs

- Fintechs will face serious obstacles to establishing themselves in multiple jurisdictions, even as technology theoretically lowers barriers to entry



Implications for All Financial Institutions

- The breeding ground for fintech innovation may become even more multipolar, as firms with offerings specialized to their locale will strengthen regional fintech hubs
- New ideas can be tested in one geography and introduced to other areas once conditions change
- Regionalization of emerging capabilities will force the creation of different solutions to similar problems

Implications for Regulators

- Regulators will face two opposed pressures: large incumbents will push for global convergence, and local firms will press for localized regulations

Implications for Incumbents

- Global firms will need distinct strategies to cultivate regional competitive advantages and integrate with local ecosystems
- Incumbents may become attractive partners for fintechs seeking to enter new markets as they look for opportunities to rapidly scale

In addition to the key findings, the following open questions will shape the industry's development – the path forward, however, is uncertain

These questions will influence the future of all financial services sectors, and are thus often subjects of discussion – but the current discussion holds more questions than answers

UNCERTAINTIES



Role of Identity

How will the rise of digital identity impact its use in financial services around the world?



Monetization of Data Flows

How can firms extract the most revenues from the data available to them? How much will it cost?



Technology – Governance Gap

How will financial services firms mitigate risk when technology races ahead of management's ability to understand the consequences?



Systemic Transparency

How will the transparency built into new systems impact their design, participants' roles or their profit models?



Cooperation Problems

Can financial services firms use technology to solve long-running partnership and collaboration issues that lie at the heart of the industry?

References

1. "How Artificial Intelligence Will Redefine Management". *Harvard Business Review (HBR)*. Retrieved from <https://hbr.org/2016/11/how-artificial-intelligence-will-redefine-management>
2. "Are You Ready for Robot Colleagues?". *MIT Sloan Management Review*. Retrieved from <http://sloanreview.mit.edu/article/are-you-ready-for-robot-colleagues/>
3. "JPMorgan Chase in push to mine customer data". *Financial Times (FT)*. Retrieved from <https://www.ft.com/content/1eaf6436-e4a2-11e6-9645-c9357a75844a>
4. "CDO interview: Macquarie Banking Group's digital leader on delivering customer trust". *CMO from IDG*. Retrieved from <https://www.cmo.com.au/article/609962/cdo-interview-macquarie-banking-group-digital-leader-delivering-customer-trust/?pp=2>

Section 3

Sector Deep Dives

Reading Guide for Sector Deep Dives

Each sector deep dive is organized according to a common structure: context on the sector and recent innovations, an analysis of key trends and uncertainties, and several potential end states illustrating evolutions of the sector in coming years

PAYMENTS | INTRODUCTION
This chapter is designed to follow up on the changes to the payments industry post-2015, and comment on the future of payments

MAJOR FORCES IMPACTING PAYMENTS, CIRCA 2015

- Mobile Payments
- Alternative Payment rails
- Seamless Payments

THESE FORCES AND OTHERS RAISED QUESTIONS LIKE...

- How might the dominant form change?
- Will mobile payment technologies be the future of payment infrastructure?
- What role will payments play in the future of alternative payment offerings?
- Would there be a place for digital currencies in payment ecosystems?

PAYMENTS | NARRATIVE A
Payments have continued to migrate away from cash and become less visible to the customer as consumers expand their spending in online and mobile environments.

SUPPORTING EVIDENCE

- Decentralized Online Sales
- Increasing Mobile Communication
- Growing Role of Online Payment

PAYMENTS | KEY UNCERTAINTIES
Uncertainties around payments largely revolve around the move to digital and online, with the effects of regionalization as a key uncertainty

WHAT TO KNOW

- The fast-paced nature of payments has shifted the revenue pressure on the payments industry. On one hand, heightened competition has led to lower fees and margins, which has forced payment providers to look for new revenue streams. On the other hand, the shift towards digital and mobile payments has led to a shift in consumer behavior, with more people using mobile devices to make payments.
- CHANGES**
- Possible Futures**

The evolution of these key uncertainties allow us to paint three diverging pictures for the future of the payments industry:

- 1. **Centralized**: The future of payments is dominated by increasing centralization, with major players like Visa and Mastercard becoming the primary drivers of change.
- 2. **Digital**: The future of payments is driven by the rise of digital currencies and blockchain technology, changing the way we think about money and payment systems.
- 3. **Fragmented**: The future of payments is characterized by increasing fragmentation, with smaller, specialized payment providers emerging to serve specific niches.

PAYMENTS | SCENARIO ONE
As payments moves from being a cash cow to a loss leader, market leaders look for new strategies and the rest look for partnerships

WORLD

1. INDEPENDENT CREDIT AND FINANCIAL SERVICES
Independent credit and financial services providers continue to dominate the market, with many smaller providers struggling to compete. They focus on providing specialized services to niche markets, such as small business lending or high-end personal finance.

2. INTEGRATED PAYMENT SYSTEMS
Additionally, the development of new integrated payment systems allows them to offer a one-stop solution for all payment needs, making it easier for consumers to manage their finances.

3. INNOVATION
Many market incumbents adapt to the changing landscape by investing in innovation, such as artificial intelligence, machine learning, and blockchain technology.

4. PARTNERSHIPS
Some market leaders use their scale and resources to create strategic partnerships with fintech companies to build customer offerings.

Critical Conditions

- High interest rates and inflation lead to a shift in consumer behavior, increasing the use of digital currencies and blockchain technology.
- Central bank digital currencies ("CBDCs") are rolled out, changing the way we think about money and payment systems.
- Blockchain technology becomes widely adopted, revolutionizing the way we transact.

Early Signs

- Increasing adoption of mobile payments and digital currencies.
- Emergence of new payment methods like peer-to-peer transfers and mobile wallets.
- Increased investment in fintech and blockchain technology.
- Shifts in consumer behavior towards digital and mobile payments.

PAYMENTS | CONCLUSION
Key takeaways for financial institutions

1. DIGITAL TRANSITION
Over payment activities will continue to become less profitable, making payment providers to focus on how they can add value to their customers. This means finding new revenue streams and exploring new opportunities where they are growing, e.g. product-level data, and partnerships, e.g. fintech firms, making data cooperation and partnerships crucial for innovation.

2. LOCAL PAYMENT NEEDS
Instead of designing payment solutions based on technology, institutions will focus on how their products and services can meet local needs. This includes developing regional solutions and tailoring regional solutions. Furthermore, emerging countries need a mature payments ecosystem and fully take the lead in developing payment solutions.

3. PARTNERS IN LARGE MARKETS
As the ability of large markets to influence the customer experience continues to grow, combined with the increased importance of product-level payment data, markets will be able to build stronger relationships and influence the broader evolution of payment ecosystems.

Introduction

- A high-level overview of the key innovations within the sector that have emerged in recent years

Findings

- An overview of the key findings shaping the sector and the underlying drivers of each finding
- Supporting evidence for the finding, as well as illustrative case studies

Uncertainties

- An overview of key uncertainties whose resolution will shape the sector's future

Potential End States

- Description of several plausible but divergent potential end states for the industry
- Critical conditions and early signs for each possible end state
- Implications mapped to key ecosystem stakeholders

Conclusion

- Key takeaways for financial institutions and all members of the sector ecosystem

A tracker on each page illustrates the reader's position in the sector deep dive

Section 3.1

Payments

Payments have greatly evolved in the last several years. This section examines the key trends shaping the industry and the uncertain path forward

The first half of this decade saw rapid change in the payments landscape, with the global entry of several innovative forces that raised fundamental questions about the future of payments

CIRCA 2015, THE MAJOR FORCES IMPACTING PAYMENTS WERE...

Mobile Payments



The 2014 launch of Apple Pay opened the developed world to the potential of mobile payments

Alternative Payment Rails



Interest grew in the potential applications of alternative currencies, such as bitcoin

Seamless Payments



Uber familiarized users with a payment experience that had no "moment" of payment

CIRCA 2015, THE BIG UNCERTAINTIES ABOUT THE FUTURE OF PAYMENTS WERE...

How might the dominant form factor of payments change?

Will incumbent payment networks be able to respond to new entrants' payments infrastructure?

What role will payments play in the broader suite of offerings from financial institutions?

Will the rise of multinationals (e.g. Apple Pay) lead to global payment convergence?

Note: For the purposes of distinguishing online and in-person brick-and-mortar shopping, all instances of "retail" refer to brick-and-mortar shopping

Payments have continued their migration to digital channels in the face of geographically varied adoption of mobile payment and declining profitability

WHERE DID DISRUPTION OCCUR?

- A Payments have continued to migrate away from cash and become less visible to the customer as consumers shift purchases to online and mobile channels
- B Payments businesses are experiencing intense pressure on margins in the face of competition and a challenging regulatory environment
- C Regional distinctions between payments ecosystems are growing, as both customer behaviour and regulatory environments diverge

WHERE HAS DISRUPTION NOT OCCURRED?

- D Mobile payment solutions have not sufficiently exceeded the functionality of pre-existing solutions in card-based markets, thus limiting their adoption
- E Customer acceptance of nontraditional payment schemes (e.g. alternative currencies) remains almost non-existent

Payments have continued to migrate away from cash and become less visible to the customer as consumers shift purchases to online and mobile channels

On the back of global shifts in commerce patterns from in-person to online, payment volumes and channels have naturally shifted away from cash towards simple, frictionless solutions, which are often operated by large tech firms

SUPPORTING EVIDENCE



Dominance of Online Sales

The global online shopping market is growing quickly at the expense of in-person shopping, and therefore online-based (cashless) solutions will dominate the overall transaction landscape



Increase in Mobile Connectedness

Especially in emerging economies, the near ubiquity of mobile phones combined with the lack of development in traditional financial solutions is driving the development of technologically advanced, mobile-based solutions for payments



Growing Role of Online Platforms

Large tech firms are driving the development of online payment platforms in e-commerce, causing payments to become less visible to the customer; the action of logging in to an online platform is sufficient to enable a transaction, with actual payment details stored in the background

Payments have continued to migrate away from cash and become less visible to the customer as consumers shift purchases to online and mobile channels (continued)

CASE STUDIES



Growth of online payment platform

Amazon's online store growth represented 53% of overall US e-commerce growth in 2016,¹ driven by the success of Amazon Prime, which now has 80 million subscribers. Amazon is also creating an ecosystem around its one-click payment service by rolling it out to other merchants (in direct competition with PayPal, for example).

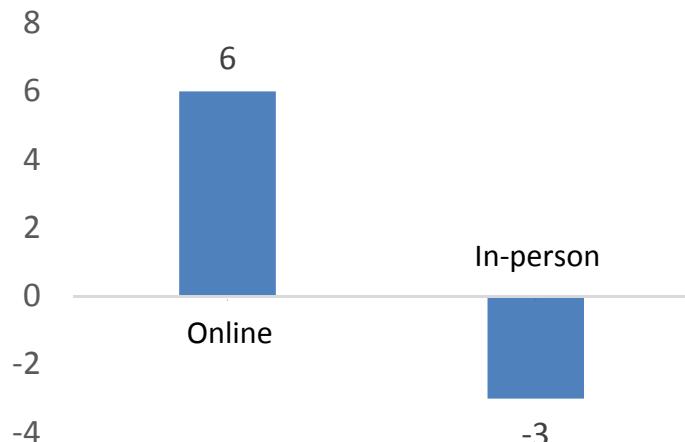


Shift to online sales

The growth of China's in-person retail shopping market slowed to 10% in November 2016,² its lowest level of growth in over a decade, as customers shifted their shopping from retail to online channels. Sales on Singles' Day, which represents the biggest one-day sale in China's online shopping market, grew more than 32% in 2016.³

QUANTITATIVE EVIDENCE

Change in US Black Friday Shoppers by Channel, 2014-2015 (million)⁴



Shift from retail to online shopping

KEY UNCERTAINTIES

The incompatibility between cash and digital marketplaces means that payments will only continue to move towards cashless solutions

1

Will dominant online payment processors (e.g. Amazon, Stripe) expand into in-person retail and if so, can they achieve scale?

2

How will card networks react to the rising importance of large techs in online payments?

3

In emerging markets, can incumbents enter and overcome locally built solutions?

Payments businesses are experiencing intense pressure on margins in the face of competition and a challenging regulatory environment

Increasing competition, coupled with regulatory forces and the rise of new solutions on top of the traditional ecosystem, means that payment profitability will decline in the future

SUPPORTING EVIDENCE



Interchange Caps

Several jurisdictions, including Europe, Canada and Australia, have either passed or are passing legislation limiting the fees charged on transactions, thus limiting profitability for all intermediaries. Europe, specifically, is implementing the EU Interchange Fee Regulation (IFR), and weakening “honour all cards” rules (which forbid merchants from selective card acceptance), making high-fee credit cards unattractive for merchants to accept



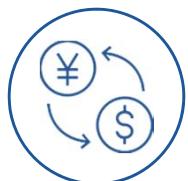
Eroding Lending Revenue

Revolvers – customers who use credit cards as short-term loans with high interest rates – are a major source of card profits. This market is facing serious pressure with the increase in alternative lenders, who target the same customers and offer more attractive interest rates



Faster Payment Schemes

The development of national-level faster payment schemes will lead to a decrease in revenues from other payment sources (wire transfers, cheques, etc.) as customers move to new platforms. Also, where national-level faster payment schemes exist, fees to the end consumer are non-existent, conditioning customers to expect low-fee payments in all transactions



New Foreign Exchange Solutions

Technologically advanced fintechs are moving into both the retail and B2B areas, lowering revenues that financial institutions can earn on foreign exchange (FX). Several banks have decided to partner with a fintech solution to offer FX services instead of operating their own, forgoing that income entirely

Payments businesses are experiencing intense pressure on margins in the face of competition and a challenging regulatory environment (continued)

CASE STUDIES



New FX solutions

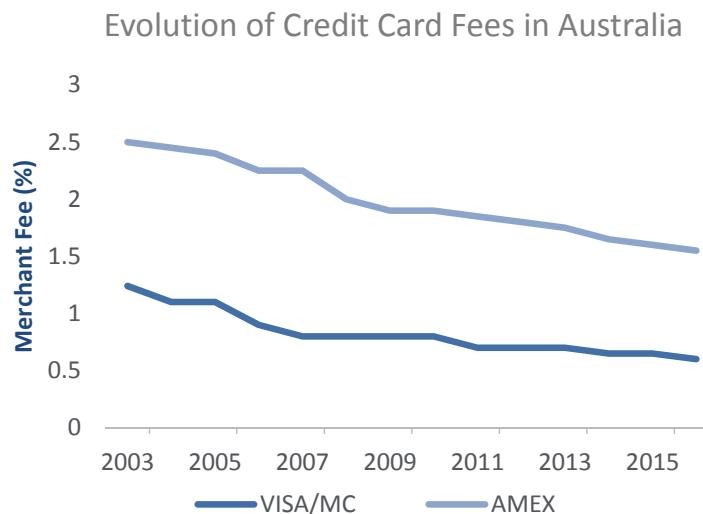
TransferWise, a retail FX platform, originally branded itself as an alternative to high bank fees, but in recent years has begun to work with select banks to expand its customer base. It has announced partnerships with N26 in Germany, Starling in the United Kingdom and LHV in Estonia (the country's largest local bank).



Fintech competing on lending

Lending Club, as well as many of its competitors in the alternative lending sector, has long advertised to the revolving credit market – highlighting lower interest rates, the absence of additional fees and the ability to raise credit scores. As of 2017, Lending Club claims it has already “converted” over 300,000 revolvers.⁵

QUANTITATIVE EVIDENCE



Declining credit card average merchant fees⁶

KEY UNCERTAINTIES

The decline in payment profitability will force incumbents to look elsewhere, including at payments data, to bridge the profit gap

1

Will cards become less important parts of the payments ecosystem as fees decrease?

2

Can banks/payment providers generate alternative forms of revenue from faster payment schemes?

3

Will traditional FX solutions compete or partner with new fintech-enabled solutions?

Regional distinctions between payments ecosystems are growing, as both customer behaviour and regulatory environments diverge

Standardized global payments systems remain elusive as location-specific pain points and regulations lead to localized improvements in payments systems

SUPPORTING EVIDENCE



Level of Unmet Needs

Countries without modern payments systems benefitted greatly from mobile payment technology, whereas the benefits are more marginal in countries with modern payments systems. As a result, adoption has differed considerably by region, depending on the degree of unmet needs



Ubiquity of Technology

Whether new payment technology is ubiquitous also greatly affects the adoption of payment solutions. The adoption of mobile payment solutions has been much higher in Africa and Asia (where merchants have supported new technologies) compared to the United States, where merchants have resisted adoption



Open Payments Regulation

The coming roll-out of PSD2 will advance the development of new payment schemes in Europe (and other jurisdictions that adopt similar legislation, such as Australia), but it is highly unlikely that changes to European payments will influence the regulation of US markets



Demonetization

Countries that embrace demonetization will force the adoption of mobile wallets, which has the effect of giving mobile-based solutions the needed critical mass to succeed – a critical mass that may be a long time in coming in countries where regulators do not act as innovation drivers

Regional distinctions between payments ecosystems are growing, as both customer behaviour and regulatory environments diverge (continued)

CASE STUDIES



Demonetization by the Indian government

At the end of 2016, India's demonetization of 500 and 1,000 rupee notes led to mass adoption of mobile wallets in record time – the compound annual growth rate (CAGR) for 2016 was expected to reach 160%, and the share of total transactions is expected to reach 57% by 2022, up from about 20% in 2016.⁷

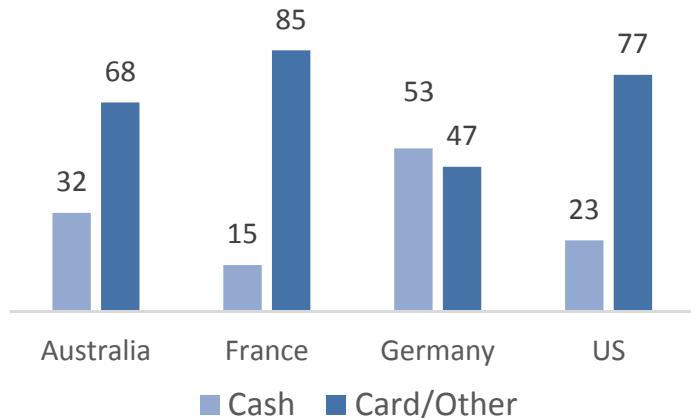


Similar markets – different adoption rates

Payment experiences can differ significantly even in similar markets. In Canada, regulation drove much earlier adoption of EMV ("smart", or chip, cards) compared to in the United States where retailer pressure slowed roll-out. As a result, only 18.6% of 2016 US point of sales transactions used EMV in compared to 90.7% in Canada.⁸

QUANTITATIVE EVIDENCE

Transactions by Type in Different Countries (%)



Varying importance of cash in different countries⁹

KEY UNCERTAINTIES

The regionalization of payments ecosystems will likely accelerate as legislation and technology continue to diverge

1

How can incumbents and/or regulators encourage ubiquitous technological solutions?

2

Will demonetization schemes catch on in other parts of the world?

3

How will the diverging payments ecosystem affect online transactions, if at all?

Sources: 7. Technavio 8. TSYS 9. International Journal of Central Banking

The coming application of the European Union's revised Payment Services Directive (PSD2) by January 2018 will greatly shift the payments landscape in Europe

PSD2 represents a host of changes to the original Payments Services Directive (PSD) passed in 2009, focusing on four broad themes: market efficiency, consumer protection, competition and choice, and security

KEY CHANGES

The main change to the original PSD consists of two new entities, with banks creating a model of simple and secure access:



Payment Initiation Services



Account Information Services

These allow users to initiate payments directly from their bank accounts to merchants

These allow users to authorize services to access their bank account information

Concurrently, the European Union is rolling out two major payments-related changes as part of IFR (Interchange Fee Regulation):

- Interchange fees are capped at 0.2-0.3% of transaction value for debit and credit, respectively
- The “honour all cards” rule (forbidding merchants from selective card acceptance) no longer applies; instead, cards are now sorted by category, and retailers can choose which category of cards to accept

EFFECT ON PAYMENTS



Payment initiation services allow merchants to link directly to the customer's bank account, bypassing a series of traditional intermediaries to lower costs

Account information services will allow services that are dependent on customer info, such as account aggregation services like Mint and Yodlee, to operate without bank account passwords, increasing security



KEY UNCERTAINTIES

- 1 What will the PSD2 implementation timeline be, and how will banks react?
- 2 How will EU regulators monitor and enforce the degree of institutional compliance with PSD2, and will this differ by country?
- 3 Will this drive innovation at the merchant/intermediary level, and will customers adapt?

Mobile payment solutions have not sufficiently exceeded the functionality of pre-existing solutions in card-based markets, thus limiting their adoption

Mobile payment solutions have not become as pervasive in the United States and Europe as in other parts of the world, due to the overwhelming dominance of card-based solutions

SUPPORTING EVIDENCE



Switching Costs vs Incremental Value

Customers are reluctant to try a new method of payment (mobile) without a clear, demonstrated improvement. Ingrained behaviours mean that the less significant an improvement a new solution represents, the less patience customers will have with it



Lack of Ecosystem Support

The ubiquity of card-based technologies has meant that many vendors simply do not support mobile payments, and it is often difficult to identify vendors that do. This creates a negative loop around the technology – the less support, the less customers will want to adopt, which leads to less support



Lack of Single Standard

Many card-based markets also lack one consistent mobile payment standard, meaning that even if stores accept mobile payments, it is often unclear which one of several solutions will work/not work, further clouding the seamless customer experience

Mobile payment solutions have not sufficiently exceeded the functionality of pre-existing solutions in card-based markets, thus limiting their adoption (continued)

CASE STUDIES



Gradual growth, but low usage

Apple Pay has grown since its introduction, with Apple's Chief Executive Officer Tim Cook announcing that the worldwide number of transactions rose by 450% year over year. However, third-party adoption studies paint a more mixed picture, with decreasing same-user usage and frequency since Apple Pay was launched in 2014.¹⁰

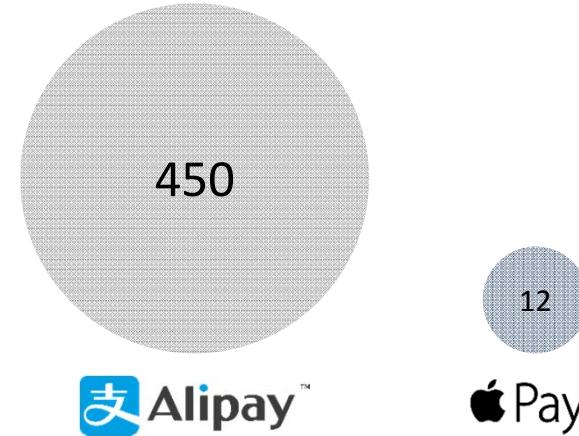


Failure of retailer-backed solution

CurrentC, a mobile payment app backed by retailers including Walmart, Target and Wendy's, shut down mid-2016 as a result of low adoption and retailers pulling out of its service.¹¹ Fractures in the retailer group due to different loyalty programmes, as well as low adoption and usage, ultimately led to its demise.

QUANTITATIVE EVIDENCE

Apple Pay Users vs Alipay Users as of 2016 (million)¹²



Mobile payment solution adoption in different markets

KEY UNCERTAINTIES

Until mobile-based solutions can demonstrate sustainable advantages over cards, their adoption in card-based markets will remain gradual

1 How will major players in mobile payments convince customers to switch from cards?

2 Does using a mobile payment solution have additional advantages yet to be unlocked?

3 Will successful incumbents from emerging markets be able to enter card-based markets?

Customer acceptance of nontraditional payment schemes (e.g. alternative currencies) remains almost non-existent

Despite rising in value, no alternative currency or payment scheme has made inroads into the traditional payments ecosystem or set up an alternative ecosystem, especially as traditional payment solutions are quickly being modernized

SUPPORTING EVIDENCE



Security Concerns

Concerns around the inherent insecurity of alternative currency transactions have only been magnified by a number of negative shocks, including hacks, freezes and their use as a tool for capital flight, all of which reduce trust



Lack of Central Oversight

Alternative rails have been difficult for regulators to track/oversee, which has held back buy-in and thus limited adoption rates. On the other hand, traditional rail replacement technologies have received regulatory buy-in



Real-Time Becoming Reality

Countries around the world are following the lead of the United Kingdom's faster payments system and modernizing their domestic payments systems to move to real-time (or close-to) processing, improving the value proposition of traditional payment schemes compared to alternatives



More Tools for Traditional Payments

New features, such as expanded data transmission and messaging (ISO 20022), transaction tracking and transparency, and flexibility (both for add-ons and cross-border convenience) are being added to traditional payments systems, minimizing the need for an alternative

Customer acceptance of nontraditional payment schemes (e.g. alternative currencies) remains almost non-existent (continued)

CASE STUDIES



Expansion of real-time system for businesses

The United Kingdom's Faster Payments system was developed to allow money transfers to move cheaply between accounts in a matter of hours, considerably faster than previous solutions. Recently, the limit for processing has been raised to £250,000 for business payments, allowing the system to handle the vast majority of business transactions.

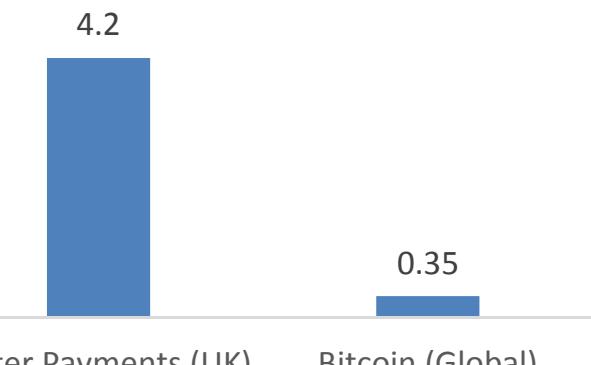


Bitcoin exchange hacks

Concerns regarding the security of exchanges and wallets are pervasive among users of bitcoin and other digital currencies. In 2016, Bitfinex, the world's second-largest coin exchange, was hacked to the value of over \$60 million; to recover, all customers were subject to a more than 30% haircut.¹³

QUANTITATIVE EVIDENCE

Transactions per Day, April 2017 (million)^{14,15}



Popularity of traditional vs alternative payments systems

KEY UNCERTAINTIES

The technology behind alternative payment schemes may be added to traditional schemes, but a significant market shift would need to occur for true payment alternatives to gain traction

1 How will regulators regulate and support digital currency development in the future?

2 Will different payment modernization standards affect the development of cross-border solutions?

3 How will banks continue to justify high payment fees once modern systems are implemented?

Sources: 13. The Wall Street Journal 14. Faster Payments 15. Blockchain.info

Uncertainties around payments largely concern the move to digital and online, with the effects of regionalization also playing a role

1 WHAT WE KNOW

The five payment findings illustrate the massive pressures on the payments industry. On the one hand, heightened competition and a challenging regulatory environment are leading to steadily declining profits. On the other, customers are reluctant to switch to nontraditional payment schemes without seeing significant benefits, thereby limiting adoption of new technologies.

Through these findings, the following key uncertainties about the future of payments emerged:

2 UNCERTAINTIES



Will the future of payments diverge into two worlds (retail and online), or can they be bridged?



Who is best positioned to benefit from the monetization of payments data?



Will PSD2 successfully create new payments value chains in Europe?



Will mobile payments ever capture a major (double-digit) share of retail payments in card-based countries?



What will the first national digital currency look like, and how far away is it?

3 POSSIBLE FUTURES

The resolution of these five key uncertainties paints three diverging pictures of the future of the payments industry:



Loss Leader



Two Ecosystems Post-PSD2



Increasing Fragmentation

Depending on how the key uncertainties are resolved, the potential end states have very different evolutionary paths and implications for all firms

LOSS LEADER



The first end state paints a world where:

- Issuers face lower interchange revenues
- Customers turn to alternatives for revolving credit
- Customers are conditioned to expect free payments
- Payment choices for customers decline

**TWO ECOSYSTEMS
POST-PSD2**



The second end state paints a world where:

- Banks develop open payment Application Programming Interfaces (APIs)
- Merchants develop online payment tools that bypass intermediaries
- The online and retail payments ecosystem diverges
- Customers are entrenched in online ecosystems

**INCREASING
FRAGMENTATION**

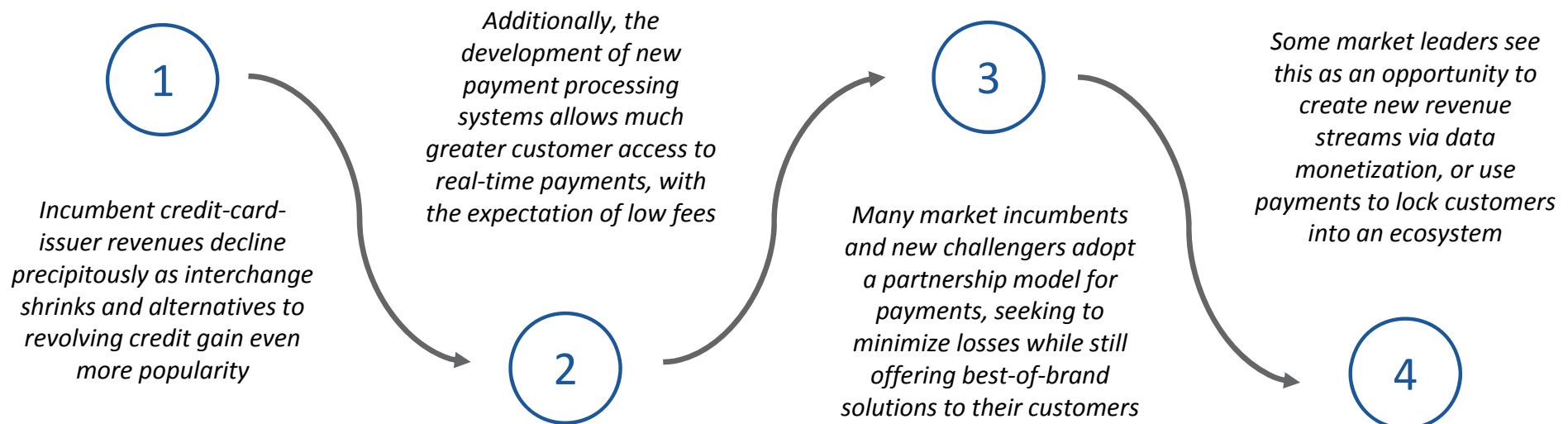


The third end state paints a world where:

- Merchants and intermediaries create personalized payment solutions
- Customers adopt a wide variety of payment tools
- Aggregated flows of data become difficult to acquire
- Monetization of data becomes much more difficult



As payments move from being a cash cow to a loss leader, market leaders look for new strategies, and the rest look for partnerships



CRITICAL CONDITIONS

- The worldwide trend of governments limiting interchange rates and weakening the power of “honour all cards” rules continues
- Low interest rates and an “easy money” monetary policy means that alternatives to revolvers remain easily available to most consumers
- Real-time faster payments systems are successfully deployed in various key geographies around the world

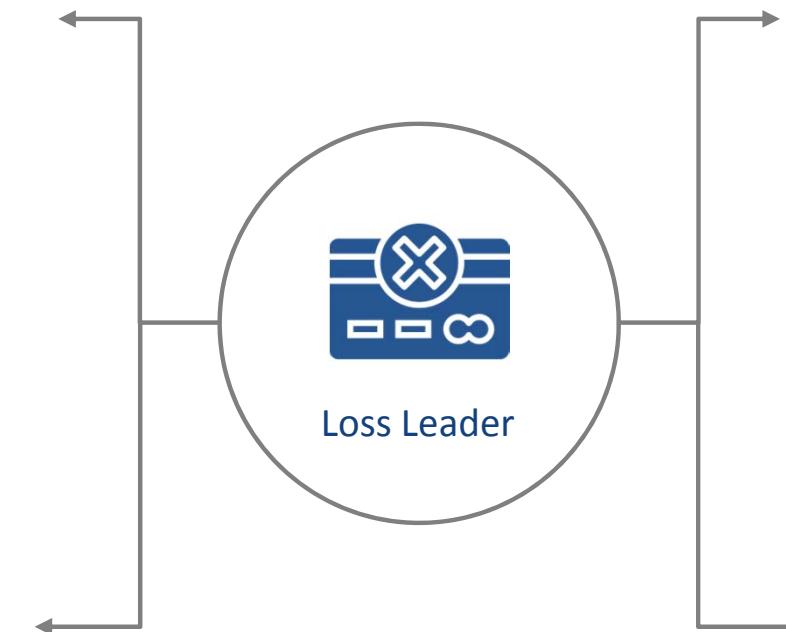
EARLY SIGNS

- Merchants push banks and credit cards to offer more (i.e. data sharing) for their fees, and hold out if no agreement is reached
- Banks start to re-evaluate their rewards and loyalty offerings on cards, offering customers less
- Banks start to partner with fintechs that offer payment services

Merchants benefit the most from this world, and customers may benefit, while intermediaries will likely suffer the most

Implications for Customers

- Fewer issuers means fewer credit card choices
- The remaining choices often represent better value for money – solutions will increasingly be free of charge
- Where allowed by law, data may be shared with multiple parties as an alternative revenue stream



Implications for Merchants

- More bargaining power means less fees paid to card issuers and intermediaries
- The opportunity exists to negotiate for more data/other benefits in return for fees

Implications for Intermediaries

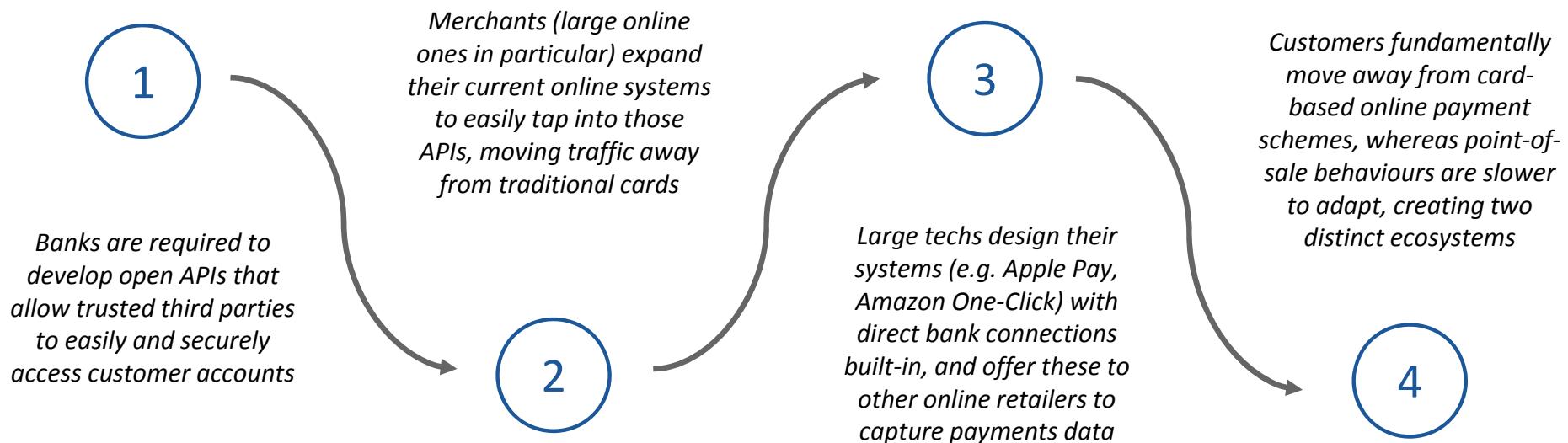
- Less interchange means less profit per transaction
- Intermediaries have the opportunity to gain market share as banks withdraw from payment-related activities in favour of partnerships

Implications for Card Issuers

- Regulations and the appearance of alternatives mean that revenues associated with the issuing of cards will decline
- An opportunity to gain market share arises as some card issuers will stop issuing cards
- Data increases in importance as a profit driver



Post-PSD2, the world of online and retail payments could diverge significantly, creating two distinct ecosystems



CRITICAL CONDITIONS

- “Hard” PSD2 or other regulations exist that force banks to develop simple, secure and effective APIs open to third parties
- Large tech solutions are developed that easily tie into these APIs and allow for some information sharing
- The continued absence of a comprehensive digital identity scheme prevents the online ecosystem from easily integrating with retail payments

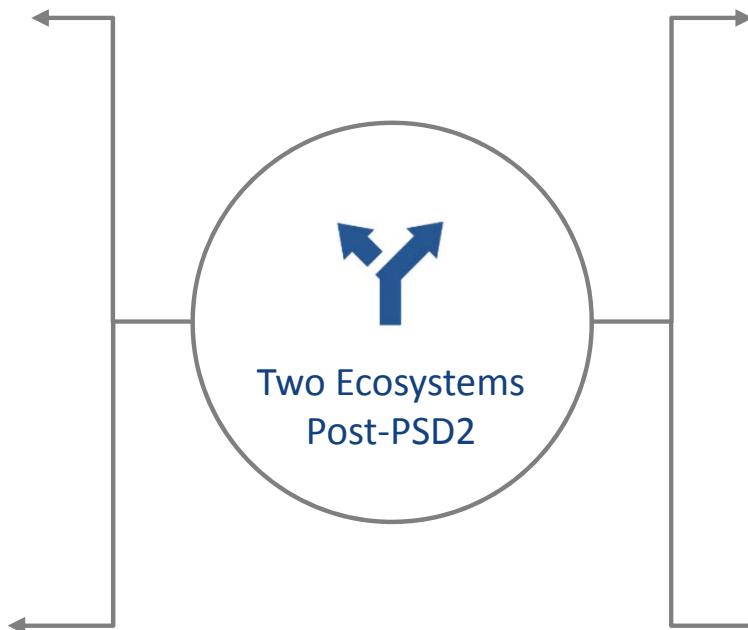
EARLY SIGNS

- Banks comply with PSD2 in Europe on time, to EU specifications
- Parties from any two of three groups (merchants, banks and large techs) form partnerships to develop solutions that allow easy consumer adoption
- Post-PSD2 credit card usage holds steady in retail stores

The implications for customers are unclear, but merchants benefit greatly on the back of shrinking profits for intermediaries

Implications for Customers

- Direct connections with banks for online purchases mean less justification for credit card fees
- Adoption of online solutions may mean customers are more deeply entrenched in large tech ecosystems



Implications for Intermediaries

- Volumes and margins decline as some retailers and banks bypass traditional intermediaries
- Consolidation is therefore likely, as players fight for a larger share of a smaller pool of profit
- Lack of online business forces a shift of focus to retail shopping to retain profits

Implications for Merchants

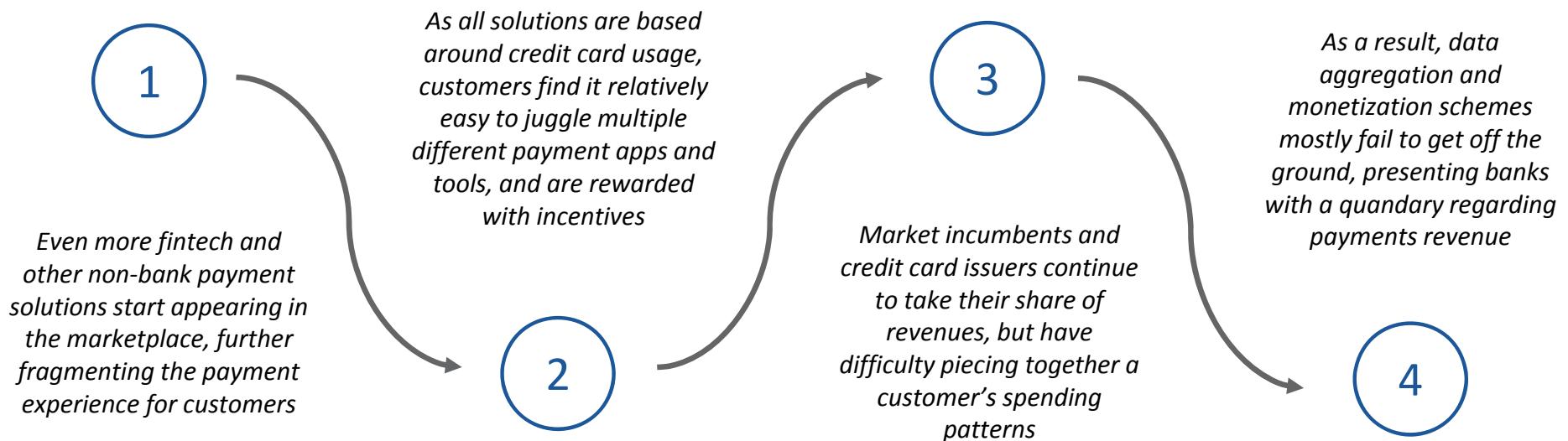
- Less fees are paid to card issuers and intermediaries as more customers use direct solutions
- The opportunity exists to choose partnerships with issuers/intermediaries if benefits align

Implications for Card Issuers

- Use of revolvers may decline somewhat as customers charge less to the card
- Issuers may ally with partners to push the use of their credit cards, driving up usage



Instead of convergence in payments, the field of payments may fragment as merchants, intermediaries and schemes all seek to differentiate



CRITICAL CONDITIONS

- Retailers, both in-store and online, continue to develop customized payment solutions and invest in reward/loyalty schemes to get customers to use those solutions
- Banks fail to bridge the SKU-level data gap

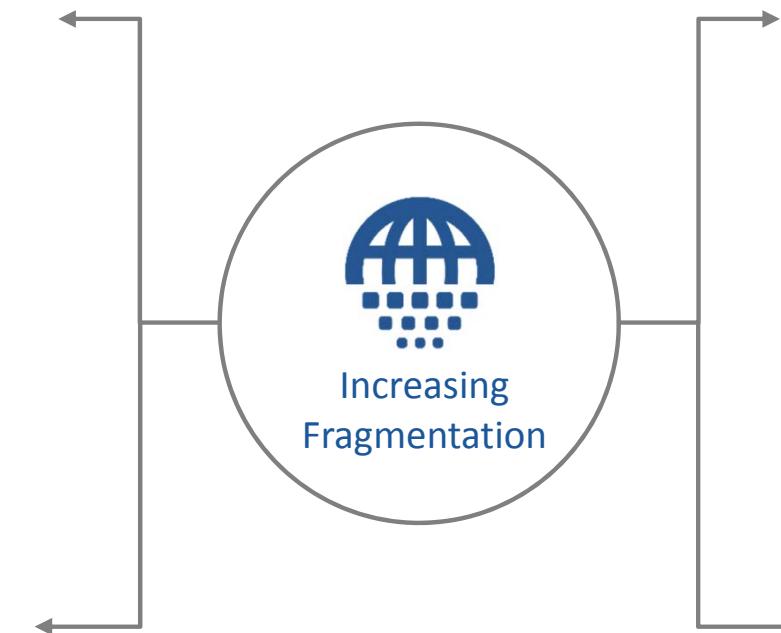
EARLY SIGNS

- The number of retail apps on a typical customer's smartphone continues to increase
- Credit card usage online does not decline
- No predominant payment channel appears out of the competitive landscape

Customers enjoy individually tailored experiences but may lose track of spending, while banks gain power as they track a customer's entire payment profile

Implications for Customers

- More bespoke solutions lead to individually tailored payment experiences
- However, more fragmentation may lead to difficulty tracking spending due to many sources of payments



Implications for Merchants

- Tailored payment experiences with loyalty rewards encourage app usage, and may lead to more customer adoption

Implications for Intermediaries

- Credit card fees continue or even rise, as more credit card usage gets built into apps
- However, nascent data monetization platforms largely fail due to a lack of information sharing
- As a result, consolidation may occur, as it is required to collect/make sense of customer data
- As customers struggle to manage spending habits, tools that offer tracking and advice could thrive

Implications for Card Issuers

- The base act of card issuing does not largely decline in revenue – cards continue to compete on rewards
- Banks have the only complete picture of the customer's spending, thus retaining control over data

Key takeaways for financial institutions

1

DATA MONETIZATION

New competition and increased regulation will continue to make core payment activities less profitable, pushing payment providers to focus on data monetization as an important source of revenue. Data streams will be significantly more valuable where they are granular (e.g. product-level data) and multidimensional (e.g. location data), making data cooperation and partnerships critical to successful monetization

2

LOCAL PAYMENT NEEDS

Instead of designing payment solutions based on technology, institutions will focus on how their customers prefer to pay, and design payment solutions that fit their customers' lives – which will lead to regional solutions. Furthermore, emerging countries without a mature payments ecosystem will likely take the lead in developing payment solutions

3

POWER OF LARGE MERCHANTS

As the ability of large merchants to influence their customers' payment choices grows (particularly in online transactions), their negotiating power within the payments ecosystem will grow accordingly. Combined with the increased importance of product-level payments data, merchants will be able to wield this power to lower fees and influence the broader evolution of payments ecosystems

References

1. "Echo turns up the volume on Amazon's ambitions as audacious bets pay off". *Slice Intelligence*. Retrieved from <https://intelligence.slice.com/echo-turns-volume-amazons-ambitions-audacious-bets-pay-off/>
2. "China retail, investment and industrial production growth soften in April". *Financial Times*. Retrieved from <https://www.ft.com/content/d9f71364-e2bf-345d-a4e9-a61c9a9058a7?mhq5j=e3>
3. "Singles' Day: Alibaba smashes records at world's largest online shopping event". *CNBC*. Retrieved from <http://www.cnbc.com/2016/11/11/singles-day-news-alibaba-poised-to-smash-records-at-worlds-largest-online-shopping-event.html>
4. "About 10 Million More Americans Shopped Online Than In Stores Over Black Friday Weekend". *Fortune.com*. Retrieved from <http://fortune.com/2016/11/27/black-friday-nrf-shopping/>
5. Statistic according to LendingClub.com
6. "Where does my money go? Interchange fees explained". *Finder.com.au*. Retrieved from <https://www.finder.com.au/where-does-my-money-go-interchange-fees-explained>
7. "How the Demonetization of Indian Currency Has Led to Increased Use of Mobile Wallets". *Technavio*. Retrieved from <https://www.technavio.com/blog/how-demonetization-indian-currency-has-led-increased-use-mobile-wallets>
8. "Worldwide EMV Deployment Statistics". *EMVCo*. Retrieved from https://www.emvco.com/about_emvco.aspx?id=202
9. "Consumer Cash Usage: A Cross-Country Comparison with Payment Diary Survey Data". John Bagnall et al, published in *International Journal of Central Banking*. Retrieved from <http://www.ijcb.org/journal/ijcb16q4a1.pdf>
10. "Apple Pay Stats". *PYMNTS.com*. Retrieved from <http://www.pymnts.com/apple-pay-adoption/>
11. "CurrentC – retailers' defiant answer to Apple Pay – will deactivate its user accounts". *Ars Technica*. Retrieved from <https://arstechnica.com/business/2016/06/currentc-retailers-defiant-answer-to-apple-pay-will-deactivate-its-user-accounts/>
12. "Alipay Takes On Apple Pay And PayPal On Their Home Turf". *Forbes*. Retrieved from <https://www.forbes.com/sites/helenwang/2016/10/30/will-alipay-dominate-global-mobile-payments/>
13. "Bitcoin Exchange to Spread Losses of Hack". *The Wall Street Journal*. Retrieved from <https://www.wsj.com/articles/bitfinex-to-spread-losses-from-cybertheft-among-all-users-1470559865>
14. "Statistics". *Faster Payments*. Retrieved from <http://www.fasterpayments.org.uk/about-us/statistics>
15. "Confirmed Transactions Per Day". *Blockchain.info*. Retrieved from <https://blockchain.info/charts/n-transactions>

Section 3.2

Insurance

Insurance has greatly evolved in the last several years. This section examines the key trends shaping the industry and the uncertain path forward

The first half of this decade signaled the start of major disruption in insurance, and the global entry of several innovative forces with the potential to dramatically change its future

CIRCA 2015, THE MAJOR FORCES IMPACTING INSURANCE WERE ...

Value Chain Pressure



From sales to claims, insurers faced pressure on all sides of the value chain

New Product Needs



New risks linked to changing lifestyles and technology meant new insurance product needs

Increasing Connectivity



Insurers' ability to connect with and monitor their customers' risks was increasing

CIRCA 2015, THE BIG UNCERTAINTIES ABOUT THE FUTURE OF INSURANCE WERE ...

Would the pressures on the insurance value chain continue, and would they lead to changes?

Would insurance products change due to changing customer lifestyles?

Would connected products reach mass adoption across all types of insurance?

How would the development of life insurance evolve as growth markets shift?

Note: For the purposes of distinguishing between property and casualty (P&C) insurance and life insurance, all findings and potential end states will specify their relevant sector, or if they are equally applicable to both sectors

Insurers are challenged by the rise of "insurtechs" and a structural transformation of their customer base, forcing them to adopt to new technologies more quickly

WHERE DISRUPTION OCCURRED

A

Increased modularity in the insurance value chain is enabling new combinations of players and threatening the position of incumbents

B

Usage-based, on-demand and object-specific insurance products are emerging in response to shifting customer lifestyles

C

Life insurers face pressure to reinvent their product strategies to meet the needs of their next generation of customers

D

The development of products to insure emerging risks is becoming critical to carrier profitability, particularly as margins in traditional products erode

WHERE DISRUPTION DID NOT OCCUR

E

Connected devices are proliferating, but insurers have failed to convince customers that connected insurance serves their interests

Increased modularity in the insurance value chain is enabling new combinations of players and threatening the position of incumbents (P&C/Life)

A rise in the number of insurtechs, coupled with external forces, is driving the disaggregation of insurance value chains – forcing insurers to adapt to the new world by partnering and investing in innovation

SUPPORTING EVIDENCE



Changing Purchasing Patterns

Customers are purchasing insurance in new ways. Some customers are choosing different channels, such as online and mobile, while others are changing their purchase occasions, including purchasing microinsurance products as needed and purchasing insurance directly tied to a product



Shifting Underwriting Responsibilities

The continued development of self-driving cars and the sharing economy has started to shift the responsibility of insurance away from the insurer to both distribution platforms and product manufacturers (e.g. Uber, Airbnb or Tesla), creating new engagement models for insurers and necessitating a shift in insurance product design



Overcapitalization

The insurance industry is overcapitalized as a whole, leading to lower returns. Thus, the recent growth of non-catastrophe insurance-linked securities (ILS), as well as partnerships between ILS and risk underwriters/product designers, will lead to additional return depression, forcing firms to find other ways of unlocking profit



Rise of Partnerships

With the rise of external forces, insurers and reinsurers are increasingly partnering with outside organizations (such as insurtechs and large tech firms) to acquire expertise and hedge against disruption, without risking direct product cannibalization by innovating internally

Increased modularity in the insurance value chain is enabling new combinations of players and threatening the position of incumbents (P&C/Life) (continued)

CASE STUDIES



Partnership with insurtech

Bought by Many, an insurtech focused on using the web to meet previously underserved affinity needs, recently partnered with Munich Re to offer insurance products directly. This gives Bought by Many the balance sheet of Munich Re for support, and provides Munich Re exposure to products without a traditional carrier intermediary.¹

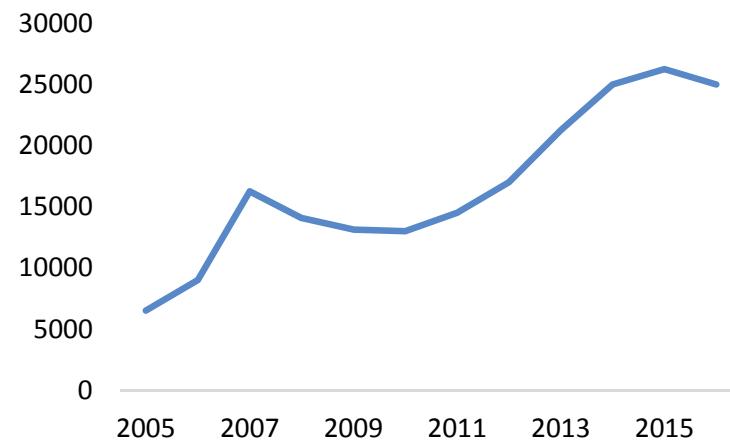


Lifetime auto insurance

Tesla has quietly rolled out lifetime auto insurance for the majority of its cars sold in Asia.² The insurance is provided by a third-party insurer (varies by geography), and the lifetime cost is included as part of the vehicle price at point of sale. Tesla believes that with its improving autopilot and safety features, the risk profile of its cars will only improve over time.

QUANTITATIVE EVIDENCE

Outstanding Cat Bond and ILS Risk Capital (\$M)³



The rise of alternative capital in insurance

KEY UNCERTAINTIES

The rise of insurtech and the transformational effect of technology shifts will force insurers to redefine their product design and distribution strategy

1 How will insurers change product design and pricing in a world where they sell through multiple channels?

2 How will insurers guard against the erosion of their profitability from institutional money?

3 To what extent will insurance get subsumed within the actual product or service being purchased?

Sources: 1. FT 2. Mashable 3. Swiss Re

Usage-based, on-demand and object-specific insurance products are emerging in response to shifting customer lifestyles (P&C)

Insurers are designing new products around their customers' changing needs, especially as people from all walks of life change their work and consumption patterns. However, questions remain about how needs will be measured and risks assessed

SUPPORTING EVIDENCE



Rise of the Prosumer

The line between the consumer and a business is blurring, with the rise of the prosumer meaning that consumers need different coverages depending on what they're doing. As a result, insurers must shift their delineation between personal and commercial insurance in order to meet customer needs



Micro-Insurance

Insurtech start-ups are offering ever smaller “slices” of insurance for individual products (e.g. customers’ mobile phones), or for smaller amounts of time that customers can choose (e.g. for a potentially delayed flight). This will test the limits of insurance product design and necessitate on-demand sales



Adaptable Insurance

Consumers are demanding modularity for their insurance in different locations, for different use cases (e.g. coverage for high-value items), and for different usage patterns (e.g. coverages that can easily be turned on and off). As a result, incumbents will have to adapt their “one-size-fits-all” products to remain competitive

Usage-based, on-demand and object-specific insurance products are emerging in response to shifting customer lifestyles (P&C) (continued)

CASE STUDIES



Blurring lines for all

The fastest-growing segment of hosts on Airbnb in the United States are seniors (102% year-over-year growth vs 85% overall), and 64% of them are women over the age of 60.⁴ The growth of this segment suggests cross-cultural participation in the sharing economy, and the subsequent need for insurance products targeted to customers' individual lifestyles.

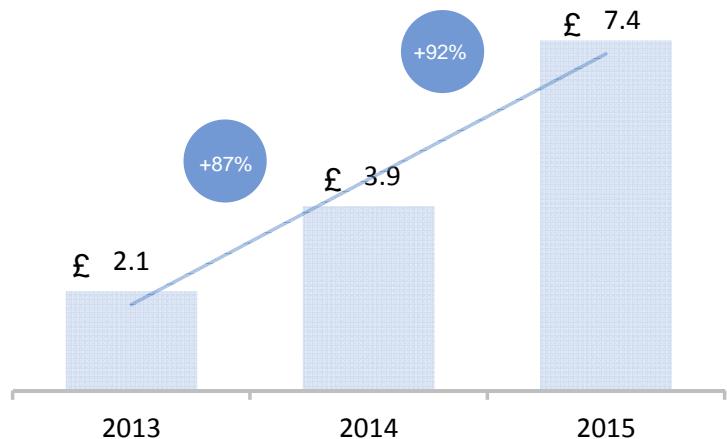


Serving the prosumer

Slice is an insurtech targeting the grey area between consumer and business insurance, in order to meet the needs of the prosumer.⁵ Slice has created a product where homesharers are covered on top of a traditional homeowner's policy, but at much cheaper prices than those for a commercial policy.

QUANTITATIVE EVIDENCE

Size of the UK Sharing Economy (billion)



Transaction value growth of the UK sharing economy⁶

KEY UNCERTAINTIES

Customers' purchasing behaviours are influenced by the blurred lines between work and personal time, and the subsequent demand for flexibility and individuality

1 How will insurers bridge the gap between personal and commercial operations within their operations?

2 Micro-insurance presumes an increased level of engagement between customers and the insurer – do customers want this?

3 How will the roll-out of adaptable insurance impact customers who previously benefitted from non-modular products?

Life insurers face pressure to reinvent their product strategies to meet the needs of their next generation of customers (Life)

The life insurance market is growing fastest in areas where the population is much younger as a whole, which leads to changes in product demands and customer purchasing behaviour that insurers must take into account

SUPPORTING EVIDENCE



Emerging Markets Growth

The vast majority of growth in life markets is in emerging markets, such as South-East Asia, the Middle East or Africa, and those younger customers seek to purchase term coverage more than retirement-related products



Comfort with Digital Channels

In many emerging markets, the traditional agent network is weak and the population is much more invested in digital (including mobile) technologies, as opposed to mature markets where traditional life insurance depends on in-person interactions with both an agent and a doctor



Rise of Digital Distribution

Several platforms started in 2017 sell simple life products online, using available information to bypass the medical check; this represents the start of a shift of rigid, fixed-term policies towards more flexible, consumable chunks for easy digital consumption

Life insurers face pressure to reinvent their product strategies to meet the needs of their next generation of customers (Life) (continued)

CASE STUDIES



Emerging market life insurance

Bima is a company delivering a wide range of mobile health coverages to customers in the emerging world, using a model where consumers can pay for insurance using prepaid mobile credit.⁷ They still require verification by an agent, but target low-income individuals (typically not a target of life insurance) in several markets in Africa.

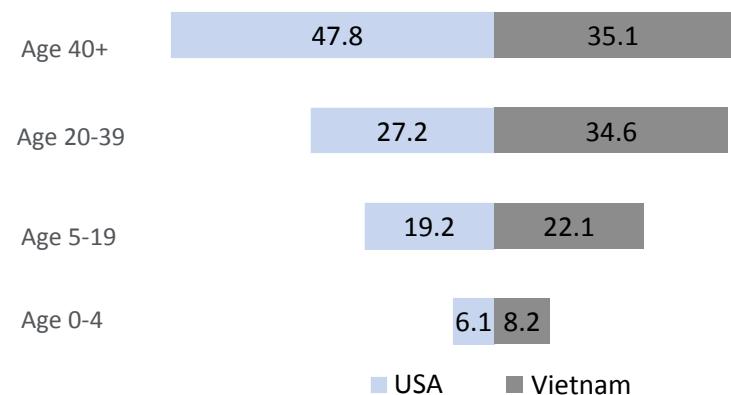


Online-based life products

Ladder and Haven Life are US insurers that have recently started to offer term life products without a medical check for the majority of applicants.⁸ Ladder is an insurtech start-up, whereas Haven Life is a wholly owned subsidiary of MassMutual. As a result, they represent two paths for the life insurance industry to offer digital products.

QUANTITATIVE EVIDENCE

Population Distribution in the US vs Vietnam, 2016 (%)⁹



Different demographics, different needs

KEY UNCERTAINTIES

Life insurance companies will have to adopt P&C insurance traits, such as digital platforms and automated processes – omnichannel, simple experiences will be a differentiating factor in customer decision-making

1

Will emerging market patterns spill over into developed markets with a traditional understanding of life insurance?

2

How will insurers acquire the information they need to bypass the medical check, and how will this differ by region?

3

How will traditional insurers manage the shift to simpler term products in their core businesses, without cannibalization?

Sources: 7. Business Insider 8. NerdWallet 9. PopulationPyramid.net

The development of products to insure emerging risks is becoming critical to carrier profitability, particularly as margins in traditional products erode (P&C)

While risk homogenization has pushed margins down for traditional insurance coverage, this decline is balanced by growth in emerging markets, value-added connected services and new products to address emerging risks

SUPPORTING EVIDENCE



Global Market as Seesaw

P&C insurance premiums in the developed world have flatlined or declined due to the homogenization of risk. This has been offset by growth of traditional insurance products in emerging markets, where penetration rates for insurance remain low



New Risks Equal New Products

The insurance market is starting to build products that protect against emerging tech-related risks, such as cyber insurance, AI and self-driving cars. Cyber insurance is already a \$2.5 billion market in the United States and is projected to grow quickly; the financial services sector itself represents a significant driver of growth for these products



Change of Role

In the commercial lines space, insurers are starting to shift to offering products that include sensor-based coverage, which reduce claims by monitoring for changes 24/7. The rise of connected insurance and sensor technology will lead to an increasing share of business focused on prevention

The development of products to insure emerging risks is becoming critical to carrier profitability, particularly as margins in traditional products erode (P&C) (continued)

CASE STUDIES



Joint cyber aggregation model

Guy Carpenter, one of the world's largest reinsurers, recently established a partnership with Symantec to create a cyber aggregation model.¹⁰ Guy Carpenter is hoping that by partnering with Symantec, it will be able to model extreme cyberevents more accurately and deliver better pricing and risk management for its customers.



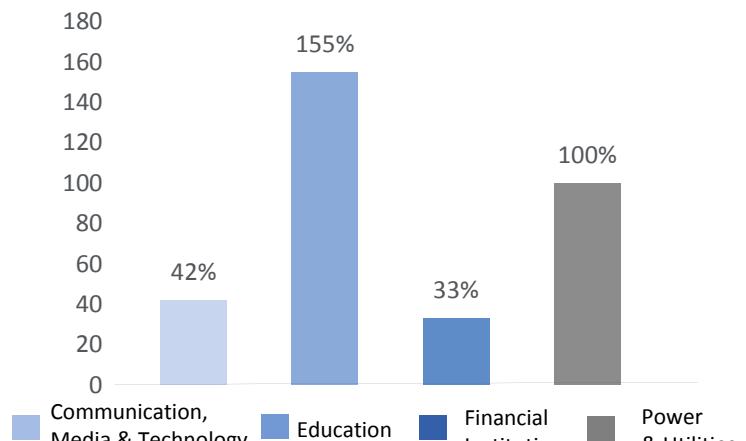
Listening. Learning. Leading.[®]

Connected monitoring for churches

A commercial insurance company recently launched a product with Church Mutual to protect churches against frozen pipe leaks (churches are especially vulnerable due to low occupancy). The initial pilot saved customers close to \$1 million in claims, and the product has been rolled out in over 1,500 churches across the United States.¹¹

QUANTITATIVE EVIDENCE

Growth in Total Cyber Insurance limits Purchased for Marsh Clients', Q1/2015¹²



Fast and broad growth of cyber insurance products

KEY UNCERTAINTIES

While traditional products remain profitable in emerging markets, finding new sources of revenues is increasingly important in the developed world

1 How long will emerging markets be able to grow rapidly, and how does that timeline contrast with the homogenization of risk?

2 Will the rise of insurance premiums on new risks and in new markets balance out the loss of traditional risks and markets?

3 With the shift to prevention, insurers will move into areas currently occupied by large techs – how will this affect partnerships?

Sources: 10. Insurance Journal 11. Yahoo Finance 12. Risk Management Monitor/Marsh Analysis

Connected devices are proliferating, but insurers have failed to convince customers that connected insurance serves their interests (P&C/Life)

The number of connections between the consumer and the insurer has risen, but consumers do not feel comfortable volunteering their information as insurers have not convinced the customer of the benefits of connectedness

SUPPORTING EVIDENCE



Customer Data Ownership

As the amount of data from connected insurance rises, regulatory bodies have started to mandate consumer data protection policies, which put control of data in the customer's hands. Moreover, regulators in some locales are working directly with companies in order to ensure data security



The Rise of Time-Measured Insurance

Traditionally, insurance products have worked on a fixed-time basis, where the price would be directly linked to the customer's risk profile. As technology advances, connected insurance products can measure both a risk and a time variable, making more targeted and accurate pricing possible



Ease of Connection

To simplify the process of connected insurance and to reach out to sometimes hesitant consumers, insurers can work with product manufacturers to build the connection into the product. In most instances, however, that connection requires customer agreement



Role of Assistants

With increasing use of virtual assistants by Amazon, Google and Microsoft, and as such assistants collect more information about their owners, they may become a virtual insurance agent for households. However, insurers would have to build relationships with large tech firms to use those channels effectively

Connected devices are proliferating, but insurers have failed to convince customers that connected insurance serves their interests (P&C/Life) (continued)

CASE STUDIES



Lifestyle rewards

The John Hancock Vitality programme rewards customers with premium savings and retail discounts for living a healthy lifestyle. Customers have the choice to opt in to the programme, earning “vitality points” by tracking daily, health-related activities. Customers benefit because they receive savings by going about their daily activities – no lifestyle change required.¹³

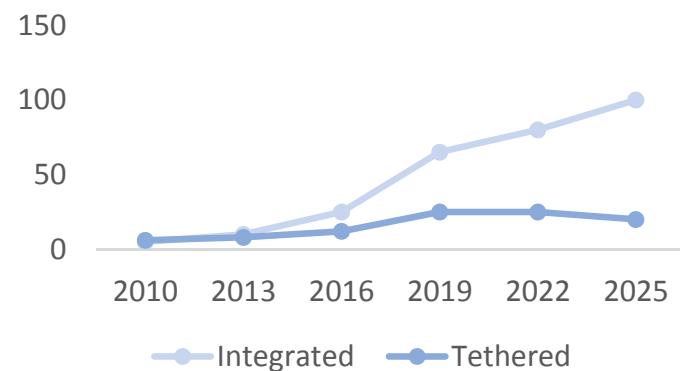


Integrated telematics

At Liberty Mutual, customers can receive a free Nest Protect smoke detector and discounted insurance premiums upon installation and verification.¹⁴ Nest notifies Liberty Mutual of the device’s battery levels and working sensors – no additional effort required. Customers save just by having a required home safety device, making adoption pain-free.

QUANTITATIVE EVIDENCE

Deployment of Integrated vs Tethered (Stand-Alone) Telematics (in million vehicles)¹⁵



Rise of integrated telematics vs opt-in telematics

KEY UNCERTAINTIES

Before customers are willing to adopt connected products, adequate data-sharing agreements and premium incentives need to be in place

1 How will insurers come together to build standards around data sharing, and how will those standards differ internationally?

2 What will be the impact of time-based insurance on the per-unit price of insurance?

3 How will the development of assistants around closed ecosystems (Siri, Alexa) impact the purchase of insurance?

Sources: 13. John Hancock 14. Nest 15. EY

The resolution of these uncertainties will shape the future development of insurance and the roles of insurers

1 WHAT WE KNOW

The insurance findings illustrate the scale of the challenges facing insurers. The value chain is under enormous pressure, and changes in purchasing patterns are forcing insurers to move away from the traditional “one-size-fits-all” model towards a flexible, customizable range of products. At the same time, insurers must change from being reactive to being proactive, with the rise of connected insurance and the need to monitor customer risk on an ongoing basis.

Through these findings, the following key uncertainties around the future of insurance emerged:

2 UNCERTAINTIES



How will the insurance consumption model change as the sources and nature of liability changes in the future?



Will the industry be able to develop guidelines for the use of data, and how will those guidelines differ around the world?



Do customers want to engage with their insurer more often (as would be needed for micro-insurance)?



How will insurers match their life products to fit the different conditions in emerging markets?



Will increasing integration and a focus on prevention lead to success for connected products?

3 POSSIBLE FUTURES

The resolution of these five key uncertainties paints four diverging pictures of the future of the insurance industry:



Challenging the Channel



Underwriting by Machine



Rise of the Flexible Product



E-Z Life Insurance

Depending on how the key uncertainties are resolved, the potential end states have very different evolutionary paths and implications for all firms

CHANGING THE CHANNEL



The first end state paints a world where:

- Insurers improve their customer-facing digital experiences
- Insurance becomes increasingly integrated with products
- Consumers benefit from products tailored to their needs
- Advertising for mindshare decreases in importance

UNDERWRITING BY MACHINE



The second end state paints a world where:

- Underwriting becomes increasingly complicated, strengthening the role of AI
- Third-party underwriting (for AI expertise) becomes the industry standard
- Two diverging paths are created for customers
- Insurers face a battle to differentiate themselves

RISE OF THE FLEXIBLE PRODUCT



The third end state paints a world where:

- Prossumers force insurers to connect business and personal insurance
- Insurers use technology to enable time flexibility
- Insurers engage with consumers to monitor coverage
- Customers may be caught off guard by inconsistent coverage

E-Z LIFE INSURANCE

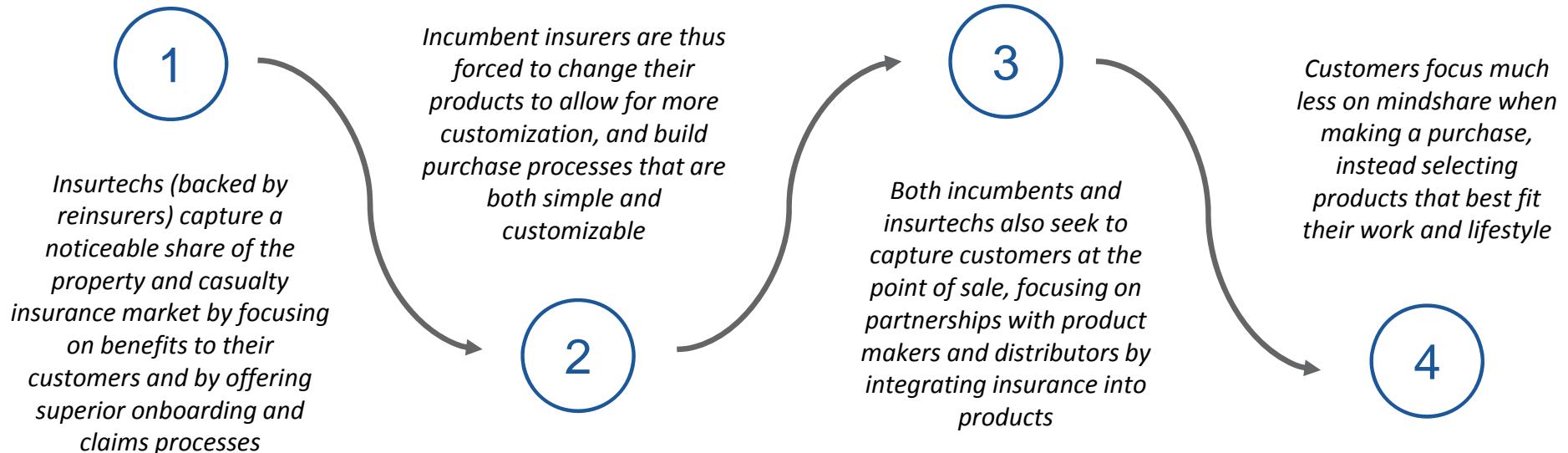


The fourth end state paints a world where:

- Insurers develop digital channels for product distribution
- Term products rise in popularity as demographics shift
- Life insurers deprioritize agents and investments
- Life insurers thus increasingly resemble P&C firms



As customer purchasing patterns start to shift, insurers emphasize benefits, digital channels and integration at point of sale (P&C)



CRITICAL CONDITIONS

- Digital channels for purchase continue to rise in popularity, led especially by insurtechs
- A majority of customers overcome apathy to consider switching insurance providers more actively
- Significant demand exists for insurance tied to specific products

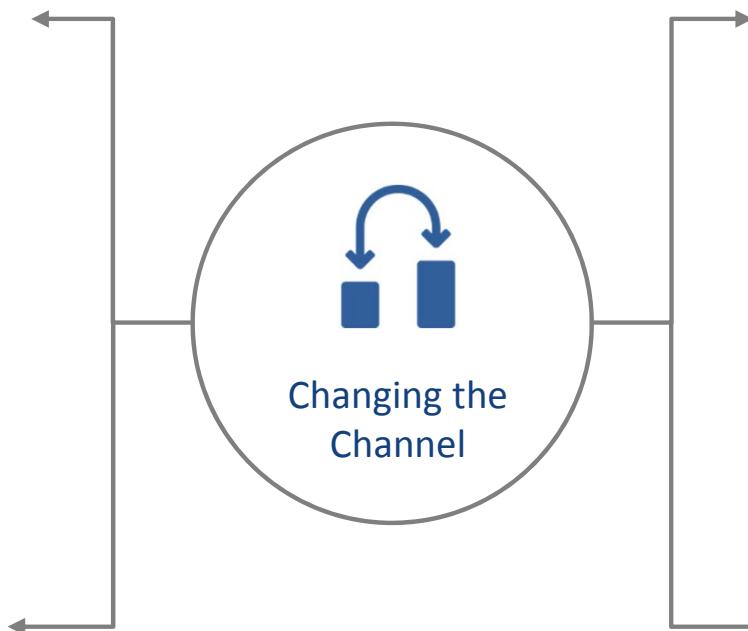
EARLY SIGNS

- A variety of insurtechs that offer different types of P&C insurance appear, driving competition
- Incumbents start offering modular products on more lines of business

As a result, product design and marketing will shift considerably, and customers will benefit from having products more tied to their needs

Implications for Incumbent Insurers

- Insurtechs will set customer expectations on digital purchase and claims experiences
- Tie-ins with products create opportunities for lucrative partnerships for leading insurers in this area
- As products become targeted to customer needs, using advertising to secure mindshare will become less important to customer acquisition



Implications for Insurtechs

- The mainstreaming of insurtechs focused on customer-specific experiences will benefit customer choice, but may force the insurtechs into niches
- Mainstreaming will also attract willing partners and create opportunities to white label products

Implications for Regulators

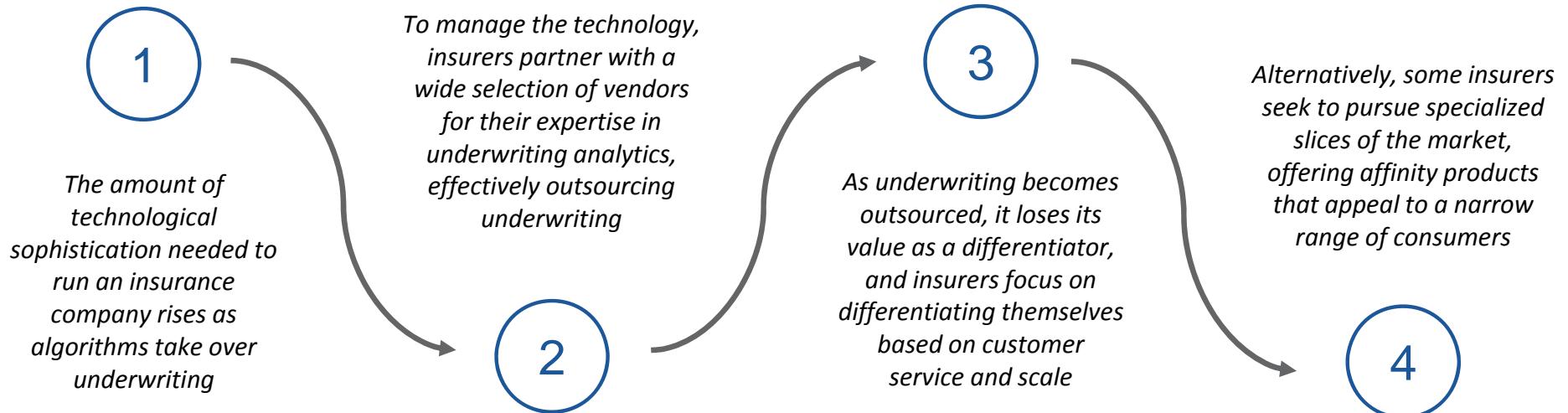
- The rise of insurance tied to product sales compels regulators to answer questions about whether exclusive partnerships are good for customers

Implications for Customers

- Customers will benefit from products tailored to their needs
- Customers who are heavy users and thus benefit from one-size-fits-all insurance may have to pay more



Insurers find it hard to keep up with rapid developments in AI, and thus outsource underwriting, causing a bifurcation of the market (P&C)



CRITICAL CONDITIONS

- AI development in underwriting advances significantly
- Insurers work with B2B vendors/utilities instead of in-house, especially to drive advancements in underwriting

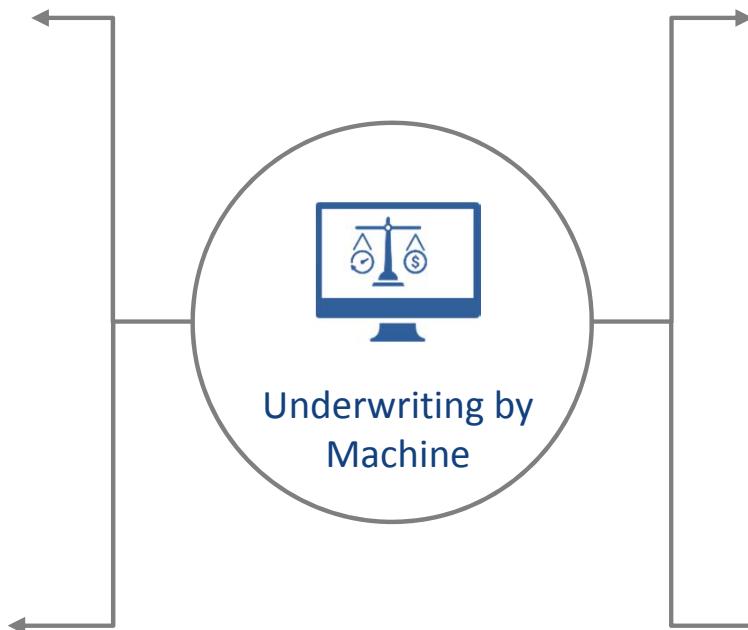
EARLY SIGNS

- Insurers start cutting staff in underwriting departments as they outsource/depend on vendors
- Insurers start offering affinity policies

Customers benefit, but new entrants (especially affinity players) may suffer from lack of scale; in addition, insurers have to find new ways to differentiate themselves

Implications for Incumbent Insurers

- Distribution and scale are more important than ever, increasing the likelihood of consolidation
- Pooling of risks ceases to exist as pricing sophistication leads to individualized, risk-based pricing
- Non-scale incumbents must find ways of differentiating themselves



Implications for Insurtechs

- Insurtechs catering to affinity customers face competition from insurers that seek to specialize
- Some insurtechs may evolve to become B2B underwriting and claims processing providers

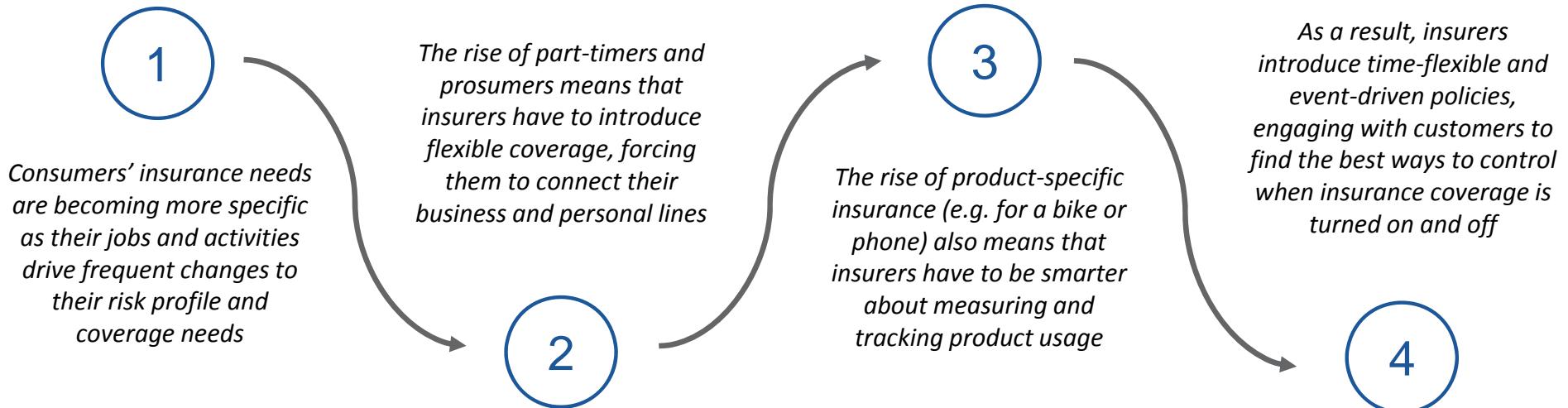
Implications for Regulators

- The externalization of underwriting could mean fewer models to monitor, but it also creates the risk of a “single point of failure”

Implications for Customers

- Customers either benefit by paying less or by being served better under an affinity

 The rise of insurance that covers changes in behaviour, role and risk profile over time means insurers must solve how to monitor products (P&C, Life)



CRITICAL CONDITIONS

- The shift towards self-employment continues around the world
- Connected products that allow monitoring of “turn on, turn off” insurance grow in popularity

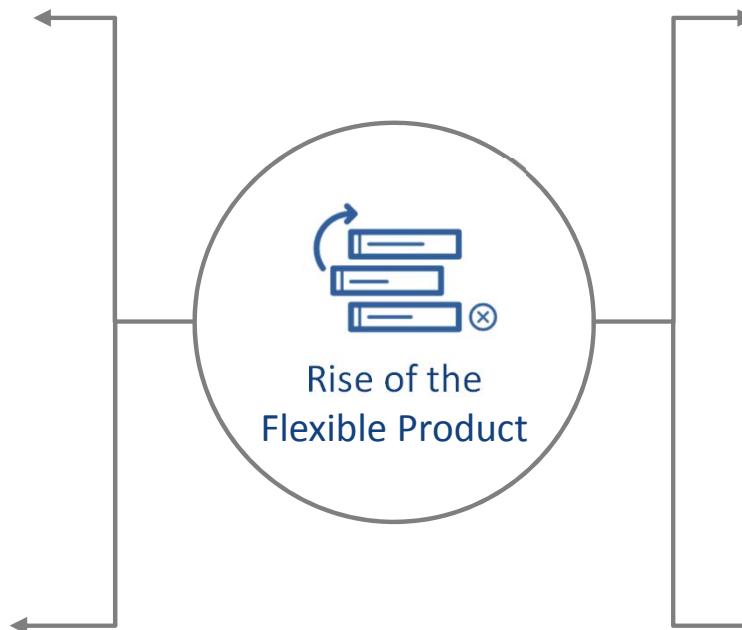
EARLY SIGNS

- Insurers start entering into partnerships or acquisitions with prosumer-focused insurtechs
- Insurers and gig economy firms launch partnerships to cover workers
- Insurers work to build in coverage for internet-enabled products

Incumbents and insurtechs would have to invest in tracking and digital solutions to protect against customer mistakes that lead to miscoverage

Implications for Incumbent Insurers

- The increase in monitoring signals a fundamental shift in the role of insurers from risk transfer to risk monitoring and management
- “Turn on, turn off” insurance means insurers will have to invest in monitoring technologies



Implications for Insurtechs

- The rise of flexible insurance means that insurtechs specializing in prosumers or connected products will have many partnership opportunities
- Insurtechs will have to carefully measure claims rates for fraud detection

Implications for Regulators

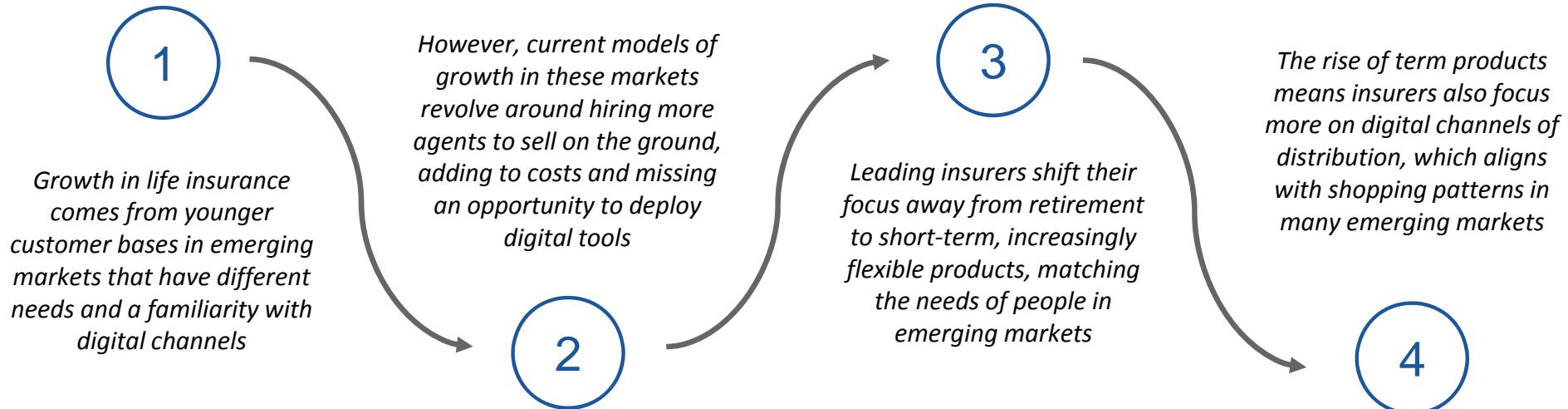
- Using connected tools for monitoring customers will create new data concerns for regulators focused on consumer protection

Implications for Customers

- Customers will benefit from flexible insurance products that can be modified to suit their needs
- Insurance that can be turned on and off may lead customers to struggle with inadvertent coverage gaps



Demographics and market maturity mean emerging markets will provide the bulk of life insurance growth, and digital distribution is key (Life)



CRITICAL CONDITIONS

- Increasing demand for life insurance in Africa, South-East Asia and South America drives life insurers' profits
- The lack of knowledge about complicated life insurance products persists
- Current demographic patterns continue

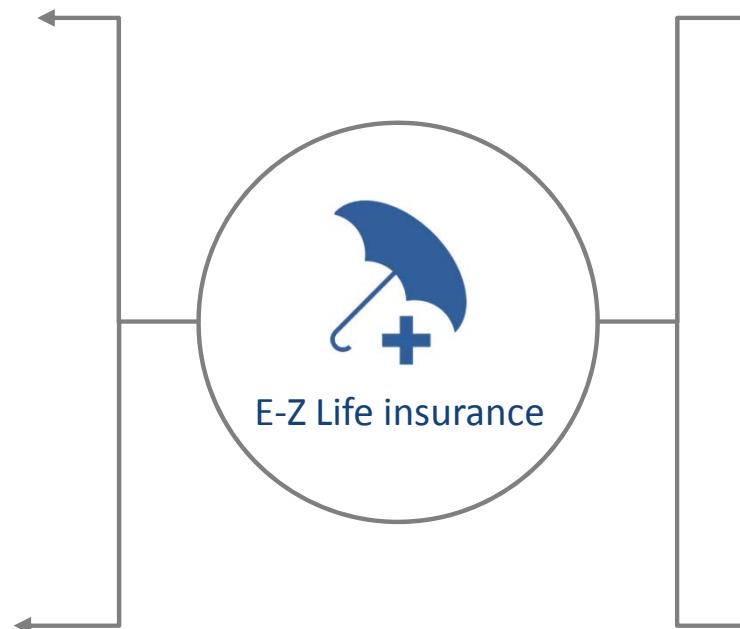
EARLY SIGNS

- Insurtechs push incumbents by offering digital life insurance products in key locales
- A global life insurer undergoes major restructuring (i.e. de-emphasizing agents) in key locales
- "Simple" term products become increasingly popular

Insurers that can offer digital distribution without compromising underwriting stand to capture market share, and provide customers with additional coverage

Implications for Incumbent Insurers

- The shift to term products and digital distribution means life insurers will start looking much like P&C insurers in their structure
- This shift will foster industry consolidation as companies seek scale to drive profits from lower-margin term products



Implications for Insurtechs

- Insurtechs will have a competitive advantage in emerging markets due to their local nature, and could represent good targets for acquisition
- They can be a useful tool for spreading innovations between borders, either organically or with a partner's help

Implications for Regulators

- The rise of digital channels may mean a more attractive target for data theft – regulators will have to ensure adequate data protection

Implications for Customers

- Customers will benefit from products that better suit their age demographic (e.g. term life products)

Key takeaways for financial institutions

1

VALUE CHAIN SHIFT

Once tightly vertically integrated, the insurance value chain is rapidly being modularized by new technologies that allow for splitting activities across many different players. Leading organizations are using this modularity to their advantage, pursuing flexible partnerships that allow them to aggressively compete for adjacent profit pools

2

COMPLEX PRODUCTS, SIMPLY DISTRIBUTED

To remain competitive, insurers need to simultaneously achieve two seemingly contradictory objectives: on the one hand, they must develop complex and highly personalized products to meet customers' needs; on the other, they will need to significantly simplify the origination process, enabling even highly complex products to be sold directly through online and mobile channels

3

CONNECTIONS CHANGING THE INSURER

Connected insurance will fundamentally change the way insurers operate, shifting their focus from risk assessment to risk prevention and creating the imperative to work with original equipment manufacturers to build in connections. To achieve this, however, insurers must overcome existing perceptions of connected insurance products, convincing customers that they represent an improvement over current products

References

1. "Bought by Many expands niche insurance role". *FT*. Retrieved from <https://www.ft.com/content/a0d04746-d9bc-11e6-944b-e7eb37a6aa8e?mhq5j=e3>
2. "Tesla is so sure its cars are safe that it now offers insurance for life". *Mashable*. Retrieved from <http://mashable.com/2017/02/23/elon-musk-tesla-lifetime-insurance/#uYPLmBieTkq3>
3. "Insurance Linked Securities market update: Volume XXVI, February 2017". *Swiss Re*. Retrieved from http://www.swissre.com/library/ILS_market_update_February_2017.html
4. "Airbnb's Growing Community of 60+ Women Hosts". *Airbnb*. Retrieved from https://www.airbnbaction.com/wp-content/uploads/2016/03/Airbnb_60_Plus_Women_Report.pdf
5. "Slice Labs Testing Pay-Per-Use Insurance App with Rideshare Drivers". *Insurance Journal*. Retrieved from <http://www.insurancejournal.com/news/national/2017/04/03/446575.htm>
6. "The sharing economy grows up: How the UK has embraced the sharing economy". *PwC*. Retrieved from <https://www.pwc.co.uk/issues/megatrends/collisions/sharingeconomy/outlook-for-the-sharing-economy-in-the-uk-2016.html>
7. "This Swedish startup brings insurance to 24 million people in the developing world through their mobiles". *Business Insider*. Retrieved from <http://www.businessinsider.com/bima-brings-microinsurance-to-africa-asia-and-latin-america-via-phones-2016-10>
8. "Where to Find Online Instant-Approval Term Life Insurance". *NerdWallet*. Retrieved from <https://www.nerdwallet.com/blog/insurance/instant-life-insurance/>
9. Retrieved from PopulationPyramid.net.
10. "Carpenter Forms Partnership with Symantec to Create Cyber Aggregation Model". *Insurance Journal*. Retrieved from <http://www.insurancejournal.com/news/international/2016/05/18/409001.htm>
11. "Church Mutual recognized as a Celent Model Insurer in Innovation and Emerging Technologies". *Yahoo Finance*. Retrieved from <https://finance.yahoo.com/news/church-mutual-recognized-celent-model-190000478.html>
12. "Cyber Insurance Purchasing Up, But Breaches Felt in Prices and Limits". *Risk Management Monitor – from Marsh analysis*. Retrieved from: <http://www.riskmanagementmonitor.com/cyber-insurance-purchasing-up-but-breaches-felt-in-prices-and-limits/>
13. "The John Hancock Vitality Program". *John Hancock*. Retrieved from: <https://www.jhrewardslife.com/how-it-works.html>
14. "Stay safe and save money with Nest and Liberty Mutual". *Nest*. Retrieved from <https://nest.com/insurance-partners/liberty-mutual/>
15. "The quest for telematics 4.0: Creating sustainable value propositions for connected car". *EY*. Retrieved from [http://www.ey.com/Publication/vwLUAssets/Key_telematics_considerations_for_the_telecoms_sector/\\$FILE/The_quest_for_telematics_EF0120.pdf](http://www.ey.com/Publication/vwLUAssets/Key_telematics_considerations_for_the_telecoms_sector/$FILE/The_quest_for_telematics_EF0120.pdf)

Section 3.3

Digital Banking

Digital banking has greatly evolved in the last several years. This section examines the key trends shaping the industry and the uncertain path forward

The first half of this decade saw the start of a shift in digital banking, with the entry of several new forces that changed the online and mobile banking ecosystem and had the potential to change the way customers bank

CIRCA 2015, THE MAJOR FORCES IMPACTING DIGITAL BANKING WERE ...

Virtual Banks



Virtual banks improved their offerings to differentiate themselves from incumbents

Mobile Channels



All banks developed mobile channels, though incumbents often struggled

Banking Platforms



Banks began to use technology to enable third-party applications

CIRCA 2015, THE BIG UNCERTAINTIES ABOUT THE FUTURE OF DIGITAL BANKING WERE ...

Would virtual banks be able to capture market share from incumbents?

How would the emergence of banking platforms affect developments in digital banking?

How would banks be able to deploy digital solutions with legacy architecture?

Banking is on the cusp of significant disruption as regulations and technology begin to lay the foundations of a fundamental shift in the business model

WHERE DID DISRUPTION OCCUR?

- A Traditional bank distribution models and economics are at risk of being deeply disrupted by the drive towards platform models of banking
- B Banks no longer define customer expectations of the banking experience; instead, fintechs and large technology companies set the standard
- C Incumbents are starting to migrate core systems to the cloud, as legacy infrastructure creates challenges in meeting customer needs

WHERE HAS DISRUPTION NOT OCCURRED?

- D Few customers have moved away from traditional deposit accounts despite significant efforts from online and mobile challenger banks

Traditional bank distribution models and economics are at risk of being deeply disrupted by the drive towards platform models of banking

Catalysed by regulators and driven by a desire to more efficiently satisfy customer needs, platform banking business models – where banks offer connections with other firms in addition to their own – are gaining momentum

SUPPORTING EVIDENCE



Increasing Technology Capacity

APIs, as software intermediaries that allow programmes to connect and interact, provide exposure-specific functionality while protecting the rest of the application. This technology, which has achieved broad adoption in recent years, allows banks to seamlessly integrate with third parties and is necessary for developing platform models of banking



Increasing Regulatory Pressure

Regulators in a number of jurisdictions have begun mandating that banks share data and access with third-party organizations via open APIs. These open banking standards, such as PSD2 in Europe, are expected to weaken banks' control over customer data and allow customers much greater control over third-party access to their accounts



Shrinking Margins

Margins on banking products are declining due to increased competition, lowering the profitability of product manufacturing. This incentivizes banks to refocus on distribution and seek partnerships with specialized product and service providers – in effect, creating platforms for their customers

CAVEATS



Uncertain Economics

Platform banking business models are nascent, and little is understood about what the model and economics will ultimately look like. The uncertainty has discouraged incumbents and financial services software providers from investing in platform banking solutions, particularly as the incremental scale required to offset potential cannibalization is unclear

Traditional bank distribution models and economics are at risk of being deeply disrupted by the drive towards platform models of banking (continued)

CASE STUDIES



Curated platform new entrant

A German digital-only bank, N26 has clearly identified its user-centred digital experience as its key differentiator. The bank engages “best-of-breed” providers, from Allianz to TransferWise,¹ to offer products that N26 itself does not focus on, thus creating a highly curated platform.

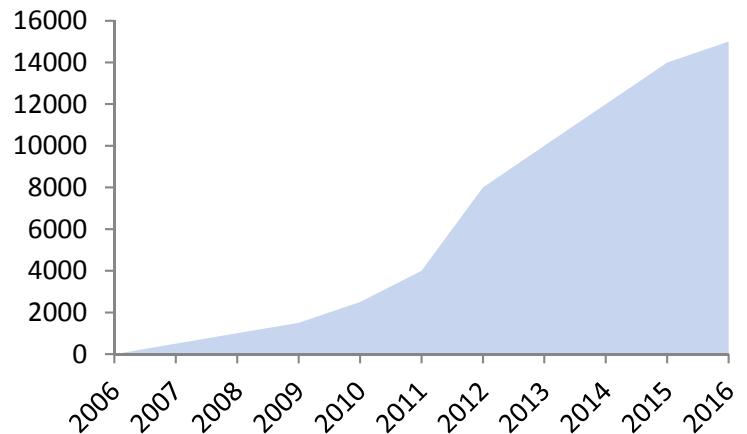


Open platform incumbent

Crédit Agricole, Europe’s third-largest bank by assets, provides an app store for its customers to download a wide range of functionalities which complement core products. To do this, the bank exposes its API to all external developers and cultivates a community that encourages customers to suggest ideas.²

QUANTITATIVE EVIDENCE

Total Number of Publicly Available APIs on the ProgrammableWeb Directory³



Rise of APIs in financial services

KEY UNCERTAINTIES

The degree of platform “openness” will depend on how many regulators enforce open banking standards and how strongly they do so

1

Will other governments pass regulations requiring the open sharing of data?

2

Will there be a “hard” or “soft” enforcement of PSD2?

3

Absent regulatory pressures, how strongly will banks seek to curate their platform offerings?

Sources: 1. The Investment Observer 2. American Banker 3. Nordics APIs

Banks no longer define customer expectations of the banking experience; instead, fintechs and large technology companies set the standard

Experiences with non-incumbents are raising the bar for banks, as customers expect more value-driven, personalized and seamless service than ever before. Incumbent banks, focused on recapitalizing their post-crisis balance sheets, are playing catch-up

SUPPORTING EVIDENCE



Client Comfort with Digital Channels

Customers' use of digital channels for banking has risen, as adoption of smartphones and other internet-enabled devices increases worldwide. Customers are also becoming more trusting of digital channels when conducting monetary transactions, as illustrated by the global rise of online shopping



Experiences with Non-Financial Firms

Customers now demand the same immediate access, frictionless experience and low-fee or free offerings from their mobile banking apps as they receive from Uber, Starbucks and other leading mobile applications, forcing banks to learn lessons from outside the banking ecosystem



Real-World Cost-Cutting

As revenues plateau, incumbent banks have sought to lower their costs by eliminating in-person services, driving customers to lower-cost channels and jettisoning unprofitable customer segments. These efforts, while necessary to maintain profitability, have meant that banks have had to learn alternative methods of customer engagement wherever they can, including from fintechs and large technology firms

Banks no longer define customer expectations of the banking experience; instead, fintechs and large technology companies set the standard (continued)

CASE STUDIES



Bank/fintech trade-off deal

JP Morgan and Wells Fargo recently signed agreements with Intuit that will give the latter easy access to banking customers' data in exchange for new limits on how Intuit uses the data. The banks have indicated they want the agreement to be a model for contracts with other tech firms, as the fight for data monetization ramps up.⁴

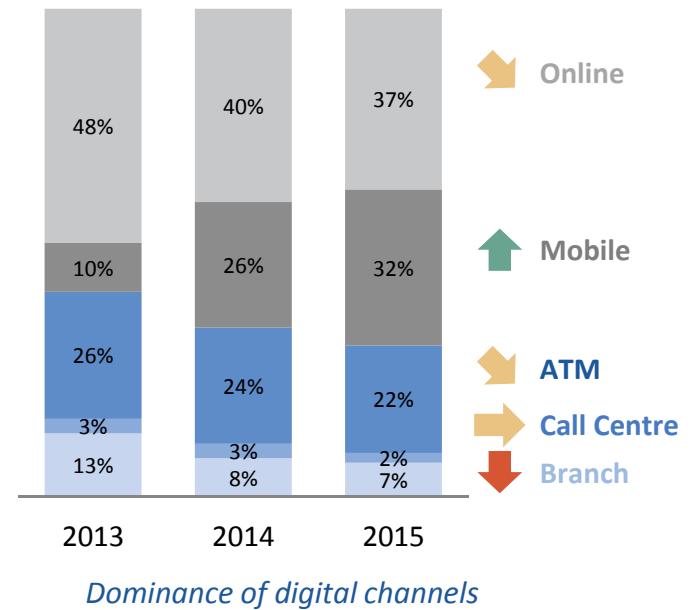


Simple digital P2P payments

Fintech firm Venmo allows users to make P2P payments at no cost, and share their transactions within their social network. It has been so successful (transferring over \$5 billion in the last three months of 2016) that major US banks have launched Zelle, a competitor offering free payment transfers and links directly with bank accounts, in the hope of taking back market share.⁵

QUANTITATIVE EVIDENCE

Share of Most Common Banking Channels (US)⁶



Dominance of digital channels

KEY UNCERTAINTIES

Banks are investing heavily in direct digital sales and service channels to lower their costs and better meet customer expectations

1 How will customer preferences of distribution channels evolve?

2 How, if at all, will large tech firms move into the digital banking area?

3 How will the move to digital impact the attractiveness of mass and mass-affluent clients?

Sources: 4. The New York Times 5. The Verge 6. The Boston Consulting Group

Incumbents are starting to migrate core systems to the cloud, as legacy infrastructure creates challenges in meeting customer needs

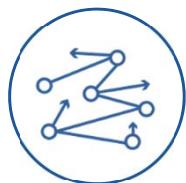
Banks have undertaken significant efforts to move to a newer, cloud-based architecture, but still struggle with legacy infrastructure that weighs down profits and limits banks' ability to meet customer needs

SUPPORTING EVIDENCE



Infrastructure Issues

Core technological systems of financial institutions are largely built on decades-old infrastructure (using extinct languages, e.g. COBOL) and are riddled with inefficiencies. As a result, many incumbents are investing in "integration layers" to bridge the needs of client-facing systems with their core system. While these layers have proven valuable, banks are also aware of the need to migrate away from legacy cores



Patchwork Solutions

Start-ups are able to begin with the client experience and build an infrastructure specially designed for the client. In contrast, incumbent financial institutions must often build ad-hoc solutions to meet specific needs, providing a short-term solution but adding to the complexity of subsequent changes and the eventual modernization of their systems



Gradual Shift to Modernization

Incumbent financial institutions are shifting away from strategies to "rip and replace" legacy systems towards a gradual migration of functions to the cloud, in order to improve flexibility and reduce costs. However, the process of migrating away from legacy systems will take years and large amounts of capital, and may prompt reliability issues

Incumbents are starting to migrate core systems to the cloud, as legacy infrastructure creates challenges in meeting customer needs (continued)

CASE STUDIES



B2B fintech focused on infrastructure

MX provides modern, external solutions to incumbents for data collection, enrichment, analysis and money-management tools. MX partnered with BBVA to develop BBVA's Compass Financial Tools,⁷ a suite of financial management and account aggregation tools.

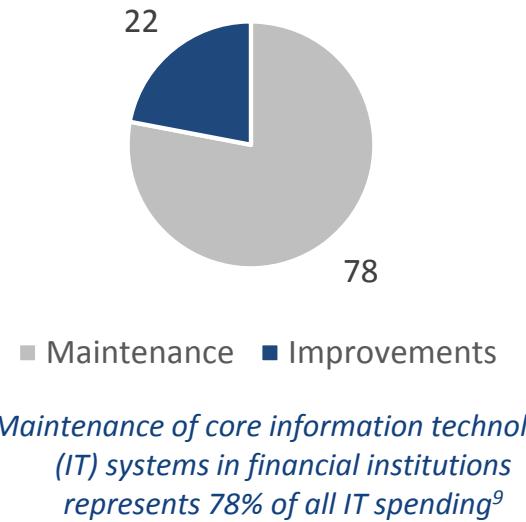


Migration to the cloud

Capital One has been a leader in migrating its core systems to the cloud. It adopted a cloud-based infrastructure approach for all new applications by 2015, and in recent years has been focused on migrating its core systems to Amazon's AWS platform, with the aim of cutting over 50% of its data centres by 2018.⁸

QUANTITATIVE EVIDENCE

Bank IT Spend in US by Focus (%)



KEY UNCERTAINTIES

Defining an overall long-term digital strategy requires incumbents to create compatibility and efficiency from the front to back end

1

Will the shift to cloud-based infrastructure create opportunities for a new data strategy?

2

How will the shift to new infrastructure affect data and privacy concerns?

3

Will infrastructure strategies of financial institutions become more divergent in the long run?

Few customers have moved away from traditional deposit accounts despite significant efforts from online and mobile challenger banks

A number of these banks have appeared in recent years; however, these challenger banks have largely failed to gain market share, especially with more profitable customer segments

SUPPORTING EVIDENCE



Value of Physical Presence

Customers' preferences are quickly shifting to digital channels, but physical branches remain a critical component of the banking experience. Many customers have banking needs which only physical locations can currently fulfill (e.g. getting a same-day wire transfer for a home purchase), while other customers prefer a channel based on human interaction



Poor Challenger Bank Economics

Because challenger banks are unable to meet more complex needs, they tend to be used as secondary bank accounts by most customers, causing them to lose out on a large share of revenue. Also, to attract customers, they often provide either lower fees or higher returns on deposits than incumbents, both of which lower profitability



Incumbents Targeting Attractive Customers

The profitability of many customer segments declined following the financial crisis, as wealth levels fell and interest rates approached zero. In response, incumbents refocused their efforts on optimizing their client base – retaining their most profitable customer segments, and ensuring that only less profitable customers would be tempted to switch to challenger banks



Ability to Fast Follow

Very few technological barriers to entry affect the development of an online or mobile challenger bank (the majority of the barriers concern regulation). Thus, if customer defections to challenger banks accelerate, incumbents can quickly follow with visually appealing front-end offerings or an online bank of their own

Few customers have moved away from traditional deposit accounts despite significant efforts from online and mobile challenger banks (continued)

CASE STUDIES



Mini robo-branch

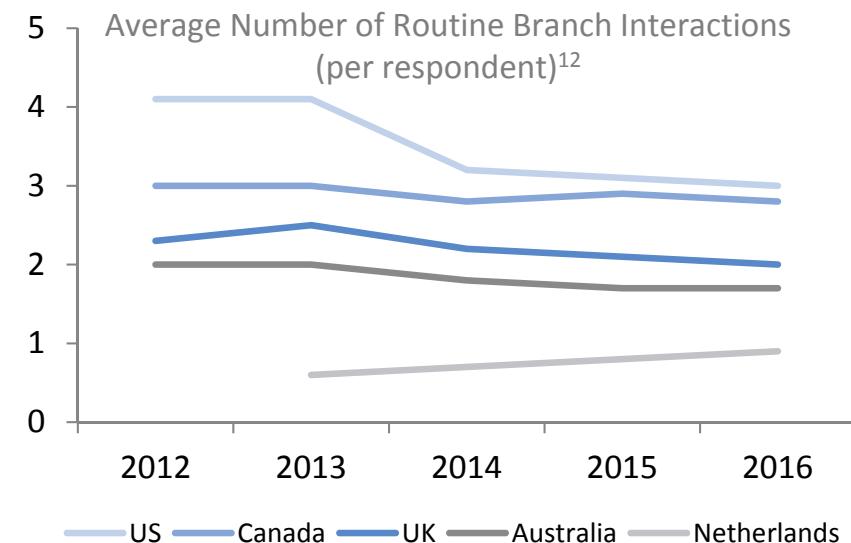
Bank of America recently tested the idea of automated branches by opening three mini bank branches that have ATMs and videoconferencing, but no employees. In addition to the ATMs, the new robo-banks – called automated centres – allow customers to make a videoconference call to a Bank of America employee at another location.¹⁰



Guide to digital banking

Santander's new Walk Out Working (WOW) initiative allows customers who open an account at a Santander branch to set up their digital banking tools on-site.¹¹ Bank employees ensure that clients' mobile and online accounts are fully activated and accessible on the first day, so they can "walk out working" and are not tempted to switch.

QUANTITATIVE EVIDENCE



Use of branches is declining – but slowly

KEY UNCERTAINTIES

Incumbents are starting to embrace the new era of digitization while building on their core competitive advantages

1

Will platform banking aid challenger banks in their battle to become primary institutions?

2

How can digital-only banks overcome their lack of physical locations?

3

As technology decreases the cost of serving clients, will banks begin to re-target less desirable clients?

The future of digital banking will be impacted by the unravelling of uncertainties around regulation, increasing digitization and the behaviour of technology giants

1 WHAT WE KNOW

Fintechs are now setting the level of expectations that customers have for banks. With the emergence of platform banking models, banks are trying to evolve, but are weighed down by legacy systems. However, though fintechs may offer superior digital experiences, consumers have yet to shift away from incumbent banks to online and mobile challenger banks.

Through these findings, the following uncertainties around digital banking emerged:

2 UNCERTAINTIES



Will PSD2 be a game changer for the industry in Europe?



Will customer interest in open banking models continue in light of growing cybersecurity?



What are the business models for large tech companies expanding into banking?



How can incumbent banks transfer their competitive advantages to the digital world?



What partners will banks choose to set out their long-term digital strategy?

3 POSSIBLE FUTURES

The resolution of these five key uncertainties paints three diverging pictures of the future of the digital banking industry:



Controlled, Curated Platforms



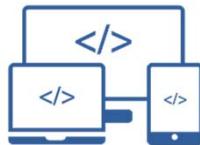
Tech Aggregation Platforms



Open Platform World

Depending on how the key uncertainties are resolved, the potential end states have very different evolutionary paths and implications for all firms

CONTROLLED, CURATED PLATFORMS



The first end state paints a world where:

- Banks outsource product design for less profitable products
- Banks form collections of best-of-breed products from various sources
- Customers benefit from diverse and customized offerings
- Fintechs focus on white-label and co-branded products

TECH AGGREGATION PLATFORMS



The second end state paints a world where:

- Large tech firms create distribution platforms
- Fintechs and smaller banks extend partnerships with large tech firms
- Customers embrace the ability to purchase from large tech firms
- Incumbents are forced to decide whether to join tech platforms or stay isolated

OPEN PLATFORM WORLD

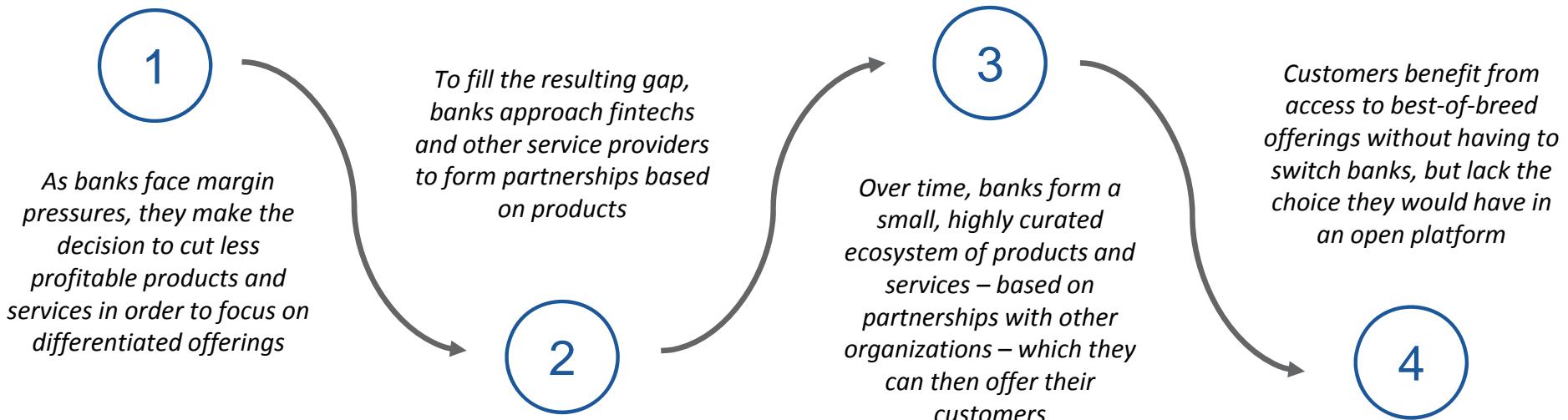


The third end state paints a world where:

- Legislation or customer pressure forces banks to use open APIs
- Third parties use APIs to develop their own products
- New entrants directly compete with traditional bank products
- Financial institutions choose to focus on single segments of the value chain



As banks focus on cost-cutting, they start embracing controlled, curated platforms as a cost-effective way of offering services



CRITICAL CONDITIONS

- Banks are not forced to develop open data solutions by regulators
- Banks make the decision to offer outside products to their customers instead of building in-house
- Product designers are willing to make partnerships with banks for greater access to customers

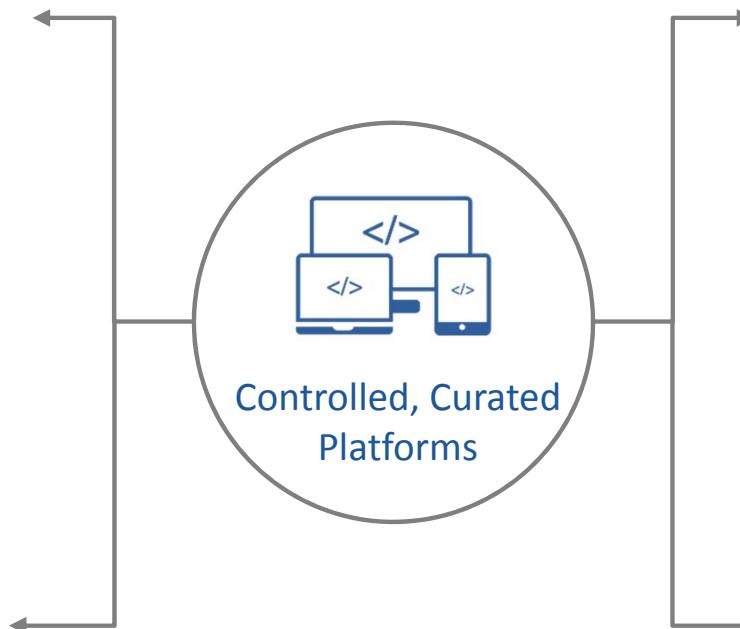
EARLY SIGNS

- Banks form product-level partnerships with fintechs to use the bank as a platform
- Open data regulations are not broadly adopted or are weakly enforced

Controlled, curated platforms give much greater power to the curator, at the expense of customer choice

Implications for Banks

- Banks get to choose the areas of banking they want to specialize in, and can offer other features to their customers via partnerships
- Banks will need to ensure that they and their partners, whether platforms or manufacturers, provide a unified experience for customers



Implications for Regulators

- Regulators must closely consider the market power of platform owners to ensure they are not using their position to distort market forces
- Regulators must also track the spread of customer data between platform owners and product manufacturers to ensure the data is handled and stored properly

Implications for Customers

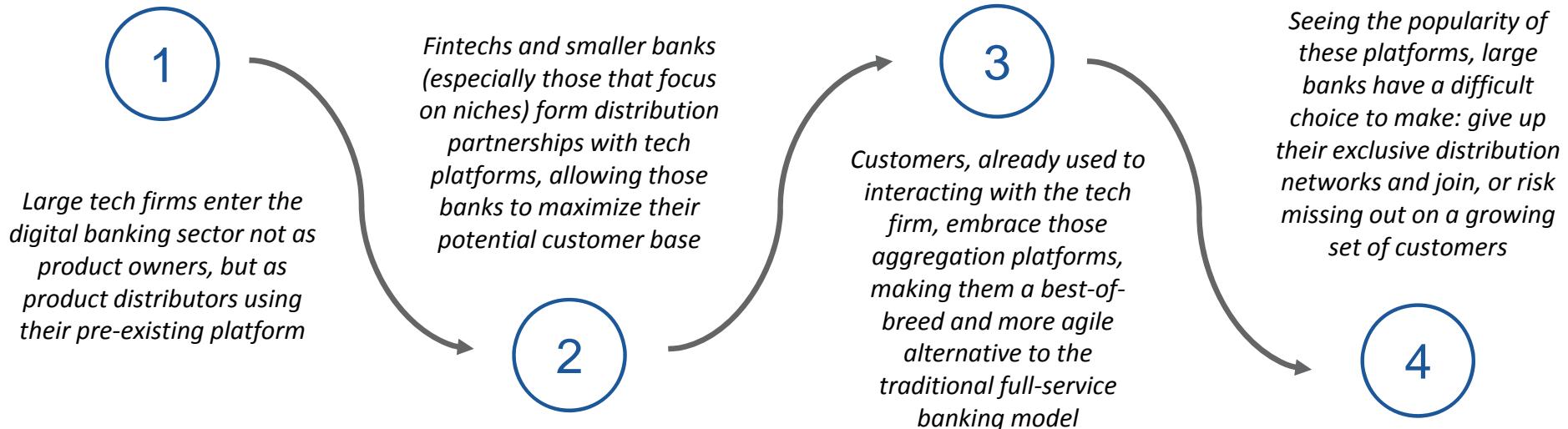
- Customers benefit from best-of-breed products, but have less choice than in other platform end states
- Customers face higher switching costs between product ecosystems

Implications for Fintechs

- Fintechs can partner with banks to extend their reach, but lose out on control over distribution
- Fintechs can also use partnerships to broaden their suite of offerings and compete directly with banks more effectively



As fintechs and banks seek partners to optimize their value chain, large tech firms start hosting significant distribution platforms



CRITICAL CONDITIONS

- Big tech players choose to enter the distribution side of financial services
- Big tech players are not plagued by a major scandal or data breach, and remain trustworthy to engage with
- Regulators accept a more oligopolistic distribution of financial services products by tech firms

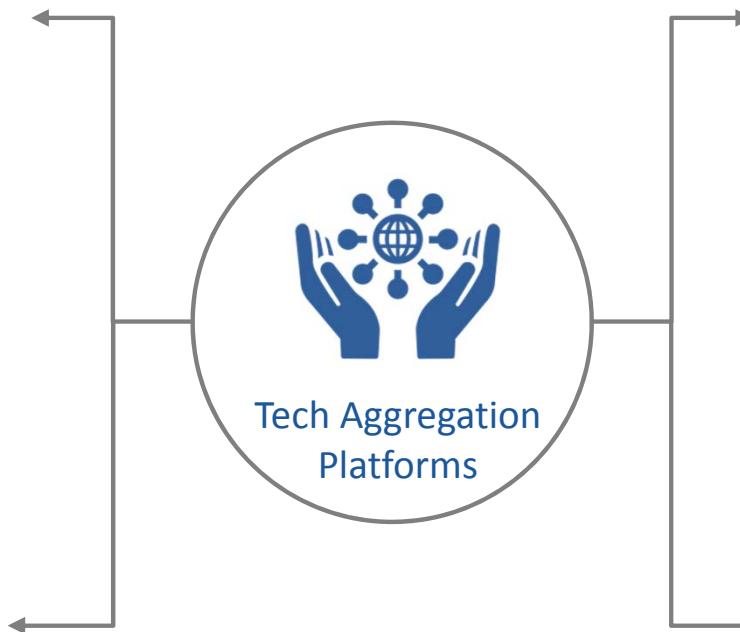
EARLY SIGNS

- Large tech players move upstream from infrastructure to providing software
- More regulatory sandboxes begin to develop and allow firms like Facebook to operate in the financial area
- Tech firms (e.g. Facebook) begin to offer simple financial services products, backed by one or two partners

Large techs expand into the financial services area, intensifying their customer relationships and challenging regulators in preserving competition

Implications for Customers

- Buying financial products from the tech provider of choice increases convenience for customers
- As the aggregation platforms represent a shelf of cross-entity products, comparability and, thus, product quality may decrease



Implications for Banks

- Banks would face a retail competitor with potentially broader reach and more resources, meaning they would have to find competitive advantages
- Products and services previously bundled under the banking umbrella would become unbundled, with only the regulated pieces staying with the bank

Implications for Regulators

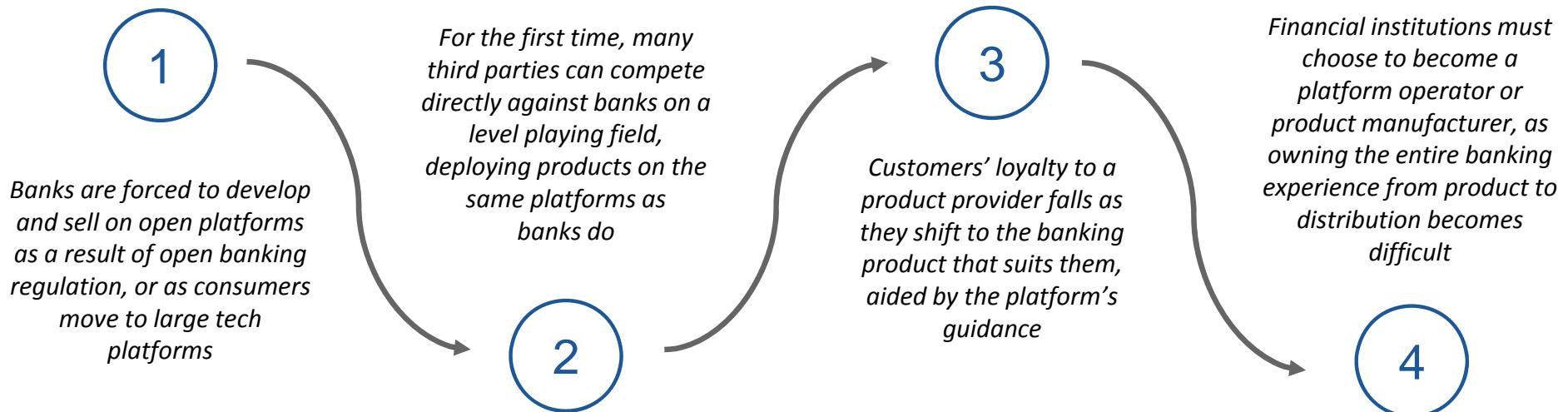
- As the dominance of large tech firms extends into finance, regulators need to consider the risk of market dominance even more strongly

Implications for Large Tech Firms

- Large tech firms would significantly increase their access to customer data sets



Pressures force an open environment, increasing competition and compelling incumbent institutions to focus on the most valuable segments



CRITICAL CONDITIONS

- Regulations force the development of open platforms; newly created open platforms gain enough customer support to force incumbents to participate
- Banks develop digital identity solutions and consistently deliver them
- Customers embrace platform banking, overcoming their stickiness to one provider

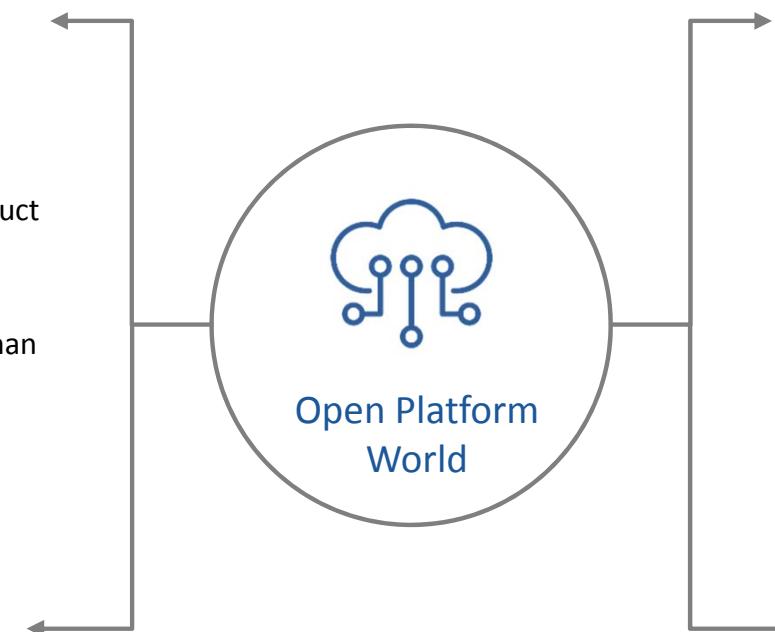
EARLY SIGNS

- Regulators push back against the formation of closed, curated platforms
- Customers flock to the development of open distribution platforms, perhaps created by large tech firms
- Fintechs appear that are only focused on product design

Power dynamics are shifting due to a more fragmented value chain, as customers are benefitting significantly from increasing competition

Implications for Banks

- Banks would be pushed to decide what role they wanted to play in the value chain: product distributor or platform manager
- Banks would lose the ability to cross-subsidize any of their products and thus would have to ensure profitability, product by product
- Open platforms would mean that brand image becomes even more important than before, and banks would have an advantage



Implications for Regulators

- As legislations open up the playing field, regulators need to clarify regulations for, and grow comfortable with, a materially different business model
- The shift to open platforms raises the question of who is liable – the distributor or the product owner

Implications for Customers

- As the market becomes more competitive and client-centric, customers would be the main beneficiaries
- However, customers may be confused and overwhelmed by the choice of products

Implications for New Entrants

- Open platforms allow fintechs to bypass the problem of scale, as platforms can provide access to many customers
- New entrants without strong branding must find ways for their products to stand out

Key takeaways for financial institutions

1

DISTRIBUTORS OR MANUFACTURERS?

The rise of product platforms in digital banking will force market participants to make a choice between a strategic focus on product distribution (i.e. becoming the platform) or a focus on product manufacturing. This choice will have far-reaching implications for their businesses and customer interaction models, as well as for their competitive landscape

2

FEWER, BIGGER WINNERS

The advantage of being the market leader will increase significantly for both product manufacturers and product distributors. Platforms will offer customers improved transparency into products, significantly increasing the advantage for the best products. For distributors, significant economies of scale in access to data and customer awareness will feed a virtuous cycle of growth

3

ECOSYSTEM IMPERATIVES

Under all possible end states, digital banking institutions will forge more relationships with other financial services and, increasingly, non-financial services firms – meaning that within the digital banking ecosystem, a proficiency for establishing partnerships and a willingness to create win-win, symbiotic relationships will lead to more partners

References

1. "European challenger bank N26: the “future” of financial services". *The Investment Observer*. Retrieved from <https://www.theinvestmentobserver.co.uk/tech/2017/05/11/european-challenger-bank-n26-390hoia2/>
2. "Open API for Bank Apps: Can Credit Agricole's Model Work Here?". *American Banker*. Retrieved from <https://www.americanbanker.com/news/open-api-for-bank-apps-can-credit-agricoles-model-work-here>
3. "Tracking the Growth of the API Economy". *Nordics APIs*. Retrieved from <http://nordicapis.com/tracking-the-growth-of-the-api-economy/>
4. "Banks and Tech Firms Battle Over Something Akin to Gold: Your Data". *The New York Times*. Retrieved from https://www.nytimes.com/2017/03/23/business/dealbook/banks-and-tech-firms-battle-over-something-akin-to-gold-your-data.html?_r=0
5. "The biggest US banks are launching their own, faster Venmo". *The Verge*. Retrieved from <https://www.theverge.com/2017/6/12/15782328/zelle-us-banks-instant-payment-processing-app-venmo-square-cash>
6. "Retail Bank Operational and Digital Leaders Reap the Rewards". *The Boston Consulting Group*. Retrieved from <https://www.bcgperspectives.com/content/articles/financial-institutions-technology-digital-retail-bank-operational-digital-leaders-reap-rewards/>
7. "BBVA Compass ranks in top group in 2016 Javelin Online Banking Leader awards". *PR Newswire*. Retrieved from <http://www.prnewswire.com/news-releases/bbva-compass-ranks-in-top-group-in-2016-javelin-online-banking-leader-awards-300364391.html>
8. "Capital One's Cloud Journey Through the Stages of Adoption". Stephen Orban, at *Amazon Web Services*. Retrieved from <https://medium.com/aws-enterprise-collection/capital-ones-cloud-journey-through-the-stages-of-adoption-bb0895d7772c>
9. "Core Banking Systems: The Industry's Achilles Heel". *The Financial Brand*. Retrieved from <https://thefinancialbrand.com/58786/core-banking-legacy-systems-marketing/>
10. "Bank tellers are the next blacksmiths". *The Washington Post*. Retrieved from https://www.washingtonpost.com/business/economy/bank-tellers-are-the-next-blacksmiths/2017/02/08/fdf78618-ee1c-11e6-9662-6eedf1627882_story.html?utm_term=.60a9e8ce7881
11. "Santander Bank Empowers New Customers With The WOW Factor". *PR Newswire*. Retrieved from <http://www.prnewswire.com/news-releases/santander-bank-empowers-new-customers-with-the-wow-factor-300463961.html>
12. "Customer Loyalty in Retail Banking: Global Edition 2016". *Bain & Company*. Retrieved from <http://www.bain.com/publications/articles/customer-loyalty-in-retail-banking-2016.aspx>

Section 3.4

Lending

Lending has greatly evolved in the last several years. This section examines the key trends shaping the industry and the uncertain path forward

The first half of this decade saw rapid developments in lending, with the entry of several new forces that threatened to change the lending landscape and the future centres of power

CIRCA 2015, THE MAJOR FORCES IMPACTING LENDING WERE ...

Mass P2P Lending



P2P services were growing quickly, reaching a significant number of customers across the globe

Alternative Adjudication



New ways to measure and track credit worthiness were being developed

Lean and Automated Processes



Automation was transforming adjudication and loan origination

CIRCA 2015, THE BIG UNCERTAINTIES ABOUT THE FUTURE OF LENDING WERE ...

Would incumbent lenders react to fintechs' speed and digital prowess?

How would low-credit or “thin-file” customers around the world benefit from alternative adjudication?

Would P2P lending be able to grow and compete with traditional banks?

New entrants are significantly disrupting the lending market, but do not appear poised to bring innovations to scale

WHERE DID DISRUPTION OCCUR?

- A New adjudication techniques have significantly expanded access to credit for underbanked, "thin-file" and subprime customers
- B Individual and small-business borrowers expect their lender to deliver the seamless digital origination and rapid adjudication pioneered by leading fintechs
- C Non-financial platforms are emerging as an important source of underwriting data and a point of distribution for credit

WHERE HAS DISRUPTION NOT OCCURRED?

- D Funding economics put marketplace lenders at a cost disadvantage compared to traditional banks, raising questions about the model's sustainability

New adjudication techniques have significantly expanded access to credit for underbanked, "thin-file" and subprime customers

New data and analytical techniques have proven valuable in adjudicating credit, especially for "thin-file" customers with insufficient credit bureau history to qualify for most loans, driving a rapid expansion of credit to underserved markets

SUPPORTING EVIDENCE



New Sources of Data

New sources of data have emerged for use in adjudicating credit, such as social and mobile data for individuals, and payments or accounting data for businesses. While this data has had limited effectiveness in improving the underwriting of established customers, it has proven to be valuable for "thin-file" borrowers (with insufficient credit bureau history) and small businesses



Using Data More Effectively

Incumbent lenders are looking to their existing stores of data to bolster their underwriting models, especially for underbanked customers. However, that data is often unstructured and siloed, making it difficult to be put to use. To address these challenges, incumbents are investing heavily in data transformation, automation and new analytics



More Agile Credit Models

New entrants improve on their credit models using short iteration cycles, while incumbents are constrained to making adjustments much more slowly. This lag in implementing best-in-class methodologies provides new entrants a temporary competitive advantage in understanding the credit risk of underbanked and "thin-file" customers, especially as new sources of data become available

CAVEATS



Lack of Credit Cycles

While credit models have improved since the financial crisis, many alternative approaches were developed following the crisis, making it unclear how alternative models for subprime customers will fare over the full life of the next macro-credit cycle

New adjudication techniques have significantly expanded access to credit for underbanked, "thin-file" and subprime customers (continued)

CASE STUDIES



Payday loan alternative

LendUp, a US direct online lender and financial education company, offers a proprietary underwriting model to serve subprime borrowers who lost access to credit following the financial crisis. The company offers loans at lower rates than payday lenders and progressively lower rates as borrowers repay.

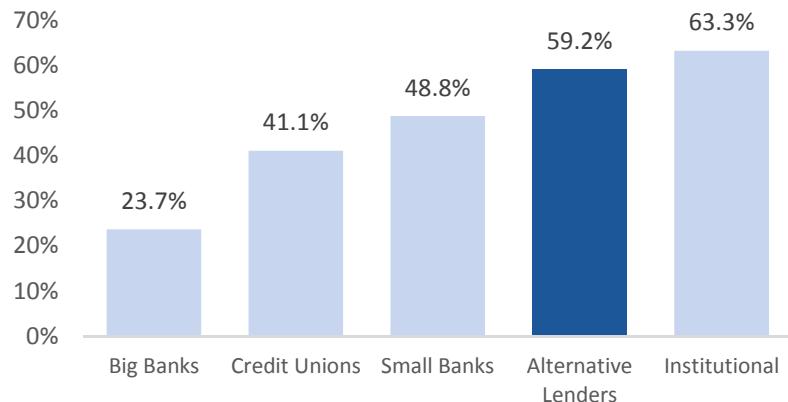


Artificial intelligence for underwriting

ZestFinance provides machine-learning underwriting technology to financial institutions that assists with analysing and processing complex, disparate data to improve pricing decisions. Following an investment from Chinese internet search giant Baidu in 2016, it is developing a credit scoring platform for Chinese borrowers, based on Baidu's search data.¹

QUANTITATIVE EVIDENCE

Approval Rates of US Small-Business Lenders, 2016 (% of applications)²



Increased lending to small businesses through alternative lenders

KEY UNCERTAINTIES

New credit adjudication techniques have proven to be effective, demonstrating strong approval and loss rates

1

How will new credit adjudication methodologies perform during a severe credit contraction?

2

What new sources of data will prove to be the most valuable to credit decisions, and who will own the data?

3

What new techniques and sources of data will regulators deem appropriate to use?

Sources: 1. Yahoo Finance 2. Deloitte

Individual and small-business borrowers expect their lender to deliver the seamless digital origination and rapid adjudication pioneered by leading fintechs

New fintechs' ability to deliver faster and less onerous application processes is placing pressure on incumbents to deliver similarly streamlined experiences

SUPPORTING EVIDENCE



Improved Processes

New online lenders have cut loan adjudication times to minutes, forcing incumbent lenders to improve and automate internal loan processes in order to compete. As a result, many loan processes that previously needed human intervention are now auto-adjudicated, allowing incumbents to offer digital origination and rapid loan origination



Legacy Technology Increasing Costs

Constrained by decades-old mainframes, incumbents must add technological bridges to connect legacy infrastructure with the digital front ends demanded by customers. This additional effort increases development time and costs compared to fintechs, but is necessary for incumbents to compete



Partnerships as Cost-Saver

Improving processes and building middleware have both proven to be relatively expensive. Incumbents have thus looked at partnerships with marketplace lenders, allowing them to access fintech-driven technological solutions without fully overhauling their infrastructure

Individual and small-business borrowers expect their lender to deliver the seamless digital origination and rapid adjudication pioneered by leading fintechs (continued)

CASE STUDIES

Quicken Loans®

Fully digital mortgage process

Quicken Loans, an incumbent lender, now offers Rocket Mortgage, a fully digital home loan origination service where users can view their credit reports online; digitally verify asset, property and income information; and receive full approval in minutes. Rocket Mortgage uses algorithms to analyse a borrower's creditworthiness, reducing latency and human errors.³

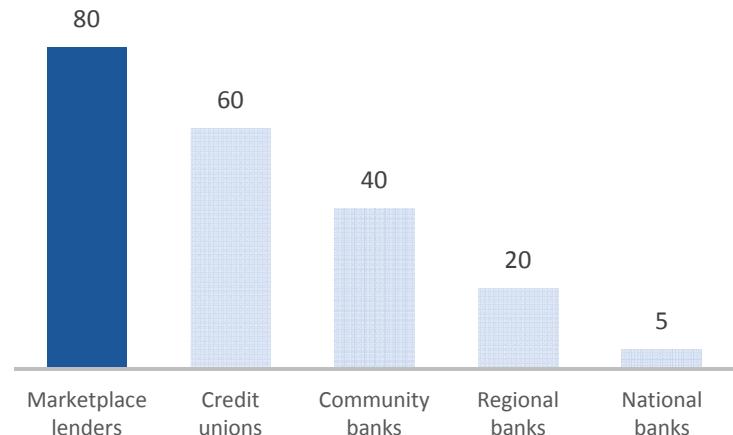
ondeck

Fintech-bank partnership

JP Morgan partnered with online lender OnDeck to improve its loan origination to the bank's roughly 4 million small-business customers. The partnership, and its near-term profitability, has driven OnDeck to reorient its strategy to focus on delivering a highly scalable OnDeck-as-a-Service model.⁴

QUANTITATIVE EVIDENCE

Average Net Promoter Score by Lender⁵



Superior customer satisfaction from marketplace lenders

KEY UNCERTAINTIES

New distribution channels and more demanding customer expectations are raising the bar for incumbent lenders, necessitating significant investment

1 To what degree will platform lending models proliferate?

2 Will incumbents be able to address their legacy system without materially impeding their competitiveness?

3 How will borrower preferences for distribution channels continue to evolve?

Sources: 3. Money 4. The Wall Street Journal 5. EY

Non-financial platforms are emerging as an important source of underwriting data and a point of distribution for credit

New distribution channels are being created as financial institutions embed lending products into third-party online platforms. As they seek to capture customers in moments of need, non-financial institutions are also jumping into the fray

SUPPORTING EVIDENCE



Increasing Customer Engagement

Lenders are targeting non-financial platforms because they provide access to the exact moments when customers need credit the most, such as during supply chain management or the settlement of accounts receivable. Thus, lenders can pre-emptively underwrite loans at “decision moments”



Increasing Data Collection

Lenders are also turning to non-financial platforms as distribution channel partners because of the particular data sets many of these platforms hold. This data can provide valuable forward-looking insights into a company’s performance, as well as enable detailed comparisons between similar businesses and individuals. As such, this data helps to lower both underwriting risk and the cost of underwriting



Risk of New Entrants

Non-financial platforms have also begun their own exploration into providing lending products directly to their users as a new line of business. Whether these loans are funded directly from the platform’s balance sheet or via a funding partner, they represent direct competition with financial institutions for credit distribution

Non-financial platforms are emerging as an important source of underwriting data and a point of distribution for credit (continued)

CASE STUDIES



Non-financial player offering loans

Amazon offers credit to merchants that sell on its platform, using sales data to measure risk. If a merchant defaults on the loan, Amazon can choose to withhold sales on its platform. The company has already made loans worth over \$3 billion using this platform, and is expanding the offering to reach even more merchants.⁶

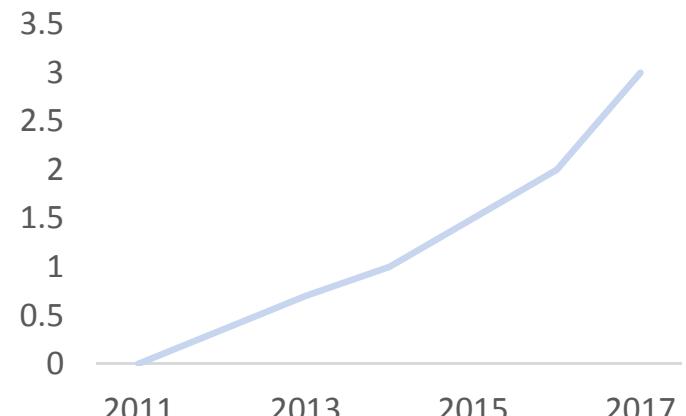


Platform-based trade financing

Tradeshift's B2B supply chain platform connects financial institutions with suppliers to offer trade financing directly through its platform. Once a borrower requests the loan, incumbent lenders receive access to granular data that enables them to underwrite the loan. Tradeshift benefits from improved client service and origination fees.⁷

QUANTITATIVE EVIDENCE

Loans through Amazon Lending (\$ billion)



Accelerating growth in Amazon Lending⁶

KEY UNCERTAINTIES

Lending at the source (i.e. the platform) has the potential to dramatically shift the balance of power towards customer platforms

- 1 How can financial institutions create a symbiotic lending relationship with non-financial platforms?
- 2 What is stopping other non-financial platforms from offering their own lending products?
- 3 Are there other non-financial platforms that make sense as an origination vehicle?

Sources: 6. TechSpot 7. City A.M.

Funding economics put marketplace lenders at a cost disadvantage compared to traditional banks, raising questions about the model's sustainability

Despite operating cost advantages, marketplace lenders suffer from higher funding costs, creating challenges in price-sensitive segments and forcing them to explore other models

SUPPORTING EVIDENCE



High Customer Acquisition Costs

Building a client base from scratch has proved to be expensive for new entrants, particularly where they have relied on high-cost analog channels such as direct mail. These higher customer acquisition costs have created particular challenges in segments where incumbents are well established and margins are low, as incumbents already have a well-defined client base and therefore a large cost advantage



High Funding Costs for Marketplaces

While the absence of a branch network creates certain cost advantages for new entrants, they are more than offset by significantly higher funding costs than for banks. While incumbent banks are able to deploy low-cost deposits, new entrants have relied on private investors, who demand higher premiums to reflect a higher credit risk (perceived or otherwise) and a lesser-known brand



Funding Instability

Maintaining liquidity in a two-sided marketplace has proved to be difficult. Marketplaces initially sought hedge fund capital to fund growth, but found this capital to be unstable as hedge funds pulled back due to broader market volatility. In response, marketplaces are now exploring alternatives, including acquiring banking licences, which would give them access to lower-cost funding sources such as demand deposits

Funding economics put marketplace lenders at a cost disadvantage compared to traditional banks, raising questions about the model's sustainability (continued)

CASE STUDIES

PROSPER

Major institutional funding

Prosper marketplace closed a deal in February 2017 with a consortium of institutional investors to purchase up to \$5 billion of loans through the lender over the following 24 months.⁸ The deal included warrants to purchase 35% of the lender's equity, highlighting its desire to secure long-term funding.

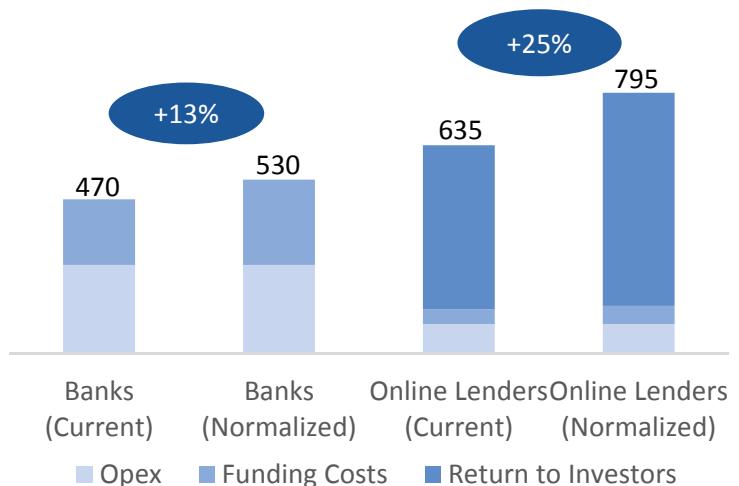


Online lender seeking deposit licence

SoFi, a major US online lender focused on student and mortgage loans, applied for a banking licence in June 2017 to diversify funding.¹⁰ The move comes after similar actions by several other major lenders, including Zopa, the United Kingdom's first online lender.¹⁰

QUANTITATIVE EVIDENCE

Total Cost of Attracting Funds in UK
Current vs Normalized, in Basis Points (bps)
(200 bps base rate)¹⁰



Online lenders pay more to attract funds, especially in a normalized environment

KEY UNCERTAINTIES

A strategy of funding diversification and cost optimization is critical to marketplace lenders, but it blurs the line with traditional banking

1 Will marketplace lenders be able to drive down their funding cost sufficiently to compete for price-sensitive clients?

2 How will marketplace lenders attract deposits if they become banks?

3 How will marketplace lenders resolve their funding instability issues?

Five key uncertainties arise from the lending findings which will shape this industry's direction

1 WHAT WE KNOW

The lending findings illustrate how fintechs have altered customer perception of the lending experience. Fintechs are using data to provide customers with pain-free lending services, and customers want the same efficient, seamless experience with their banks. Additionally, consumers can choose from a multitude of financial and non-financial providers. However, fintechs are struggling to find a sustainable business model in the face of funding instability.

Through these findings, the following uncertainties around lending emerged:

2 UNCERTAINTIES



How much more effective will underwriting become with new sources of data and analytical techniques?



Will platform-based lending emerge to become a relevant distribution channel?



What is the long-term impact of marketplace lenders licensing their underwriting technology?



Will marketplace lenders move to provide direct lending?



How will the borrower's preference of distribution channels continue to evolve?

3 POSSIBLE FUTURES

The resolution of these five key uncertainties paints three diverging pictures of the future of the lending industry:



Different Evolutionary Paths



Shared Service Providers



Distribution 2.0

Depending on how the key uncertainties are resolved, the potential end states have very different evolutionary paths and implications for all firms

**DIFFERENT
EVOLUTIONARY PATHS**



The first end state paints a world where:

- Marketplace lenders are challenged as funding costs rise
- Marketplaces further specialize and target niche areas
- Other marketplace lenders seek to become banks
- Customers benefit, especially in niche areas

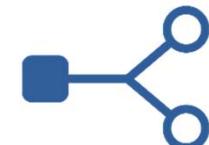
**SHARED
SERVICE PROVIDERS**



The second end state paints a world where:

- Certain marketplace lenders become B2B service providers
- Banks find service providers more capable and cost-effective than their own internal functions
- Service providers flourish and become indispensable
- The industry's cost base becomes commoditized

DISTRIBUTION 2.0

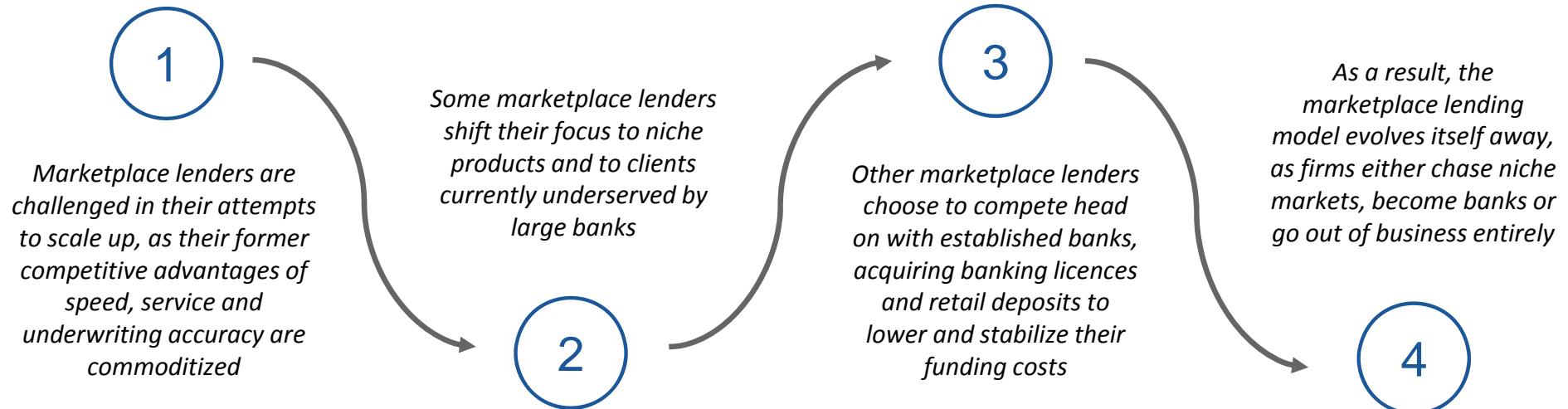


The third end state paints a world where:

- Lenders form partnerships with non-financial firms
- Non-financial firms use their platforms to originate loans
- Lenders begin to offer more customized products using additional data
- Consumers benefit from loans at the point of need



Marketplace lenders have to further develop sophisticated capabilities or compete on price with established banks



CRITICAL CONDITIONS

- Marketplace lenders fail to emerge as dominant players in non-niche markets
- Incumbent banks are able to sufficiently lower operating costs quickly enough to outperform marketplace lenders

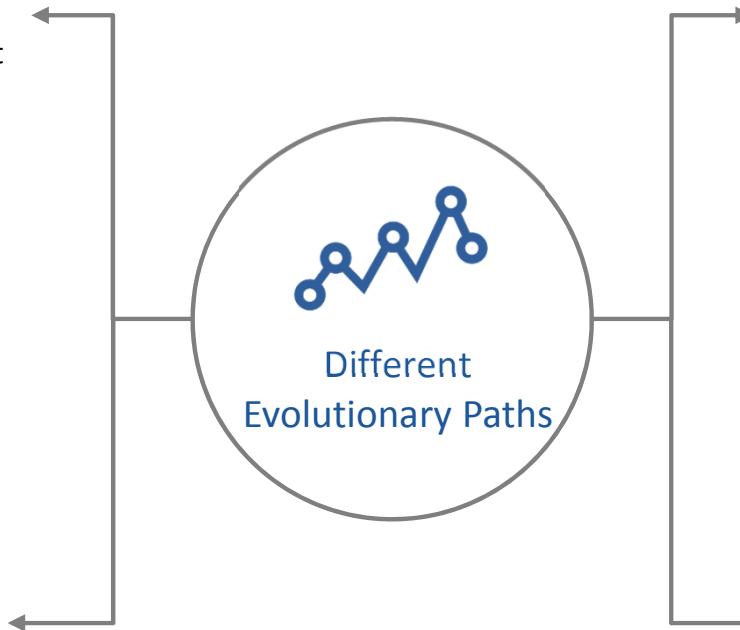
EARLY SIGNS

- The growth of marketplace lenders continues to be weak
- Some marketplace lenders expand into new products and customer segments
- Other marketplace lenders shift to acquire banking licences

Clients will benefit from more sophisticated niche lending and increased competition as the lending landscape becomes more fragmented

Implications for Incumbents

- Competition increases for niche areas, but overall competition decreases as marketplace lenders become less competitive
- Marketplace lenders become a regular venue for banks to deploy excess capital



Implications for Alternative Lenders

- Alternative lenders have access to much smaller sections of the market as they cede market share to banks
- Convergence with digital banking fintechs could lead to increased competition
- Significant growth occurs across new niche markets

Implications for Regulators

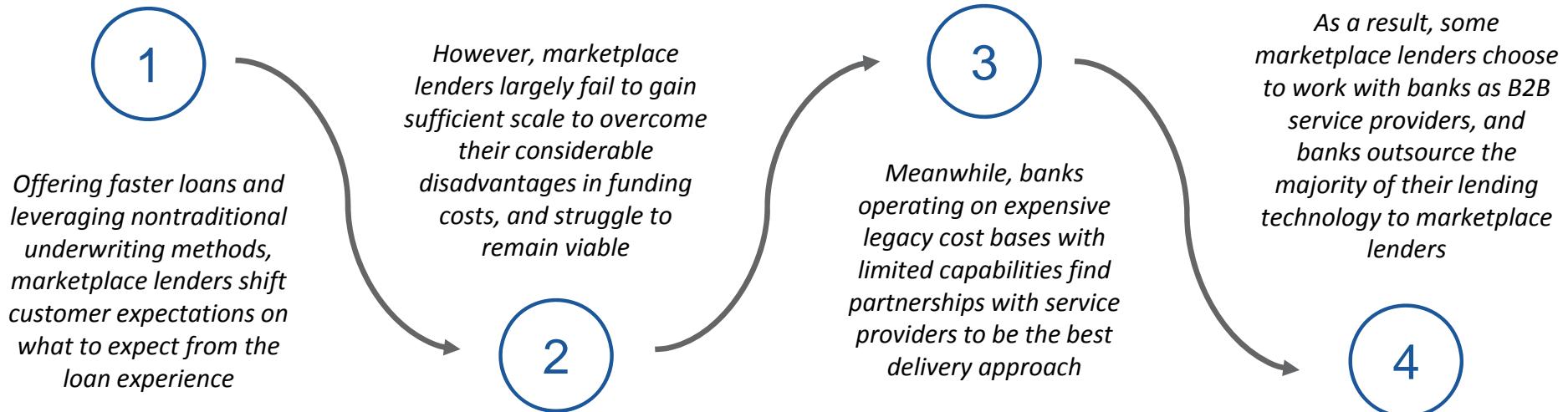
- Awareness is required of risks stemming from increased consolidation as incumbents gain market share
- Regulators must define the rules for edge cases as lending firms try to adapt their business model, becoming more like a bank

Implications for Customers

- Customers benefit from expanded availability of credit to underserved markets



The desire for cost-commoditization drives growth in B2B service providers, as two needs come together in one solution



CRITICAL CONDITIONS

- Regulators buy in to shared-service models between competitors
- A critical mass of financial institutions using shared service and external providers is reached
- Connectivity between capability providers and banks becomes standardized

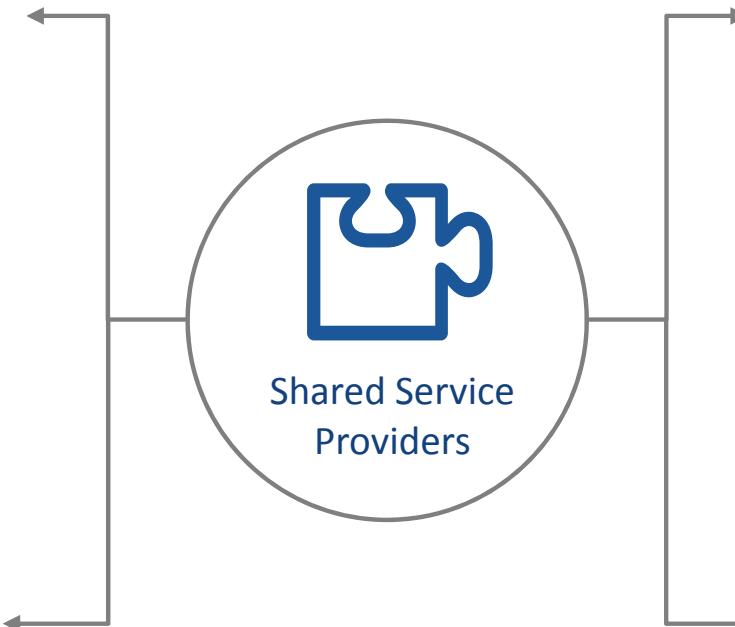
EARLY SIGNS

- Lending margins continue to erode
- Specialized capability providers that successfully deliver absolute cost advantages proliferate
- Businesses develop adjacent to shared services (e.g. “rating agencies” for vendors)

Increasing externalization improves industry cost bases, but creates potential new points of systemic risk

Implications for Incumbents

- Externalization leads to significant reductions of in-house middle and back office functions
- Many in-house capabilities that have set apart banks from competition are no longer differentiators
- Increased capacity from software-as-a-service providers makes IT expenditures more of a variable cost, decreasing the benefits of scale



Implications for Alternative Lenders

- As lenders' business models move from B2C to B2B, the capabilities required for success shift significantly
- Non-financial firms expand into lending as barriers to entry fall, potentially leading to a return to the era of personal credit issued by retailers

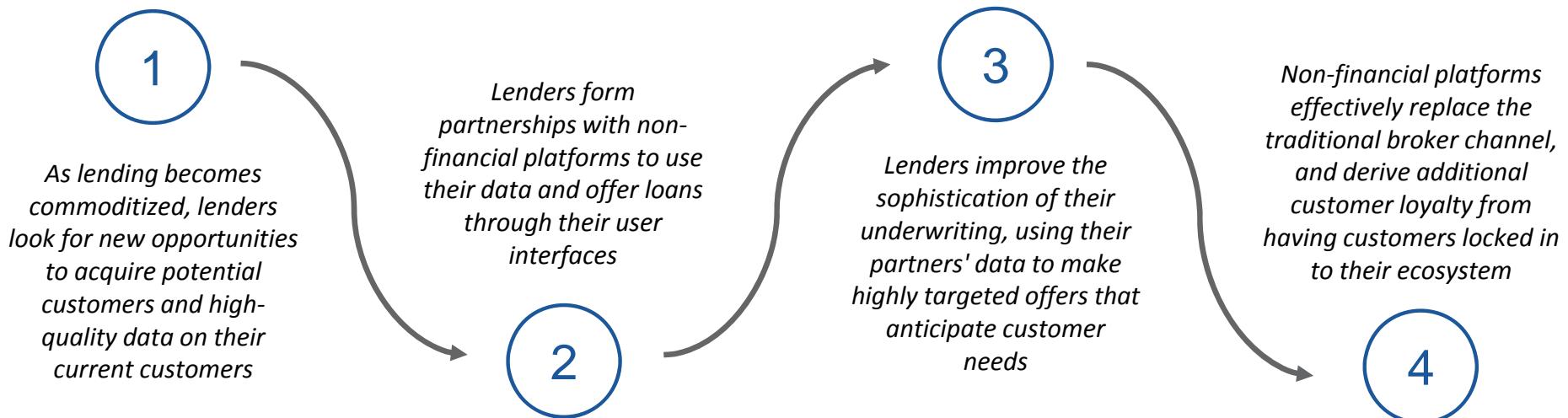
Implications for Regulators

- The rise in B2B providers potentially increases the systemic risk of a single point of failure
- Granularity increases, and service providers face more intense regulatory scrutiny

Implications for Customers

- More competition on service and costs as “high-quality execution” becomes commoditized
- Lower loan costs as bank operating expenses decrease
- Market fragmentation drives an intense battle for mindshare

 Non-financial firms move horizontally into financial services and disintermediate the traditional broker channel



CRITICAL CONDITIONS

- Connectivity between the non-financial firm and the bank allows banks to receive data from, and to offer loans through, the platform
- Data provided by non-financial firms is considered better than from other sources in adjudicating credit

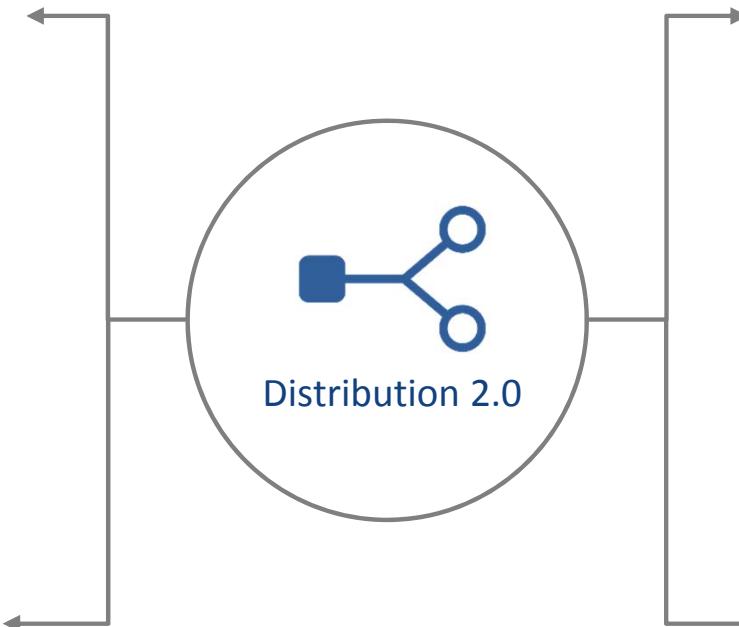
EARLY SIGNS

- Small and medium-sized businesses increasingly adopt cloud-based software solutions
- More non-financial firms begin to move into the financial services area, either on their own or through partnerships with existing lenders

As partnerships between banks and non-financial firms proliferate, customers' experience improves and choices become numerous

Implications for Incumbents

- The rise of platforms as intermediaries means incumbents move further away from their customers
- Some platforms may act as aggregators and allow for comparisons, thereby increasing price competition
- Incumbents acquire a better understanding of clients as they gain access to a new and deeper pool of non-financial data



Implications for Non-Financial Firms

- Such firms develop a new source of revenue, as platforms receive fees in exchange for access and data
- They proactively provide funding to clients directly “in-app”, thereby increasing customer interaction and providing more pull into the platform
- The firms have a deeper relationship with their banks and more bargaining power in negotiations

Implications for Regulators

- Regulators need to monitor new non-financial distribution channels and potentially regulate previously unregulated parties

Implications for Customers

- Customers benefit from an improved experience: loans are available directly in app, and customers know in advance whether they are approved
- Customers have improved comparability of financial products and access to multiple providers

Key takeaways for financial institutions

1

THE LOWEST FUNDING COSTS WIN

Despite innovations in origination and adjudication, the online lending model is fundamentally limited by high and unstable funding costs in its ability to compete with banks. The need for a consistent funding source at a cost similar to that of deposits for banks will drive online lenders to acquire banking licences – unless an alternative funding source can be found

2

LENDING GOES DIGITAL

Marketplace lenders and technology firms have reoriented customer expectations. Leading lenders are expected to offer simple credit origination experiences, where a combination of design and automation provides customers with a frictionless application experience and a swift response

3

LENDERS USE DATA EFFECTIVELY

Leading lenders are using data to improve both the effectiveness and the efficiency of their adjudication processes. They employ new sources of data to underwrite applications whose risks could not previously be assessed (e.g. "thin-file" customers), and reduce underwriting costs by automating the collection and analysis of key data (e.g. using data collected directly from a small-business accounting platform). Moving forward, lenders will increasingly look for new signals/data to inform lending decisions

References

1. "ZestFinance Introduces Machine Learning Platform to Underwrite Millennials and Other Consumers with Limited Credit History". *Yahoo Finance*. Retrieved from <https://finance.yahoo.com/news/zestfinance-introduces-machine-learning-platform-150000764.html>
2. "Marketplace lending 2.0: Bringing on the next stage in lending". *Deloitte*. Retrieved from <https://www2.deloitte.com/content/dam/Deloitte/us/Documents/financial-services/us-fsi-markeplace-lending2.pdf>
3. "You Can Now Be Approved for a Mortgage in 8 Minutes". *Money*. Retrieved from <http://time.com/money/4129146/quicken-loans-8-minute-mortgage/>
4. "Inside J.P. Morgan's Deal With On Deck Capital". *The Wall Street Journal*. Retrieved from <https://www.wsj.com/articles/inside-j-p-morgans-deal-with-on-deck-capital-1451519092>
5. "Alternative Lending". *EY*. Retrieved from [http://www.ey.com/Publication/vwLUAssets/ey-understanding-alternative-lending/\\$File/ey-understanding-alternative-lending.pdf](http://www.ey.com/Publication/vwLUAssets/ey-understanding-alternative-lending/$File/ey-understanding-alternative-lending.pdf)
6. "Amazon has lent over \$3 billion to merchants since 2011". *TechSpot*. Retrieved from <http://www.techspot.com/news/69665-amazon-has-lent-over-3-billion-merchants-since.html>
7. "HSBC's partnering with fintech startup Tradeshift to offer trade financing and help businesses increase their working capital". *City A.M.* Retrieved from <http://www.cityam.com/262044/hsbcs-partnering-fintech-startup-tradeshift-offer-trade>
8. "Prosper Inks \$5 Billion Loan-Buying Deal With Investors Including Soros, Jefferies". *The Wall Street Journal*. Retrieved from <https://www.wsj.com/articles/prosper-inks-5-billion-loan-buying-dealwith-investors-including-soros-jefferies-1488222470>
9. "SoFi has applied for a bank charter". *TechCrunch*. Retrieved from <https://techcrunch.com/2017/06/12/sofi-applies-to-be-a-bank/>
10. "Zopa raises \$41.2 million for challenger bank launch". *CNBC*. Retrieved from <http://www.cnbc.com/2017/06/02/zopa-raises-41-point-2-million-for-challenger-bank-launch.html>
11. "A temporary phenomenon? Marketplace lending: An analysis of the UK market". *Deloitte*. Retrieved from <https://www2.deloitte.com/content/dam/Deloitte/uk/Documents/financial-services/deloitte-uk-fs-marketplace-lending.pdf>

Section 3.5

Investment Management

Investment management has greatly evolved in the last several years. This section examines the key trends shaping the industry and the uncertain path forward

The first half of this decade was marked by profound changes to the investment management industry, including the entry of several major forces that held the potential to fundamentally shift the industry's course

CIRCA 2015, THE MAJOR FORCES IMPACTING INVESTMENT MANAGEMENT WERE ...

The Rise of Robo-Advisors



Automated advisers that use trading formulas based on low-fee ETFs were capturing attention

Big Data-Driven Analysis



Fintechs were beginning to tap into the potential of big data for investments

Increasing B2B Externalization



Firms were starting to outsource back office processes, such as regulatory monitoring

CIRCA 2015, THE BIG UNCERTAINTIES ABOUT THE FUTURE OF INVESTMENT MANAGEMENT WERE ...

Was robo-advisory service truly the right answer for the vast majority of customers?

How would companies look at B2B externalization as margins continued to decline?

Would monoline fintechs be able to capture significant market share?

Note: "Wealth managers" are defined as organizations that provide advice and distribute products to customers in investment management. "Asset Managers" are companies that "manufacture" the financial product itself, which forms the basis for the investment

Four trends in the investment management industry have shaped its future, and incumbents, not innovators, look poised to benefit

WHERE DID DISRUPTION OCCUR?

- A As individuals become more responsible for their investments, robo-distribution has become the most compelling tool for customer engagement
- B Scaling the delivery of investment advice requires fewer resources, as middle and back office functions are increasingly being automated or externalized
- C The growth of low-cost products has increased the importance of scale in product manufacturing, driving pressures for consolidation

WHERE HAS DISRUPTION NOT OCCURRED?

- D New entrants to investment management have struggled to gain market share in the face of customer stickiness and high customer acquisition costs

As individuals become more responsible for their investments, robo-distribution has become the most compelling tool for customer engagement

As employers abandon traditional defined benefit (DB) plans in favour of defined contribution (DC) plans, individuals are becoming more responsible for managing their own investments, driving a need for low-cost investments and advice on asset allocation

SUPPORTING EVIDENCE



Shift from Institutional to Individual

Baby boomers are drawing down on defined benefit plans (guaranteed benefits), while younger workers are predominantly limited to defined contribution investment plans (benefits based on investment returns). These trends are increasing the share of total investments that are self-managed, driving demand for products and services targeted to individuals as opposed to institutional investors



Increasing Regulation Raising Costs

Regulators have stepped up efforts to protect retail investors, citing mis-selling scandals, rising investor dissatisfaction and the shifting of retirement burdens from institutions to individuals. An unintended consequence of these policies has been to increase the cost of providing customers with individualized offerings through traditional channels, making robo-advisors a compelling solution



Rising Client Expectations

Customers have become accustomed to customer-centric offerings and service in non-financial settings, and expect their financial services experiences, including wealth management, to exhibit similar characteristics. Robo-advisory products offer a digital and customer-centric experience at a low cost and are thus attractive, particularly for younger customers

As individuals become more responsible for their investments, robo-distribution has become the most compelling tool for customer engagement (continued)

CASE STUDIES



Robo-advisory product for the masses

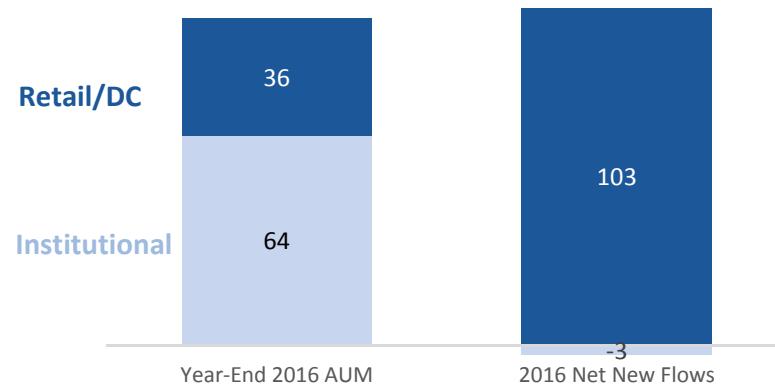
Charles Schwab has rolled out its Intelligent Portfolio robo-advisory product focused on mass and mass-affluent customers. With minimums of \$5,000 and no fees apart from ETF product fees, as well as 24/7 access to investment professionals, Charles Schwab is aiming to compete against fintechs such as Wealthfront.¹

New standards for advice

The US Department of Labor Fiduciary Rule will elevate all financial professionals who provide retirement planning advice to the level of a fiduciary, bound legally and ethically to meet the standards of that status. This rule and others like it, including the UK Financial Conduct Authority's rules on investment management, raise the cost of advisory service and make robo-investors more attractive.^{2,3}

QUANTITATIVE EVIDENCE

Global Asset Management Industry Net New Flows by Investor Type (%)⁴



Shift from institutional to retail

KEY UNCERTAINTIES

To win over individual investors, incumbents are seeking to differentiate their offerings through product development and the delivery of bespoke services

1 How will firms differentiate their robo-advisory offerings from similar offerings throughout the industry?

2 How far will regulators push in mandating transparency and fiduciary duty in advice?

3 How will a prolonged period of low market returns continue to shift industry economics?

Sources: 1. Charles Schwab 2. Investopedia 3. Forbes 4. Deloitte (Casey Quirk)

Scaling the delivery of investment advice requires fewer resources, as middle and back office functions are increasingly being automated or externalized

Asset and wealth managers are seeing margins decline and are turning to externalization and automation to lower costs. As non-core functions become externalized and commoditized, the industry value chain threatens to shift considerably

SUPPORTING EVIDENCE



Margin Compression Forcing Cost-Cutting

Manufacturing margins are declining as demand shifts from high-cost to low-cost products, and distribution margins are falling as robo-advisors gain popularity. This pressure is driving incumbents to search for savings, especially in the areas of the value chain that add the least value – the middle and back office



Growth in External Service Providers

Enabled by technological advancements, external service providers are growing and building a track record of success in driving efficiency. As these firms proliferate and allow asset managers to focus on the strategic aspects of investing, they will be trusted with more and more functions that are central to the asset manager's operations



Automation and AI Replacing Processes

Automation and AI are becoming more capable and may soon be able to replace complex human activities across the front, middle and back office. As they do so, competitive advantages derived from excellence in process execution will deteriorate, leading to even more process externalization

Scaling the delivery of investment advice requires fewer resources, as middle and back office functions are increasingly being automated or externalized (continued)

CASE STUDIES



Real-time analytics

Kensho drastically reduces the manual analytics required to explore futures for capital markets and allows users to express those futures using natural language. Media network CNBC used Kensho's tool to analyse the impact of recent political events (e.g. WannaCry cyberattack) on stock prices.⁵

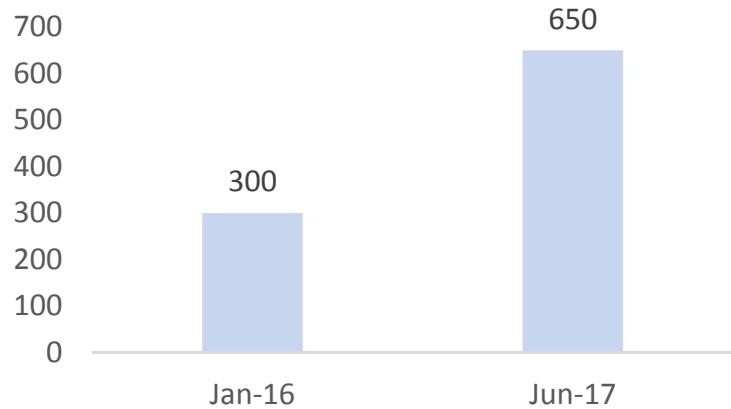


Zero commission discount broker

Robinhood is a digital discount brokerage that allows users to trade securities with zero commissions.⁶ Recently, it announced partnerships with other wealth management innovators, such as Quantopian, OpenFolio and StockTwits, to provide customers of those online tools access to additional services through its platform.

QUANTITATIVE EVIDENCE

Growth in Addepar's* Assets on Platform (\$ billion)⁷



* External wealth manager

Massive growth in external service platforms

KEY UNCERTAINTIES

As innovative vendors provide economical access to sophisticated capabilities, high-quality process execution is becoming a commodity

1

Where will firms strike the balance between automating and maintaining manual processes?

2

How does commoditization of back office functions affect an institution's ability to differentiate itself?

3

How does the division of regulatory responsibilities change as functions are externalized?

The growth of low-cost products has increased the importance of scale in product manufacturing, driving pressures for consolidation

As the demand for low-cost investments grows, utilizing economies of scale to lower product costs and offering differentiated products at low cost become major competitive priorities

SUPPORTING EVIDENCE



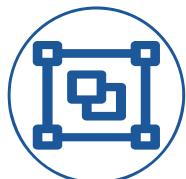
Alpha Becoming More Elusive

For asset managers, excess returns over the market (alpha) have proven elusive to generate in the post-crisis environment, making it difficult for managers to justify their higher fees and diminishing their appeal in favour of low-cost products



Low Fees, High Economies of Scale

As the popularity of low-cost products has grown, providers have primarily competed on the basis of price, with the lowest-cost US equity ETF charging just three basis points. This significant advantage of scale in the production of low-cost products means industry consolidation is inevitable



Rise of Smart Beta

The growth of low-cost ETF products has created a gap in the market for investors that are attracted to active strategies but are also looking for low costs. As a result, “smart beta” products that employ active strategies but use low-cost beta products have risen in popularity, and are also helping to drive the push for additional scale to lower costs

The growth of low-cost products has increased the importance of scale in product manufacturing, driving pressures for consolidation (continued)

CASE STUDIES



Passive products as competitive advantage

As an early proponent of index funds, Vanguard has benefited greatly from the ongoing shift to low-cost investments while its competition grapples with declining margins. Vanguard attracted net mutual fund flows of \$823 billion over the last three years, 8.5 times as much as its competitors combined.⁸

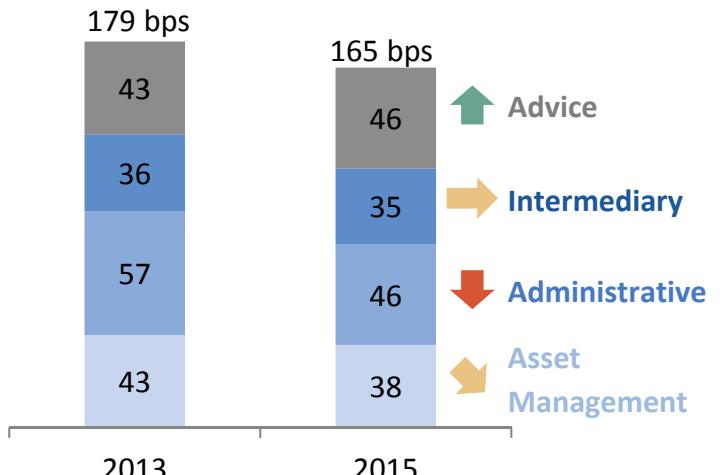
BLACKROCK

Consolidation of human-managed funds

Continuing 30 years of R&D and strong investment performance of its quantitative investing team, BlackRock laid out an ambitious plan to consolidate a large number of human-managed mutual funds that rely on algorithms and models to pick stocks. These funds focus on quantitative and other strategies that adopt a more rules-based approach to investing.⁹

QUANTITATIVE EVIDENCE

Investor Average Fee Budget (in basis points)¹⁰



Significant decline in fees due to low-cost products

KEY UNCERTAINTIES

As the asset management industry consolidates, large manufacturers are capturing the vast majority of new flows

1

How will low-cost products perform in a complex and volatile macro environment?

2

How will rising interest rates affect choices of investment methodologies?

3

Will active managers be able to generate sufficient alpha to stem the flow to low-cost products?

New entrants to investment management have struggled to gain market share in the face of customer stickiness and high customer acquisition costs

Incumbents have quickly co-opted the robo-advisory model, driving monoline robo-advisors to explore new business models, such as licensing their technology to incumbents

SUPPORTING EVIDENCE



Challenging Per-Customer Economics

Monoline robo-advisors have primarily attracted mass or mass-affluent customers. Coupled with their low fees, these clients generate relatively low per-customer revenue. These economics have proven challenging, as customer acquisition costs are high relative to each customer's value, making it difficult to be profitable



Low Barriers to Entry

Robo-advisory offerings have proven to be relatively quick and economical to develop. The low cost of entry has allowed incumbent wealth managers to fast follow new entrants and build their own offerings, which they can then offer to their existing customer base to keep customer acquisition costs low



Value Added Services

Traditional wealth management services are becoming commoditized as new entrants automate advice and cash flow management services. However, this commoditization has underscored that clients value highly intangible "human" capabilities and bespoke services, especially as they increase in net worth. Incumbents' ability to provide these services can foster customer stickiness

New entrants to investment management have struggled to gain market share in the face of customer stickiness and high customer acquisition costs (continued)

CASE STUDIES



Early digital advice platform bought by asset manager

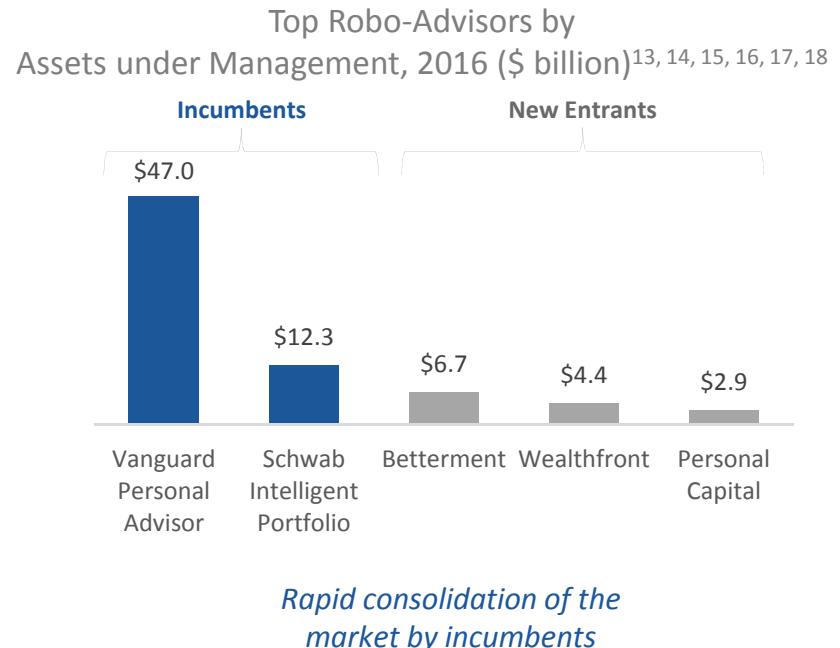
In August 2015, FutureAdvisor was the first major customer-facing “robo-advisory” product bought by one of the leading global asset managers (BlackRock).¹¹ FutureAdvisor now provides tech-enabled digital advice for investors through banks and wealth managers in an open architecture platform.



Flat-fee digital investment advice

Macquarie, a leading asset management and investment banking firm from Australia, launched OwnersAdvisory in 2015, offering flat-fee digital investment advice service that empowers self-directed investors across various asset classes.¹²

QUANTITATIVE EVIDENCE



KEY UNCERTAINTIES

Benefiting from their strong brands, both distributors and manufacturers are quickly and successfully co-opting the robo-advisory model

1 How will the role of human advisers be affected by increased automation and the shift to robo-advisors?

2 Will the majority of wealth managers choose to build, buy or partner to offer robo-advice?

3 How can wealth managers differentiate their robo-advisory offerings?

Uncertainties in investment management largely revolve around the nature of future investment products and the composition of the related value chain

1 WHAT WE KNOW

These findings illustrate increasing client expectations and the importance of a personalized customer experience. As middle and back office functions are automated or externalized, firms are forced to differentiate on high-quality process execution and distinct, tailored advice. Customer stickiness and the high cost of new customer acquisition allow incumbents to benefit, as successful fintech offerings, such as robo-advisors, are quick and easy to replicate.

Through these findings, the following uncertainties around investment management emerged:

2 UNCERTAINTIES



To what degree will product manufacturers move upstream and disrupt distributors?



How will wealth managers differentiate their robo-advisory offerings?



Will clients continue to prefer low-cost investments, or will “guaranteed outcome” products become popular?



How will the role of human advisers and their job requirements change?



Will product manufacturing be characterized by more or less scale?

3 POSSIBLE FUTURES

The resolution of these five key uncertainties paints three diverging pictures of the future of the investment management industry:



Certainty-Based Offerings



Advice as a Differentiator



Quality Externalization

Depending on how the key uncertainties are resolved, the potential end states have very different evolutionary paths and implications for all firms

CERTAINTY-BASED OFFERINGS



The first end state paints a world where:

- Retail clients have less access to traditional pensions
- Retail clients become a more attractive segment than institutional clients
- Robo-advisors condition clients to expect certainty
- Asset management develops and delivers “guaranteed outcome” products

ADVICE AS A DIFFERENTIATOR



The second end state paints a world where:

- Clients, especially millennials, flock to robo-advisors
- Algorithm-driven interfaces expand across multiple asset categories
- Wealth becomes the primary point of interaction with financial institutions
- Data-sharing agreements become much more important to understand consumers

QUALITY EXTERNALIZATION

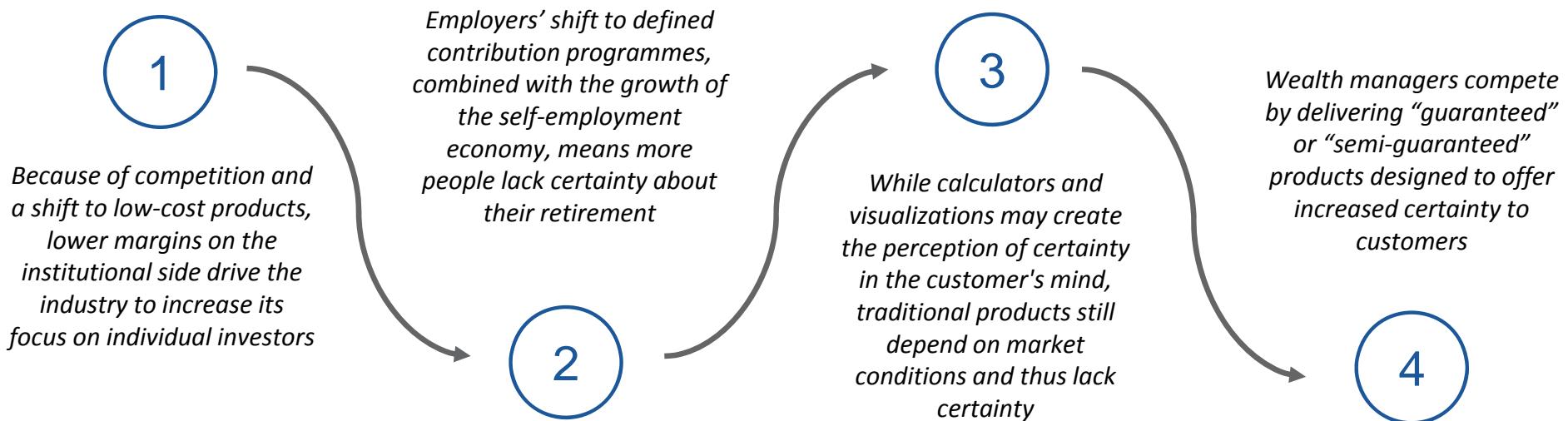


The third end state paints a world where:

- More and more cloud and platform-as-a-service providers emerge
- Benefits of scale erode as high-quality execution becomes the norm
- Much of the market gets consolidated into large firms that can afford differentiated technology
- Many specialized smaller wealth managers thrive by appealing to niche markets



Growing profit pools in retail wealth lead to a renaissance of products guaranteeing a predefined outcome



CRITICAL CONDITIONS

- Improvements in analytics and risk management provide more granular insights into the liabilities associated with guaranteed products
- Institutions and manufacturers would need to be comfortable taking risk on some balance sheets and holding capital against it
- An operating model for breaking down barriers between insurance and wealth management/banking is accepted by regulators

EARLY SIGNS

- The shift of pensions from defined benefit to defined contribution continues
- Partnerships form between product manufacturers, insurers and gig-economy firms

Customers will profit from products offering increased certainty, but strong partnerships are needed to manage risks

Implications for Customers

- Products that offer guaranteed outcomes increase customer certainty about retirement
- Predefined and guaranteed outcomes prevent severe losses and are thus better options for risk-averse individuals
- The duality of goal-based and value-based propositions creates different segments of clients



Implications for Asset Managers

- Individual demands allow product development and brand to become more important
- The offering of guarantee-based products makes proprietary risk management practices a key differentiator
- Increased risk requires stronger collaboration with wealth managers (distribution) and insurers (risk management)

Implications for Wealth Managers

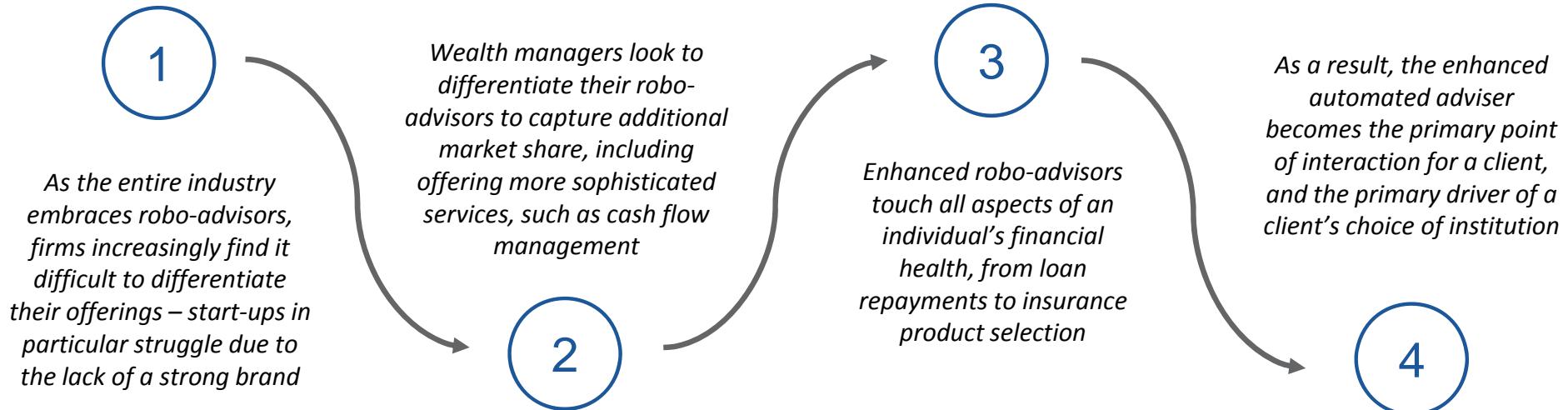
- The increasing importance of individual clients requires significant investment to distribute via mobile/online channels
- Human factors (e.g. synthesis, decision-making) are becoming more important

Implications for Regulators

- The offering of guarantee-based products requires corresponding regulation and supervision
- More individual decision-making requires more comprehensive financial education



Based on significant improvements in robo-advice, investment advice becomes the primary driver of a client's choice of institution



CRITICAL CONDITIONS

- The capabilities of robo-advisors (e.g. cash flow management) are significantly improved
- Interoperability is established between products and services to allow for managing them through a single enhanced robo-advisory system
- Advisers are able to secure access to a full view of relevant customer data, including external data

EARLY SIGNS

- Core banking margins narrow, increasing the relative importance of wealth management business units as a profit driver and a differentiator
- The number of partnerships and acquisitions between incumbent institutions and robo-advisors, or other technology providers, increases further

Investment services will become more convenient but also less transparent for customers, while the role of wealth managers becomes more critical

Implications for Customers

- Sophisticated robo-advisors, coupled with customized advice and services, improve experiences and outcomes for digitally savvy customers
- The relationship with financial institutions becomes service-based instead of product-based

Implications for Wealth Managers

- Highly automated, AI-driven advice requires significant investment in system integration for information
- Core competencies shift from process execution to more human factors (e.g. synthesis, decision-making)
- The importance of data will lead to a focus on third-party data-sharing agreements



Implications for Asset Managers

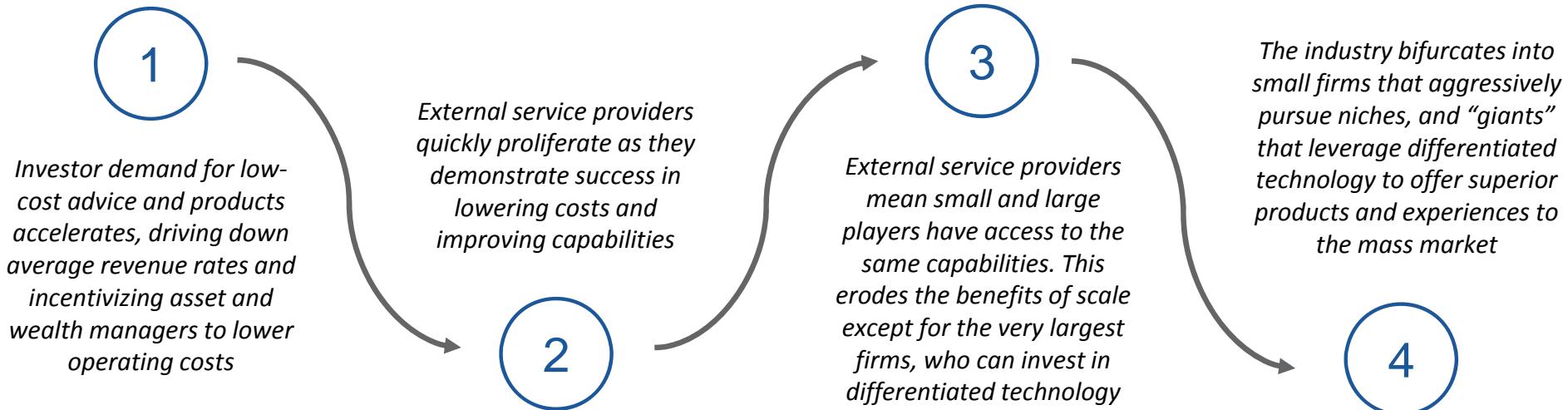
- Power dynamics shift away from manufacturers and towards distributors, as they control the customer relationship and mindshare

Implications for Regulators

- The need to interpret and regulate behaviour of algorithms and AI in the retail area increases, especially regarding recommendations



Increasing cost pressures force firms to either rely on external service providers or gain the scale to invest in differentiated technology



CRITICAL CONDITIONS

- Capability providers demonstrate the ability to offer similar levels of service at substantially lower cost
- Regulators are comfortable with increased outsourcing of core business functions
- Capability providers exhibit the necessary level of interoperability to make externalization efficient

EARLY SIGNS

- Incumbents are comfortable with cloud/platform-as-a-service solutions
- Increasing numbers of utilities or B2B capability providers emerge
- Incumbents partner with capability providers as opposed to acquiring them

Increasing standardization and industry bifurcation create new opportunities as well as new threats for all industry stakeholders

Implications for Customers

- The emergence of sophisticated capability providers increases the speed of and reduces errors in client onboarding
- Asset management products, as well as interactions with distributors, become undifferentiated from a customer perspective



Implications for Asset Managers

- Human capital needs and organizational structure will change in order to manage a portfolio of capabilities as opposed to a portfolio of talent
- The use of capability providers makes middle and back office functions more efficient
- The ability to differentiate based on process is reduced, as externalization becomes an imperative

Implications for Wealth Managers

- The use of capability providers makes middle and back office functions more efficient
- The reduced ability to differentiate based on process means scale becomes a major differentiator

Implications for Regulators

- Visibility increases due to natural standardization created by externalization
- The potential for systemic risk, created by single points of failure, needs to be contained

Key takeaways for financial institutions

1

DIFFERENTIATION OF OFFERING

The ongoing industry-wide automation and externalization of middle and back offices, combined with the ubiquity of robo-advisory offerings, are commoditizing the investment advisory value proposition. Consequently, leading firms will seek to identify and invest in other ways of differentiating themselves to stand apart from competition, in particular through deeper personalization of customer offerings

2

ADVICE-DRIVEN CUSTOMER GUIDANCE

As robo-advisors become more ubiquitous and more sophisticated, leading investment management companies will look to use these capabilities to deepen their engagement with robo-advisory customers, drawing on new sources of data to deliver advice on all aspects of their financial lives. This will mark the start of a change in their role from robo-investors to true robo-advisors

3

ROLE OF HUMAN ADVISERS

The human adviser will still be crucial when differentiating products, especially for high-net-wealth customers, but the role of such advisers will shift in leading companies from product selection to a focus on customer engagement, emotional intelligence and decision support

References

1. "Schwab Intelligent Portfolios". *Charles Schwab*. Retrieved from <https://intelligent.schwab.com/>
2. "DOL Fiduciary Rule Explained as of July 5th, 2017". *Investopedia*. Retrieved from <http://www.investopedia.com/updates/dol-fiduciary-rule/#ixzz4eohksXqf>
3. "Labor Secretary Acosta Concedes Fiduciary Rule Cannot Be Legally Stopped Before June 9th". *Forbes*. Retrieved from <https://www.forbes.com/sites/jamiehopkins/2017/05/23/labor-secretary-acosta-concedes-fiduciary-rule-cannot-be-legally-stopped-before-june-9th/#74d3e7f41e82>
4. Casey Quirk analysis. *Deloitte*
5. "Cybersecurity stocks jump after major 'WannaCry' attack". *CNBC*. Retrieved from <http://www.cnbc.com/2017/05/15/cybersecurity-stocks-surge-on-fears-wannacry-cyberattack-isnt-over.html>
6. "New Integrations". *Robinhood*. Retrieved from <http://blog.robinhood.com/news/2015/11/20/new-integrations>
7. "Addepar raises \$140 million". *Finextra*. Retrieved from <https://www.finextra.com/pressarticle/69579/addepar-raises-140-million>
8. "Vanguard Is Growing Faster Than Everybody Else Combined". *The New York Times*. Retrieved from <https://www.nytimes.com/2017/04/14/business/mutfund/vanguard-mutual-index-funds-growth.html>
9. "At BlackRock, Machines Are Rising Over Managers to Pick Stocks". *The New York Times*. Retrieved from <https://www.nytimes.com/2017/03/28/business/dealbook/blackrock-actively-managed-funds-computer-models.html?hp&action=click&pgtype=Homepage&clickSource=story-heading&module=first-column-region®ion=top-news&WT.nav=top-news&r=1>
10. "Survival of the Fittest: Defining Future Leaders in Asset Management". *Casey Quirk*. Retrieved from <http://www.caseyquirk.com/whitepapers.html>
11. "BlackRock To Buy FutureAdvisor, Signaling Robo-Advice Is Here To Stay". *Forbes*. Retrieved from <https://www.forbes.com/sites/samanthasharf/2015/08/26/blackrock-to-buy-futureadvisor-signaling-robo-advice-is-here-to-stay/#7328c3603023>
12. "OwnersAdvisory by Macquarie to provide custom investment advice online". *Macquarie*. Retrieved from <http://www.macquarie.com/ph/about/newsroom/2016/ownersadvisory-by-macquarie-to-provide-custom-investment-advice-online>
13. "2016 Annual Report". *Charles Schwab*. Retrieved from <https://www.aboutschwab.com/investor-relations/annual-report>
14. "Wealthfront Review 2017: Fees, Returns, Investing Services & Competitors". *Business Insider*. Retrieved from <http://www.businessinsider.com/wealthfront-review>
15. "Betterment Review 2017: Fees, Returns, Investing Services & Competitors". *Business Insider*. Retrieved from <http://www.businessinsider.com/betterment-review>
16. "Vanguard Rolls Out New Robo-Hybrid Advisor Service With \$17 Billion In Assets". *Forbes*. Retrieved from <https://www.forbes.com/sites/janetnovack/2015/05/05/vanguard-rolls-out-new-robo-hybrid-advisor-service-with-17-billion-in-assets/#142e01d545c0>
17. "The Vanguard Cyborg Takeover". *Bloomberg*. Retrieved from <https://www.bloomberg.com/news/articles/2016-03-24/the-vanguard-cyborg-takeover>
18. "Top 5 Robo-Advisors in 2017". *Investopedia*. Retrieved from <http://www.investopedia.com/tech/top-robo-advisors/>

Section 3.6

Equity Crowdfunding

Equity crowdfunding has greatly evolved in the last several years. This section examines the key trends shaping the industry and the uncertain path forward

The first half of this decade saw a change in how start-up businesses raise capital, with the entry of new forces that could potentially change the future of venture fundraising

CIRCA 2015, THE MAJOR FORCES IMPACTING EQUITY CROWDFUNDING WERE ...

Mass Crowdfunding



UK-based crowdfunding platforms were opened to unaccredited investors for the first time

Expert-Led Crowdfunding



Platforms advertised expert-backed rounds to signal trustworthiness

Crowdfunding-as-a-Service



Crowdfunding platforms began on a white-label basis

CIRCA 2015, THE BIG UNCERTAINTIES ABOUT THE FUTURE OF EQUITY CROWDFUNDING WERE ...

Could crowdfunding platforms prove that the “wisdom of the crowd” is superior to individual investors?

Could crowdfunding platforms continue to grow absent successful company exits?

How could crowdfunding platforms attract larger (i.e. institutional) investors?

Note: In this chapter, Equity Crowdfunding is considered to be early-stage/seed investments in unlisted companies. It does not include crowdfunding models such as pre-sales or the relatively recent appearance of initial coin offerings (ICO's)

Equity crowdfunding is growing, but the industry is still in its infancy and regulation will dramatically shape its future

WHERE DID DISRUPTION OCCUR?

- A Crowdfunding platforms have grown rapidly, driven by strong demand from both investors and entrepreneurs
- B The quality of regulation has been a defining factor in the success of the equity crowdfunding ecosystem

WHERE HAS DISRUPTION NOT OCCURRED?

- C The crowd has proven less wise than expected, highlighting the need for further education and commercial due diligence tools to assist investors
- D Equity crowdfunding remains disconnected from the broader financial system, limiting its long-term scalability

Crowdfunding platforms have grown rapidly, driven by strong demand from both investors and entrepreneurs

The venture fundraising market is more competitive than ever, driven by a growing number of start-ups and private market investors seeking alternatives to venture capital

SUPPORTING EVIDENCE



Strong Private Market Returns

Established start-ups, finding a more liquid venture capital market, are choosing to remain private for longer to avoid burdensome disclosures and market scrutiny. This delay has resulted in greater returns flowing to private investors, ultimately driving others to look for opportunities to participate in the area



Low Seed-Stage Funding Rates

Venture capitalists are paying more attention to the growing pool of private companies with valuations above \$1 billion, and overlooking smaller firms, creating a strong need for seed capital from individuals



Rise in Entrepreneurship

Shifting attitudes towards entrepreneurship and the availability of new technologies that lower barriers to entry for start-ups have resulted in an explosion in the number of tech-based start-ups, driving the need for additional sources of funding

Crowdfunding platforms have grown rapidly, driven by strong demand from both investors and entrepreneurs (continued)

CASE STUDIES



Participation of unaccredited investors

A UK platform launched in 2012, Seedrs allows all types of investors to invest as little as £10 in a start-up. Firms listed on Seedrs raised £85 million in 2016 (up 33% vs the previous year), funding 159 deals with 45,000 individual investments.¹ The average investor demonstrated strong platform engagement with nine investments.

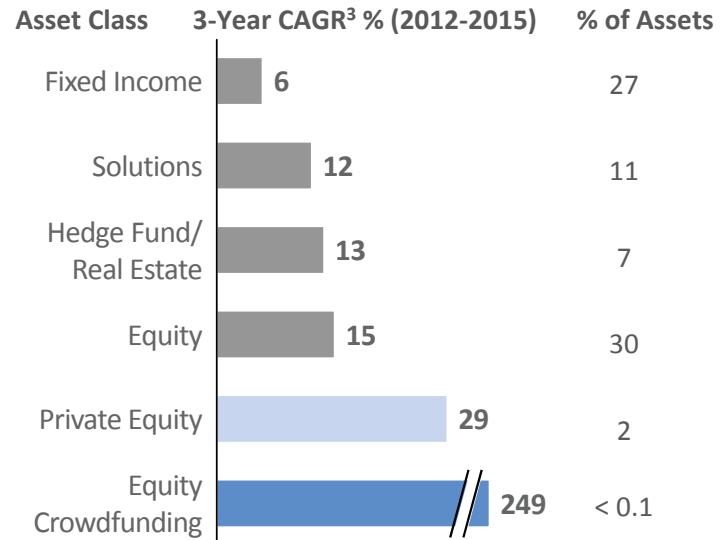


Invest alongside prominent investors

Founded in 2010, AngelList is a US platform for accredited investors investing alongside prominent angel investors. AngelList raised \$190 million in 2016 (up 17% vs the previous year) and invested in 460 start-ups with funds from over 3,500 investors.²

QUANTITATIVE EVIDENCE

Growth of Equity Crowdfunding



Equity crowdfunding is growing rapidly, but is still a very small market

KEY UNCERTAINTIES

The industry is maturing, albeit slowly, as individual investors embrace previously inaccessible investment opportunities

1 How would increased investor risk aversion impact demand for private equity?

2 How will distributed fundraising sources using blockchain technology affect the market for equity crowdfunding?

3 As more capital flows to equity crowdfunding, how will this affect venture capital firms?

Sources: 1. Seedrs Blog 2. AngelList 3. Casey Quirk analysis

The quality of regulation has been a defining factor in the success of the equity crowdfunding ecosystem

New regulations around the globe are helping to structure and add transparency to the crowdfunding industry, as regulators attempt to balance investor protection with a desire to make platforms an attractive and accessible source of capital

SUPPORTING EVIDENCE



Relaxed Suitability Requirements

Many regulators are encouraging the industry by relaxing private market suitability requirements to allow non-accredited investors to participate. This ensures that limits against investment sizes and wealth levels do not unreasonably limit the pool of potential capital



Differing Disclosure Requirements

Regulators have generally taken a light-touch approach with respect to disclosure requirements, allowing for a process significantly less onerous than for public firms. However, certain jurisdictions have imposed harsher rules, deteriorating the caliber of start-ups on platforms as only those truly desperate for capital put themselves through such a process



Regulatory Divergence

Crowdfunding regulations have diverged globally as different jurisdictions view equity crowdfunding very differently, and thus treat its risk profile differently. This hampers the ability of platforms to expand and operate internationally



Limited Deal Size

Regulators have capped deal sizes to allow platforms to lead Seed and A rounds. If set too low, these risks significantly reduce crowdfunding's value to entrepreneurs seeking larger funding rounds

The quality of regulation has been a defining factor in the success of the equity crowdfunding ecosystem (continued)

CASE STUDIES



Crowdfunding enthusiast turned to alternatives

Pebble is a smartwatch start-up that raised over \$10 million in non-equity crowdfunding on Kickstarter (funding was raised on a pre-sale rather than equity basis).⁴ Pointing to burdensome disclosures, Pebble chose to raise its next round of \$15 million from traditional investors as opposed to equity crowdfunding.



Crowdfunding compliance utility

CrowdEngine provides white-label compliance tools to streamline investor accreditation, due diligence and core back office processes for crowdfunding websites. The platform incorporates cloud-based automation technology to make the process 100% digital, increasing the quality of due diligence and thus investors' trust in platforms.⁵

QUANTITATIVE EVIDENCE

Equity Regulations by Country⁶

			
Suitability Requirements	Non-qualified investors may invest up to 10 % of their net assets		Accredited investors only
Disclosure Requirements	Start-ups must release audited financial statements	Platforms need to certify that disclosures are accurate	No regulation
Fundraising Limit	\$1M	£5M	No limit

KEY UNCERTAINTIES

Crowdfunding has been most successful in markets that balance early market growth with investor protections

1 What will be the next region to create equity crowdfunding regulation?

2 Will regulation converge to a specific standard that allows for the development of international crowdfunding markets?

3 How will governments balance crowdfunding platform growth with consumer protection?

The crowd has proven less wise than expected, highlighting the need for further education and commercial due diligence tools to assist investors

The crowd has driven valuations higher than those seen in venture capital markets, creating the risk that investors become disillusioned due to disappointing returns in the future

SUPPORTING EVIDENCE



Lack of Resources and Time

Unlike angel and venture capital investors, crowdfunding platforms do not have the institutional knowledge and time to invest a sizeable amount of effort in due diligence, instead performing simpler diligence and relying on the wisdom of the crowd



Inexperienced Investors

Many large platforms allow non-accredited investors to participate in equity fundraising. Those inexperienced investors drive valuations high in early rounds and are more likely to invest in less viable start-ups, creating problems in later rounds. Moreover, investors' personal affiliations with brands can often play an outsized role in their investment decisions



AI and Cognitive Solutions

There is strong interest in leveraging new forms of data and the powers of automation and AI to perform commercial due diligence, analogous to the credit analysis performed by lending marketplaces

The crowd has proven less wise than expected, highlighting the need for further education and commercial due diligence tools to assist investors (continued)

CASE STUDIES



Overvalued brewery?

BrewDog, a Scottish craft brewery, leveraged brand advocates to have the most successful equity crowdfunding campaign to date (raising over £15 million in 2016). However, its valuation was almost 10 times higher than similar breweries, and concerns have been raised about inaccuracies in promotional materials.⁷

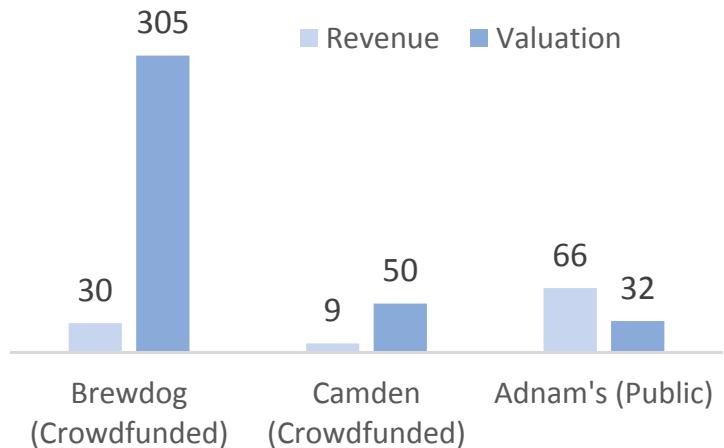


Investor-led due diligence on crowdfunding

SyndicateRoom pioneered the investor-led model, where investment rounds are led by professionals who validate the investment opportunity by leading the funding round with their own money. Online investors then join in under the same economic terms.⁸

QUANTITATIVE EVIDENCE

Revenues vs Valuations for Three UK Breweries (£ million)⁹



Funded start-ups priced much higher than publicly traded start-ups

KEY UNCERTAINTIES

Start-ups are raising capital at much higher valuations on crowdfunding platforms than through traditional sources, raising concerns about the accuracy of crowdfunding valuations

1

How can crowdfunding platforms best provide educational and commercial due diligence tools to empower investors?

2

Will the “wisdom of the crowd” model continue, or will the investor-led model eventually take over?

3

What new technologies and sources of data are most valuable to improve the accuracy of pricing?

Equity crowdfunding remains disconnected from the broader financial system, limiting its long-term scalability

Although crowdfunding is an increasingly meaningful part of the SME funding landscape, its momentum has recently slowed. To sustain growth, platforms need to broaden their distribution strategies to institutional funding

SUPPORTING EVIDENCE



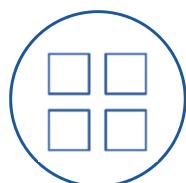
Limited Track Records

Due to the immaturity of the platforms and the lack of an established track record, investors have limited ability to gauge the risks and return expectations of their investments. Thus, they are reluctant to invest or, in many jurisdictions, are limited by investor protection laws



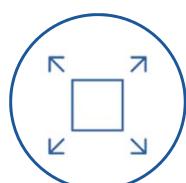
Lack of Liquid Secondary Markets

Early-stage venture capital investments are highly illiquid, with investors unable to realize a return until the company goes public or is sold – often years after the initial investment. A liquid secondary market would allow investors an opportunity to exit; it also creates “signaling issues” for the start-ups, as stock temporarily trading down could impact the business’s prospect of raising future rounds of investment



Demand for Pooled Products

Researching and investing in individual stocks is largely a cottage industry for retail investors, as the majority of individuals desire the simplicity and accessibility of pooled products. Platforms have not yet developed more accessible products, and could work with asset managers to do so



Wider Distribution Networks

The majority of wealth is invested through financial advisers (both automated and human) and not through direct channels. Equity crowdfunding platforms have not yet accessed wealth management distribution channels

Equity crowdfunding remains disconnected from the broader financial system, limiting its long-term scalability (continued)

CASE STUDIES



Secondary market launch

In June 2016, Crowdube announced its plans to launch a secondary market that enables investors to trade crowdfunded securities. The platform has also committed to building products and services that allow start-ups to improve transparency and better manage equity investors.¹⁰



Asset manager partnership with institutional platform

In December 2016, iCapital received an investment from BlackRock, highlighting the startup's desire to partner with incumbents for scale and the market leader's interest in investing in new entrants. iCapital connects accredited investors and their advisers to private equity and venture capital funds through a digital-first process.¹¹

QUANTITATIVE EVIDENCE

Equity Crowdfunding Track Record (2011-2016)¹²



The industry has not had time to successfully exit many firms and establish a track record

KEY UNCERTAINTIES

While the equity crowdfunding model has proven workable, the industry needs to demonstrate scale and performance in order to be viable

1

What will the track record of equity crowdfunding investments be over the next five years?

2

How important are secondary markets for attracting new investors, and what technology is needed to enable such markets?

3

How can platforms collaborate with professional managers to develop products and access distribution networks?

Five uncertainties will determine to what degree the industry can demonstrate stability and legitimacy while continuing to grow

1 WHAT WE KNOW

The four equity crowdfunding findings illustrate the rise in demand for crowdfunding platforms, the imperative role of regulation on crowdfunding success, the challenges faced with the lack of investor knowledge, and the difficulty of equity crowdfunding to integrate into the broader financial ecosystem.

Through these findings, the following key uncertainties around the future of equity crowdfunding emerged:

2 UNCERTAINTIES



How can platforms use emerging technologies (e.g. AI and machine learning) to educate investors and provide due diligence tools?



What partnerships are important to developing new products and expanding distribution?



How will regulators balance investor protection with ensuring that platforms remain an attractive source of capital?



How will rates of entrepreneurship evolve as macroeconomic conditions change and industries mature?



Will shifting market conditions (e.g. rising interest rates) significantly impact investor demand for early-stage equity?

3 POSSIBLE FUTURES

The resolution of these five key uncertainties paints three diverging pictures of the future of the equity crowdfunding industry:



Social Driver



International Expansion



Shooting Star

Depending on how the key uncertainties are resolved, the potential end states have very different evolutionary paths and implications for all firms

SOCIAL DRIVER



The first end state paints a world where:

- Equity crowdfunding for profit-oriented companies never achieves profitability
- Social impact-oriented crowdfunding builds on the success of debt instruments like social impact bonds
- Platforms differentiate themselves based on social returns and affinity groups
- Projects get sources of community support and feedback

INTERNATIONAL EXPANSION



The second end state paints a world where:

- Regulations across jurisdictions are standardized
- Platforms start expanding internationally
- New technologies allow inter-platform connectivity
- Secondary market trading allows platforms to attract additional investors and grow

SHOOTING STAR

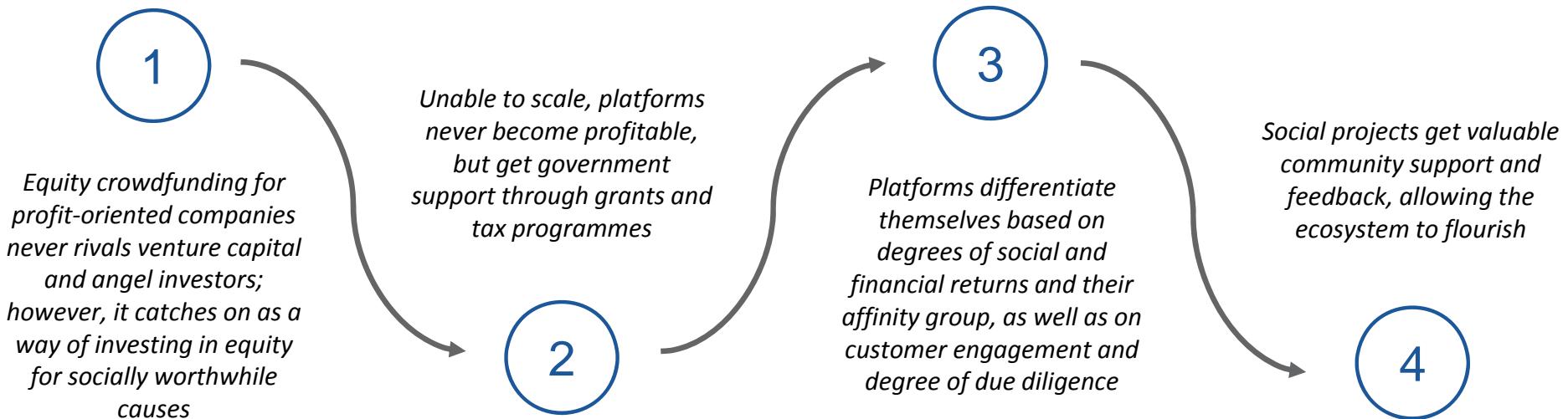


The third end state paints a world where:

- Continued low interest rate environments drive wealth managers to seek yield
- Partnerships with equity crowdfunding platforms are developed
- AI and automation is used to analyse firms and investments
- The crowdfunding market grows considerably as institutional money arrives



Platforms fail to scale in profit-oriented industries, but catch on as vehicles to deliver social impact



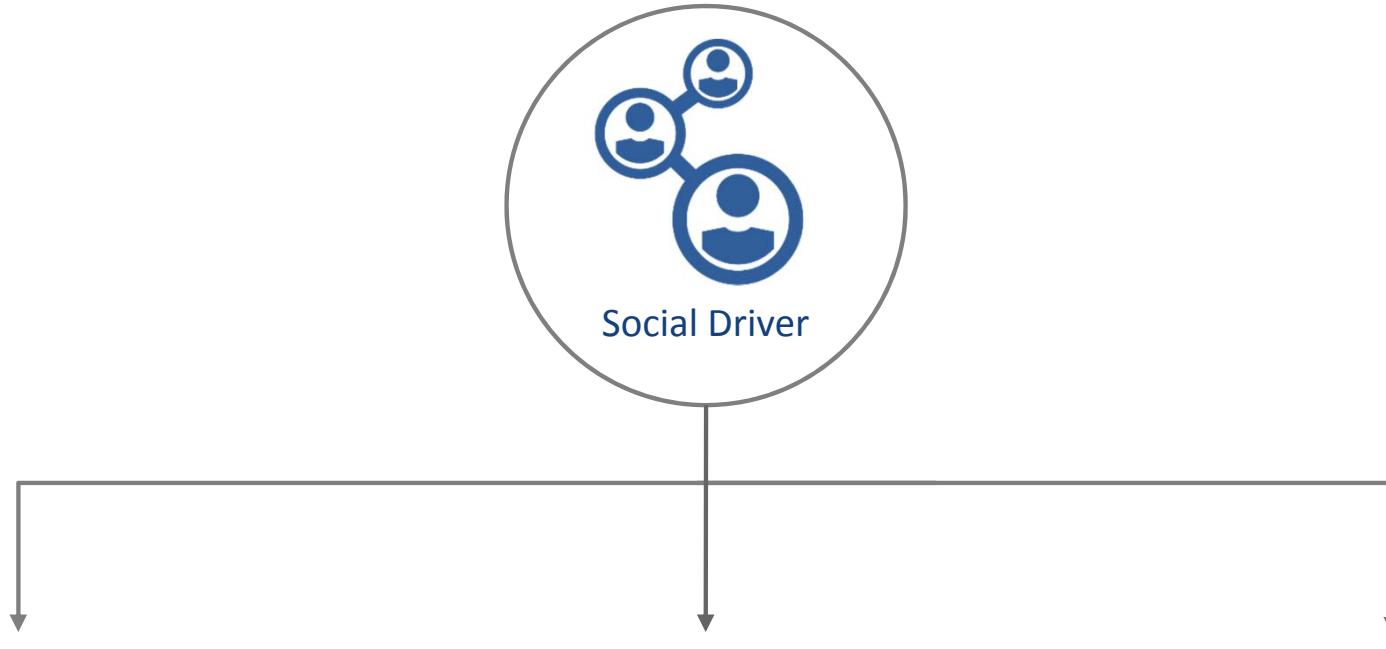
CRITICAL CONDITIONS

- Venture capital funds remain the dominant source of early-stage start-up funding
- The number of investors interested in providing equity to social enterprises grows
- Government support for platforms continues through grants and tax advantages

EARLY SIGNS

- High valuations and/or poor track records stifle platform growth and drive investors away from the industry
- Poor equity crowdfunding regulations are not fixed
- Quality start-ups turn away from the crowdfunding platform and opt for venture capital funding instead

Social enterprises attract more funding and are more impactful as the ecosystem becomes developed and dedicated



Implications for Individual Investors

- Individual investors receive access to a platform to invest equity in social causes they truly care about
- They give valuable input to affinity and social-focused projects that other sources of investment do not provide

Implications for Incumbents

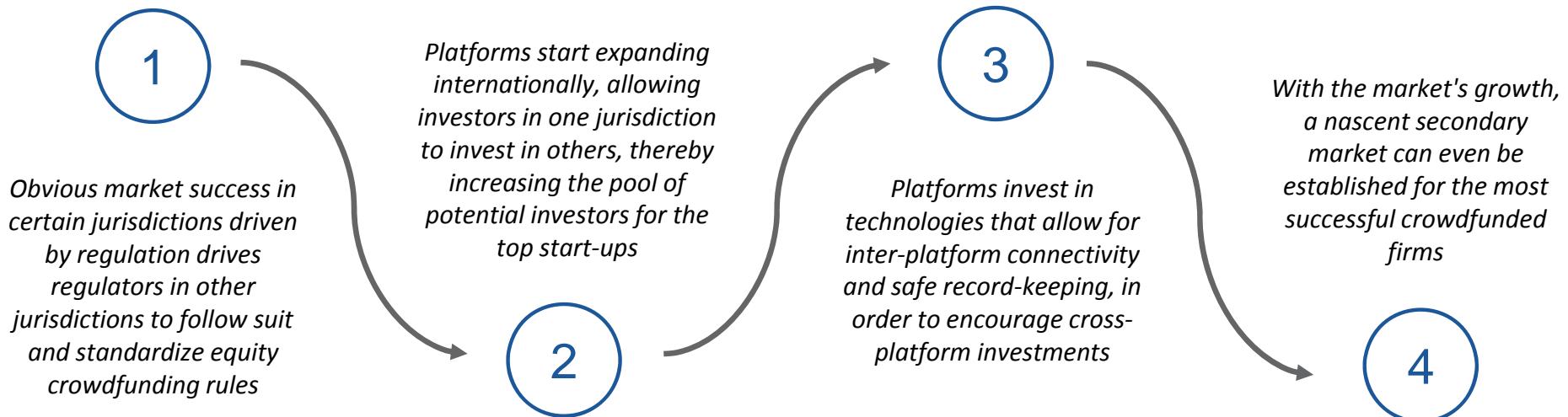
- Angel investors and venture capital firms remain the dominant source of investment for private equity

Implications for Entrepreneurs

- Start-ups providing a social good have increased access to capital
- Start-ups operating in less popular sectors for venture capital have fewer funding sources, and/or are located in less liquid venture capital markets



Regulator convergence allows for cross-border investment and crowdfunding platform growth



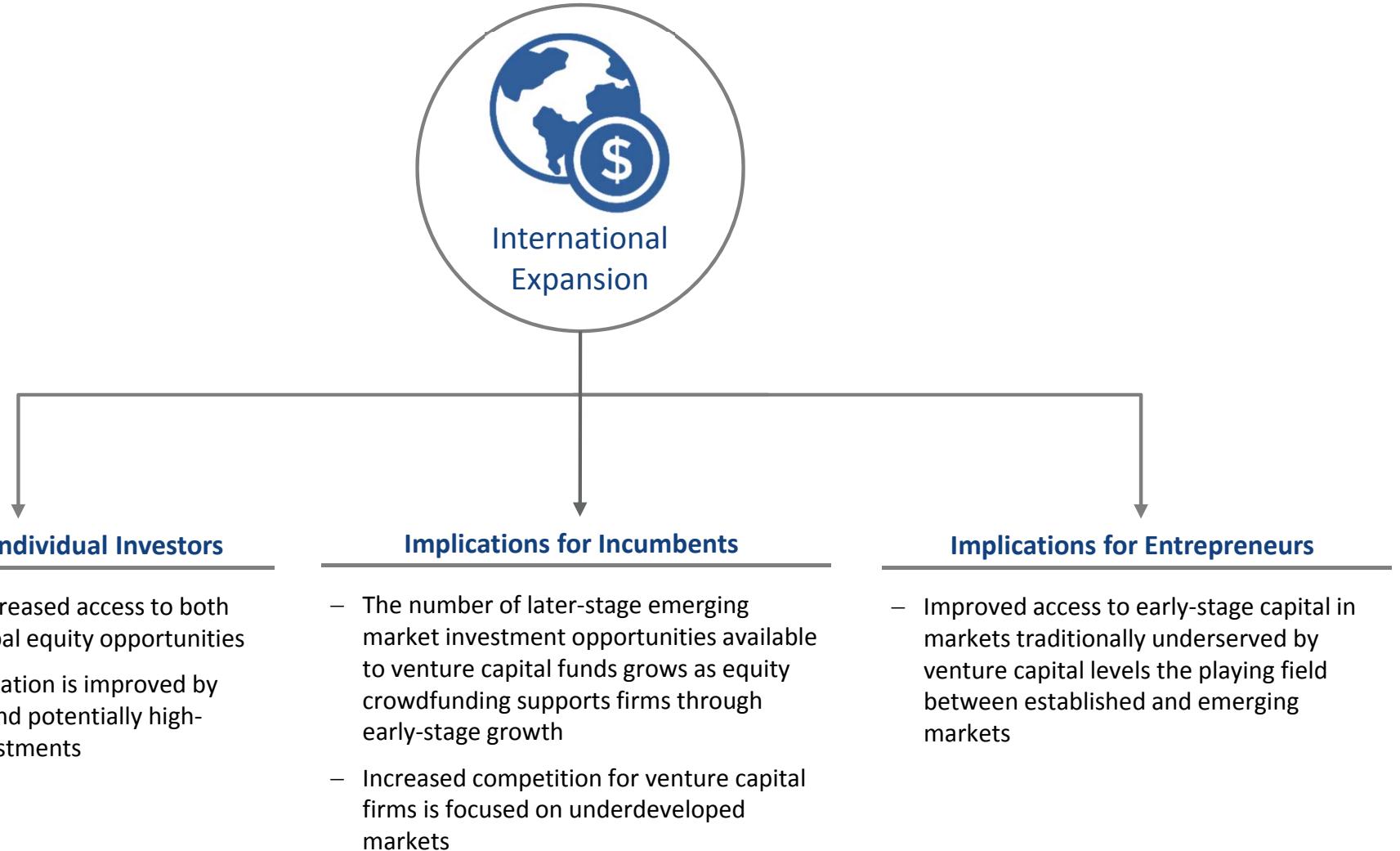
CRITICAL CONDITIONS

- Increased collaboration between crowdfunding platforms and regulators across jurisdictions will help create standardized regulation for equity crowdfunding
- Investment in technology leads to building inter-platform connectivity and due diligence tools for investors

EARLY SIGNS

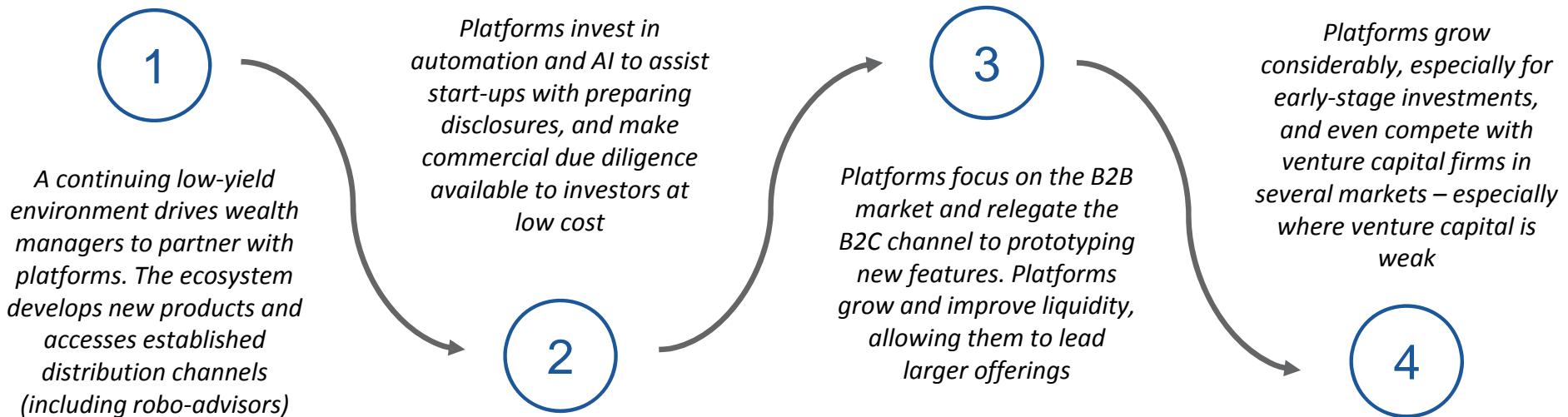
- Increased pressure to regulate the industry results in new regulations and improved investor confidence in platforms
- Interest grows for firms in emerging markets to use crowdfunding because of limited venture capital opportunities, and for investors in mature markets to invest in them
- New tools emerge that allow investors to conduct due diligence

International expansion by crowdfunding platforms levels access to venture capital across geographies





Crowdfunding platforms forge partnerships and gain scale to successfully lead late-stage offerings traditionally done by venture capital firms



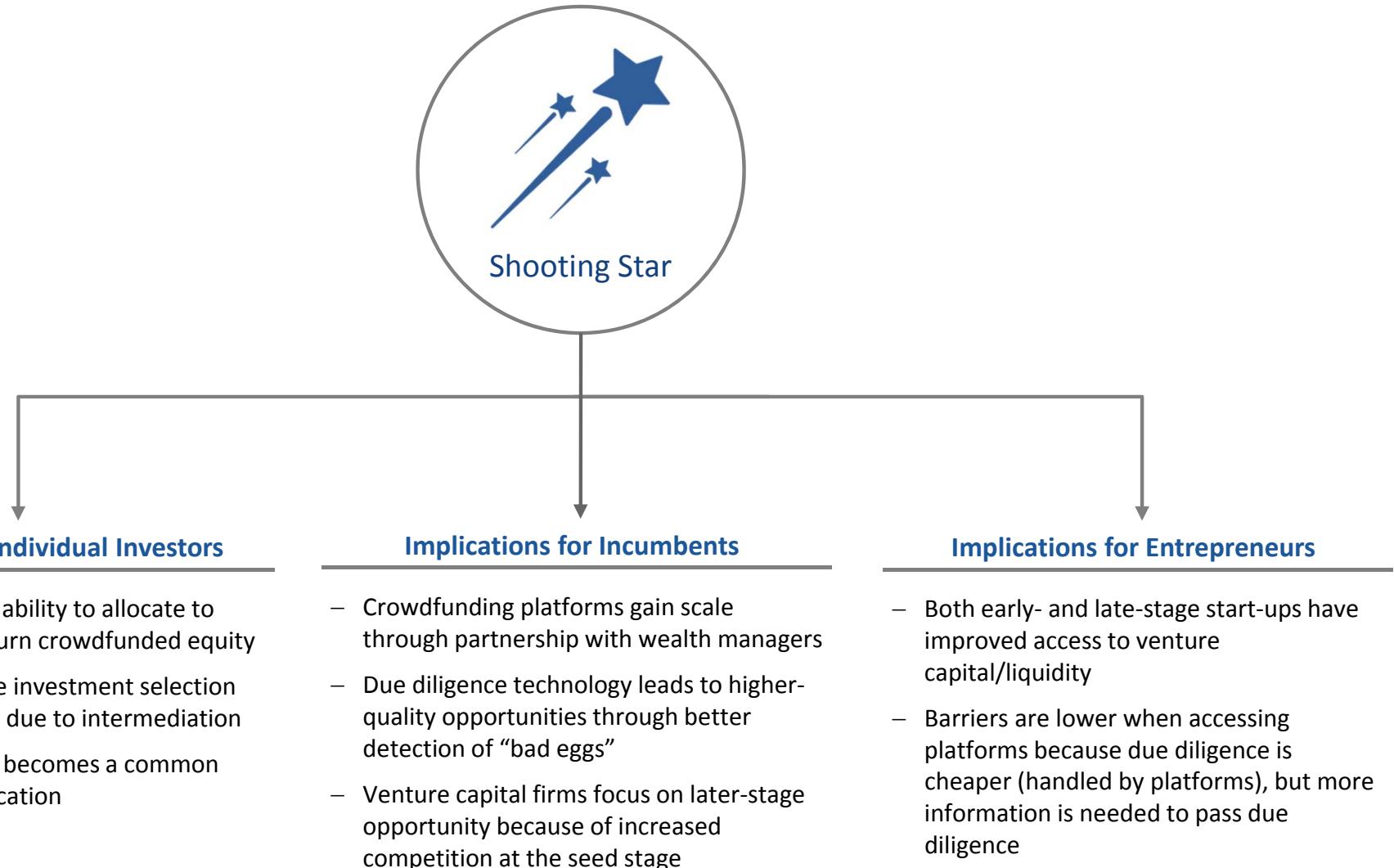
CRITICAL CONDITIONS

- A prolonged low-return environment leads wealth managers to look for other higher-yield opportunities
- Technology start-ups develop advanced analytics tools that help wealth managers perform due diligence
- Platforms demonstrate some early successes and build track records
- Regulators accept partnerships with wealth managers

EARLY SIGNS

- Early tentative partnerships between wealth managers and platforms are successful
- Technology start-ups emerge that focus on improving the early-stage due diligence process

Crowdfunding plays an increasingly large role for seed stage funding, but individual investors only interact with crowdfunding through their wealth managers



Key takeaways for financial institutions

1

IMPROVED LIQUIDITY AT SEED STAGE

Leading crowdfunding platforms will increase the amount of seed-stage funding available to entrepreneurs, thus filling a valuable niche in the fundraising ecosystem, especially in parts of the world with less venture capital investment

2

REGULATOR BALANCE

Regulation plays a significant role in shaping the equity crowdfunding industry across all possible end states, whether crowdfunding platforms go direct to consumers or partner with incumbents. Regulators must balance encouraging crowdfunding and ensuring adequate due diligence

3

INTEGRATION WITH BROADER FINANCIAL ECOSYSTEM

In order to achieve a sustainable level of scale, equity crowdfunding platforms will need to grow their scope of funding through integration with the broader financial ecosystem (e.g. incorporation into wealth management platforms) and will need to establish secondary markets with sufficient liquidity

Note: Due to their relative recency, ICOs were not in the scope of this initiative, but they represent a new mechanism for crowdfunding that warrants further research

References

1. "Crowdfunding tops private equity investments for 2016, with Seedrs leading the charge". *Seedrs Blog*. Retrieved from <https://www.seedrs.com/learn/blog/crowdfunding-tops-private-equity-investments-for-2016-with-seedrs-leading-the-charge>
2. "AngelList FAQ". *AngelList*. Retrieved from <https://angel.co/help>
3. Proprietary analysis by Casey Quirk
4. "Some Simple Economics of Crowdfunding". Ajay Agrawal, Christian Catalini and Avi Goldfarb, in *Innovation Policy and the Economy*, Vol. 14, from the National Bureau of Economic Research. Retrieved from <http://www.nber.org/chapters/c12946.pdf>
5. "CrowdEngine First to Offer Regulation CF Crowdfunding Software". *CrowdFundingBeat*. Retrieved from <http://crowdfundbeat.com/2016/05/14/crowdengine-first-to-offer-regulation-cf-crowdfunding-software/>
6. "Understanding Crowdfunding and its Regulations". *European Commission*. Retrieved from <http://publications.jrc.ec.europa.eu/repository/bitstream/JRC92482/lbna26992enn.pdf>; "Equity Crowdfunding in China: Current Practice and Important Legal Issues". *The Asian Business Lawyer*, Vol. 18. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2842752
7. "Will investing in BrewDog ever make you money?". *The Telegraph*. <http://www.telegraph.co.uk/business/2016/04/09/will-investing-in-brewdog-ever-make-you-money/>
8. "SyndicateRoom FAQ". *SyndicateRoom*. Retrieved from <https://www.syndicateroom.com/faqs>
9. "Valuations In Crowdfunding: Are We All Barking Mad?". *Forbes*. Retrieved from <https://www.forbes.com/sites/goncalodevasconcelos/2015/05/27/valuations-in-crowdfunding-are-we-all-barking-mad/#47d493665424>
10. "Crowdcube Plans Secondary Market For Equity Crowdfunding". *Forbes*. Retrieved from <https://www.forbes.com/sites/davidprosser/2016/07/21/crowdcube-plans-secondary-market-for-equity-crowdfunding/#6885227e2991>
11. "BlackRock to Invest in iCapital Network". *Business Wire*. Retrieved from: <http://www.businesswire.com/news/home/20161215006121/en/BlackRock-Invest-iCapital%C2%AE-Network>
12. "Where are they now 2016". *AltFi Data*. Retrieved from http://www.altfi.com/download/Where_are_they_now_2016

Section 3.7

Market Infrastructure

Market infrastructure has greatly evolved in the last several years. This section examines the key trends shaping the industry and the uncertain path forward

The first half of this decade saw the beginning of rapid change in the infrastructure underlying capital markets, with the global entry of several innovative forces that had the potential to change how transactions were conducted

CIRCA 2015, THE MAJOR FORCES IMPACTING MARKET INFRASTRUCTURE WERE ...

Capital Requirements



Basel III capital requirements challenged the engagement models of traditional sell-side firms

New Platforms



Technologically enabled platforms were starting to appear in traditional over-the-counter-driven markets

Market Regulations



Led by Europe, many regions implemented additional controls around the exchange of assets

CIRCA 2015, THE BIG UNCERTAINTIES ABOUT THE FUTURE OF MARKET INFRASTRUCTURE WERE ...

How would electronic platforms develop, and what assets would be electronified?

What effect would continued regulation have on the development of new trading tools?

How would incumbents seek to respond to new technologies used by start-ups?

Note: In this chapter, a "platform" is an electronic environment that facilitates trading of financial products by offering one or more services along the continuum from price discovery to post-trade settlement

The role of platforms in capital markets is growing, if unevenly, but regulatory changes and new technology will influence their adoption and capabilities

WHERE DISRUPTION OCCURRED

- A Traditional over-the-counter (OTC) products continue their journey towards electronification, driven by regulation and the promise of improved economies of scale
- B The efforts of electronic platforms to scale up are complicated by an uncertain and regionally fragmented regulatory environment and political instability
- C Market infrastructure providers are disrupting themselves to preserve a pivotal role in future processes and unlock new revenue streams

WHERE DISRUPTION DID NOT OCCUR

- D New market platforms have rarely challenged incumbents, and instead see joint ventures and partnerships as the most successful path to scaling up

Traditional OTC products continue their journey towards electronification, driven by regulation and the promise of improved economies of scale

The electronification of traditional OTC asset classes (e.g. fixed income), has continued in recent years, following the path of equity markets. However, this process has been uneven with some product types moving away from OTC faster than others

SUPPORTING EVIDENCE



Data and Standardization

Platforms are collecting demand/supply data to create an aggregated market view and aid discovery of suitable counterparties, and are even providing additional market analytics to better inform buyers, sellers and intermediaries. However, securing data standards and cross-platform interoperability remains key to avoid fragmentation and secure liquidity during the electrification process



Regulatory Push

Some post-financial crisis regulations have required particular asset classes to move their trade and post-trade processes to trading platforms (e.g. interest rate swaps). Other regulations have provided indirect nudges towards trading platforms, such as the European Union's Second Markets in Financial Instruments Directive (MiFID II), increasing the cost of traditional OTC trading under the best-execution imperative



Asset Class Characteristics

Certain asset classes have characteristics that naturally make them better suited for trading platforms. Products that are relatively homogenous and have low trade sizes are particularly good fits for trading platforms, and have migrated quickly. Asset classes that lack those characteristics have struggled to reach a critical mass of supply and demand on the marketplace level

Traditional OTC products continue their journey towards electronification, driven by regulation and the promise of improved economies of scale (continued)

CASE STUDIES



Bet on bond electronification

In July 2017, Deutsche Börse Group has bought a \$10m stake in Trumid, a young bond trading platform. Trumid's platform focuses on bringing electronic trading to corporate debt, an asset class where most trading today is still conducted over the phone¹.

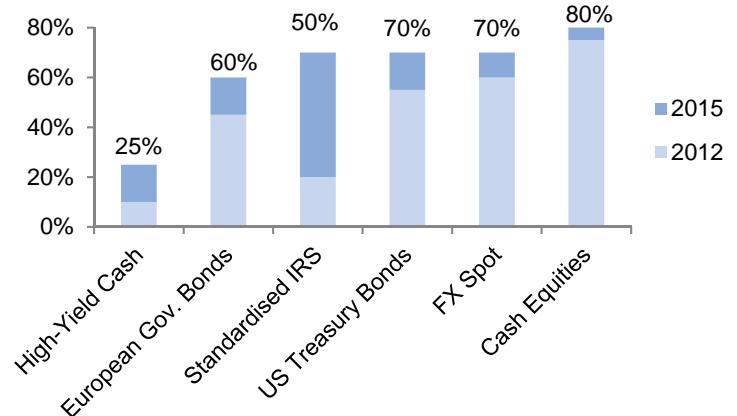
Bloomberg

Move into regulated trade execution

Bloomberg is in the final stage of shifting trading in cash bonds and derivatives from its existing AllQ platform to the Bloomberg Trading Facility, which launched in 2015 and is the company's first regulated European venue.² The AllQ platform accounted for 37% of European government bond trades in late 2016.

QUANTITATIVE EVIDENCE

Electronification of Various Asset Classes (%)³



The level and growth of electronification across asset classes varies considerably

KEY UNCERTAINTIES

While the move to electronic platforms has been uneven, it will likely continue in the push for transparency and liquidity

1

How can stronger cross-platform cooperation be achieved to further improve access tools and standardize "market language"?

2

Will regulators further expand the scope of asset classes which need to be traded via electronic trading platforms?

3

Can buy-side firms adjust to the requirements of direct platform access, disintermediating the sell-side?

The efforts of electronic platforms to scale up are complicated by an uncertain and regionally fragmented regulatory environment and political instability

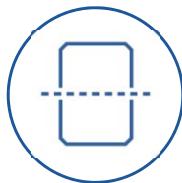
Post-financial crisis regulation has generally upheld the themes of cross-border equivalence, transparency and capital efficiency, all of which support the electronification of trading; however, recent events are calling this trend into question

SUPPORTING EVIDENCE



Post-Crisis Regulation

Platforms have been able to achieve scale quickly in the last few years by taking advantage of regulatory reforms (such as MiFID, or Dodd-Frank in the United States) that were enacted in response to the financial crisis. As the crisis becomes a relic of the past, regulatory bodies around the world are starting to revisit financial crisis-era policies



Political Instability

The widespread political uncertainty that enveloped many developed markets post-2016 has introduced new risks to capital markets, slowing investments as financial institutions wait for clear signals on the priorities of newly formed governments



Regionalization

The global regulatory trend over the last few decades has been one of increasing global interconnectivity and standardization, which benefitted platforms' journeys to scale. However, due to geopolitical factors and the regionalization of financial ecosystems, the trend for the future is likely to be regionalization of regulatory policies

The efforts of electronic platforms to scale up are complicated by an uncertain and regionally fragmented regulatory environment and political instability (continued)

CASE STUDIES



New regulatory path

At the 2017 Annual International Futures Industry Conference, J. Christopher Giancarlo, Acting Chairman of the US Commodity Futures Trading Commission, laid out the future agenda of the regulatory body by emphasizing the need to right-size the regulatory footprint, particularly with respect to the Dodd-Frank Act.⁴ He laid out the main objective as the reduction of excessive regulatory burdens.

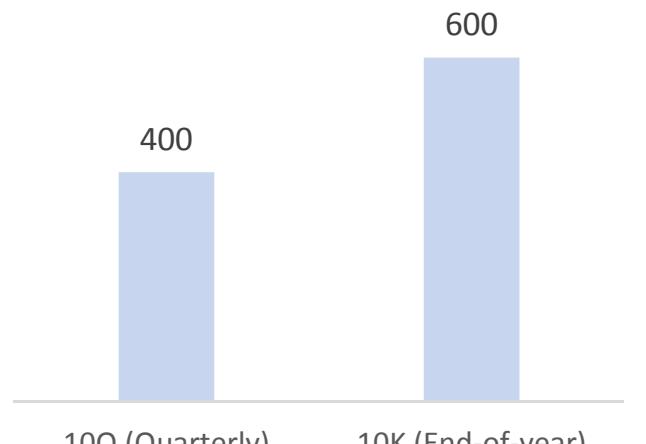


Political-derived uncertainty

The impact of Brexit on capital markets is still unclear. Several EU regulators have indicated⁵ they will not allow brokers based outside the European Economic Area (including a post-Brexit United Kingdom) to offer third-country end users electronic access to exchanges residing under the European Union's jurisdiction.

QUANTITATIVE EVIDENCE

Number of Brexit-Related Risks in Major Company Disclosures, 2016⁶



Growth of political instability as a major issue

KEY UNCERTAINTIES

The exact impact of a regulatory pivot on capital market economics is very difficult to predict, but will likely have a large (if localized) effect

1

Will regulatory protection, in particular in the United States, trigger a global regulatory competition?

2

Will freed-up capital flow back into old business models, or will it contribute to further platform innovation?

3

How does regional fragmentation reshape the business models of platform providers?

Market infrastructure providers are disrupting themselves to preserve a pivotal role in future processes and unlock new revenue streams

The industry has long known the potential benefits of disruptive technologies, such as AI and distributed ledger technology (DLT), and has started to invest in the development of new business models around those technologies

SUPPORTING EVIDENCE



Erosion of Margins

As technological improvements lower economies of scale, the profitability of operating a utility is declining. Additionally, utilities are under pressure from a prevailing low interest rate environment and increasing capital costs, causing them to explore new profit opportunities



Data and Data Flow as Key Resources

As profitability in core businesses erodes, the data flows of incumbent market infrastructure providers could create new sources of revenue. However, doing so will require extensive industry cooperation between different data providers, including complementary infrastructure and data-sharing agreements



Value Chain Disruption Capabilities

New technology could lead to significant changes in the architecture of capital markets by enabling real-time processes and more direct connectivity. This could drive the elimination of many existing roles and the creation of new ones, upending the traditional value chain

Market infrastructure providers are disrupting themselves to preserve a pivotal role in future processes and unlock new revenue streams (continued)

CASE STUDIES



Infrastructure improvements

The Depository Trust & Clearing Corporation (DTCC) is using blockchain technology to rebuild its platform responsible for processing \$11 trillion worth of credit default swaps. The new platform will aim to align processing including execution and risk management along the trade life-cycle, so as to make usage and reconciliation of multiple databases obsolete.⁷

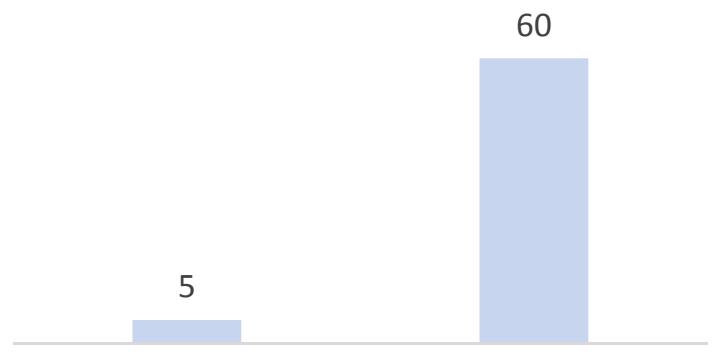


Betting on blockchain

In June 2017 Thomson Reuters launched BlockOneIQ, a “smart oracle” that provides users with cryptographic proof of the source of external securities pricing data – a perquisite for many “smart contract” use cases of blockchain in financial services. The product is one in a suite of potential opportunities currently being explored to provide enabling services for those use cases⁸

QUANTITATIVE EVIDENCE

Revenue Growth for Major US Exchanges, 2009-2015 (%)⁹



Growth in information-related revenues

KEY UNCERTAINTIES

New revenue models are emerging, but unlocking – and profiting – from them will require co-operation and time

1

How far away are new technology-enabled business lines from applicability, scalability and maturity?

2

Will disruption attract capital-heavy technology firms like IBM or Google to the areas of market data and infrastructure?

3

What are prerequisites for regulatory buy-in to new business models around disruptive technologies?

Sources: 7. Forbes 8. Thomson Reuters 9. Business Insider

New market platforms have rarely challenged incumbents, and instead see joint ventures and partnerships as the most successful path to scaling up

Many fintechs have entered the trading platform area (23 new corporate bond platforms alone between 2010 and 2015), but a review of the survivors suggests that a mix of fintech technological innovation and incumbent scale is the winning bet

SUPPORTING EVIDENCE



Monoline Challenges

Trading platforms with a narrow asset class or value chain focus (i.e. most start-ups) are struggling to meet the needs of incumbents, who operate in many differentiated markets and thus look for efficiency and cross-product synergies from their platforms



Incumbent Adaptation

Incumbent banks, brokers and platform providers can use available resources (both talent and financial) and the industry's high switching costs to their advantage. Rather than adopt fintech solutions, they can either develop their own or acquire promising start-ups to bridge the gap



Stickiness

Even when significant efficiencies exist on new trading platforms, two factors have created a strong stickiness for traditional trading methods: the desire of incumbents to limit the integration of new technology platforms due to switching costs, and a reluctance to disturb the complex network of individual and institutional relationships characterizing capital markets



Ongoing Need for Improvement

Incumbents who provide market access to investors remain slow at improving customer-friendly and cost-efficient, technology-driven relationship models due to inertia and a lack of expertise. Therefore, fintechs represent an ideal partner for enriching and improving core technology, as well as continuously improving customer interfaces

New market platforms have rarely challenged incumbents, and instead see joint ventures and partnerships as the most successful path to scaling up (continued)

CASE STUDIES



Expansion of joint venture

In March 2017, Euronext announced the global expansion of its joint venture with fixed-income technology provider Algomi.¹⁰ It will create a network of centralized information venues, turning disparate data into trade opportunities between counterparties yet maintaining the current client-to-dealer market structure.

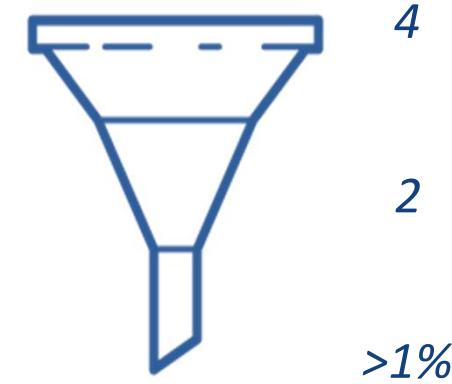
Bondcube

Monoline platform failure

In 2015, Bondcube, an electronic fixed-income trading system that had just received regulatory approval to trade in Europe, filed for liquidation. According to the chief executive officer, liquidity was not the problem, but Bondcube lacked the capability to “follow through from converting matches into trades”.¹¹

QUANTITATIVE EVIDENCE

Development of US Fintech-Run Swap Execution Facilities (SEFs)¹²



SEFs launched in 2013 by fintechs

SEFs launched by fintechs still operating

Fintech SEF market share

Fintechs have struggled to capitalize on the regulatory drive towards SEFs

KEY UNCERTAINTIES

The popularity of joint ventures and partnerships may mean that future market infrastructure development is slower, albeit more predictable

- 1 Should new fintech platforms focus directly on business models around partnering and filling B2B gaps?
- 2 Will the trend towards partnerships lead to further consolidation in the platform universe?
- 3 Can a monoline product offering be a sustainable business model for platforms at all?

Uncertainties around market infrastructure largely concern the future direction of regulation, and the impact of new technologies on the industry

1 WHAT WE KNOW

The four market infrastructure findings illustrate the increasing role of platforms in capital markets. Traditional OTC products are becoming more and more electronified, but are hindered in their efforts to scale up due to fragmented regulatory and technological environments. In order to scale up and garner success, joint ventures and partnerships between fintechs and incumbents are key.

Through these findings, the following key uncertainties around the future of market infrastructure emerged:

2 UNCERTAINTIES



What will political disruption and potential deregulation mean for platform trading and proliferation?



How will buy-side investor demand for innovation and new business models shape the platform universe?



How far away are disruptive technologies, such as AI and DLT, from applicability and scalability in a production environment?



What will drive the necessary cooperation to embed new business models into the existing ecosystem?



How will disruptive technologies affect the value chain and individual roles in market infrastructure?

3 POSSIBLE FUTURES

The resolution of these five key uncertainties paints three diverging pictures of the future of the market infrastructure industry:



Platform Proliferation



Data-Infrastructure Collision



New Post-Trade Value Chains

Depending on how the key uncertainties are resolved, the potential end states have very different evolutionary paths and implications for all firms

PLATFORM SUCCESS



The first end state paints a world where:

- Market platforms enhance their tools and standardize languages
- Trading in many asset classes becomes easier
- Market participants adopt platforms en masse
- Platforms continue to innovate as usage rises, thus consolidating their market position

DATA-INFRASTRUCTURE COLLISION



The second end state paints a world where:

- Data-focused firms expand within the platform area
- Infrastructure providers leverage information custody to provide data services
- As a result, those players find themselves on a collision course
- Users increasingly have fewer providers for both data and infrastructure

NEW POST-TRADE VALUE CHAINS

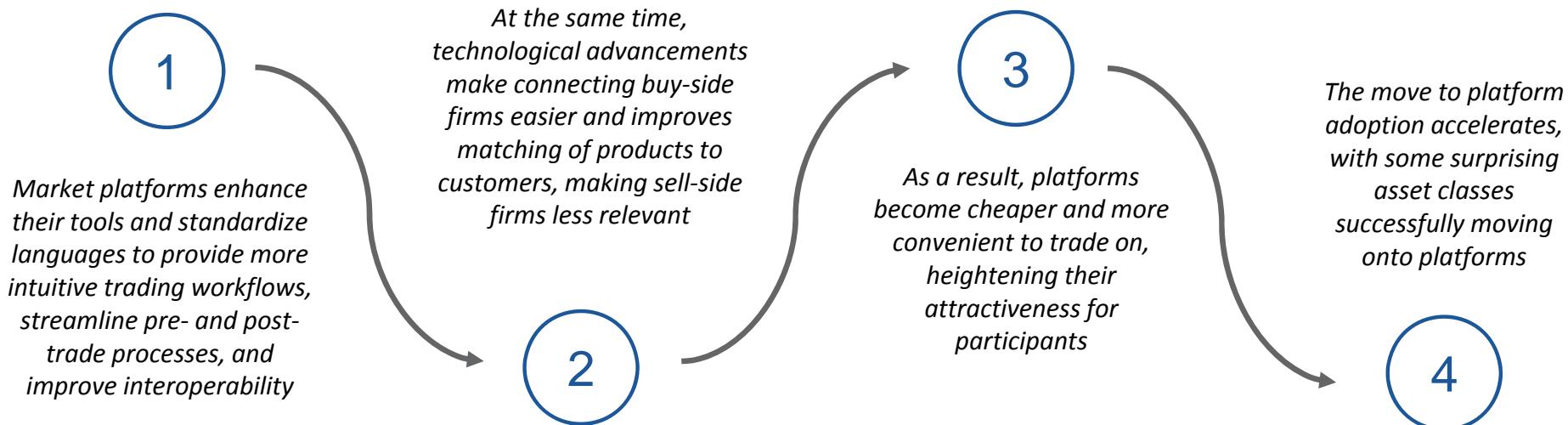


The third end state paints a world where:

- Infrastructure providers disrupt the capital markets value chain
- Improvements (e.g. real-time settlement) lead to new market structures
- Some entities leave the ecosystem while others redefine their role
- Additional resources are freed up by improvements to processes



New platform capabilities, including pre- and post-trade processes, will accelerate their adoption across asset classes



CRITICAL CONDITIONS

- A stable regulatory environment is favourable for market providers
- Buy-side clients adopt and use platforms on a significantly larger scale

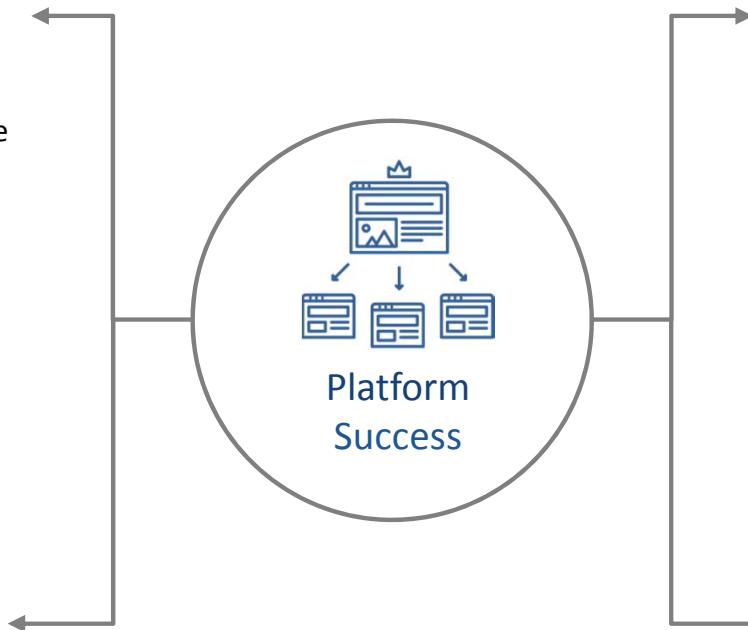
EARLY SIGNS

- Buy-side firms start to partner directly with platform providers
- Increasingly more platforms create significant liquidity in production, as volumes of transactions executed via platforms grow further and for more asset classes

The rise of additional platforms to facilitate trading increases pressure on incumbents to continue to improve, benefiting the buy side

Implications for Incumbent Infrastructure Providers

- More platform usage means incumbents must further develop their existing platform solutions to protect market share
- Alternatively, they could partner with emerging platforms or acquire them



Implications for New Entrants

- Higher platform usage would direct traffic to innovative new entrants, allowing them to gain market share
- More platform usage would also contribute to platform interoperability and multilateral relationships, benefitting new entrants

Implications for Regulators

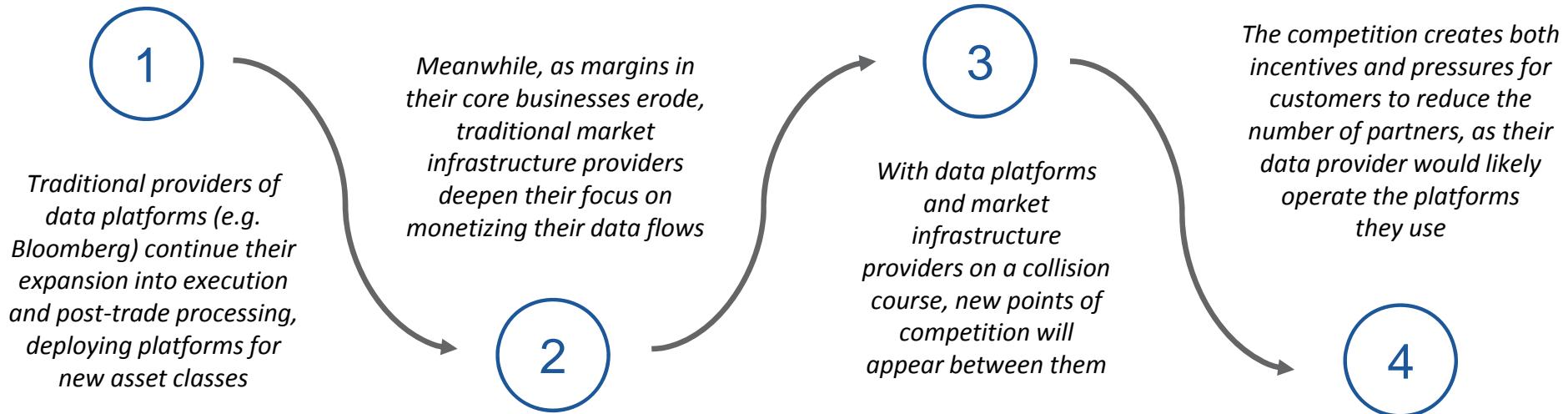
- Regulators would increase their visibility into the market as platform usage grows, allowing for greater tracing of activities

Implications for Buy-Side Customers

- Platforms would allow customers to become less dependent on sell-side participants in the longer term



As infrastructure and data providers encroach on the other's core businesses, customers will likely have to choose between them



CRITICAL CONDITIONS

- The trend towards electronification of asset trading continues, and even increases in pace
- The platform environment remains highly competitive, and pure access to standard products represents a commoditized service
- New technologies can be applied in enhanced data science (e.g. AI) and are coupled with robust monetization strategies

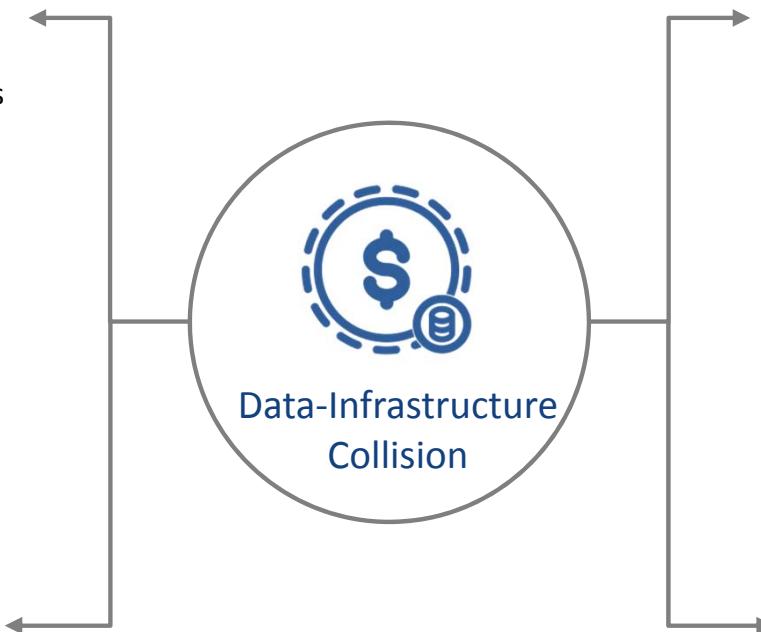
EARLY SIGNS

- Platform infrastructure providers start focusing on hiring employees with a data background
- Data and/or platform providers start offering customers incentives to use their company for trading and data

Customers may have additional choice regarding partnerships, leading to lower costs, and will likely work with fewer partners

Implications for Incumbent Infrastructure Providers

- Expansion may mean more partnerships with or acquisitions of data-heavy fintechs to acquire competencies
- Regulatory questions may mean more partnerships to ensure easier risk management



Implications for Incumbent Data Providers

- Moving into the infrastructure field may mean new infrastructures with data at their core
- Additional competition may mean more partnerships with or acquisitions of platform fintechs to gain competencies

Implications for Regulators

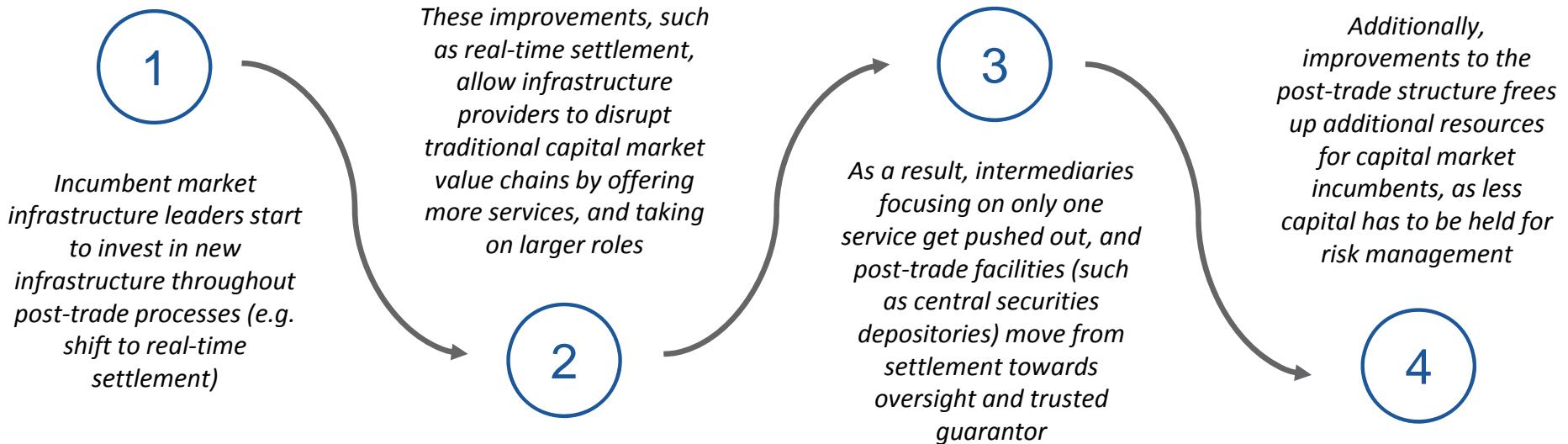
- Additional data means more opportunities to monitor the market
- However, regulators will have to build connections with data providers, an entirely new set of constituents

Implications for Buy-Side Customers

- Additional service providers may mean lower prices and additional benefits, but one provider for both infrastructure and data
- However, the rise of data means some level of acceptance is needed that their data is no longer solely theirs to use



As incumbents invest in market infrastructure improvements, the value chain will naturally shift, leading to consolidation and role changes



CRITICAL CONDITIONS

- Significant investment in new technology by market infrastructure providers moves markets towards real-time and flexible settlement
- Regulators accept new technology-based business models or even ecosystems, embed them into existing regulatory frameworks and define the nature of the relationship to existing ecosystems
- New ecosystems are complementary on an international scale to reflect the global nature of capital markets

EARLY SIGNS

- Investment share in new infrastructure technologies rises constantly over the next five years
- Cooperative models on DLT ecosystems embrace growing numbers of industry stakeholders
- The first distributed ledger system is launched in production by a bank or an exchange organization and linked to post-trade activity

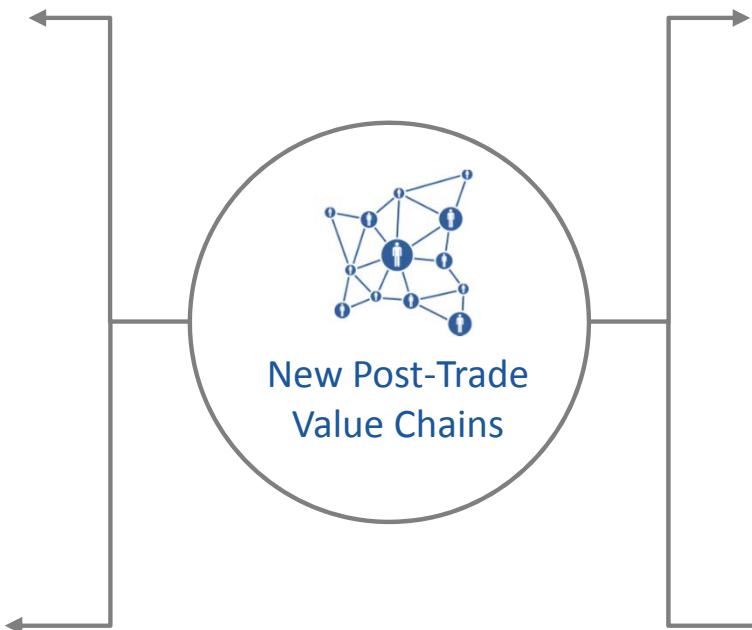
These improvements to the value chain will lead to significant savings for buy-side investors, as cash flow management and risk management costs decline

Implications for Incumbent Infrastructure Providers

- New technologies allow incumbent providers to revamp existing business models, playing a bigger role in the value chain
- The need to offer more services (as they play a bigger role in the value chain) may mean consolidation to acquire expertise
- Ongoing consolidation is likely to result in an increasing number of utilities and consortia, aimed at cost mutualization for non-differentiating and commoditized activities (e.g. KYC or Risk Compliance)

Implications for Regulators

- Improvements, such as real-time settlement, may mean a more difficult role for regulators, as there is less time for review



Implications for Fintechs

- The changes to infrastructure mean that blockchain-related or other real-time focused firms will find many partners
- However, incumbents' ability to own more of the value chain may make it harder for fintechs to gain market share

Implications for Buy-Side Customers

- Improvements to post-trade settlement will allow for simple cash flow management and streamlined operations, increasing profits in the long run

Key takeaways for financial institutions

1

INSUFFICIENCY OF TECHNOLOGY ALONE

New technological solutions alone are insufficient to enable the creation of new market infrastructure or to drive significant changes in existing infrastructure; this will make “minimum viable ecosystems” of cooperating stakeholders critical to development. Leading players from both the public and private sphere will seek to actively participate in and shape the direction of these stakeholder groups

2

NAVIGATING REGULATORY UNCERTAINTY

Differing regulatory direction around the world will likely lead to both regionalization and uncertainty in the short and medium term. Financial institutions will need to develop the flexibility to rapidly adapt to both large-scale regulatory changes and regionally divergent regulatory treatment of emerging-market infrastructure technologies

3

NEW VALUE CHAIN PRESSURES AND OPPORTUNITIES

Regulation and technological advancements are driving efficiencies, which will put pressure on incumbents to consolidate their positions and thus shorten the value chain. Forward-looking firms will seek to position themselves in areas that will continue to add value, including areas currently occupied by other firms

References

1. "Deutsche Börse buys into Soros-backed bond trading platform". *Financial Times*. Retrieved from <https://www.ft.com/content/d32a786a-635a-11e7-8814-0ac7eb84e5f1?mhq5j=e2>
2. "Best Fixed Income Trading Platform". *Financial News*. Retrieved from <http://tt.efnevents.com/shortlist/best-fixed-income-trading-platform/>
3. "Electronic trading in fixed income markets". *Bank for International Settlements (BIS)*. Retrieved from <http://www.bis.org/publ/mktc07.pdf>
4. "CFTC: A New Direction Forward". *US Commodity Futures Trading Commission*. Remarks of Acting Chairman J. Christopher Giancarlo before the 42nd Annual International Futures Industry Conference in Boca Raton, Florida (USA). Retrieved from <http://www.cftc.gov/PressRoom/SpeechesTestimony/opagiancarlo-20>
5. "EU regulators consider Mifid electronic trading lock-out". *Risk.net*. Retrieved from <https://www.risk.net/regulation/mifid/4778566/eu-regulators-consider-mifid-electronic-trading-lock-out>
6. "SEC Disclosure Trends Related to Brexit and the Trump Administration". *Skadden Arps Slate Meagher & Flom LLP*, published on Lexology.com. Retrieved from <http://www.lexology.com/library/detail.aspx?g=3573f703-ddec-483f-a53d-9cba0201634f>
7. "DTCC Partners With IBM, Startups For Blockchain-Based Credit Default Swaps Solution". *Forbes*. Retrieved from <https://www.forbes.com/sites/laurashin/2017/01/09/dtcc-selects-partners-for-blockchain-solution-for-credit-default-swaps/#28c877395061>
8. "Thomson Reuters Releases BlockOne IQ into Blockchain Developer Community". *Thomson Reuters*. Retrieved from <https://www.thomsonreuters.com/en/press-releases/2017/june/thomson-reuters-releases-blockone-iq-into-blockchain-developer-community.html>
9. "There's a new 'hot-button' issue on Wall Street, and battle lines are being drawn". *Business Insider*. Retrieved from <http://www.businessinsider.com/stock-exchanges-market-data-cost-becoming-big-issue-2016-10>
10. "Euronext Invests in Algomi and Expands JV". *Algomi*. Retrieved from <http://www.algomni.com/company-news/euronext-invests-in-algomni-and-expands-jv-1>
11. "Auction Backups and Boring Regulation". *Bloomberg*. Retrieved from <https://www.bloomberg.com/view/articles/2015-07-23/auction-backups-and-boring-regulation>
12. Information retrieved from the FIA Swap Execution Facility (SEF) Tracker <https://fia.org/sef-tracker>

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A Blueprint for Digital Identity

The Role of Financial Institutions in Building Digital Identity



An Industry Project of the Financial Services Community | Prepared in collaboration with Deloitte

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Foreword

Consistent with the World Economic Forum's mission of applying a multi-stakeholder approach to address issues of global impact, the creation of this report involved extensive outreach and dialogue with the financial services community, innovation community, technology community, academia and the public sector. The dialogue included numerous interviews and interactive sessions to discuss the insights and opportunities for collaborative action.

We extend sincere thanks to the industry and subject matter experts who contributed their unique insights to this report. In particular, the members of the Project's Steering Committee and Working Group, who are introduced in the following pages, played an invaluable role as experts and patient mentors.

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Executive Summary

The Blueprint for Digital Identity project is the most recent phase of the Forum's ongoing Disruptive Innovation in Financial Services work

2015

THE FUTURE OF FINANCIAL SERVICES

The Future of Financial Services project explored the landscape of disruptive innovations in financial services, provided the first consolidated taxonomy for these disruptions, and explored their potential impacts on the structure of the industry



2016

BEYOND THE FUTURE OF FINANCIAL SERVICES

This phase of the disruptive innovation work explores two topics with key potential as foundational enablers of future disruption

A Blueprint for Digital Identity: The role of Financial Institutions in building Digital Identity



This project explores the potential for digital identity in financial services and beyond and lays out a blueprint for the implementation of effective digital identity systems

The future of financial infrastructure: An ambitious look at how blockchain can reshape financial services



This project explores the potential for distributed ledger technology to transform the infrastructure of the financial services industry

The mandate of this project was to explore digital identity and understand the role that Financial Institutions should play in building a global standard for digital identity

PROJECT CONTEXT

Identity is a critical topic in Financial Services today. Current identity systems are limiting Fintech innovation and well as secure and efficient service delivery in Financial Services and society more broadly. Digital identity is widely recognized as the next step in identity systems. However, while many efforts are underway to solve parts of the identity challenge and create true digital identity, there is a need for a concerted and coordinated effort to build a truly transformational digital identity system.

This document is intended as a guide for Chief Strategy Officers of Financial Institutions as well as policy makers who are interested in the topic of identity and want to understand the digital identity and their own potential role in the creation of robust digital identity systems.

PROJECT SCOPE

The mandate of this project was to explore identity and its importance in Fintech, Financial Services and in developed societies broadly, the topic of digital identity, and provide a landscape scan of current efforts to build digital identity solutions.

This report will discuss different structures for identity systems and discuss which configurations are best suited to solve different problems, and provide a perspective on the role of Financial Institutions in building digital identity systems.

This report will not focus on the creation of standards around identity; much valuable work has already been done in this space and current developments such as the publication of the European Union eIDAS Regulation are moving the conversation on this front. Nor will it discuss technology solutions. Rather, it will attempt to provide clarity and direction around the structure of identity and provide a call to action for Financial Institutions to move against the identity challenge.

Over 12 months of research we engaged with subject matter experts through interviews and multi-stakeholder workshops

Industry Leaders

Guidance and thought leadership from **12 C-suite executives** and **24 strategy officers** of global financial institutions



Subject Matter Experts

In-person and phone interviews with **100+ subject matter and industry experts**



Global Workshops

Four multi-stakeholder workshops at global financial hubs with 200+ total participants including industry leaders, innovators, subject matter experts, and regulators



Singapore
Oct. 2015



New York, USA
Nov. 2015



London, UK
Dec. 2016



Davos, Switzerland
Jan. 2016



This report synthesizes our findings and presents a Point of View on the role that we see for Financial Institutions in digital identity

PROJECT OUTCOMES

Our Perspective: The Role of Financial Institutions in Digital Identity

How should Financial Institutions engage with digital identity? What role can they play in the development of digital identity solutions?

1 Introduction

What is the global identity challenge, and what problems does it pose for Financial Institutions?

2 Digital Identity Primer

What is the purpose of identity systems, and why is digital identity the solution to the global identity challenge?

3 The Landscape of Digital Identity

What do efforts to build digital identity systems look like globally?

4 The Right Solution to the Right Problem

How should digital identity systems be constructed to serve different needs?

5 Benefits of Digital Identity

Who stands to benefit from the introduction of digital identity systems?

6 Implementation

How do you reach a global digital identity solution?

The Role of Financial Institutions in Digital Identity

Current identity systems place major limitations on Fintech innovation

Lack of digital identity limits the development and delivery of efficient, secure, digital-based Fintech offerings

Identity is currently a critical pain point for Fintech innovators. Many of these innovators are trying to deliver pure digital offerings, but the process of identifying users consistently forces them to use physical channels. These Fintech innovators now see the development of a new generation of digital identity systems as being crucial to continuing innovation and delivering efficient, secure, digital-based Fintech offerings.

Examples

Payments

Payments require validation of ACH information, meaning that digital payments innovators must either require users to provide identity information through pseudo-digital channels (such as by photographing their driver's license) or act as platforms on top of established Financial Institutions and rely on their KYC processes



Loans

Evaluating customer risk and issuing loans requires validation of basic customer information, requiring innovators to gather information from users, again through pseudo-digital channels such as photographing existing ID or gathering trusted information from an existing source, and therefore decentralizing a central piece of the product offering



Digital identity is a critical enabler of activity inside Financial Services broadly

Digital identity would allow FIs to perform critical activities with increased accuracy over that afforded by physical identity, and to streamline and partially or fully automate many processes

Identity is also central to the broader financial services industry, enabling delivery of basic financial products and services. Reliance on physical identity protocols introduces inefficiency and error to these processes. Digital identity has great potential to improve core financial services processes and open up new opportunities.

Examples

Operational decisions

Traditional FS offerings such as insurance and credit and well as customer experience such as contact centers and collections rely on accurate and detailed knowledge of the customer



Regulatory compliance

FIs are required to comply with strict regulation on identifying their customers and are liable for mistakes and inaccuracies



Customer experience and product delivery

Improved knowledge of customer preferences and habits can help FIs deliver radically better customer experience (e.g., tailor authentication requirements based on behaviour)



The relevance of digital identity stretches beyond Financial Services to society as a whole

Identity enables many societal transactions, making strong identity systems critical to the function of society as a whole

Physical identity systems currently put users at risk due to overexposure of information and the high risk of information loss or theft; they also put society at risk due to the potential for identity theft, allowing illicit actors to access public and private services. Digital identity would streamline and re-risk completion of these public and private transactions.

PUBLIC TRANSACTIONS



Entities are required to prove their identities or certain attributes to demonstrate their eligibility for public services

Examples

- *Access to social assistance (e.g., old age security, unemployment insurance)*
- *Access to education*
- *Access to healthcare*
- *Access to civic structures (e.g., voting)*

PRIVATE TRANSACTIONS



Entities are often required to prove their identities or certain attributes to participate in private transactions

Examples

- *Many basic merchant transactions (e.g., buying alcohol)*
- *Large private provider transactions (e.g., renting an apartment, buying a car)*

The need for digital identity is becoming increasingly pressing

Five key trends are increasingly the need for efficient and effective identity systems:

1



Increasing transaction volumes

The number of identity-dependent transactions is growing through increased use of the digital channel and increasing connectivity between entities

2



Increasing transaction complexity

Transactions increasingly involve very disparate entities without previously established relationships (e.g., customers and businesses transacting cross-border)

3



Rising customer expectations

Customers expect seamless, omni-channel service delivery and will migrate to services that offer the best customer experience

4



More stringent regulatory requirements

Regulators are demanding increased transparency around transactions, meaning that FIs require greater granularity and accuracy in the identity information that they capture and are increasingly being held liable for inaccurate or missing identity information

5



Increasing speed of financial / reputational damage

Bad actors in financial systems are increasing sophisticated in the technology and tools that they use to conduct illicit activity, increasing their ability to quickly cause financial and reputational damage by exploiting weak identity systems

However, identity is a multi-layered problem making the creation of digital identity systems complex

Each layer of identity serves a different purpose, and suffers from a distinct set of problems in today's identity landscape

GOALS

Providing efficient, effective and seamless services to users

Provisioning what services users are entitled to access based on their attributes

Providing mechanisms for exchanging attributes between parties

Providing mechanisms for linking users to attributes

Capturing and storing user attributes

Developing standards to govern system operation

PROBLEMS

Inefficient or unsuited service delivery

Complex authorization rules and relationships

Insecure and privacy-compromising attribute exchange

Weak or inconvenient authentication

Inaccurate or insufficient attribute collection

Lack of coordination and consistency

Service Delivery

Authorization

Attribute Exchange

Authentication

Attribute Collection

Standards

There are currently many distinct gaps in the digital identity landscape



1. Confusing authentication with identity

Many efforts today focus on authentication as a solution to the identity challenge without addressing the strength of the underlying attribute collection and authorization processes

- *Authentication technology solutions, while valuable, rely on preexisting onboarding and attribute collection processes*
- *Authentication solutions provided by global technology platforms are convenient for users but do not provide security or verification of the identity behind an account or username*



2. Enabling transaction completion rather than user activity

Many solutions are driven by the goals and perspectives of a single organization and therefore are designed to serve the needs of particular transactions rather than the broader needs of users

- *eGovernment solutions are intended to make government service delivery to users more efficient, and do not enable further transactions in which users might want to participate*
- *Transaction-focussed solutions result in the repeated collection of 'tombstone' data rather than effective collection of user-centric and risk-relevant data such as transaction habits*



3. Building consensus rather than driving action

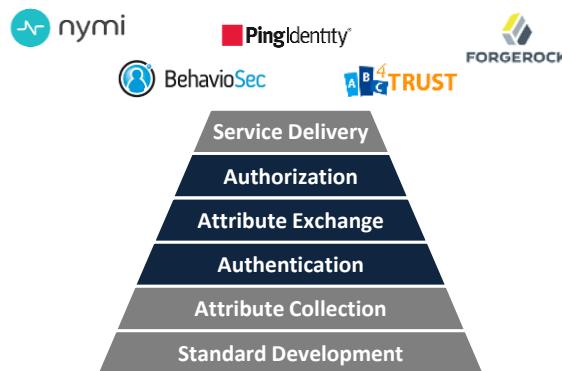
Many efforts focus on building agreement around standards and processes rather than creating a full identity solution and therefore do not result in private sector-implementable solutions

- *Utilities and standards organizations are focussed on creating consensus and a standardized view of data, rather than providing a full identity solution*
- *Multi-governmental efforts have considerable scale but are mainly focussed at the regulatory level, and do not offer a commercially viable solutions*

These gaps are a result of the crowded digital identity landscape, with many different entities building solutions

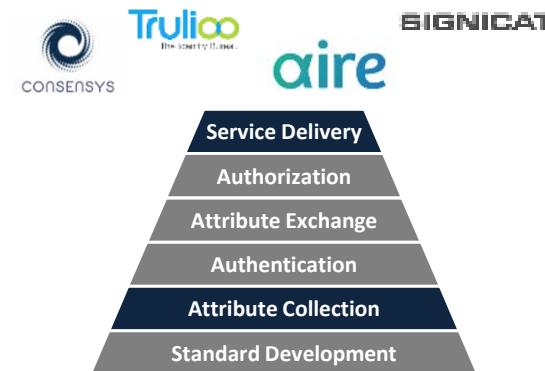
Technology solution providers

Technology solution providers focus on point solutions for authentication, attribute exchange or identity management for enterprises



Private Service Providers

Private service providers focus on collecting the attributes they themselves need to provide specific services to users



Global technology companies

Global technology companies act as platforms to authenticate users to a wide variety of other service providers



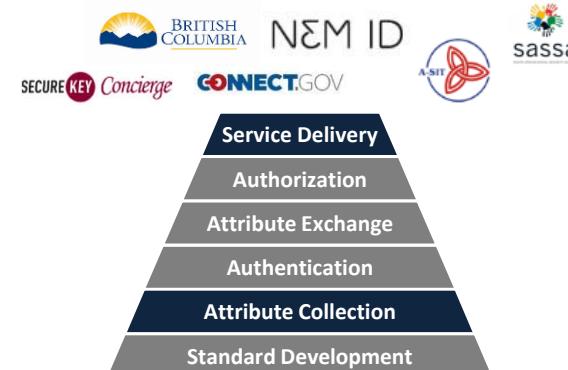
Industry Bodies

Industry bodies focus on standardizing and centralizing the collection of attributes within that specific industry



Governments

Governments focus on the provision of identity to their citizens, and providing citizens with services based on these attributes



Standards Organizations

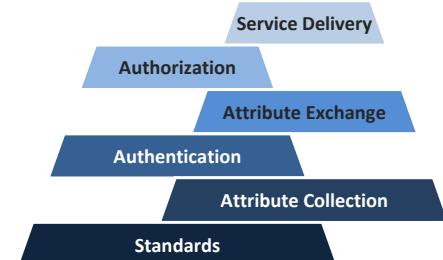
Standards organizations focus on frameworks and guidance for developing identity systems



There is an opening for new digital identity systems that can deliver scope and scale

While many ongoing efforts, such as new authentication solutions, are critical to building digital identity, there is a core need for a strong system will enable effective action against each layer of the stack

The entire stack does not need to be provided by a single entity – some components may be modular – but the entire stack must be effective and integrated to provide digital identity systems that have certain critical features



Critical characteristics of a strong identity system

1 Operationally effective

The system allows digital transactions to be completed conveniently and effectively

2 Scope & scale

The system enables large volumes of transactions through provision of transaction-critical attributes and connecting large numbers of users with important and frequently used service providers

3 Security

The system prevents user information from being overexposed, lost or stolen

4 User control & privacy

The system allows users to determine where their information is held and when it is shared or exposed

5 Viability

The system delivers value to all stakeholders, creating broad support and uptake and making it a commercially viable system

Financial Institutions are well positioned to drive the creation of digital identity systems

Financial institutions are exceptionally well positioned to drive identity systems that fill the gaps left by current efforts

STRUCTURAL

- 1** FIs already act as **stores of customer attributes** for their own commercial purposes, and therefore are positioned to act as identity providers without extensive incremental effort
- 2** FIs are one of very few types of institutions that can **verify user information**; they already perform this function for commercial and regulatory purposes
- 3** FIs are **incentivized to collect accurate user information** for their own commercial purposes
- 4** FIs have **proven executional ability** to develop new systems and standards (e.g., Interac) that have been widely adopted and effectively used within the private sector
- 5** The FS industry has near-complete **coverage of users** (people, legal entities, and assets) in developed economies
- 6** Global FIs have interconnected **operations across multiple jurisdictions**, giving them a structural advantage in enabling cross-jurisdictional identity transactions and systems

POSITIONING

- 1** FI operations and use of customer data are **rigorously regulated**
- 2** FIs act as **established intermediaries** in many transactions and are therefore well positioned to act as identity intermediaries
- 3** FIs are typically **trusted by consumers** beyond other institutions to be safe repositories of information and assets

There is a strong business case for Financial Institutions to lead the development of digital identity systems

FIs could derive substantial benefit from investing in the development of digital identity solutions. We have categorized these benefits into three categories: efficiency / cost avoidance, new revenue opportunities & brand enhancement, and transformational future state opportunities



Efficiency / Cost Avoidance

Opportunities to streamline current processes, increase automation, and reduce error and human intervention



New Revenue Opportunities

Opportunities to create new revenue streams from new products and services, and to increase the positive recognition of the brand



Transformational Future State Opportunities

Opportunities to stretch outside of core business and capabilities to create transformational new business models and reach new customers

Financial Institutions could benefit from basic efficiency improvements and cost avoidance...



Efficiency / Cost Avoidance



Process streamlining & automation

Streamline and improve onboarding and compliance processes through access to a reliable and consolidated digital view of user attributes, minimizing RFIs and information remediation due to inaccuracy and human error



Improved service delivery

Provide increasingly tailored products and services to customers by leveraging non-traditional attributes
Improve process efficiency and increase STP by automating processes through use of standardized, reliable digital data



Improved customer experience

Improve customer experience by leveraging a variety of user attributes to better understanding the customer's needs and preferences



Improved risk assessment & scoring

Improve risk assessment and reduce fraud by creating more holistic and accurate customer risk profiles to inform suspicious transaction monitoring, insurance payouts, and provision of credit- and risk-based products

Develop new revenue streams...



New Revenue Opportunities



New financial products & services

Offer new products and services based on increased knowledge of customers (e.g., extended financial advisory, new insurance products such as insurance on fractionally owned assets and behaviour-based insurance)



Identity-as-a-service

Offer identity as a service to relying parties who cannot or do not wish to store customer information



Identity-only customers

Offer identity as a separate, fee-based service for individuals who do not otherwise transact with that FI

... and stretch beyond current business and markets to fundamentally transform their businesses



Transformational Future State Opportunities



Allocation of liability

Shift the liability for incorrect information, and the outcomes of holding this information, from Financial Institutions to other entities in the network (e.g., users through approval and consent requirements)



Trust brokerage

Act as a 'broker of trust' in previously trustless interactions between disparate parties in multiple industries, expanding the reach of FIs beyond the FS industry and reaching new profit pools



Disruption of the credit bureau model

Evaluate customer creditworthiness based on accurate identity data including preferences and financial history rather than relying on third parties and the mining of multiple different data sources



Refocussing around the customer

Refocus business around customer service, assisting with day-to-day decisioning and blurring the lines between financial and non-financial advisory



Public sector partnerships

Become the trusted identity provider of the public sector, assisting with social services and civic requirements such as tax filing

We are calling on FIs to champion the development of digital identity systems

FIs should champion efforts to build digital identity systems, driving the building and implementation of identity platforms through the creation of minimum viable digital identity systems

Requirements of a minimum viable identity system

1 Identity provision

Identity provider(s) that hold trusted information and have coverage over a critical mass of users within their target area, and can therefore serve a large number of users and transactions

2 High-transaction volume attributes

Secure storage of verified attributes that are required for common transactions (inherent attributes such as name, date of birth, nationality, national identifier number, and some assigned attributes such as address)

3 Relying party adoption

Involvement of relying parties that offer important and frequently used user-facing services

4 Technology platform

A technology platform that enables secure attribute exchange between identity providers and relying parties with a convenient user consent mechanism (e.g., operates on mobile and desktop)

5 System standards

Supervisory & liability standards that guide operation and use of user information in the system and provide liability and user recourse

6 Legal & regulatory acceptance

Legal & regulatory acceptance for using third-party verified information, attribute exchange and external use of user information

FIs could take several different approaches to creating identity systems

There are different configuration options for the development of digital identity systems, each with advantages and drawbacks



Single-Institution

Global institutions could create internal systems that stretch across the jurisdictions in which they operate

This would enable quick implementation but a single institution would likely have difficulty in gaining a critical mass of users, limiting its ability to drive system adoption and integration of relying parties



Consortium

Consortiums of financial institutions could form networks that cover large, contained oligopoly economies (such as Canada or Australia)

A consortium requires a high degree of collaboration among parties but is an effective method of getting complete coverage over a user group

Consortiums are well suited to provide identity for individuals as data storage is not centralized, increasing privacy and system resilience



Utility

Financial Institutions could create industry utilities to deliver identity services across the industry

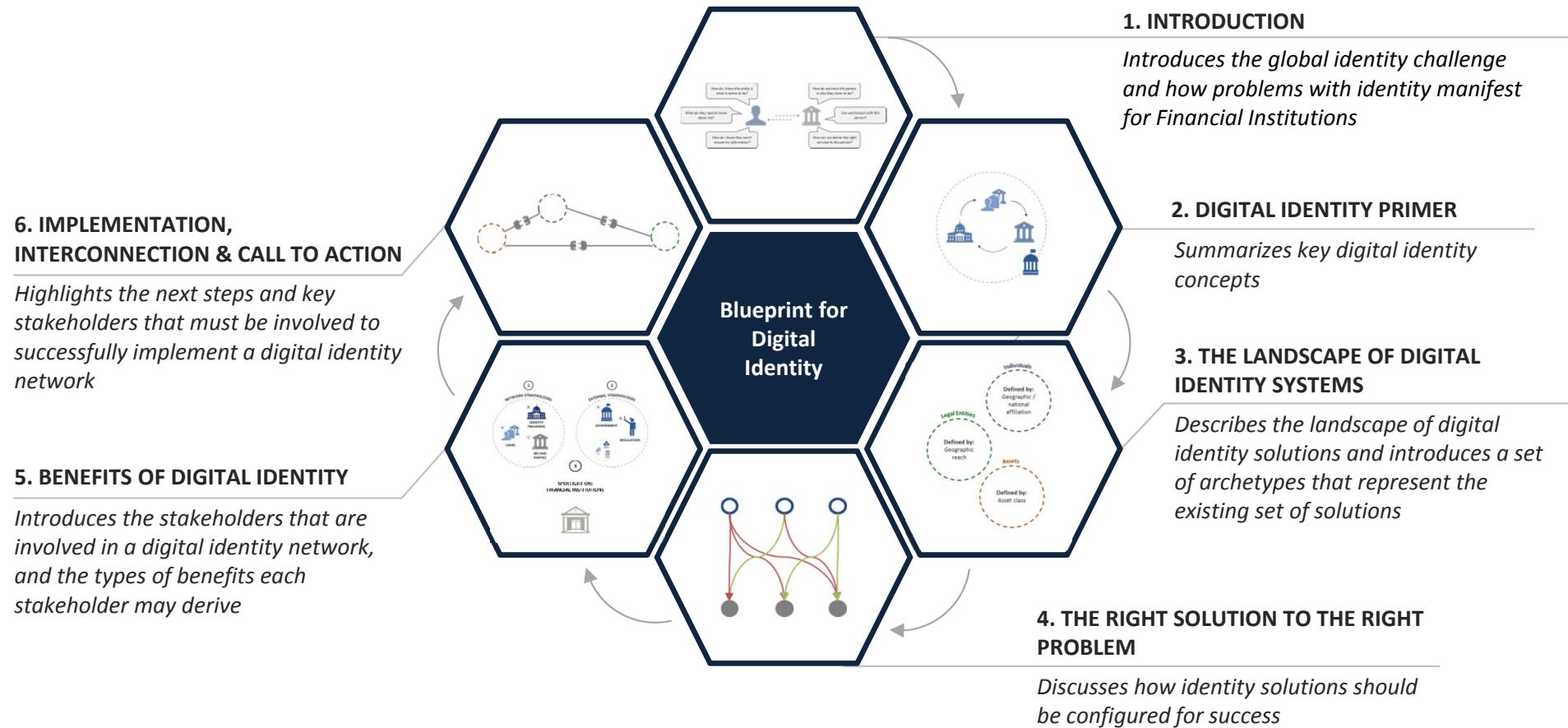
This model is effective in creating standardization and broad coverage, but implementation may be difficult due to the involvement of many different stakeholders

Utilities are a good model for legal entity and asset identity because they provide a standardized view and golden record of information

This report will provide guidance on constructing effective and robust digital identity systems while avoiding implementation pitfalls

Implementation of identity systems is extremely sensitive and therefore easy to get wrong; situational, operational and cultural factors all have important implications for identity systems, and implementation or operational failure has extremely negative consequences for both the drivers of identity system (e.g., wasted resources) and for users (e.g., data breaches).

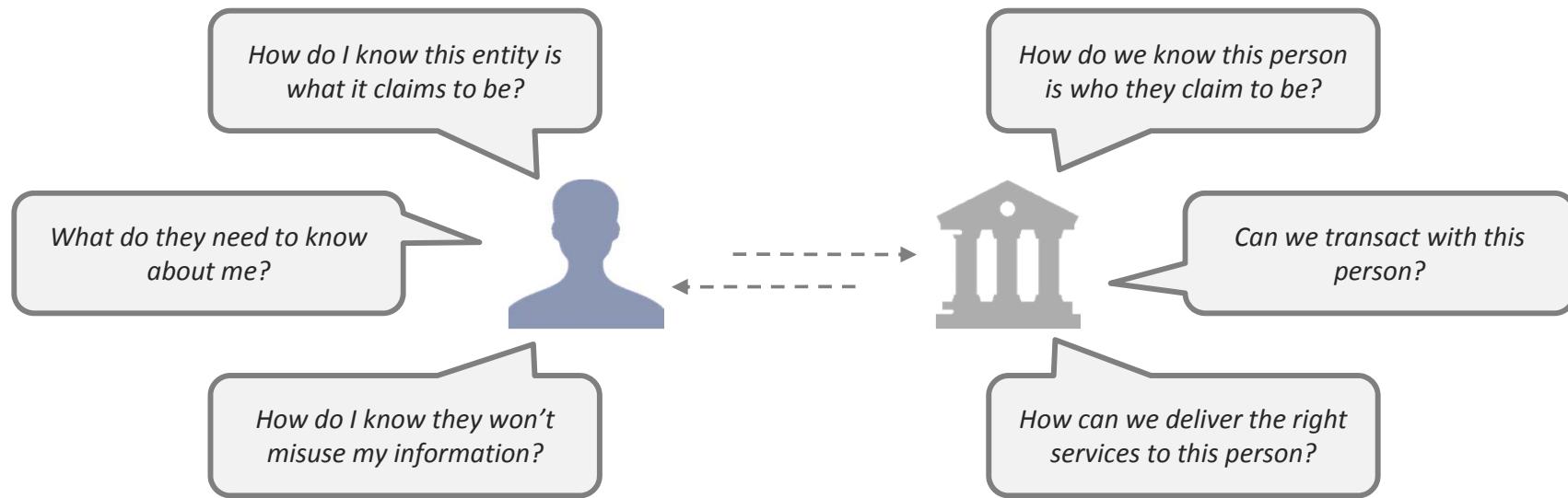
We have studied the landscape of identity providers to understand what efforts are ongoing and which system models are best suited to different situations and to provide recommendations on system configuration and implementation.



The Global Identity Challenge

Identity is critical to today's society

Identity is foundational to many of the transactions that occur in today's society. In any exchange with requirements about the transacting parties – they must be a certain age or reside in a certain jurisdiction – structures must be in place that allow entities to determine certain information about their counterparty, and to have confidence that the information is true.



THE ROLE OF IDENTITY IN TRANSACTIONS

Many transactions do not require identity. Some, such as crime reporting, may in fact require anonymity. However, many transactions do require identity: to determine if the necessary conditions for the transaction to occur exist, to establish a relationship for repeated transactions, or to tailor delivery of products and services.

Society requires identity systems to enable identity-requiring transactions at scale, putting methods in place that enable the formal asking and answering of identity queries at scale, to allow many day-to-day transactions to occur.

Ineffective identity systems create global challenges for people, for businesses and for society as a whole

Reliance on legacy identity systems that do not effectively enable the transactions that people and entities wish to engage in create challenges for a wide set of stakeholders.

FOR PEOPLE



Service exclusion

Individuals are excluded from key services due to their inability to demonstrate identity



Poor user experience

Services provided to users do not match their needs or are delivered inconveniently



Information overexposure

User information is overexposed, putting users at risk of identity theft and privacy breach



Process inefficiency

Proving identity involves many steps and documents

FOR BUSINESSES



Inefficient service delivery

User-facing processes are cumbersome, resulting in poor customer experience



Obscure risk

Lack of reliable information prevents businesses from accurately calculating the risk of doing business



Fraud

Businesses suffer fraud resulting from stolen or incorrect customer information, or poor authentication



Process inefficiency

Processes provide out-of-date data or require checking multiple sources

FOR SOCIETY



Service exclusion

Entities may be unable to prove attributes and therefore be excluded from key social structures



Service mismatch

Services are delivered incorrectly due to the lack of information



Fraud

Entities can use false information or misrepresent information to gain illicit access to services



Process inefficiency

Processes are highly manual and paper-based, requiring human intervention and remediation

These global identity challenges manifest as specific business problems for FIs

Identity is critical to FIs; their businesses are entirely transaction-based, involving transactions with a high degree of risk and require a high degree of certainty in completion. Global problems with identity therefore manifest as specific business problems for FIs.

ILLUSTRATIVE: BUSINESS PROBLEMS IN FINANCIAL SERVICES

Business problem	Retail / small- to medium-sized enterprise banking	Corporate and investment banking
Inefficient and costly onboarding processes	✓	✓
Inefficient, costly and ineffective know-your-customer (KYC) and due diligence processes	✓	✓
Highly manual and time-consuming compliance processes	✓	✓
Difficulty aggregating information on legal entities and determining total risk exposure	✓	✓
Difficulty attaching individual identity (e.g. corporate directors) to corporate identities	✓	✓
Difficulty identifying all transaction counterparties (e.g. third parties in trading relationships)	✓	✓
Difficulty complying with regulatory standards around data handling and privacy	✓	✓
Multiple views of the customer	✓	✓
Difficulty providing effective/suitable products and services	✓	
Lack of visibility into financial history for new customers	✓	
High fraud rates	✓	
Difficulty tracking asset origination and ownership		✓
Difficulty monitoring and tracking asset rehypothecation		✓

Many of these challenges are driven by the use of physical identity protocols to serve digital transactions

Today's standard identity systems are based on physical documents and processes, which creates many limitations.

CHARACTERISTICS OF PHYSICAL IDENTITY SYSTEMS

Document-based: Identity is based on physical records – the ability to prove identity depends on access and authentication to physical documents (e.g. passports, ID cards and records)

Siloed: Identity information is held in discrete places that are not interconnected and do not enable aggregation, which may be desired by the entity itself or required for some applications

Inflexible: Identity is codified in documents as a limited and standardized set of information about an entity that cannot be easily adapted to transaction requirements

THE PROBLEMS WITH PHYSICAL IDENTITY

- *Proof of identity that is based on possession of physical documents may not require demonstration of a link between an individual and the documents (i.e., authentication), enabling use of an entity's credentials by a different user*
- *Physical identity documents can be falsified, altered or tampered with, as well as lost or stolen*
- *Physical attribute presentation and transfer create the potential for human error in transactions*

THE IDENTITY SHIFT

Identity is now at an inflection point; physical identity systems are breaking down and digital systems are emerging in response.



PHYSICAL IDENTITY

Physical identity was designed to enable face-to-face transactions among entities

DIGITAL IDENTITY

Digital identity enables transactions in the digital world and offers improved functionality for its users

Digital identity systems support the needs of today's world

Digital identity systems emerged as a direct response to the requirements of transactions in the digital world.

CHARACTERISTICS OF DIGITAL IDENTITY SYSTEMS

Digital-based: Identity exists as a set of digital records that the user can control and use to complete transactions

Interconnected: Proof of identity can be communicated between entities in a standardized, digital format

Flexible: Identity systems adapt to the nature of the transaction, and continuously adapt to requirements by integrating additional information to create a rich view of the user

THE PROMISE OF DIGITAL IDENTITY

- *Digital information can be protected from damage, tampering, loss and theft, with cutting-edge authentication and security protocols*
- *Digital information can be shared in streamlined, tailored and secure ways, predicated on user consent*
- *Institutions can better know and serve their customers, improving existing products and offering new products and services to the underserved*

BENEFITS

Digital identity would deliver a range of benefits to people, businesses and society.



Privacy and control
People would be able to control access to their information



Revenue growth
Financial Institutions would have opportunities to offer Identity-as-a-service



Improved compliance
Regulators would have increased access to trusted, up-to-date information



Improved service delivery
Governments could more easily and effectively deliver public services

New and maturing technologies have important implications for the creation of robust digital identity systems

These technologies may hold considerable promise for identity, and are being explored by many different players.

Data storage

New technologies may offer improved methods of storing user information and increasing user control, privacy and security



- Distributed Ledger Technology combined with encryption and cloud storage allows information to be held and transferred point-to-point in a dispersed, immutable network
- Federated identity standards, such as SAML 2.0, create interoperability between identity management networks and external applications, allowing federated identity systems to scale to large numbers of identity providers and relying parties

Data transfer

Improved attribute exchange protocols allow information to be securely shared between endpoints without risk of interception or decryption, and with more controls that create privacy for users



- Improved encryption protocols, such as Keyless Signature Infrastructure on the blockchain and hashing, provide strong protection for sensitive information and increase the reliability of digital activities
- Data transfer protocols, such as Attributed Based Credentials 4 Trust and zero-knowledge proofs, prevent the creation of metadata by concealing transaction endpoints, increasing user privacy

Authentication

Many new techniques for authenticating users are being explored for their potential to increase information security and user control in certain circumstances by linking users to their digital activities in more robust and persistent ways



- Behavioural and contextual authentication incorporate human and environmental factors to authenticate a user or device
- Biometrics, including fingerprint, retina scanning, heartbeat waveform and facial recognition based on mobile devices have potential to provide greater convenience and security and are being integrated into many anti-fraud controls

Digital identity systems have great potential but also many pitfalls in implementation

Many new identity systems are under development around the world in response to the need for digital identity and new technology capabilities. However, not all have been successful, illustrating some of the pitfalls inherent in the construction of identity systems.

PITFALLS IN IDENTITY SYSTEMS

Stakeholder rejection

- Users may not adopt the system due to poor design or distrust of the system's purpose or structure
- Stakeholders may perceive systems with limited scope and scale as valueless, and therefore not adopt them

Ineffective technology

- A poor technology platform can reduce system functionality, preventing user integration or transaction completion
- Insufficient data protection results in breaches, system compromise and data leakage

Limited support

- Systems that have support from a narrow set of interests may fail due to inconsistent efforts behind their construction and operation
- Systems that lack support from all key stakeholders may not experience sustainable and continuous uptake

Unsustainable operation

- Systems with unsustainable operating or business models will fail

Policy Changes

- Large, complex and emotive programmes such as ID cards can be susceptible to political and / or ideological shifts

Examples of identity system challenges are common...

Hack Brief: Turkey Breach Spills Info on More Than Half Its Citizens
-WIRED, April 2016

Philippine electoral records breached in 'largest ever' government hack
-The Guardian, April 2016

Aadhaar Bill passed in Lok Sabha, Opposition fears 'surveillance'
-Indian Express, March 2016

South Korea at a crossroads with ID card, data theft losses
-CBC News, October 2014

The National [UK] Identity Card scheme will be abolished within 100 days with all cards becoming invalid
-BBC News, May 2010

Identity Primer

Why is identity important?

Identity is the frontier of privacy and security in the digital world

In an increasingly borderless and digital world, privacy and security cannot be ensured through the construction of walls around sensitive information

Identity is the new frontier of privacy and security, where the very nature of entities is what allows them to complete some transactions but be denied from completing others

To understand the importance of identity and the criticality of strong identity protocols that protect against cyber-risk and suit the needs of transacting parties, it is essential to understand what identity is, and its role in enabling transactions

9-Figure Deals Lift Cybersecurity Investments To An All-Time High
-Forbes, February 2016

Cybersecurity top on government agenda
-Times of India, February 2016

In Today's Era of Data Breaches, Are You Sure Your Data Is Protected?
-Security Intelligence, January 2016

1 in 3 Americans Victim of Healthcare Data Breach in 2015
-Information Management, February 2016

U.S. presses retail banks to help millions of 'unbanked' Americans
-Reuters, February 2016

How to Fight Tax Identity Theft
-Huffington Post, February 2016

FCA fines Barclays £72 Million for poor handling of financial crime risks
-Automated Trader, November 2015

Identity is a collection of pieces of information that describe an entity

Identity is not a monolith; it is a collection of individual attributes that describe an entity and determine the transactions in which that entity can participate. While the total existing set of attributes is endless, they can be broadly categorized into three groups: inherent, inherited and assigned attributes. These attributes differ for members of three main user groups: individuals, legal entities and assets.

For individuals:

- *Age*
- *Height*
- *Date of birth*
- *Fingerprints*

For legal entities:

- *Industry*
- *Business status*

For assets:

- *Nature of the asset*
- *Asset issuer*

INHERENT ATTRIBUTES

Attributes that are intrinsic to an entity and are not defined by relationships to external entities.

ACCUMULATED ATTRIBUTES

Attributes that are gathered or developed over time. These attributes may change multiple times or evolve throughout an entity's lifespan.

- *Health records*

- *Preferences and behaviours (e.g. telephone metadata)*

- *Business record*

- *Legal record*

- *Ownership history*

- *Transaction history*

ASSIGNED ATTRIBUTES

Attributes that are attached to the entity, but are not related to its intrinsic nature. These attributes can change and generally are reflective of relationships that the entity holds with other bodies.

- *National identifier number*
- *Telephone number*
- *Email address*

- *Identifying numbers*
- *Legal jurisdiction*
- *Directors*

- *Identifying numbers*
- *Custodianship*

Specific attributes enable entities to complete certain transactions

Identity is the total set of an entity's attributes. These attributes enable entities to participate in transactions, by proving to their counterparty that they have the specific attributes required for that transaction.

EXAMPLE: Users and transactions

Individuals

To purchase alcohol, users must prove that they are over the legal drinking age in that jurisdiction

To vote, users must prove that they are over the legal voting age, have citizenship and reside in that jurisdiction

To open a bank account, users must prove that they are a non-sanctioned person who is legally allowed to engage in financial transactions

Legal entities

To onboard with a FI, the entity must have proof that it is a legal and non-sanctioned entity

To transact in capital markets, the entity must have proof that it is a legal and non-sanctioned entity with an acceptable risk profile

Assets

Asset trading, such as trading of equities on a stock exchange, requires proof of ownership and origination

Transfer of title of an asset requires proof of ownership from the entity that is transferring the asset

Note: Assets have identity, but are unable to act or transact on their own. Assets require custodians who are entitled to act or transact on the asset's behalf.

Identity transactions have three main aspects

Authorization

What must be true about the users to complete the desired transaction?

Authorization is a function of the transaction and the transaction counterparty; they will determine the requirements for transaction eligibility, and make a query about certain user attributes (e.g. age, address).

Attributes

Can users prove that they are eligible to complete this transaction?

Users must present their proof of attributes in response to the query. Once users present the required attributes, the counterparty must determine if they are reliable.

Authentication

Do the attributes being presented genuinely belong to the entity that is presenting them?

The counterparty will determine whether the attributes match the presenting users. If the users are able to authenticate the attributes, the transaction can proceed.

Repeated identity transactions

This model of identity transaction applies to onboarding transactions, that is, transactions where the counterparties do not have an established relationship or where the counterparty is required to gather identity information with every transaction.

Some identity relationships may have a single onboarding transaction; after initially onboarding the users and verifying them through a full identity transaction, the counterparty may use an authentication method (e.g. username and password, chip-and-PIN card) for each subsequent transaction. This allows them to verify that the same entity is transacting each time without going through the full identity transaction process.

*Note: Not all transactions require **exact knowledge** of attributes. Many transactions simply require attribute data to fall inside certain parameters (e.g. instead of knowing an individual's birthdate, a transaction may only require that the user be over a certain age); this is critical in constructing privacy-enhancing identity systems.*

Different identity transactions require different levels of assurance

The level of assurance (LoA) in an identity transaction is the degree of certainty that the transacting parties have in the veracity of the identity being presented.

ASSURANCE IN TRANSACTIONS

A high LoA in identity transactions is not always desirable, as a high LoA requires intensive onboarding and strong authentication processes that may be cumbersome for the user. The LoA required in an identity transaction should therefore generally be dependent on risk – the risk level of the transaction and the consequences of error.

DETERMINING ASSURANCE LEVELS

The level of assurance of a given transaction is determined by two main factors:

1. Registration protocols: How stringently the identity provider verifies attributes when onboarding users
2. Authentication method: The strength of the authentication method used to complete transactions between the identity provider and the relying party

Low assurance transactions

Transactions that do not involve a release of information and only involve an information flow from the user to the relying party are low-assurance transactions

Examples include online registrations (e.g. signing up for a news site) and some payments (e.g. paying a parking ticket online)

High assurance transactions

Transactions that involve the release of sensitive and private information, or the transfer of money or assets, are high-assurance transactions

Examples include banking and other financial transactions, such as using an online brokerage account, and many government services

Identity systems tend to evolve inside natural boundaries...

Identity exists within networks that enable transactions between the entities inside that network. These networks tend to evolve around user groups with similar needs and characteristics. These boundaries form what are called “natural identity networks”. Every natural identity network has different needs and therefore will require different system configurations.

NATURAL IDENTITY NETWORKS



The networks that form inside the natural boundaries of identity systems for individuals are based on **geographic location or affiliations with a supervisory entity**

Examples include national identity systems, state or provincial identity systems, and employee management systems



The networks that form inside the natural boundaries of identity systems for legal entities are based on **national affiliation, industry or geographic reach**

Examples include national or global business registries and industry identifier systems



The networks that form inside the natural boundaries of identity systems for assets are based on their **asset class, origination or ownership**

Examples include registries of assets of a single class, or registries of assets that are all owned by a single entity

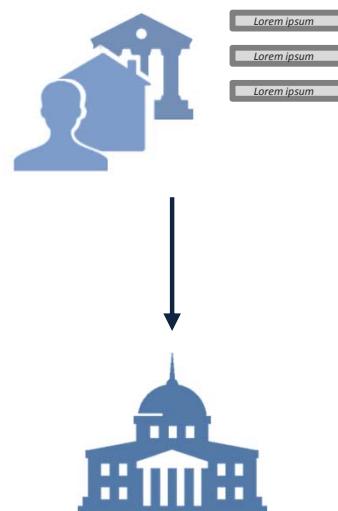
... and operate on a basic shared structure

The purpose of a formal identity system is to allow counterparties without a previously established relationship to engage in trusted transactions.

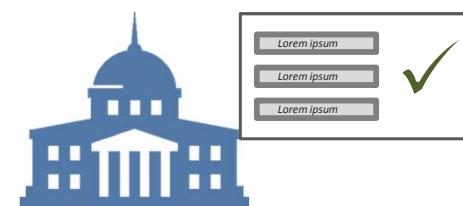
- In a formal identity system, the users' attributes are attested to by trusted third parties; these third parties issue credentials that tie their attestation to the specific attributes, with some method of authenticating the credential to the entity that is presenting it
- Users can use their wallet of credentials to engage in transactions with other entities that require some proof or knowledge of their attributes

THE STRUCTURE OF IDENTITY SYSTEMS

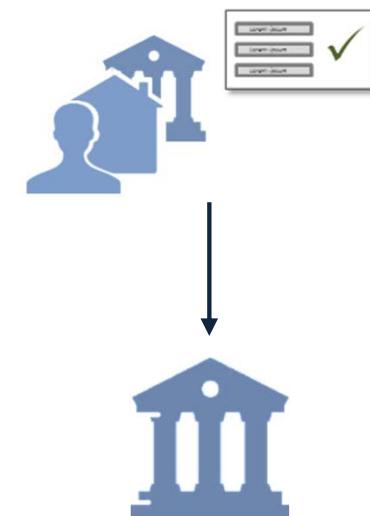
1 *The user presents a set of attributes to a third party*



2 *The third party verifies the attributes and attaches its attestation to the attributes, becoming an identity provider for the user*

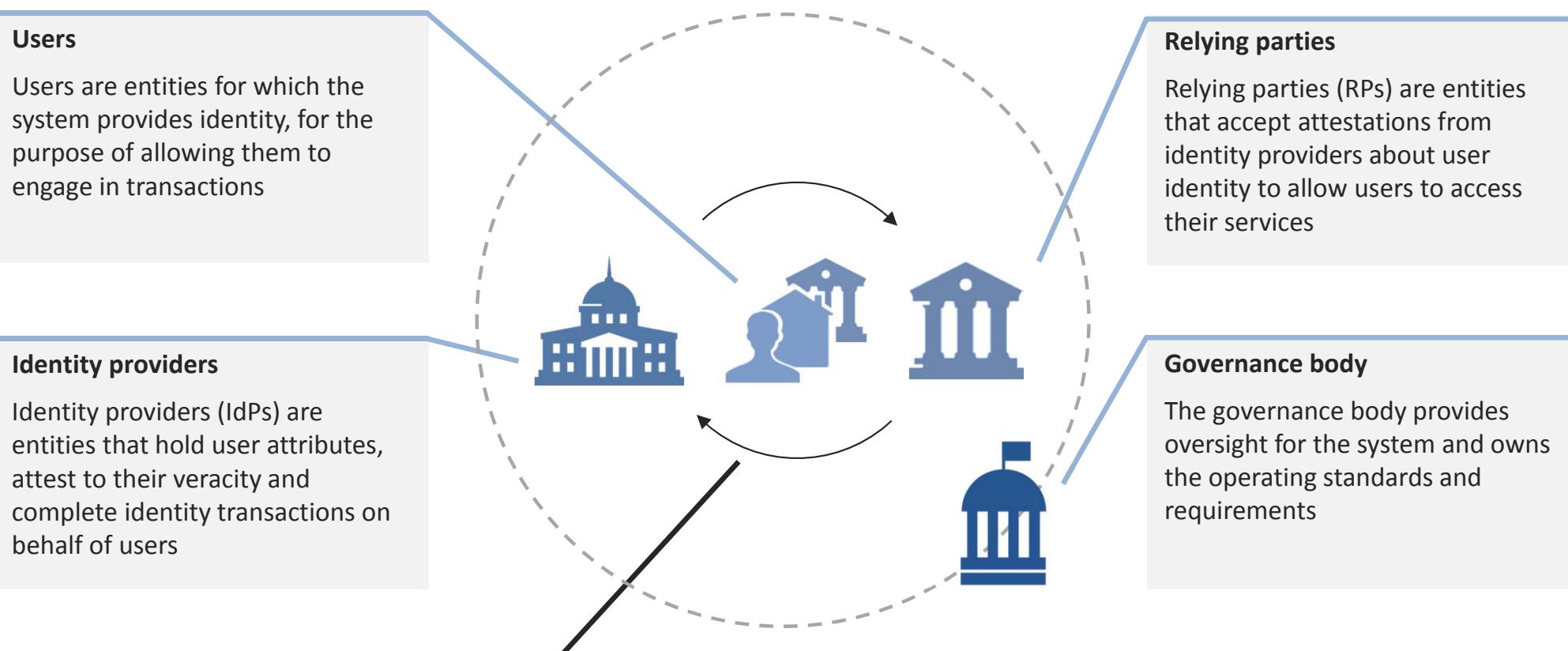


3 *The user then uses the credential from the identity provider in transactions with relying parties*



Certain roles and functions must exist in every identity system

Every identity system must have four roles and one function to operate.



Methods have evolved, but the concept of identity proofing has not changed over time

The fundamental concept, purpose and structure of identity systems have not changed over time, while methods and technology have made huge strides forward.

Past

Present

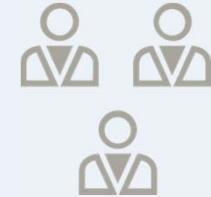
A letter of introduction is one of the oldest forms of identity documentation.

- **User:** Individuals would use a letter of introduction as an attestation of identity and character to someone they did not know
- **IdP:** The letter writers would provide attestations for various attributes of the users (e.g. that the user was a person of good character)
- **RP:** The recipients of the letter would choose whether or not to accept the attestations based on their knowledge of the IdP and their evaluation of the letter's veracity



Today a passport issued by an individual's country of residence or origin is one of the most common, trusted identity documents.

- **User:** Individuals are often asked to present their passport to complete transactions that require proof of identity (e.g. entering new countries, opening a bank account, etc.)
- **IdP:** The government of that country acts as an IdP, making certain attestations about the user
- **RP:** The attestations made by the IdP are accepted by a RP based on its trust in the document, its issuer and its evaluation of whether the bearer is the true owner of the passport



Digital identity allows identity transactions to be completed through digital channels

A digital identity system has the same basic structure as a physical identity system, but attribute storage and exchange are entirely digital, removing reliance on physical documents and manual processes.

FEATURES OF DIGITAL IDENTITY SYSTEMS



Digital information storage and transfer

- User identity information is captured and stored in digital form
- User identity information is transferred between IdPs and RPs in digital form
- Form factors, such as computer or mobile devices rather than physical documents, can be used to complete transactions

Direct connectivity

- Information transfer occurs directly between IdPs and RPs, without an intermediary (although user consent can be built in) and without manual intervention (e.g. physical information entry)

THE CURRENT LANDSCAPE OF DIGITAL IDENTITY

Digital identity is not a new concept; many identity systems exist in the world today that either incorporate some digital elements or are entirely digital-based systems. The landscape of digital identity solutions is explored further in the next section of this report. These systems exist along a spectrum of maturity and degree of sophistication; however, all are designed to capture some of the benefits that digital identity brings over traditional physical-based identity systems.

Digital identity offers significant benefits over physical identity systems

Beyond offering new functionality, digital identity has significant functional benefits over physical-based identity systems.

Security



- ✗ Physical identity documents can easily be lost, stolen or replicated by illicit actors, as well as read by entities with no legitimate reason to have the user information
- ✓ Digital identity information could be stored, transferred and exposed using cutting-edge digital security protocols that would prevent against data breach, modification, loss and theft

Privacy and control



- ✗ Physical identity does not allow the release of information to be tailored to the identity transaction; identity documents display a fixed set of information that can be read by almost any entity
- ✓ Digital identity allows individuals to control the sharing of their information, to expose the minimum amount of information required for a given transaction, and shield their information from illicit access

User experience



- ✗ Physical identity requires users to manually show documents or enter identity information in transactions, resulting in a cumbersome user experience and creating potential for human error in transactions
- ✓ Digital information transfer would streamline the transaction process for users and RPs across all channels, increasing the ease of transacting for both parties and removing the potential for human error

Flexibility



- ✗ Physical identity results in the crystallization of user identity in physical documents, and a fixed view of identity that cannot be expanded to cover additional user attributes
- ✓ Digital identity would provide a flexible and scalable system that could incorporate a greater richness of identity information than is currently possible

The Landscape of Digital Identity Systems

Many digital identity systems exist in the world today, serving various natural networks

The digital identity systems that exist today fall across broad ranges of purpose, scope and sophistication. Some systems have a digital element bolted onto what is still fundamentally a physical identity system, while others are fully digital and are built to scale and expand as user needs evolve.

Disparate identity systems were studied, including systems for all user groups, to understand the landscape of digital identity solutions, categorize these systems and draw high-level conclusions on which systems best suit different needs.

TYPES OF DIGITAL IDENTITY SYSTEMS

Systems for individuals

The majority of identity systems are designed for individuals, and are often government-driven systems

Purpose:

Designed to increase financial or social inclusion and streamline the delivery of services, or to control access to internal systems for a single organization

Systems for legal entities

Identity systems for legal entities often take the form of centralized registries of information that are owned by a single government or utility

Purpose:

Intended to standardize data across entities, streamline processes and enable data aggregation at a macro level

Systems for assets

Identity systems for assets often take the form of a centralized registry or an internal system for a single organization

Purpose:

Intended to clarify ownership, standardize data or enable the operation of networked systems

The most significant differences in identity systems fall across three primary dimensions

Primary dimensions of choice are the set of choices that must be made in the design of a digital identity system that have the greatest impact on the system's function and structure.

These are not always conscious choices; they are often a natural outcome of the setting in which the system is being implemented, and the problem that the system is intended to solve or the needs that it is intended to serve. The three primary dimensions of choice are:

Nature of identity provision

Is there a single source of identity information? Are there a limited set of parties who provide attributes? Is identity provision distributed across many different entities?



Centralized:
One entity stores and provides the identity information

Federated:
A limited number of entities store and provide identity information

Distributed:
Many different entities store and provide identity information

Number of relying parties

Is there a single RP that can access user attributes, or are there many RPs that can access user information?



One:
The system has a single RP that is able to access identity information

Many:
The system incorporates many RPs that are able to access identity information

Nature of information transfer

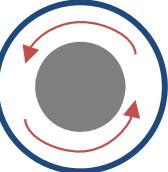
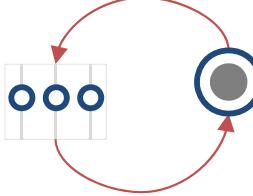
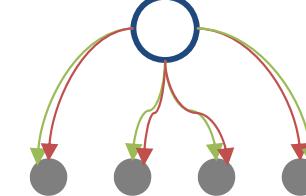
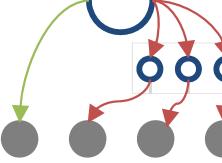
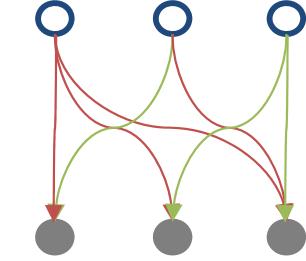
Is information transferred from the IdP to the RP for the purpose of authenticating a user, or is there a transfer of user attributes that the RP requires to execute a given transaction?



Authentication:
The IdP authenticates the user for the RP, allowing the RP to complete transactions using information or records that the RP holds

Transaction:
The RP requires information from the IdP for the purposes of completing a transaction for the user

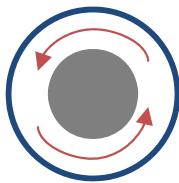
We have defined five distinct archetypes that exhibit significant differences in structure and purpose

	Internal identity management	External authentication	Centralized identity	Federated authentication	Distributed identity
Structure					
Flow of information	<ul style="list-style-type: none"> The system provides users within a single network access to services that they are permissioned to access based on their attributes All user attributes are held inside the single entity and are used to permission users to either grant or deny access to a given service or pathway 	<ul style="list-style-type: none"> The system authenticates users to the RP based on their authentication to one of a set of IdPs No attributes are transferred between the IdPs and the RP; the authentication transaction is used to simply grant or deny the user access to the services offered by the RP 	<ul style="list-style-type: none"> The system has a single IdP that authenticates users and transfers or exposes attributes to many different RPs 	<ul style="list-style-type: none"> The system has a single IdP that stores user information, while a separate set of IdPs authenticate users who are attempting to transact with RPs After authentication, the requested attributes are transferred from the IdP that holds attributes to the RP with which the user is transacting 	<ul style="list-style-type: none"> The system involves multiple IdPs that authenticate users and transfer attributes to many different RPs

● Identity provider (IdP) — Attribute flow
● Relying party (RP) — Authentication flow

Internal identity management solutions are designed for use by one entity

INTERNAL IDENTITY MANAGEMENT



In internal identity management systems, the same entity acts as an IdP and a RP. The entity uses information that it holds on users to permission them to access various internal services.

A good example of an internal identity management system would be a company or a government that permissions its employees or citizens to access different services based on their attributes.

KEY ARCHETYPE FEATURES

- The IdP/RP owns the required attributes needed to determine user permissions within the organization
- The system is used to control which users within a single organization or entity have permission to access certain services
- These types of solutions are generally developed by private organizations and sold as a product or service to various entities and institutions

CASE STUDIES

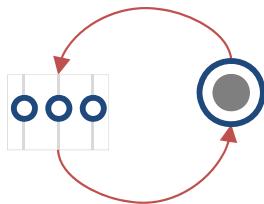
Closed Internal Management Systems

Private solutions, global

Leading software as a solution (SaaS) providers such as Salesforce, Oracle, SAP and Microsoft provide solutions that help their customers better understand, manage and interact with a set of users. SaaS has become a common delivery model for many business, as these solutions help keep users, data and applications within a closed system secure. These solutions serve a variety of industries and user groups (e.g. customers, employees, citizens, etc.).

External authentication systems facilitate access to high-traffic services

EXTERNAL AUTHENTICATION



In external authentication systems, one entity acts as both the IdP and the RP but uses an additional external set of IdPs to authenticate its users. The purpose of this system is to improve user experience for individuals or businesses when accessing online services; these users can use existing logins rather than maintaining multiple usernames and passwords for each service.

KEY ARCHETYPE FEATURES

- The system has one RP, often a government, that holds user information and leverages a set of established institutions as IdPs (e.g. FIs, telecom providers)
- The IdPs are usually trusted entities that perform strong authentication in user onboarding and are therefore trusted to provide a high level of assurance in identity transactions
- Users can use their existing authentication methods through this group of IdPs to gain access to the RP's services
- Both the RP and IdPs store user attributes – the authentication system is used to verify that the entity authenticating through the IdP should be permitted to transact with the RP
- No attributes are transferred from IdPs to the RP

CASE STUDIES

GOV.UK Verify

Public-private programme, United Kingdom

The GOV.UK Verify programme is an external authentication system that allows UK citizens to access government services online. Users verify their identity online with one of nine IdPs. Once the users are authenticated through one of these providers, they are granted access to the government service they are trying to access.

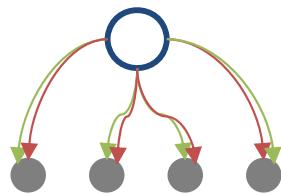
SecureKey Concierge

Public-private solution, Canada

SecureKey Concierge is a digital authentication system that allows individuals to choose a trusted credential they already have with one of a set of FIs to access government services online. The users log in with their online banking username and password and are authenticated by their bank. Once authenticated, the users are granted access to the service. No attributes are transferred in the system.

Centralized identity systems use one IdP as a single source of truth

CENTRALIZED IDENTITY



In centralized identity systems, a single entity acts as an IdP that authenticates users to RPs and transfers their attributes. These systems are often designed to streamline service delivery, enable data aggregation and provide a single view of users across multiple RPs.

KEY ARCHETYPE FEATURES

- A single IdP holds all user attributes and owns the identity system; this is often the government or another central governing body
- The IdP authenticates the user to the RP and transfers either a fixed or a tailored set of attributes to the RP to enable it to complete a transaction on behalf of the user
- Some systems require RPs to pay a fee to use the system and to gain access to user attributes
- Identity information can be transferred directly through a physical form factor (e.g. a smart card) or through a digital brokerage system

CASE STUDIES

DigID

Government programme, Netherlands

DigID is a digital authentication system for Dutch residents who are accessing government services online. Individual attributes are held in a national citizen registry; these attributes are used to authenticate users when they apply for a DigID. Individuals can then use their DigID username and password to authenticate themselves to government agencies. Their national identifier number is transferred from the national citizen registry to the RP.

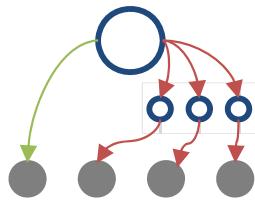
Population Registry

Government programme, Finland

The Population Registry is a national database that is owned and maintained by the Finnish government. The government acts as the IdP, transferring attributes to public and private RPs. The purpose of the system is to collect data that can be used for elections, tax filing, judicial administration, etc. Private RPs may also access this data if they pay a fee and have received user consent.

Federated authentication systems rely on third parties to grant user access to services

FEDERATED AUTHENTICATION



In federated authentication systems, one IdP uses a set of third parties to authenticate users to a range of RPs. The primary IdP is the entity that stores and transfers user attributes. These systems are designed to improve the login and transaction processes for users who are accessing online services by allowing them to use a single set of credentials to authenticate, and transferring attributes to RPs on their behalf.

KEY ARCHETYPE FEATURES

- Identity information is stored centrally by one IdP
- A set of third-party IdPs act as brokers that authenticate users to the RPs with which they are attempting to transact
- RPs are able to access user attributes from the primary IdP, often for a fee; many systems also require explicit user consent for attributes to be transferred
- In systems that allow for the discretionary transfer of attributes rather than a fixed set of attributes, the user must explicitly consent to the transfer of specified attributes from the primary IdP to the RP
- These systems are often government-driven, and the government acts as the central IdP that holds citizen or entity data

CASE STUDIES

NemID

Private sector solution, Denmark

NemID is an electronic ID, digital signature and secure email solution that provides individuals access to public and private services. The government tendered the system to the private sector. Users use a common NemID login and password, as well as unique one-time passwords to authenticate themselves to online services. User attributes are stored in a central registry.

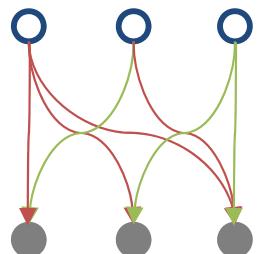
Sweden BankID

Public-private service, Sweden

Sweden has established an eID system that provides citizens and businesses access to over 300 public and private services. Digital identities are issued by a set of private entities, including large banks and a major telecommunications provider. The public sector buys identity validation services from the private sector. Private sector service providers can join the BankID system by signing contracts with eID providers for authentication. The solution has been very successful; over 9 million citizens currently use the service.

Distributed identity systems connect many IdPs and RPs

DISTRIBUTED IDENTITY



In distributed identity systems, many IdPs collect, store and transfer user attributes to many RPs. These systems are notable in that they do not rely on attributes from a single IdP. The purpose of these systems is to allow users to interact easily with many different entities in an online environment by giving them a digital “wallet” of credentials.

KEY ARCHETYPE FEATURES

- Identity information may be stored by multiple IdPs, on a distributed protocol (e.g. blockchain), or may be collected from a variety of sources and aggregated by a single entity that operates the system
- Attributes can be transferred from IdPs to RPs through a variety of methods, including smart cards or digital/mobile protocols
- These systems are often privately owned and funded; governments or other public sector bodies may not play an active role within the network
- Users own their own identities and often control which transactions occur and what attributes are transferred from one or more IdPs to the RP
- These systems may not have a governance body and instead rely on common operating standards for interoperability

CASE STUDIES

TUPAS

Private sector solution, Finland

TUPAS is an identity system in which over 10 banks act as IdPs. Individuals can log into a wide range of services with credentials from their bank. The users' full names and National ID numbers are transferred from the IdP to the RP.

Global Legal Entity Identifier Foundation (GLEIF)

Non-profit organization, global

GLEIF supports the implementation of the Legal Entity Identifier (LEI) standard. This system assigns LEIs to every entity that engages with FIs; entities can use their counterparty's LEI to access their identity information from the GLEIF's partner network.

Mobile Connect

GSMA, global

Mobile Connect is a digital identity system that authenticates the users through their device, allowing users to access a variety of services. This eliminates the need for users to have many usernames and passwords to access online services.

The potential of blockchain technology in identity

Blockchain, or distributed ledger technology (DLT), is a technology protocol that allows data to be shared directly between entities in a network, without intermediaries. DLT has certain key features that hold potential for identity systems:

FEATURES OF DISTRIBUTED LEDGER TECHNOLOGY



Low transaction cost

Distributed ledgers eliminate the need for intermediaries and therefore lower the cost of completing transactions



Immutability

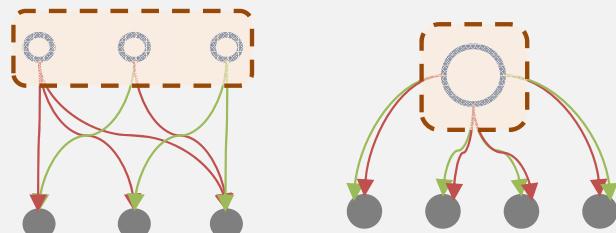
Transaction history is maintained and verified through the network, preventing the falsification of information



Convenience

Record-keeping and transactions can be executed from any device, on- or offline

Illustrative: Applications of DLT in digital identity



DLT has potential in identity applications as an information storage and transfer mechanism within different archetypes. DLT could be applied as a distributed protocol, giving users the ability to store their identity attestations on a ledger and expose them to different RPs, or in a centralized system where the ledger would be owned by a single entity that would provide a consolidated view of the users' attestations for use in transactions, but would not reveal the nature of the credentials.

Many initiatives are currently underway that explore the true potential for DLT in identity systems; this report will not explore this topic in detail.

The Right Solution for the Right Problem

The archetypes of digital identity are built to serve very different needs

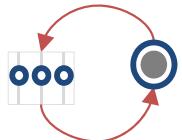
Internal identity management



Best suited to: manage user permissions inside a single entity based on internal information, to ensure the right individuals have access to the right resources and endpoints

Example: Large organizations that need an identity access and management solution to control access to their internal services with a select user group (e.g., employees, customers, etc.)

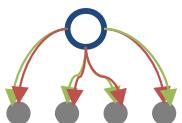
External authentication



Best suited to: streamline user access to a suite of services that are offered by a single entity and eliminate proprietary logins

Example: A government offering its citizens online services that are critical but infrequently used

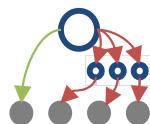
Centralized identity



Best suited to: provide a single version of the truth and a complete, accurate and standardized view of non-confidential data across different users

Example: An industry utility offering a comprehensive view of the entities in that industry to manage risk and exposure

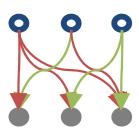
Federated authentication



Best suited to: provide a single version of the truth and a complete, accurate and standardized view of data while allowing users to authenticate to a set of third parties, thereby eliminating proprietary logins

Example: A government enabling identity transactions for its citizens through collaboration with third parties

Distributed identity



Best suited to: incorporate large numbers of IdPs and RPs, providing user convenience, control and privacy in an online environment

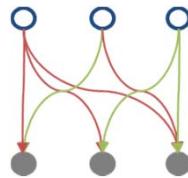
Example: A full digital economy requiring multiple independent connections between IdPs and RPs to enable user transactions

Two of these archetypes are well suited to solve broad identity problems

Centralized and distributed identity systems are best suited to provide digital identity at scale; however, these two archetypes are not equally well suited to provide identity for different user groups.

FOR INDIVIDUALS

Distributed identity



Distributed identity systems are the best fit to provide identity for **individuals** at large scale

- Distributed identity systems are built to scale to large numbers of IdPs and RPs, enabling a full set of convenient and efficient transactions for users
- These systems protect user privacy and increase control by allowing users to choose which entities hold their information, and by removing a single point of failure from the system

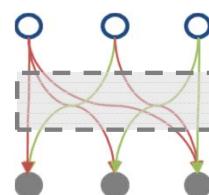
FOR LEGAL ENTITIES AND ASSETS

Centralized identity

Centralized identity systems are suitable to provide identity for **legal entities** and **assets** on a large scale

- Centralized identity systems offer a consolidated and standardized view of identity information, and offer the single source of truth that is required for transactions involving legal entities and assets to deliver key value to external stakeholders such as regulators

Distributed identity



Distributed identity systems are also suited to provide identity for **legal entities** and **assets** on a large scale; however, these identity systems should have a “wallet” or aggregation layer that can provide a consolidated view of the user

- Distributed identity solutions offer identity at scale, and an aggregation layer provides the single view of the user required for legal entities and assets

The centralized and distributed identity archetypes would also solve many of the business challenges that FIs are currently experiencing

IN RETAIL / SMALL- TO MEDIUM-SIZED ENTERPRISE BANKING

The need:

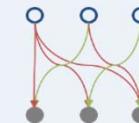
- Trusted, up-to-date individual identity information
- Ability to access additional user attributes with consent
- Ability to internally link identity information to provide a single view of the customer
- Secure repositories for user information to prevent identity theft due to stolen data

IN CORPORATE AND INVESTMENT BANKING

The need:

- Trusted, up-to-date user identity information
- Visibility into asset and user identity information
- Ability to link asset, entity identity and individual information
- Ability to aggregate identity information across entities

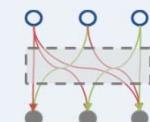
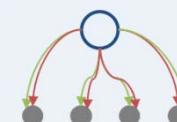
Distributed identity



Distributed identity for individuals would allow FIs to access trusted user information and link it back to a single user identity; it would also ensure that user information would be securely stored with redundancy in the case of breach.

Centralized identity

Distributed identity



Centralized identity and **distributed identity with an aggregation layer** for legal entities and assets would allow FIs to have a consolidated, trusted source of digital attributes for these users.

Configuring and implementing an identity system require many additional choices beyond archetype selection

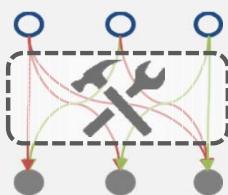
Configuring an identity system requires choices to be made against a secondary set of dimensions that do not have the key functional and structural importance of the primary dimensions, but have strong impact on how the system will operate. The choices made against the secondary dimensions should therefore be tailored to suit the specific needs and requirements of the natural identity network.

ILLUSTRATIVE: SECONDARY DIMENSIONS OF CHOICE

Types of IdPs and RPs: What types of entities are allowed to act as IdPs and RPs in the identity system?

Broker mechanism: How are RP queries connected with IdP attestations? Can the system support attribute exposure and attribute inquiry transactions? Does the system support transaction blinding?

Data management: Where are data stored - in a central database, on a smart card, on a distributed protocol (e.g. blockchain)? Are user attributes aggregated by a third party?



Scaling: Is the system designed to scale beyond its initial set of applications?

Business model: What is the business model that supports the system? Who funds the system?

Governance: Who is responsible for system governance and oversight? Who is responsible for system operation?

User rights: What level of control do users have over the information that is held on the system, who holds it, and when and how it is shared?

Note: This is not an exhaustive list of choices; many further choices must be made

It is impossible to provide an exhaustive list of the secondary dimensions of choice in the configuration and implementation of an identity system, or to give recommendations against each. A set of guiding principles has therefore been developed to steer secondary decision-making and to assist in delivering a robust identity system that suits the needs of its stakeholders.

Guiding Principles

The guiding principles shape the choices that need to be made against the secondary set of dimensions

A successful natural identity network is a product of the choices made against the secondary dimensions. Five principles inform decision-making around these choices and guide the development of robust, value-accretive systems.

GUIDING PRINCIPLES FOR DIGITAL IDENTITY

Social good

The system is designed as a social good that is available to all users and will deliver maximum benefit to a range of stakeholders

Privacy-enhancing

User information is only exposed to the right entities under the right circumstances

User-centric

Users have control over their information and can determine who holds and accesses it

Viable and sustainable

The system is sustainable as a business and is resilient to shifting political priorities

Open and flexible

The system is built on open standards to allow scaling and development; standards and guidelines are transparent to stakeholders

Identity systems should provide identity to all users, serve user interests and be accessible to all entities that wish to transact within them

SOCIAL GOOD

BACKGROUND

The ability to prove identity allows users to be integrated into formal financial and social systems and engage in necessary and basic day-to-day transactions; digital identity should therefore be considered a social good to which all entities should have access.

IMPLICATIONS

- The system should be designed to scale to all users and network stakeholders who wish to participate
- The public sector should have some involvement in defining the system's operating parameters and regulatory standards to ensure user interests are protected and to increase the scale of the system
- System access mechanisms (e.g. mobile platforms) should democratize access

IMPLICATIONS FOR FIs

- FIs have relationships with a large numbers of users; this scale can act as a catalyst in driving system adoption and uptake
- FIs have a key role to play in ensuring that identity systems are a tool to increase financial inclusion

CASE STUDIES

SASSA

Public-private partnership, South Africa

The South African Social Security Agency, Grindrod Bank and MasterCard have issued biometric enabled debit cards to over 22 million social security recipients. The SASSA card holds an individual's personal information on the chip, is authenticated through biometrics (fingerprint and voice pattern) or a personal identification number (PIN), and is linked directly to a bank account where social grants are deposited. The end result is over 5 million people becoming financially included, and huge efficiencies in the distribution of social grants in South Africa.

Identity systems should be privacy-enhancing, protecting user information from illegitimate access, accidental exposure and overexposure

PRIVACY-ENHANCING

BACKGROUND

Current identity systems put users at risk, leaving user information vulnerable to privacy infringement, data leakage and overexposure. A digital identity system should protect user information, ensuring that only what is needed is revealed to RPs, and that these parties are only using the data for the disclosed purposes.

IMPLICATIONS

- All attributes, including demonstrated behaviour and preferences, should be covered in an identity system
- Attribute transfer should use new information exchange protocols that allow endpoint blinding
- The brokerage mechanism that connects the endpoints of identity queries should allow only the minimum required information to complete attribute inquiry or attribute exposure transactions to be exposed to the RP
- Attributes should only be stored by IdPs with adequate data security (as defined by system standards)
- Users or custodians should have visibility into requested identity transactions and a defined recourse method if their information is being misused
- The storage of sensitive information should be non-centralized to reduce the severity of consequences and the impact on users in the event of a data breach

IMPLICATIONS FOR FIs

- FIs should build cyber-resilient identity systems and meet standards set by the governance body around data protection and storage
- FIs will need to seek user consent to gain access to or share attributes

CASE STUDIES

TUPAS

Private identity solution, Finland

In the Finnish TUPAS system, a set of FIs act as IdPs and transfer user information on their behalf to RPs. The user has visibility into which attributes are being requested by the RP, and must provide consent for the exchange to occur .

Drivers' Licences

Government solutions, global

Traditional drivers' licences are a commonly used form of identity. However, they compromise privacy by permitting the RP to read all the user's information, rather than just the information required for the transaction.

Identity systems should give users control over the storage and transfer of their personal information

USER-CENTRIC

BACKGROUND

Many identity systems have failed due to a lack of user uptake, driven by concerns around the function and purposes of these systems. A successful digital identity system that serves as a social good should place the user (or the user's custodians) in control over identity information.

IMPLICATIONS

- The mutuality of identity should be considered; users or custodians must have clear visibility into who is requesting their information and for what purpose
- Identity transactions should require consent; exceptions must be clearly defined and communicated, and users should be advised of when their information has been accessed
- Users should be able to revoke consent
- Users should have control over where their personal information is stored
- Users should be able to easily update their information with IdPs

IMPLICATIONS FOR FIs

- FIs will be able to request identity information from users in order to tailor products and services
- FIs will require user consent to share identity information

CASE STUDIES

ConsenSys

Private solution, USA

In the ConsenSys system, users are able to upload their information and have complete control over who their data are exposed to. Users do not choose who stores their data because all identity information is stored on uPort – a user-controlled application that operates on the blockchain.

SecureKey Concierge

Public-private solution, Canada

The SecureKey Concierge system allows Canadian citizens to access government services online by authenticating through any of a large number of FIs with which they already transact.

Identity systems should be designed as businesses that are viable and sustainable in the long term

VIABLE AND SUSTAINABLE

BACKGROUND

Implementing a digital identity system represents a significant effort for all stakeholders; stakeholders must have assurance that their investment will be worthwhile. The system must therefore be designed as a viable and sustainable project.

IMPLICATIONS

- The public sector should have some role in system development and implementation to represent user interest, to drive uptake and to ensure regulatory participation
- The private sector should be involved in system development and implementation to provide executional ability, and operational viability and ensure the system is cost-effective
- Both the public and private sectors should play a role in developing operational standards, including:
 - Liability and dispute resolution
 - Business model
 - Information collection, storage and transfer
 - Levels of assurance
 - Technical requirements
 - User consent models
 - Auditing

IMPLICATIONS FOR FIs

- FIs have a key role to play as important and trusted private entities in shaping the system's operational requirements and standards
- FIs will have the opportunity to monetize identity-as-a-service

CASE STUDIES

National ID Cards

Government solution, United Kingdom

The UK government introduced national ID cards as a personal identification document. The system was scrapped in January 2010, as the incoming government stated the system was "wasteful, bureaucratic and intrusive", posing a significant threat to the privacy and security of personal information.

Clarent Entity Hub, DTCC

Private identity solution, global

Clarent Entity Hub is a utility designed to manage data and regulatory complexity for parties engaging in financial transactions. It aims to increase transparency across financial markets and is offered as a paid service to other entities.

Identity systems should be built on open technology and data standards, and should be designed to integrate new parties and serve changing user needs

OPEN AND FLEXIBLE

BACKGROUND

Identity systems that are static and designed for a single purpose are by nature limited in scope and have low resilience to environmental changes. A resilient identity system should accommodate changing requirements and integrate new parties.

IMPLICATIONS

- The system must be built on open technology standards
- The system must be built on open data standards
- The system must have clear standards around IdPs and RPs, such that new entities can join the system and adhere to all standards and requirements
- The system must have a governance body that will continuously adapt requirements and standards and monitor system performance

IMPLICATIONS FOR FIs

- Open technology and data standards will reduce barriers to users switching institutions

CASE STUDIES

X-Road

Government solution, Estonia

The Estonian digital identity system is built on a common technology framework, called X-Road. This framework creates interoperability between different databases, hugely increasing the digital identity system's functionality and effectiveness.

European Union E-Identity Legislation

Public sector solution, EU-wide

The EU E-Identity legislation sets requirements for member states issuing identity to citizens to ensure mutual recognition and scale of identity systems across Europe.

The established implications should help guide decision-making around configuring identity systems

Building a successful identity network is difficult. A series of choices need to be made to ensure the system delivers value to all stakeholders and gains traction and acceptance.

- The highest-level considerations in the development of an identity system are the user group and the need that the system will serve, and the archetype structure that should therefore be considered.
- Once these considerations have been settled, the secondary dimensions of choice should be considered against the guiding principles of digital identity.

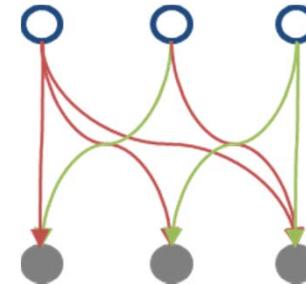
1 Problems and user groups

The highest consideration is the user group and the problem that the identity system is designed to solve; this will determine the limits of the natural identity network



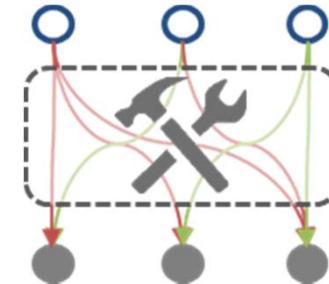
2 Primary dimensions of choice

The user group and target problem will guide the selection of an appropriate identity archetype



3 Secondary dimensions of choice

The guiding principles for identity and their implications will help determine what structural and configuration choices should be made against the secondary dimensions of choice



These implications are meaningful for entities within the digital identity network

When configuring identity systems, stakeholders will have a set of decisions to make at each stage of the process.

ILLUSTRATIVE: Some open questions for identity stakeholders

1. Problems and user groups

- Which user group does this system serve? What problems will the system solve?
- What unique characteristics will affect this user group's acceptance and use of an identity system?
- Which archetype is best suited to solve this problem?

2. Primary dimensions of choice

- Which entities should act as IdPs in this system?
- What type of RPs should be included in this system?
- What type of information must be transferred in the system?

3. Secondary dimensions of choice

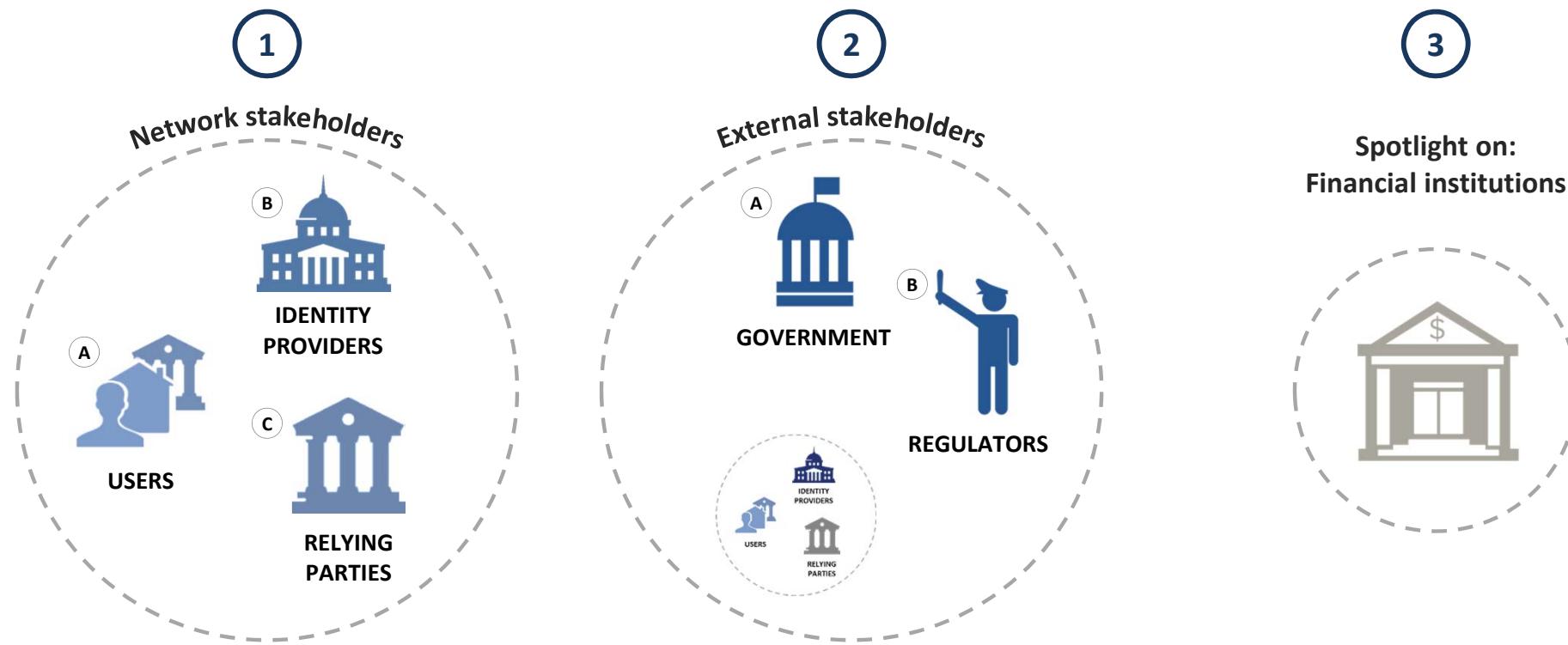
- What technology standard and trust framework will the system use?
- What assurance model will the system use?
- Should the system use an identity-as-a-service, fee-for-transaction business model?
- How will the governance body be organized? What entities will be involved in system governance?
- How will the user give consent in transactions?
- Will any exceptions to user consent requirements be allowed?
- How will the public sector be engaged in shaping the operational standards?

Benefits

The implementation of digital identity networks would benefit a set of different stakeholder groups

Identity systems that are constructed based on this guidance will deliver benefits both to the stakeholders involved directly in the identity network and to external stakeholders. FIs, specifically, would accrue deep benefit as a result of the implementation of digital identity.

STAKEHOLDER GROUPS



What benefits would accrue to network stakeholders?

Network stakeholders are parties who are involved in the core operation of the network itself. The network stakeholders are users, IdPs and RPs.



What benefits would accrue to users?

USERS



Privacy and control

1. Privacy and control

- Users would have full control over which IdPs hold their attributes
- Users consent would be required before IdPs could expose attributes to RPs
- User data would not be sold by third parties
- The minimum amount of user information required would be transferred during transactions



Security

2. Security

- User attributes would only be held by entities meeting system standards and requirements for information handling and storage
- Digital attribute storage would make identity information resistant to damage, destruction or loss
- Users would have the ability to disperse their identity information, creating contingency if an IdP suffered a data breach or data were erased or stolen, and reducing the impact of a data breach on the user



Convenience

3. Convenience

- Digital identity and digital attribute transfer would simplify and improve the user experience in transactions, eliminating the need for users to track multiple authentication methods (e.g. usernames and passwords) and manually submit personal information during transactions
- Attributes would be transferred digitally, removing the potential for human error and subsequent information remediation
- Users would be able to easily update information held with their IdPs and would not have to deal with transactions being executed based on inaccurate or out-of-date information



Transparency

4. Transparency

- Users would have visibility into which attributes would be exposed and to what entity during identity transactions

What benefits would accrue to users?

USERS: Case study

Estonia's e-government system protects citizen information, provides an extremely convenient experience for users and allows them to feel ownership over their data.

E-Government

Government solution, Estonia

- The Government of Estonia has created a digital interface between citizens and government agencies. The government holds citizen information in a centralized Population Registry and acts as the IdP and governing body, transferring reliable and trusted data to RPs.
- Citizens are each assigned an eID identifier that they can use to log on to the State Portal, which provides access to dozens of services, from voting, to updating automobile registries, to applying to universities. The government transfers the attribute information needed to complete each transaction from the Population Registry to the RP, and citizens are able to see what entities have accessed their information.
- Citizens of Estonia have the ability to view who has accessed their records, how often and for what purpose. This transparency allows citizens to feel ownership over their data, as they are able to see how the information is being used.
- A compelling example is the Electronic Health Record – a nationwide system that integrates data from various healthcare providers into a single portal. Users are able to log on to a Patient Portal to control their treatment and manage their healthcare information.

Chekki allows users to own, manage and share their personal information

Chekki

Private sector solution, Global

- Chekki is a mobile solution that provides users with a secure wallet of their personal attributes and allows them to share up-to-date information with the entities with which they transact.
- In the Chekki system, only the information required for a transaction is supplied, meaning that the user is in control and their privacy is protected.

What benefits would accrue to IdPs?

IDENTITY PROVIDERS



Revenue growth

1. Revenue growth

- IdPs would complete identity transactions for RPs; this would allow them to monetize identity-as-a-service through per-transaction fees or other business models



Defined risk and liability

2. Defined risk and liability

- Liability guidelines would be clearly defined and communicated; IdPs would be clear about their liability in the event of data loss or breach, or contravention of the standards for identity provision



Competitive positioning

3. Competitive positioning

- IdPs would be able to forge a strong relationship with users and position themselves as a critical part of the digital economy, given their unique insight into users and their established position of trust



Improved products and services

4. Improved products and services

- IdPs would have increased access to detailed and reliable user information that would allow them to better tailor processes, products and services
- IdPs could begin to draw on non-standard user attributes to better manage and evaluate risk (e.g. health records)
- Secure digital identity protocols and digital attribute transfer would improve user experience and expand the number of services that IdPs could securely provide online

What benefits would accrue to IdPs?

IDENTITY PROVIDERS: Case study

A set of banks act as IdPs in the TUPAS system, providing individuals with access to over 180 public and private services.

TUPAS

Private sector solution, Finland

- The Federation of Finnish Financial Services drove the creation of a bank identity system called TUPAS, designed to improve user access to online services.
- The RPs pay for the service (initiation fees, monthly fees and fees for set transaction volumes). Users may also be charged on a monthly basis, depending on their relationship with their bank.
- While a group of telecoms in Finland offer a competing service, as of February 2016, 95% of all online service logins were processed through TUPAS. Only 2% of online service logins were processed through the competing system. This may be due to the government's strong adoption of TUPAS, citizen loyalty towards government and banks, or the fact that it was the first successful service in the region. TUPAS has established a new revenue stream for banks as well as a strong competitive position.
- With most banks, the user must approve and certify that the data being transferred from the bank to the RP are accurate, eliminating any liability risk for the IdP.

What benefits would accrue to RPs?

RELYING PARTIES



Information accuracy

1. Information accuracy

- RPs would have access to trusted, verified identity information matched to the level of assurance required for their products or services; this would eliminate the need for information remediation and for information cross-checks through paid third-party services
- Digital attribute exchange would eliminate the potential for human error in transactions



Service tailoring

2. Service tailoring

- RPs would be able to provide more tailored products and services to users by requesting access to identity information beyond what they would traditionally require to complete transactions



Service provision

3. Service provision

- More reliable and accurate identity protocols would give RPs greater ability to differentiate between illicit and legitimate users, and to deny or provide services accordingly



Decreased transaction abandonment

4. Decreased transaction abandonment

- A more streamlined user experience would remove barriers to completing transactions (e.g. forgotten login information, required account creation, rejected billing information) and would therefore reduce the rates of users' transaction abandonment



Decreased risk and liability

5. Decreased risk and liability

- Liability guidelines would be clearly defined and communicated; RPs would be clear about their liability in the event of data loss or breach, or contravention of the standards for identity provision

What benefits would accrue to RPs?

RELYING PARTIES: Case study

The Population Registry is a central database that stores identity information – the data are trusted by many entities in Finland as a comprehensive source of up-to-date information about citizens, assets and legal entities.

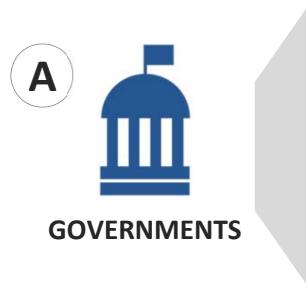
Population Registry

Government programme, Finland

- The Population Registry is a national database owned and maintained by the Finnish government. The government acts as the IdP, transferring attributes to public and private RPs.
- Citizens are required to provide up-to-date information to the Population Registry, such that IdPs can trust that the information they are receiving is accurate.
- Public RPs that require attributes to complete transactions can use citizens' national ID numbers to access data held in the Population Registry. The necessary attributes are transferred digitally from the registry to the RP.
- Private RPs can also subscribe to the Population Registry and access information (with consent) to provide better products and services to their users.

What benefits would accrue to external stakeholders?

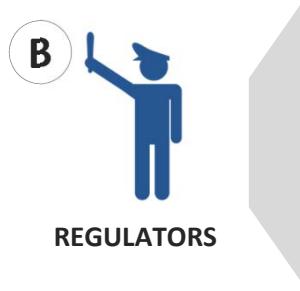
External stakeholders are parties that are not involved in the system's day-to-day operation, but are key stakeholders in the system. The external stakeholders are governments and regulators.



Process streamlining and efficiency
Governments can more efficiently interact with their citizens, saving time and money



Improved service delivery
Governments can more easily identify and deliver services to various groups of citizens



Tracing of assets
Regulators can more effectively trace asset origination and ownership



Transparent view of entities
Regulators can access an aggregated view of legal entities across their hierarchies



Improved compliance
Regulators can access trusted, up-to-date attribute information for users, improving the effectiveness of the overall compliance process



Data standardization
Data collection and storage can be standardized across all FIs, reducing friction in data aggregation

What benefits would accrue to governments?

GOVERNMENTS



*Process
streamlining
and efficiency*

1. Process streamlining and efficiency

- Governments would be able to more efficiently interact with their citizens, saving time and money in the delivery of services such as tax filing and the distribution of social assistance



*Improved
service
delivery*

2. Improved service delivery

- Governments would be able to leverage accurate identity information to more easily identify the individuals and entities that are eligible to access given services
- Governments would be able to easily identify and deliver services to those who might be financially or socially excluded due to the lack of traditional identity information

What benefits would accrue to governments?

GOVERNMENTS: Case study

The Aadhaar programme was introduced in India to increase social and financial inclusion by providing identity for all Indians residents, many of whom previously had no means of proving their identities.

Aadhaar

Government programme, India

- The Aadhaar card was developed to improve financial inclusion in the country. The Unique Identification Authority of India (UIDAI) acts as the central IdP, controlling who has access to the data that they collect and store.
- To receive a card, individuals submit various documents to a local registrar. If they are unable to provide documentation, an “introducer”, such as an elected representative or a local teacher or doctor, can vouch for the person's identity. This parallel process decreases the chance of UIDAI storing inaccurate information or providing social services to illegal immigrants or other illicit actors. The UIDAI has a database that holds information such as name, date of birth, and biometrics data that may include a photograph, fingerprint, iris scan, or other information.
- The Aadhaar program has been very effective in increasing financial inclusion with over 1 billion people enrolled for accounts, however there are still some outstanding concerns about information protection and privacy.

The Estonian e-Residency program allows non-Estonian citizens to gain digital residency in the country.

E-Residency

Government programme, Estonia

- The e-Residency program allows non-Estonian citizens to get a digital ID card that enables them to use Estonian private and public services and to use secure digital signatures. The purpose of the program is to create a virtual business environment and continue to position Estonia as a hub of the digital world
- Since its inception in December 2014, almost 10,000 people have applied for e-Residency and over 400 have established a new company domiciled in Estonia.

What benefits would accrue to regulators?

REGULATORS



Tracing of assets

1. Tracing of assets

- Regulators would be able to more effectively trace asset origination and ownership, increasing their ability to track the proceeds of criminal activity
- Asset rehypothecation could be traced, ensuring that assets would not be rehypothecated beyond their total value



Transparent view of entities

2. Transparent view of entities

- Regulators would have access to an aggregated view of legal entities across their hierarchies, increasing their ability to evaluate systemic risk and manage stability



Improved compliance

3. Improved compliance

- Access to trusted identity information would increase the ability of FIs to be compliant with anti-money laundering, know-your-customer and other regulations within their jurisdiction
- Access to trusted information on legal entity and asset identity would allow FIs to more accurately detect money laundering and other suspicious transactions
- Access to trusted digital attributes would allow FIs to automate their compliance processes to some degree, potentially allowing regulators to increase the required frequency of compliance reviews



Data standardization

4. Data standardization

- Data collection and storage could be standardized across all FIs, reducing friction in data aggregation

What benefits would accrue to regulators?

REGULATORS: Case study

GLEIF is an organization that supports the implementation of the Legal Entity Identifier standard – this standard might ultimately become a common thread between identifier systems in an effort to create a standardized global view of legal entities.

Global Legal Entity Identifier Foundation (GLEIF)

Non-profit organization, global

- GLEIF manages a network of Local Operating Units that issue Legal Entity Identifiers (LEIs) to legal entities worldwide.
- Legal entities engaging in financial transactions submit a standard set of attributes to a Local Operating Unit, which validates them against third-party records and then issues an LEI. GLEIF holds the master file of all LEIs and associated entity information.
- The system was introduced by financial regulators to improve micro- and macro-prudential risk assessment and management, increase market transparency and improve the accuracy of financial data.
- Beyond financial services and regulation, the goal of the LEI system is to provide reliable identity information to permit unique identification of legal entities worldwide, in financial services and beyond (e.g. supply chain applications).
- Over 430,000 LEIs have been issued since October 2015. The LEI is intended to become the link between all other identifier systems (e.g. know-your-customer systems, business register codes, etc.). This would allow regulators to have a consistent and comprehensive view of all legal entities and financial instruments globally.

FIs have key features that would give them structural advantages within identity systems

FIs have unique advantages that make them well-suited to playing key roles in digital identity networks.

ADVANTAGES OF FIs IN DIGITAL IDENTITY

FIs are highly reliant on identity

Identity is central to the function of FIs, while they bear a large part of the cost of ineffective identity protocols

FIs are connected to many key identity stakeholders

FIs have standing relationships with users, governments, regulators and other key stakeholders, and have experience working with these groups on key concerns while balancing competing interests

FIs are trusted institutions

FIs are more trusted by consumers to hold personal information than other institutions, such as governments, telecoms and technology companies

FIs have existing business models that do not require directly monetizing customer information

CASE STUDIES

iDIN

Private sector solution, Netherlands

iDIN was created to capitalize on the large investments that banks have made in onboarding their customers; banks already collect highly trusted identity information and are well positioned to transfer it to other parties.

NemID

Private sector solution, Denmark

To maximize the adoption of NemID, the governing body wanted to cooperate with private actors who have frequently used services; banks not only interact with individuals on a regular basis, but are also seen as trusted institutions that already store user identity.

SecureKey Concierge

Public-private programme, Canada

SecureKey partnered with nine banks that are trusted and hold accurate data; this data can be used to authenticate individuals in the system.

What benefits would accrue to FIs from the implementation of digital identity?

The benefits to FIs of implementing digital identity fall into six categories:



Improved products and services

FIs will be able to use detailed and trusted customer information to deliver tailored services to customers



Operational efficiency

Digital attribute transfer and handling will allow FIs to streamline and automate many processes, eliminating human error



Decreased fraud

The secure, digital storage of user information will reduce fraud resulting from stolen information or compromised authentication



Improved compliance

Digital attribute handling and greater access to user identity will allow FIs to complete compliance processes more easily and accurately



Revenue growth

FIs will have the opportunity to increase revenue from improved products and services as well as to offer identity-as-a-service



Better user experience and competitive positioning

FIs can offer a streamlined user experience and position themselves as a critical part of the digital economy

What benefits would accrue to FIs from the implementation of digital identity?

FINANCIAL INSTITUTIONS

1. Improved products and services

- FIs would have increased access to detailed and reliable user information that would allow them to better tailor processes, products and services such as:
 - Risk scoring for insurance products
 - Financial advisory
 - Asset management
 - Credit scoring
 - Loan adjudication
- FIs could begin to draw on trusted information, with consent, to better manage and evaluate risk; secure digital identity protocols and digital attribute transfer would improve user experience and expand the number of services that FIs could securely provide online



*Improved
products and
services*

2. Operational efficiency

- FIs would be able to access user information in a consolidated, digital form through queries in the digital identity network; having attributes in a consolidated digital form would provide a single view of the customer and allow FIs to streamline customer-facing operations, such as onboarding, as well as many back-end processes
- Digital identity for assets would allow FIs to track financial products and assets more closely, through greater visibility into ownership and the resolution of rehypothecation concerns



*Operational
efficiency*

3. Decreased fraud

- User information would be held only by entities that follow standards around data protection; this would reduce fraud (such as card-not-present transactions made using shipping and billing information stolen in large-scale data breaches)
- Digital authentication methods would reduce fraud resulting from hacked or compromised user accounts



*Decreased
fraud*

What benefits would accrue to FIs from the implementation of digital identity?

FINANCIAL INSTITUTIONS



Improved compliance

4. Improved compliance

- Digital identity would give FIs access to trusted, up-to-date attribute information for users, improving the accuracy of know-your-customer processes
- Digital information transfer and storage would allow FIs to complete their compliance processes more quickly and easily, allowing faster processing and reducing time spent on information remediation and correcting human error
- Compliance processes could be automated and executed on more regular cycles
- Digital identity would give FIs better visibility into corporate ownership structures and the identity of corporate directors to improve corporate know-your-customer processes
- Digital identity would give FIs better visibility into asset origination and ownership



Revenue growth

5. Revenue growth

- FIs could monetize identity-as-a-service through business models such as subscription fees with RPs or fee-for-transaction services for high-assurance identity transactions, including:
 - Authentication
 - Digital signatures
 - The completion of identity transactions for RPs, such as providing attribute information (e.g. providing shipping information to merchants) or providing information about attributes (e.g. attesting to a merchant that a user is over a certain age based on date of birth)



Better user experience and competitive positioning

6. Better user experience and competitive positioning

- By collaborating with governments, public sector entities and other private sector entities, FIs would become part of a trusted ecosystem working on developing the digital economy
- As trusted safeguards of user information, FIs would increase the strength of their relationships with users

What benefits would accrue to FIs from the implementation of digital identity?

FINANCIAL INSTITUTIONS: Case studies

Aire is able to assist individuals who lack traditional credit information by using non-traditional user attributes to build a new credit score.

Aire

Private company, United Kingdom

Aire, a UK-based start-up, offers an alternative to traditional credit-scoring techniques. Aire allows individuals to submit a wide range of materials that are used to evaluate the individual's creditworthiness; for example, a user could submit utility or Netflix bills.

Know-your-customer utilities provide FIs with access to trusted, up-to-date attribute information for users, improving the accuracy of individual and corporate know-your-customer processes.

Industry Know-Your-Customer Utilities

Private solutions, global

Industry know-your-customer utilities, such as Thomson Reuters' OrgID or DTCC's Clarient Entity Hub, are intended to serve as reliable repositories of identity information on legal entities, eliminating the need for entities to perform know-your-customer requirements on their counterparties in financial transactions and giving them access to reliable and current information.

FIs in the TUPAS system are the only entities to hold and transfer user information, allowing them to monetize identity-as-a-service through business models such as subscription or fee-for-transaction services with RPs.

TUPAS

Private sector solution, Finland

In the TUPAS system, RPs must pay IdPs (in this case, a consortium of banks) to access trusted and accurate user attributes.

Future-State Applications

Digital identity offers FIs improved and new capabilities

Beyond the first-level benefits of digital identity that FIs would receive as a result of participating in an identity system, we have explored some future-looking use cases that illustrate additional capabilities that digital identity might offer to FIs.

POTENTIAL FUTURE-STATE APPLICATIONS



- 1. Tailored risk profiles**



- 2. International resettlement**



- 3. Attributes tied to payment tokens**



- 4. Digital tax filing**



- 5. Determining total risk exposure**



- 6. Identifying transaction counterparties**



- 7. Linking individual identity to corporate identity**



- 8. Tracking total asset rehypothecation**

What additional capabilities can digital identity offer to FIs?

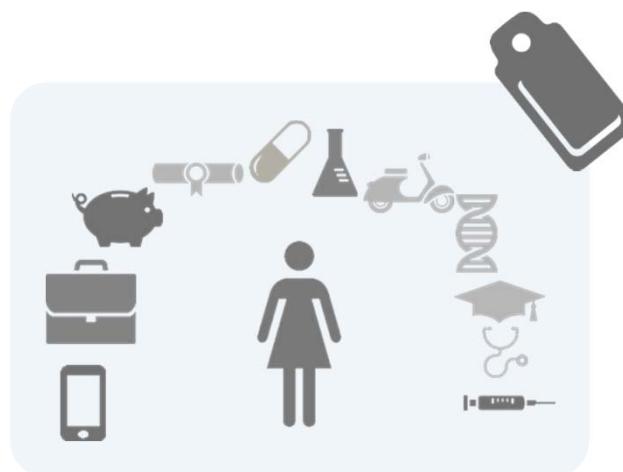
1. TAILORED RISK PROFILES

CURRENT STATE:

FIs currently create risk profiles for individuals and legal entities using the limited information that is collected when customers are onboarded and predictive algorithms to provide relevant and tailored products and services to their customers.

HOW WOULD DIGITAL IDENTITY HELP?

FIs could leverage trusted user attributes, with a user's consent, to more effectively build risk profiles for their customers and therefore tailor credit- and risk-based products. This enhanced user experience would ultimately lead to increased customer stickiness and offer growth opportunities for FIs.



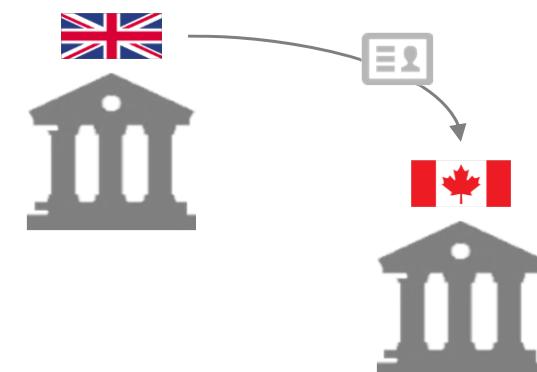
2. INTERNATIONAL RESETTLEMENT

CURRENT STATE:

Today's onboarding processes require every FI to onboard a customer from a zero-knowledge state, resulting in difficulty opening accounts for entities that are unable to prove their identities, and disregard of financial history.

HOW WOULD DIGITAL IDENTITY HELP?

Users could transport their digital identity across jurisdictions and use it to easily gain access to financial and other services in their new place of residence; the attestations and attributes held by the user's original FI(s) would serve as the basis for new FIs to become IdPs. This would eliminate the need for the recipient FI to perform the costly and labour-intensive know-your-customer process that would otherwise be required. In addition, it would reduce the time and effort needed for FIs to onboard users, and allow them to incorporate trusted, historical information.



What additional capabilities can digital identity offer to FIs?

3. ATTRIBUTES TIED TO PAYMENT TOKENS

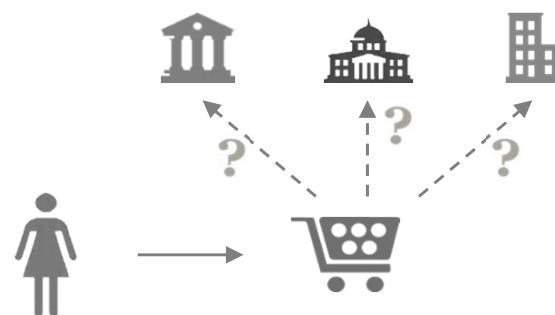
CURRENT STATE:

When completing transactions, customers are required to manually provide their attributes (e.g. confirmation of age, shipping information) or proof of attributes to merchants at the point of sale.

HOW WOULD DIGITAL IDENTITY HELP?

FIs could automatically provide customer attributes to merchants, streamlining and securing the transaction process for the merchant and customer. The digital transfer of attributes would eliminate the potential for human error in information transfer and dramatically reduce information remediation and transaction abandonment for the RP.

Note: This automatic transfer of attributes could be supported by an additional factor of authentication (e.g. mobile or behavioural authentication) to prevent fraud.



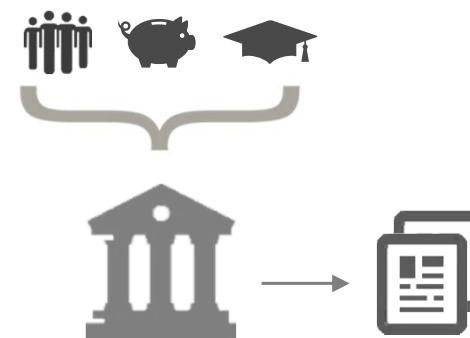
4. DIGITAL TAX FILING

CURRENT STATE:

Individuals and businesses currently file their taxes based on the aggregation of pieces of information from multiple sources (e.g. FIs, employers, educational institutions, etc.).

HOW WOULD DIGITAL IDENTITY HELP?

In collaboration with governments, taxes could be automatically completed and filings generated by customers' chosen FIs, using their complete knowledge of customers' financial holdings, assets, income and personal circumstances. With user consent, all of this information would be available through a robust digital identity network. This would allow the typically complex and tedious tax filing process to be completed efficiently and accurately.



What additional capabilities can digital identity offer to FIs?

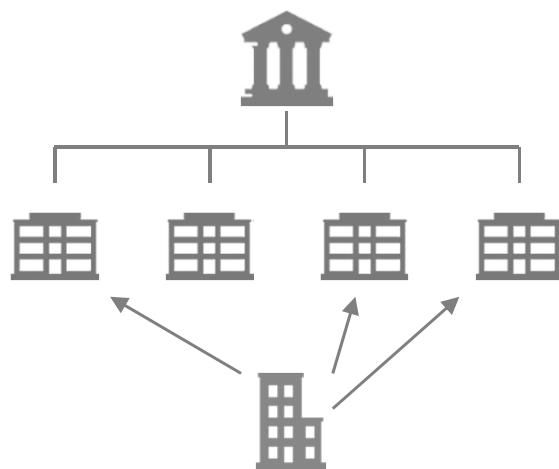
5. DETERMINING TOTAL RISK EXPOSURE

CURRENT STATE:

Legal entities are often unable to determine their total risk exposure to a given counterpart due to complicated ownership structures and difficulty aggregating a complete view of a legal entity.

HOW WOULD DIGITAL IDENTITY HELP?

Transaction counterparties could have a consolidated view of the corporate structure of the entities with which they are transacting, allowing them to determine their total risk exposure to that entity across transactions and lines of business.



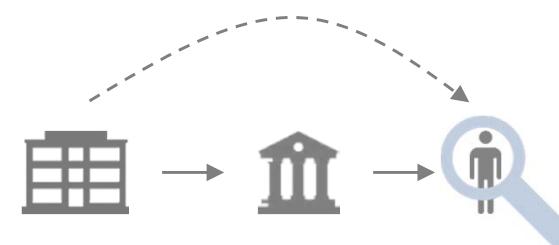
6. IDENTIFYING TRANSACTION COUNTERPARTIES

CURRENT STATE:

It is currently challenging or impossible for entities to identify all entities that are participating in a given transaction; they may not have visibility into the end customer in a transaction that is being completed by a broker or other counterparty.

HOW WOULD DIGITAL IDENTITY HELP?

Legal entities could request visibility into the consolidated identity of a third party and the ownership history of a given asset involved in a transaction. This would allow them to identify both the direct customer and the end customer in the transaction, better informing the decision of whether to complete the transaction.



What additional capabilities can digital identity offer to FIs?

7. LINKING INDIVIDUAL IDENTITY TO CORPORATE IDENTITY

CURRENT STATE:

Individual and corporate identity information is currently not linked; it is challenging to identify individuals who are associated with corporate entities.

HOW WOULD DIGITAL IDENTITY HELP?

The digital and standardized collection, storage and transfer of attributes for both individuals and legal entities would ensure identity information is accurate and up-to-date. Linkages between these systems would create reliable pictures of the identities of individuals affiliated with legal entities for know-your-customer and other purposes.



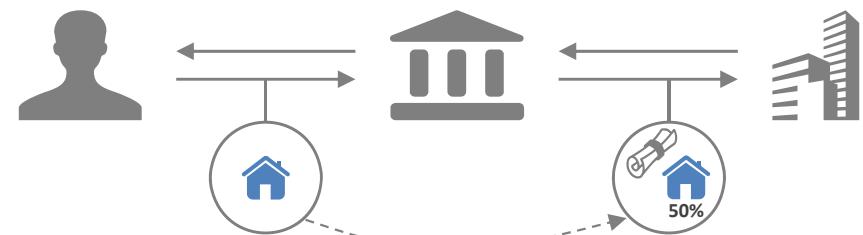
8. TRACKING TOTAL ASSET REHYPOTHECATION

CURRENT STATE:

The transaction and ownership history of assets can become ambiguous as assets are rehypothecated; this exacerbates counterparty risk and asset valuation uncertainty, while the lack of a historical tracking mechanism prevents the enforcement of limits on the extent of asset rehypothecation.

HOW WOULD DIGITAL IDENTITY HELP?

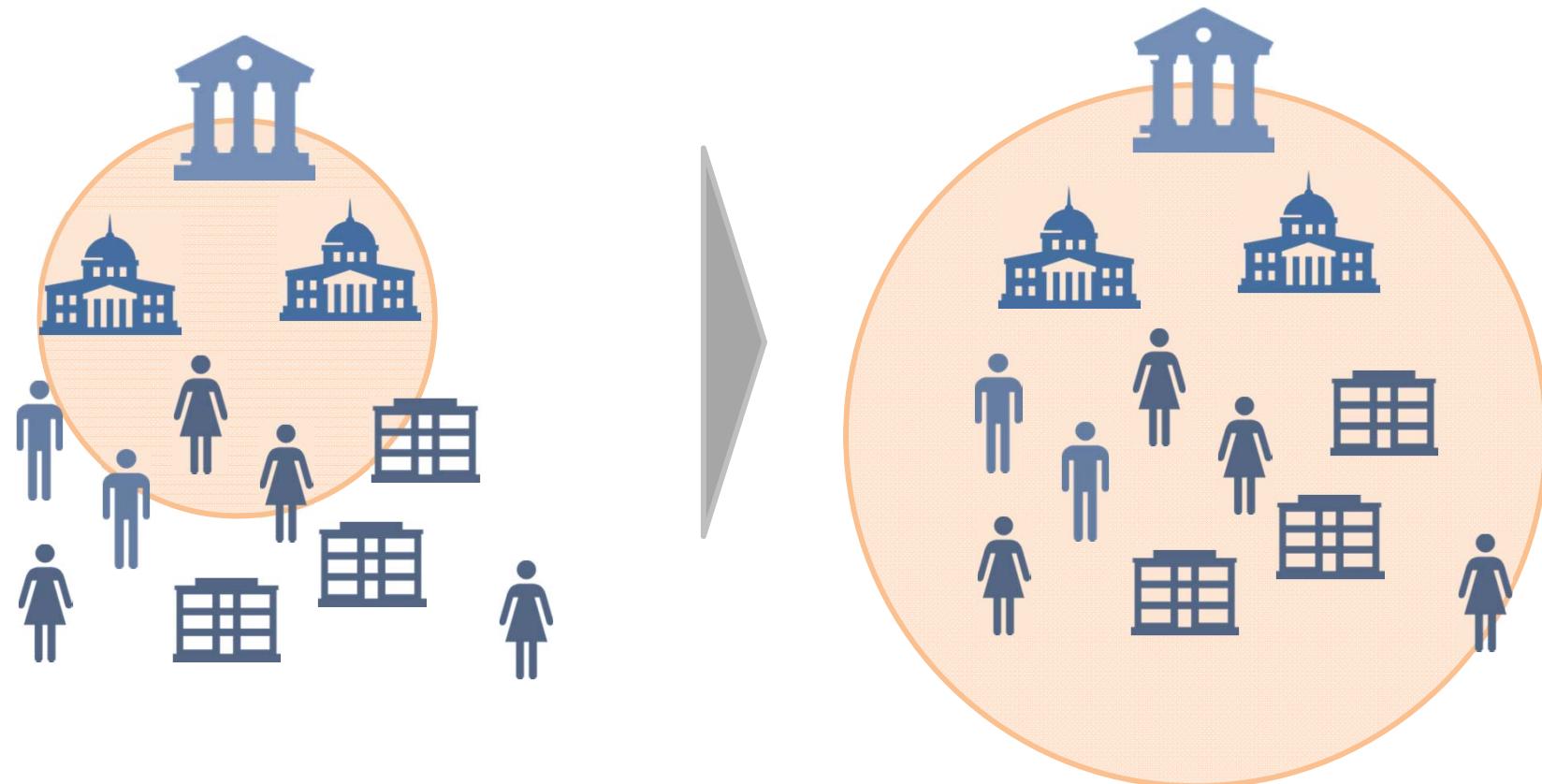
Consolidated, standardized and digital identity information for assets would be available to all entities engaging in a transaction involving that asset, giving transaction counterparties the ability to check asset information, such as issuer and transaction history; this would enable the tracking of the asset ownership structure and composition, and prevent over-rehypothecation due to the lack of visibility into past transactions involving that asset.



Implementation of Identity Systems

Implementation of a digital identity system should follow a bottom-up approach

We have outlined our perspective on the prime movers within digital identity solutions and how they should implement digital identity solutions. It is critical to observe that this is the first step in a bottom-up approach that would result in systems being scaled outwards to incorporate greater numbers of users, relying parties and identity providers as guidelines and functionality are tested and refined.



The system is launched with a critical mass of parties to test and refine

The system is scaled to increasing numbers of users, relying parties and identity providers

Global identity will never exist as a monolith

This document has laid out a principles-based approach to building effective, sustainable and bounded natural identity networks as the foundation for interconnecting individual identity networks. There will never be a single, global solution for identity.

Identity serves different needs

Different user groups have different needs and requirements for identity. Identity systems for individuals are designed to increase the ability of users to perform transactions in a safe and secure manner. Identity systems for legal entities are intended to enable comprehensive aggregation at a macro level – whether to determine total exposure to a single legal entity or manage systematic risk and stability. Identity systems for assets are designed to allow tracking and provide transparency around ownership and value. Privacy is one of the key requirements of individual identity, but is much less important in legal entity and asset identity and may even interfere with the larger purposes of these systems. Individuals have self-determination, whereas legal entities and assets have custodians who act on their behalf.

Identity is cultural

Identity is hugely affected by cultural and geopolitical factors. For example, while some populations are comfortable having a national ID card, this system has failed in other jurisdictions. Certain authorities may not be a stable government to drive the creation and adoption of digital identity.

This means that, aside from having different configurations for purely practical reasons, identity systems will differ dramatically to suit the cultural and geopolitical needs that they serve.

There is no one-size-fits-all for identity.

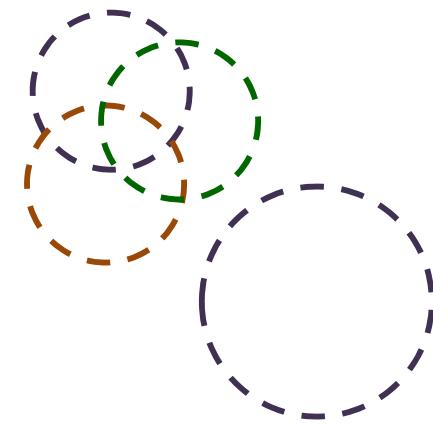
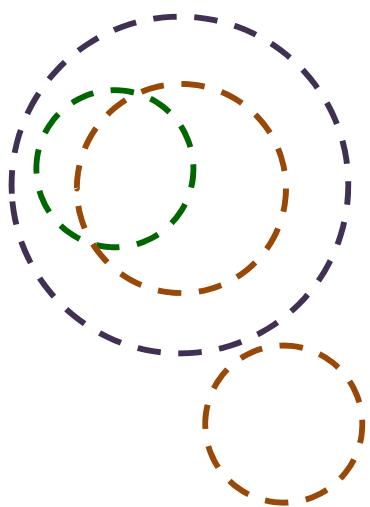
A global system for identity therefore initially requires the construction of discrete identity networks, and then the creation of rails between them

Creating a global solution for identity is a two-step process: the key to building a global system for digital identity is first building successful natural identity networks that address the unique needs and preferences of their user group and situation, and then building connective tissue that creates interoperability between these systems.

1

Implementation: Configuring natural identity networks

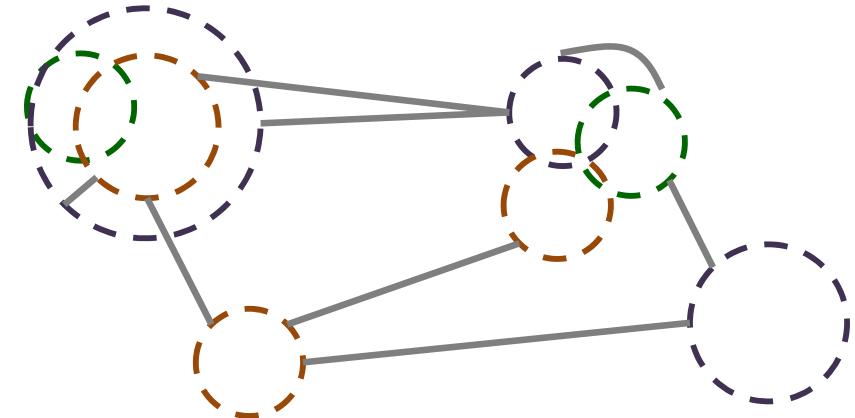
The configuration of natural identity networks will be guided by the decisions made against the primary and secondary dimensions of choice



2

Interconnection: Building the rails for global identity

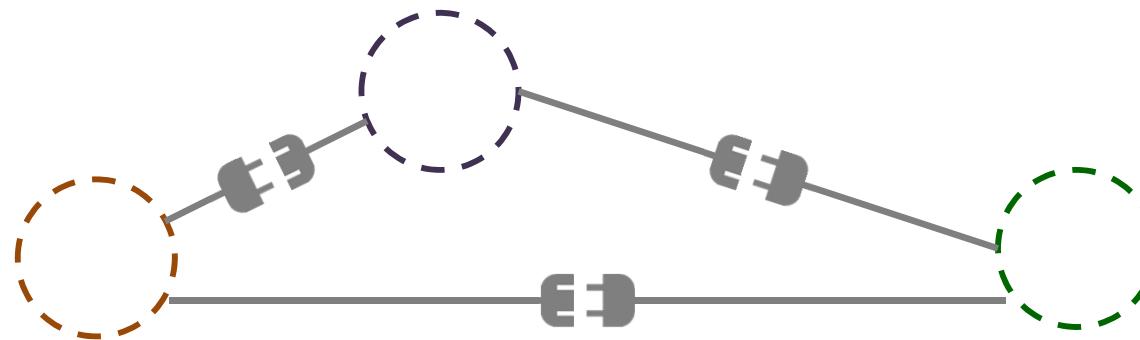
Building the rails between natural identity systems will create global interconnection and interoperability



While the rails for global identity will begin to emerge as systems develop, it is important that entities follow a guiding framework

Building identity as a two-step process enables identity systems to be built by narrowing the required stakeholders to groups that have similar needs and concerns, and therefore have relatively aligned incentives. It also ensures that these systems are tailored to the specific needs and wants of their user and stakeholder groups and will therefore gain the uptake that a top-down, one-size-fits-all system would not attain. However, these solutions should also be built following a common framework that will ensure interoperability by defining the features, attributes and requirements of the identities that are exchanged in the system. This reinforces the need for individual identity systems to be built by entities such as financial institutions that have experience working together to define standards, and then building individual systems within these standards.

Implementing discrete digital identity systems that suit the unique needs and cultural factors of users in their own jurisdictions, and designing these systems around resilience, interoperability and interconnection, will allow a global blueprint for digital identity to emerge.



There are many standing questions and uncertainties that must be considered in the creation of new identity systems

SOME THOUGHT STARTERS TO BUILDING IDENTITY SOLUTIONS

Drivers of identity systems will need to consider many detailed tactical questions in the configuration and implementation of their own identity solutions. We have provided some example questions and uncertainties below.

- Which entities need to be involved in an identity system for your area and user group – governments, regulators, financial institutions, consumer groups, others?
- What business model that will be sustainable in that situation – user pays, relying party pays, government pays? By transaction, subscription, subsidized through other services?
- What governance structure is necessary for the system – who should be involved, what should be the extent of their mandate, how will governance be renewed and refreshed?
- What is the minimum viable identity product required for that situation – what users should be involved, what services need to be covered, which entities should be involved, what metrics are being tested?
- Which frameworks and standards can be adopted for the identity system?
- Which components of the identity stack must be proprietary, and which ones can be outsourced or obtained through partnership?
- What technology platform is required for the system?
- What is the best method of communicating system functionality and benefits to users?

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The Future of Financial Services

How disruptive innovations are reshaping the way financial services are structured, provisioned and consumed

An Industry Project of the Financial Services Community | Prepared in collaboration with Deloitte

Final Report • June 2015

Forward

Consistent with the World Economic Forum's mission of applying a multi-stakeholder approach to address issues of global impact, the creation of this report involved extensive outreach and dialogue with the financial services community, innovation community, academia and a large number of financial technology startups. The dialogue included numerous interviews and interactive sessions to discuss the insights and opportunities for collaborative action.

Sincere thanks are extended to the industry experts and emerging disruptors who contributed their unique insights to this report. In particular, the members of the Project's Steering Committee and Working Group, who are introduced in the following pages, played an invaluable role as experts and patient mentors.

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Table of Contents

Acknowledgements.....	4
Executive Summary.....	10
Reading Guide.....	24
Detailed Research Modules.....	27
Payments:	
<i>How will customer needs and behaviours change in an increasingly cashless payments landscape?.....</i>	28
<i>How will the evolution of decentralised or non-traditional payment schemes change the role of traditional financial institutions?</i>	43
Insurance:	
<i>How will disaggregating forces across the value chain transform the insurance industry?</i>	58
<i>How will an ever more connected world impact the value delivered by insurance providers?</i>	72
Deposits and Lending:	
<i>How will emerging alternative models of lending change the market dynamics of traditional lenders?</i>	86
<i>What will be the future role of financial institutions in response to continually shifting customer preferences?</i>	100
Capital Raising:	
<i>How will the evolution of distributed capital raising impact the role of traditional intermediaries?</i>	112
Investment Management:	
<i>How will the empowerment of individuals through automated systems and social networks transform the business of investment management?.....</i>	127
<i>How will the externalisation of key processes transform the financial ecosystem?</i>	139
Market Provisioning	
<i>How will smarter and faster machines transform capital markets?</i>	153
<i>What impact will better connected buyers and sellers have on capital markets?</i>	163
Contact Details.....	178



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Executive Summary

The mandate of this project was to explore the transformative potential of new entrants and innovations on business models in financial services

Project Context

We set out to address three major problems that have prevented a comprehensive understanding of the state of disruptive innovation in the industry:

- There is no common taxonomy or understanding of which innovations are the most relevant
- There is no clear understanding of the evolutionary path of emerging innovations
- The implications of those evolutions on incumbent business models are unclear, creating significant uncertainty for traditional players as they strive to react to growing competitive pressures

Project Approach

We structured our research around three main questions, each requiring distinct actions:

1

Which emerging innovations are the most impactful and relevant to the financial services industry?



Action: We identified 11 key clusters of innovations based on how they impact the core functions of financial services

2

How will these innovations impact the ways in which financial services are structured, provisioned and consumed in the future?



Action: We considered a range of scenarios for the degree and nature of impact each cluster of innovation could have

3

What would be the implications of these changes on customers, financial institutions, and the overall financial services industry?



Action: We analysed the implications of each scenario on customers, incumbent institutions and the overall financial services ecosystem

Over 15 months of research we engaged with industry leaders and innovators through interviews and multi-stakeholder workshops

Industry Leaders

- Oversight, guidance and thought leadership from **16 C-suite executives and 25 strategy officers of global financial institutions**



Innovators

- In-person and phone interviews with **100+ innovative new entrants and subject matter experts**



Global Workshops

- Facilitated **six multi-stakeholder workshops** at global financial hubs with 300+ total participants including industry leaders, innovators, subject matter experts, and regulators

Hong Kong SAR 4 Sep. '14	Tianjin, China 11 Sep. '14	Boston, USA 30 Sep. '14	New York, USA 21-22 Oct. '14	London, UK 2 Dec. '14	Davos, Switzerland 21 Jan. '15



The outcome of this work is the first consolidated taxonomy for disruptive innovation in financial services

Research Framework

We have structured our framework against **six functions** of financial services and **eleven clusters** of innovation.

Functions of Financial Services

Even in an environment of rapid change to the design, delivery and providers of financial services, the core needs those services fulfill remain the same. We have identified six core functions that comprise financial services :

- *Payments*
- *Market Provisioning*
- *Investment Management*
- *Insurance*
- *Deposits & Lending*
- *Capital Raising*

Clusters of Innovation

We have identified 11 clusters of innovation exerting pressure on traditional business models



We have synthesised six high level insights on innovation in financial services

Key Research Findings

- 1** Innovation in financial services is **deliberate and predictable**; incumbent players are most likely to be attacked where the **greatest sources of customer friction** meet the **largest profit pools**
- 2** Innovations are having the **greatest impact** where they employ business models that are **platform based, data intensive, and capital light**
- 3** The most **imminent** effects of disruption will be felt in the banking sector; however, the greatest **impact** of disruption is likely to be felt in the insurance sector
- 4** Incumbent institutions will employ **parallel strategies**; aggressively **competing with new entrants** while also leveraging legacy assets to provide those same new entrants with **infrastructure and access to services**
- 5** **Collaboration** between regulators, incumbents and new entrants will be required to understand how new innovations alter the **risk profile of the industry** – positively and negatively
- 6** Disruption will not be a one-time event, rather a **continuous pressure to innovate** that will shape customer behaviours, business models, and the **long-term structure of the financial services industry**

In the following pages, we have summarised our insights by function and cluster

Insight Summary – Reading Guide

This section provides a summary of our findings, divided by function and clusters within the functions. For each cluster of innovation we have defined the major disruptive trends, summarized the impact, and examined key implications for institutions in that function and cluster.

Function grouping

Innovation cluster

Key trends driving disruption in financial services business model

Summary of the activity that the cluster of innovation is creating

Major implications for financial institutions as a result of activity within the cluster

Function grouping	Innovation cluster		
		 Key Findings Payments	 Emerging Payment Rails
		Cashless World	Emerging Payment Rails
		Key Disruptive Trends <ul style="list-style-type: none"> ●  Mobile Payments ●  Streamlined Payments ●  Integrated Billing ●  Next Generation Security Summary <p>New consumer functionalities are being built on existing payment systems and will result in meaningful changes in customer behaviour</p> Implications for Financial Institutions <ul style="list-style-type: none"> ▪ Financial institutions may lose control over their customers' transaction experience as payments become more integrated ▪ With reduced visibility, becoming the card of first choice among specific customer segments will become critical ▪ Winning issuers will gain visibility into more of customers' spending patterns and build more holistic understanding of customers 	Key Disruptive Trends <ul style="list-style-type: none"> ●  Cryptographic Protocols ●  P2P Transfers ●  Mobile Money Summary <p>The greatest potential for cryptocurrencies may be to radically streamline the transfer of value, rather than as store of value</p> Implications for Financial Institutions <ul style="list-style-type: none"> ▪ As more efficient alternative rails are adopted, the role of traditional intermediaries as a trusted party may diminish ▪ Financial institutions may face a new set of risks (e.g., reputation, security) and regulatory issues as they participate in new rails ▪ Applications of these technologies can expand beyond money transfer to modernise other financial infrastructures



Key Findings | Payments

Cashless World

Key Disruptive Trends



Mobile Payments



Streamlined Payments



Integrated Billing



Next Generation Security

Summary

New consumer functionalities are being built on existing payment systems and will result in meaningful changes in customer behaviour

Implications for Financial Institutions

- Financial institutions may lose control over their customers' transaction experience as payments become more integrated
- With reduced visibility, becoming the default card among specific customer segments will become critical
- Winning issuers will be able to gain visibility into more of customers' spending patterns, build more holistic understanding of customers, and create more competitive offerings

Emerging Payment Rails

Key Disruptive Trends



Cryptographic Protocols



P2P Transfers



Mobile Money

Summary

The greatest potential for cryptocurrencies may be to radically streamline the transfer of value, rather than as store of value

Implications for Financial Institutions

- As more efficient alternative rails are adopted, the role of traditional intermediaries as a trusted party may diminish
- Financial institutions may face a new set of risks (e.g., reputation, security) and regulatory issues as they participate in new rails
- Applications of these technologies can expand beyond money transfer to modernise other financial infrastructures



Key Findings | Insurance

Insurance Disaggregation

Key Disruptive Trends



Disaggregated Distribution



Sharing Economy



Self-Driving Cars



3rd Party Capital

Connected Insurance

Key Disruptive Trends



Smarter, cheaper sensors



Wearables



Internet-of-Things



standardised Platforms

Summary

Emergence of **online insurance marketplaces** and **homogenisation of risks** will force big **changes in insurers' strategies**

Implications for Financial Institutions

- In an increasingly commoditised environment, the risks of customers being more fickle will increase and creating loyalty through innovation will become more important
- Insurers' ability to benchmark against competitors will become more important as customers gain ability to comparison-shop
- With increased margin pressure, insurers will need to increase their size by expanding either scope or scale

Implications for Financial Institutions

- As customer relationships evolve from short-term product-based to long-term advisory, capturing customers early on becomes critical
- As insurers become a hub for customer data, their strategic value within full-service financial institutions will grow
- Forming partnerships with data providers, device manufacturers and other ecosystem participants will be critical to enable connected insurance



Key Findings | Deposits & Lending

Alternative Lending

Key Disruptive Trends



P2P



Lean, Automated Processes



Alternative Adjudication

Summary

New lending platforms are **transforming credit evaluation and loan origination** as well as opening up consumer lending to **non-traditional sources of capital**

Implications for Financial Institutions

- Intensified competition will narrow spread between deposits and loans, decreasing financial institutions' profitability
- As savers turn to alternative platforms, traditional deposits and investment products will be eroded
- Distribution of customers' credit portfolio over a large number of alternative platforms may make it difficult to measure customer's creditworthiness

Shifting Customer Preferences

Key Disruptive Trends



Virtual Banking 2.0



Banking as Platform (API)



Evolution of Mobile Banking

Summary

New entrants will make **meeting customer demands more important**, creating an imperative for banks to **reconsider their roles**

Implications for Financial Institutions

- Financial products will increasingly be offered on a stand-alone basis limiting incumbents' ability to competitively cross-subsidise
- Financial institutions' ability to collaborate with non-traditional players and other institutions will become essential
- Financial institutions will need to choose where they will specialise and where they will leverage external partners (e.g., product manufacturing vs. creation of customer experience)



Key Findings | Capital Raising

Crowdfunding

Key Disruptive Trends



*Empowered Angel
Investors*



*Alternative
Adjudication*

Summary

Crowdfunding platforms are **widening access** to capital raising activities, making **the overall ecosystem richer**

Implications for Financial Institutions

- Access to more diverse funding options allow new companies to grow at a quicker pace and shorten the average time between early funding stages
- Distribution platforms create a venue for investors to tailor their investment portfolio across dimensions beyond financial return
- As the barriers to enter the asset class fall, it becomes ever more important for traditional intermediaries' profitability to find undiscovered "start" investments



Key Findings | Investment Management

Empowered Investors

Key Disruptive Trends



*Social
Trading*



*Automated Advice &
Wealth Management*



*Retail Algorithmic
Trading*

Summary

Robo-advisors are improving **accessibility to sophisticated financial management** and creating **margin pressure**, forcing traditional advisors to evolve

Implications for Financial Institutions

- New entrants will place pressure on margins and intensify competition among traditional players in more specialised segments
- As more advisory functions become automated, distributing wealth products via proprietary advisory channels will become less effective
- As new entrants widen the access for mass customers, they will compete for customers' traditional savings deposits

Process Externalisation

Key Disruptive Trends



*Advanced
Analytics*



*Natural
Language*



*Process-as-a-
Service*



*Capability
Sharing*

Summary

The **scope of externalisable processes is expanding**, giving financial institutions access to the new levels of **efficiency and sophistication**

Implications for Financial Institutions

- The ability to access sophisticated capabilities without large infrastructure investments flattens the playing field for mid-sized institutions
- Organisational agility will become critical to sustain competitiveness as high-value capabilities are continued to be commoditised
- Externalisation of capabilities may result in workforce skill loss by preventing the development of a holistic view of operations



Key Findings | Market Provisioning

Smarter, Faster Machines

Key Disruptive Trends



Machine Accessible Data



Artificial Intelligence /
Machine Learning



Big Data

Summary

As the popularity of high frequency trading declines, the focus of **algorithmic trading** may shift to **smarter, faster response to real-life events**

Implications for Financial Institutions

- The impacts of event-driven algorithmic trading on liquidity, spread and systemic stability are unclear
- With end-to-end trading activities automated, even small errors in data integrity, trade strategy, and execution will lead to large impacts
- Regulators have the potential to significantly alter the course of developments in this area

New Market Platforms

Key Disruptive Trends

ALGOMI

Fixed Income

NOVUS

Funds / Fund
of Funds

BISON

Private Equity /
Venture Capital
Shares

LIQUTY

Private
Company
Shares

ClauseMatch

Commodities &
Derivative
Contracts

Summary

New information platforms are **improving connectivity** among market constituents, making the markets more **liquid, accessible, and efficient**

Implications for Financial Institutions

- As traditional differentiators among intermediaries (e.g., ability to discover counterparty) become commoditised, the importance of advisory services will increase
- Information platforms will evolve the standards for best-execution from a best-efforts basis to more quantifiable and comparable metrics

We identified six important themes that cut across functions and touch multiple clusters of innovation

1 Streamlined Infrastructure

- Emerging platforms and decentralised technologies provide new ways to aggregate and analyse information, improving connectivity and reducing the marginal costs of accessing information and participating in financial activities

2 Automation of High-Value Activities

- Many emerging innovations leverage advanced algorithms and computing power to automate activities that were once highly manual, allowing them to offer cheaper, faster, and more scalable alternative products and services

3 Reduced Intermediation

- Emerging innovations are streamlining or eliminating traditional institutions' role as intermediaries, and offering lower prices and / or higher returns to customers

4 The Strategic Role of Data

- Emerging innovations allow financial institutions to access new data sets, such as social data, that enable new ways of understanding customers and markets

5 Niche, Specialised Products

- New entrants with deep specialisations are creating highly targeted products and services, increasing competition in these areas and creating pressure for the traditional end-to-end financial services model to unbundle

6 Customer Empowerment

- Emerging innovations give customers access to previously restricted assets and services, more visibility into products, and control over choices, as well as the tools to become "prosumers"



At the conclusion of the research phase, the Steering Committee gave us a mandate to dive more deeply into high-potential areas of disruption

Next Steps

We have identified three major challenge areas related to innovation in financial services that will require multi-stakeholder collaboration to be addressed effectively. We are launching a project stream related to each area, with the goal of enabling tangible impact.

The Forum is uniquely positioned to support advancements against each challenge due to its ability to:

- Convene senior multi-stakeholder groups and align diverse perspectives
- Create thought leadership on cutting-edge issues with long-term implications to the industry

Challenges



New financial products and services are creating significant regulatory uncertainty and fueling perceptions of regulatory arbitrage



Decentralised systems, such as the blockchain protocol, threaten to disintermediate almost every process in financial services



Outdated identity management protocols create risks and inefficiencies for both service providers and consumers

Projects



**Regulatory Models
for Innovation**



**Applications of
Decentralised Systems**



**Blueprint for
Digital Identity**

We will be presenting outcomes from these projects in early 2016



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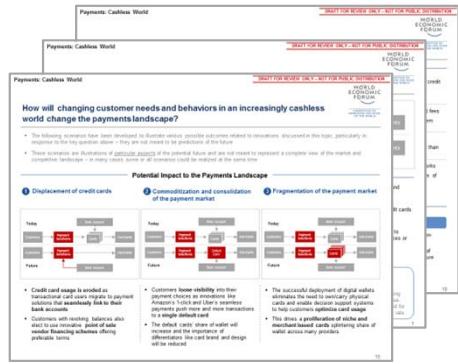
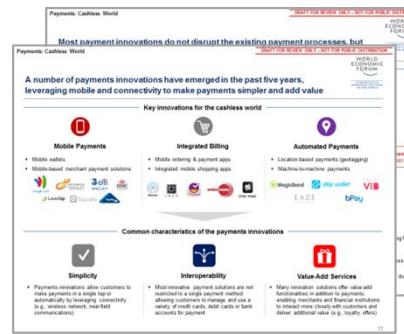
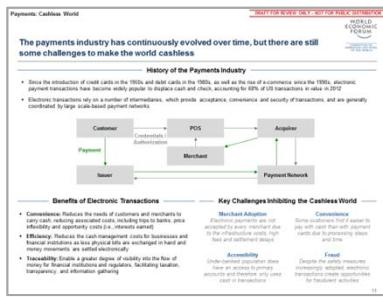
Reading Guide for the Detailed Sections of the Report

The following detailed sections of the report are organised based on key innovation clusters and how they map to the core functions of financial services



We have analysed the relevant cluster of innovations for each key area of impact and developed scenarios that present potential answers

Report Structure



A Background Context

- Brief analysis of current state business models and processes in the impacted function
- Summary of historical developments
- Key pain points and challenges with the current state

B Analysis of Innovations

- Overview of key innovations impacting the topic
- Key characteristics of the innovations
- Impact of the innovations on the current state value chain
- Comparison of the current state models and innovations

C Future Characteristics

- Key characteristics of future models of financial services enabled by innovations for the impacted function

D Scenarios

- Summary of potential outcomes related to the key question for the topic in a scenario format
- Narratives and case studies to further illustrate each scenario
- Necessary conditions required for each scenario to be realised
- Implications of the scenario on customers, incumbents and overall industry
- Key opportunities and risks associated with the scenario

Key insights from the analysis of each topic and relevant cluster of innovations have been summarised in the Executive Summary and Conclusions pages in each module



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Detailed Research Modules

Payments

How will customer needs and behaviours change in an increasingly cashless payments landscape?

Executive Summary

Context / Innovation

- A number of innovations have emerged in the past five years leveraging mobile devices and connectivity to make payments simpler and more valuable. Examples range from digital wallets to automated machine-to-machine payments
- The majority of these innovations will modify front-end processes to improve the customer and merchant experience while leaving the underlying payments infrastructure undisrupted

Future of Payments

- These innovations will reduce the use of cash and make payments less visible to payers. They will also enable financial institutions and merchants to use data-driven customer engagement platforms
 - As more payment solutions allow customers to link their bank accounts for direct payment and seamless point-of-sale vendor financing, the use of credit cards could be displaced by these platforms
 - Customers may lose visibility into their payment choices, increasing their default cards' share of wallet and reducing the importance of some traditional differentiators like brand and design
 - The elimination of a need to carry physical cards and the emergence of payment decision support systems could support the proliferation of niche and merchant issued cards, splintering wallet share among many cards

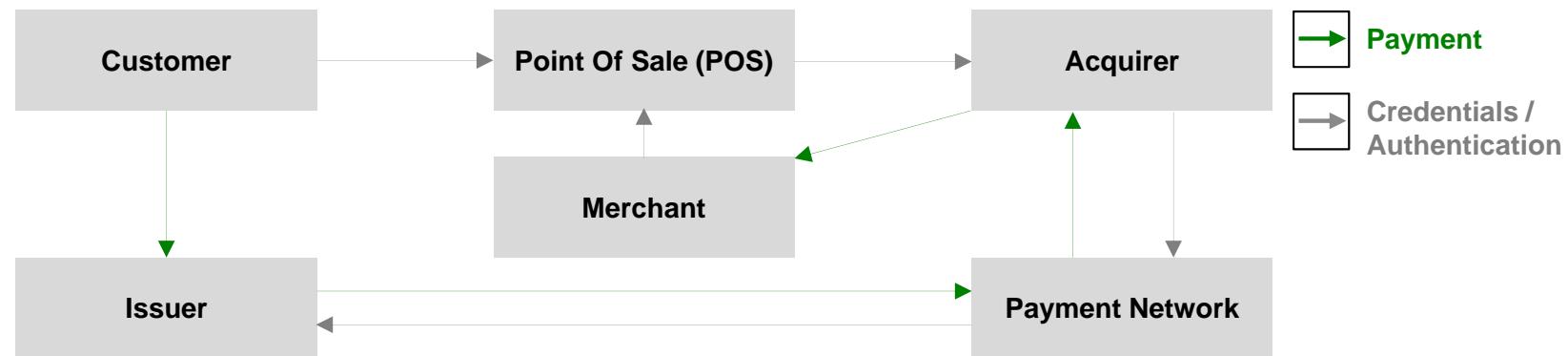
Key Implications

- Success of any innovative payment solution will require a strong customer rationale to switch, as most customers do not consider the existing payment regime to be broken
- In an increasingly cashless future payment providers who can embrace emerging payment innovations to offer differentiated, value-adding digital experiences will be able to deepen their relationships with customers and take a dominant place in the changing market landscape

The payments industry has continuously evolved over time, but there are still some challenges to make the world cashless

History of the payments industry

- Since the introduction of credit cards in the 1950s, debit cards in the 1980s and the rise of e-commerce through the 1990s, electronic payments have grown in popularity, displacing cash and cheques. In 2012 they accounted for 68 percent of U.S. transactions in value
- Electronic transactions rely on a number of intermediaries, which provide acceptance, convenience and security of transactions, and are generally coordinated by large scale-based payment networks



Benefits of electronic transactions

- **Convenience:** Reduces the need for customers and merchants to carry cash, reducing associated costs, including trips to banks, price inflexibility and opportunity costs (i.e., interest earned)
- **Efficiency:** Reduces the cash management costs for businesses and financial institutions as fewer bills are exchanged by hand and money movements are settled electronically
- **Traceability:** Enables a greater degree of visibility into the flow of money for financial institutions and regulators, facilitating taxation, transparency, and information gathering
- **Protection:** Protects customers and merchants from fraud and theft by documenting transaction records and reducing the need to hold cash

Key challenges inhibiting the cashless world

Merchant Adoption

Electronic payments are not accepted by every merchant due to the infrastructure costs, high fees and settlement delays

Accessibility

Under-banked population does not have access to primary accounts and therefore only uses cash in transactions

Convenience

Small denomination payments are often still conducted reducing the number of processing steps and time to complete a transaction

Fraud

Despite the safety measures increasingly adopted, electronic transactions create opportunities for fraudulent activities

A number of payments innovations have emerged in the past five years, leveraging mobile and connectivity to make payments simpler and add value

Key innovations for the cashless world



Mobile Payments

- Mobile wallets
- Mobile-based merchant payment solutions



Integrated Billing

- Mobile ordering & payment apps
- Integrated mobile shopping apps



Streamlined Payments

- Location-based payments (geotagging)
- Machine-to-machine payments



Next Generation Security

- Biometrics / location-based identification
- Tokenisation standards



Common characteristics of successful payments innovations



Simplicity

- Payments innovations allow customers to make payments in a single tap or automatically by leveraging connectivity (e.g., wireless network, near-field communications)



Interoperability

- Most innovative payment solutions are not restricted to a single payment method, allowing customers to manage and use a variety of credit cards, debit cards or bank accounts for payment



Value-Add Services

- Many innovative solutions offer value-add functionalities in addition to payments, enabling merchants and financial institutions to interact more closely with customers and deliver additional value (e.g., loyalty, offers)

Most payment innovations do not disrupt the existing payment processes, but rather modify front-end processes to improve customer and merchant experience

How different types of innovative payment solutions interact with today's payment process

Open-loop mobile payment solutions

Allows for increased consumer access by using existing payment network ecosystem to connect to parties already on the platform (including a large number of merchants) and make payments more convenient for customers leveraging new form factors (e.g., NFC, QR code)

Closed-loop mobile payment solutions

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

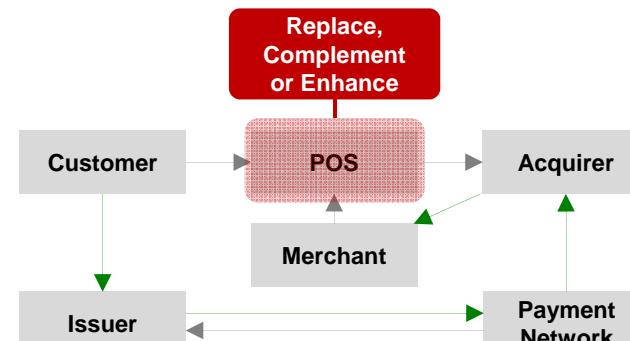
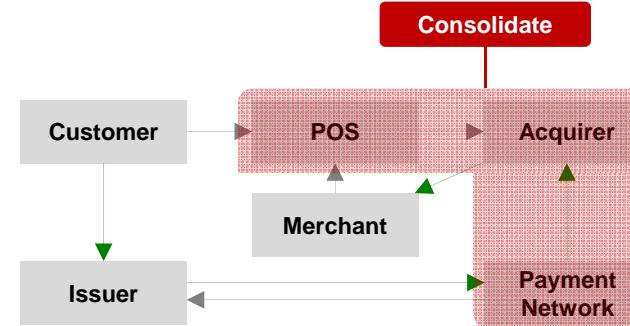
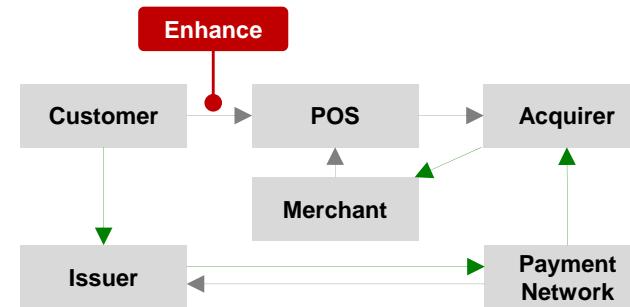
Mobile merchant payment solutions; Integrated payment apps; Streamlined payment solutions

Aims to replace or complement the current POS infrastructure by leveraging mobile connectivity (and aggregate transactions in some cases) to make the payments process more effortless and accessible by more merchants

How They Work

Illustrative Diagram

Examples



→ Payment

→ Credentials / Authentication

Innovations will make payments more cashless and invisible in the future, while enabling data-driven engagement platforms for customers

Key characteristics of the future of payments



Cashless

More cash will be displaced by electronic transactions as payments innovations make it beneficial for customers to use payment cards even in small denomination transactions



Back of Mind

As more transactions become virtual and automated, more payments processes will become invisible to end customers, changing their needs and behaviours



Engagement

As payments and mobility becomes more integrated, the importance of payment transactions as a potential customer interaction point will increase for merchants and financial institutions



Data-Driven

With greater adoption of electronic payments, more data will be accumulated from payment transactions, allowing financial institutions, services providers and merchants to gain greater understanding of customers and businesses



Increased Access to Loans

As more payments are processed through electronic rails, financial institutions' visibility into individuals' and businesses' cashflow and spending patterns will increase, improving their ability to extend loans to customers previously less understood



Reduced Costs

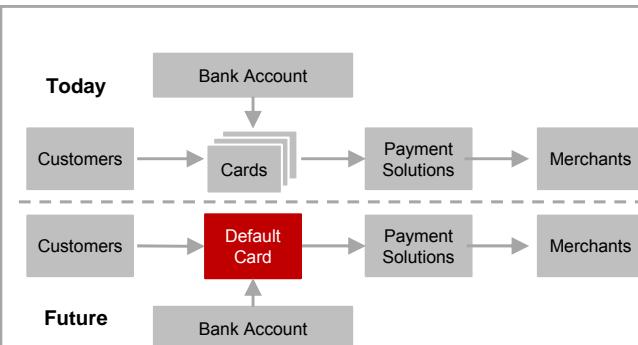
Because innovative solutions build on the existing infrastructure, which has very low variable costs, the cost of making electronic transactions will fall as electronic payments gain more volume

As innovations change customer behaviours by making payments more effortless and provide financial institutions and merchants with data, what will be the payments landscape in the future?

How will changing customer needs and behaviours in an increasingly cashless world change the payments landscape?

Potential impact on the payments landscape

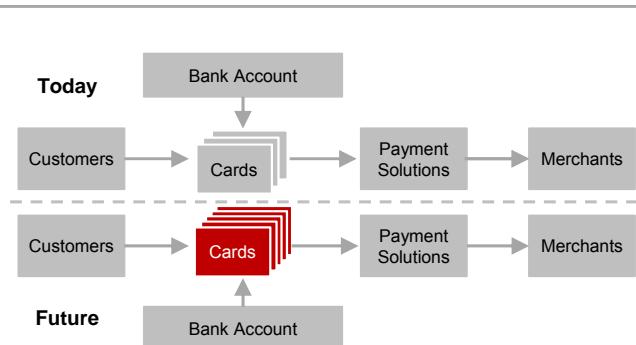
1 Consolidation of the Payment Market



Key change to payment behaviour

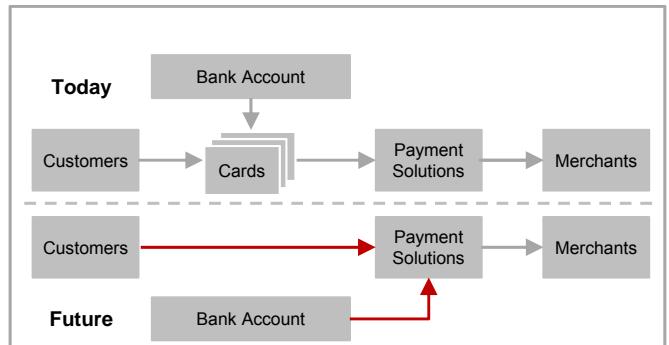
- Customers **lose visibility** into their payment choices as innovations like Amazon's 1-click and Uber's seamless payments push more and more transactions to a **single default card**
- The default cards' share of wallet will increase and the importance of differentiators like card brand and design will be reduced

2 Fragmentation of the Payment Market



- The successful deployment of digital wallets eliminates the need to own/carry physical cards and enable decision support systems to help customers **optimise card usage**
- This drives a **proliferation of niche and merchant issued cards**, splintering share of wallet across many providers

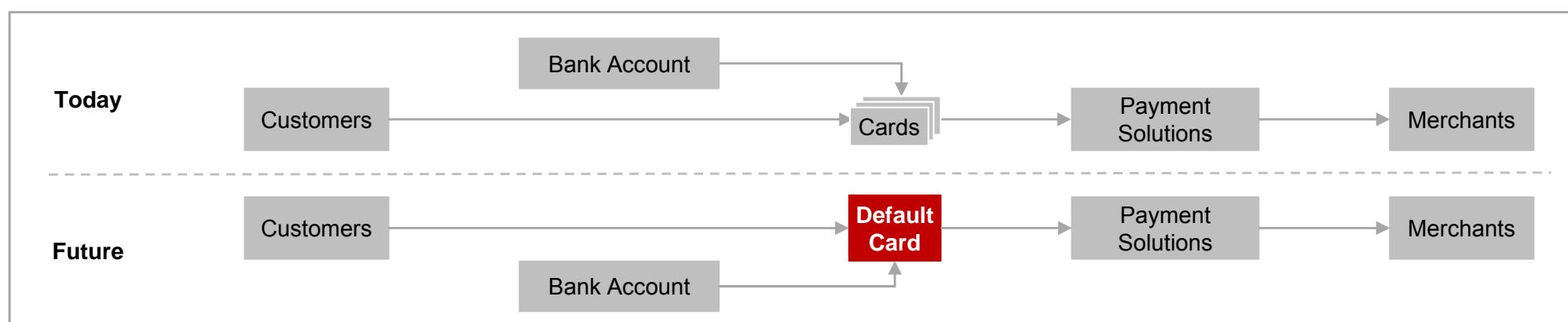
3 Displacement of Credit Cards



- Customers with revolving balances elect to use innovative **point of sale vendor financing schemes** offering preferable terms
- Credit card usage is eroded** as transactional card users migrate to payment solutions that **seamlessly link to their bank accounts**

- The following scenarios illustrate potential outcomes generated by the innovations discussed in this topic, particularly in response to the key question above – they are not meant to be future predictions
- These scenarios are illustrations of particular aspects of the potential future and are not meant to represent a complete view of the market and competitive landscape – in many cases, some or all scenarios could be realised at the same time

Scenario 1: Consolidation of the payment market (1 / 2)



Narrative

To avoid “moments of truth” in customer decision-making, more merchants and payment solutions will adopt an automated or one-click / one-touch / one-tap check-out in both virtual and physical marketplaces. These “seamless” check-out environments will rely on a default card that will be used unless customers make a conscious choice to change cards. As a result, default cards will become significantly stickier and receive a higher share of total customer spend.

Card issuers will respond to the changing landscape by developing products that provide the best loyalty points and benefits in aggregate to compete for the role of the default card.

Summary of impact

- Customers lose the desire to regularly use a variety of cards as payment innovations enable a seamless transaction experience in one-click / one-touch or less
- Driven by simplicity and convenience, customers push more transactions to a single default card, increasing the default card's share of wallet
- As customers' desire to switch cards decreases, traditional differentiators like card brand and design may become less prominent, making it more difficult for card issuers to differentiate

Case studies



In-app purchases within mobile apps can turn traditional physical purchases into online purchases and combine purchase and payment into a single tap, eliminating the step for payment method selection



Virtual payment processing services store customers' payment credentials and allow customers to use those credentials in one-click or tap to maximise convenience and improve security

Scenario 1: Consolidation of the payment market (2 / 2)

Necessary conditions for the scenario

- Availability and widespread adoption of seamless payment solutions to a large number of customers and at a large proportion of everyday-spend merchants
- Customers' willingness to relinquish control over payment options (e.g., convenience over control)

Implications of the scenario on...

Customers

- Less complex and time-consuming customer experience at check-out
- Decreased cognitive effort on payment selection

Merchants

- Reduced friction and improved efficiency at check-out
- Issuers seek to incentivize merchants to influence consumers to load their cards

Incumbents

- Increased competitive intensity among existing players to become top of wallet
- Marginalisation of niche players

Overall Ecosystem

- Reduction in the number of credit card providers
- Increased stickiness to those surviving card issuing institutions

Opportunities and risks associated with the scenario

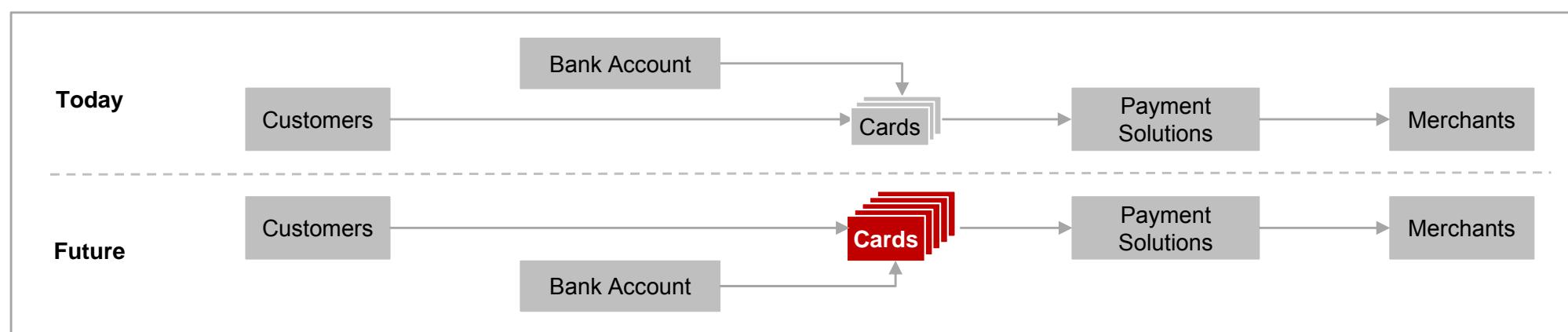
Opportunities

- Development of more personalised rewards programs for cards to attract and retain customers

Risks

- Over time, potential decrease in the number of available card choices as consumers use fewer cards, leading to decreased competition and innovation

Scenario 2: Fragmentation of the payment market (1 / 2)



Narrative

The adoption of digital wallets will free consumers from physical limitations on the number of cards they can carry, allowing niche cards to gain popularity, particularly in geographies where customers are value-conscious.

This proliferation of cards will encourage the development of decision support systems that interact with digital wallets to help customers choose the best card for each purchase. As a result, owning and using multiple payment cards will no longer hinder the delivery of a seamless customer experience, prompting further proliferation of niche / merchant-issued cards.

Summary of impact

- The successful deployment of digital wallets eliminates the need to carry physical cards and virtually removes the limitations on the number of payment cards customers can carry and use
- Proliferation of digital wallets also enables decision support systems to help customers optimise card usage by automating card selection based on loyalty points and other benefits
- This drives a proliferation of niche and merchant-branded cards, optimised for specific purchases, splintering share of wallet across many providers

Case studies



Currently, customers can add multiple payments cards (credit and debit) to leading digital wallets (e.g., 8 for Apple Pay, unlimited for Google Wallet), and pick and choose a payment card for each transaction with few additional clicks / taps



While currently not integrated with digital wallets, decision support systems run on mobile and wearable devices to automatically recommend the optimal payment option among payment cards added by the customers to maximise the overall rewards

Scenario 2: Fragmentation of the payment market (2 / 2)

Necessary conditions for the scenario

- Merchants' widespread acceptance of smart payment solutions or the solutions' successful integration with existing acceptance markets
- Development of payment solutions into platforms surrounded by innovative ecosystems (e.g., increased linkage between mobile wallets and merchant apps, location-based check-out experience creation)
- Proven efficiency and impartiality of recommendations engines' card choice for each transactions, creation of streamlined user experience and differentiated value propositions by smart wallets that will drive consumers to want to adopt the optimisation services

Customers

Implications of the scenario on...

- Able to optimise reward collection without sacrificing seamless experience
- Potential increase in debt as it becomes easier to issue multiple credit cards, offset by spending management functionalities of mobile wallets

Merchants

- Potential decrease in total merchant service charges paid as private-label cards are more widely adopted among each merchant's customer base

Incumbents

- Increased issuance of a greater variety of cards
- Increased competition from new entrants, including merchant credit cards
- Stronger competitive position for niche players

Overall Ecosystem

- Encourage issuers to improve and innovate their product offerings (e.g., rewards programmes, interest rates)

Opportunities and risks associated with the scenario

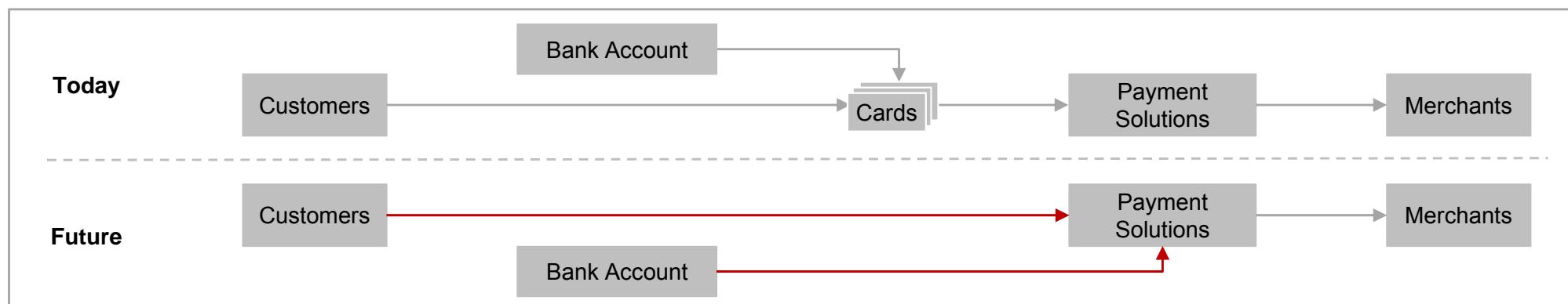
Opportunities

- Opportunities for merchants to directly enter the payments ecosystem via private label solutions and gain deeper understanding of their customers' spending patterns
- Ability for financial institutions to introduce highly specialised rewards programmes to capture specific segments of spend

Risks

- Decreasing opportunities to scale for credit card providers
- Potential decline in the efficacy of rewards programmes if card is only used for most rewarding (lowest margin) transactions
- Displacement of traditional players who are not willing to participate in smart payment solutions
- Potential arms race for rewards and backward optimisation

Scenario 3: Displacement of credit cards (1/3)



Narrative

Today, merchants and payment solutions providers, such as mobile wallets pay higher merchant service charges on credit card-funded transactions than on bank account-funded transactions. To reduce costs, these players will use incentives to encourage customers to switch their funding method from credit cards to bank accounts. At the same time, merchants will adopt data-driven alternative vendor financing solutions that offer customers lower interest rates and provide financing income to merchants.

These innovations will place pressure on credit card transaction volume and interest income; limiting issuers' ability to offer attractive loyalty programmes and reducing competitiveness in the face of merchants who are able to directly offer their own incentives (e.g., loyalty points, special offers).

Summary of impact

- Credit card usage is eroded on two fronts: payment facilitation and revolving lending / loyalty
- Payment solutions that link directly to bank accounts provide an alternative to customers who previously relied on credit cards for payment facilitation
- Point-of-sale vendor financing schemes and merchant loyalty functionalities within new payment solutions further their appeal to customers who currently rely on credit cards for revolving balances or loyalty accumulation

Case studies



Leading mobile payment solutions allow customers to fund their purchases with credit cards and bank accounts and generally earn profits only on bank-funded transactions



Leading mobile payment platforms allow customers to add, manage and use multiple merchant loyalty programmes and enable merchants to directly issue offers to customers



Emerging point-of-sale vendor financing schemes provide revolving or purchase-specific line of credit to replace the need for credit card financing

Scenario 3: Displacement of credit cards (2/3)

Necessary conditions for the scenario

- Create incentives for customers to switch their funding methods
 - Merchants' willingness to transfer financial incentives to customers to be more appealing than the rewards offered by card issuers
 - Sufficient trust needs to build with wallet providers, alternative lending providers and loyalty providers
- Development of alternative financing providers that can offer comparable user experience and efficiency as credit cards (e.g., seamless application process at POS and efficient loan servicing)
- Cooperation of bank account providers and payment solution providers to allow a seamless connection of payment vehicle and account, including sufficient data visibility for real-time decisioning and authorisation
- Clearly defined liability rules across all ecosystem participants and payment solutions' ability to provide zero liability for consumers while offering higher rewards
- Bank account providers' willingness to take on credit risk
- Fraud monitoring that maintains fraud levels near those of the current payment networks
- Development of wallet solutions and business models that do not impose large adoption costs to merchants and have a strong business case
- Acceptance infrastructure of providers must be ubiquitous enough to build customer use patterns

Implications of the scenario on...

Customers

- Shift in financial incentives from card-driven rewards programmes to direct savings from merchants
- Potential savings from lower transaction fees if bank account / wallet providers can adopt security innovations and offer protection at a lower cost than current credit card fees

Merchants

- Cost reduction due to elimination of credit card fees, potentially offset by passing on savings to customers and increased fraud costs
- Exert greater control in the payments ecosystem

Incumbents

- Reduced fee revenues
- Transaction accounts become more important than credit cards in customer retention

Overall Ecosystem

- Potential disintermediation of credit card networks
- Entrance of technology companies as providers of alternative payment networks

Scenario 3: Displacement of credit cards (3/3)

Opportunities and risks associated with the scenario

Opportunities

- Encouragement of more prudent spending patterns by customers as revolving credit lines are replaced by case-by-case loans
- May increase check-out conversion for merchants

Risks

- Fragmentation of payment solutions leading to proliferation of non-interoperable or nationally exclusive payment solutions
- Increased risk of violations against data protection and security of transactions due to replacement of proven credit card infrastructure with immature alternative payment solutions
- Lack of clear liability construct could drive confusion across participants
- De-centralisation of payment transactions could drive increased fraud and lower efficacy than existing models

What does this mean for financial institutions?

Key implications and remaining questions

“Safe Bets” – Likely Implications Under All Scenarios

- ! **Reduced control over customer experience:** Financial institutions may lose some or most control over their customers' transaction experience as digital wallets consolidate digital payment platforms
- ! **Customer targeting:** Leveraging data on specific customer segments will become an essential component of strategies to gain a dominant share of wallet among those segments that encourage or drive more frequent usage in a diversified market
- ! **Merchant relationships:** Financial institutions' ability to partner with merchants will become critical component of strategies to drive merchant-specific usage, enable merchant-issued credits, or become a preferred card on merchant platforms
- ? How will issuers create differentiated customer experience when their control over customer experience is taken over by digital payment platforms?

Scenario 1: Consolidation of the payment market

- ! **Competitiveness of bank-issuers:** Large stand-alone issuers or network issuers may gain competitive edge over bank-issuers using their scale to consolidate the market
- ! **360° view of customers:** Issuers that consolidate their customers' share of wallet will gain visibility into most of their payment activities, leading to valuable data on their lifestyles and preferences
- ? What will be the characteristics of issuers who successfully consolidate the market?
- ? To what degree can and should financial institutions leverage the enhanced view of customers to deliver more value?

Scenario 2: Fragmentation of the payment market

- ! **Customer retention:** As consumers spread purchases over a larger and larger number of cards, the credit card will lose its significance as a key anchor of customer retention for financial institutions
- ! **Distributed credit:** It will become more difficult for individual financial institutions to assess customers' credit worthiness as their credits become distributed over multiple cards
- ? How will retail financial institutions generate customer loyalty and stickiness in the future?

Scenario 3: Displacement of credit cards

- ! **Shift in credit business models:** As new credit vehicles displace credit card based borrowing the overall profit models of retail financial institutions will be forced to change
- ! **Loyalty programmes:** Financial institutions will need to create new ways to promote customer loyalty as lower fees on bank account transactions disrupt the current credit card loyalty models
- ? How will financial institutions assess their customers' creditworthiness without traditional payment history?
- ? What will the future loyalty models look like on direct payments from bank accounts?

Payments

How will the evolution of decentralised or non-traditional payment schemes change the role of traditional financial institutions?

Executive Summary

Context / Innovation

- The current value transfer system, built on automated clearing houses and intermediary banks, has made it easier for customers to send money across geographies, but many pain points remain to enabling rapid and inexpensive value transfer between countries
- Decentralised currencies and mobile money solutions provide compelling alternatives to traditional value transferring systems by streamlining the intermediating processes

Future of Payment and Settlement Rails

- Driven by competitive pressure from these innovations, the future of value transfer will be more global, faster, more transparent, and cheaper
 - These non-traditional schemes may compete directly with the existing financial ecosystem as alternative payment networks emerge along with a variety of financial products denominated in network's native currency
 - Financial institutions may choose to facilitate the growth of alternative payment networks as a complement to existing networks. They might act as a gateway for value into these networks and launch financial products that are connected to non-traditional payment schemes
 - Alternatively, the non-traditional schemes may act as a catalyst for traditional institutions to develop solutions that fix key pain points in the current value transfer system; potentially by leveraging elements of the non-traditional schemes

Key Implications

- To bring innovations to the traditional value transfer rails, financial institutions must collaborate to identify top priority areas for transformation solve for regulatory complexity

While the rails built on automated clearing houses have enabled value transfer across geographies, many pain points are emerging as customer expectations rise

How do financial institutions facilitate value transfer today?

- While the current “rails” for value transfer between financial institutions are complex and involve many institutions a similar process is used for all transactions; from large institutional transfers to the settlement of retail payments

1 Sender Request

Sender asks their financial institution to transfer an amount to a specific address (using BIC or IBAN codes)

2 Secure Messaging

Sending bank sends a secure message to the recipient bank requesting transfer of the specified amount

3 Flow of Funds

The recipient bank responds to the sender bank’s request for funds via a clearing house or correspondent bank



Evolution of money transfer schemes

- The basic elements of the current value transfer process have been in place for over 150 years
- The concept of “wire transfers” was originated by telegraph companies (e.g., Western Union) who would receive funds for transfer from a sending party and send a telegraph to correspondent branch instructing them to deliver the money to the intended recipient
- The digitisation of this process throughout the latter half of the 20th century improved the security of messaging services and improved the settlement time of clearing house activities

Key pain points with today's schemes

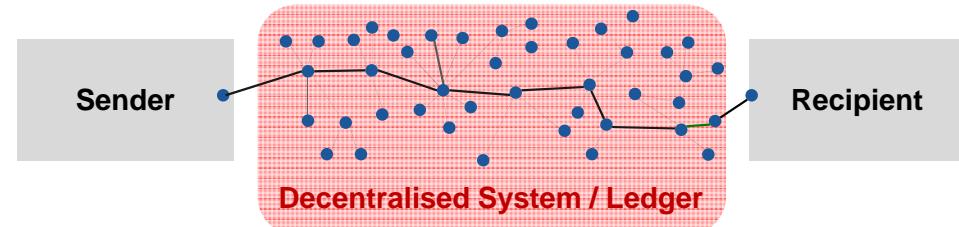
- The actual transfer is not instantaneous: funds may take several hours or even days to move from the sender's account to the receiver's account
- If the sending and recipient banks do not hold reciprocal accounts the payment must be sent to a clearing house or correspondent bank for the assurance of payment for the recipient, adding costs and delays
- The complex structure of requesting the recipient bank to demand payment makes the process more vulnerable to fraud using exposed sender credentials

Decentralised payment schemes leverage cryptographic protocols to transfer value virtually in a secure, low cost, near-instantaneous manner

What are decentralised payment schemes?

- Decentralised networks utilise a common set of protocols to allocate tasks across many individual nodes rather than via a central point
- Email is an example of a decentralised system that uses a common protocol (SMTP) to distribute mail between a vast number of servers
- Decentralised payment systems allow users to transmit value between users, typically secured by a set of cryptographic processes
- Most decentralised payment schemes use a single distributed ledger and denominate payments between users in a native “currency,” often referred to as a “crypto-currency”

Illustrative Distributed Payment Network



How have decentralised schemes developed?

- Digital payment schemes are as old as the internet itself with many notable failures including Beenz, Flooz, and Dicash, and the most notable success being PayPal. However, all of these schemes utilised a centralised network requiring trust by users in a central counterparty
- In 2009 a pseudonymous whitepaper proposed the creation of a distributed ledger where transactions between participants could be processed in a trustless environment via a cryptographic process
- The implementation of this distributed payment protocol is the Bitcoin network and the native currency of the ledger are Bitcoins
- Since 2009 a range of service providers have emerged to support the acceptance of payments via the Bitcoin network
- At the same time, many competing schemes have launched, built on the same underlying concepts but employing different encryption technology or focusing on different use cases

What are some emerging decentralised schemes?



Digital currency run on decentralised payment network



Open-source low-cost (~1 / 1000th of a cent) payments protocol and instant exchange of any form of money or value



Open-source P2P Internet currency enabling instant, near-zero cost payments



Decentralised open source information registration and transfer system

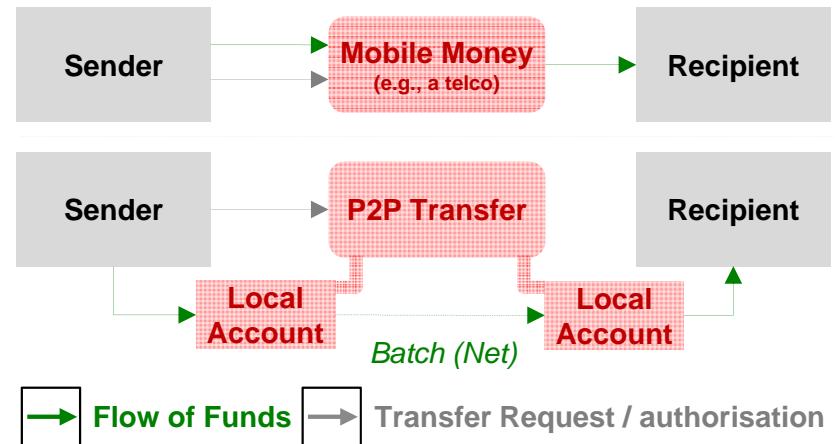
Characteristics of decentralised schemes

- Secured by cryptographic protocols
- Capable of near real-time settlement
- Very low transaction costs
- Frequently open source where changes are governed by a network of participants
- Transparency and traceability of transactions is typically superior to current systems but user identification may be weaker or nonexistent

Mobile monies and P2P value transfer networks rely on a trusted central party to transfer value rapidly across geographies, even in underbanked regions

What are non-traditional payment schemes?

- Mobile money refers to a network that supports payment from one user to another via a mobile device
- A mobile money service may be launched by any firm, not just a traditional financial institution. Mobile money services have been launched by network operators (MPESA) and online retailers (PayPal)
- Transactions may be denominated in a fiat currency or in a form of value issued by the central intermediary
- In developing countries mobile payment solutions have been deployed to extend financial services to the "unbanked" or "underbanked"



How have non-traditional schemes developed?

- In 2002, researchers noted that individuals in Uganda, Botswana and Ghana were spontaneously using airtime as a proxy for money transfer; transferring airtime to their relatives or friends who would then use or resell it
- In April 2007, Kenya's dominant mobile network operator, Safaricom, launched a new mobile phone-based payment and money transfer service, M-Pesa allowing users to deposit money into an account that can be accessed on their cell phones and send balances using SMS
- In January 2011, Transferwise launched a P2P cross-border money transfer service to aggregate and facilitate exchange of foreign currency and transfer needs at the interbank rate

What are some emerging non-traditional schemes?

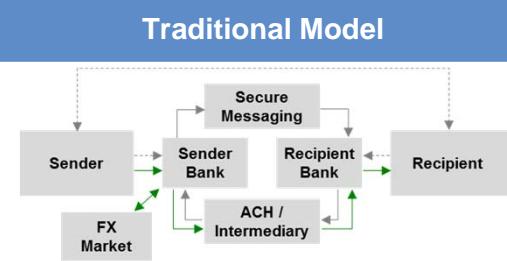
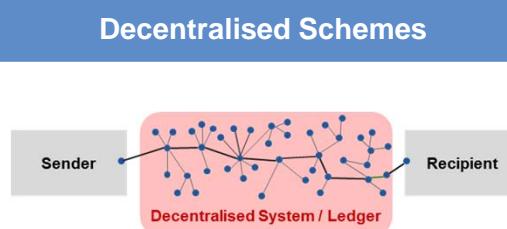
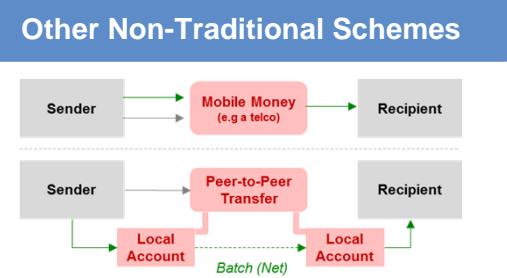


Characteristics of non-traditional schemes

- Transactions are completed rapidly and are highly transparent to both senders and recipients
- Transfer costs are very low and fees are highly transparent
- Many schemes are moving towards open systems, as they build in interoperability with other schemes and traditional outlets (e.g., ATM)
- Does not necessarily require a traditional bank account or well established financial infrastructure making them well suited for financial inclusion goals

While non-traditional payment schemes offer a greater level of efficiency than the traditional rails, their usefulness is dependent on the scale of adoption

How do decentralised and non-traditional schemes differ from traditional money transfer models?

	Traditional Model	Decentralised Schemes	Other Non-Traditional Schemes
Value Chain			
Key Characteristics	<ul style="list-style-type: none"> Processing of transfers is handled by correspondent financial institutions, often facilitated by payment schemes (e.g., SWIFT, Visa, MasterCard) Relies on a central clearing body Transfer is initiated by recipient bank 	<ul style="list-style-type: none"> Value transfer is recorded in a distributed ledger Transactions are managed by a distributed network of processors Sender initiates the transfer 	<ul style="list-style-type: none"> Value transfer is facilitated by a single trusted non-financial 3rd party Relies on the intermediary to keep records and settle the transfer Sender initiates the transfer
Advantages	<ul style="list-style-type: none"> Network is scalable and includes most existing financial institutions Proven ability to manage large capital flows on a global scale Large retail and institutional customer base who are familiar with the model 	<ul style="list-style-type: none"> Transfer history is transparent, traceable and practically unalterable Lower direct costs of transaction due to distribution across the network Lower exposure to conventional fraud Settlement is near real-time; no counterparty risk 	<ul style="list-style-type: none"> Simpler and cheaper transfers Improved user transparency Enables rapid or real-time settlement The reach of the intermediary may exceed that of financial institutions, particularly in developing countries
Shortcomings	<ul style="list-style-type: none"> Limited visibility into value flow for both senders and recipients Prone to fraud when the sender's credentials are exposed Transfer can take days and efficiency varies by countries / institutions High costs / number of intermediaries 	<ul style="list-style-type: none"> High volatility in the value of the native "currency" Regulatory scrutiny creates challenges to connecting with fiat currency ecosystems Anonymity of accounts / irreversibility of transfers creates security issues Higher exposure to unconventional fraud (e.g., large-scale hacking) 	<ul style="list-style-type: none"> Scalability is dependent on the availability / adoption of the intermediary platform Cross border flows of funds can create regulatory challenges

These emerging non-traditional payment schemes will create competitive pressure for the value transfer rails to become faster, cheaper and more borderless

Key characteristics of the future value transfer systems



Global

Geographical distance as a factor in transferring value will continue to narrow and even under-banked regions will be connected



Fast

The time it takes to transfer value between two accounts will be significantly reduced



Transparent

The flow of funds will become increasingly visible and traceable



Secure

The opportunities for fraudulent activities will be largely reduced



Reduced Costs

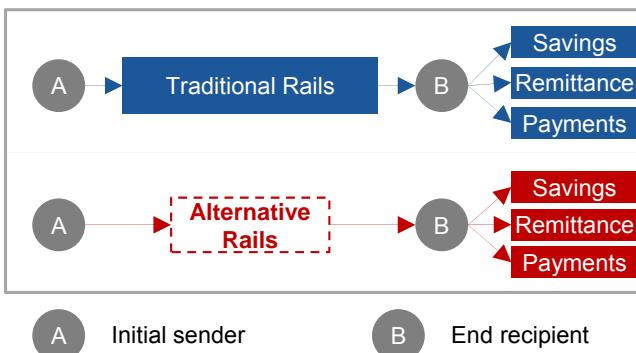
The cost to execute transfers will be minimised with the streamlined and automated rails

In achieving these future state characteristics, how will the evolution of decentralised or non-traditional payment schemes change the role of traditional financial institutions?

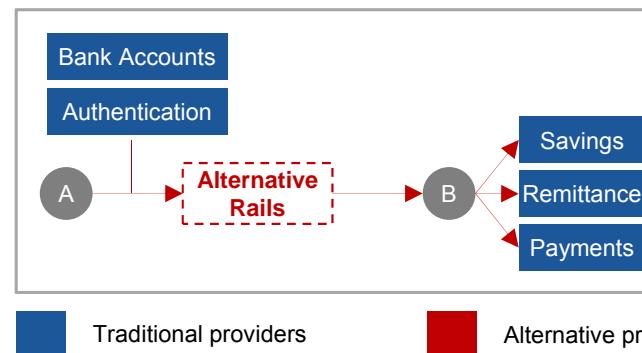
How will the evolution of decentralised or non-traditional payment schemes change the role of traditional financial institutions?

Potential changes to the role of traditional institutions

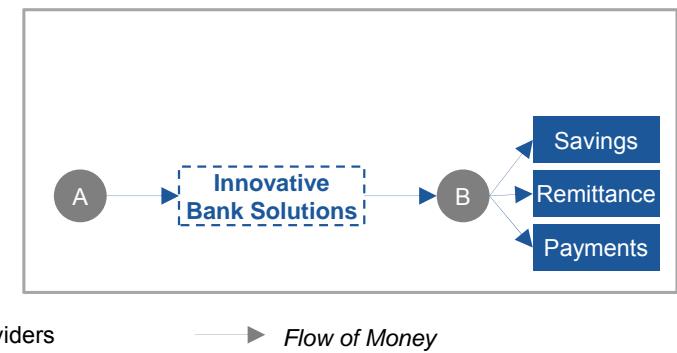
1 Compete with an alternative network of financial providers



2 Facilitate alternative payment schemes as complements



3 Provide leaner, faster payment options within the existing network



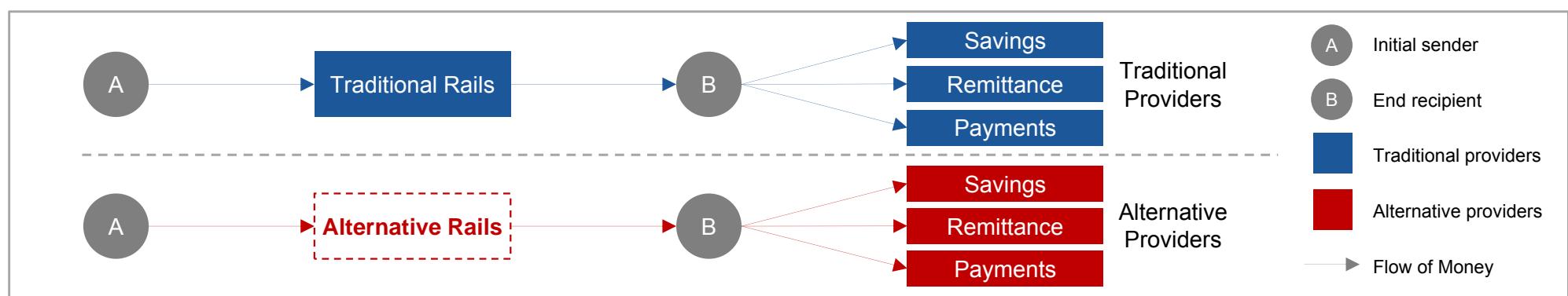
- A network of innovative financial services providers** (e.g., authentication, remittance, savings / lending, insurance, merchant payments) emerge **around alternative payment schemes**
- These services provide customers **a meaningful alternative** to financial institutions by **keeping money entirely within the alternative schemes**

- Traditional institutions** launch financial products that are **connected to alternative payment scheme ecosystems** (e.g., Bitcoin savings accounts, mobile money insurance)
- Financial institutions may also act as **a gateway** to alternative payment schemes (e.g., authentication)

- Alternative payment schemes act as a **catalyst** for traditional institutions to develop new solutions
- Leveraging **elements of alternative schemes**, traditional institutions build more streamlined rails for the movement of money
- These solutions reduce the advantages of alternative payment schemes and **retain the flow of money within** the traditional financial network

- The following scenarios illustrate potential outcomes generated by the innovations discussed in this topic, particularly in response to the key question above – they are not meant to be future predictions
- These scenarios are illustrations of particular aspects of the potential future and are not meant to represent a complete view of the market and competitive landscape – in many cases, some or all scenarios could be realised at the same time

Scenario 1: Incumbent institutions compete with an alternative network of financial providers (1 / 2)



Narrative

With new start-ups providing protection against fraud and fluctuation in value, decentralised schemes (e.g., Bitcoin) gain momentum as a set of rails to transfer value between individuals. In less developed countries, alternative payment schemes (e.g., M-Pesa) become the dominant solution for the under-banked population.

New entrants emerge to manufacture and distribute financial products with a compelling value proposition (e.g., savings accounts, insurance policies, merchant solutions) denominated in the native currencies of these alternative payment networks. As the result, customers no longer need to transfer money out of the scheme to consume these products, further reinforcing the network.

Summary of impact

- A network of innovative financial services providers (e.g., savings / lending, insurance, authentication, merchant payments) emerge around alternative payment schemes
- These services provide customers a meaningful alternative to traditional financial institutions by keeping money entirely within the alternative schemes
- Traditional rails and alternative schemes will stay mostly separated with limited points of interaction

Case studies



Bitcoin exchanges allow customers to securely and quickly transfer value within the Bitcoin network. Bitcoin financial services providers (e.g., bitpay – merchant processor, Coinbase – wallet), in conjunction with those exchanges, strive to provide a competitive value proposition for customers to retain value within the Bitcoin ecosystem



Mobile money solutions (e.g., M-PESA) have led to an increase in financial product offerings from innovative new entrants, across various financial services functions from insurance to savings

Scenario 1: Incumbent institutions compete with an alternative network of financial providers (2 / 2)

Necessary conditions for the scenario

- Low volatility in native currency of the alternative scheme(s)
- A strong rationale for widespread consumer adoption of the alternative scheme(s)
- A strong rationale for widespread merchant adoption of the alternative scheme(s)
- Regulatory acceptance of alternative currency products and low friction transfers between alternative currency and fiat currency stores of value
- Provision of sufficient and efficient entry points into alternative scheme(s)

Customers

- More willing to engage in cross-border commerce
- Finances are split between native and alternative currencies, creating undesirable complexities

Incumbents

- Lower floats as customers shift funds into alternative payment networks
- Price competition with various alternative currency offerings

Overall Ecosystem

- Creation of a parallel ecosystem
- Development of regulatory institutions or expansion of existing regulatory bodies to oversee financial transactions in alternative ecosystems

Opportunities and risks associated with the scenario

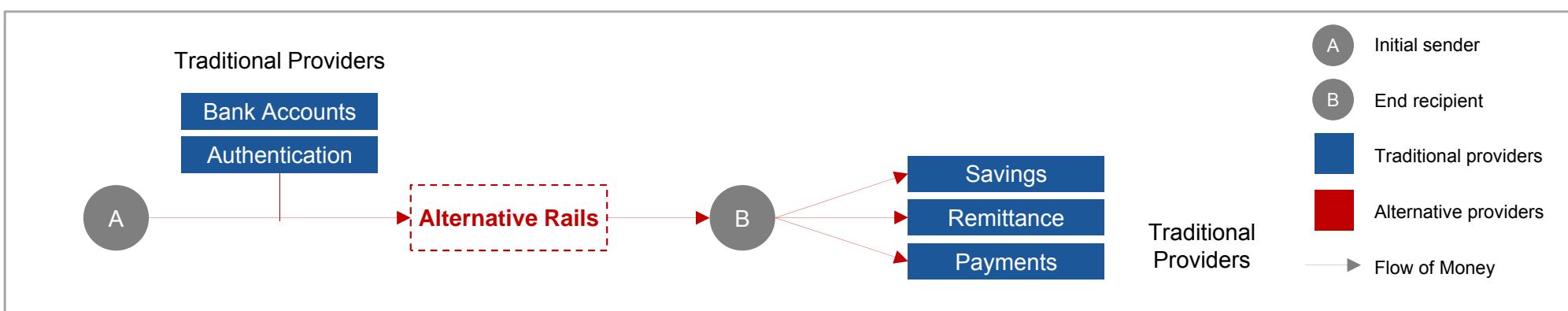
Opportunities

- Competition between established and new ecosystems drives innovation and improvements in both

Risks

- Security of stored alternative currencies is a challenge with a history of significant breaches (e.g., Mt. Gox)
- Regulatory redress in alternative schemes has a number of unsolved challenges
- Unstable alternative currencies lead to “foreign” exchange exposure on domestic transactions

Scenario 2: Incumbent institutions facilitate alternative payment schemes as complements (1 / 2)



Narrative

As the popularity of decentralised and other non-traditional payment schemes grows within customer segments, incumbent institutions make it easier for their customers to transfer value into and out of the alternative rails. Gradually, these institutions leverage their current products and capabilities to begin playing a greater role as a gateway to non-traditional payment networks rails and financial products denominated in alternative currencies (e.g., a Bitcoin denominated bank account).

Alternatively, incumbent institutions could adopt non-traditional schemes as an internal settlement rail to improve efficiency and customer experience. Once these rails are in place, it would be easier for financial institutions to offer products for non-traditional schemes.

Summary of impact

- Traditional institutions launch financial products that are connected to alternative payment scheme ecosystems (e.g., Bitcoin savings accounts, mobile money insurance)
- Financial institutions may also act as a gateway to alternative payment schemes (e.g., authentication)
- Traditional institutions are involved in both alternative payment schemes and traditional rails and in some cases, act as points of interaction

Case studies



Fidor, an online full-service bank, has adopted the Ripple protocol for all internal settlement processes to improve efficiency. If usage of the Ripple protocol were to expand to other banks, it could be easily used for real-time payment and settlement between these institutions with no automated clearing house or correspondent banks required.



CIC, a traditional insurer, launched micro-insurance products (e.g., funeral insurance) that accept payment, and pay out claims in M-Pesa balances to target the under-banked population. These products allow CIC to build loyalty and brand recognition with a future customer base.

Scenario 2: Incumbent institutions facilitate alternative payment schemes as complements (2 / 2)

Necessary conditions for the scenario

- Strong business case for financial institutions to offer products and services connected to alternative schemes (e.g., customer demand vs. reputational risks)
- Trust in reliability, security and sustainability of alternative payment schemes

Implications of the scenario on...

Customers

- Expands the universe of choice between traditional and alternative schemes
- Potential for lower fees to transfer value within the financial system

Incumbents

- Shift from higher margin traditional products to low margin alternative products
- Possibility of a higher level of regulatory scrutiny
- Changes to existing technologies, processes and business models to adapt to alternative schemes

Overall Ecosystem

- Increased focus on cyber security
- Potential for new competition among institutions from different geographies

Opportunities and risks associated with the scenario

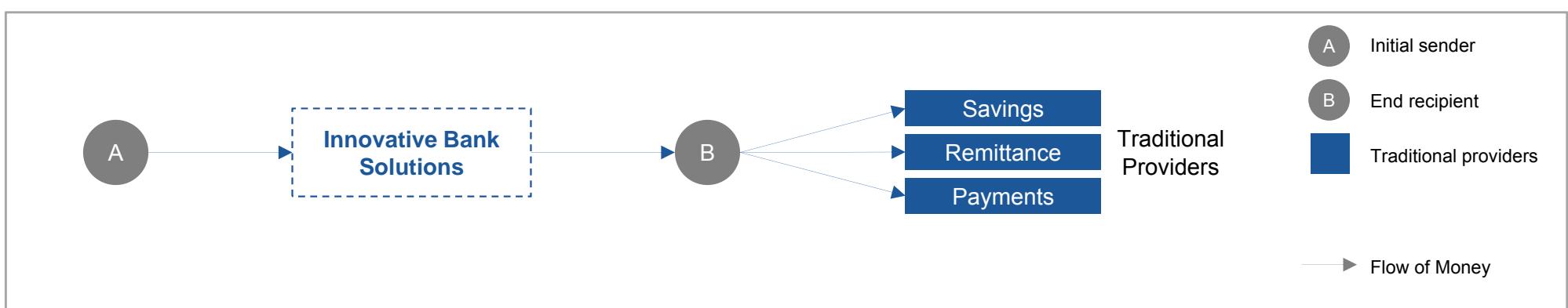
Opportunities

- Improved direct connectivity among institutions as others adopt same alternative schemes
- Ability to leverage financial institution's existing core capabilities to provide better services than alternative competition (e.g., KYC, AML)
- Opportunities for increased efficiency in foreign exchange
- May support financial institutions in providing a more borderless experience for their customers

Risks

- Exposure to security and volatility risks associated with alternative schemes
- Significant regulatory exposure as some alternative schemes are not well understood yet
- Increased reputational risks in case of alternative schemes' failure

Scenario 3: Incumbent institutions provide leaner, faster payment options within the existing network (1 / 2)



Narrative

Increasingly perceiving alternative payment schemes as a threat, traditional financial institutions have intensified efforts to transform their payment and settlement rails. Financial institutions may make major upgrades to existing payment and settlement systems or build on top of them, employing existing or proprietary message sets. Alternatively, financial institutions may leverage innovations developed by alternative payment networks (such as the block chain) to achieve these goals but elect to stop short of using the alternative networks themselves.

As transferring value within the existing financial ecosystem becomes cheaper, faster, more transparent and more global, the incentives for customers to use payment rails from non-traditional providers will decrease in the face of uncertainties associated with these options.

Summary of impact

- Alternative payment schemes act as a catalyst for traditional institutions to develop new solutions
- Leveraging elements of alternative schemes, traditional institutions build more streamlined rail for the movement of money
- These solutions reduce the advantages of alternative payment schemes and retain the flow of money within the traditional financial network
- As a result, alternative payment schemes do not reach maturity and cease to be a serious threat of disintermediation

Case studies



A number of national retail financial institutions launched consortiums to provide a P2P money transfer service to their customers. While some of these services still rely on traditional settlement rails, adoption of more streamlined technologies and processes can improve these transfers making them lower cost and near-real-time.

Scenario 3: Incumbent institutions provide leaner, faster payment options within the existing network (2 / 2)

Necessary conditions for the scenario

- Sufficient competitive pressure for incumbents to invest in development of new rails or major improvements to existing infrastructure
- Incumbents must possess technical capabilities to build and maintain new rails
- Sufficient cooperation among financial institutions and other infrastructure providers globally to set up widely accepted standards, potentially augmenting existing standards to expedite adoption
- Regulatory comfort with new technologies and standards adopted

Customers

Implications of the scenario on...

- Ability to receive higher standard of customer experience without relying on less proven systems
- Receive better prices but potentially not as low as under more disruptive solutions

Incumbents

- Limited disruption of operations or customer relationships
- Improved efficiency in operations
- Introduction of new types of risks and necessary controls
- Potential costs to integrate with new networks

Overall Ecosystem

- Development of leaner, more efficient global system for transfer of value

Opportunities and risks associated with the scenario

Opportunities

- Ability to achieve efficiency and improvements without adding uncertainty of introducing new parties and assets

Risks

- Difficulty implementing new technologies and processes may lead to unforeseen consequences
- Risks of not being able to establish appropriate, widely accepted standards

What does this mean for financial institutions?

Key implications and remaining questions

“Safe Bets” – Likely Implications Under All Scenarios

- !** **Revised margin structure:** Margins on the current payment and settlement transactions will need to be restructured as competitive pressure grows from alternative rails
- !** **Global implementation:** Global settlement infrastructure and emerging markets may present the largest immediate opportunities for the development of alternative rails of payment and settlement given regulatory complexity of developed local markets
- !** **Changing role of trusted intermediaries:** As highly accurate and efficient alternative rail designs are implemented, the role of traditional intermediaries (e.g., payment networks) as a trusted party may diminish
- ?** What are the new roles that trusted intermediaries will play in the future and how will they address key limitations and weaknesses with today's alternative payment and settlement rails?
- ?** How will the new or improved rails for transferring value be deployed, tested and rolled out to minimise unwanted disruption

Scenario 1: Compete with an alternative network of financial providers

- !** **Loss of visibility into customer transactions:** As more financial transactions are conducted via alternative rails, financial institutions will lose visibility into payment history to asset / loan portfolio aspects of some or most of customers' finances
- ?** How will financial institutions assess customers' finance and provide appropriate products when they lose visibility into transactions on alternative rails?

Scenario 2: Facilitate alternative payment schemes as complements

- !** **New sets of risks:** As financial institutions participate in the further development and usage of alternative rails, they will face a new set of risks around reputation, security and compliance that are not under their direct control
- ?** What are the new risks associated with alternative rails for value transfer, and how will they be managed and mitigated by financial institutions?

Scenario 3: Provide leaner, faster payment options within the existing network

- !** **Importance of industry collaboration:** Due to the network-based nature of payment and settlement rails, working with other financial institutions at a global level will become more critical to ensure seamless connectivity for customers
- ?** What is the appropriate participation model for incumbent institutions in establishing new infrastructure and standards for value transfer?

Insurance

**How will disaggregating forces
across the value chain transform the
insurance industry?**

Executive Summary

Context / Innovation

- A number of emerging forces are creating pressure across the insurance value chain, with the potential to redefine the structure of the market
- The rise of online aggregators and the potential entry of technology players could disaggregate the distribution of personal and small commercial policies and separate insurers from the ownership of customer relationships
- The development of autonomous vehicles and advanced sensors will inherently reduce risk with home and auto while the proliferation of sharing economies will homogenize risks. These and other forces are standardising and commoditising individual risks

Future of Insurance Value Chain

- New sources of capital and investment management capabilities, such as hedge funds and investment banks, are aggressively moving in to the insurance industry through innovative securitisation products, offering more cost-effective options to fund policies
 - As the insurance value chain is disaggregated and commoditised, the importance of scale as a source of efficiency may increase, leading to market consolidation
 - Increased use of commoditised personal insurance products in cross sell, along with blurring lines of property ownership, may support the rise of extremely broad multi-line policies
 - Disaggregation of the mass personal lines market may also lead to insurers shifting their focus to niche and commercial markets where traditional capabilities like actuarial skill, underwriting and personal relationships can make bigger differences to performance

Key Implications

- In order to remain competitive in the face of a disaggregating value chain insurers will need to reconsider which core competencies they will invest in to maintain a strong competitive position

The industry has been slowly evolving over the past couple decades, adopting customer centric innovations from other financial services functions

What are the core capabilities of insurers today?

- Insurance is typically considered one of the functions within financial services where the adoption of innovation has been the slowest
- However, over the past decade many innovative practices such as digital channels and process automation have been gradually adopted by many insurers. This has been especially true in personal lines of business while large commercial lines have continued to focus on establishing a “personal touch” across the value chain

- Traditional broker / agent in-person distribution faces significant competitive pressures from digital channels in personal lines
- Distribution partnerships with banks and retailers through white-labelling and over-the-counter products have become increasingly popular
- In some geographies, customer-centric high-touch services have emerged to provide differentiated claims experience (e.g., rapid response teams)
- The adoption of digital channels has begun to replace manual time-consuming processes to empower customers and / or workforce



- Innovation labs within insurance companies are being established to combine brand and product managers with technological and analytical resources
- New products increasingly require integration with 3rd party data providers
- Advanced statistical models are being deployed to understand the correlation between measurable factors and risk (actuarial) using historical data
- A large portion of pricing risks with collected data (underwriting) has been automated over the years to improve accuracy and speed, especially with the advent of out-of-box solutions
- Insurers traditionally deploy their own capital and premiums collected to reserve funds for future claims and invest the rest in various classes of assets to earn investment income. They also reinsurance a portion of their business to reduce exposure to catastrophic risks
- The amount of reserve capital required and allocation of investment assets allowed are mandated by regulatory bodies and limits insurers' underwriting capacity

A number of emerging forces will lead to pressure on the insurance industry across the value chain (1 / 2)

Key pressures across the insurance value chain

Advancing technologies, changing customer preferences and the market landscape are enabling a number of innovations and trends, which create pressure across the insurance value chain

e-Aggregators

Online aggregators that allow customers to compare prices and purchase insurance products online may displace traditional distribution channels as customer preferences change and more insurance products are commoditised (e.g., UK P&C market)



Entry of tech players

Technology providers with brand recognition and trust surpassing financial institutions may enter the insurance distribution market, leveraging their extensive data and distribution capability. Google acquired a UK e-aggregator BeatThatQuote charging insurers up to \$54 per click



Securitization

Insurance linked securities such as catastrophe bonds are introducing new pools of capital providing fully collateralised coverage to insurers, outside of traditional re-insurance and insurance pools



R&D/ Product Manufacturing



Distribution



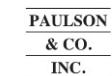
Underwriting



Claims



Risk Capital & Investment Mgmt.



Self-driving cars

Fully or partially self-driving cars are emerging leveraging smart sensors, connectivity and machine-to-machine communications. This will considerably reduce the risks associated with driving and may shift the principal of insurance from drivers to manufacturers

Impact on all Insurers

Impact on P&C insurers

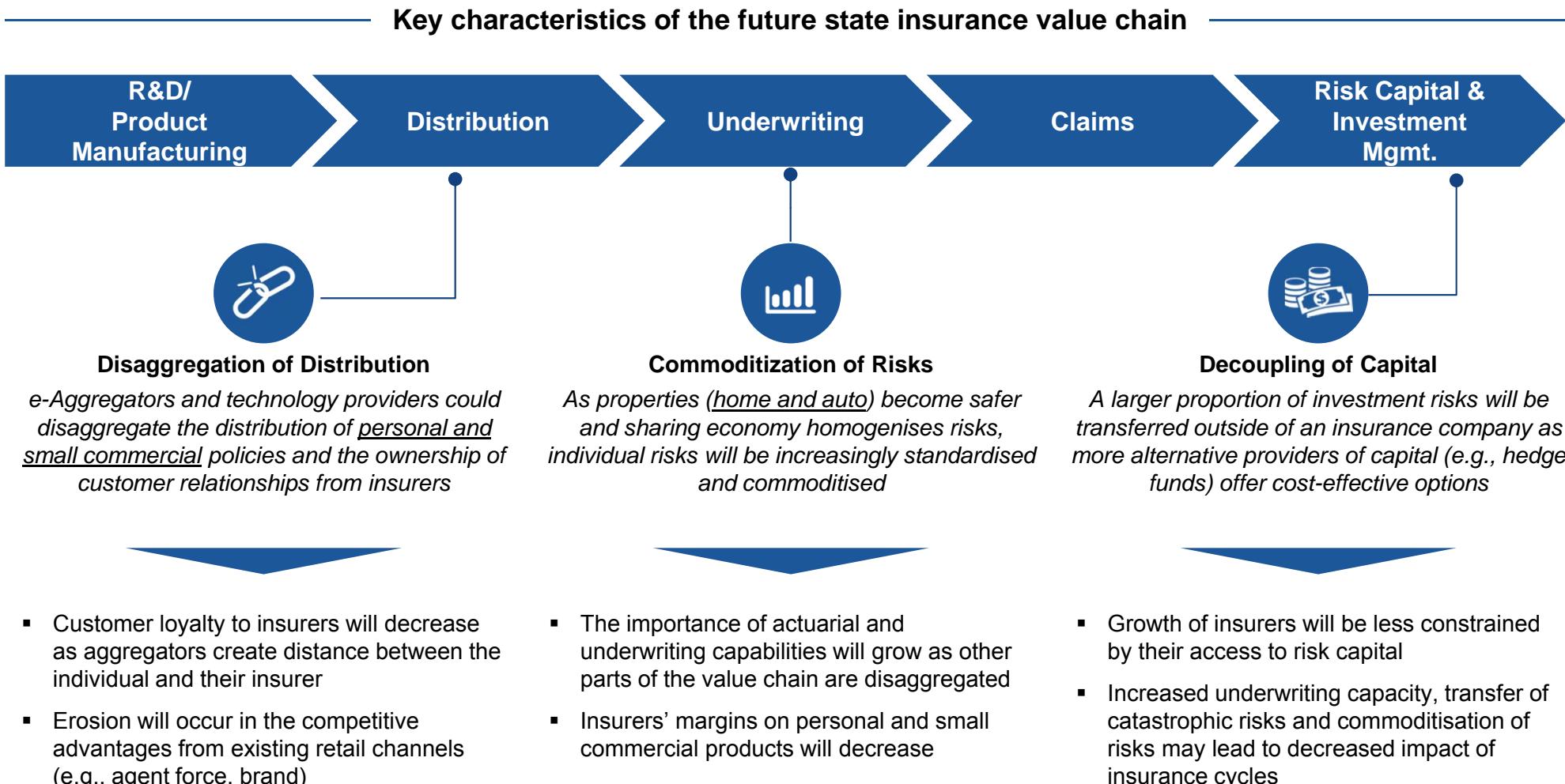
Sharing economy

As sharing economies emerge from pay-as-you-go rentals to shared vehicles and houses, the concept of ownership may radically change, challenging traditional insurance models developed based on one-to-one ownership structure

Entry of hedge funds

Driven by a low interest rate environment and access to premiums, hedge funds and alternative sources of capital are moving closer to the insurance value chain by setting up reinsurers, providing additional funding options for insurers

As the result, the insurance value chain will be increasingly disaggregated in the future, changing the nature of the insurance business

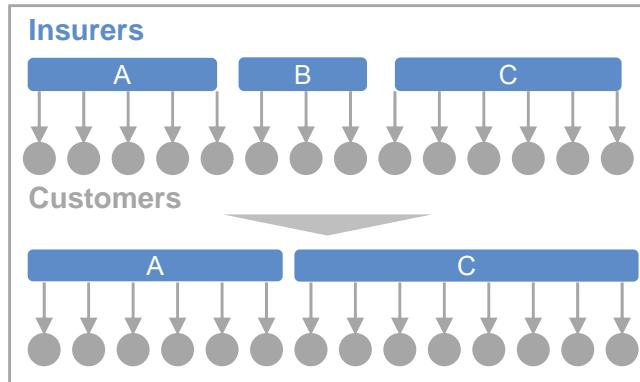


How will disaggregation across the value chain change the insurance landscape in the future?

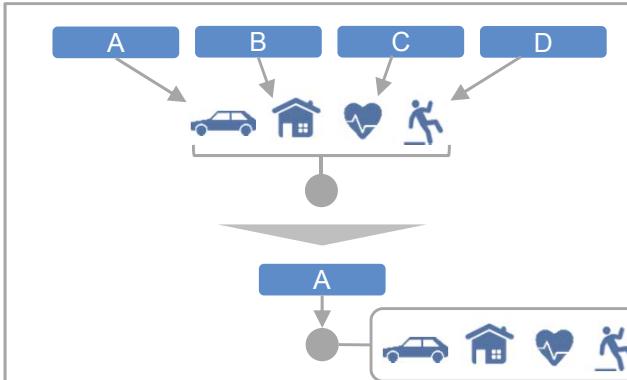
How will disaggregation across the value chain change the insurance landscape in the future?

Potential changes to the insurance landscape

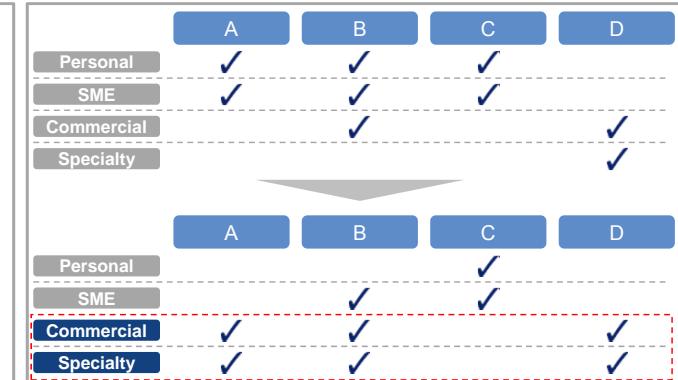
1 Consolidation of the market by mega insurers



2 Rise of multi-line policies



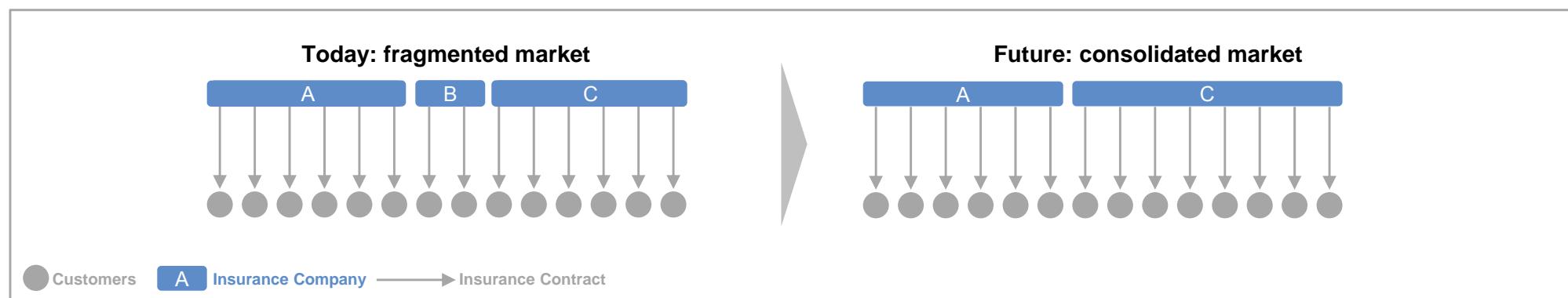
3 Shifting focus to niche market and commercial lines



- With increasingly homogenised risk profiles and commoditised personal insurance policies, the **importance of scale** to drive efficiency will grow, leading to the **market consolidation**
- Disaggregation of distribution to technology platforms will enable insurers to **scale rapidly** in a cost-effective manner
- Widened access to capital through securitisation and alternatives will generate **excess underwriting capacity** for insurers to support rapid growth and consolidation

- The following scenarios illustrate potential outcomes generated by the innovations discussed in this topic, particularly in response to the key question above – they are not meant to be future predictions
- These scenarios are illustrations of particular aspects of the potential future and are not meant to represent a complete view of the market and competitive landscape – in many cases, some or all scenarios could be realised at the same time

Scenario 1: Consolidation of the market by mega insurers (1 / 2)



Narrative

As a homogenisation of risk profiles leads to margin pressures and a price sensitive market (particularly in more commoditised segments such as personal auto) insurers who can achieve economies of scale will be able to provide lower prices and gain market share. In order to gain scale, M&A activities among insurers will proliferate and insurers will partner with non-traditional companies, such as technology platforms, to distribute their products. This will allow customers to compare prices and products more readily and accelerate commoditisation of the market. Insurers may also actively reinsurance their businesses using securitisation and alternative capital sources to minimise regulatory burdens and stabilise their margins.

Summary of impact

- With increasingly homogenised risk profiles and commoditised personal insurance policies, the importance of scale to drive efficiency will grow, leading to the market consolidation
- Disaggregation of distribution to technology platforms will enable insurers to scale rapidly in a cost-effective manner
- Widened access to capital through securitisation and hedge funds will generate excess underwriting capacity for insurers to support rapid growth and consolidation

Case studies



Increased transparency via online channels and limited investment returns have put significant pressure on pricing in the US auto insurance industry, driving a rapid consolidation over the past 10 years. Even absent notable M&A activities, large insurers who can afford big marketing and R&D budgets have grown rapidly; leveraging their superior customer acquisition capabilities and a price advantage derived from economies of scale. As a result, the share of top 10 auto insurers in the United States has grown from 59% in 2000 to 71% in 2012.

Scenario 1: Consolidation of the market by mega insurers (2 / 2)

Necessary conditions for the scenario

- Regulatory allowance of the consolidation of the market (i.e., resolution of anti-trust issues)
- Ability to realise the benefits of scale, particularly in terms of cost efficiencies and underwriting accuracy improvements
- Personal lines customers continue to perceive insurance as a commoditised products

Implications of the scenario on...

Customers

- Reduced choices for and differentiation among insurance products
- Potential for higher prices due to lower competition

Incumbents

- Margins expand for surviving insurers as competition is lowered
- Smaller insurance companies are at risk of becoming takeover targets

Overall Ecosystem

- Decreased impetus for innovation and diversification as smaller players exit the market

Opportunities and risks associated with the scenario

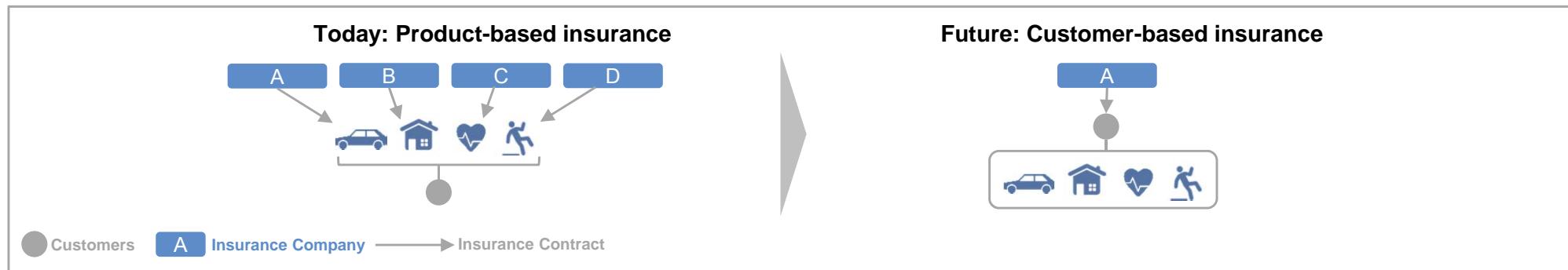
Opportunities

- Consolidation leads to reduced transaction costs due to economies of scale
- Cost savings from efficiency gains can be passed on to customers via lower prices

Risks

- Oligopolistic structure may lead to potential collusion among large players, leading to price increases
- Mega insurers may bear more systemic risk resulting in increased regulatory pressures

Scenario 2: Rise of multi-line policies (1 / 2)



Narrative

Today insurers frequently cross sell commoditised, low margin products with their higher margin peers (e.g., the bundling of low margin auto insurance with higher margin home insurance). As the commoditisation of risks accelerates across various products, multi-line insurers may focus more heavily on bundling and cross selling products to achieve economies of scale and build customer loyalty.

Leveraging the more granular and individualised data available through connected devices, insurers may ultimately be able to take product cross selling to its logical extreme; offering a single insurance policy covering all (or a very wide range) of an individual's risks.

Summary of impact

- Personal insurance products that are commoditised in the future will be increasingly used as a bundle to cross sell other more profitable products
- As the concept of property ownership blurs in the sharing economy, the concept of cross sell may expand so that an insurance policy encompasses all risks associated with the customer, rather than risks associated with specific assets
- Through increased connectivity, the “personal” insurance policies may be adjusted more frequently to add, subtract or modify coverages to match the customers’ individual usage patterns

Case studies



Farm Family has introduced the concept of aggregate flexible contract to small / medium enterprises, concentrating on rural and suburban area, and targeting specific risks surrounding certain sectors (e.g., Special Farm Package 10 for agriculture owners). On the personal insurance side, many multi-line insurers offer bundling discounts to customers to promote cross sell across personal auto, home and life policies, with auto and home cross sell being more popular among customers, yet multi-line contracts are still not widely adopted.

Scenario 2: Rise of multi-line policies (2 / 2)

Necessary conditions for the scenario

- Insurance companies need to be able to assess and cover a wide range of risks for individuals
- Insurers need the ability and capacities to modify coverage and pricing in real-time
- Customers must trust in insurers' ability to evaluate and cover their risks comprehensively and fairly

Customers

Implications of the scenario on...

- Peace of mind knowing that a broad range of situations are covered by a single contract
- Potential loss of control over details and choices around specific insurance coverage
- Potential premium reduction driven by vertical consolidation

Incumbents

- Requires a full suite of products offering to participate in the market
- Economies of scale driven by vertical consolidation
- Potential challenges for mono-line and niche insurers regarding their competition with multi-line insurers

Overall Ecosystem

- Expansion of coverage range for each individual
- Minimum size/capabilities required to participate in the market increases

Opportunities and risks associated with the scenario

Opportunities

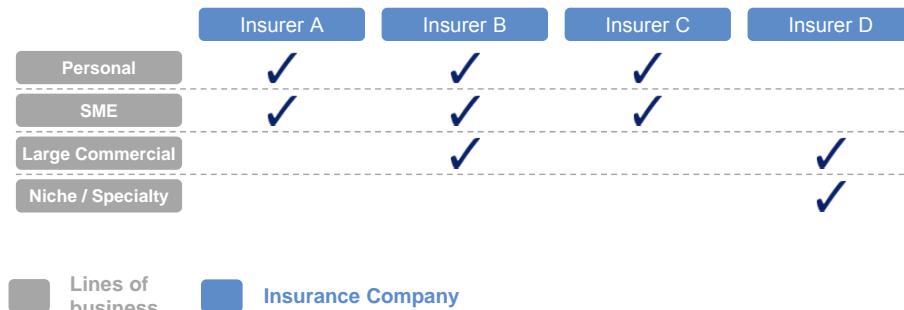
- Shifting from insuring "things" to insuring "people" is more aligned with who is actually exposed to risks
- Mono-line and niche insurers may partner with each other or evolve into product-specific reinsurers with deep product knowledge

Risks

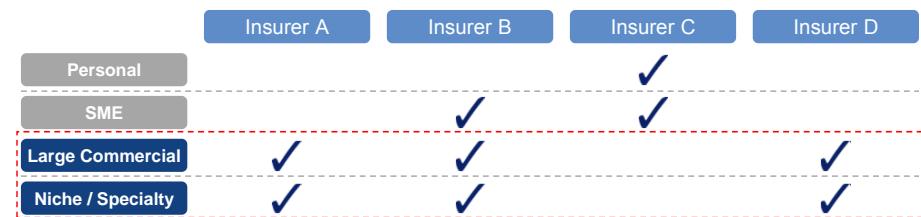
- Risk of adverse selection by customers is exacerbated by insurers expanding into areas where they have less experience
- Potential for certain individuals to oversubscribe to insurance

Scenario 3: Shifting focus to niche market and commercial lines (1 / 2)

Today: Diverse focus between personal and commercial lines



Future: Shift to commercial lines / niche specialty



Narrative

As access to granular data and sophisticated underwriting become necessary conditions for personal insurers to survive, those with insufficient scale to compete may choose to specialise in specific market segments. These segments will tend to require in-depth historical knowledge and niche distribution networks based on factors such as demographics (e.g., cancer patients), sector (e.g., medical SME), or region (e.g., Manhattan). Multi-line insurers who sell both personal and commercial policies today may also choose to exit the commoditised personal insurance market and focus more heavily on the commercial market, where their specialised capabilities can lead to higher margins and growth / customer retention.

Summary of impact

- Disaggregation of the personal lines value chain may lead some insurers to shift their focus to niche markets where traditional capabilities (e.g., actuary and underwriting) can make bigger differences in performance and profitability, or pivot toward an increased focus on commercial lines
- In these markets, distribution and underwriting will continue to be relatively more manual and the insurers' expertise will not be easily replicated or replaced

Case studies



Bought by Many, a UK-based insurance start-up, brings together customers with specific insurance needs (e.g., age, illness, residence location, profession) to represent their needs to insurers and promote the creation and distribution of specialised insurance products designed for them. Bought by Many matches customers who do not fit commoditised insurance policies to insurers who are willing to specialise in certain customer segments.

Scenario 3: Shifting focus to niche market and commercial lines (2 / 2)

Necessary conditions for the scenario

- Niche markets and complex commercial lines must continue to require special capabilities that take time and investment to develop
- Margins for niche markets and complex commercial lines need to be attractive
- Mechanisms for insurers to exit their existing commitments in non-niche markets

Implications of the scenario on...

Customers

- Fewer suppliers of commoditised insurance products, potentially resulting in a marginal price increase
- Proliferation of the niche market results in development of products that meet special needs

Incumbents

- Increased competition in the most profitable niche and commercial markets
- Less competitive intensity in commoditised markets as companies exit

Overall Ecosystem

- Bifurcation of the ecosystem into commodity and niche markets with different characteristics

Opportunities and risks associated with the scenario

Opportunities

- Opportunity to encourage insurers to leverage their sophisticated underwriting capabilities to understand and insure against more complex risks (e.g., unhealthy population)
- Increased need for reinsurance as insurers focus more on specific, concentrated markets

Risks

- Greater risks for catastrophic losses as the concentration of insurers around niche risks increases

What does this mean for financial institutions?

Key implications and remaining questions

“Safe Bets” – Likely implications under all scenarios

- !** **Reduced customer stickiness:** With insurers' ownership of customer relationship further disaggregated and personal lines products further commoditised, customers will become more fickle and creating customer loyalty will become increasingly difficult
- !** **Self-insurance models:** The overall revenue for the insurance industry will be reduced as the agents of the commoditising forces (e.g., self-driving car manufacturers, sharing economy platforms) gain scale and begin to self-insure
- !** **Competitive benchmarking:** Insurers' ability to scan and benchmark against competitors' pricing models and strategies will become more important as customers gain visibility into prices from multiple insurers via digital distribution platforms
- ?** How will insurers create customer loyalty and stickiness going forward as the insurance products become increasingly commoditised and new, digital entrants disaggregate customer relationship?
- ?** What role will insurers play in supporting the self-insuring agents of commoditising forces in response to the erosion of the premium base?
- ?** How can the insurance industry cultivate innovation ecosystem amidst risk-averse culture in order to proactively manage the disaggregating forces instead of reacting to them?

Scenario 1: Consolidation of the market by mega insurers

- !** **Regulatory complexity:** As mega insurers emerge across multiple regulatory jurisdictions, their burden to comply with various regulatory regimes will increase

Scenario 2: Rise of multi-line policies

- !** **Acquisition of capabilities:** Many mono-line insurers today may face challenges in acquiring expertise and capabilities to effectively provide multi-line policies
- ?** What capabilities will insurers need to develop in order to quickly and accurately assess and respond to changes in customers' risks?

Scenario 3: Shifting focus to niche market and commercial lines

- !** **Relationship-driven distribution:** Insurers' ability to build and closely manage relationships with customers and distribution partners, potentially via human workforce, will become more important again to penetrate niche and commercial markets

Insurance

How will an ever more connected world impact the value delivered by insurance providers?

Executive Summary

Context / Innovation

- Increasing adoption of connected devices in cars, homes and lifestyles presents an opportunity for insurers to expand the use of telematics, i.e., the integration of telecommunication and information processing

Future of Personal Insurance

- Expansion of the telematics insurance models through connected devices and platforms will create channels for insurers to better understand their customers and engage more closely with them
 - Connected devices can allow insurers to track and continuously refine individual risk profiles, enabling more accurate underwriting of individual risks and more personalised products
 - Insurers can also evolve into a risk manager for clients by interacting more frequently with their customers and proactively participating in risk management through their customers' connected devices
 - Furthermore, insurers could leverage the individualised data gathered through connected devices to gain a fuller view of customers' identities and lifestyles, and work with retailers and external parties to deliver relevant, and financially beneficial, offers to customers

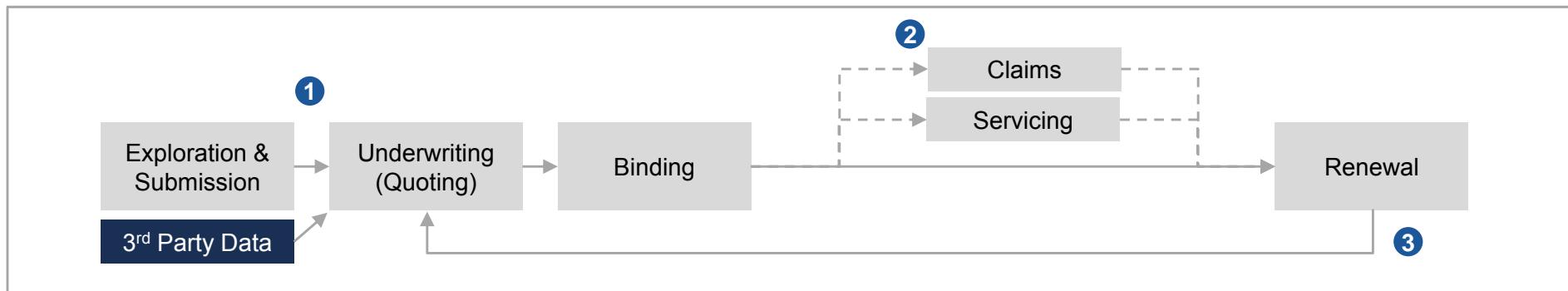
Key Implications

- To reap the benefits of new business models enabled by connected devices, insurers must work closely with device and service providers and must also define acceptable boundaries in utilising customer data

The business model for property & casualty (P&C) and health insurance has been refined over the centuries, but improvement opportunities still exist

Traditional P&C and health insurance processes

- Traditionally, P&C and health insurance policies have been priced based on predictions made using historical information and best in class statistical models



- Risks are priced based on the data customers submitted and some 3rd party data, including **historical data and predictive indicators**, against loss models and clusters created by insurers based on historical statistics
- After binding, insurers and customers **do not interact** until renewal unless specific events are triggered such as claims (e.g., accidents) or servicing (e.g., address change)
- Customers' usage and losses are reflected in their risk profile only in the underwriting process during the **next renewal cycle**

Improvement opportunities in the traditional P&C and health insurance model

Backward-looking

Despite the gradual improvement on the accuracy of loss prediction models, losses are predicted using historical indicators. Most pricing models do not adjust to real-time individual behavioural and usage data.

Limited interactions

Profitable, claim-free customers typically do not interact with insurers until renewal, limiting insurers' ability to demonstrate value to them and develop stickiness

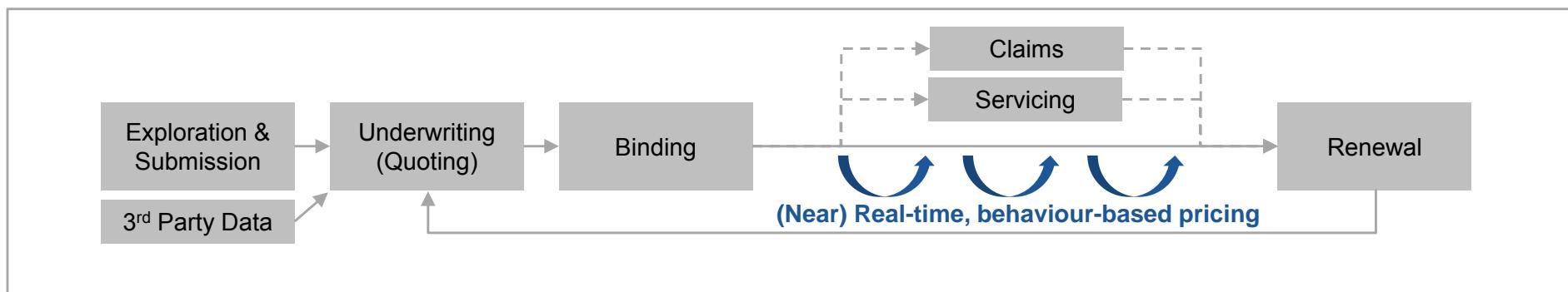
Passive

Insurers only react to customers' predicted risk profiles upon binding and at renewal, with little to no visibility into proactive risk management opportunities throughout the policy term

Telematics offers a promising proposition to P&C and health insurers and customers, but its adoption is slow due to a number of factors

What is telematics?

- First introduced in the mid-2000s, telematics insurance products leverage the GPS technology and wireless communications to enable auto insurers to collect usage and behaviour data of their customers in real time or near-real time
- Leveraging such data, insurers charge customers' premiums based on their usage of the vehicles and current driving behaviours instead of typical fixed premiums, given the strong correlation between usage of vehicles and risks
- Today's telematics devices have evolved to measure a variety of additional behavioural factors from rapid acceleration to air bag deployment



Benefits of telematics

- **Pricing Accuracy:** Insurers' risk models become more accurate as individual, empirical and near real-time data is used combined with historical predictions based on segmentation
- **Lower Claims:** Telematics products incentivise safer behaviours among customers as premiums are linked directly to the behaviours and reduce the overall claims losses for insurers
- **Personalisation:** As usage and behavioural data accumulates, the insurance premium becomes increasingly personalised to each customer, resulting in lower premiums for customers and customer stickiness for insurers

Factors inhibiting adoption of telematics

- | | |
|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| Device | ▪ Installation of physical tracking devices creates an additional "moment of truth" when customers may abandon adoption of telematics |
| Selection | ▪ Only predominantly low-risk customers sign up for telematics-based insurance contracts and high-risk customers opt out, deterring insurers' economics |
| Delays | ▪ Gathering and utilisation of data is usually delayed due to connectivity, costs and analytical power |
| Incentives | ▪ Discounts often do not serve as sufficient incentives for customers to adopt and share personal data |

Connected devices and platforms emerging across cars, homes and lifestyles present an opportunity to improve and expand the telematics insurance models

Drivers behind the emergence of connected devices



Innovations creating potential opportunities for the connected insurance model

1. Connected Cars

- Run on operating systems (apps can be installed) and are connected to the internet
- Gather and transmit information on every part of the vehicle
- Communicate with other cars to prevent accidents



2. Connected Homes

- Monitor key metrics (e.g., temperature) and automatically modify the environment accordingly based on learning
- Identify risk factors (e.g., smoke) and take adequate actions for prevention / triaging
- Communicate with the environment to adapt to surrounding environments



3. Connected Lifestyles

- Quantify, track, monitor and manage daily activities through wearable devices
- Identify trends, patterns and recommendations based on quantified data
- Measure, track and analyse vitals relevant for specific conditions and illness



4. Standardised Platforms

- Increase interoperability; facilitate data gathering, management and utilisation; and improve coordination among connected devices



Key advantages

Easier utilization of data

Gathered data can be shared easily via connectivity and data-based services can be easily provided as apps through platforms (i.e., a tap to install and opt in)

Real-time communication

Data from vehicles, properties and individuals are gathered and analysed in real-time to provide timely, relevant insights and information to users

Mix-and-match of data

Data from multiple sources can be combined and analysed to create more comprehensive and accurate understanding of users

Proliferation of connected insurance models will create channels for P&C and health insurers to better understand and engage more closely with their customers

Key characteristics of the future connected insurance business model



Personalisation

Increased measurability and availability of personal data will allow insurers to refine their understanding of customers' risks from cluster-based approach to individualised pricing



Accuracy

With better understanding of each individual's risks, the pricing accuracy of insurers will improve and more customers will pay premiums appropriate for their risks (i.e., less cross-subsidisation among customers)



Transparency

As customers' usage and behaviours become more measurable, insurers will gain greater visibility into the circumstances surrounding claims and the opportunities for fraud will decrease



Data-Rich

Insurers will become a critical custodian of customer data as they gain access to behavioural data on their customers (e.g., vehicle movement), above and beyond historical and static data available today (e.g., type of vehicle owned)



Engagement

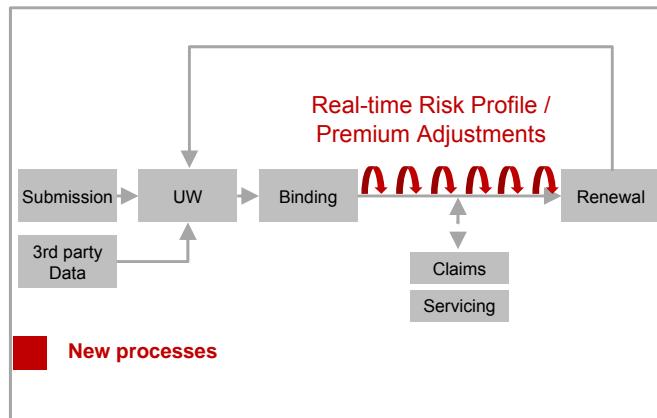
Insurers will be able to access additional channels to engage with their customers through mobile and other connected platforms and generate more relevant content for their customers based on data

As insurers are enabled with additional data and communication channels from connected devices and platforms, how will the value delivered by insurance companies evolve?

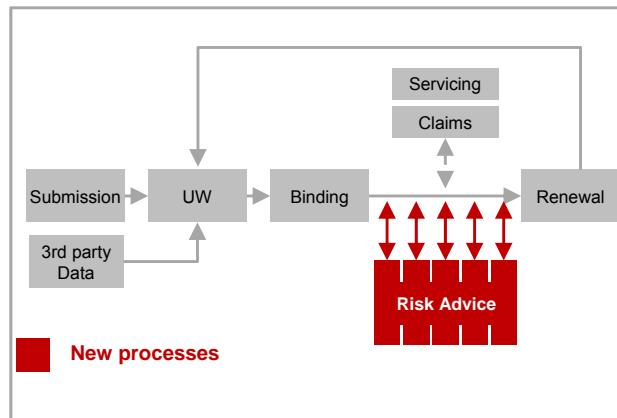
How will increasing levels of connectivity impact the value delivered by insurance providers?

Potential value proposition of connected insurers

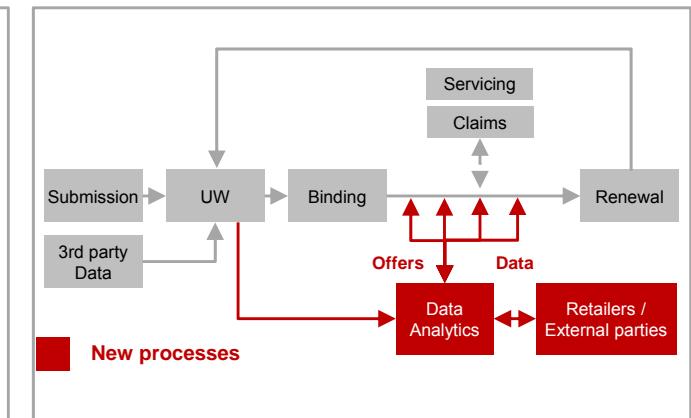
1 Personalisation of insurance policies



2 Active management of the insured's risks



3 Broker of personal data



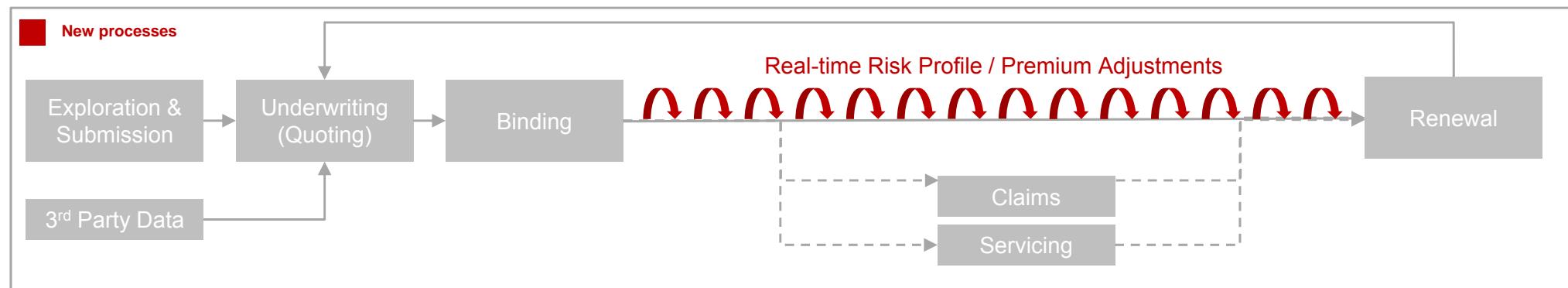
- Connected devices allow **insurers to track and continuously refine individual risk profiles** with empirical data, enabling more accurate underwriting of individual risks
- Furthermore, connected devices enable a **channel for consumers to purchase event-based coverage** to personalise their policies for better protection

- Connected devices create a bilateral channel for insurers to **interact more frequently with their customers** and proactively get involved in **managing their customers' risks** (e.g., health consultation based on data gathered through wearables)
- By developing '**concierge**' functions, insurers can actively **manage their client's risk, lower losses** and deliver additional value to customers

- Connected devices allow insurers to **gather ongoing behavioural data** from their customers to **gain a fuller view** of customer identity and lifestyle
- Working with retailers and other external parties, insurers use the increased knowledge on their customers to **deliver relevant, financially beneficial information** (e.g., offers)

- The following scenarios illustrate potential outcomes generated by the innovations discussed in this topic, particularly in response to the key question above – they are not meant to be future predictions
- These scenarios are illustrations of particular aspects of the potential future and are not meant to represent a complete view of the market and competitive landscape – in many cases, some or all scenarios could be realised at the same time

Scenario 1: Personalisation of insurance policies (1 / 2)



Narrative

A wider adoption of wearable devices (e.g., wristbands) and smarter home sensors (e.g., smart thermometers), as well as the development of aggregation platforms, allows insurers to expand usage-based offerings to home and health policies. As the result, customers pay premiums that are more customised to their risk profiles and usage.

In the automotive space the adoption of standardised platforms and improved sensors enables insurers to create app-based telematics offerings that customers can easily sign up for. Through these apps, customers can purchase additional coverage for specific events.

Summary of impact

- Connected devices create a real-time stream of more granular, individualised, empirical data, enabling insurers to track, analyse, understand and continuously refine individual risk profiles for more accurate underwriting of individual and organisational risks
- Telematics and usage-based-insurance become readily adoptable through the elimination of the need for physical devices and the development of standardised platforms
- Increased connectivity via mobile creates a channel for consumers to purchase event-based coverage to personalise their policies for better protection

Case studies



Leading mobile platforms are creating standardised platforms that enable the development of apps that can be installed across many vehicles from different automakers. These apps can enable real-time gathering of granular driving data



Wearable devices that can track users' lifestyle data are gaining popularity and a number of portable health solutions to track key vitals are being developed. Mobile OS and device makers have also begun to introduce platforms to connect and aggregate data from these devices



Smarter sensors and control devices (e.g., fire alarms, thermostats) are gaining popularity in households and aggregation platforms are emerging to establish connection among and provide central management of those devices and sensors

Scenario 1: Personalisation of insurance policies (2 / 2)

Necessary conditions for the scenario

- Widespread adoption of personal connected devices
- Sophisticated analytical capabilities to use real-time data streams to constantly update underwriting of risks
- Collaboration between regulators, insurance companies, device manufacturers and telecommunications operators
- Customers willing to share additional personal data with insurers

Customers

Implications of the scenario on...

- More customised insurance premiums and coverage
- Premiums that are more reflective of true personal risks – less cross-subsidisation between customers

Incumbents

- Increased focus on data ownership
- Need to create partnerships with other ecosystem players
- Complete redevelopment of underwriting models

Overall Ecosystem

- Personalised insurance products allow less comparability between insurers

Opportunities and risks associated with the scenario

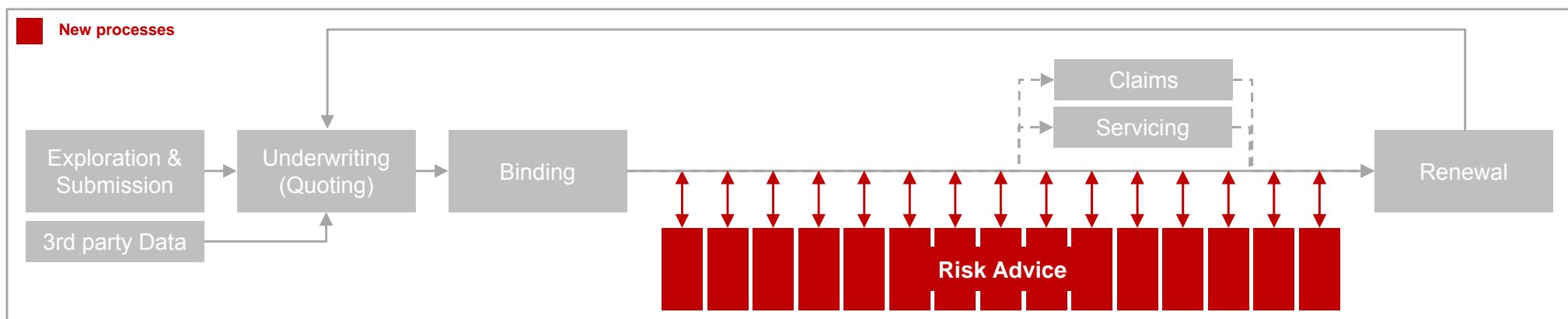
Opportunities

- More accurate underwriting and premium calculation on the basis of available individual data
- Increased stickiness of customers to their insurers

Risks

- Management and protection of sensitive, personal data generated by connected devices
- As cross-subsidisation decreases, accessibility to insurance becomes a concern for high-risk customers
- Red-lining customers who elect not to participate in or are excluded from personalised insurance based on data from connected devices

Scenario 2: Active management of the insured's risks (1 / 2)



Narrative

Utilising driving patterns gathered from connected cars and 3rd party data (e.g., weather), insurers send warnings and advice via in-car applications to support safer driving by their customers

As health insurers gain more granular data on customers' lifestyles and better understand indicators for future illness, they arrange health consultants to high risk customers via mobile apps

As a result, customers benefit by avoiding accidents and illness and find their insurance policy more valuable, whereas the frequency and magnitude of losses are reduced for insurers

Summary of impact

- Collection and analyses of more granular data allows insurers to more accurately understand behavioural risk factors and predict near and long-term increases in risk
- Connected devices create a bilateral channel for insurers to interact more frequently with their customers and proactively get involved in managing their customers' risks before events occur
- By evolving into a manager for their client's risks, insurers can lower losses while delivering additional value to customers

Case studies



Marmalade Insurance, a UK based insurance company, targets less-experienced driver segments with its telematics offering by providing feedback and e-learning based on driving behaviour to promote safer driving



Vitality Health's app encourages its customers to voluntarily track and share lifestyle data with the insurer. The app then provides analysis and feedback based on the gathered data, and rewards customers for healthier lifestyle choices with gifts and other benefits

Scenario 2: Active management of the insured's risks (2 / 2)

Necessary conditions for the scenario

- Development of advanced analytical capabilities to predict future risks
- Clear understanding of liabilities associated with advice
- Customer trust in insurers to manage their risks and provide advice

Customers

Implications of the scenario on...

- Reduce risks and better manage future risks through insurers' advice

Incumbents

- The implementation of 'concierge' functions becomes a core value proposition
- Increased focus on behavioural indicators of risks (i.e., what matters and when to engage)
- Build customer loyalty by becoming partners to customers

Overall Ecosystem

- Decrease in the overall risk pool of the participating customers through active management of individuals' risks

Opportunities and risks associated with the scenario

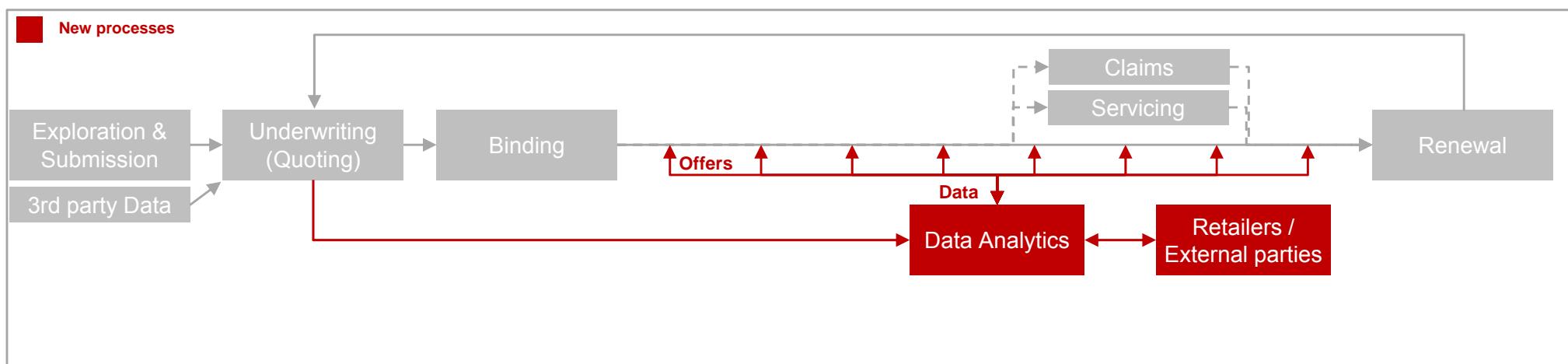
Opportunities

- Opportunity for insurers to evolve into a service provider that offers differentiated services to customers (e.g., health consulting)
- Lower claims due to proactive management of risks and longer-term customer education

Risks

- Dealing with losses resulting from policy holders rejection of advice
- Dealing with losses resulting from absence of advice or the delivery of incorrect advice
- Risk of fraud from customers gaming the connected systems

Scenario 3: Broker of personal data (1 / 2)



Narrative

Insurers already gather static data on customers' properties (e.g., make of car, house location, age). Connected devices will allow insurers to track their customers' behaviour with sufficient granularity to create a comprehensive picture of their identity and lifestyle. Automotive insurers will be able to predict future erosion of tires and collaborate with auto parts retailers to send discount offers to replace tires based on the make of vehicles. Home insurers could utilise customer data to predict a vacation approaching and offer discounts on travel packages as well as travel insurance. These offers will provide additional financial value to customers, encouraging loyalty and supporting proactive risk management.

Summary of impact

- Connected cars, homes and health devices will allow insurers to gather ongoing behavioural data from their customers, which can be combined with existing asset data to better understand customers' identity and lifestyle
- Working with retailers and other external parties, insurers can use the improved knowledge of their customers to deliver relevant, financially beneficial information to customers, which can incent them to better manage their risks

Case studies



While many P&C insurers already partner with retailers to offer relevant discounts, the use of behavioural data is still limited.

Insure the Box, a UK auto insurer, leverages telematics devices installed on cars to provide theft recovery services.

Scenario 3: Broker of personal data (2 / 2)

Necessary conditions for the scenario

- Insurers gain customer trust as guardians of personal data by clearly demonstrating alignment of interests with customers and providing sufficient value in exchange for their personal data
- Compliance with existing and future regulations on usage of personal data

Customers

Incumbents

Overall Ecosystem

Implications of the scenario on...

- Financial incentives from individualised offers
- Decrease in claims and losses
- Potential for partnership revenue
- Halo effect with customers based on providing additional value
- Increased competition for partnerships
- Early-movers may benefit from locking up partnerships

Opportunities and risks associated with the scenario

Opportunities

- Incentives may support lower risk behaviour by policy holders (e.g., not delaying tire replacement)

Risks

- Data might be misappropriated by external parties
- Risk of losing customers' trust, particularly if relevance of offers is low

What does this mean for financial institutions?

Key implications and remaining questions

“Safe Bets” – Likely implications under all scenarios

- !** **Real-time data and analytics:** Insurers' ability to gather and analyse data in real-time will become more essential to enabling and optimising the benefits of connected insurance models
- !** **Strategic role of insurance business:** As insurers gather behavioural data from customers and become more sophisticated in understanding risks, the role of insurance within retail financial institutions will become critical in understanding customers' financial status and needs (e.g., Bancassurance players may benefit significantly from insights generated from the connected insurance models)
- !** **Importance of customer lifecycle management:** As insurers' relationships with customers become stickier, it will become more difficult for insurers to steal market share. Capturing desirable customers early in their lifecycle will become critical to building revenue
- ?** How will the individual behavioural data generated from connected devices be sourced? What issues will arise related to the aggregation and ownership of this new data?

Scenario 1: Personalisation of insurance policies

- !** **Reduced cross-subsidisation:** Insurers' current business model of cross-subsidising across customers will no longer feasible when a majority of insurance policies and premiums are highly individualised
- ?** How will insurers successfully demonstrate the value new offerings to early adopters given their lack of historical data and limited experience analysing these data streams
- ?** How will less-desirable customers be served as insurers become able to exclude them, particularly considering the public nature of some insurance products (e.g., health, auto)?

Scenario 2: Active management of the insured's risks

- !** **Separation of distribution and customer management:** Insurers will need to develop direct digital channels to interact with customers and manage their risks, regardless of their distribution strategies and channels (e.g., brokers)
- ?** How will the insurers incentivise customers to participate in the connected models of insurance and modify their behaviours as they play more proactive role in managing customers' risks?

Scenario 3: Broker of personal data

- !** **Merchant relationships:** In order to deliver relevant value to customers, insurers' ability to manage relationships with merchants will become more critical, which is not a core capability in the insurance industry today
- ?** Where will the new boundaries lie in selecting desired customers and utilising their data to generate value (e.g., 3rd party offers) while ensuring fairness and privacy?

Deposits & Lending

**How will emerging alternative models
of lending change the market
dynamics of traditional lenders?**

Executive Summary

Context / Innovation

- Following the financial crisis, lower risk appetites among retail banks have significantly limited access to traditional bank intermediated lending. This is particularly true among sub-prime borrowers
- Over the same period of time alternative lending platforms leveraging P2P models have experienced rapid growth. These platforms use alternative adjudication methods and lean, automated processes to offer loans to a broader base of customers and a new class of investment opportunities to savers

Future of Savings & Lending

- As competitive pressures from alternative lending platforms grow, the overall savings and lending industry will be forced to compete
 - Alternative lenders could successfully move upstream to replace traditional institutions in intermediating prime loans while traditional lenders, restricted by legacy processes and high capital requirements, lose share
 - Alternatively, traditional institutions and alternative platforms may continue to cater to different classes of investors and borrowers, especially with growing partnerships between smaller traditional institutions and alternative platforms
 - Traditional institutions could also transform their processes and technologies, potentially absorbing alternative platforms, to adopt the key features of alternative lending business models

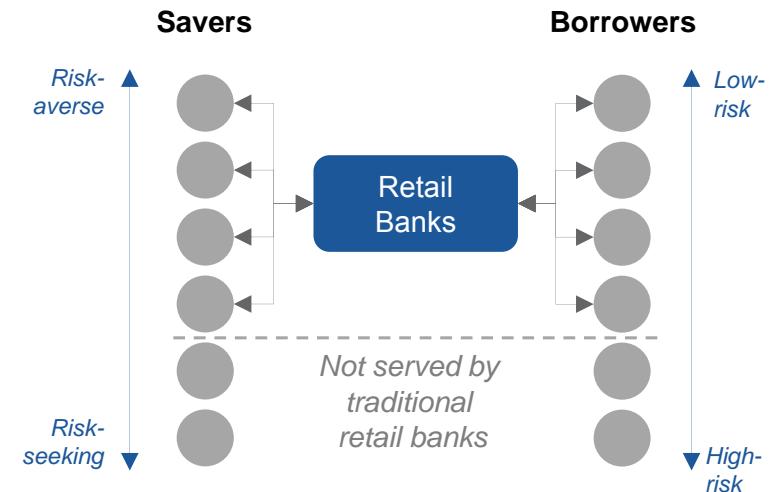
Key Implications

- Emerging alternative lending models create both competitive threats and evolutionary opportunities for financial institutions, making it important for incumbent institutions and alternative platforms to develop more integrated partnerships and learn from and share each other's capabilities

In a risk-averse economy, retail banks' model of intermediating savers and borrowers has reduced accessibility to loans for subprime customers

How do financial institutions facilitate lending activities today?

- Retail banks receive savings from their account holders and provide interest on the savings in return. In most countries, regulators mandate banks to insure and hold minimum reserve on the savings held
- Using the saved funds, retail banks originate loans to borrowers and receive interest in return. The availability of loans and the interest rates are determined by the adjudication of borrowers' risk profiles, typically using credit scores
- Typically, interest received on loans are higher than interest paid on savings to account for default risks and other operational costs
- The breadth of borrowers served is dependent on each bank's risk appetite, which is generally related to the size and scale of the banks (e.g., riskier borrowers tend to be served by tier 2/3 banks or balance sheet lenders)



Evolution of traditional lending models

- Following the 2008-2009 global financial crisis, customer trust surrounding financial services quickly dissipated
- Regulators also mandated increased safety measures around loans (e.g., higher capital requirements) which resulted in many banks tightening loan requirements
- This mutual loss of confidence created a lending gap, leaving a considerable portion of borrowing needs underserved by financial institutions
- Furthermore, customer preferences in financial services are rapidly changing, demanding more transparency, efficiency and control over their savings and loans

Key characteristics of traditional models

Limited Access

A growing lending gap limits the availability of loans to individuals and companies with higher risk profiles

Slow Speed

Traditional adjudication processes with multiple layers of approval limits the banks' ability to process loans in timely manner

Margin for Error

Traditional adjudication models and credit scores tend to miss suitable lending opportunities in a virtual economy

Poor Customer Experience

Highly manual adjudication processes and requirements fall short of increasing expectations on customer experiences

Limited Control

Borrowers have limited visibility and control over the uses of funds and interest rates earned

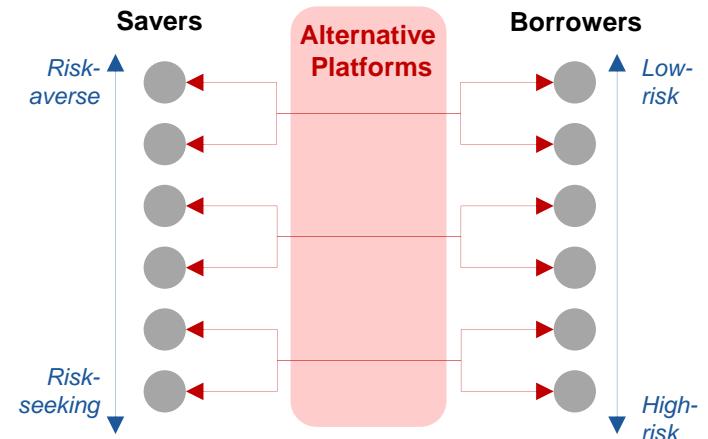
Low Return

Operational inefficiency and reduced risk appetite of banks result in low returns on savings

Alternative lending platforms leverage P2P models and lean operations to offer seamless services to a broader base of customers

Description of alternative lending models

- Alternative lending institutions have emerged to fill gaps in the traditional lending model. New industry players are emerging across the globe, showcasing a myriad of value propositions and strategies that are challenging traditional business models
- Online and P2P (P2P) lending platforms provide customers low-cost, fast, flexible, and more customer-oriented alternatives to mainstream retail banking that traditional financial institutions once dominated
- While the business models of alternative lenders often differ from one another, most providers directly link borrowers and lenders, employ advanced adjudication methods and streamline processes



Key characteristics of alternative lending platforms



P2P

- Alternative lenders leverage online platforms and legal contracts to provide direct matching of funds between savers and borrowers
- By acting as online marketplaces P2P lenders facing lower funding costs than traditional depository lenders



Alternative adjudication

- Alternative lending platforms assess the creditworthiness of borrowers based on metrics beyond the credit scores used by traditional lenders (e.g., social data)
- Most alternative lenders also refine their risk engine more frequently than traditional lenders to incorporate feedback based on empirical analysis



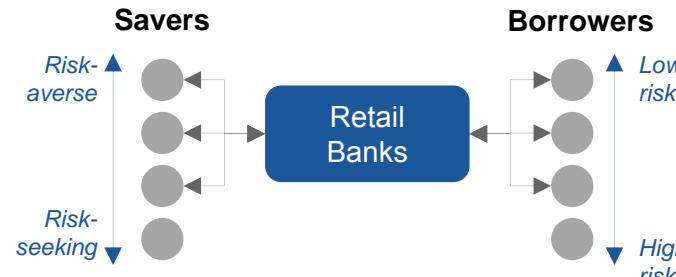
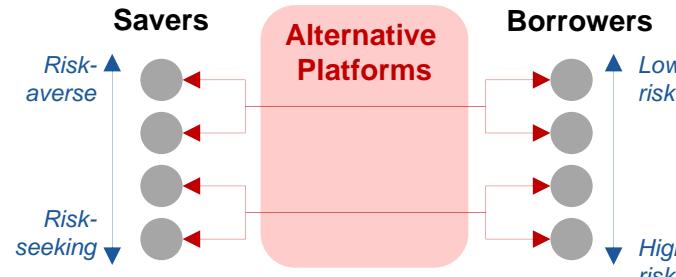
Lean, automated processes

- Alternative lending platforms are free of legacy processes and technologies, allowing them to onboard and assess borrowers and lenders in a more streamlined fashion
- At most alternative platforms, assessment of borrowers is at least partly automated against predefined rules for fast, transparent processing



Traditional and alternative lending models differ significantly in their flexibility and allocation of risk

- Traditional lending intermediaries (e.g., retail banks) take risks themselves and leverage their scale to provide stability to lenders (depositors), however their focus is typically limited to low-risk borrowers and they charge high fees (in form of interest spread). Therefore the needs of risk-seeking savers and high-risk borrowers are not fully served by traditional banks
- Alternative lending platforms typically provide an online marketplace where lenders have the flexibility to pick and choose a desired risk portfolio. The marketplace generates lenders' scores and typically takes a cut of loan originations and ongoing loan revenues but does not directly take risks

	Traditional lending intermediaries	Alternative lending platforms
Ecosystem	 <p>The diagram illustrates the traditional lending model. At the top, two vertical arrows labeled "Risk-averse" (up) and "Risk-seeking" (down) indicate the spectrum of savers and borrowers. Below these arrows are four grey circles representing individual savers and borrowers. In the center is a blue box labeled "Retail Banks". Arrows point from each of the four circles to the central "Retail Banks" box, representing the flow of funds.</p>	 <p>The diagram illustrates the alternative lending model. It features a central red box labeled "Alternative Platforms". Four grey circles representing individual savers and borrowers are connected to this central box by arrows. The same vertical "Risk-averse" (up) and "Risk-seeking" (down) arrows are present on either side of the central box, indicating the range of lenders and borrowers it serves.</p>
Description	<ul style="list-style-type: none"> ▪ Traditional intermediaries hold savings from retail, commercial and institutional clients and provide interest in return ▪ Using those funds, traditional intermediaries originate loans to borrowers based on their creditworthiness and earn interest (the differential between interest, or "spread" is the intermediary's return) 	<ul style="list-style-type: none"> ▪ Alternative lending platforms directly match lending needs of borrowers with willing lenders (individuals or institutions) ▪ Contractual obligations exist directly between borrowers and lenders and platforms provide mere intermediation and adjudication ▪ Alternative platforms are compensated through originations fees or a percentage of interest payments
Advantages	<ul style="list-style-type: none"> ▪ Lenders' savings are protected by the intermediaries' reserves and by deposit insurance schemes ▪ The complete pooling of savings and loans most effectively mitigates individual default risks 	<ul style="list-style-type: none"> ▪ Lending processes and risk profiles are transparent to both borrowers and lenders ▪ Traditionally underserved borrowers gain access to loans and diverse risk appetite of lenders is met ▪ Reduction of transaction costs
Limitations	<ul style="list-style-type: none"> ▪ Lenders do not have flexibility to determine the desired level of risk and return ▪ Primary focus on low risk loans exclude higher risk borrowers, depending on the market conditions 	<ul style="list-style-type: none"> ▪ Investments may be more susceptible to individual default risks even with portfolio approach, especially for smaller investments ▪ Guarantees on the investments are limited

Alternative lending platforms are creating competitive pressures to savings and lending industry to become more transparent and customer friendly

Key characteristics of future deposits and lending models



More Accurate Underwriting

Adverse selection by lending intermediaries with superior underwriting capabilities will lead to a broader adoption of alternative credit indicators for adjudication and pricing



Increased Access

Use of alternative adjudication and diversification of lenders will provide more lending options to a broader spectrum of borrowers (e.g., "thin file" borrowers)



Control and Transparency

Lenders will gain more control over the return on their savings based on their risk appetite and more visibility into the flow of their savings



Reduced Costs for Borrowers/ Increased Return for Savers

As the understanding of risk profiles of borrowers is improved, the margins of lending intermediaries may be pressured, resulting in lower cost of obtaining loans for borrowers and increased return for lenders



Fast and Customer Friendly

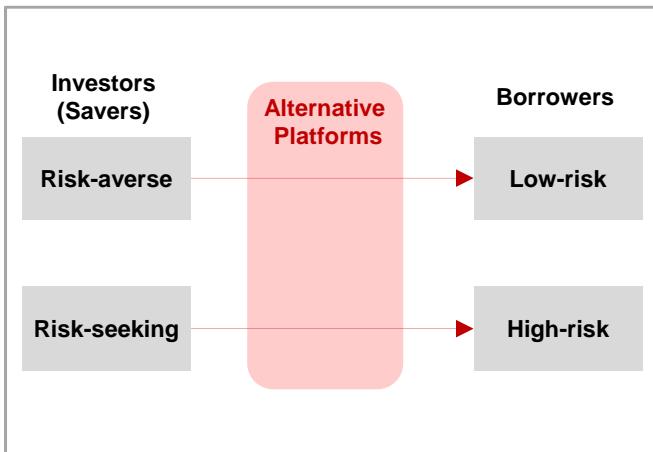
Streamlined and automated processes expedite loan processing and improve customer experience for borrowers

While enabling these future state characteristics, how will emerging alternative models of lending change the market dynamics of traditional lenders?

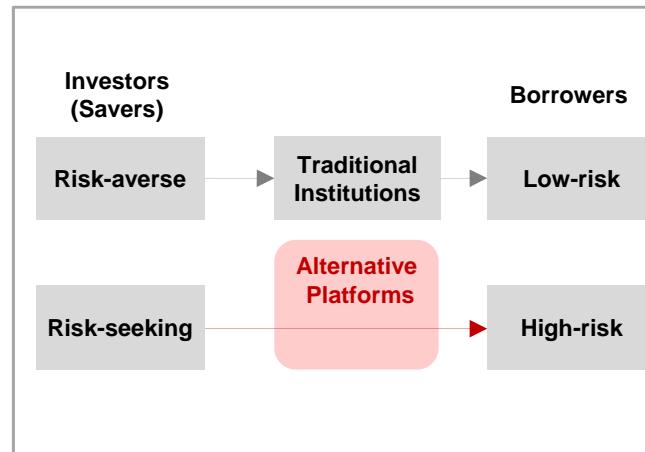
How will emerging alternative models of lending change the market dynamics of traditional lenders?

Potential roles of alternative lending platforms

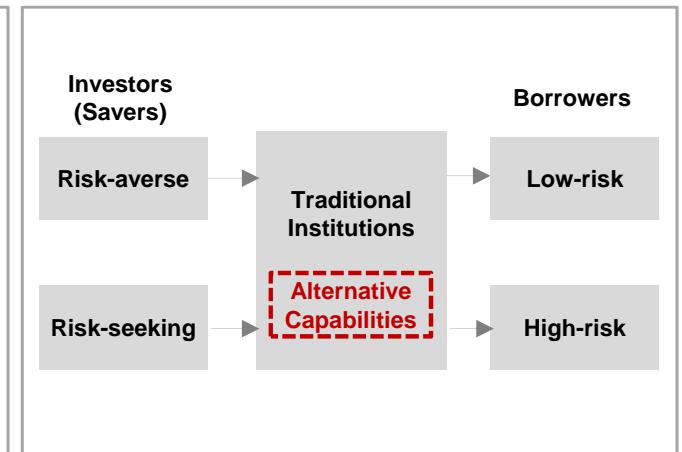
1 Disintermediation of traditional intermediaries



2 Complementing traditional intermediaries



3 Driving change within traditional intermediaries



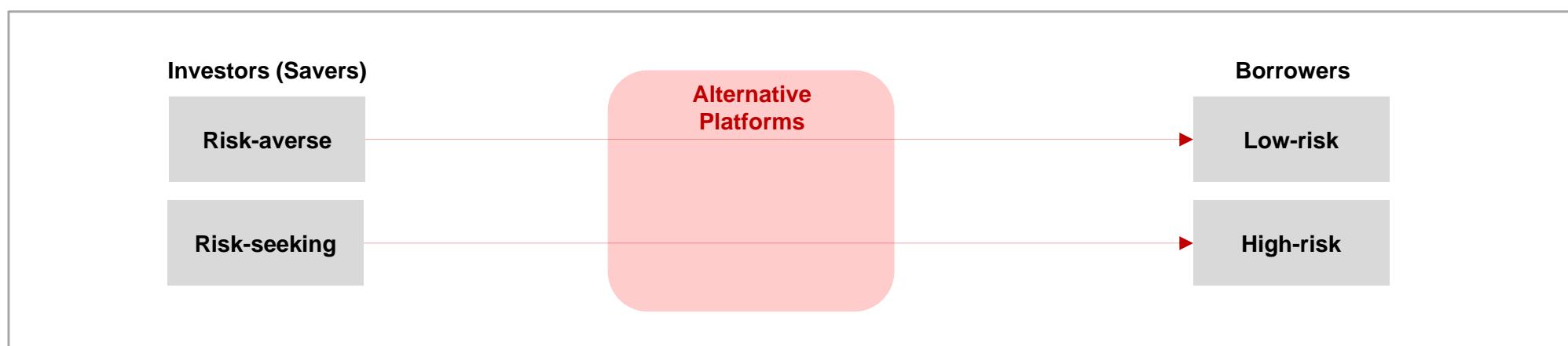
- Alternative platforms successfully **move upstream** to replace traditional institutions in intermediating **risk-averse savers and low-risk borrowers**
- Restricted by legacy processes / technologies and reserve requirements, **traditional institutions lose their share** to leaner and more consumer-friendly alternative lending platforms

- Traditional institutions and alternative platforms continue to **cater to different classes** of investors and borrowers
- Some smaller institutions with limited lending bandwidth may **partner with alternative lenders** through customer referral and capital investments to **address the underserved needs** of their customer base

- Traditional institutions **transform their processes and technologies** or absorb alternative platforms to adopt the key features of alternative lending business model
- Traditional institutions serve as a lending intermediary for **both low-risk and high-risk borrowers**, building on their trust and reliability among customers

- The following scenarios illustrate potential outcomes generated by the innovations discussed in this topic, particularly in response to the key question above – they are not meant to be future predictions
- These scenarios are illustrations of particular aspects of the potential future and are not meant to represent a complete view of the market and competitive landscape – in many cases, some or all scenarios could be realised at the same time

Scenario 1: Disintermediation of traditional intermediaries (1 / 2)



Narrative

As the position of alternative lending platforms in the high-risk lending market matures, alternative lending marketplaces will gain sufficient customer trust and reputation to attract more risk-adverse investors and low-risk borrowers. The ability of alternative lending platforms to offer borrowers lower interest rates and a more streamlined customer experience will also help attract and retain low-risk borrowers.

As lending marketplaces move upstream to prime lending markets they may evolve to become the primary origination point for consumer lending and an investment destination for a portion of bank's deposit float.

Summary of impact

- Leveraging alternative adjudication methods, streamlined processes, and lower overhead, alternative lenders successfully move upstream and emerge as a cheaper and faster direct competitor to traditional lending institutions in the low-risk lending space
- Entrenched by legacy processes / technologies and capital requirements, traditional institutions do not adapt quickly enough and lose share to leaner and more consumer-friendly alternative lending platforms

Case studies



Launched in 2005 as the world's first P2P lending service, Zopa targets only prime lenders as determined by its adjudication model, and competes with traditional institutions on rates / returns and a more seamless origination process. In 2014, Zopa achieved a default rate of 0.38 percent, significantly lower than traditional institutions.



Launched in 2006, CreditEase started as a Chinese P2P lending service, aiming to bridge urban lenders with excess funds and an underbanked rural population with borrowing needs. Building on its success CreditEase has grown to offer other financial products and services, such as wealth management products for high net worth customers.

Scenario 1: Disintermediation of traditional intermediaries (2 / 2)

Necessary conditions for the scenario

- Sufficient customer knowledge and trust in alternative lending platforms by both borrowers and lenders
- Relevant authorities need to be comfortable with alternative lending platforms accounting for a significant portion of total loans originations
- Increased liquidity of investments through the development of secondary markets (allowing them to compete with money market funds and other highly liquid savings products)

Implications of the scenario on...

Customers

- Customers across the spectrum gain ability to select desired risk / return mix
- Some investments become more susceptible to default risk

Incumbents

- Loss of market share to alternative lending platforms
- Reduced ability to cross-subsidise financial products
- Negative impact on capital ratio as deposits erode

Overall Ecosystem

- Loss of savings accounts may lead to losing shares in other products

Opportunities and risks associated with the scenario

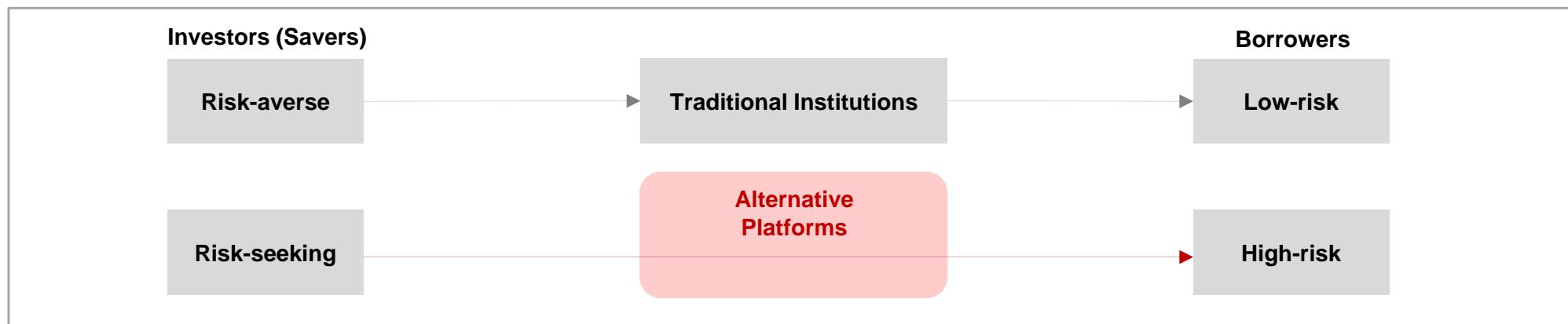
Opportunities

- Creates a new asset class once critical mass for liquidity is achieved

Risks

- Uncertainty around the stability of the ecosystem in a high interest rate environment
- Overhead costs for alternative lending platforms may increase as their scale grows, eroding their cost advantage
- Conflict of interest may arise as alternative lending platforms act as rating agencies within their marketplace but also benefit from the origination of new loans

Scenario 2: Complementing traditional intermediaries (1 / 2)



Narrative

Unable to build sufficient customer awareness / trust, particularly in the market for low-risk lending, alternative lenders enter into partnerships with existing financial institutions. Traditional financial institutions are able to refer high-risk borrowers who do not meet minimum lending requirements to alternative platforms, thereby helping those customers fulfill their financing needs without the risk of losing other elements of their business (e.g., deposit accounts, credit cards) to another traditional financial institution.

Some smaller, and more regional, institutions may also find it beneficial to “park” excess funds with their lending marketplace partners as a mechanism for diversifying their lending portfolios.

Summary of impact

- Traditional institutions and alternative lending platforms continue to cater to different classes of investors and borrowers – traditional institutions cater to the low-risk market based on trust, and alternative platforms cater to the high-risk market based on access
- Some traditional institutions with limited lending bandwidth may partner with alternative lenders to meet the underserved needs of their customer base, by referring customers or investing excess capital
- Overall, more customers gain access to savings and lending products that best suit their needs as the industry becomes more diversified

Case studies



In 2014, Lending Club (an alternative lending platform) and Union Bank (a U.S. regional bank) formed a strategic alliance. Under the agreement, Union Bank plans to purchase personal loans through the Lending Club's platform and work with the platform on the co-creation of new credit products. Through the partnership, Union Bank can meet the borrowing needs of its sub-prime customer segments while earning higher interest on its strong balance sheet.

Scenario 2: Complementing traditional intermediaries (2 / 2)

Necessary conditions for the scenario

- Continued regulatory acceptance of alternative lending models serving the sub-prime market
- Alternative lenders do not gain sufficient awareness / trust from the low-risk borrower and investor base
- Banks continue to have a limited appetite for high-risk lending

Customers

Implications of the scenario on...

- Customers are more likely to trust alternative lending platforms as they become associated with established financial institutions

Incumbents

- The ability to serve high-risk customers without risking losing other business lines (e.g., transaction accounts)
- The ability to earn origination revenue from high-risk borrowers without taking high risks

Overall Ecosystem

- Expansion of credit without disruption of traditional industry structure and lending models

Opportunities and risks associated with the scenario

Opportunities

- Opportunity to create a more inclusive financial ecosystem and mechanisms for customers to build / rebuild creditworthiness without the main financial ecosystem taking direct risks

Risks

- Reputational risks for traditional institutions who partner with alternative lenders
- Established institutions that refer customers to alternative lending platforms may fuel the growth of those platforms, allowing them to evolve into more direct competitors

Scenario 3: Driving change within traditional intermediaries (1 / 2)



Narrative

Responding to the threat of alternative lending platforms, traditional institutions transform their technologies and processes and / or acquire the alternative platforms. This allows traditional institutions to leverage alternative adjudication methods, deliver a more streamlined lending process, and improve efficiency to potentially offer lower interest rates. It will also allow them to selectively cater to more borrowers that traditionally fell in underserved categories.

Summary of impact

- Traditional institutions transform their processes and technologies or absorb alternative platforms to adopt the key features of an alternative lending business model, such as alternative adjudication and streamlined processes, to provide compelling value proposition to customers
- Traditional institutions successfully create financial products beyond savings products to cater to the borrowing needs of high-risk borrowers and provide the desired level of return to risk-seeking lenders

Case studies



Advanced Merchant Payments (AMP) helps traditional financial institutions transform and supplement their adjudication models with alternative methods to improve underwriting accuracy of small / medium enterprise loans. For instance AMP enables financial institutions to leverage merchant acquiring data in adjudication, which is more accurate indication of a company's cash flow and readily accessible by financial institutions.

Scenario 3: Driving change within traditional intermediaries (2 / 2)

Necessary conditions for the scenario

- Sufficient pressure from alternative lending platforms on traditional intermediaries to justify significant investments in new business processes and IT infrastructure
- The ability of traditional financial institutions to achieve cost competitiveness with alternative lending platforms by adopting alternative adjudication and process improvements

Implications of the scenario on...

Customers

- Significant improvement in customer experience and availability of loans / investment opportunities without customers having to change service providers

Incumbents

- Ability to directly serve their customer base's borrowing needs, even for the high-risk customers
- Improved profitability due to adoption of alternative adjudication methods
- Reduced leakage during lending application process due to streamlined straight-through processing

Overall Ecosystem

- Incumbents remain dominant with minimal changes to ecosystem but significant improvements are made in the efficiency of the lending process

Opportunities and risks associated with the scenario

Opportunities

- Accessibility to the financial system can be extended to more customers without changing the overall ecosystem
- Financial institution's ability to more accurately understand risks associated with borrowers and loans will improve

Risks

- Potential risks might be created by channelling additional credit volume through the traditional financial institutions
- Reputational risks associated with running alternative lending platforms that specialise in high-risk loans

What does this mean for financial institutions?

Key implications and remaining questions

“Safe Bets” – Likely implications under all scenarios

- !** **Erosion of deposits and investment products:** As savers leverage alternative lending platforms as short and medium-term investment vehicles, erosion will occur among traditional deposits and investment products (e.g., money market funds) offered by traditional institutions, ultimately leading to some balance sheet shrinkage
- !** **Distributed credit:** Customers' savings and credit portfolios could become distributed over a large number of alternative platforms with varying reporting standards, making it difficult for financial institutions to measure each customer's creditworthiness on a consistent basis
- ?** How will retail banks continue to maintain their ability to serve lending needs of customers as the erosion of deposits to alternative lending platforms leads to a smaller balance sheet?
- ?** How will retail banks continue to accurately and consistently assess creditworthiness as customers' loan portfolios become distributed and the measurement of creditworthiness becomes increasingly diversified?

Scenario 1: Disintermediation of traditional intermediaries

- !** **Pressure on spread:** Intensified competition driven by alternative lending models will create pressure on spread earned between interest paid to savers and earned from borrowers, leading to margin pressure on financial institutions
- ?** How will traditional institutions offer competitive interest rates to both savers and lenders against the disintermediated business model of alternative lending platforms?

Scenario 2: Complementing traditional intermediaries

- !** **Reduced diversification of customers:** As risk-tolerant savers and high risk borrowers switch to alternative lending platforms, the profiles of customers served by traditional institutions will become increasingly homogenised
- ?** How will traditional institutions participate in the alternative lending market to meet the needs of their customers who are currently underserved (e.g., direct entry, investment vehicle, distribution partnership)?

Scenario 3: Driving change within traditional intermediaries

- !** **Diversification of products:** In order to compete against diverse lending platforms and serve various needs of savers and borrowers, traditional institutions will need to diversify savings and lending products from today's one-size-fits-all approach
- ?** In addition to the adoption of alternative adjudication models and streamlined processing, how will financial institutions meet increasingly diversified needs of savers and borrowers nurtured by alternative lending platforms?

Deposits & Lending

What will be the future role of financial institutions in response to continually shifting customer preferences?

Executive Summary

Context / Innovation

- Driven by generational shifts and rapid consumer adoption of technology, customers' channel preferences for financial products and services are shifting rapidly
- These changing customer preferences have manifested in a number of innovations, from the development of virtual banks to the evolution of mobile banking capabilities, and the development of "banking as platform" movement

Future of Primary Accounts

- As customer expectations for financial institutions continue to rise, financial institutions will be required to create a fuller virtual experience that is more customer driven, potentially changing the role of primary account providers
 - Increasing customer demand and growing trust with tech companies may enable non-traditional firms that excel in creating digital customer experiences to assume control of the customer relationship, while traditional institutions focus on manufacturing financial products
 - Full-service virtual banks could offer a comprehensive suite of financial products by partnering with a range of niche alternative providers (e.g., P2P lenders, automated asset managers); allowing the network of alternative providers to compete directly with full-service retail banks
 - In the future financial institutions could leverage virtual channels to offer frequent customer interactions and non-financial value-adds above and beyond needs-based transactions to strengthen customer relationships

Key Implications

- As customers' demands continues to grow, it will become increasingly difficult for financial institutions to cater to all the needs of customers. In the future – financial institutions should consider what portion of their business they would like to retain and what partnerships can deliver better value to customers

These changing customer preferences have manifested in a number of innovations emerging across primary account providers

What are the key innovations manifested by shifting customer channel preferences?



Virtual Banks

- “Direct Banks” first emerged in the 1990s based on telephone banking and have since evolved to become more “virtual,” relying on online / mobile channels
- Most virtual banks established to date have been subsidiaries of large traditional financial institutions, targeting their price-sensitive customer segments
- Today, improved technology is allowing virtual banks to offer new and compelling value propositions beyond just lower cost



Evolution of Mobile Banking

- Rapid adoption of mobile devices has led many financial institutions to quickly add digital channels for basic transactions
- However, these channels often struggle to meet customers’ demands for fully functional mobile platforms
- Free of legacy systems, non-traditional players are emerging to offer mobile apps that make financial transactions even more effortless for customers (e.g., P2P money transfer, photo bill payment, voice recognition)



Banking as Platform

- Legacy systems and competing priorities limit the speed at which traditional players can offer innovative online and mobile tools; particularly for smaller institutions where the cost to deliver a full suite of solutions to meet diverse customer needs can be prohibitive
- Banking-as-platform movement aims to standardise APIs across financial institutions allowing 3rd party developers to easily build and integrate customer-facing enhancements to the institutions’ core offerings

Case studies



Fully virtual “community” bank in Germany, offering innovative products such as game currency wallet and high degree of social media integration

Other Examples



Case studies



Provides financial institutions with a mobile / online solution that enables fast, easy and low cost consumer to consumer money transfer via email and text across institutions

Other Examples



Case studies



Runs an app store for its customers to download a wide range of additional functionalities to its core online and mobile platform by exposing its API to external developers

Other Examples



As customer expectations continue to rise, the primary accounts industry will become more virtual and customer-driven

Key characteristics of the future banking experience



Full Virtual Experience

Virtual channels will evolve beyond basic transactions to provide broader functionality such as onboarding and servicing



Customer-Driven

As customers become more tech savvy, the value propositions and customer experiences of financial institutions will be increasingly shaped by customer demands



Higher Expectations

Banks will need to cater to heightened expectations of customers who are accustomed to the seamless customer experiences offered by technology providers



Segment-based

Service offerings will evolve to target and meet the needs of each segment or community, moving away from one-size-fits-all mass market approach



Externalised

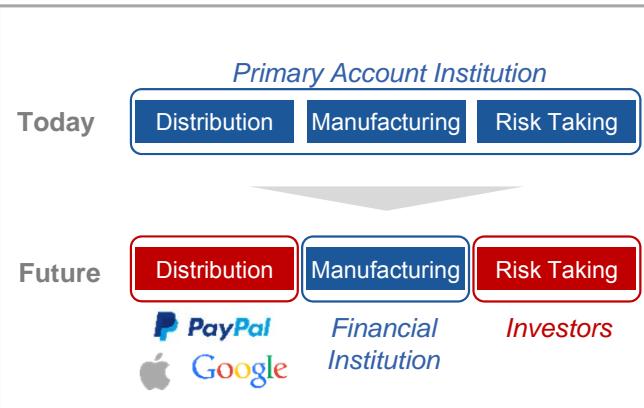
Financial institutions, especially the smaller and newer organisations, will shift away from in-house approach to relying on external providers to deliver online and mobile solutions in a timely manner

What will be the future role of financial institutions in response to continually shifting customer preferences?

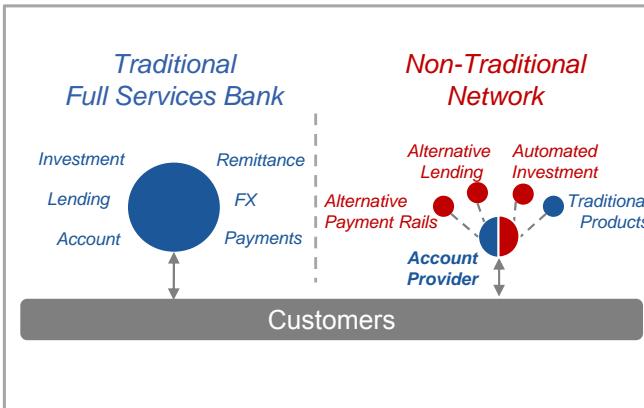
What will be the future role of financial institutions in response to continually shifting customer preferences?

Potential impact of shifting customer channel preferences

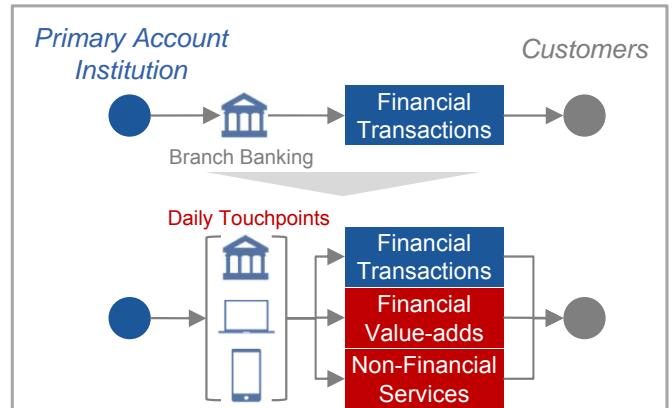
1 Disaggregation of customer relationship ownership



2 Enabling the ecosystem of non traditional providers

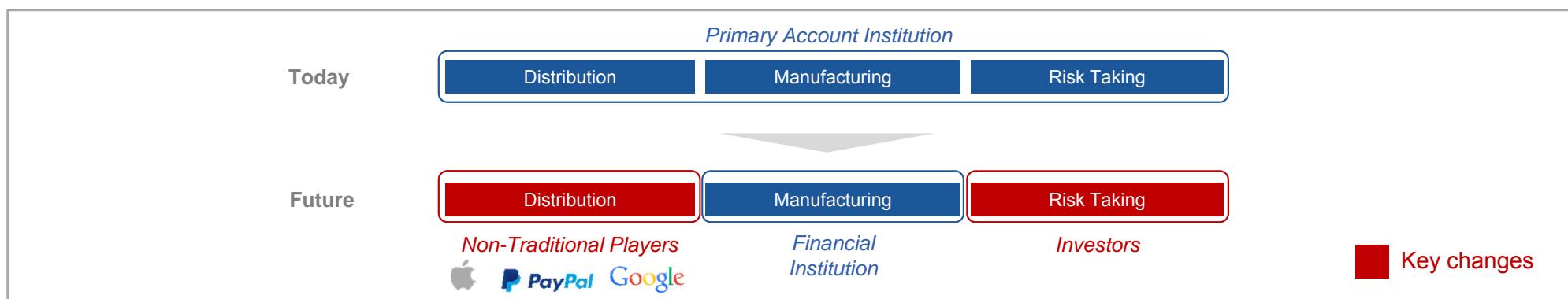


3 Embedding closer into customers' daily lives



- Increasing customer demand and growing trust with technology companies enable **non-financial companies** that excel in creating digital customer experience to **disaggregate distribution** of financial services and **ownership of customer relationships**
- Traditional financial institutions evolve to become **providers of financial products**, focusing on sophisticating the products with excess capacity
- The following scenarios illustrate potential outcomes generated by the innovations discussed in this topic, particularly in response to the key question above – they are not meant to be future predictions
- These scenarios are illustrations of particular aspects of the potential future and are not meant to represent a complete view of the market and competitive landscape – in many cases, some or all scenarios could be realised at the same time

Scenario 1: Disaggregation of customer relationship ownership (1 / 2)



Narrative

A partnership is launched between a financial institution with no retail banking presence and a technology player with existing customer relationships, customer trust, and an expertise in the creation of online experiences. Together these partners leverage their respective expertise in a seamless digital customer experience and manufacturing financial products to create a new kind of online financial experience complete with a full suite of financial products.

The structure of the partnership allows the technology player to increase their access of data and centrality to the lives of their customers with limited pressure on their balance sheet or increased regulatory exposure.

Summary of impact

- In the face of rising customer expectations for a highly flexible, intuitive and personalised service across multiple platforms, new and existing players who are accustomed to providing these sort of solutions disaggregate the manufacturing of financial products from the ownership of customer relationships
- Traditional financial institutions evolve to become manufacturers of financial products, shifting freed capacity from distribution to focus on manufacturing sophisticated or highly personalised products

Case studies



Many leading technology players chose to enter the mobile payments space by partnering with established financial institutions and leveraging white-label products. This allowed them to focus on their own expertise in customer interactions (e.g., marketing, UX, offers) while relying on their financial partners' infrastructure and capabilities. Paypal's mobile payment solution used Discover's payment network infrastructure for acquiring, approval, clearing and settlement, while a core component of Google Wallet's mobile offering involves a virtual pre-paid Visa card issued by US Bancorp.



Scenario 1: Disaggregation of customer relationship ownership (2 / 2)

Necessary conditions for the scenario

- Non-traditional market players must be perceived as highly trustworthy and must provide a sufficiently superior offering to justify a change in financial institutions
- Seamless integration among players involved in the value chain

Implications of the scenario on...

Customers

- Significantly improved customer experience
- Changes the ways customers perceive their banks and technology providers

Incumbents

- Acceleration of existing shifts in the dominant distribution strategy away from branch based sales
- Pressure on retail banks to cannibalise existing business by creating competing partnerships
- Loss of customer ownership and commoditisation of core services drives decreased bargaining power

Overall Ecosystem

- Potential for consolidation of financial service product providers
- Pressure on regional players with limited ability to partner with technology providers

Opportunities and risks associated with the scenario

Opportunities

- Financial institutions will be able to develop a broader suite of more sophisticated products as they focus solely on manufacturing
- Potential for financial products and services to integrate more seamlessly with other services offered by technology players
- Financial institutions no longer need to worry about customer experience management

Risks

- Financial institutions may lose control over the ownership of customers and become at the disposal of technology providers
- Customer loyalty and stickiness may erode as customers gain more visibility and can more readily compare financial institutions and products
- Technology players may lack regulatory familiarity with requirements on product sales and the emergence of more personalised financial products may create regulatory uncertainties

Scenario 2: Enabling the ecosystem of alternative providers (1 / 2)



Narrative

Alternative providers of niche financial services continue to mature and become reliable alternatives to offerings of traditional institutions. Initially, connections develop among these niche providers through bi- or multi-lateral partnerships. Eventually, some traditional banks shift their focus to managing customer relationships as “depositories of trust” and serve as a central platform for connections to niche providers’ products. Alternatively, digital wallets (e.g., Google Wallet, PayPal) or online marketplaces (e.g., Money Supermarket, Amazon) may evolve to become those central platforms.

These network of non-traditional niche providers collectively meet customers’ banking needs and compete with traditional full service banks. They also provide the ability to seamlessly mix and match niche providers that fit the clients needs in a fashion not possible within today’s full service financial institutions.

Summary of impact

- “Light” or virtual financial institutions emerge that only focus on account management, offering a comprehensive suite of financial products by partnering with a range of niche providers of financial services (e.g., alternative lending, alternative payment rails)
- These partnerships allow a network of alternative financial service providers to compete directly with full-service retail banks
- Customers are able to select the products that best fit their needs and pay transparent fees since financial products are not cross-subsidised

Case studies



Simple is a low cost, virtual-only bank that provides primary account services to its customers with a focus on improving customers’ ability to save, budget and control their spending. Simple has partnered with a number of traditional and emerging financial institutions to provide fuller functionalities to customers: Visa to facilitate payments (debit cards), Venmo to enable mobile payments, Bankcorp and CBW to deposit savings in FDIC-insured products, and Allpoint to provide a fee-free access to ATM networks.

Scenario 2: Enabling the ecosystem of alternative providers (2 / 2)

Necessary conditions for the scenario

- Existence of account providers with the ability and incentive to connect with many competing providers of financial services
- Services and products of alternative niche providers must in aggregate fulfill the core requirements of most clients
- The network of alternative niche providers must provide a sufficiently compelling value proposition for customers to consider changing financial institutions
- Account providers must be able to act as a trusted verifier of services offered by alternative niche providers
- Regulatory comfort with significant growth in the use of alternative niche products

Customers

Implications of the scenario on...

- Creation of market for each product class leads to increased choice and potentially lower prices
 - Greater control over the selection of financial products
 - Lower loyalty to financial institutions
-
- Increased competition with alternative niche providers who are now able to achieve greater scale
 - Challenge to pricing of cross-subsidised products with increased competition from mono-line products
 - Pressure to integrate with 3rd parties to deliver cheaper and more customer friendly solutions
-
- Alternative niche providers gain access to the main population and form more meaningful pressures for financial institutions to innovate
 - Markets for each product become more modular

Incumbents

Overall Ecosystem

Opportunities and risks associated with the scenario

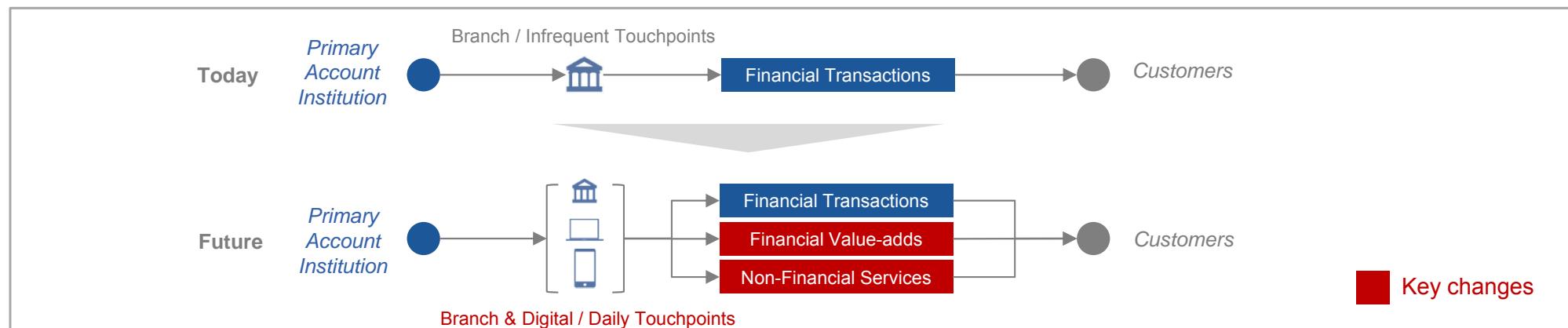
Opportunities

- Decrease in cross-subsidisation will benefit the consumers of those products and services that are currently subsidising other products
- Increased pressure for innovation within each product line

Risks

- With increased choices, customers may face cognitive challenges to select the right products and providers for them
- Liability may be unclear in cases of fraud or service failure
- Non-bank virtual account providers may lack sufficient understanding of risks associated with niche products
- Decrease in customer loyalty and stickiness

Scenario 3: Embedding closer into customers' daily lives (1 / 2)



Description of the scenario

To meet evolving customer demands, financial institutions actively explore innovations in mobile and other virtual channels' transactional services. Empowered by smarter machines that can emulate human-human interactions, financial institutions automate previously high-touch, high-value services and deliver them through virtual channels to increase touchpoints with customers.

Financial institutions also build on their core competencies today and extend them to tangent spaces (e.g., extending secure management of finances to personal data / identity management) to play a bigger role in customers' lives and improve customer loyalty and retention.

Potential development stories

- Financial institutions leverage virtual channels to offer frequent enriched interactions with customers above and beyond today's needs-based transactions in order to strengthen customer relationships
- Virtual channels may present an opportunity for financial institutions to evolve their role from providing financial transactional and value-add services to delivering non-financial services to customers (e.g., concierge services for high value customers, custodian of data, identity management) without significantly increasing costs

Transactional Innovation



Voice recognition and command



Cardless ATM withdrawals



Provide instant digital receipts

Case studies

New Services



Location-based reward offers



Augmented reality new home finder



Digital lockbox for important documents

Scenario 3: Embedding closer into customers' daily lives (2 / 2)

Necessary conditions for the scenario

- Continued competitive pressure from disruptors on incumbent institutions to innovate
- Financial institutions' ability to understand customers' unidentified needs and develop competitive offerings to cater to them

Customers

Implications of the scenario on...

- Access to new and better integrated quasi-financial services

Incumbents

- Importance of the traditional branch as a source of customer interaction will decrease
- Pressure to acquire or develop new capabilities
- Improved stickiness of customers

Overall Ecosystem

- Expansion of the role of financial institutions in customers' lives
- Non-cost differentiation of product offerings

Opportunities and risks associated with the scenario

Opportunities

- Opportunities to solidify customers' trust in financial institutions by playing bigger roles
- Opportunities to use 3rd party services to create more literate, better protected clients

Risks

- New risks and liabilities may arise as financial institutions expand to offer quasi-financial services
- Potential to leave out customers unfamiliar with / unwilling to adopt technologies as financial institutions' distribution strategies change

What does this mean for financial institutions?

Key implications and remaining questions

“Safe Bets” – Likely implications under all scenarios

- !** **Reduced cross-subsidisation:** Whether they are anchored around non-traditional players or financial institutions, financial products and services will increasingly be offered on a stand-alone basis limiting incumbent institutions' ability to competitively cross-subsidise
- !** **Partnership with non-traditional players:** Financial institutions' ability to work with non-traditional players will be come essential to creating new distribution channels, providing competitive product offerings and enabling non-traditional services
- !** **Redefining the role of financial institutions:** Financial institutions will need to realign their long-term strategy based on how they define their shifting role with varying emphasis on product manufacturing and creation of customer experiences
- ?** How will the emergence of competitive unbundled products and resulting limits on cross-subsidisation impact the overall structure and business model of retail financial institutions?

Scenario 1: Disaggregation of customer relationship ownership

- !** **Reduced access to customer data:** As customers consume financial services on a a-la-carte basis, financial institutions will no longer own the majority of individuals' financial data, limiting their ability to independently create more compelling products and services
- ?** What will be the products and services that anchor customer relationships to retail financial institutions in the future; particularly as customers move toward “shopping” for financial products through technology players (e.g., Amazon, Google)?

Scenario 2: Enabling the ecosystem of non traditional providers

- !** **Reduced control over customer experience:** Even though financial institutions may still act as a gateway, their ability to control end-to-end customer experience will be reduced
- ?** What will be the core value proposition of traditional financial institutions to customers compared to technology players, considering traditional institutions' strengths as perceived by customers?
- ?** How open and collaborative will financial institutions choose to be with other institutions and new entrants considering the trade-offs between control and agility?

Scenario 3: Embedding closer into customers' daily lives

- !** **New set of risks:** As financial institutions evolve their core offerings to stay more relevant in customers' daily lives, they may need to expand to unfamiliar and less-defined areas, which may generate new risks and compliance issues that are not common to financial institutions today
- ?** What tangential products and services could financial institutions offer in the future, leveraging their strengths (e.g., custodian of customer data)?

Capital Raising

How will the evolution of distributed capital raising impact the role of traditional intermediaries?

Executive Summary

Context / Innovation

- Traditionally, capital raising activities have been facilitated by specialised financial institutions, leveraging their deep expertise to identify and support investment opportunities. Access to investments in these intermediaries has been limited to select high net worth and institutional investors
- In the face of growing interest in start-ups and digital democratisation, a series of alternative funding platforms have emerged, widening access to capital raising activities and providing funding to a greater number of companies and projects

Future of Alternative Funding Platforms

- While these alternative funding platforms are not likely to replace the traditional capital raising ecosystem in the short or medium term, their growth could change the role of incumbent institutions
 - Alternative funding platforms may solidify their position as a key capital raising intermediary for higher risk seed-stage companies, which would increase their access to funding and increase the number of new firms eligible for venture capital
 - Alternative platforms could also evolve to focus on investors with motives beyond financial return. They could help funnel capital to low-return opportunities that would not have qualified for investment from traditional venture capitalists but provide non-financial returns to crowd investors (e.g., alternative energy projects or local development projects)
 - Alternative capital raising platforms could also provide a channel for larger companies to raise capital directly from their customers base, potentially reducing costs while supporting customer engagement

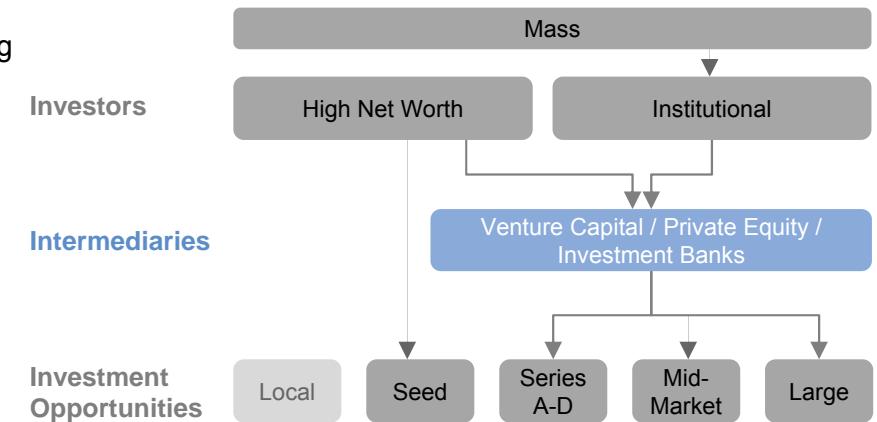
Key Implications

- The opportunities created by the proliferation of alternative capital raising platforms likely outweigh the risks they pose to incumbent institutions as they enable a more diversified pipeline of investment opportunities to support a richer innovation ecosystem

Capital raising has been traditionally facilitated by specialised institutions with deep expertise, but individual investors have limited access so far

How do financial institutions facilitate capital raising activities today?

- While smaller loans for small / medium enterprises are directly issued by retail / commercial banks, larger capital needs of companies are typically fulfilled by issuing equity or debt through a specialised intermediary like an investment bank
- Unlike lending transactions where loans are issued from the banks' balance sheet, investment banks facilitate the structuring, marketing and sales of equity or debt capital to potential investors and charge a fee to the issuing company (in certain cases, banks participate as an investor by buying shares / bonds, managing investors funds or providing a lending facility)
- Issuing companies directly pay back principal and interest on debt or pay dividends for equity to the investors
- Layers of financial institutions, from venture capital to investment banks, specialise in and focus on various stages of businesses to facilitate capital raising



Emerging pressure on traditional lending models

- Increased connectivity, the success of internet start-ups, changing consumption behaviours and increasingly entrepreneurship-friendly policies have fueled a rapid increase in the number of start-ups, making effective screening and selection processes by traditional funding options (e.g., venture capital) increasingly difficult
- To maintain control and agility, rapid growth companies continue to delay accessing the public pool of capital via IPOs, aided by policies and regulations permitting widening of investor base without going public (e.g., Jumpstart Our Business Startups Act (JOBS Act))
- As a result, an imbalance is created between supply and demand for capital in the private market, calling for alternative models to provide the funding required

Key challenges with traditional models

Limited Access

Access to capital can be limited by the size, history and relationships of a business

Standardised Measurement

Appeal to investors is determined strictly by risk / return and funding may be limited for opportunities with alternative propositions

Timely Supply of Capital

Lengthy structuring and fulfillment process may limit timely access to capital

Loss of Control

Businesses may lose control over key decisions to investors and individual investors do not have direct control over their investments

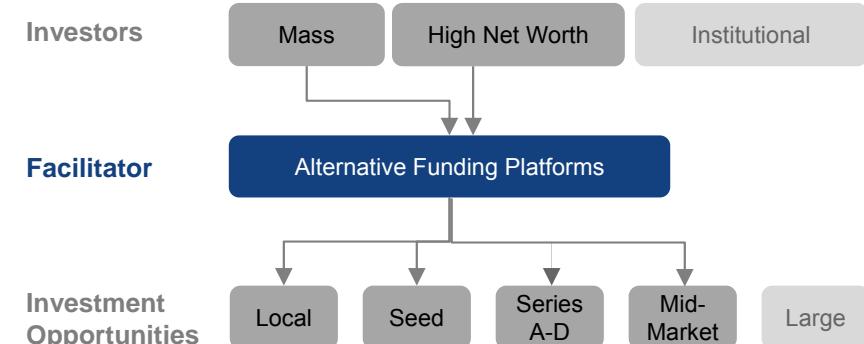
Potential for Inadequate Funding

The ability to meet funding needs at a fair price can be deterred by the capability of the intermediating institution

Alternative funding platforms enable the crowd to play a bigger role in providing capital to investment opportunities

Description of alternative funding platforms

- Alternative funding platforms provide an opportunity for businesses to interact directly with individual investors to widen options for raising capital
- Instead of providing investment advice or directly marketing investments in equity or debt capital, alternative funding platforms aggregate investment opportunities, provide a standardised view of the opportunities and facilitate legal structuring of equity or debt issued
- The rating of investment opportunities are conducted through the wisdom of the crowd (i.e., minimum target must be met for successful funding) or by allowing more experienced individual investors to lead the investment activities, instead of using credit rating agencies or sell-side analysts



Key characteristics of alternative funding platforms



Crowd Based

- Alternative funding platforms provide a marketplace for individual investors to directly discover and invest in investment opportunities
- Investment opportunities are typically only funded when a pre-determined target is met, to weed out less credible or less promising opportunities through “crowd’s approval”



Empowering Individuals

- Some alternative funding platforms leverage the expertise of more experienced individual investors in certain fields (e.g., angel investors) by providing them an opportunity to lead funding for desired investments
- Some platforms allow these “lead” investors to gain additional income through fees, similar to carries paid to general partners of private equity firms

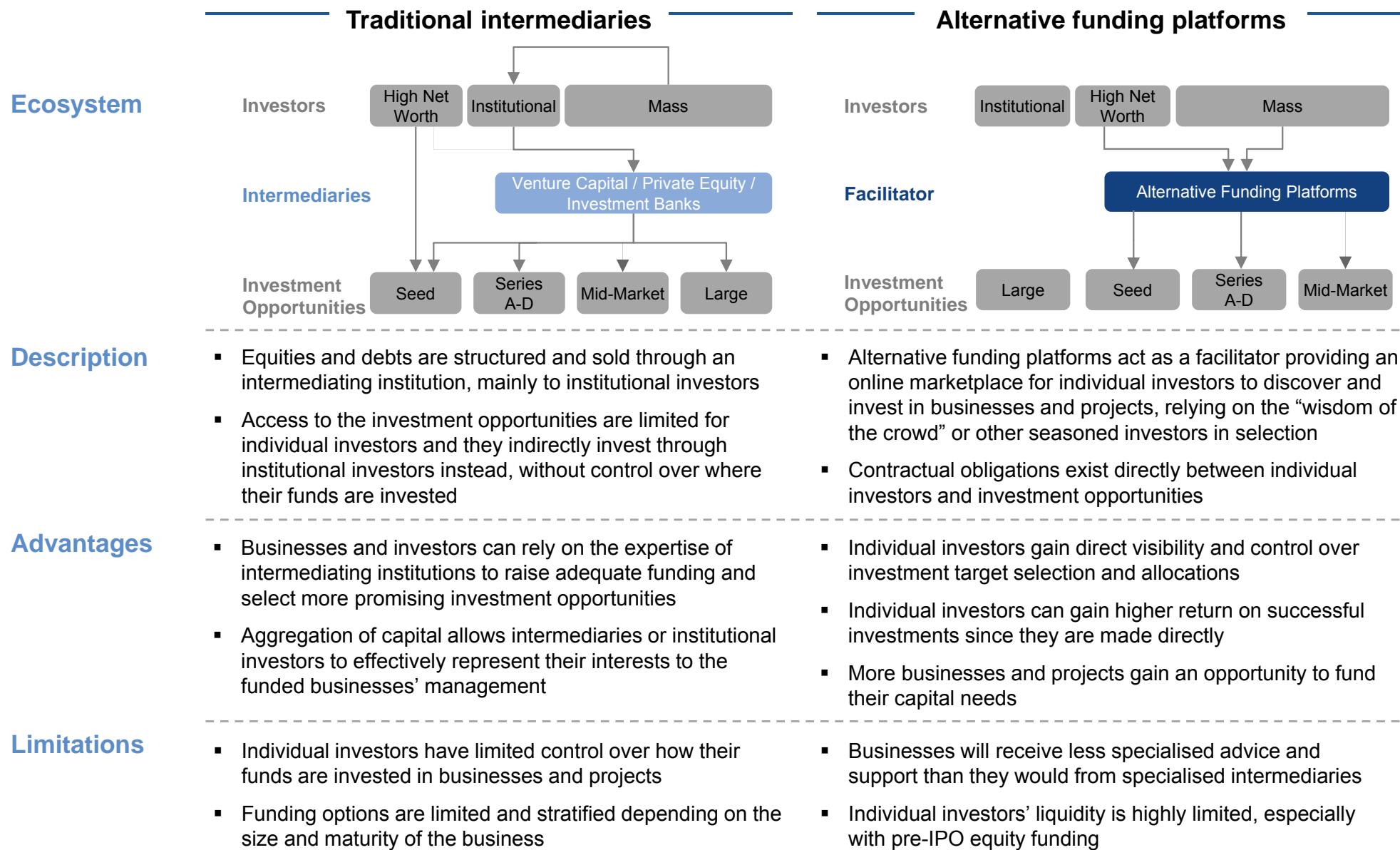


Customisation

- Alternative funding platforms provide a number of customisable parameters for businesses to adjust and easily design funding options desirable for them (e.g., term, equity share)
- Moreover, some platforms allow businesses to build in unique clauses, such as rewards, to make them appealing to investor segments



While traditional capital raising intermediaries directly structure products or investment money for their customers, alternative platforms act as a marketplace



The proliferation of alternative funding platforms will make the capital raising market more diversified and accessible

Key characteristics of the future capital raising market



Increased Accuracy

As more individual investors get involved in funding decisions, the business' prospects will be tested from multiple perspectives. This "wisdom of the crowd" may improve the accuracy of overall investment decisions



Increased Access

As more individual investors receive opportunities to directly fund businesses, more businesses and projects will gain access to potential funding options



Increased Control

Individual investors will gain more control over where their investments flow and determine whether they want direct control over investment decisions



Reduced Costs

As individual investors participate directly in funding without going through intermediaries, their cost to invest will decrease, but the impact to overall profitability remains unclear



Diversified Options

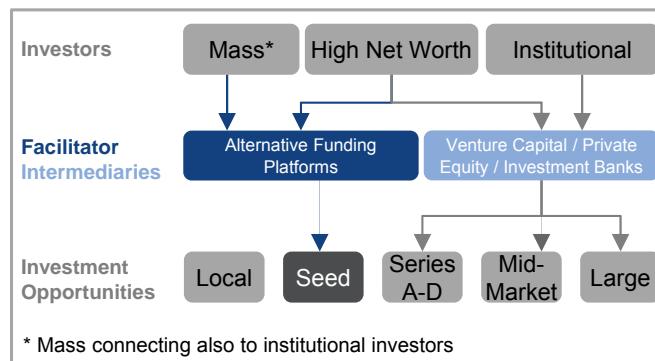
Businesses will be able to structure equity or debt more flexibly to meet funding needs and will offer more diversified incentives to potential investors to increase appeal

In enabling these future characteristics, how will the evolution of distributed capital raising impact the role of traditional intermediaries?

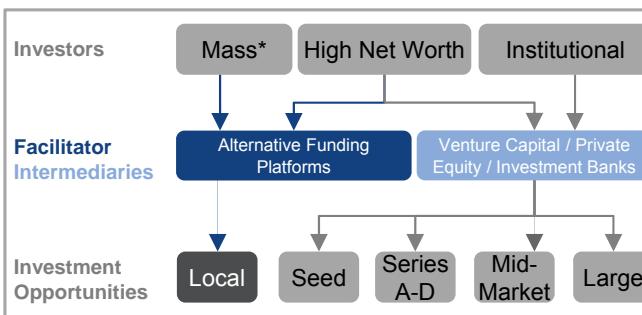
How will the evolution of distributed capital raising impact the role of traditional intermediaries?

Potential role of alternative funding platforms

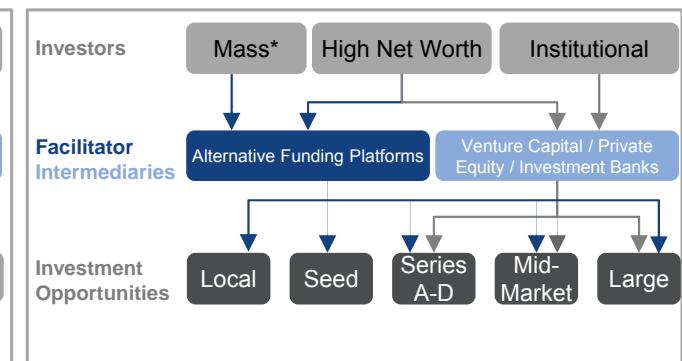
① Incubator of seed-stage companies



② Provider of funding to lower return investments



③ Evolution into an alternative funding option for larger companies



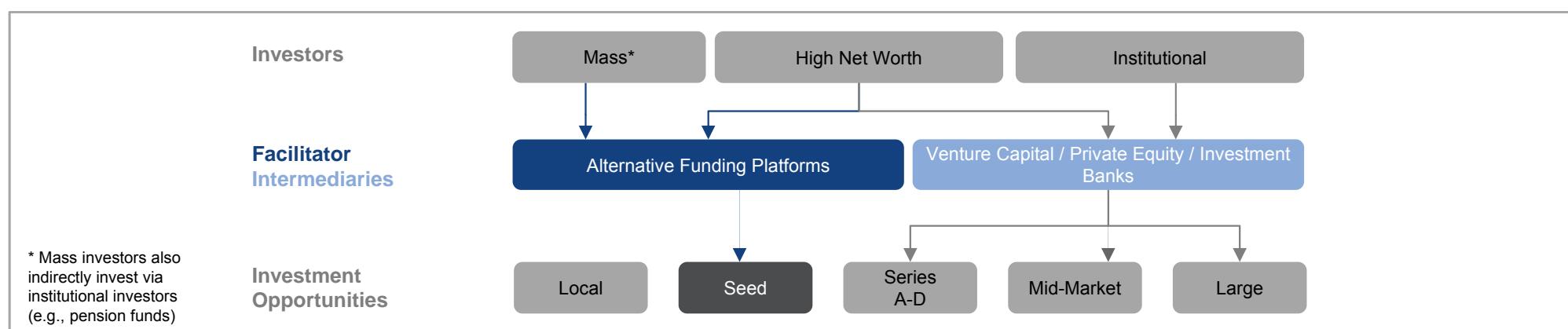
- Peer-based funding platforms solidify their position as the capital raising intermediaries for **higher risk seed-stage** companies
- Extending funding opportunities to more seed-stage companies makes the overall capital raising ecosystem richer by **increasing the number of investment opportunities eligible for later stage venture capital financing**

- Peer-based funding platforms focus on investors with **motives beyond financial return** (e.g., sustainability and social responsibility interests) to provide capital to **low-return** investment opportunities that otherwise would not have qualified to raise capital through traditional intermediaries
- **Seed-stage** companies are funded by traditional angel investors and venture capitalists who can provide appropriate **guidance for growth**

- Larger companies leverage peer-based platforms as an alternative channel to **engage and raise capital from their customer base**
- In addition to benefiting from implicit marketing and increased customer loyalty, larger companies further **reduce costs of capital by providing non-financial incentives** to customers (e.g., future discounts)

- The following scenarios illustrate potential outcomes generated by the innovations discussed in this topic, particularly in response to the key question above – they are not meant to be future predictions
- These scenarios are illustrations of particular aspects of the potential future and are not meant to represent a complete view of the market and competitive landscape – in many cases, some or all scenarios could be realised at the same time

Scenario 1: Incubator of seed-stage companies (1 / 2)



Narrative

The popularity of peer-based funding platforms grows but remains focused on seed-stage ventures, with later stage firms opting to raise funds through traditional providers, such as venture capitalists, who are able to provide guidance and access to networks.

Within this environment early-stage companies can more easily test their product ideas, and gain exposure to potential customers, while later-stage companies can accelerate their growth through venture capital involvement. Some venture capitalists may partner with peer-based platforms as a sourcing channel for potential deals.

Summary of impact

- Peer-based funding platforms solidify their position as the capital raising intermediaries for higher risk seed-stage companies
- Private equity and venture capital firms move upstream to focus on Series A or later stage ventures, where their networks and guidance matter most and risks of failure are lower
- Extending funding opportunities to more seed-stage companies makes the overall capital raising ecosystem richer by increasing the number of investment opportunities eligible for later-stage venture capital financing

Case studies



Seedrs is an online peer-based capital raising platform for individual investors to discover and invest in seed-stage ventures. Investment opportunities at Seedrs provide equity shares to investors and only those investments that meet their funding target receive funding. Seedrs acts as a custodian for the individual investor's equity to protect their interests and enable further rounds of investment.

Scenario 1: Incubator of seed-stage companies (2 / 2)

Necessary conditions for the scenario

- Accumulation of a critical mass of investors who are interested in participating in peer-based funding models
- Investors have access to sufficient high-quality and accurate information to conduct due diligence
- Investors have sufficient financial literacy in order to understand high-risk investment opportunities
- Regulators to implement well-defined and well-balanced investor protection rules

Individual Investors

Implications of the scenario on...

- Diversify their portfolio adding on high-risk and potentially high return investments
- Increased level of engagement throughout the investment process

Incumbents

- Pressure on margin for angel investors and seed-stage venture capitals
- Increased maturity of investment opportunities
- Increased number of potential investment targets

Overall Ecosystem

- More diversified opportunities are funded fostering economic growth in financial markets

Opportunities and risks associated with the scenario

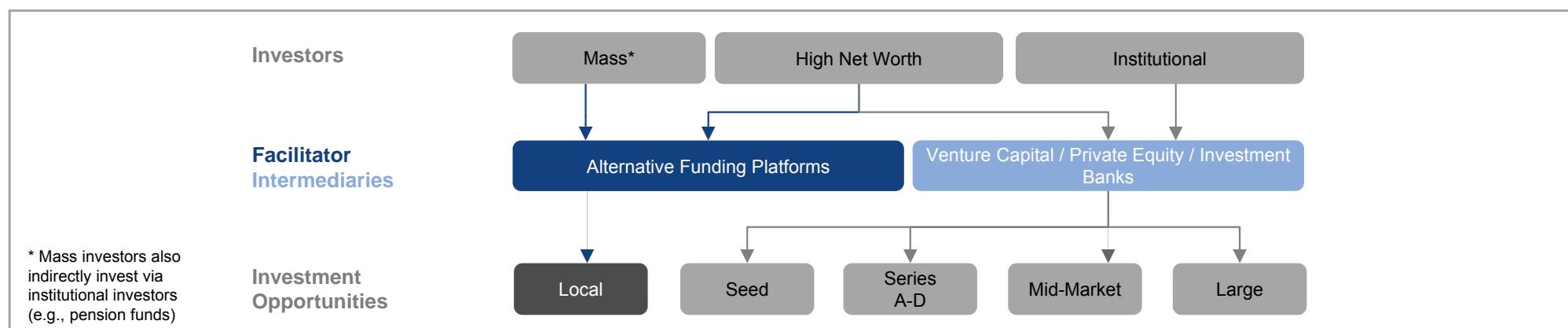
Opportunities

- Creates a channel to source investment opportunities for later-stage venture capitals that have been approved by the potential customer base (e.g., VC creating a crowd-funding platform to incubate seed-stage companies)

Risks

- Many investors may not understand the risks associated with even the most promising seed-stage investments thus increasing the risk and impact of fraud
- Risk of excessive dilution by venture capitals during later-stage funding rounds

Scenario 2: Provider of funding to lower return investments (1 / 2)



Narrative

Peer-based capital raising platforms that focus on seed-stage investment opportunities lose popularity among mass investors as they realise that the investment horizon is very long and the chance of a successful exit is extremely low.

Instead, peer-based platforms shift their focus to smaller projects that either have a higher chance of generating sustainable profits sooner, or can deliver benefits above and beyond financial return. Examples of non-financial returns include community development (e.g., funding expansion of a favorite coffee shop, funding re-paving local roads) and ideological pursuits (e.g., sustainable energy).

Summary of impact

- Peer-based funding platforms focus on connecting lower-return investment opportunities, which would not qualify for capital raising through traditional intermediaries, with investors with motives beyond financial return (e.g., empowering local community, sustainability)
- Seed-stage companies continue to be funded by traditional venture capitalists and angel investors who can provide appropriate guidance for growth
- Peer-based mechanisms are adopted by traditional intermediaries or high net worth individuals to encourage angel investor involvement

Case studies



Spacehive is a peer-based funding platform for civic projects, which enables local residents and businesses to fund community development projects (e.g., playgrounds, parks). Individuals with project ideas can directly pitch ideas to other residents through Spacehive and rally support and capital.



Abundance Generation is a peer-based capital raising platform for local or regional sustainable energy projects that are too small to be attractive to investment banks. The platform raises capital from environmentally conscious investors and facilitates issuance of debentures to create cash flow back to investors sooner.

Scenario 2: Provider of funding to lower return investments (2 / 2)

Necessary conditions for the scenario

- Limited funding opportunities for local start-ups through traditional institutions
- Existence of communities that accept a lower than market return in order to make a project succeed

Implications of the scenario on...

Individual Investors

- Access to investments with low financial return but high social return
- Low cost capital for socially beneficial projects
- The ability for investors to closely identify with their investments

Incumbents

- Traditional investors like government funding agencies can re-deploy funds to other investment targets

Overall Ecosystem

- Minimal overlap with traditional capital raising intermediaries
- Potential erosion of businesses for commercial banks (e.g., balance sheet lending)

Opportunities and risks associated with the scenario

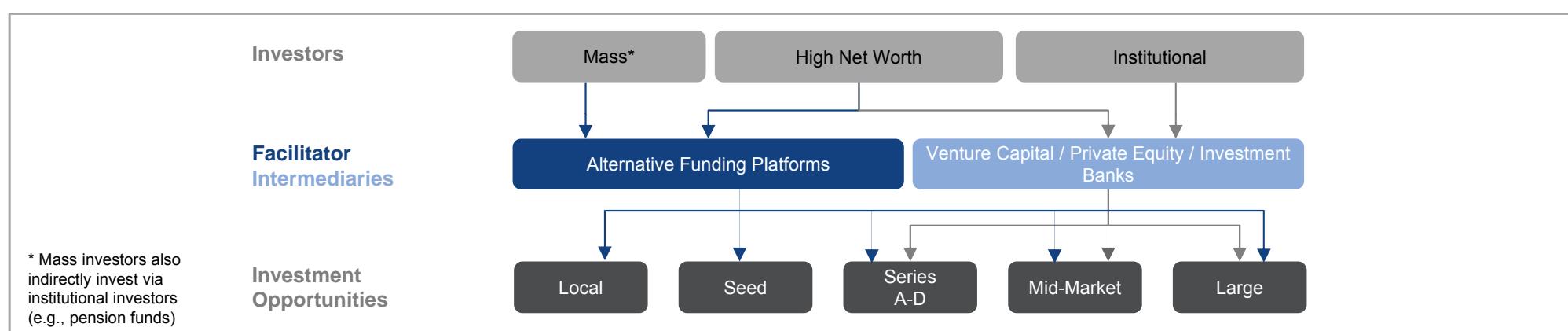
Opportunities

- Provides funding to local and purposeful projects with high social return that would not be properly served by the traditional ecosystem
- Institutional investors could get access to investment opportunities they don't have access to today. This would help them meeting their triple bottom line goals

Risks

- Potential misallocation of funds to high profile but ineffective projects or over-concentration of funds into certain types of projects
- Potential for higher than expected rate of default on debentures for products unable to meet even the lower than market expectations

Scenario 3: Evolution into an alternative funding option for larger companies (1 / 2)



Narrative

Inspired by the ability of peer-based funding platforms to simultaneously raise funding and cultivate new clients, established companies partner with peer-based platforms to fund their growth. By engaging directly with customers large companies can gain exposure to potential customers and build deeper partnerships with exiting customers. Customers in turn feel that they are participating in the growth of their favourite businesses. Businesses can also further compensate or incentivise their customer-investor base by providing perks that go beyond interest or dividends, such as future discounts.

Summary of impact

- Large established companies utilise peer-based capital raising platforms as an alternative channel to raise capital directly from their customer base
- In addition to benefiting from implicit marketing and increased customer loyalty, larger companies further reduce direct cost of capital by providing non-financial incentives to customers (e.g., future discounts)
- Peer-based funding platforms develop into an alternative funding method that exists in parallel with the traditional capital raising ecosystem, potentially reducing traditional intermediaries' businesses

Case studies



Chilango, a UK-based fast food chain, structured a campaign to raise £1 million for expansion by selling four-year corporate bonds with an 8 percent unsecured, unlisted coupon through peer-based capital raising platform, CrowdCube. In addition to offering a financial return (8 percent coupon), Chilango offered a free burrito every week for the duration of the bond to investors who invested more than £10,000 and a voucher for two free burritos to investors with smaller investments. This campaign raised £2.16 million from 749 investors, exceeding the target as the largest funds raised on the CrowdCube platform.

Scenario 3: Evolution into an alternative funding option for larger companies (2 / 2)

Necessary conditions for the scenario

- Fully loaded cost of funding through peer-based platforms must be lower than the costs incurred in the traditional financial ecosystem
- Alternative funding platforms should be able to provide equivalent levels of information to mass market investors as institutional investors receive from intermediaries

Implications of the scenario on...

- | | |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Customers / Investors | <ul style="list-style-type: none"> ▪ Feel more personally involved with their favourite businesses ▪ Act as partners to investment target's strategic decisions ▪ Gain access to an asset class unavailable to individual investors today (e.g., corporate bonds) |
| Incumbents | <ul style="list-style-type: none"> ▪ Increased competition and potential margin pressure for commercial loans / investment banks |
| Overall Ecosystem | <ul style="list-style-type: none"> ▪ Introduction of new tool to raise capital may induce traditional institutions to innovate |

Opportunities and risks associated with the scenario

Opportunities

- Businesses can achieve non-financial gains (e.g., revealed preference in the market, marketing, customer loyalty) through financial activities

Risks

- Businesses issuing securities without professional advice from capital raising intermediaries risk underpricing and under-subscription
- Individual investors may lack financial sophistication to properly understand the covenants of financial products or assess a suitable return for the risks entailed
- Reputational risks for businesses when issues arise with their financial products

What does this mean for financial institutions?

Key implications and remaining questions

“Safe Bets” – Likely implications under all scenarios

- !** **Competition for investments:** While distributed capital raising platforms and traditional intermediaries may have limited overlap in investment opportunities, traditional intermediaries will need to compete for investments, especially from angel investors, against distributed platforms where investors can play more active roles
- !** **Shortening capital raising cycles:** With access to more diverse funding options, new companies will be able to grow at a quicker pace and the average time between funding stages will be shortened
- !** **Alternatives to wealth products:** As individual customers gain access to investment products with potential higher returns and / or better aligned to their interests, their mix of investments in traditional wealth management products will shift over time
- ?** How will traditional institutions, from investment managers to investment banks, participate in distributed capital raising platforms to maximise the benefits from the broadened capital raising market (e.g., direct entry, sourcing partnerships, investment vehicles, valuation model)?

Scenario 1: Incubator of seed-stage companies

- !** **Changes to sourcing strategy:** Advantages of distributed platforms as a sourcing tool, such as testing with future customer base, will create pressure to traditional internally-driven sourcing models
- ?** How will traditional intermediaries discover unique investment opportunities and generate exclusivity when most investment opportunities become visible to competition via distributed platforms?

Scenario 2: Provider of funding to lower return investments

- !** **Channel for new investment opportunities:** Distributed platforms may enable traditional institutions to directly participate in smaller investments without significant efforts (e.g., entry of hedge funds)
 - ?** What are the hurdles that prevent traditional institutions from participating in smaller investments and how may distributed platforms resolve them?

Scenario 3: Evolution into an alternative funding option for larger companies

- !** **Importance of selection:** Traditional intermediaries' ability to provide value not linked directly to financing will become more important if they wish to maintain their current role
- ?** What differentiated value will traditional intermediaries offer to compete against distributed platforms that successfully move upstream?

Investment Management

How will the empowerment of individuals through automated systems and social networks transform the business of investment management?

Executive Summary

Context / Innovation

- The wealth management industry has suffered from the loss of customer trust since the financial crisis. This trust has been slow to recover in the face of continued economic uncertainties
- In this environment, a number of disruptors, from automated wealth management services to social trading platforms, have emerged to provide low-cost, sophisticated alternatives to traditional wealth managers. These solutions cater to a broader customer base and empower customers to have more control of their wealth management

Future of Investment Management

- These innovations will create pressures for the wealth management industry to improve the value delivered while broadening access to more customers
 - Cheaper and faster online tools and automated services that originally catered to underserved customers may steal share from traditional wealth managers in the mass affluent market, pushing traditional managers to switch their focus to more personalised, relationship-based segments
 - Alternatively, automated investment management platforms could commoditise traditional high-value services and reduce the value delivered by wealth managers across all customer segments, enabling traditional wealth managers to focus on providing more personalised, bespoke services to a broader customer base
 - Empowered with intuitive and affordable tools, some individual investors may also gain sufficient level of sophistication to act as investment experts, selling and sharing their investment expertise via social trading platforms that erode the value of traditional wealth management professionals

Key Implications

- The emergence and growing popularity of automated wealth management services and customer empowerment tools will pose a tangible threat to the traditional practices of the wealth management industry. However, incumbent institutions who can embrace these innovations and streamline their processes will be able to provide higher value services to a broader customer base

The wealth management industry has suffered a significant loss of customer trust and increased regulatory scrutiny following the financial crisis

Overview of the wealth management industry

- Offered by variety of financial institutions, including private banks, registered investment advisors, bank brokers/ insurers
- Targets higher-end of customers with investable capital, such as ultra high net worth, high net worth and mass affluent customers



Advisory

- Investment allocation strategies
- Active money management (e.g., asset selection)
- Securities analysis



Brokerage

- Distribution of wealth products (e.g., mutual funds, ETFs, annuities, insurance products)
- Access to rare products and assets
- Brokerage account management



Value-Add Services

- Wealth transfer planning
- Estate / tax strategies
- Retirement planning
- Private banking

Recent developments in wealth management

- In recent decades, wealth managers have begun to expand their focus from high net worth to mass affluent segments
- Increased regulations on consumer protection requires banks to advise customers in a more structured way, raising the bar for new entrants
- Increased transparency into investment performance is allowing individuals to better compare products
- Continued economic instability has left customers uncertain about the economic outlook and reticent to pursue active strategies. This trend toward passive products has placed pressure on pricing

Key challenges in wealth management

Accessibility

- High fees limit access to wealth management services for mass and mass affluent clients

Customer Expectation

- Customers' expectations of personalisation, efficiency and low costs continue to grow

Agility

- Ability to meet customer needs is limited by organisation structures and technology infrastructure

Lack of Trust

- Customer trust has been slow to recover following the financial crisis

A number of disruptors are emerging to provide low-cost and sophisticated alternatives to traditional wealth managers to a broader customer base

Key innovations democratising wealth management



Automated Management and Advice

- Offers high-value advisory services on portfolio allocation and money management at low costs based on automated analysis
- Automates the management of a personalised investment portfolio based on individual needs
- Provides aggregated view and analysis of multiple accounts



Social Trading

- Empowers individual investors to build and share investment strategies and portfolios with other investors
- Empowers individual investors to share their opinions and gain market insights from the opinions shared by the crowd



Retail Algorithmic Trading

- Enables investors to easily build, test and execute trading algorithms with limited technical knowledge and infrastructure
- Provides platforms for sophisticated investors to share trading algorithms with others



Common characteristics of wealth management disruptions

Lower Barriers

Allow customers with fewer assets to receive financial advice by reducing the minimum investment threshold and management fees by leveraging automated algorithms

Algorithm-Driven

Commoditises previously high-value, manual-intensive services at a low cost via automation. This minimises the need for manual intervention

Customer Empowerment

Improves the financial literacy of customers by readily providing analysis of their financial position and empowering them with tools to easily create and execute investment strategies

Reliance on the Crowd

Leverages the capabilities existing within the crowd to create more accurate understanding of the market and provide low-cost alternatives to investment funds to customers

Disruptive innovation in wealth management pressures the industry to improve the value delivered to more customers

Key characteristics of the future of wealth management



Accessibility

More sophisticated wealth management services will become available to a broader customer base, including the mass affluent and mass market customers



Transparency and Control

Customers will gain greater visibility into their financials and how their money is invested and will be able to make adjustments to their financials more readily as more wealth management options become available



Convenience

Online and mobile channels will be increasingly leveraged to interact with customers and deliver higher value services, providing access to financial information on demand



Personalised

As algorithms used in managing wealth become more sophisticated, the degree of customisation and individualisation will increase for services delivered to mass affluent and mass market customers



Low Cost

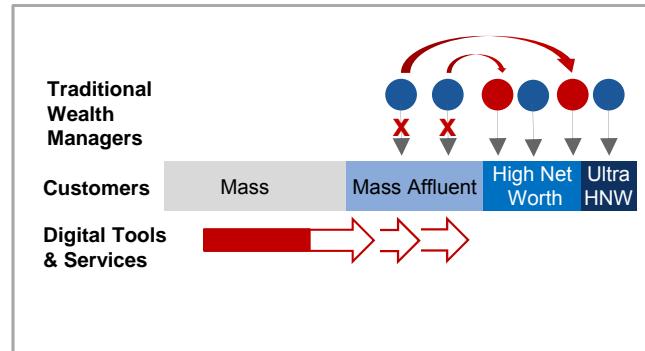
The cost of receiving advisory and management services will decrease as automation lowers the operating costs and new disruptive entrants spur competition in the market

As these disruptive innovations create pressures for the wealth management industry by empowering individuals, how will the wealth management landscape evolve?

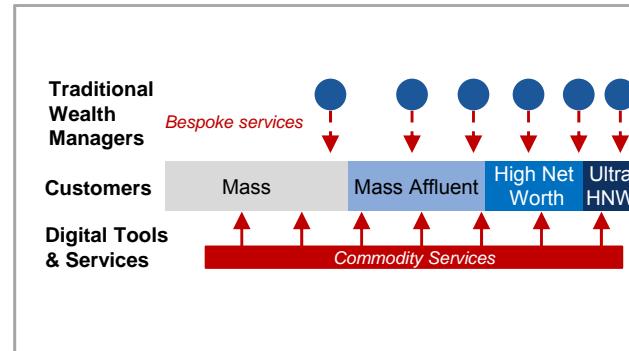
How will the empowerment of individuals through automated systems and social networks transform the business of investment management?

Potential impact to investment experts

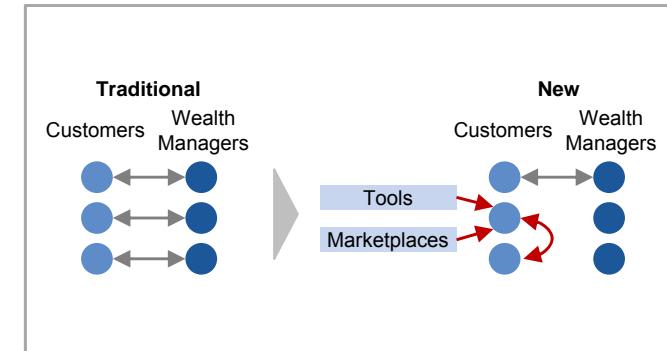
1 Erosion of the mass affluent market



2 Revamping the value proposition of wealth managers



3 Lowering bars to act as an investment expert



- Cheaper and faster online tools and automated services that originally catered to underserved customers **steal share** from traditional wealth managers in the **mass affluent market**
- Wealth managers, who have been expanding their focus to the mass affluent market, **shift their focus** back to more personalised and relationship-based **high net worth individuals**
- Automated investment management platforms **commoditise traditionally high-value services** (e.g., tax loss harvesting) and reduce the value delivered by investment managers even to high net worth customers
- Services provided by physical wealth managers evolve to more **personalised, bespoke** space, such as financial concierge services and the management of inter-generational wealth transfers
- Empowered with intuitive, affordable and accessible tools, some **individual investors** gain sufficient level of **sophistication to act as investment experts** without the technical knowledge or infrastructure traditionally required
- The next generation of retail and social trading platforms offer effective means for individuals to **share or sell their investment expertise**, directly competing with traditional investment managers
- The following scenarios illustrate potential outcomes generated by the innovations discussed in this topic, particularly in response to the key question above – they are not meant to be future predictions
- These scenarios are illustrations of particular aspects of the potential future and are not meant to represent a complete view of the market and competitive landscape – in many cases, some or all scenarios could be realised at the same time

Scenario 1: Erosion of the mass affluent market (1 / 2)



Narrative

As automated wealth management services and online tools establish a solid track record they continue to develop their service offerings to encompass functionalities desired by the mass affluent segment.

Traditional wealth managers find their market share eroding as a growing number of mass affluent customers defect to lower cost automated options. Traditional wealth managers are forced to either develop their own automated solutions, accepting lower margins, or move upstream to higher new worth clients seeking a highly personalised experience.

Summary of impact

- Cheaper and faster online tools and automated services that originally catered to underserved customers move upstream and steal share from traditional wealth managers in the mass affluent market
- Wealth managers, who have been expanding their focus to the mass affluent market, shift its focus back to more personalised and relationship-based high net-worth individuals, intensifying the competition and improving the services offered to those customers

Case studies



Launched in December 2011, Wealthfront offers an automated investment service that consists of managing a diversified, continually rebalanced portfolio of index funds, along with tax loss harvesting, via fully automated algorithms. Unlike traditional wealth management companies, the minimum account size is small (\$5,000) and fees are extremely low; which reduces the hurdles for entry for the Millennial generation. Since inception, Wealthfront has penetrated above and beyond Millennial customers to gather \$1.5 billion in assets under management within three years.

Scenario 1: Erosion of the mass affluent market (2 / 2)

Necessary conditions for the scenario

- Customer trust and awareness of new market entrants
- New players' offerings must cater to sufficient portion of customers' needs to replace traditional wealth managers

Customers

- Access to more personalised and sophisticated services at a lower price
- Extended services for high net worth and ultra high net worth customers as incumbents move upstream
- Increased transparency into and control over their wealth

Incumbents

- Revenue and margin pressure as the mass affluent market is eroded
- Intensified competition in high net worth market as incumbents move upstream

Overall Ecosystem

- Competition will increase and pricing for advisory services will adjust accordingly
- Shift into low-fee, passive investment

Opportunities and risks associated with the scenario

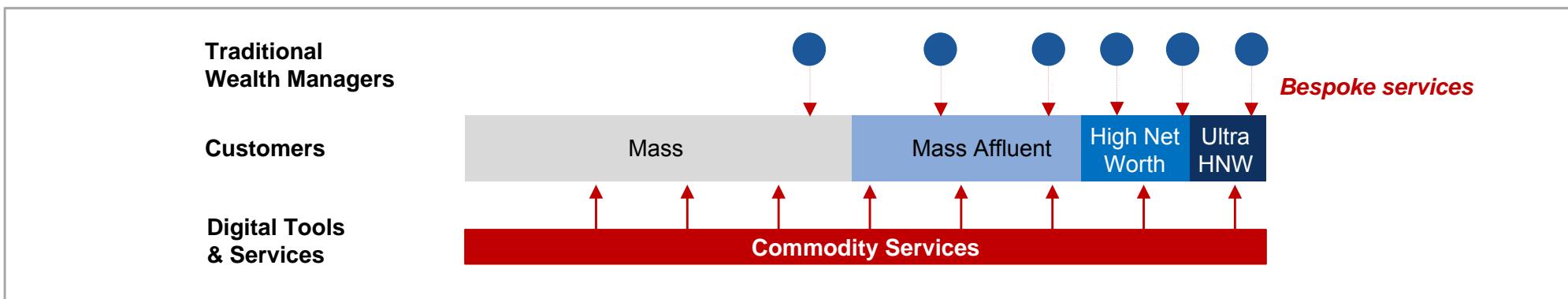
Opportunities

- Customers may make better, more educated choices based on a more holistic view of their financial situation
- Potential increase of market size as more customers get access to investment management services
- Mass consumers have access to different level of services which suits with their respective needs

Risks

- Lack of personal relationship means customers may make irrational financial choices in extreme situations (e.g., market crash)
- Risk of not receiving sufficient customer information to offer a suitably customised portfolio
- Shift to passive investment may increase market volatility and amplify losses during extreme events
- Potential impact to retail banks as their ability to cross sell wealth management products is reduced

Scenario 2: Revamping the value proposition of wealth managers (1 / 2)



Narrative

Automated investment management platforms commoditise a large portion of the wealth management transactions by automating standardised activities (e.g., asset allocation) and formerly high-value services (e.g., tax loss harvesting). However, the demand for in-person interactions and other specialised transactions continues to exist across the customer segment spectrum.

In order to remain competitive against automated platforms, traditional wealth institutions adopt and further develop automated functionalities, which in return free up capacity for in-person wealth advisors. Leveraging freed capacity, wealth managers can now offer more specialised, high-touch services to a broader customer base, improving the overall quality of services received by customers

Summary of impact

- Automated investment management platforms commoditise services once considered high-value and reduce the value delivered by investment managers even to high net-worth customers
- Services provided by physical wealth managers evolve to be a more personalised financial concierge and expand to provide specialty in areas such as intergenerational wealth transfer
- As incumbent institutions adopt improved automation, traditional wealth managers can free up capacity to expand their customer base

Case studies



Facing the threats of new automated investment services like Wealthfront, Charles Schwab announced the launch of its own automated investment service "Intelligent Portfolios" based on ETFs, featuring competitive capabilities like automatic rebalancing and tax loss harvesting, at no charge and with low minimum account threshold.

Scenario 2: Revamping the value proposition of wealth managers (2 / 2)

Necessary conditions for the scenario

- Incumbents must be able to acquire and implement new capabilities or be comfortable with partnering with automated service providers
- Incumbents must successfully identify and deliver on high-value services that can only be delivered through personal relationships

Implications of the scenario on...

Customers

- Reduced price for commoditised services and access to more sophisticated services
- Access to more differentiated offerings among financial institutions

Incumbents

- Pressure to differentiate from other institutions
- May face challenges in redeploying workforce to deliver different services than today

Overall Ecosystem

- Market structure will remain largely similar as existing players evolve
- Increased focus on non-price differentiation

Opportunities and risks associated with the scenario

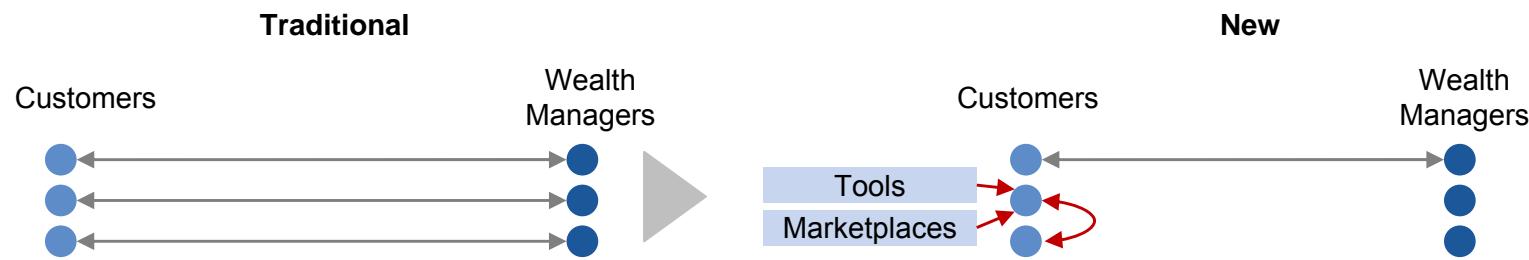
Opportunities

- Opportunity to leverage freed capacity from automation to serve more clients
- Ability to scale automated service offerings in new markets once developed

Risks

- Customers may not find additional, “personal” offerings valuable, eroding institutions’ value proposition
- Incumbents risk not being able to successfully transform their workforce to adopt new business models
- Evolution of mass affluent-focused institutions to offer more bespoke services may create competitive pressure to upstream institutions

Scenario 3: Lowering bars to act as investment expert (1 / 2)



Narrative

Since the advent of online discount brokerages, the ability for individual investors to develop sophisticated strategies and participate in investment activities has grown continuously. Next generation tools (e.g., retail algorithmic trading platforms) are leveraging advanced algorithms, visualisation and cloud computing to eliminate traditional barriers like a need for programming skills.

These innovations are narrowing the gap between individual and professional investors and facilitating the emergence of marketplaces for trading strategies and algorithms, enabling some of these empowered individuals to steal share from traditional investment managers.

Summary of impact

- The next generation of retail and social trading platforms offer effective means for individuals to share or sell their investment expertise to other individual investors
- Sophisticated individual investors directly compete with traditional investment managers and aspects of the market for active retail investment management experience margin compression

Case studies



Quantopian

Quantopian allows sophisticated individual investors to build, test and execute algorithmic trading strategies with limited development knowledge and infrastructure, and manage other investors' investments for a fee.



Estimize gathers stock-performance opinion from professional and individual investors (buy-side) to create price estimates that would mimic the market reaction, without relying on sell-side analysts.

Scenario 3: Lowering bars to act as investment expert (2 / 2)

Necessary conditions for the scenario

- Sufficient track record of performance by investment experts to gain customers' trusts and overcome reputational barriers
- Competitive value proposition offered by investment experts in terms of return, risk and costs
- Regulatory control to ensure that accountabilities and disclosure standards are well understood by all parties

Implications of the scenario on...

- | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Customers | <ul style="list-style-type: none"> ▪ Access to more diverse investment strategies at lower costs ▪ Ability to expand financial knowledge |
| Incumbents | |
| <ul style="list-style-type: none"> ▪ Erosion of market share to investment experts and DIY customers ▪ Need to develop differentiated offering from individual investment experts ▪ Increased reliance on brand as a differentiator | |
| Overall Ecosystem | |
| <ul style="list-style-type: none"> ▪ Creation of "prosumer" environment where consumers participate in production ▪ Increased churn of entries and exits into investment advisory roles by individual experts | |

Opportunities and risks associated with the scenario

Opportunities

- Room for misalignment of interests by incumbent advisors is reduced due to increased competition

Risks

- Risk of less sophisticated customers overlooking tail risks associated with seemingly well-performing investment strategies
- Interests of marketplace platforms may not be aligned with the interests of investors, making it easier for fraudulent behaviour from investment experts
- Customers may feel overly confident or lose long-term view resulting in investment portfolios unsuitable to their needs
- Due to lower tolerance to short-term poor performance, customers may switch too frequently between investment strategies, leading to suboptimal return and incentivising bad behaviour among advisors

What does this mean for financial institutions?

Key implications and remaining questions

“Safe Bets” – Likely implications under all scenarios

- !** **Decoupling of advisory and products:** As more customers switch to automated advisors for more streamlined and cost-effective advisory services, the “one-stop” model of distributing financial institutions’ wealth products primarily via their advisory channels will become less effective
- !** **Eroding advantages of scale:** Traditional wealth managers’ scale-based advantages will erode as once manual processes are automated, virtual channels are utilised and core infrastructure become available at a low cost to new entrants
- !** **Increased competition:** The commoditising forces generated by new entrants will make more segments and services less profitable for traditional wealth managers and intensify competition among traditional players in more specialised segments or services
- ?** How will wealth managers that used to distribute their own products via advisory channels change their distribution strategy as new entrants providing automated digital solutions erode their customer base?
- ?** What are the differentiated services provided by traditional wealth managers that will remain difficult to automate and replicate by new entrants?

Scenario 1: Erosion of the mass affluent market

- !** **Erosion of deposits:** New entrants will begin to compete for mass or mass affluent customers’ deposits with retail banks
- !** **Importance of relationship:** As competition intensifies among traditional players in relationship-driven high / ultra net worth market, the role of in-person managers will become more critical
- ?** How will retail financial institutions prevent the erosion of deposits to new wealth products that now offer lower threshold for entry?

Scenario 2: Revamping the value proposition of wealth managers

- !** **Empowering retail banks:** More retail banks will be able to meet most needs of wealth management customers through automated services
- !** **Organisational change:** Traditional players may face challenges in redeploying workforce to deliver different services and customer segments than today
- ?** How will traditional institutions capture customers early on in their lifecycle as younger, mass affluent customers enter the wealth management market earlier through automated advisors?

Scenario 3: Lowering bars to act as an investment expert

- !** **Benchmarking challenge:** Benchmarking the performance of traditional wealth products will become increasingly difficult as distributed, constantly-changing group of prosumers become a source of competition
- !** **Importance of brand and trust:** In competing against prosumers who can generate similar return on investment, traditional institutions’ brand and customer trust will become a critical differentiator
- ?** How will traditional investment managers change their competitive and workforce strategy as emerging platforms empower sophisticated individuals to compete directly with professional investors?

Investment Management

How will the externalisation of key processes transform the financial ecosystem?

Executive Summary

Context / Innovation

- Many processes within investment institutions are considered as “core” to their business operation. However, a new breed of process externalisation providers are using highly flexible platforms (typically based in the cloud) to provide financial institutions with increased efficiency and new levels of process sophistication / excellence

Future of Process externalisation

- As service providers externalise and consolidate processes previously considered core capabilities, the core competencies that differentiate winning financial institutions shift from process execution to more “human” factors (e.g., synthesis, decision making)
- External service providers could enable small and medium-sized organisations to better compete with large incumbents by providing them access to top-tier processes that were once unreachable due to lack of scale
- Some external providers that consolidate regulatory compliance capabilities may also create an opportunity to centralise communications to regulatory agencies. This would improve the speed at which financial institutions are able to respond to regulatory changes and ensure a higher level of compliance

Key Implications

- By exploring options to externalise a large number of redundant processes across institutions, firms will benefit from efficiency gains and increased sophistication
- However, financial institutions must consider which capabilities they should continue to focus on as a source of competitive advantage

Many processes within investment management institutions considered as core to their business today are facing various pressures

Core capabilities of investment institutions today

- Over the past few decades, externalisation of non-core processes (e.g., HR, finance) has been a major trend in the financial services industry to drive efficiency and operational excellence
- Despite this trend many processes, such as transaction monitoring, regulatory compliance and risk management continue to be perceived as mission critical or competitive differentiators and have remained in house



— Evolution of landscape impacting core processes —

- The notion of core internal processes can change when external providers emerge with the ability to complete the process more efficiently and with more sophistication than individual institutions
 - The ability to access and collect market data was once considered a critical internal competency for equity investments firms until external providers emerged to provide more standardised and comprehensive set of data (e.g., Bloomberg, Thomson Reuters)
- A number of issues are arising that impact the institutions' ability to excel across today's core processes:
 - Increased regulatory burden as a result of the 2008 financial crisis (e.g., the Dodd-Frank Act) and the introduction of stricter compliance requirements (e.g., anti-money laundering) has taken up a large amount of institutions' capacity
 - Legacy processes and systems built based on the physical computing environment continue to limit institutions' flexibility and agility in adapting to the rapidly changing market conditions and continuously evolving regulatory requirements

— Key challenges faced by institutions —

Capacity Constraints

Lost capacity on updates and maintenance limits the ability to invest in core capabilities

Limited Flexibility / Agility

Timely update of the processes and technologies is limited due to costs and efforts required

Scale-driven Barriers

Sophistication of capabilities is not feasible due to the institutions' scale and size

High Cost of Maintenance

Updating and maintaining processes and technologies are costly and time-consuming

Inconsistency

Fragmented, local legacy processes and technologies impede connectivity across the organisation

Complexity

Inflexible systems designed for past market environments result in added complexity to adapt to the current environment

The new breed of process externalisation providers are built on the technologies and philosophies behind Web 2.0

Key innovations enabling the new breed of process externalisation



Advanced Analytics

- Utilise advanced computing power, algorithms and analytical models to not only automate existing manual processes but also provide a new level of sophistication

AYASDI



Cloud Computing

- Leverage cloud technology to improve connectivity with and within institutions to facilitate data sharing, streamline implementation and maintenance of processes, and enable real-time processing



FUNDAPPS



Natural Language

- Integrate natural language technology into processes to make them more intuitive for end users, reducing the need for deep technical backgrounds



DUCO

KENSHC



Platform

- Technology platforms, such as real-time databases and expert systems, that leverage automation to help users complete tasks faster and with fewer resources

NOVUS

OpenGamma

DUKO



As-a-Service

- Provide full externalisation of an entire capability, including automated and manual processes, as a service to institutions to minimise infrastructure investments required

FUNDAPPS



Capability Sharing

- Facilitate institutions to work with one another to share capabilities or easily integrate with new providers by constructing legal and technical standards and vehicles

OPENBANK PROJECT

eCo
Financial
Technology

For each capability within investment institutions that are considered “core”, process externalisation can effectively resolve key pain points experienced today

Illustrative transformative potential of process externalisation across core capabilities

	Data Collection	Analysis	Trade Strategy & Execution	Monitoring	Risk	Compliance
Current State Pain Points	<ul style="list-style-type: none"> Collection from multiple sources required for certain assets Processing of disparate formats required 	<ul style="list-style-type: none"> Reliance on manual modelling leading to human errors, lengthy turnaround time and capacity constraints to support more prudent decision making 	<ul style="list-style-type: none"> Trading strategy starts with hypotheses, requiring trial-and-error process Increasingly dynamic and complex trading landscape requires increased costs to achieve best execution 	<ul style="list-style-type: none"> Transactions are monitored post-trade in a batch process, focusing on coping with erroneous behaviours rather than preventing them 	<ul style="list-style-type: none"> Risk modelling and analysis is conducted by middle and back office functions with periodic reporting to front office, limiting its visibility on risk in real-time 	<ul style="list-style-type: none"> Constantly evolving regulations across geographies mean significant resources must be expended to ensure compliance processes are up to date and properly monitored
Benefits Offered by External Providers	<ul style="list-style-type: none"> Aggregating data collection from multiple sources and automating extraction not only improve efficiency, but allow greater influence over the sources of data 	<ul style="list-style-type: none"> Utilisation of advanced analytics and automation make analyses instant and more accurate, and allow institutions to test a greater number of opinions to support decision making 	<ul style="list-style-type: none"> Advanced analytics support automated data-driven trading strategy formation Automated execution providers improve the efficiency and quality of execution through connectivity with multiple venues 	<ul style="list-style-type: none"> Transactions can be monitored in real-time to ensure erroneous trades are identified and addressed in real time 	<ul style="list-style-type: none"> Automation of risk modelling and monitoring with user-friendly interfaces allows front office to directly engage in understanding and analysing risk in real-time 	<ul style="list-style-type: none"> Centralised compliance monitoring providers for specific types of regulations aggregate collection of changing regulations across multiple geographies with greater efficiency
Examples of New External Providers	NOVUS <i>Novus aggregates performance and position data of funds from regulators and participating funds to provide a single point of access to fund of fund managers</i>	KENSHO <i>Kensho automates the modelling of investment scenarios to support decision makers with real-time projection of performance under various outlook assumptions</i>	AYASDI <i>Ayasdi utilises topological data analysis to draw out correlations and outliers from big data to inform hypothesis and trading strategy development</i>	redkite <i>RedKite monitors erroneous trading patterns in real-time (e.g., layering) to help organisations deal with noncompliant transactions instantaneously</i>	OpenGamma <i>OpenGamma provides an open source platform for real-time market risk mgmt. and analytics, allowing front office resources to control and manipulate calculation</i>	FUNDAPPS <i>FundApps organises regulatory information and delivers a cloud-based managed service to automate shareholding disclosure and monitor investment restrictions</i>

The next generation of process externalisation not only brings efficiency, but also enables institutions to gain the level of sophistication unattainable by themselves

Key characteristics of the future state enabled by process externalisation



Automation

More processes will be automated and commoditised to free up capacity to invest in differentiating core capabilities



Flexibility / Agility

Updating and maintaining processes and technologies to adapt to the changing landscape will become quicker and more effortless



Sophistication

Leveraging scale, externalised processes will become more sophisticated than was possible within a single organisation



Consistency

Increased standardisation of processes, technologies and their interfaces will bring consistency across various operations and facilitate sharing of data



Reduced Costs

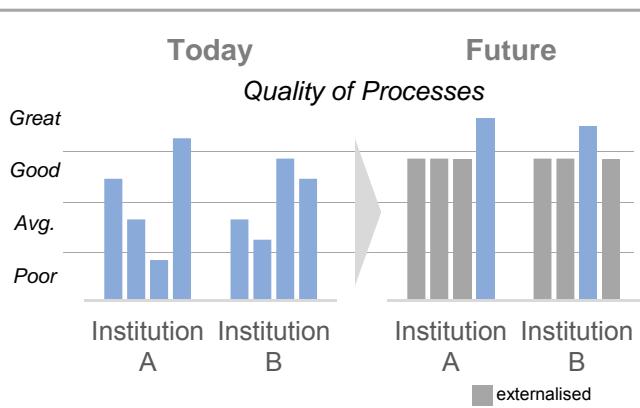
The costs to update and maintain processes and technologies will be reduced as they are shared among a number of institutions

Empowered by these benefits, how will the externalisation of key processes transform the financial ecosystem?

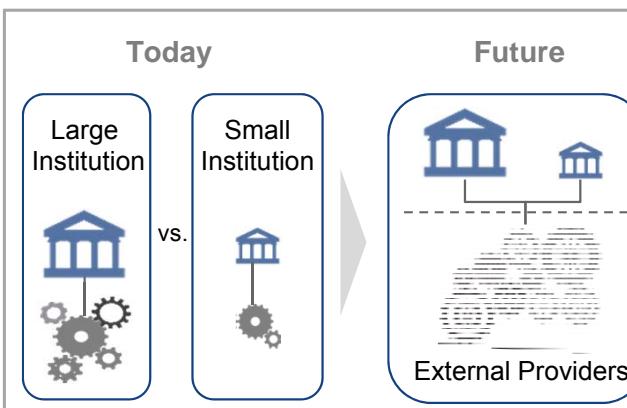
How will the externalisation of key processes transform the financial ecosystem?

Potential impact of process externalisation

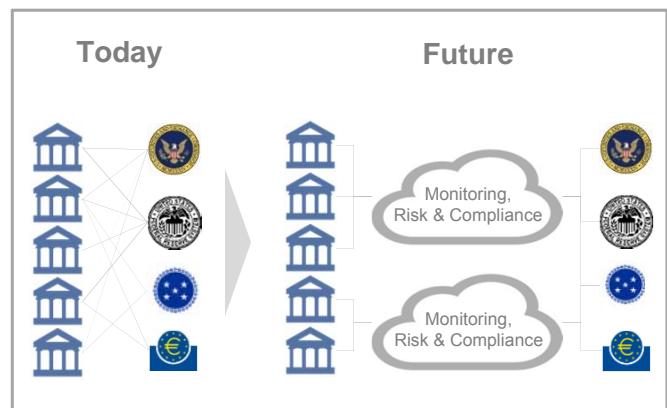
1 Redefined core capabilities of financial institutions



2 Level playing field for newer, smaller financial institutions



3 Centralised communications with regulatory agencies



- Service providers use advanced technologies to **externalise, consolidate and commoditise** processes that were previously considered **core capabilities**, in a more efficient and sophisticated manner
- As a result, **core competencies** that differentiate winning financial institutions shift from process execution to more **“human” factors** (e.g., synthesis, decision making)

- External service providers give **small and medium-sized organisations** access to **sophisticated capabilities** that were not previously attainable due to lack of scale
- By enabling small and medium-sized organisations to access top-tier processes, **barriers to entry are lowered** for new players and smaller existing players are able to compete with large incumbents on a **more level playing field**

- These providers improve the **speed** at which financial institutions are able to respond to regulatory changes, ensure a **higher level of compliance** via automation, and empower regulators to receive **consistent inputs** from financial institutions
- As more regulatory compliance and monitoring processes are outsourced to a small number of service providers, these firms can act as **centralised communication touch points** for regulators

- The following scenarios illustrate potential outcomes generated by the innovations discussed in this topic, particularly in response to the key question above – they are not meant to be future predictions
- These scenarios are illustrations of particular aspects of the potential future and are not meant to represent a complete view of the market and competitive landscape – in many cases, some or all scenarios could be realised at the same time

Scenario 1: Redefined core capabilities of financial institutions (1 / 2)



Narrative

Financial institutions begin to outsource select processes to specialised external firms who leverage advanced technologies to provide improved outcomes at a much lower cost. Efforts previously spent on managing these processes in-house can be deployed toward higher value activities that provide competitive differentiation.

As this pattern repeats over multiple processes, a financial institution's competitive position ceases to be defined by core operational excellence and instead is defined by which higher value activities they have chosen to focus on.

Summary of impact

- Service providers using advanced technologies provide options for financial institutions to externalise processes once considered core capabilities
- Competitive advantages derived from excellence in process execution will disappear as high quality process execution becomes a commodity available for purchase
- Financial institutions are required to redefine what capabilities differentiate them from other institutions with process execution taking a backseat to more "human" factors

Case studies

The ability to quickly and accurately model market projections and hypotheses through large quant teams has traditionally been a key advantage of large financial institutions. Kensho threatens that advantage by offering a next-generation analytics platform for the investment industry with massively-parallel statistical computing, scalable analytics architectures and user-friendly visual interfaces. By leveraging Kensho's platform, any investment institution can now rapidly model projections without an army of quantitative analysts; instead focusing more "human" capabilities like hypothesis generation and market insights.

Scenario 1: Redefined core capabilities of financial institutions (2 / 2)

Necessary conditions for the scenario

- External service provider's ability to demonstrate a clear business case for financial institutions to outsource many core functions
- Clear definition of accountabilities and liabilities between financial institutions and their service providers
- Securing regulatory comfort by demonstrating financial institutions' control over the externalised processes

Implications of the scenario on...

Customers

- High quality service levels across most financial institutions
- Access to increasingly differentiated services / product offerings among financial institutions

Incumbents

- Need to reallocate resources to develop new core capabilities
- Increased pressure to identify and develop new differentiating capabilities

Overall Ecosystem

- Emergence of a class of institutions specialising in externalising specific processes
- Increase in the average level of sophistication of processes across institutions

Opportunities and risks associated with the scenario

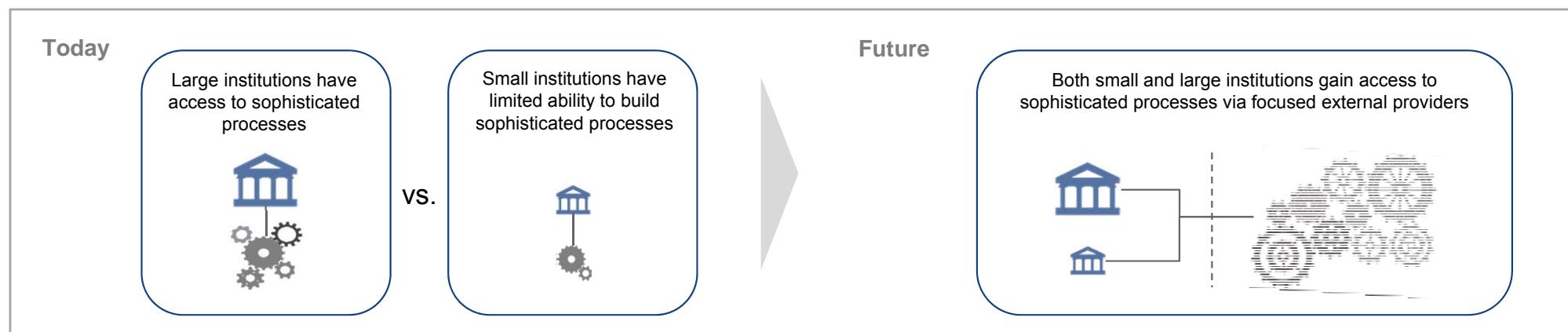
Opportunities

- Fewer process failures as they are externalised to more focused and specialised providers
- Emergence of institutions competing to excel in specific processes drives deeper specialisation
- Increased capacity for financial institutions to be innovative due to reduced focus on resource intensive core processes

Risks

- Centralisation of processes creates larger implications of process failures including continuity risks for banking in the case of a failure of an external service provider
- Risks resulting from potential lack of clarity surrounding accountabilities
- Loss of deep process knowledge within financial institutions may have unforeseen spill-over consequences in other areas of the business

Scenario 2: Level playing field for newer, smaller financial institutions (1 / 2)



Narrative

Once an external service provider has developed the tools for a financial institution to externalise a process, the cost of extending that service to additional financial institutions is typically very low and not dependent on the institution's size.

Small and medium-sized financial institutions capitalise on these economics to both improve their efficiency and radically increase the sophistication of their processes across the board. As process sophistication ceases to be a source of competitive advantage for large financial institutions, small and medium-sized institutions are able to increase their focus on differentiating capabilities.

Summary of impact

- External service providers provide small and medium-sized organisations access to sophisticated capabilities, which were previously unattainable due to lack of scale
- Barriers to entry into the market will be lowered and the playing field will be leveled with small and medium-sized organisations increasingly able to compete with large institutions

Case studies



Open Gamma uses an open source platform to provide real-time market risk management analytics to buy-side, sell-side and clearing institutions. While Open Gamma provides the platform free of charge, they offer support, consulting and training services to help institutions configure and modify the platform and select appropriate risk models. The platform includes a number of advanced functions not normally available to small institutions.

Through services like Open Gamma, new and small institutions no longer need to set up extensive support functions in middle and back offices to attain sophisticated capabilities and compete with larger institutions.

Scenario 2: Level playing field for newer, smaller financial institutions (2 / 2)

Necessary conditions for the scenario

- Externalisation providers must be able to provide suitable options for both small and large institutions
- Clear definition of accountabilities and liabilities of financial institutions and their service providers
- Securing regulatory comfort by demonstrating financial institutions' control the externalised processes

Customers

Implications of the scenario on...

- Wider universe of options for financial services as customers' choice of institutions is no longer restricted by their scale

Incumbents

- Increased competition as smaller institutions gain a stronger competitive position
- A need to re-evaluate business models that are based on economies of scale

Overall Ecosystem

- Wider distribution of market share
- Increased monitoring burden to regulators as the number of players increase

Opportunities and risks associated with the scenario

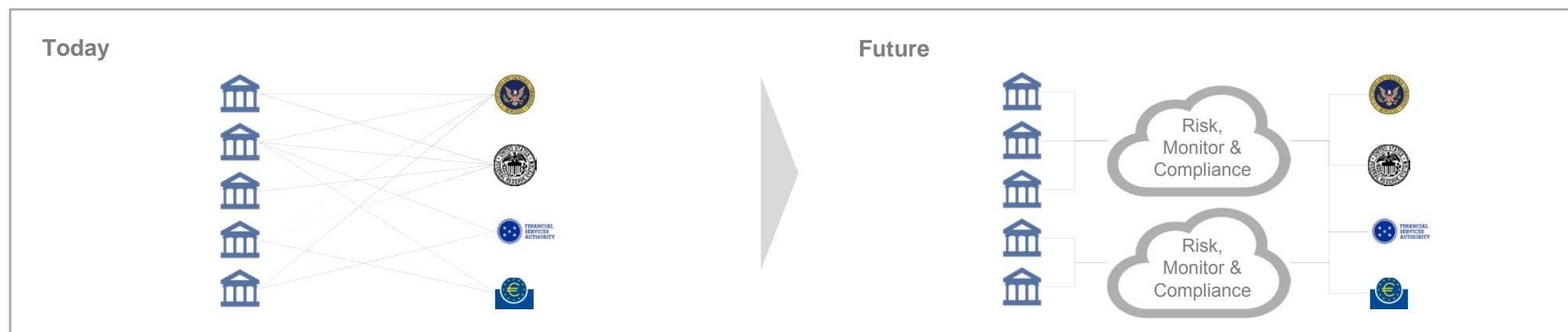
Opportunities

- Potential increase in diversification of strategies as smaller financial institutions are empowered to pursue innovative strategies
- Increased competition might lead to reduction of transaction costs for customers

Risks

- Risks to small and mid-sized players that their externalisation service providers will be acquired and internalised by large financial institutions
- Systemic benefits of scale, such as visibility into the market, may erode as the average size of institutions decreases

Scenario 3: Centralised communications with regulatory agencies (1 / 2)



Narrative

A number of niche service providers are emerging who are able to externalise processes related to specific regulations (e.g., restricted holdings, KYC). These firms are able to interpret regulatory changes and translate them into rules that can be applied across various financial institutions, improving regulatory compliance and the speed at which financial institutions can respond to regulatory changes.

As regulatory compliance within financial institutions becomes more closely integrated with these service providers, some regulators may choose to collaborate directly with them even to the point of issuing regulations in code rather than as policy documents.

Summary of impact

- More regulatory compliance and monitoring processes are outsourced to a small number of service providers with better connections to and understanding of regulations, reducing the compliance burden for financial institutions
- These compliance service providers can act as centralised communication touch point for regulators
- By solidifying their connections with regulators, these providers improve the speed at which financial institutions are able to respond to regulatory changes, ensuring a higher level of compliance

Case studies



FundApps organises regulatory information and delivers a cloud-based managed-service to automate shareholding disclosure and monitor investment restrictions across 100+ regulatory regimes on a daily basis. FundApps partners with a global legal service provider to monitor and translate changes in relevant regulations into rules on a daily basis.

If regulatory agencies partner with FundApps in the future, they could ensure consistent compliance across financial institutions, make dissemination of regulatory changes in disclosure regimes faster, and reduce the compliance burden faced by the industry.

Scenario 3: Centralised communications with regulatory agencies (2 / 2)

Necessary conditions for the scenario

- Buy-in from multiple regulators to collaborate with external service providers regarding regulatory topics will be necessary. Dealing with emerging risks like cyber security might be a good starting point
- Solid track record of performance and reliability demonstrated by externalisation business models
- Full accountability and liability for actions remain with financial institutions
- Critical mass of financial institutions externalise regulatory processes to a manageable number of service providers

Implications of the scenario on...

Customers

- Increased trust in financial institutions as overall compliance level increases

Incumbents

- Ability to respond faster, more easily and more cheaply to regulatory shifts
- Freed capacity from compliance processes to focus on the core competencies

Overall Ecosystem

- Higher, more consistent level of regulatory compliance
- Formalisation of externalisation providers as a core piece of the overall financial ecosystem
- Higher level of clarity in regulations

Opportunities and risks associated with the scenario

Opportunities

- Opportunities to improve the clarity of regulations across jurisdictions
- Cost for compliance and regulation, which tends to be very high in global institutions, potentially will be reduced
- Standardised data simplifies supervision for regulators

Risks

- Unclear how risks of regulatory capture will be influenced by externalised compliance models
- Amplification of non-compliant activities and unclear liabilities when centralised externalisation providers fail
- Decreased internal compliance expertise within financial institutions may have unintended consequences

What does this mean for financial institutions?

Key implications and remaining questions

“Safe Bets” – Likely implications under all scenarios

- !** **Loss of negotiating power and continuity:** As more capabilities, technologies and processes are externalised financial institutions will become increasingly dependent on 3rd parties for continuity
- !** **Skill loss of workforce:** Even though externalising less valuable capabilities will create efficiency, it may result in workforce skill loss over the long term and employees ability to develop a holistic view of financial services operations
- ?** How will financial institutions participate in capability sharing with other institutions to balance efficiency with control (e.g., utility creation, co-development, 3rd party providers)?
- ?** How will financial institutions prevent the loss of negotiating power and continuity as the next generation of process externalisation providers are often built on managed services models as opposed to today's vendor models?

Scenario 1: Redefined core capabilities of financial institutions

- !** **Organisational agility:** As innovative providers continue to streamline and commoditise previously high-value capabilities, creating an agile organisation will be critical to adapt to the changing landscape and realign core competencies
- ?** What capabilities and processes will financial institutions focus investments on to create competitive advantages that cannot be replicated through the new process externalisation providers?

Scenario 2: Level playing field for newer, smaller financial institutions

- !** **Higher turnover of new entrants:** externalisation of processes will make it easier for new players to enter the market without significant infrastructure, increasing the turnover in the industry
- !** **Imperative for direct participation:** In order to sustain scale-driven advantages, large financial institutions will actively participate in creating, funding, and acquiring innovative externalisation providers
- ?** What are the advantages that larger financial institutions may continue to benefit from when externalisation levels the playing field?

Scenario 3: Centralised communications with regulatory agencies

- !** **Limited regulatory interpretation:** When regulatory compliance is centralised and automated, regulatory models may shift from today's interpretation-based approach to more measurable, "black-and-white" approaches, reducing the room for regulations to be flexibly interpreted

Market Provisioning

How will smarter and faster machines transform capital markets?

Executive Summary

Context / Innovation

- As the popularity and profitability of high frequency trading declines, the next evolution of algorithmic trading may be dependent on smarter machines, allowing a broader class of trades to reap the benefits of automation and sophistication

Future of Smarter Faster Machines

- The proliferation of smarter machines will further shift the focus of machine-based trading to rapidly respond to real-life events
 - As the race for speed transitions to the development of strategies responding to real-life events, market makers' trading strategies may become more diversified as they access a vast amount of different data sources and infer different market conditions from that data
 - When trading algorithms become more intelligent by incorporating machine learning, the breadth and accuracy of their analyses will expand, and could result in convergence toward a single view of the market
 - Growing public discontent with algorithmic trading may lead to regulations on the use of automatic data feeds or smart machines in executing trades, reverting some parts of market-making activities to manual processes

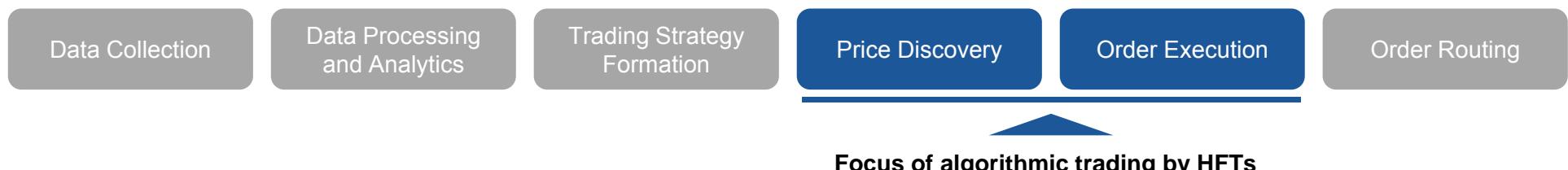
Key Implications

- The development of smarter, faster machines in algorithmic trading will have varying implications on the market structure in terms of volume, liquidity, volatility and spread – the future of algorithmic trading must be approached with a new lens with respect to the benefits it can deliver to the ecosystem weighed against the new types of risks it might create

As the popularity and profitability of high frequency trading declines, the next evolution of algorithmic, machine trading remains in question

Overview of algorithmic trading and high frequency trading

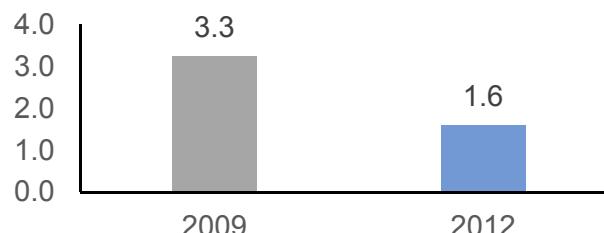
- The use of algorithms in trading activities has proliferated in lockstep with the evolution of computing power since its initial application for optimal portfolio determination in the 1970s and the emergence of fully automated algorithmic trades in the early 1990s
- Since then, the key focus of algorithmic trading has been on exploiting arbitrage opportunities in time and / or across venues by leveraging low latency access to the exchanges (i.e., high-frequency trading, autonomous market makers) and thereby providing liquidity to the market
- These high frequency traders largely replaced the market-making activities traditionally performed by broker dealers, who provided liquidity and made prices by manually coordinating offers and taking on the risks of buying and selling shares in return for spread
- While some trading firms and hedge funds use algorithms to achieve faster processing times for analysis of large datasets; price discovery and order execution remain the most active areas of high frequency trading



Declining popularity and profitability of high frequency trading

- High frequency trading reached its peak in 2009-2010, where those trades accounted for over 60 percent of all U.S. equities traded in volume
- However, the popularity and profitability of high frequency trading has significantly decreased due to lower volatility, improved liquidity, rising costs of trading infrastructure, and regulatory scrutiny

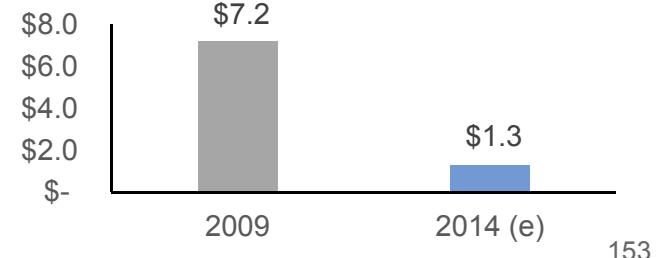
of High Frequency Trades per Day in United States
(in billions, est. by Rosenblatt Securities)



Average Profit per Share on HFTs
(est. by Rosenblatt Securities)



U.S. Revenue of High Frequency Traders
(in billions, est. by TABB Group)



Smarter, faster machines will allow broader types of trades beyond high frequency trading to reap the benefits of automation and sophistication

Smarter, faster machines' capabilities may shape the future of algorithmic trading



Machine Accessible Data

- Process news feeds through algorithms in real-time without human interpretation (machine-readable news)
- Discover major events faster than the news through social media / sentiment analysis



Event-Driven

- Input for algorithmic trading will shift from market information (i.e., movements in price) to real-life events
- The race for low latency will also shift to the access to real-life events leveraging faster connection to and interpretation of traditional and emerging news sources



Big Data

- Access extensive real-time data sets through specialised databases
- Uncover predictive insights on market movements based on correlations mapping
- Update and access insights in real-time through cloud-based analytics



Comprehensive

- The development of big data based analyses will allow traders to leverage broader and deeper sets of data in making trades
- More factors seemingly less relevant to the market / stock performance will be discovered and used for trading strategies



Artificial Intelligence / Machine Learning

- Ask questions, discover and test hypotheses, and make decisions automatically based on advanced analytics on extensive data sets
- Self-correct and continuously improve trading strategies with minimal human interaction through machine learning and prescriptive analytics



Automated

- The involvement of humans in the overall trading process may decrease as machines automate a wide range of core activities from hypothesising to decision making
- The accuracy, consistency and speed of trades will improve through automation and self-learning

Proliferation of smarter and faster machines will further develop traders' capabilities and transform the capital markets

Key characteristics of the future of trading



Agility

Real-life events will be reflected in the market price at a much faster speed as traders gain access to and act on news from new and traditional sources more quickly



Accuracy

The room for human error will decrease as more aspects of trading activities are automated. The quality of trading decisions will also improve as the machines used in researching, hypothesising and decision making self learn



Privileged

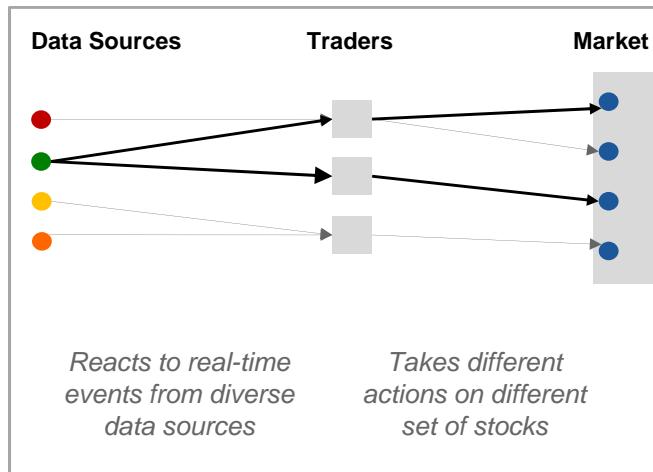
The gap between trading institutions and individual investors will increase as the increased infrastructure costs to compete in collecting, analysing and acting on information create barriers for individual investors

As smarter, faster machines improve the capabilities of traders, how will the capital markets transform?

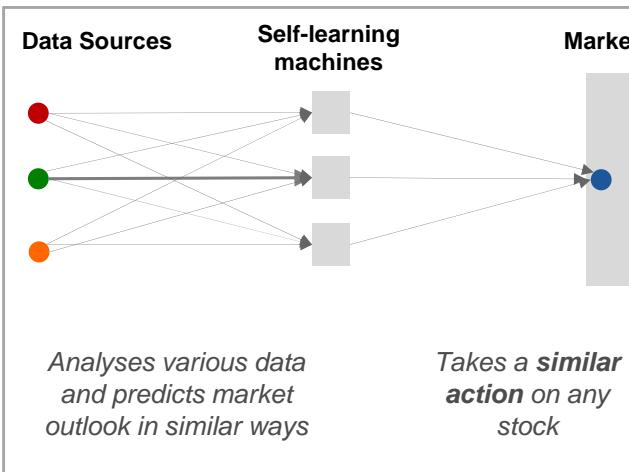
How will smarter and faster machines transform capital markets?

Potential scenarios enabled by smarter, faster machines

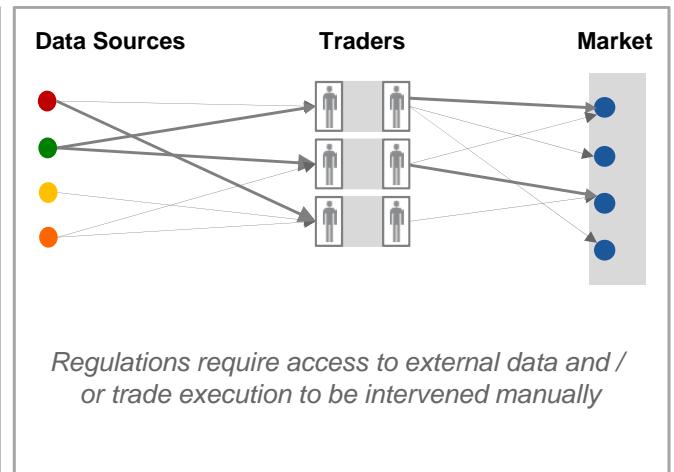
1 Diversification of trading strategies and tactics



2 Convergence of trading strategies and activities



3 Reverting to manual processes

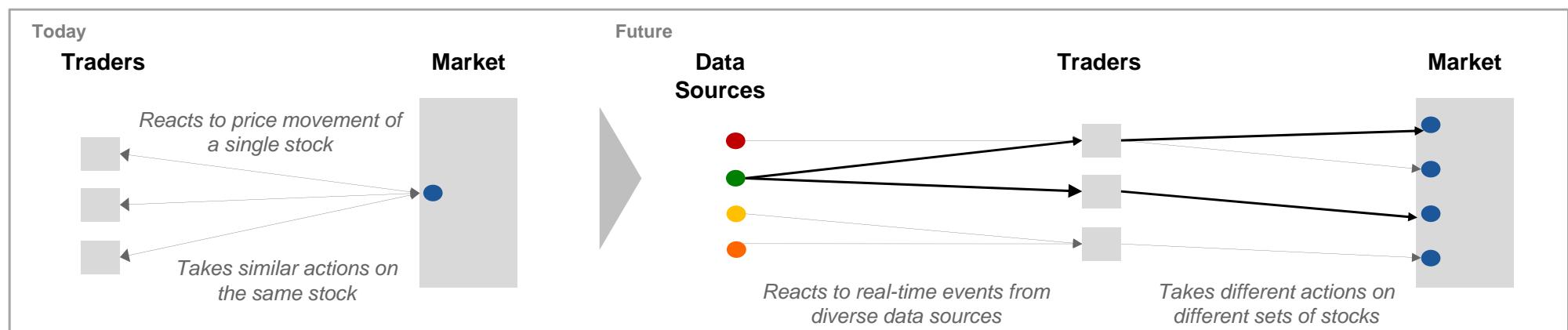


- The race for speed transitions from responding to price movements to the development of strategy **responding to real-life events** through big data analysis and machine readable news
- Algorithmic trading strategies become diversified** as they access different data sources and infer different market outcomes

- As trading algorithms become more intelligent and are able to access more complete sets of market data, their analyses **converge toward a single view** of the market
- As trading and market-making **strategies converge**, volume decreases and spreads tighten

- The following scenarios illustrate potential outcomes generated by the innovations discussed in this topic, particularly in response to the key question above – they are not meant to be future predictions
- These scenarios are illustrations of particular aspects of the potential future and are not meant to represent a complete view of the market and competitive landscape – in many cases, some or all scenarios could be realised at the same time

Scenario 1: Diversification of trading strategies and tactics (1 / 2)



Narrative

As the benefits that can be earned from incremental investments in high frequency trading decrease, algorithmic traders will shift their focus to real-life events by connecting to new data sources available from social media feeds to machine readable news. (1) Due to the vast amount of data available, most algorithmic traders will focus on different events and triggers. (2) Unlike most high frequency trading strategies, the market reaction to real-life events is not certain and traders with different views, skills and analytical tools will make different decisions in face of the same data. As the result, the trading strategies and tactics of algorithmic traders will vastly diversify.

Summary of impact

- The focus of a race for speed moves from chasing price movements to responding to real-life events through big data analysis and machine accessible news
- Market makers' trading strategies become diversified as they access different data sources and infer different market outcomes
- Diversification leads to increase in intraday volatility and wider ask-bid spread

Case studies

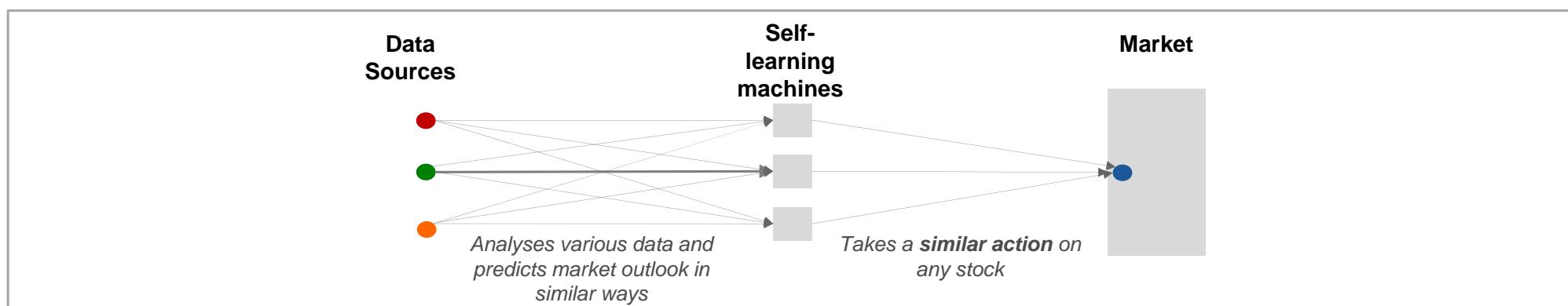


New innovative services like Dataminr and SNTMNT enable traders to gain access to events and news that may trigger market movement (e.g., breaking news, M&A speculation) faster than the competition by utilising non-traditional data sources like social media / market sentiment and real-time analytics.



Leveraging these platforms, algorithmic traders can leverage their infrastructure to shift focus from reacting to stock price movements to monitoring and reacting to real-life events faster than other traders and investors in the market.

Scenario 2: Convergence of trading strategies and activities



Narrative

As access to a universe of real-time data feeds becomes essential to the execution of successful algorithmic trading strategies, the set of data used by traders converges with every trader using almost every available data source. At the same time algorithms become smarter incorporating machine learning and improving the accuracy of projections.

With algorithmic traders connected to similar data sources and smarter machines generating similar projections from those data, the variances among algorithmic traders' activities will decrease.

Summary of impact

- Accuracy of market projections by trading algorithms gradually improves as market makers gain access to broader sets of big data and more sophisticated machines
- Since each market maker's system accurately predicts the market movement, differences among various market makers' projections and trading strategies are eliminated
- As trading strategies converge, volume decreases and arbitrage opportunities effectively disappear

Case studies

AYASDI

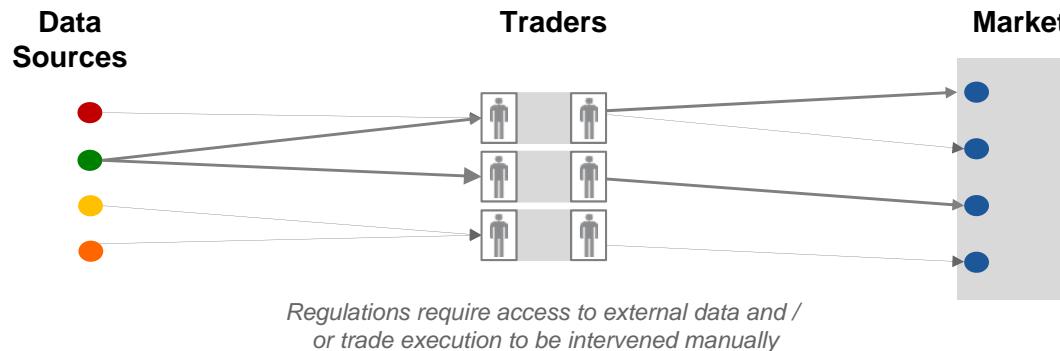


Ayasdi leverages topological data analysis to process big data sets to unveil patterns within the network of data. In capital markets, Ayasdi's technology can be used to understand the relationships between various real-life events and market performance to derive trading hypotheses. Over time, additional historical data and trading outcomes can be added back to the analysed big data to continuously sophisticate and automatically correct the trading hypotheses.

Neuro Dimension's TradingSolutions combines technical analysis with artificial intelligence using neural networks and genetic algorithms to learn patterns from historical data and optimise system parameters.

As these types of systems become more sophisticated, algorithmic traders will simultaneously predict the market performance with a greater degree of accuracy and their trading activities will converge.

Scenario 3: Reverting to manual processes



Narrative

The utilisation of new data sources like machine readable news and advanced computing in trading activities increases the gap in the level of sophistication between professional algorithmic traders and individual, retail investors. The public may perceive some of these innovations to be an “unfair” advantage; similar to how infrastructures costs associated with high frequency trading have been scrutinised.

Reacting to public sentiment, policy makers and regulatory agencies may impose restrictions on what automated data streams and trading machines can and cannot be used for various activities. Potential misinterpretation of data by smart machines triggering systemic losses might accelerate such movements toward regulation.

Summary of impact

- Growing public discontent with algorithmic trading leads to regulations on the use of automated data feeds and / or smart machines in obtaining information or executing trades
- At least some parts of market-making activities revert to old, manual processes, tangibly reducing the trade volume and the liquidity of the market
- As a result, the liquidity of the market will decrease. As traders cannot react to fact-based price arbitrage as quickly, they may also increase their spread to mitigate their risks, resulting in unfavourable price formation for both buyers and sellers

Case studies



On 23 April 2013, a false report of explosions at the White House was posted on the hacked Twitter account of Associated Press. With many algorithmic traders’ systems linked to key Twitter feeds, algorithmic trades caused a selling spree nearly immediately after the posting. As the result, \$136 billion was wiped out from the S&P 500 index within two minutes of the tweet’s posting. While the market quickly recovered three minutes after the correcting announcement, many industry experts and regulatory agencies perceive the event as something that would not have been caused by human traders as humans would have second-guessed the validity of the tweet.

What does this mean for financial institutions?

Key implications and remaining questions

“Safe Bets” – Likely implications under all scenarios

- ! Reduced role of humans:** As the adoption of smarter and faster machines accelerates the competition for speed in gathering, analysing and acting on data, the role of humans in trade execution will diminish and intelligent machines will replace largely human activities today, such as trading strategy development
- ! Larger impact of errors:** Even small errors in data integrity, trade strategy, and trade execution will lead to much larger impact as end-to-end trading activities are automated via smarter, faster machines, with limited human intervention
- ? What role will human traders play as end-to-end trading activities become automated through smarter, faster machines?**
- ? How will financial institutions effectively sort out erroneous data, algorithms and execution to avoid resulting in enormous losses, while maintaining execution speed?**

Scenario 1: Diversification of trading strategies and tactics

- ! Competition for data sources:** Competition to discover new data sources and gain exclusivity will intensify as the focus of algorithmic trading shifts from price movements to real-life events
- ! Increased specialisation:** Traders with a deeper understanding of specific companies, sectors and real-life events will gain advantage over firms with broader approaches as trading strategies diversify
- ? How will financial institutions gain exclusive or faster access to data without appearing as having an unfair advantage?**

Scenario 2: Convergence of trading strategies and activities

- ! Marginalised returns:** As trading strategies converge through big data and machine learning, competition for each trade triggered by real-life events will intensify and marginal returns will diminish
- ! Competition for speed:** When most players in the market rely on similar trading strategies, the basis for competition will shift again from discovery of new insights to faster execution via infrastructure investments
- ? How will each institution differentiate from one another as the convergence of trading strategies via smarter, faster machines lower the margin?**

Scenario 3: Reverting to manual processes

- ! Competitive uncertainty:** Capabilities required to be competitive in the market (e.g., faster computation, faster access, advanced analytics) will change drastically and rapidly depending on regulatory changes, leading to uncertainty in traders' long-term strategies
- ! Impetus for agility:** In order to react timely to those competitive uncertainties generated by potential regulations, traders' organisational agility will become critical amidst the current shift toward replacement of workforce with smarter, faster machines

Market Provisioning

What impact will better connected buyers and sellers have on capital markets?

Executive Summary

Context / Innovation

- Many illiquid financial assets remain highly dependent on intermediating institutions to discover and connect buyers and sellers, often based on networks of pre-existing relationships with other institutions
- However, following the financial crisis, traditional capital market intermediaries' risk appetite has been reduced while their capital requirements increased, limiting their ability to take positions on financial assets to create liquidity; this has resulted in reduced liquidity mainly for non exchange traded assets
- Leveraging automation and standardisation of information flow, a number of platforms (information/connection platforms) have emerged with an aim to redefine how buyers and sellers are connected in a variety of markets

Future of Market Making / Intermediation

- As these platforms proliferate, the market landscape may change for many financial products and assets
 - New information/connection platforms will allow demand and supply represented by smaller intermediaries to be more readily and objectively discovered by counterparties, Levelling the playing field between them and larger institutions
 - Alternatively, these platforms could be developed for a “group” of larger institutions to improve connectivity among themselves, reducing their need to connect with smaller intermediaries and stabilising the current market framework for existing institutions
 - Information/connection platforms may also choose to extend the connections to individual investors, acting as a market for specific assets and products and opening doors for sellers to easily broaden their buyer base to the broader public

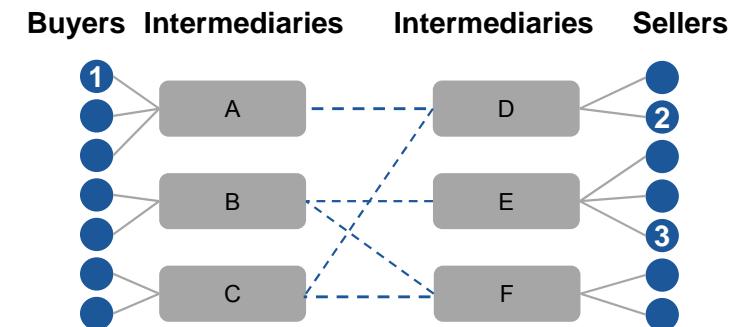
Key Implications

- Improving information flow among market participants through new information/connection platforms will create tangible benefits to the industry by empowering intermediating institutions to optimise their ability to make the best decisions for their clients; however, it will also require behaviour changes within those institutions

Over-the-counter activities depend on intermediating institutions to discover and connect buyers and sellers

How do financial institutions facilitate financial markets liquidity today?

- For a wide range of assets and financial products, financial institutions play a role as an intermediary to connect and act on behalf of buyers and sellers
- For some assets (e.g., public stocks, liquid bonds), formal markets exist to facilitate the connection between buyers and sellers, typically in the form of exchanges
- For less liquid and less standardised assets and products, demand and supply is often dispersed, making direct discovery and connection among buyers and sellers highly inefficient
- For these assets and products, financial institutions aggregate demand and supply, and build relationships with one another to effectively create a market, the so called over-the-counter (OTC) market
- As an intermediary, financial institutions sometimes take positions in the assets traded to provide liquidity or offer advisory services to the buyers and sellers they represent



Buyer 1 can be connected with Seller 2, but not with Seller 3 because their intermediaries do not have contact
 Result: When 1 is buying from 3 trade is not executed at the optimal price

Evolution of OTC driven activities

- Over the years, the markets for standardised assets with high transaction volume have greatly improved their efficiency by adopting technologies to improve connectivity among buyers and sellers
- However, OTC markets still rely on relationship-based intermediaries and non standardised processes to connect buyers and sellers
- Since the 2008 financial crisis, increased capital requirements and reduced risk appetite among intermediary institutions have limited the desirability of acting as a market maker, reducing liquidity for many financial assets and products

Key limitations of today's model

Operational Inefficiency

Highly manual discovery process for the counterparties makes transactions time consuming, costly and complex

Limited Liquidity

Not all buyers and sellers at a given moment are discovered by one another, limiting liquidity

Suboptimal Pricing

No intermediaries, regardless of their size, have a full view of the demand and supply, making the best price discovery difficult

Limited Visibility

Buyers and sellers have imperfect visibility into the market supply, demand and counterparties, limiting their ability to exert control over transactions

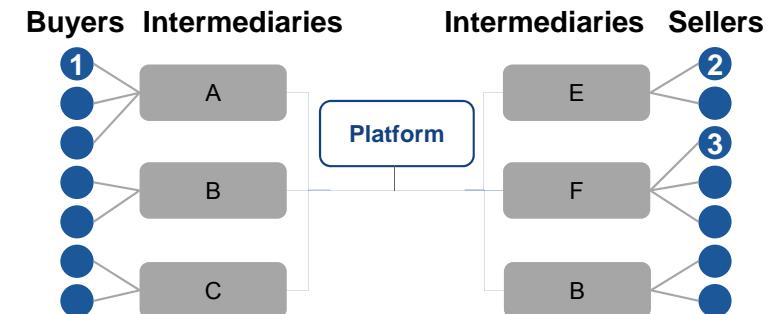
Limited Access

Buyers' ability to access assets is limited by their intermediaries' connections with sellers' intermediaries

New platforms are emerging to connect intermediaries of buyers and sellers to facilitate the flow of market information and the discovery of counterparties

What are the new platforms?

- Leveraging technological innovations, a number of platforms have emerged to redefine how buyers and sellers are connected for various financial assets and products, improving the efficiency of those markets
- These platforms automate and standardise collection of demand / supply data from intermediaries or buyers and sellers to create an aggregated view of the market and facilitate discovery of the most suitable counterparties
- Some platforms provide additional analyses on the data collected to better inform buyers / sellers and their intermediaries in choosing their counterparties



Buyer 1, Seller 2 and Seller 3 connected through new platform can exchange information

Result: All transactions are likely to be executed at an optimal price

Examples of platforms improving connection between buyers, sellers and intermediaries



Fixed Income



Funds / Fund of Funds



Private Equity /
Venture Capital Shares



Private Company
Shares



Private Company
Tenders



Commodities &
Derivative Contracts

Key characteristics of the platforms improving connection between buyers and sellers



Social

These platforms embed the elements of social networks to facilitate the interaction among buyers, sellers and intermediaries and improve how buyers and sellers are evaluated



Standardisation

These platforms typically standardise what data points are collected and analysed through a set of sophisticated metrics to allow buyers to evaluate sellers more critically

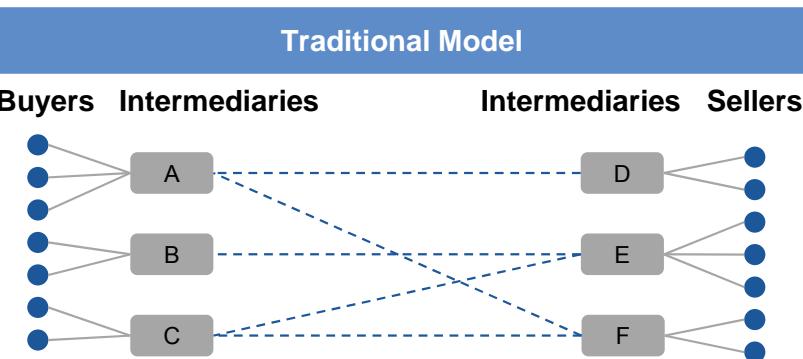


Automation

These platforms automatically collect and analyse data to help buyers and sellers make more informed decisions and make the discovery process less relationship-driven

These market connection platforms do not replace the traditional market-making activities of intermediaries, but rather help them broaden their connections

How do market connection platforms differ from traditional models of market making?

	Traditional Model			Market Information/Connection Platforms				
Value Chain	Buyers	Intermediaries	Intermediaries	Sellers	Buyers	Intermediaries	Intermediaries	Sellers
	A	B	C	D	E	F	A	D
Key Characteristics	<ul style="list-style-type: none"> Information about buyers and sellers (e.g., current inventory / demand, historical performance) is distributed via relationships / awareness existing among their intermediaries Intermediaries collect, analyse and act on the information about the counterparties and the market 		<ul style="list-style-type: none"> Intermediaries of buyers and sellers in some cases, are directly discovered and connected via a central platform Information on counterparties and the market is aggregated and analysed by the central platform for all constituents in the market 					
Advantages	<ul style="list-style-type: none"> Reduced chance of counterparty failure by transacting through established, trusted intermediary relationships Reduced exposure to arbitrage attempts as demand and supply is only visible to a small number of intermediaries 		<ul style="list-style-type: none"> More efficient discovery and assessment of demand and supply in the market leading to more accurate price formation Reduced need for financial institutions to take position in assets and products to generate liquidity Increased visibility and control over transactions by buyers and sellers 					
Shortcomings	<ul style="list-style-type: none"> Highly manual, relationship-based discovery and assessment of demand and supply leading to inefficiency Potential to overlook the best price available due to the limitation in the scale of each intermediary's network Limited visibility of the transaction process to buyers and sellers 		<ul style="list-style-type: none"> Need to balance adequate price formation with potential price discovery and arbitrage attempts Potential counterparty risks when dealing with intermediaries (or buyers / sellers) without an established relationship or reputation 					

As buyers, sellers and intermediaries become better connected via these platforms, the overall efficiency of the market will improve

Key characteristics of the future markets enabled by improved market connections



Increased Liquidity

More intermediaries, and buyers and sellers, will be connected with one another to enable more accurate assessment of demand and supply in the market, leading to improved liquidity in the market



Improved Price Accuracy

As the aggregate demand and supply can be assessed more accurately, intermediaries and buyers / sellers will be able to determine the best price more accurately without revealing undesired information to the market



Transparency

Buyers and sellers will gain more visibility into the transaction process and therefore will be able to exert greater control over the transactions and reduce the opportunities for suboptimal transactions by intermediaries (e.g., agent conflict of interest)



Improved Access

The ability to buy / sell financial assets and products will be less dependent on the scale or the size of the intermediaries' network, improving access to the market by more buyers, sellers, and intermediaries



Faster, Cheaper Transactions

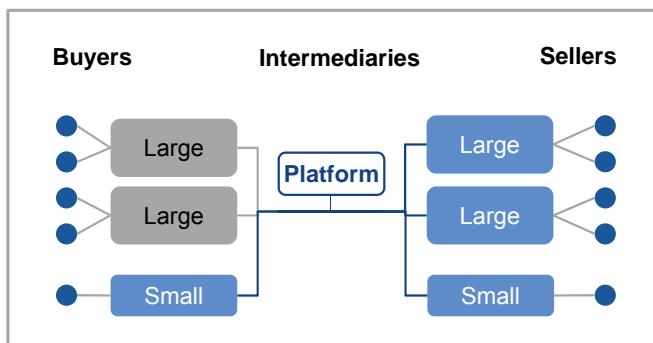
As the discovery and assessment of counterparties become more streamlined and automated, the efficiency of intermediaries will improve, leading to faster turnaround and lower cost to complete transactions for buyers and sellers

How will the market landscape change for various financial assets and products as buyers and sellers are better connected in the future?

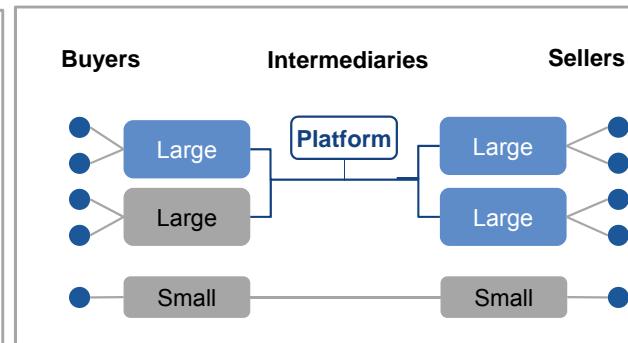
How will the market landscape change for various financial assets and products as buyers and sellers are better connected in the future?

Potential impact of buyer / seller connection

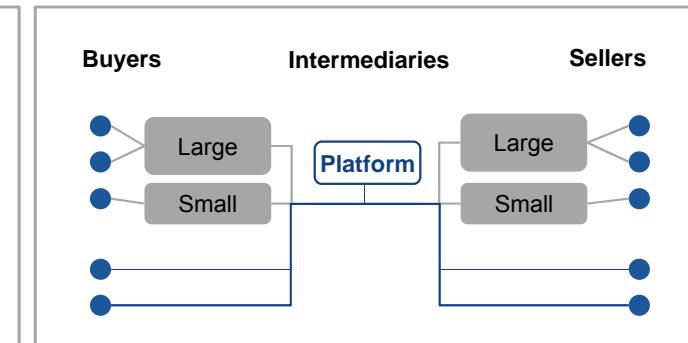
1 Levelling the playing field for newer, smaller institutions



2 Stabilising market framework for existing institutions



3 Opening the doors to individual investors



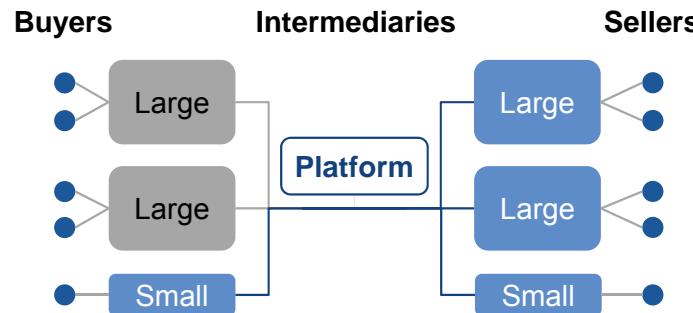
- Unlike relationship-driven market making, where larger institutions have an advantage over smaller institutions, new platforms will allow demand and supply represented by **smaller institutions** to be **more readily discovered** by counterparties
- These platforms will also provide **fact-based measures** to make counterparty comparison and selection to be more **objective**, enabling smaller institutions with less developed networks of relationships to compete

- Platforms are developed and used by larger institutions to improve connectivity and efficiency among a “group” of large players
- As connections among larger intermediaries are strengthened by information/connection platforms, the need for larger institutions to connect with smaller intermediaries to generate liquidity will decrease, effectively building **barriers of entry** for smaller, newer institutions

- As platforms grow, they may choose to extend **connections to individual investors** (e.g., acting as brokerages)
- When sufficient volume from individual investors can be aggregated, these platforms can act as a **market for specific assets and products** and open doors for sellers to easily broaden their buyer base to the broader public

- The following scenarios illustrate potential outcomes generated by the innovations discussed in this topic, particularly in response to the key question above – they are not meant to be future predictions
- These scenarios are illustrations of particular aspects of the potential future and are not meant to represent a complete view of the market and competitive landscape – in many cases, some or all scenarios could be realised at the same time

Scenario 1: Levelling the playing field for newer, smaller institutions (1 / 2)



Narrative

Market information / connection platforms open their doors to intermediating institutions of all sizes. Smaller institutions are particularly incentivised to join such platforms as the platforms significantly expand the intermediaries' access to market information and connect them to a universe of potential counterparties.

As these platforms grow in scale, so will the pressure for greater trade transparency and the use of more quantitative metrics for best execution. As large intermediaries yield to client pressure to adopt these metrics, they will be more likely to interact with smaller intermediaries with whom they may not have previously established working relationships.

Summary of impact

- Standardised platforms facilitate connections between large and small intermediating institutions to help them find counterparties; considerably expanding the number of trading options for smaller intermediaries, whose ability to connect with other institutions was previously limited by scale
- These platforms provide fact-based measures to improve the objectivity of counterparty comparison and selection, enabling smaller intermediaries to compete based on the interests of their clients and their merits, instead of scale and reputation

Case studies

Novus is a portfolio intelligence platform that automatically gathers and analyses data on various funds' performance to provide visibility and transparency to fund-of-funds managers. Traditionally, fund-of-funds managers discovered and researched investment opportunities manually by contacting target funds. As a result, the ability of fund-of-funds to source investment opportunities was dependent on their scale, reputation and network. Through Novus' automated platform, nearly all funds operating across the world and their performance are catalogued and analysed based on an automated collection of regulatory reporting data. This allows smaller fund-of-funds to independently identify lucrative investment opportunities without being limited by their reputation and the size of their networks.

Scenario 1: Levelling the playing field for newer, smaller institutions (2 / 2)

Necessary conditions for the scenario

- Top-level and line-level buy-in from large and small institutions for adopting the information/connection platforms
- Intermediating institutions' are comfortable with managing the risks associated with transacting with less familiar, less pre-defined counterparties

Clients

Implications of the scenario on...

- Higher chance of achieving the best execution of trades
- Customers' ability to achieve optimal results is no longer constricted by the size of their intermediaries
- Sources liquidity from the broadest group of counterparties without risking discovery of demand / supply

Incumbents

- Traders are required to adapt to new behaviours
- Need to establish new processes to support the new business model (in particular small institutions who might need to improve their transparency and best execution policies)

Overall Ecosystem

- Supports diversification of counterparties based on asset specialisation

Opportunities and risks associated with the scenario

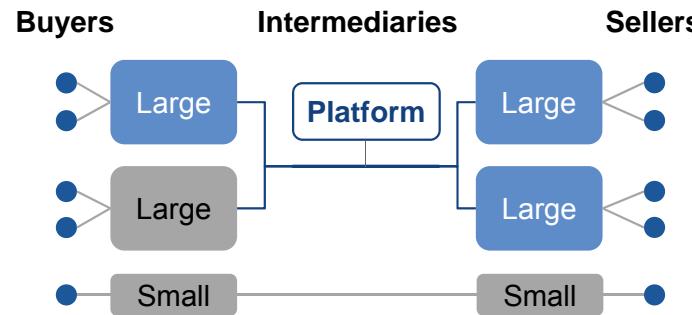
Opportunities

- Incentivise deeper specialisation of intermediaries by creating higher returns to specialization
- Potential increase in systemic resilience as the result of diversification of related parties

Risks

- Transparency of counterparty selection is dependent on the transparency of the information/connection platforms
- Increased counterparty risks when dealing with newer, smaller counterparties without standing reputation or relationships

Scenario 2: Stabilising market framework for existing institutions (1 / 2)



Narrative

As standardised information/connection platforms gain popularity, a “group” of large intermediaries may explore adopting the techniques behind these platforms to create a streamlined, exclusive network among themselves. These large institutions may acquire or partner with standardised platforms to set up artificial barriers against smaller and newer institutions.

As these exclusive networks grow, it will become more difficult for smaller institutions to find trading counterparties or compete with the efficiency delivered by those networks.

Summary of impact

- As connections among larger intermediaries are strengthened by platforms, the need for larger institutions to connect with smaller intermediaries may decrease, effectively building barriers of entry for smaller, newer institutions
- Smaller companies lack economies of scale to set up their own liquidity network and may lose their customers to the larger institutions

Scenario 2: Stabilising market framework for existing institutions (2 / 2)

Necessary conditions for the scenario

- Regulatory tolerance of exclusive networks (e.g., no collusion or anti-trust concerns)
- Large institutions participating in exclusive networks do not experience significant loss in liquidity by excluding smaller institutions
- Continued customer confidence in large institutions to fulfill their orders at a reasonably fair price

Implications of the scenario on...

Clients

- Liquidity may increase relative to the current state, but could be less than under an open platform

Incumbents

- Large institutions retain strategic advantages over smaller institutions

Overall Ecosystem

- Increased concentration of trades among a small number of intermediaries
- Increased difficulty for small intermediaries to compete outside of niche specialties
- Creates barriers of entry for new intermediaries

Opportunities and risks associated with the scenario

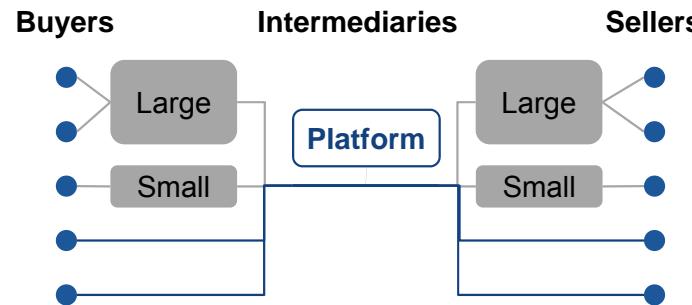
Opportunities

- Opportunities for large institutions to continue to be highly influential in the market landscape
- Shifting transactions from obscure internal execution facilities to more transparent standardised platforms

Risks

- Encouraging concentration of transactions among few large institutions
- Public and regulatory agencies may perceive exclusive networks as an unfair, colluding activity

Scenario 3: Opening the doors to individual investors (1 / 2)



Narrative

Under the current market structure individual investors cannot directly participate in markets for many assets because information about supply and demand is disparate and disorganised. As the growth of information/connection platforms improves visibility into these asset classes, the platforms may choose to expand their offerings to provide access for qualified individual investors.

Using these platforms, individual investors are able to transact directly with one another or can aggregate their demand/supply to interact with institutional investors. As engagement with individual investors grows, some platforms may choose to evolve to play the role of a broker.

Summary of impact

- As platforms grow, they choose to extend their connections to individual investors, enabling them to bypass traditional intermediaries and transact with one another
- These information/connection platforms may help individual investors represent their aggregate demand and supply more effectively to institutional buyers and sellers
- If sufficient volume can be aggregated from individual investors, these platforms can effectively act as a market for specific assets and products, and open doors for sellers to broaden their buyer base

Case studies



Liquity provides private company directors with a comprehensive suite of shareholder and equity management services and match investors with private company shareholders who want to sell some or all of their equity. Liquity facilitates complete deals, from introduction to transaction completion including escrow and custodial services.

Scenario 3: Opening the doors to individual investors (2 / 2)

Necessary conditions for the scenario

- Appetite for individual investors with high degree of financial sophistication to directly participate in trades
- Development of execution infrastructure to facilitate trades with individual investors who do not possess over-the-counter capabilities
- Ability to aggregate sufficient demand and supply volume among individual investors to transact with institutional investors

Clients

- Ability to make direct connections with trade counterparties
- Access to new asset classes for individual investors
- Improved transparency and control over the transaction process

Incumbents

- Erosion of market shares to brokers and groupings of groups of high net worth individuals
- Impetus for intermediaries to strengthen values they provide to clients beyond transaction facilitation

Overall Ecosystem

- Increased liquidity on standardised platforms

Opportunities and risks associated with the scenario

Opportunities

- Opportunities to separate transactional services from high-value, advisory offerings
- Opportunities to engage new buyers and sellers in the market, increasing liquidity and diversifying the needs and opinions of market participants

Risks

- Potential for sophisticated individual investors to make errors due to lack of specialised knowledge (relative to professional intermediaries)
- Increased burden on regulatory agencies as more parties are directly involved in the market

What does this mean for financial institutions?

Key implications and remaining questions

“Safe Bets” – Likely implications under all scenarios

- !** **Less differentiation among intermediaries:** As the ability to fulfill the transaction needs of customers become commoditised by market connection platforms, financial intermediaries will be less differentiated by their capabilities
- !** **Redistributed negotiating power:** With both counterparties and their intermediaries gaining improved visibility into market demand and supply, negotiating power will be redistributed based on actual demand and supply resulting in more efficient pricing
- !** **Shift to advisory models:** As the financial intermediaries' role in counterparty discovery and negotiation diminishes, their ability to build customer relationships based on advice will become more important to their competitiveness
- ?** How will financial intermediaries differentiate from one another as improved information flow and trading connections reduce the gaps in institutions' ability to find counterparties for their customers?

Scenario 1: Levelling the playing field for newer, smaller institutions

- !** **Reduced fee structure:** As the cost of fulfilling transactions falls, the fee structure of intermediation services, as well as actual products themselves (e.g., carry on funds), may be reduced regardless of client size
- ?** How will larger financial institutions continue to maintain advantage over smaller players when economies of scale are eroded and smaller players can gain access to the same information and counterparties?

Scenario 2: Stabilising market framework for existing institutions

- !** **Direct investments by established institutions:** Established intermediaries will become more active in investing, implementing, and acquiring market connection platforms to stabilise the current market framework
- ?** How will established intermediaries gain exclusive access to market connection platforms while avoiding conflict-of-interest (i.e., best execution) and anti-trust issues?

Scenario 3: Opening the doors to individual investors

- !** **Reduced value proposition to institutional customers:** As some institutional customers choose to directly discover and transact with counterparties via market connection platforms, their stickiness on other institutional services, such as asset management and investment banking, may decrease
- ?** What additional value will financial intermediaries provide high net worth individuals to prevent the erosion of their businesses by direct access to counterparties via market connection platforms?



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OF THE WORLD

The future of financial infrastructure

An ambitious look at how blockchain can reshape financial services



An Industry Project of the Financial Services Community | Prepared in collaboration with Deloitte

Part of the Future of Financial Services Series • August 2016

Foreword

Consistent with the World Economic Forum's mission of applying a multistakeholder approach to address issues of global impact, creating this report involved extensive outreach and dialogue with the Financial Services Community, Innovation Community, Technology Community, academia and the public sector. The dialogue included numerous interviews and interactive sessions to discuss the insights and opportunities for collaborative action.

Sincere thanks to the industry and subject matter experts who contributed unique insights to this report. In particular, the members of this Financial Services Community project's Steering Committee and Working Group, who are introduced in the Acknowledgements section, played an invaluable role as experts and patient mentors.

We are also very grateful to Deloitte Consulting LLP in the US, an entity within the Deloitte¹ network, for its generous commitment and support in its capacity as the official professional services adviser to the World Economic Forum for this project.

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The Distributed Ledger Technology project is the most recent phase of the Forum's ongoing Disruptive Innovation in Financial Services work

2015

THE FUTURE OF FINANCIAL SERVICES

The Future of Financial Services project explored the landscape of disruptive innovations in financial services, provided the first consolidated taxonomy for these disruptions, and explored their potential impacts on the structure of the industry



2016

BEYOND THE FUTURE OF FINANCIAL SERVICES

This phase of the disruptive innovation work explores two topics with key potential as foundational enablers of future disruption

The future of financial infrastructure: An ambitious look at how blockchain can reshape financial services



This project explores the potential for distributed ledger technology to transform the infrastructure of the financial services industry

A Blueprint for Digital Identity: The Role of Financial Institutions in building Digital Identity



This project explores the potential for digital identity in financial services and beyond and lays out a blueprint for the implementation of effective digital identity systems

Contents

Acknowledgements.....	5
Executive Summary	
Context and Approach.....	13
Key Findings.....	17
Use Case Deep-Dives	
Approach.....	32
Summaries.....	37
Modules	
<i>Payments: Global Payments.....</i>	46
<i>Insurance: P&C Claims Processing.....</i>	56
<i>Deposits and Lending: Syndicated Loans.....</i>	65
<i>Deposits and Lending: Trade Finance.....</i>	74
<i>Capital Raising: Contingent Convertible (“CoCo”) Bonds.....</i>	83
<i>Investment Management: Automated Compliance.....</i>	92
<i>Investment Management: Proxy Voting.....</i>	101
<i>Market Provisioning: Asset Rehypothecation.....</i>	110
<i>Market Provisioning: Equity Post-Trade.....</i>	119
Contact Details.....	128

Section 1

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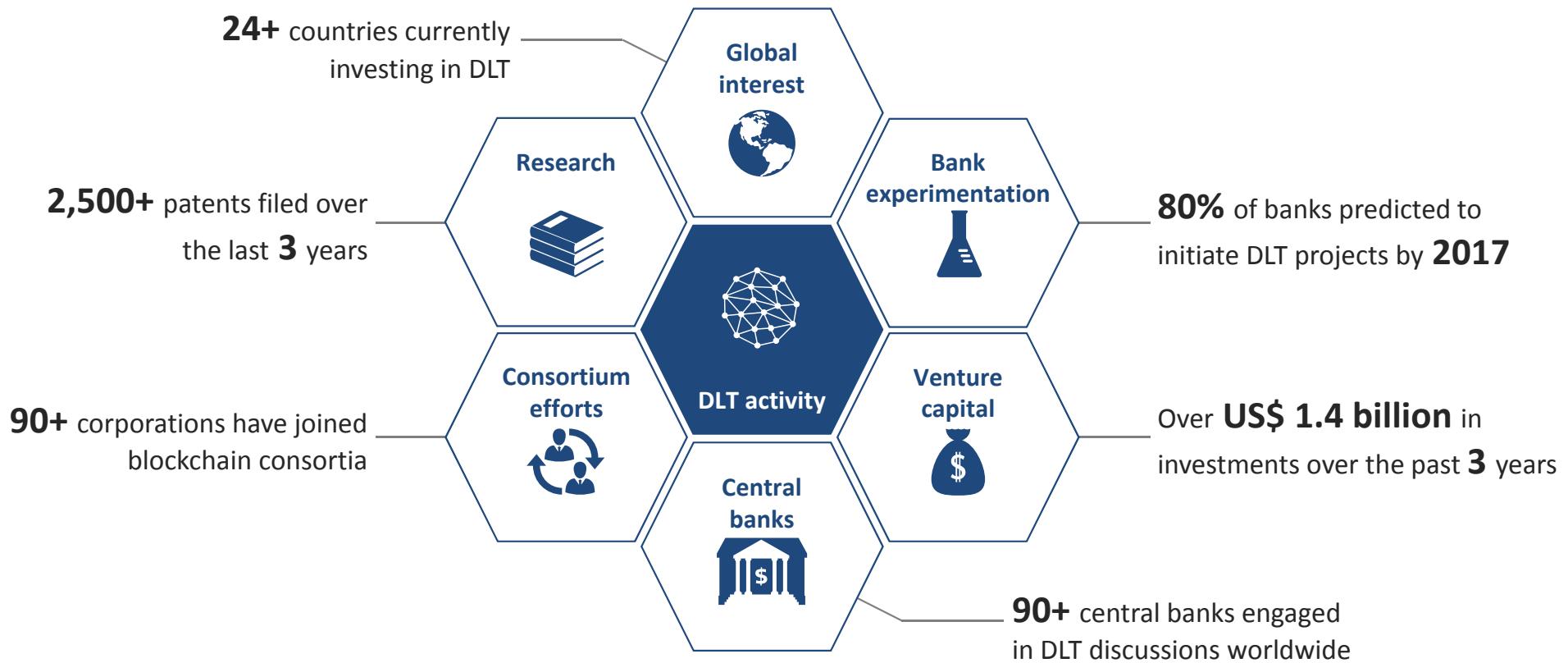
Section 2

Executive Summary

Section 2.1

Context and Approach

Distributed ledger technology (DLT), more commonly called “blockchain”, has captured the imaginations, and wallets, of the financial services ecosystem



Awareness of DLT has grown rapidly, but significant hurdles remain to large-scale implementation



An uncertain and unharmonized regulatory environment

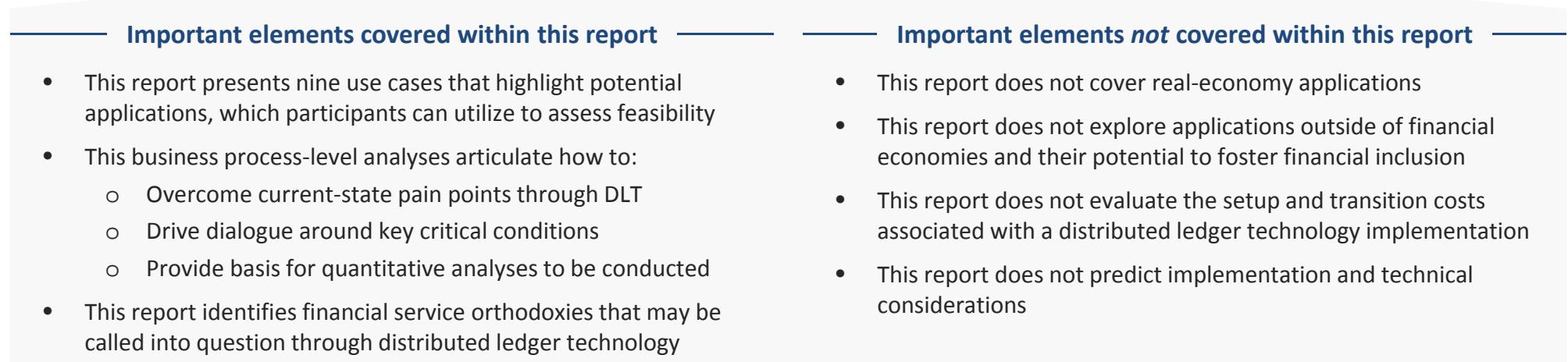
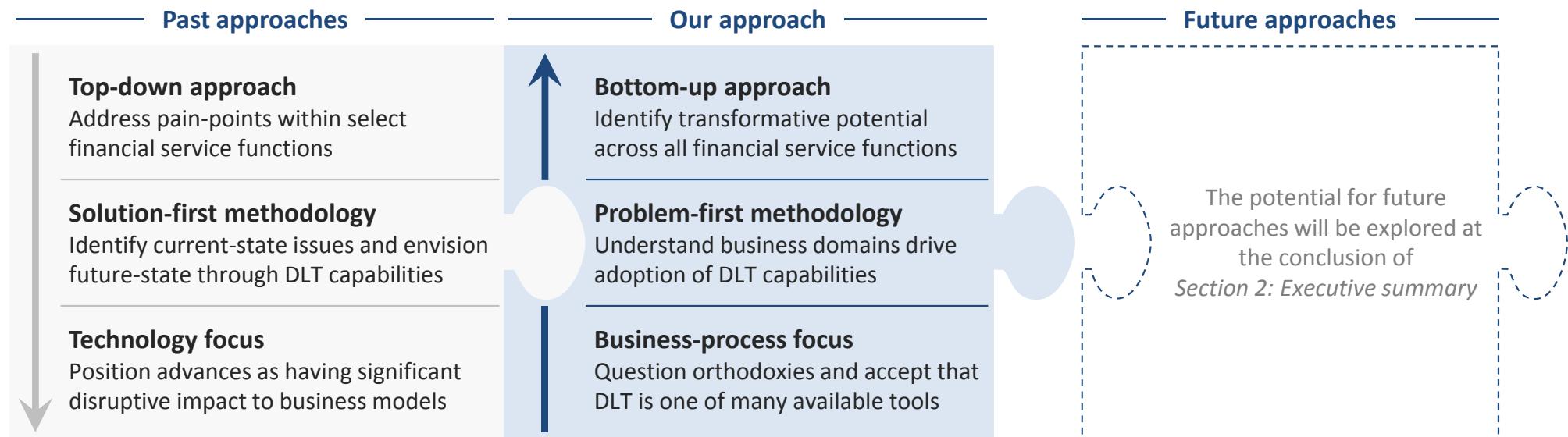


Nascent collective standardization efforts



An absence of formal legal frameworks

This report aims to complement existing distributed ledger technology research by providing a clear view into how financial service functions can be reimaged



This analysis was based on over 12 months of research, engaging industry leaders and subject matter experts through interviews and multistakeholder workshops

Received guidance from thought leaders across global financial institutions



Conducted interviews and solicited input from subject matter experts



Engaged leaders in academia, government and regulation



Global workshops

Five multistakeholder workshops at global financial hubs, with 200+ total participants, including industry leaders, innovators, subject matter experts and regulators



Singapore
Oct. 2015



New York, USA
Nov. 2015



London, UK
Dec. 2015



Davos, Switzerland
Jan. 2016



Sydney, Australia
Apr. 2016



Section 2.2

Key Findings

The World Economic Forum's analysis has yielded six key findings regarding the implications of distributed ledger technology (DLT) on the future of financial services

Key findings

- 1 DLT has **great potential to drive simplicity and efficiency** through the establishment of new financial services infrastructure and processes
- 2 DLT is **not a panacea**; instead it should be viewed as **one of many technologies** that will form the foundation of **next-generation financial services infrastructure**
- 3 Applications of DLT will **differ by use case**, each leveraging the technology in **different ways** for a diverse range of benefits
- 4 **Digital Identity** is a **critical enabler** to broaden applications to new verticals; **Digital Fiat (legal tender)**, along with other emerging capabilities, has the ability to **amplify benefits**
- 5 The most impactful DLT applications will require **deep collaboration between incumbents, innovators and regulators**, adding complexity and **delaying implementation**
- 6 New financial services infrastructure built on DLT will **redraw processes** and **call into question orthodoxies** that are foundational to today's business models

These key findings are explored in depth in the following pages, based on the use case deep-dives conducted across financial services.

Distributed ledger technology has great potential to drive simplicity and efficiency through the establishment of new financial services infrastructure and processes

The following six key value drivers for DLT were identified through the in-depth examination of nine use cases from across financial services.

Value drivers

- 1  **Operational simplification**
DLT reduces / eliminates manual efforts required to perform reconciliation and resolve disputes

- 2  **Regulatory efficiency improvement**
DLT enables real-time monitoring of financial activity between regulators and regulated entities

- 3  **Counterparty risk reduction**
DLT challenges the need to trust counterparties to fulfil obligations as agreements are codified and executed in a shared, immutable environment

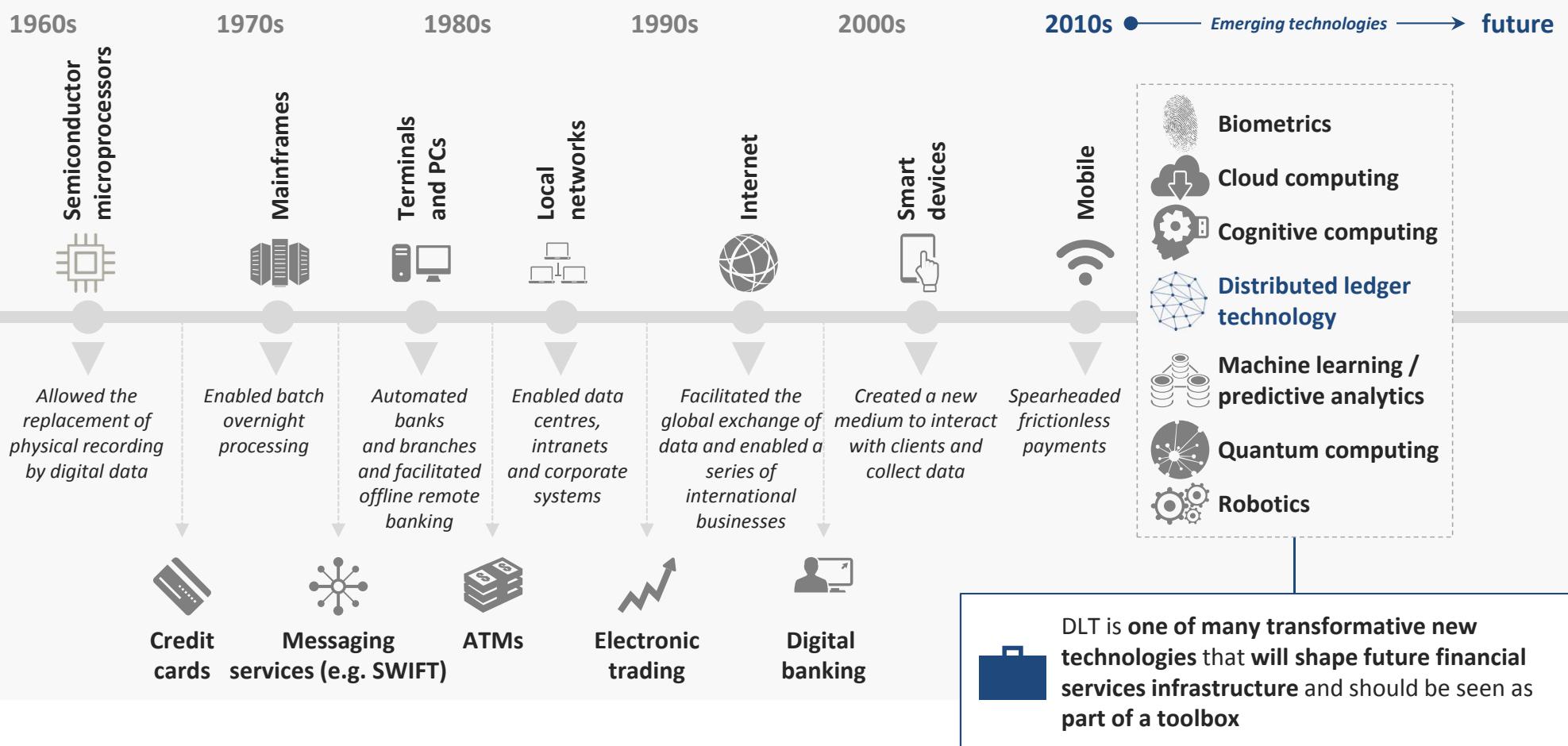
- 4  **Clearing and settlement time reduction**
DLT disintermediates third parties that support transaction verification / validation and accelerates settlement

- 5  **Liquidity and capital improvement**
DLT reduces locked-in capital and provides transparency into sourcing liquidity for assets

- 6  **Fraud minimization**
DLT enables asset provenance and full transaction history to be established within a single source of truth

Distributed ledger technology is not a panacea; instead it should be viewed as one of many technologies that will form the foundation of next-generation financial services infrastructure

Over the last 50 years, technology innovation has been fundamental to financial services industry transformation. Today, multiple technologies poised to drive the next wave of financial services innovation are converging in maturity.



Applications of distributed ledger technology will differ by use case, each leveraging the technology in different ways for a diverse range of benefits

Examples of DLT value drivers and benefits

Use case	Value driver	Benefits
Trade finance	 Operational simplification	Enables real-time multi-party tracking and management of letters of credit, and enables faster automated settlement
Automated compliance	 Regulatory efficiency improvement	Provides faster and more accurate reporting by automating compliance processes that draw on immutable data sources
Global payments	 Settlement time reduction	Enables the near real-time point-to-point transfer of funds between financial institutions (FIs), removing friction and accelerating settlement
Asset rehypothecation	 Liquidity and capital improvement	Provides market participants with an improved line of sight into assets, enabling improved risk evaluation and decision-making

Digital Identity is a critical enabler to broaden applications to new verticals; Digital Fiat (legal tender), along with other emerging capabilities, has the ability to amplify benefits

	 Digital identity	 Digital fiat	 Future innovations
Current state	Correct identity information is critical to ensuring financial transactions are accurate and compliant – but integrating physical identity protocols with DLT creates frictions and increases the potential for errors	DLT systems are frequently denominated with tokens that are native to the system – but users of formal financial infrastructure will demand high levels of liquidity between assets on the system and fiat currency	The advent of the fourth industrial revolution is rapidly altering the financial system and broader economy through the exponential acceleration of innovation
Capability enabler	A fully digital system for storing and transferring identity attributes could be directly integrated into distributed financial infrastructure	Distributed fiat currencies issued by central banks could be employed within distributed financial infrastructure, ensuring the availability of liquidity even in the event of systemic instability	Opportunities for integration may emerge between distributed financial infrastructure and a range of innovations, such as artificial intelligence or the rapidly evolving internet of things
Future benefits	<ul style="list-style-type: none"> Faster and accurate anti-money laundering (AML) and know-your-client (KYC) processes Seamless customer onboarding Improved counterparty matching 	<ul style="list-style-type: none"> Settlement to liquid cash-equivalent tokens issued by a central bank Elimination of the need for an inefficient bridge between cash and new financial infrastructure 	 <i>The potential benefits of these integrations are highly uncertain</i>

The most impactful DLT applications will require deep collaboration between incumbents, innovators and regulators, adding complexity and delaying implementation

Updating financial infrastructure through DLT will require significant time and investment. Three key observations must be taken into consideration for this implementation to be successful.

Key observations and insights

Replacing existing financial infrastructure by DLT will require significant time and investment

Infrastructure replacement

Implementing new financial infrastructure will require changes to existing regulations, standards of practice, and the creation of new legal and liability frameworks. Specifically, the implementation of smart contracts will require additional stakeholder alignment and governance considerations

Competing interests

Aligning key stakeholders for collective action will require difficult balancing of interests in the face of diverging interests and zero-sum games

Legal, regulatory and governance frameworks

Achieving all three key observations will delay large-scale, multi-party DLT implementations in highly regulated markets. However, if successful, these could enable scalable infrastructure fabrics, industry-wide solutions and standardized processes

New financial services infrastructure built on DLT will redraw processes and call into question orthodoxies that are foundational to today's business models

Assumptions that are central to today's financial business models will be impacted both intentionally and unintentionally by the shift to distributed financial infrastructure, requiring incumbents to adjust their business practices in response.

Current-state assumptions	Transformative characteristics of distributed infrastructure	Implications for market participants within financial services
Information silos drive the need for detailed reconciliation activities	a) immutability	 Eliminates need for reconciliation
Lack of a single version of the truth and audit trails creates arbitrage concerns		 Provides historical single version of the truth
Asymmetric information between market participants drives the proliferation of central authorities	b) transparency	 Eliminates imbalance of information among market participants
Lack of transparency increases regulations on FIs		 Increases cooperation between regulators and regulated entities
Lack of trust between counterparties creates the need for central authority oversight in contract execution	c) autonomy	 Ensures agreements are executed to agreed upon business outcomes
		 Disintermediates supporting entities established to resolve disputes

Distributed ledger technology will question the need for individual books of record through immutable and distributed record-keeping

DLT provides transaction immutability, which is a key requirement for eliminating the need for an enforcer of trust in the ecosystem. Tamper-proof distributed data enables an environment in which trust is not an issue and allows counterparties to operate with a single version of the truth.

Current state



Traditionally, asset and transaction information was stored within physical books to independently reference previous actions internally and externally. As technologies advanced, physical books were translated into digital ledgers



Today, every FI maintains its own digital “book of record” repository



As a result, central intermediaries proliferate in the industry, providing unbiased reconciliation services to facilitate transactions between counterparties without requiring them to trust each other. For transactions executed internal to the organization, reconciliation is performed within lines of businesses

DLT transformative potential



At its core, DLT is a growing repository of transactions organized in chronological blocks where the technology intrinsically makes changes to previous transactions functionally impossible



DLT has been designed to replicate data among participating nodes in real time, ensuring all parties operate off of a single version of the truth at all times

Financial services implications



Challenges **information silos** between market participants and eliminates the need for **inter-firm reconciliation**



Disintermediates **central intermediaries** and reduces the fear of **arbitrage** within the ecosystem



Enables **audit trails** to be established for assets and transactions with a significant **reduction in disputes**

Distributed ledger technology will significantly increase transparency between market participants

Infrastructure must be capable of sharing information among all market participants. DLT builds upon a single version of the truth to provide transparency for historical and real-time transactions.

Current state



The age and fragmentation of large parts of existing financial infrastructure have placed limits on the degree of transparency these systems are able to offer, creating opportunities for information asymmetry



As a result, some actors within the ecosystem have gained competitive advantages through the imbalance of information



While some entities profit from this state of information, others experience suboptimal performance and spend excessive resources on risk hedging and liquidity guarantees

DLT transformative potential



The “default setting” of DLT is to provide full transparency into transactions



DLT has the potential to transform existing notions of private records, in which transaction details are only known to counterparties



DLT can promote the creation of a public record of activity in the ecosystem to which all market participants have access in real time

Financial services implications



Challenges existing **competitive advantage models** that leverage information asymmetry



Reduces the role of supporting entities (e.g. insurers) that profit from opacity within the ecosystem



Promotes discourse in the ecosystem where transparency best serves market participants vs where opacity is needed (e.g. secure personally identifiable information data)

Distributed ledger technology will have implications for the cost of leverage by reducing information asymmetry between borrowers and lenders

DLT enables improved visibility into the ways in which assets are being employed through the tokenization of assets and a public record of transactions.

Current state

-  In a wide variety of transaction types, FIs may loan or pledge assets to provide or receive access to credit; however, limited visibility exists into how many times an asset has been loaned or pledged
-  This limited line-of-sight into liens against an asset enables that asset to be used to secure multiple debts by the borrowers, often in excess of nominal asset value
-  This opacity causes lenders to rely upon reputational factors and assessments by supporting entities such as rating agencies

DLT transformative potential

-  DLT can tokenize individual assets (e.g. property and bonds) on a shared and trusted ledger to establish provenance
-  DLT can provide visibility into assets and associated liabilities based on transactional history while increasing the efficiency of credit transactions

Financial services implications

-  Promotes **visibility** of assets and associated liens/ownerships to **quantify risk** and **increase pricing accuracy**
-  Reduces **access to capital for borrowers** by limiting the ability to use the same asset to secure leverage from multiple parties
-  Challenges the **role** of rating entities in quantifying risks

Distributed ledger technology will transform the relationship between regulators and regulated entities, reducing frictions and improving outcomes

Transactional data must provide granularity and accuracy to regulators in order to monitor and comply with regulatory obligations. DLT facilitates transparency between regulators and regulated entities through a shared repository with real-time access to data.

Current state

 Regulated entities and regulators are increasingly challenged to support information requirements to certify compliance

 While regulated entities are committed to enable transparency, significant costs and risks are associated with current systems and business processes

 As complexity within the ecosystem and financial instruments increases, the trade-off between transparency and cost becomes a balancing act

DLT transformative potential

 DLT can become a shared data repository between regulators and regulated entities, breaking down organizational silos

 DLT has the potential to allow subsets of transactional data to be effortlessly shared with regulators in real-time

 DLT can facilitate 'regulatory-inclusive' business models, in which regulators utilize smart contracts to verify transactions / deals in real-time

Financial services implications

 Transforms compliance from post-transaction monitoring to **on-demand and immediate monitoring**

 Improves **capability of regulators** to fulfil their mandate of ensuring the legality, security and stability of financial markets

 Improves efficiency for regulators to monitor trading venues such as **over-the-counter markets and dark pools**

 Reduces **regulatory compliance costs significantly**

Distributed ledger technology will reduce the need for intermediaries by providing autonomous execution capabilities

Financial agreements are enforced via a complex set of business rules and processes to ensure obligations are fulfilled by counterparties. DLT provides the ability to autonomously execute these conditions in a shared and trusted environment.

Current state

-  All transactions involving at least two market participants are governed by agreements that highlight business outcomes based on obligations that must be met by each counterparty
-  The responsibility for ensuring these agreements are enforcements dependent on legal and regulatory frameworks
-  As a result, the complexity of these agreements has given rise to intermediaries that mediate disputes between parties and resolve deviations within agreed upon outcomes

DLT transformative potential

-  DLT can codify financial agreements in a shared platform and guarantee execution based on mutually agreed conditions, limiting unilateral counterparty actions
-  DLT can eliminate the manual effort required to support the execution of financial agreements and can accelerate business outcomes

Financial services implications

-  Reduces **counterparty risk** due to the reduced need to trust counterparties' willingness or ability to fulfil obligations
-  Disintermediates entities that currently mediate disputes and resolve business outcomes

Additional research remains to assess distributed ledger technology feasibility, quantify benefits and analyze implementation details



Important questions to be answered moving forward

- Cost-benefit analyses need to be conducted to determine the financial viability of distributed ledger technology
- Roadmaps need to be developed to achieve market participant collaboration and establish standards
- Governance models, backed by societal-level discussions, need to be envisioned to support technology accountability
- Regulatory, legal and jurisdictional-specific tax frameworks need to be established and well-understood

To conclude our executive summary, the following page will expand on our approach and help navigate across our use case deep-dives.

This report provides comprehensive, business-process-level views of distributed ledger technology implementations within each financial services function

This report's detailed findings are designed to be consumed according to business affinity and interest. The table below shows the location of each use case, which can be read independently of each other.

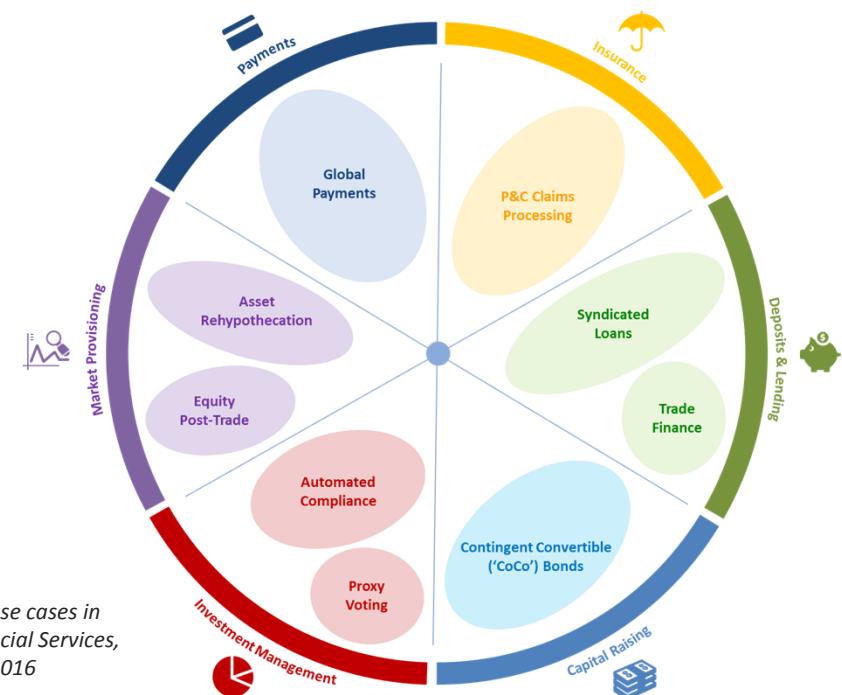
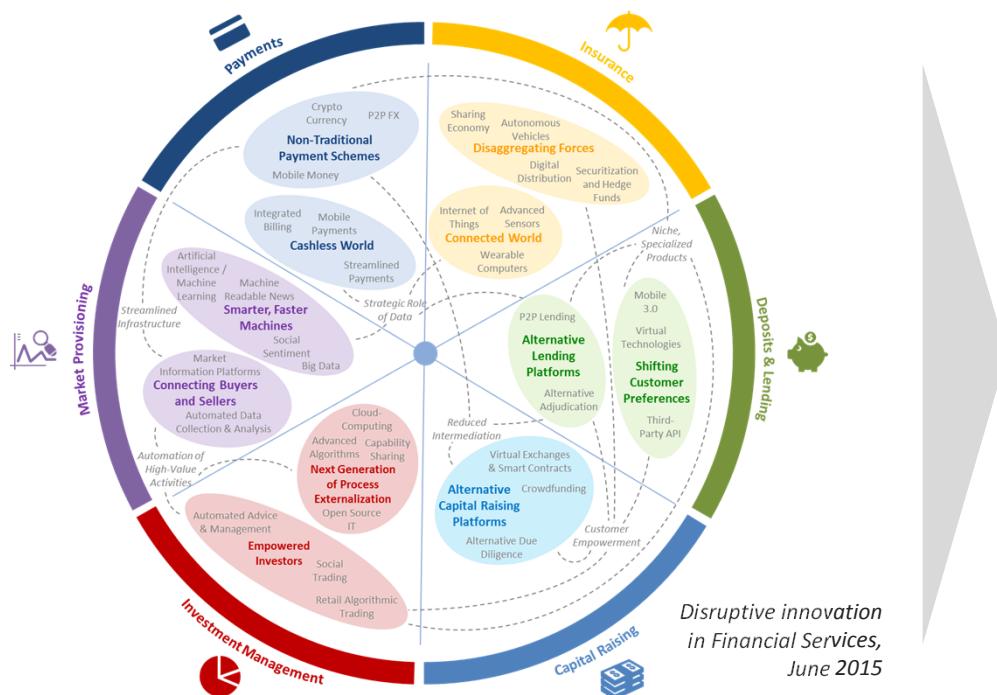
1	Context and Approach An overview of current global DLT activity and the analysis methodology																		
2	Executive Summary A summary of the use case deep-dives through six key findings																		
3	Use Case Deep-Dive Approach An introduction of selected use cases, the analysis structure and high-potential use case characteristics																		
4	Use Case Deep-Dive Summaries A summary of the key findings of each use case organized by financial services function																		
5	Use Case Deep-Dive Modules Nine business-process-level analyses of a use case's current state and transformed future state enabled by DLT Each use case can be read individually according to the table below:																		
	<table border="1"> <thead> <tr> <th>Global Payments</th> <th>46</th> <th>P&C Claims Processing</th> <th>56</th> <th>Syndicated Loans</th> <th>65</th> </tr> </thead> <tbody> <tr> <td>Trade Finance</td> <td>74</td> <td>Contingent Convertible Bonds</td> <td>83</td> <td>Automated Compliance</td> <td>92</td> </tr> <tr> <td>Proxy Voting</td> <td>101</td> <td>Asset Rehypothecation</td> <td>110</td> <td>Equity Post-Trade</td> <td>119</td> </tr> </tbody> </table>	Global Payments	46	P&C Claims Processing	56	Syndicated Loans	65	Trade Finance	74	Contingent Convertible Bonds	83	Automated Compliance	92	Proxy Voting	101	Asset Rehypothecation	110	Equity Post-Trade	119
Global Payments	46	P&C Claims Processing	56	Syndicated Loans	65														
Trade Finance	74	Contingent Convertible Bonds	83	Automated Compliance	92														
Proxy Voting	101	Asset Rehypothecation	110	Equity Post-Trade	119														

Section 3

Use Case Deep-Dive Approach

Use cases for this report were identified across each function within financial services

Leveraging the financial services innovation taxonomy within the World Economic Forum's *The Future of Financial Services 2015* report, the implementation of DLT is considered across each function of financial services.



Use case portfolio selection criteria

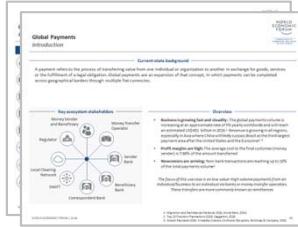
1. Representation of DLT implementations across various asset classes across multiple subsectors
2. Demonstration of scenarios where DLT must be implemented in a networked or single entity environment
3. Consideration of implementations that could be justified both on financial and non-financial/strategic grounds

Use case deep-dives were conducted and summarized in a standardized format

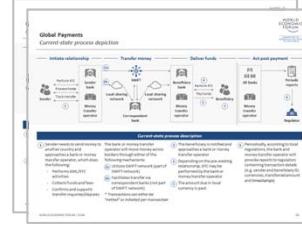
Use case deep-dives that follow a standardized format were conducted to strike a balance between the possible and practical in order to consider how the structure of financial services might be transformed by DLT.

Use case deep-dive structure

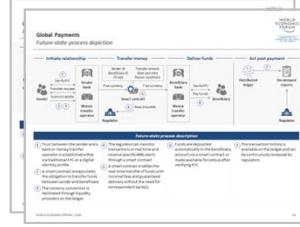
Introduction



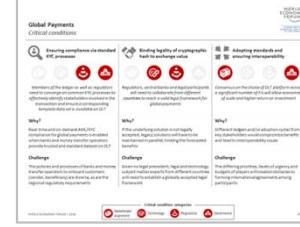
Current state



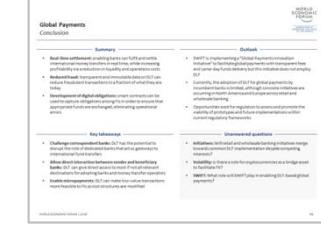
Future state



Critical conditions



Conclusion



Overview of ecosystem players and statistics

Current-state process description and pain points analysis

Future-state process description and benefits analysis

Key barriers that must be met for DLT to be successful

Summary, outlook and unanswered questions of use case deep-dive

The goals

1

Educate the community on the key DLT value drivers through business-process-level use cases

2

Highlight key conditions that must be met to implement new, distributed financial services infrastructure

3

Support existing conversations to implement DLT and initiate new discussions elsewhere

Throughout the use case deep-dives, a broad set of assumptions regarding DLT had to be developed.

Each use case deep-dive maintained a consistent focus and set of assumptions

Our focus

- Understanding the direct impacts that DLT can have at the business-process level on FIs and other market participants
- Analysing use cases that are broadly applicable in global financial markets, occasionally utilizing US regulations as reference points
- Identifying critical conditions for the successful implementation of DLT across the following four categories:



Stakeholder alignment: achievement of shared benefits



Technology: implementation dependencies



Regulatory: compliance-related requirements



Governance: administration and liability oversight

Our assumptions

1. We assume that enabling capabilities (e.g. digital identity) are available to be incorporated, in conjunction with distributed ledger technology, to meet each use case's goals securely and effectively
2. We assume that distributed ledger solutions implemented in the near future will be scalable to meet volume requirements (including, in some cases, billions of transactions)
3. We assume data sources that are accessible by distributed ledgers and/or facilitate autonomy cannot be compromised
4. We understand that benefits realized will be contingent on specific business models for each FI and jurisdictional uniqueness

A note on security considerations

Similar to any technological innovation, DLT comes with a set of risks that must be considered:

1. Ensuring that distributed ledgers are secure and safeguarded against errors is paramount to the long-term success of the technology and should not be treated the same as fundamentally questioning the strength of the protocol
2. While smart contracts enable autonomous agreement execution between parties, they rely on architects and security experts to build business rules that prevent malicious behaviour, complete thorough end-to-end testing and verify all code
3. Meticulous IT controls must be in place to detect potential gaps in security across all the inputs, components and outputs of DLT

Through the deep-dives, a number of characteristics were discovered that should be utilized to identify other high-potential use cases in financial services

Through the examination of nine use cases, a set of common characteristics were identified that appeared to be shared by high-potential applications of DLT

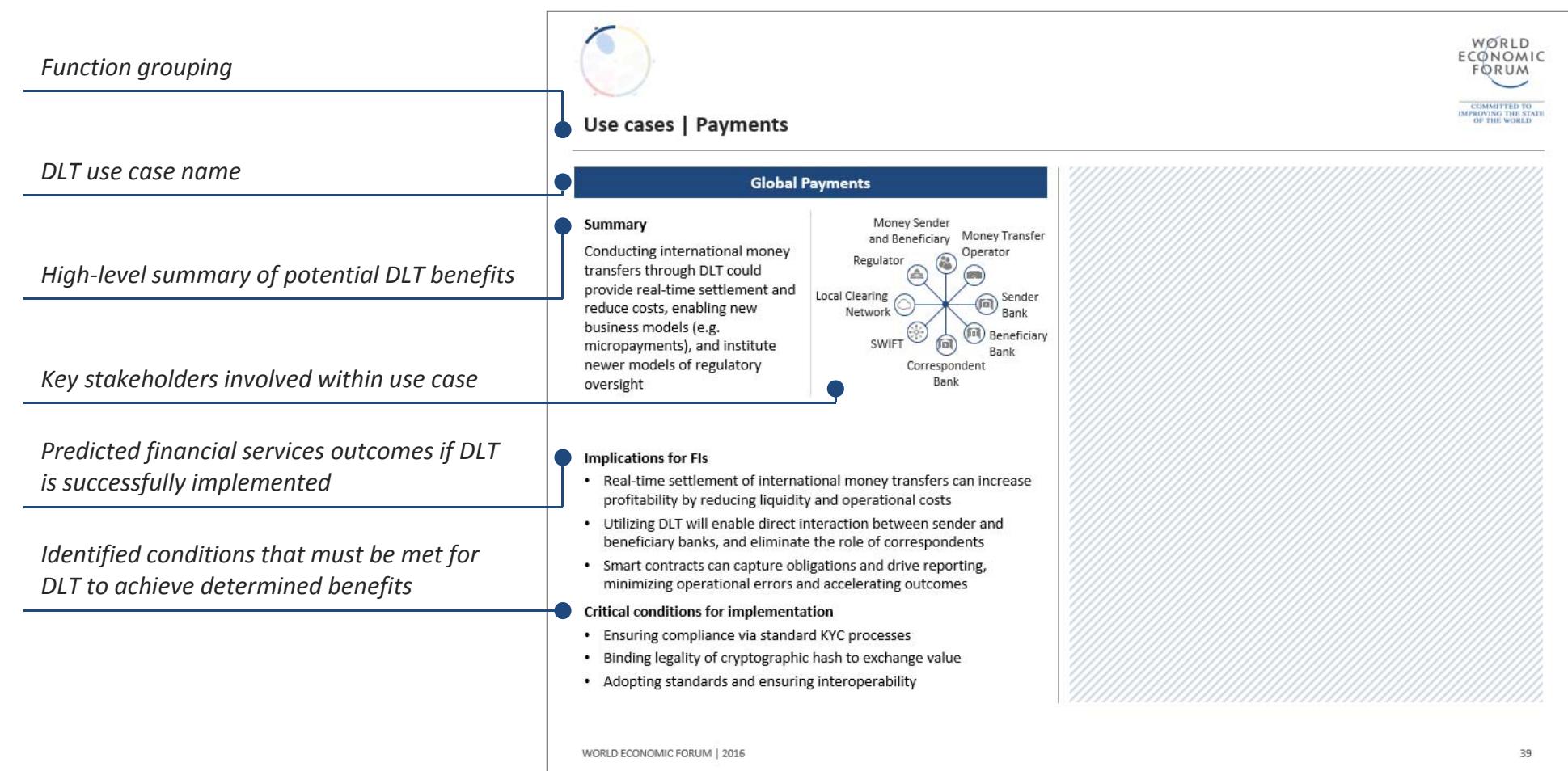
Characteristics of high-potential use cases		Example
	Shared repository	A shared repository of information is used by multiple parties <i>Ledger that stores financial assets in which an owner and owned assets are tracked and shared with other internal/external parties (e.g. regulators and other geographical units)</i>
	Multiple writers	More than one entity generates transactions that require modifications to the shared repository <i>Payments system collectively managed and maintained by a small group of banks, but each bank has millions of end users transacting with their bank</i>
	Minimal trust	A level of mistrust exists between entities that generate transactions <i>Multiple parties within a trade finance arrangement (e.g. importer, exporter, issuing bank, receiving bank, correspondent banks and customs) that do not “trust” each other and, therefore, institute layers of verification and impose collateral requirements</i>
	Intermediaries	One (or multiple) intermediary or a central gatekeeper is present to enforce trust <i>Removing and/or reducing the importance of a central intermediary, whose primary role is to provide “trust” to the post-trade ecosystem</i>
	Transaction dependencies	Interaction or dependency between transactions is created by different entities <i>A situation in which Alice needs to send funds to Bob, then Bob needs to send funds to Charlie. Bob’s transaction is dependent on Alice’s transaction, and one cannot verify Bob’s transaction without checking Alice’s first</i>

Section 4

Use Case Deep-Dive Summaries

Reading guide

This section provides a summary of the findings, divided by function and DLT use cases within the function. For each use case, the key players and impact are summarized, the critical conditions to be successful are identified and the possible outcomes are examined.



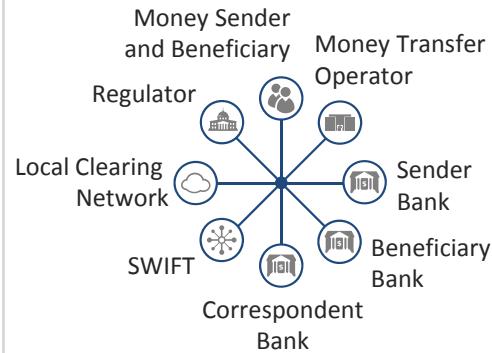


Use cases | Payments

Global Payments

Summary

Conducting international money transfers through DLT could provide real-time settlement and reduce costs, enabling new business models (e.g. micropayments), and institute newer models of regulatory oversight



Implications for FIs

- Real-time settlement of international money transfers can increase profitability by reducing liquidity and operational costs
- Utilizing DLT will enable direct interaction between sender and beneficiary banks, and eliminate the role of correspondents
- Smart contracts can capture obligations and drive reporting, minimizing operational errors and accelerating outcomes

Critical conditions for implementation

- Ensuring compliance via standard KYC processes
- Binding legality of cryptographic hash to exchange value
- Adopting standards and ensuring interoperability

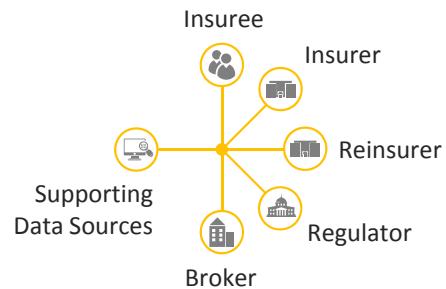


Use cases | Insurance

P&C Claims Processing

Summary

Facilitating claims management for property and casualty (P&C) insurers on DLT can automate processing through smart contracts, improve assessment through historical claims information and reduce potential for fraudulent claims



Implications for FIs

- Smart contracts can automate claims processing through third-party data sources and codification of business rules
- DLT can drive reductions in operating costs through process simplification
- Storing historical claims information on the ledger will enable insurers to identify suspicious behaviour and improve assessment

Critical conditions for implementation

- Building a comprehensive set of asset profiles and history
- Adopting standards for relevant claims data
- Providing a legal and regulatory framework

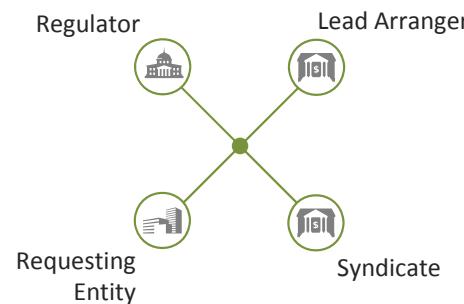


Use cases | Deposits and Lending

Syndicated Loans

Summary

Utilizing DLT to automate syndicate formation, underwriting and the disbursement of funds (e.g. principal and interest payments) can reduce loan issuance time and operational risk



Trade Finance

Summary

Utilizing DLT to store financial details can facilitate the real-time approval of financial documents, create new financing structures, reduce counterparty risk and enable faster settlement



Implications for FIs

- Forming syndicates through smart contracts can increase speed and provide regulators with a real-time view to facilitate AML/KYC
- Performing risk underwriting through DLT can substantially reduce the number of resources required to perform these activities
- Smart contracts can facilitate real-time loan funding and automated servicing activities without the need for intermediaries

Critical conditions for implementation

- Building risk rating framework for syndicate selection
- Standardizing diligence and underwriting templates
- Providing access to financial details on the distributed ledger

Implications for FIs

- Storing financial details on the ledger can automate the creation and management of credit facilities through smart contracts
- DLT can improve real-time visibility to the transaction to better institute regulatory and customs oversight
- Utilizing DLT will enable direct interaction between import and export banks, and eliminate the role of correspondent banks

Critical conditions for implementation

- Providing transparency into trade finance agreements
- Enabling interoperability with legacy platforms
- Rewriting regulatory guidance and legal frameworks

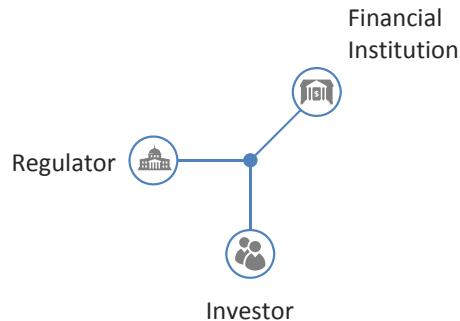


Use cases | Capital Raising

Contingent Convertible (“CoCo”) Bonds

Summary

Utilizing smart contracts to automate regulator reporting can minimize the need for point-in-time stress tests, reduce market volatility and, ultimately, increase “CoCo” bond issuance



Implications for FIs

- Tokenizing bond instruments when soliciting capital from investors can enable them to make informed, data-driven decisions
- Smart contracts can alert regulators when loan absorption needs to be activated, minimizing need for point-in-time stress tests
- Providing investors with transparency into loan absorption can reduce uncertainty currently associated with “CoCo” bonds

Critical conditions for implementation

- Standardizing attributes for soliciting investments
- Streamlining trigger calculations across FIs
- Developing processes to act on real-time trigger notifications

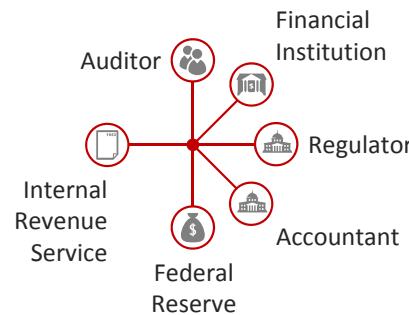


Use cases | Investment Management

Automated Compliance

Summary

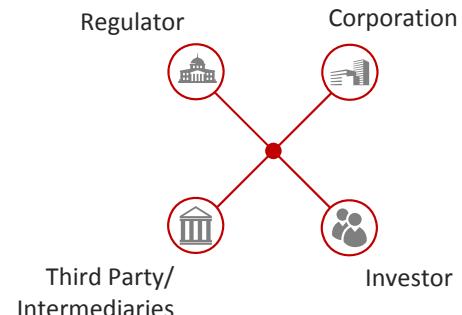
Utilizing DLT to store financial information can eliminate errors associated with manual audit activities, improve efficiency, reduce reporting costs and, potentially, support deeper regulatory oversight in the future



Proxy Voting

Summary

Distributing proxy statements via DLT and counting votes via smart contracts may improve retail investor participation, automate the validation of votes and, potentially, enable personalized analyses in the future



Implications for FIs

- Storing financial information on the ledger provides immutable, real-time updates and facilitates automated review
- Executing reporting activities through smart contracts can facilitate the automated creation of quarterly and annual findings
- In the future, DLT can seamlessly execute and automate compliance activities (e.g. Comprehensive Capital Assessment Review)

Critical conditions for implementation

- Providing compartmentalized access to data
- Automating faster and efficient enforcement of regulations
- Enabling interoperability with legacy platforms

Implications for FIs

- Distributing proxy statements via the distributed ledger can reduce costs associated with printing and mailing
- Smart contracts can automate the validation of votes and increase the transparency of counting votes (e.g. end-to-end confirmation)
- Storing proxy statements on the ledger may enable investors to conduct personalized, automated analyses in the future

Critical conditions for implementation

- Storing investment records on a distributed ledger
- Integrating legacy voting mechanisms into tokens
- Collaborating across actors to ensure success

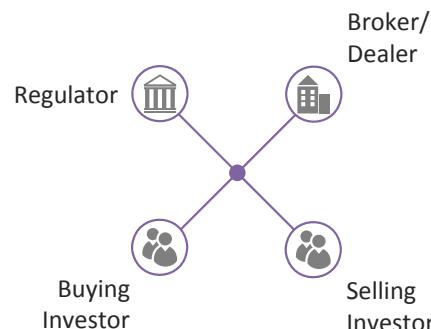


Use cases | Market Provisioning

Asset Rehypothecation

Summary

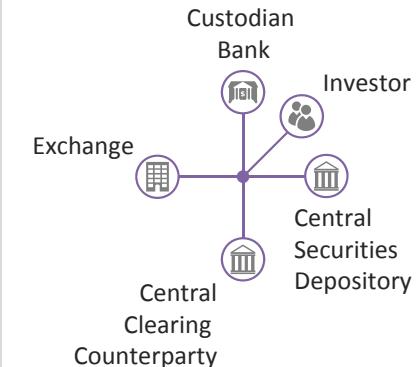
Utilizing DLT to track and manage asset rehypothecation via smart contracts can enable the real-time enforcement of regulatory control limits across the financial system and reduce settlement time



Equity Post-Trade

Summary

Utilizing DLT and smart contracts to facilitate post-trade activities can disintermediate processes, reduce counterparty and operational risk and, potentially, pave the way for reduced settlement time



Implications for FIs

- Rating counterparties based on transaction history stored on DLT can enable investors to improve investment decisions
- Smart contracts enable the real-time reporting of asset history and the enforcement of regulatory constraints
- Facilitating clearing and settlement processes via smart contracts can eliminate need for intermediaries and reduce settlement time

Critical conditions for implementation

- Tokenizing assets using a shared standard
- Fostering engagement among the financial ecosystem
- Architecting solution to manage over-the-counter (OTC) templates

Implications for FIs

- Conducting clearing activities through the ledger can automate processes, reduce settlement time and lower counterparty risk
- Smart contracts can simultaneously transfer equity and cash in real time, reducing the likelihood of errors impacting settlement
- Disintermediating clearing, settlement and servicing processes can reduce costs and enable capital & liquidity management efficiencies

Critical conditions for implementation

- Incorporating “net transaction” benefits within settlement
- Achieving multistakeholder alignment across participants
- Standardizing reference data utilized to match trades

Section 5

Use Case Deep-Dive Modules

Section 5.1

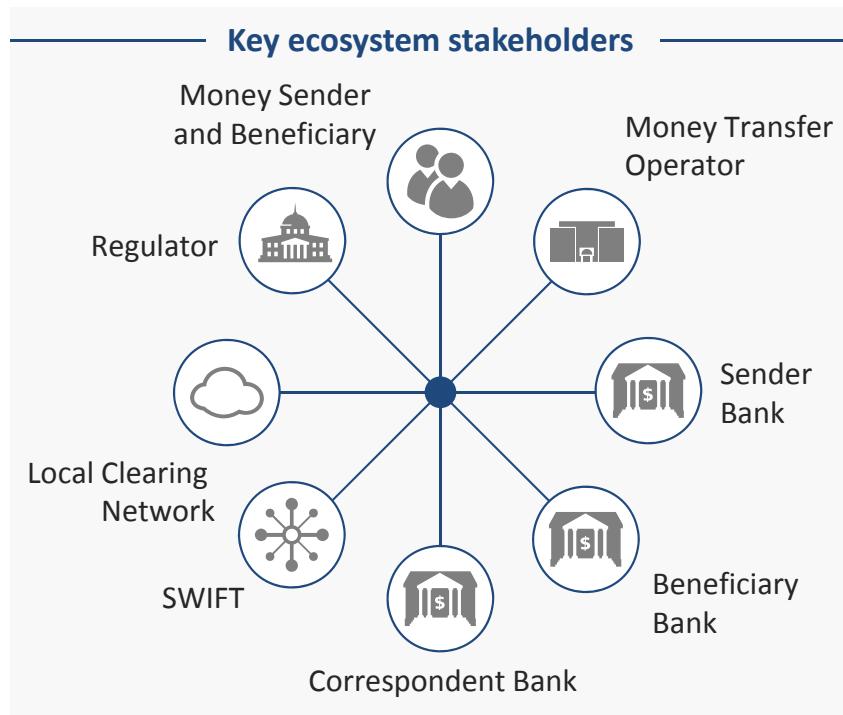
Payments: Global Payments

Global Payments

Introduction

Current-state background

A payment refers to the process of transferring value from one individual or organization to another in exchange for goods, services or the fulfillment of a legal obligation. Global payments are an expansion of that concept, in which payments can be completed across geographical borders through multiple fiat currencies.



Overview

- **Business is growing fast and steadily :** The global payments volume is increasing at an approximate rate of 5% yearly worldwide and will reach an estimated US\$ 601 billion in 2016.¹ Revenue is growing in all regions, especially in Asia where China will likely surpass Brazil as the third largest payment area after the United States and the Eurozone^{2, 3}
- **Profit margins are high:** The average cost to the final customer (money sender) is 7.68% of the amount transferred
- **Newcomers are arriving:** Non-bank transactions are reaching up to 10% of the total payments volume²

The focus of this use case is on low value-high volume payments from an individual/business to an individual via banks or money transfer operators. These transfers are more commonly known as remittances

1. Migration and Remittances Factbook 2016, World Bank, 2016.

2. Top 10 Trends in Payments in 2016, Capgemini, 2016.

3. Global Payments 2015: A Healthy Industry Confronts Disruption, McKinsey & Company, 2015.

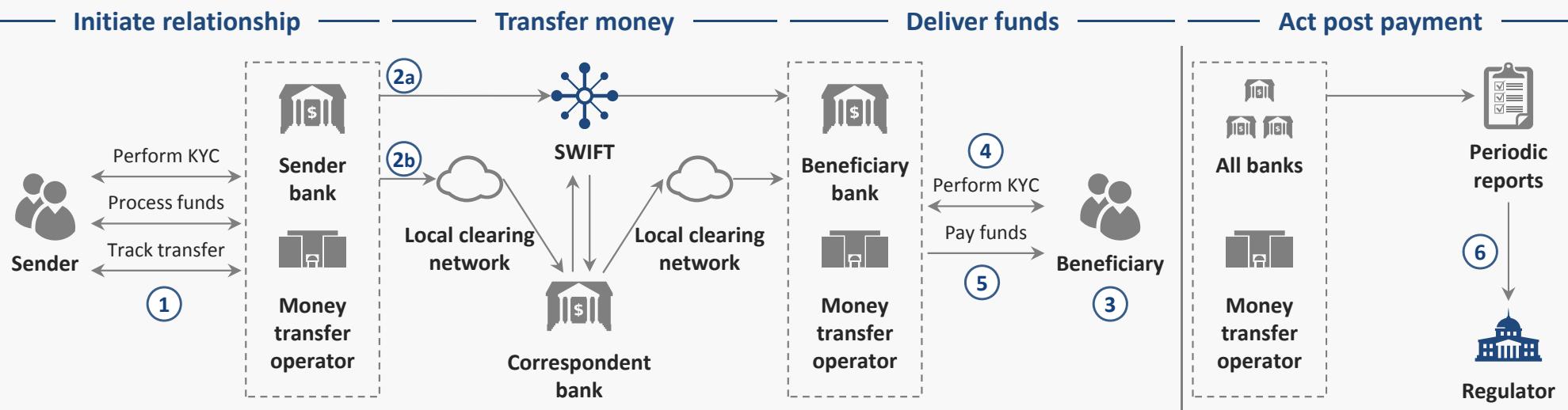
Global Payments

Key market participants

Market participant	Role	Description
	Money Sender and Beneficiary	<i>Core</i> An individual or business wishing to transfer money (sender) to another individual or business (beneficiary) internationally
	Money Transfer Operator	<i>Core</i> Non-bank companies specialized in international money transfer through a global network of agents
	Sender Bank	<i>Core</i> A sender's preferred bank that offers international money transfer
	Beneficiary Bank	<i>Core</i> A bank used by the beneficiary to receive funds
	Correspondent Bank	<i>Supporting</i> A bank that has access to foreign exchange (FX) corridors and facilitates the transfer (via nostro accounts and SWIFT)
	SWIFT	<i>Supporting</i> The global member-owned cooperative provider of secure financial messaging and settlement services
	Local Clearing Network	<i>Supporting</i> The national interbank network that allow financial messaging/settlement (e.g. ACH, SPB and Zengin)
	Regulator	<i>Supporting</i> Central banks and monetary authorities that determine and monitor adherence to KYC and AML standards

Global Payments

Current-state process depiction

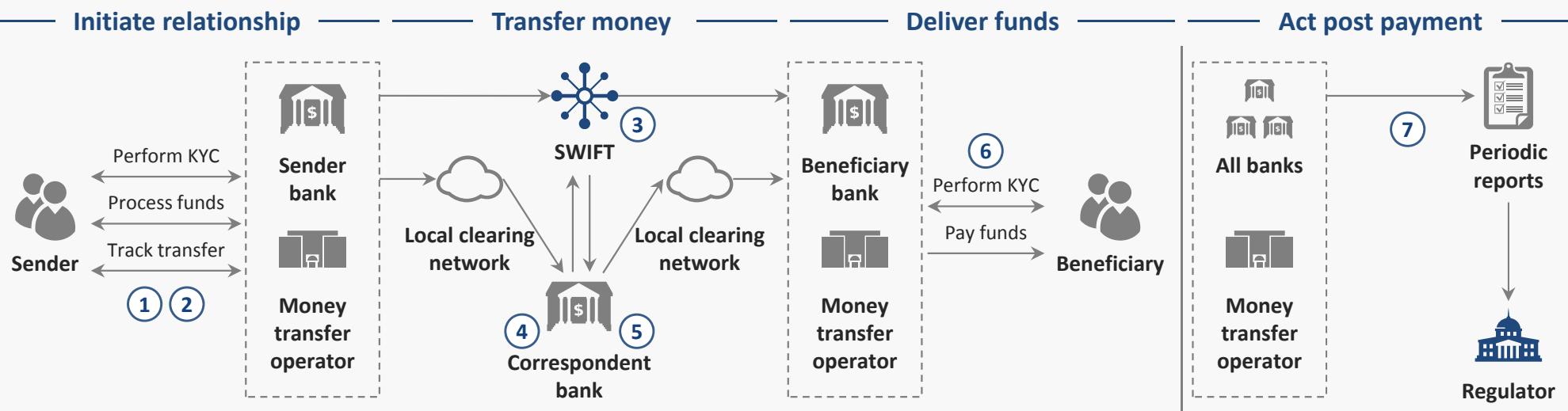


Current-state process description

<p>① Sender needs to send money to another country and approaches a bank or money transfer operator, which does the following:</p> <ul style="list-style-type: none"> - Performs AML/KYC activities - Collects funds and fees - Confirms and supports transfer inquiries/disputes 	<p>The bank or money transfer operator will move money across borders through either of the following mechanisms:</p> <ul style="list-style-type: none"> ②a Utilizes SWIFT network (part of SWIFT network) ②b Facilitates transfer via correspondent banks (not part of SWIFT network) <p>* Transactions can either be "netted" or initiated per-transaction</p>	<p>③ The beneficiary is notified and approaches a bank or money transfer operator</p> <p>④ Depending on the pre-existing relationship, KYC may be performed by the bank or money transfer operator</p> <p>⑤ The amount due in local currency is paid</p>	<p>⑥ Periodically, according to local regulations, the bank and money transfer operator will provide reports to regulators containing transaction details (e.g. sender and beneficiary ID, currencies, transferred amount and timestamps)</p>
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Global Payments

Current-state pain points

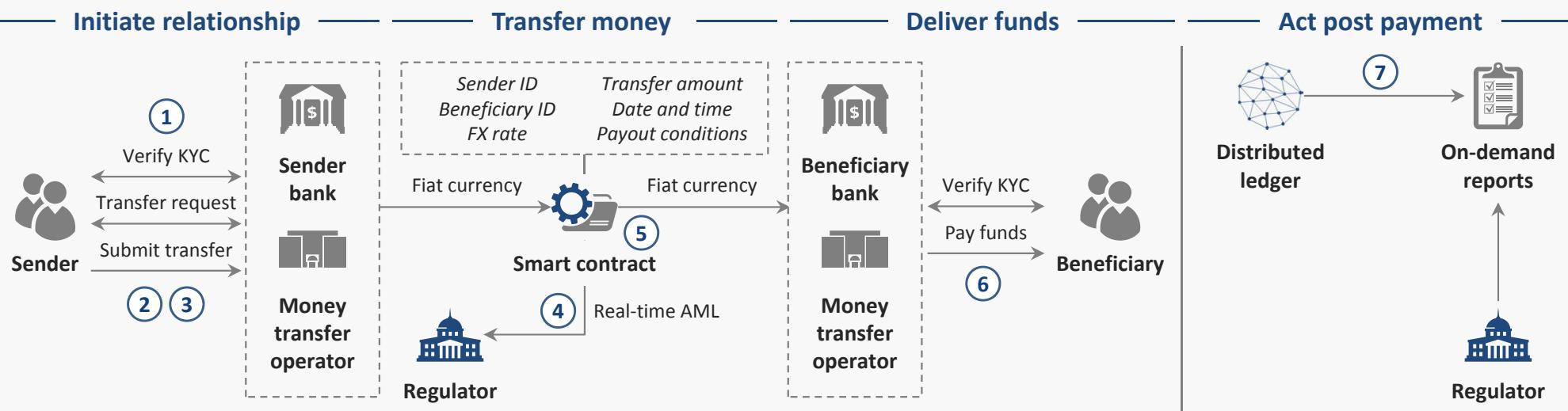


Current-state pain points

<p>1 Inefficient onboarding: information about the sender and beneficiary is collected via manual and repetitive business processes</p>	<p>3 Cost and delay: payments are costly and time consuming depending on route</p>	<p>6 Vulnerable KYC: similar to #2, limited control exists over the veracity of information and supporting documentation, with various maturity levels across institutions</p>	<p>7 Demanding regulatory compliance: due to various data sources and channels or origination, regulatory reports can require costly technology capabilities in addition to complex business processes (often supported by multiple operation teams)</p>
<p>2 Vulnerable KYC: limited control exists over the veracity of information and supporting documentation, with various maturity levels across institutions</p>	<p>4 Error prone: information is validated per bank/transaction, resulting in high rejection rate</p> <p>Liquidity requirement: banks must hold funds in nostro accounts, resulting in opportunity and hedging costs</p>		

Global Payments

Future-state process depiction

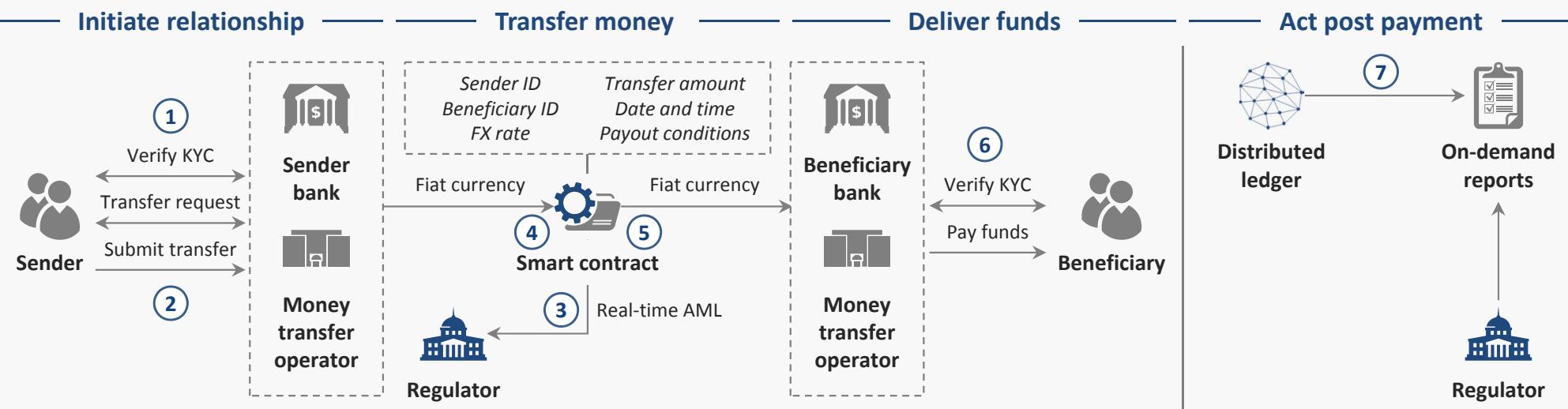


Future-state process description

- | | | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| <p>① Trust between the sender and a bank or money transfer operator is established either via traditional KYC or a digital identity profile</p> <p>② A smart contract encapsulates the obligation to transfer funds between sender and beneficiary</p> <p>③ The currency conversion is facilitated through liquidity providers on the ledger</p> | <p>④ The regulator can monitor transactions in real time and receive specific AML alerts through a smart contract</p> <p>⑤ A smart contract enables the real-time transfer of funds with minimal fees and guaranteed delivery without the need for correspondent bank(s)</p> | <p>⑥ Funds are deposited automatically to the beneficiary account via a smart contract or made available for pickup after verifying KYC</p> | <p>⑦ The transaction history is available on the ledger and can be continuously reviewed by regulators</p> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|

Global Payments

Future-state benefits



Future-state benefits

- | | | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| <p>① Seamless KYC: leveraging the digital profile stored on DLT establishes trust and authenticates the sender</p> <p>② FX liquidity capabilities: through smart contracts, foreign exchange can be sourced from participants willing to facilitate the conversion of fiat currencies</p> | <p>③ Real-time AML: regulators will have access to transaction data and can receive specific alerts based on predefined conditions</p> <p>④ Reduced settlement time: cross-border payments can be completed in real time</p> <p>⑤ Cost savings: with fewer participants, the improved cost structure can generate value</p> | <p>⑥ Seamless KYC: leveraging the digital profile stored on DLT establishes trust and authenticates the beneficiary</p> | <p>⑦ Automated compliance: the regulator will have on-demand access to the complete transaction history over the ledger</p> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|

Global Payments

Critical conditions

 <p>Ensuring compliance via standard KYC processes</p> 	 <p>Binding legality of cryptographic hash to exchange value</p> 	 <p>Adopting standards and ensuring interoperability</p> 				
<p><i>Members of the ledger as well as regulators need to converge on common KYC processes to effectively identify stakeholders involved in the transaction and ensure a corresponding template data set is available on DLT</i></p> <p>Why?</p> <p>Real-time and on-demand AML/KYC compliance for global payments is enabled when banks and money transfer operators provide trusted and standard dataset on DLT</p> <p>Challenge</p> <p>The policies and processes of banks and money transfer operators to onboard customers (sender, beneficiary) are diverse, as are the regional regulatory requirements</p>	<p><i>Regulators, central banks and legal participants will need to collaborate from different countries to reach a valid legal framework for global payments</i></p> <p>Why?</p> <p>If the underlying solution is not legally accepted, legacy solutions will have to be maintained in parallel, limiting the forecasted benefits</p> <p>Challenge</p> <p>Given no legal precedent, legal and technology subject matter experts from different countries will need to establish a globally accepted legal framework</p>	<p><i>Consensus on the choice of DLT platform across a significant number of FIs will allow economies of scale and higher return on investment</i></p> <p>Why?</p> <p>Different ledgers and/or adoption cycles from key stakeholders would compromise benefits and lead to interoperability issues</p> <p>Challenge</p> <p>The differing priorities, levels of urgency and budgets of players will created obstacles to forming international agreements among participants</p>				
		<p>Critical condition categories</p> <table border="1" data-bbox="593 1470 1537 1579"> <tr> <td data-bbox="593 1470 720 1579">  <p>Stakeholder alignment</p> </td> <td data-bbox="720 1470 846 1579">  <p>Technology</p> </td> <td data-bbox="846 1470 1184 1579">  <p>Regulatory</p> </td> <td data-bbox="1184 1470 1537 1579">  <p>Governance</p> </td> </tr> </table>	 <p>Stakeholder alignment</p>	 <p>Technology</p>	 <p>Regulatory</p>	 <p>Governance</p>
 <p>Stakeholder alignment</p>	 <p>Technology</p>	 <p>Regulatory</p>	 <p>Governance</p>			

Global Payments

Additional considerations



DLT enabled by global banks

Overview

Global correspondent banks can implement DLT to unlock benefits and increase efficiency in the value chain, while also enabling next-generation competitive services to local banks



Embedded solution

Overview

The adoption of DLT may be driven by key information technology providers; as they integrate DLT into their core banking platforms, they might play a key role on setting standards



Cryptocurrency as the linking currency

Overview

Banks can leverage cryptocurrency on the DLT to facilitate global payments, eliminating supporting settlement platforms and foreign currency buffers in nostro accounts

Impact

- Non-members of the DLT platform would still be reliant on middlemen and their associated fees to offer global payments as a product

Impact

- Banks and information technology providers will need to collaborate on a shared strategy to converge on mutual interest
- The use of DLT may be driven by the choice of ledger implemented by the information technology provider

Impact

- Additional gains will be made on liquidity management and transaction settlement time
- The use of cryptocurrency will add to additional volatility and will demand additional hedging instruments
- Banks would be required to hold cryptocurrency as assets on their books

Global Payments

Conclusion

Summary

- **Real-time settlement:** enabling banks can fulfil and settle international money transfers in real time, while increasing profitability via a reduction in liquidity and operations costs
- **Reduced fraud:** transparent and immutable data on DLT can reduce fraudulent transactions to a fraction of what they are today
- **Development of digital obligations:** smart contracts can be used to capture obligations among FIs in order to ensure that appropriate funds are exchanged, eliminating operational errors

Outlook

- SWIFT is implementing a “Global Payments Innovation Initiative” to facilitate global payments with transparent fees and same-day funds delivery but this initiative does not employ DLT
- Currently, the adoption of DLT for global payments by incumbent banks is limited, although concrete initiatives are occurring in North America and Europe across retail and wholesale banking
- Opportunities exist for regulators to assess and promote the viability of prototypes and future implementations within current regulatory frameworks

Key takeaways

- **Challenge correspondent banks:** DLT has the potential to disrupt the role of dedicated banks that act as gateways to international fund transfers
- **Allow direct interaction between sender and beneficiary banks:** DLT can give direct access to most if not all relevant destinations for adopting banks and money transfer operators
- **Enable micropayments:** DLT can make low-value transactions more feasible to FIs as cost structures are modified

Unanswered questions

- **Initiatives:** Will retail and wholesale banking initiatives merge towards common DLT implementation despite competing interests?
- **Volatility:** Is there a role for cryptocurrencies as a bridge asset to facilitate FX?
- **SWIFT:** What role will SWIFT play in enabling DLT-based global payments?

Section 5.2

Insurance: P&C Claims Processing

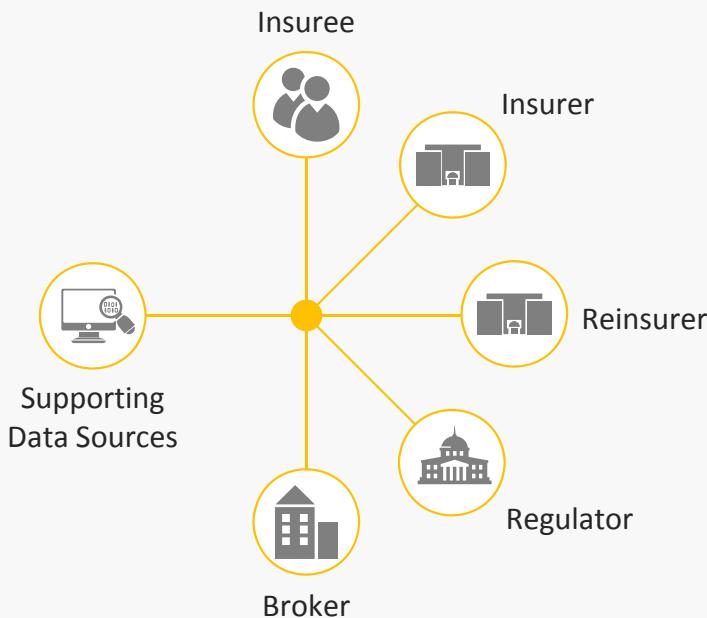
P&C Claims Processing

Introduction

Current-state background

Insurance is a financial risk management product in which an individual or entity receives protection against losses (e.g. property, asset, casualty and health) from the insurer. Commercial property and casualty (P&C) insurance (e.g. commercial motor, commercial property and commercial liability) protects businesses against risks that may result in loss of life or property.

Key ecosystem stakeholders



Overview

- **P&C is large:** P&C is the second largest segment of insurance worldwide (after life and health) with earned premiums in 2014 of US\$ 728.6 billion, growing at 5.1% since 2010, and is set to reach US\$ 895.1 billion by 2018¹
- **Claims processing is a key bottleneck:** For P&C insurance, the tasks associated with claim and loss processing are a major source of friction, accounting for an average of 11% of the overall written premium (revenue)²

DLT has the potential to optimize the back-office operational costs of property and casualty insurers. This use case highlights the key opportunities in claims processing for the P&C commercial insurance business

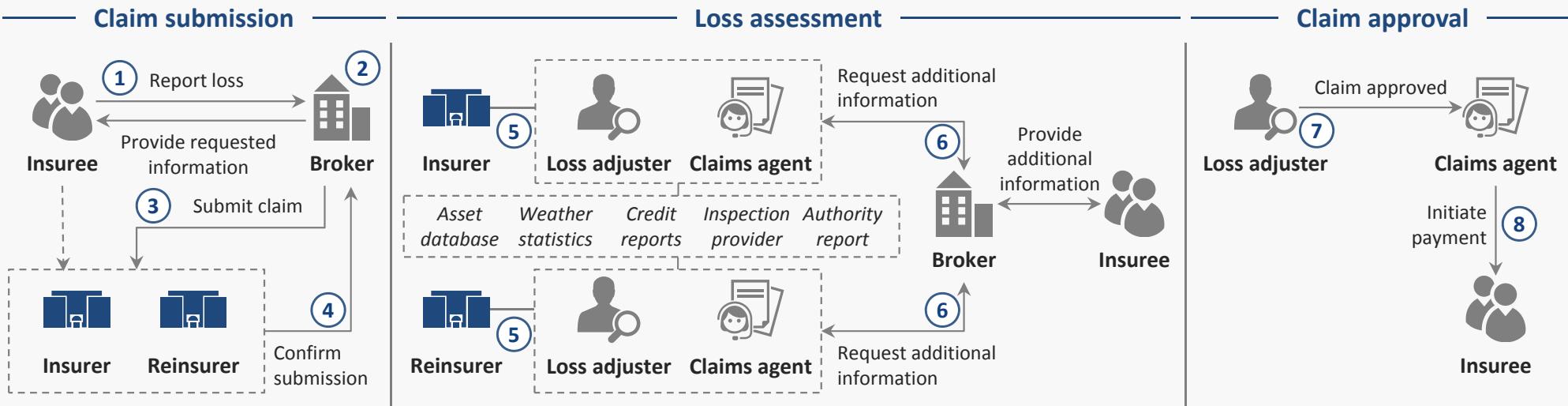
P&C Claims Processing

Key market participants

Market participant	Role	Description
 Insuree	Core	Companies looking for insurance to cover their underlying operational risks (properties and casualties)
 Insurer	Core	A company that, through a contractual agreement, undertakes to compensate specified losses, liability or damages incurred by another company
 Reinsurer	Core	A company that provides financial protection to insurance companies handling risks that are too large for insurance companies to handle on their own
 Regulator	Supporting	Insurance supervisory agency and central banks that determine and monitor adherence to KYC, AML, risk concentration, liquidity and solvency standards
 Broker	Supporting	A specialized company or registered professional that acts as an intermediary, advising and connecting insureds with insurers
 Supporting Data Sources	Supporting	Diversified sources of information used by insurers to assess underwriting risks and evaluate claims and losses; they can include authorities, experts and official data sources, among others (e.g. police report, weather database, official inspection reports, asset ownership records)

P&C Claims Processing

Current-state process depiction

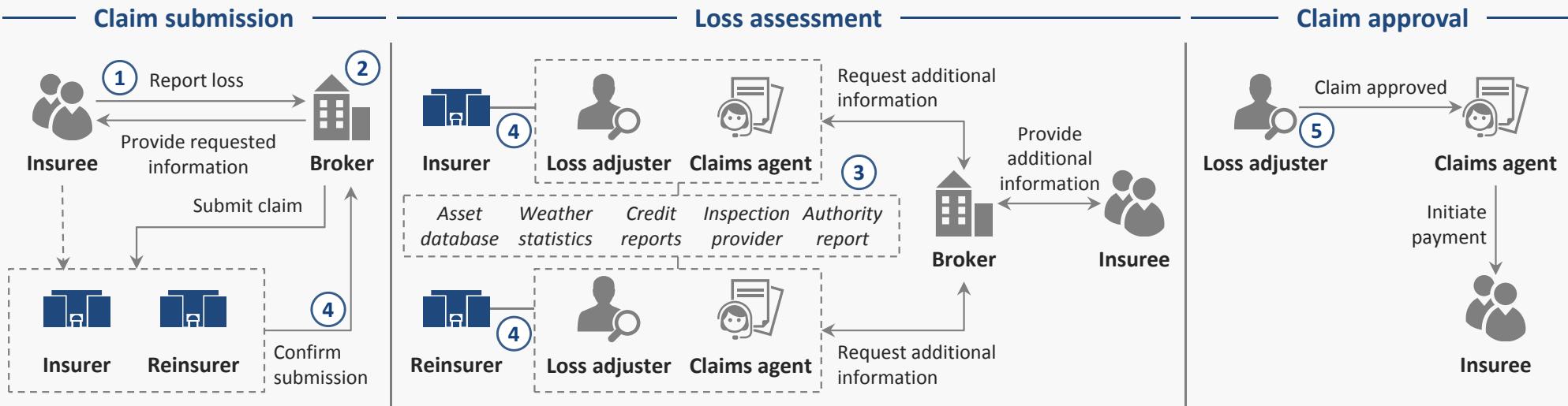


Current-state process description

- | | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>① Insuree reports loss and claims restitution from an insurer (and reinsurer, if applicable) via a broker (or independently)</p> <p>② Broker may request additional information from insuree to support the loss claim</p> <p>③ Broker submits the claim to the insurer and reinsurer (in cases of syndicate insurance or reinsurance)</p> | <p>④ After verifying the documentation received, the insurer(s) confirm receipt of the claim submission</p> <p>⑤ Loss adjusters perform claim assessments and verify the validity of the claims through client information, secondary data sources (e.g. weather statistics and authority reports) or additional inspection assessments/interviews</p> <p>⑥ If additional information is required by the insurer, a new information request is made to the broker or insuree. In some situations, the insuree must collect supporting documentation directly from secondary data sources</p> | <p>⑦ After concluding claim assessments, the loss adjuster within each insurer reaches a conclusion about the claim</p> <p>⑧ If the claim is approved, payment to the insuree is initiated via an insurer's claims agent</p> |
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P&C Claims Processing

Current-state pain points

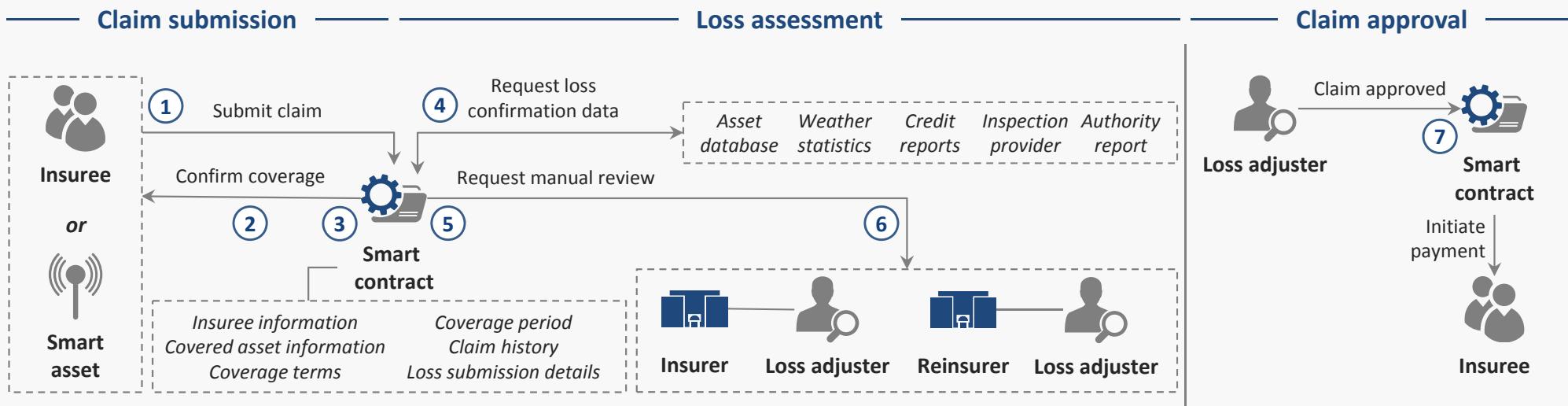


Current-state pain points

- | | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1 Undesirable customer experience: to initiate a claim, the insuree must complete a complex questionnaire and maintain physical receipts of the costs incurred by the loss</p> <p>Costly intermediaries: brokers act as intermediaries during processing, adding delays and costs to the submission</p> | <p>3 Fragmented data sources: insurers must establish individual relationships with third-party data providers to get manual access to supporting asset, risk and loss data that may not be updated</p> | <p>5 Manual claim processing: loss adjusters are required to review claims and to:</p> <ul style="list-style-type: none"> - Ensure their completeness - Request additional information or use supporting data sources - Validate loss coverage - Identify the scope of the liability - Calculate the loss amount |
| <p>2 Fraud prone: the loss assessment is completed on a per-insurer and per-loss basis with no information sharing between insurers, increasing the potential for fraud and manual rework</p> | | |

P&C Claims Processing

Future-state process depiction

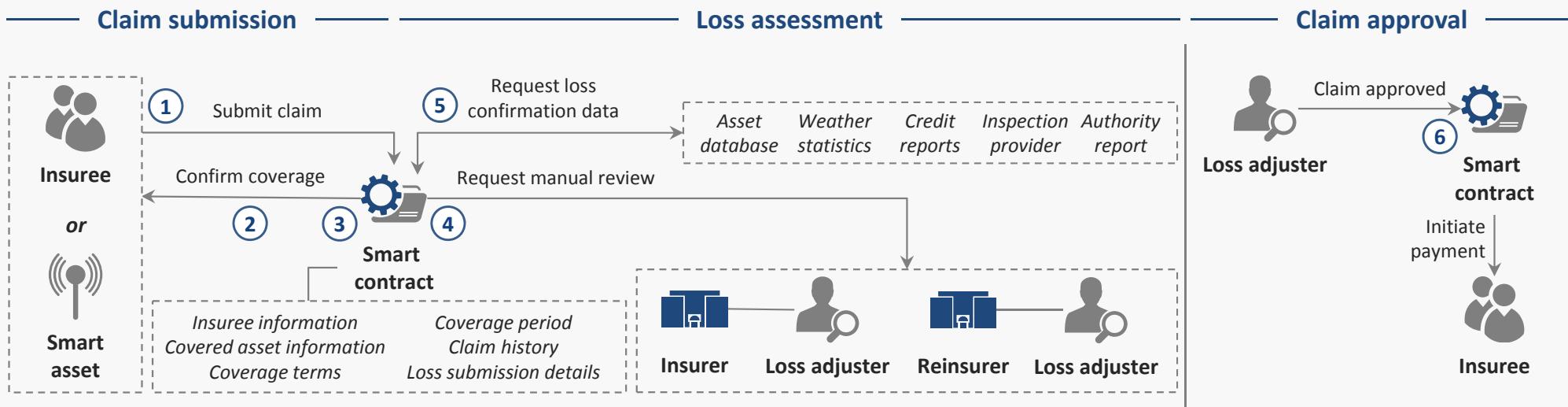


Future-state process description

- ① Loss information is submitted by the insuree or smart asset (via sensors or external data sources if the asset is technologically capable), triggering an automated claim application
- ② For insurance policies issued via a smart contract, insurees receive feedback regarding initial coverage in real time
- ③ Claim due diligence is automated via codified business rules within the smart contract, using information submitted by the insuree
- ④ DLT automatically utilizes secondary data sources to assess the claim and calculate the loss amount
- ⑤ Depending on the insurance policy, a smart contract can automate the liability calculation for each carrier where a syndicate (or insurers or reinsurers) exists
- ⑥ In predetermined situations, the smart contract can trigger an additional assessment of the claim in order to reach a final decision/calculation
- ⑦ If the claim is approved, payment to the insuree is initiated **via a smart contract**

P&C Claims Processing

Future-state benefits



Future-state benefits

- ① **Simplified and/or automated claim submission:** through a smart contract, the claim submission process will be simplified and/or fully automated (in cases of smart assets)
- ② **Enhanced customer experience:** through the streamlined transfer of loss information from insuree to insurer, DLT eliminates the need for brokers and reduces claim processing times
- ③ **Automated claim processing:** business rules encoded in a smart contract eliminate the need for loss adjustors to review every claim (functionality will enable the loss adjuster to review the claim and provide a decision, in specific risk situations)
- ④ **Reduction in fraudulent claims:** the insurer will seamlessly have access to historical claims and asset provenance, enabling better identification of suspicious behaviour
- ⑤ **Integrated data sources:** DLT facilitates the integration of various data sources from trusted providers with minimal required manual review
Streamlined payment process: in most cases, the smart contract will facilitate the payment automatically without effort from the back office
- ⑥

P&C Claims Processing

Critical conditions



Building a comprehensive set of asset profiles and history



Asset records must migrate to the DLT to allow smart contracts to consume reliable and updated asset information directly over the ledger in the case of a claim

Why?

If asset provenance and loss information are kept off the ledger among different players, smart contracts will lose their effectiveness to process claims automatically

Challenge

Engaging the market and enforcing a specific DLT as the dominant mechanism for asset registry may be challenging to implement and will require stakeholders diligence



Adopting standards for relevant claims data



Insurers and regulators will play a key role in setting data standards and facilitating the adoption by external data providers to ensure the effective flow of information among the participants

Why?

If the data is not standardized, additional manual work will still be required, resulting in cost inefficiencies and jeopardizing gains

Challenge

Changing current company-specific processes and data sets to a shared standard will require extensive discussion and converging interests



Providing a legal and regulatory framework



Regulators, insurers and other relevant stakeholders will have to establish a legal framework that regulates the validity of smart contracts as binding instruments for insurance policies

Why?

The absence of a legal precedent will expose the insurer and insuree to higher counterparty risk and disputes

Challenge

Careful and close collaboration would be required since stakeholders will likely have competing interests and senses of urgency to establish a shared framework

Critical condition categories



Stakeholder
alignment



Technology



Regulatory



Governance

P&C Claims Processing

Conclusion

Summary

- Claims automation:** Claims processing can be automated using trusted third-party data sources and the codification of business rules in smart contracts on the ledger
- Reduced fraud:** Transparent and immutable data on the ledger can also reduce fraudulent claims to a fraction of what they are today

Outlook

- The application of DLT within insurance is currently in its infancy, with a number of incumbents and new entrants providing early proof of concept, focusing on:
 - Creation of immutable insurance claim records
 - Development of asset provenance to assist in risk profiling and claims processing
 - P2P insurance
- Opportunities exist for regulators/FIs to:
 - Monitor and assess new DLT-based products (e.g. P2P insurance)
 - Guide the industry towards a lower-cost model via the common and shared implementation of DLT

Key takeaways

- Smart contracts will be key:** Insurance policies can be managed using smart contracts on DLT, capturing coverage conditions, and syndicate insurance agreements or insurer-reinsurer agreements
- Loss adjustment expenses may become irrelevant:** DLT utilization will fundamentally disrupt the cost and profitability ratios that are currently in use across the insurance industry

Unanswered questions

- Profitability:** Will the automated processing of claims have adverse effects on loss ratios?
- Pricing:** What impact will changes in loss ratios have on insurance premiums?

Section 5.3

Deposits and Lending: Syndicated Loans

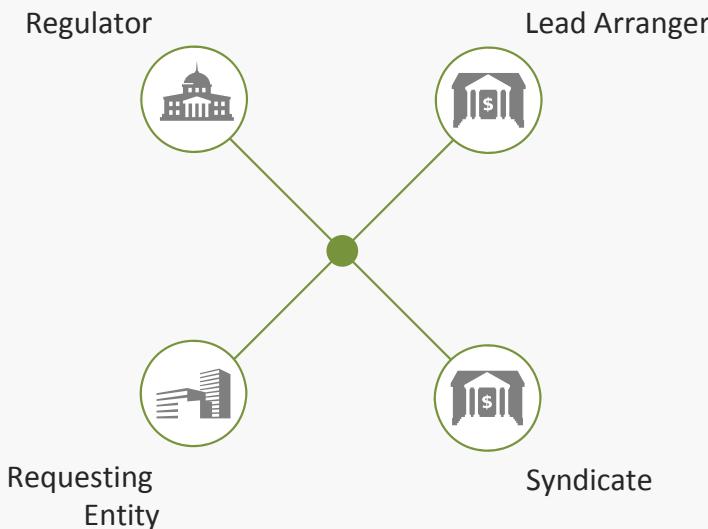
Syndicated Loans

Introduction

Current-state background

Syndicated loans provide clients with the ability to secure large-scale diversified financing at the current market rate. These loans are funded by a group of investors (e.g. syndicate), where one investor serves as the lead arranger. The lead arranger serves as the underwriter for the loan and performs all administrative tasks throughout the loan life cycle, charging a fee based on the complexity and risk factors associated with the loan.

Key ecosystem stakeholders



Overview

- **The US market is dominated by incumbents:** Four US FIs accounted for more than 50% of the market share (US\$ 1,917 billion total volume) in 2014¹
- **The EMEA market is large:** The total EMEA syndicated loan volume in 2014 amounted to US\$ 1,214.5 billion¹
- **The Asia-Pacific market is growing:** The Asia-Pacific (ex-Japan) syndicated loan volume increased by 22% in 2014, bringing total volume to US\$ 524.2 billion¹
- **The Latin American market is immature:** The total Latin American syndicated loan volume in 2014 amounted to US\$ 42.2 billion¹

DLT has the potential to optimize syndicated loan back-office operations. This use case highlights key opportunities in the end-to-end syndicated loan process

1. Global Syndicated Loans: League Tables 2014, Bloomberg, 2014.

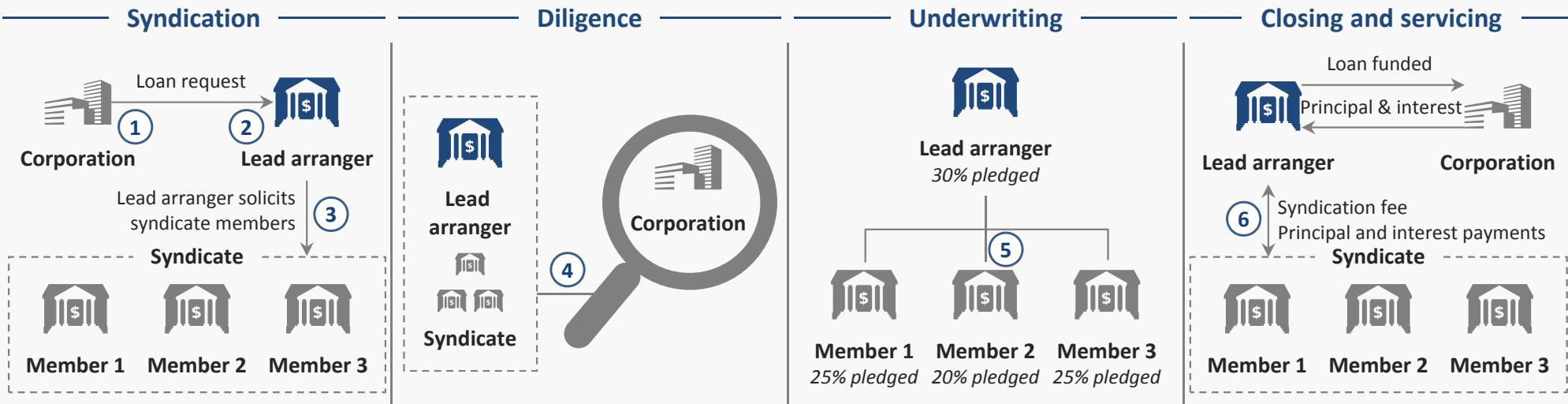
Syndicated Loans

Key market participants

Market participant	Role	Description
	Lead Arranger	<i>Core</i> An FI that leads a group of investors through the underwriting and financing of a large loan
	Syndicate	<i>Core</i> A group of investors formed into one entity for the purpose of distributing risk across institutions for large transactions
	Requesting Entity	<i>Core</i> An organization requesting a large loan from an FI
	Regulator	<i>Supporting</i> A monitor that verifies adherence to AML compliance activities

Syndicated Loans

Current-state process depiction

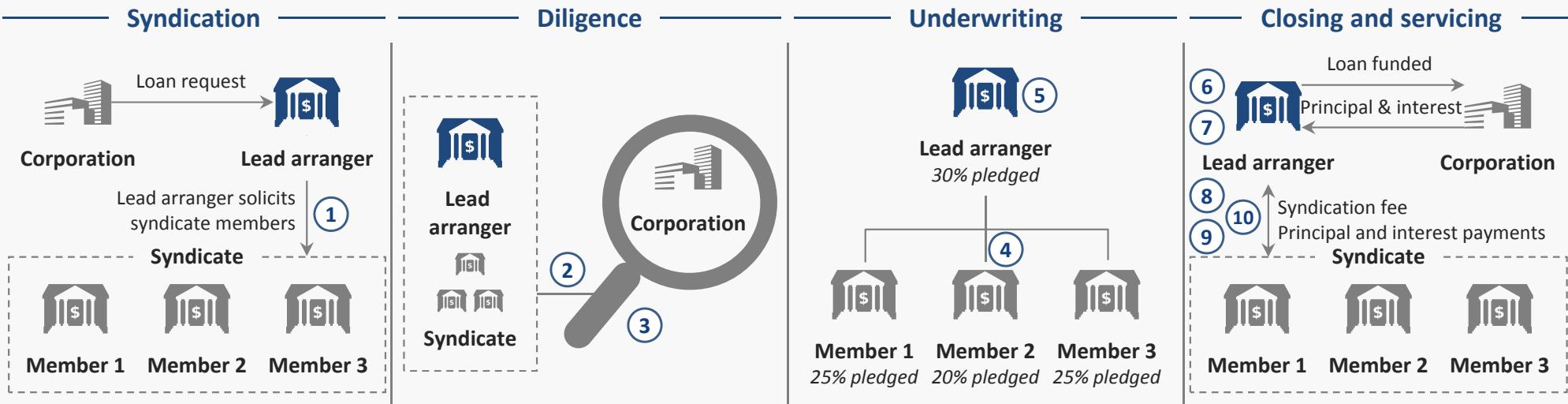


Current-state process description

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| <p>① A corporation requests a loan from an FI (referred to as the lead arranger within the syndicated loan market)</p> <p>The lead arranger performs KYC procedures in accordance with regulatory requirements</p> <p>To reduce risk, the lead arranger sources prospective members to fund the loan</p> | <p>④ The lead arranger facilitates the investigation of the corporation's financial health to determine credit worthiness and the level of risk associated with the loan</p> | <p>⑤ Syndicate members pledge a percentage of the overall risk based on their respective tolerance levels</p> | <p>⑥ The lead arranger takes on the administrative responsibility for servicing throughout the agreed upon contract life cycle (e.g. funding the loan and dispersing principal and interest payments to syndicate members)</p> |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Syndicated Loans

Current-state pain points

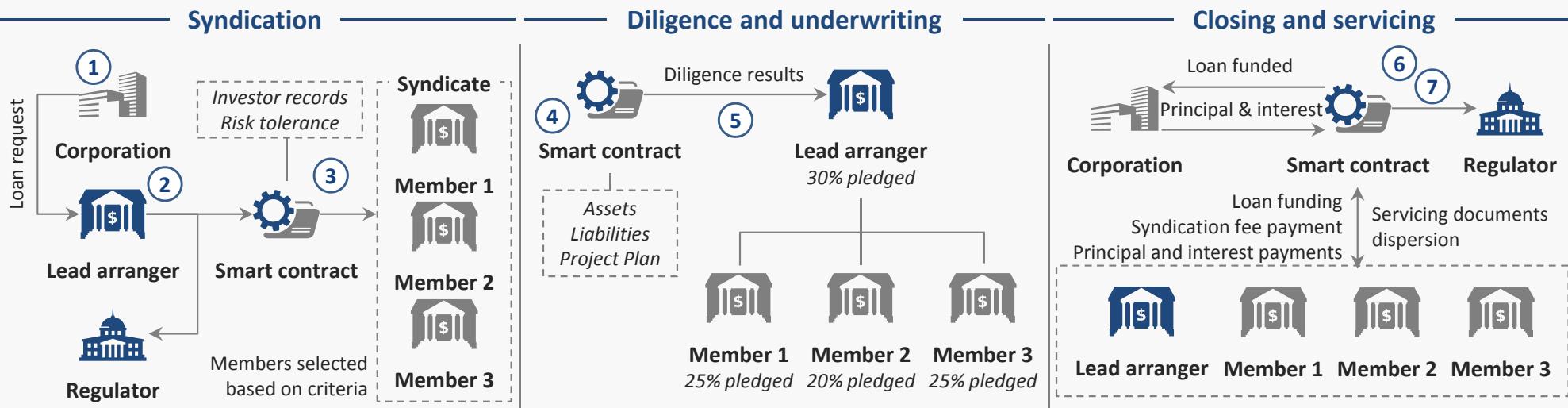


Current-state pain points

- | | | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1 Time-intensive process: selecting syndicate members based on financial health and industry expertise is time-intensive and inefficient due to manual review processes</p> | <p>3 Lack of technology integration: due diligence team members reference various applications and data sources, resulting in additional time required and a potential for errors</p> | <p>5 Lack of technology integration: underwriting systems do not communicate with diligence systems, duplicating efforts</p> | <p>8 Delayed settlement time: while verifying funds, payments settle t+3 (trade date plus three days), delaying investors from obtaining funds</p> |
| <p>2 Time-intensive review: analysing a corporation's financial information is time-intensive and inefficient due to manual review processes</p> | <p>4 Labour-intensive process: the documentation of syndicate member pledging is labour-intensive and inefficient due to reliance on manual activities</p> | <p>6 Inefficient fund disbursement: the lead arranger facilitates principal and interest disbursement, resulting in additional costs to investors</p> | <p>9 Costly intermediaries: third-party organizations facilitate servicing operations, resulting in additional costs to investors</p> |
| | | <p>7 Default risk: the lead arranger poses a risk in the disbursement of funds throughout the loan life cycle</p> | <p>10 Siloed systems: activities are duplicative since systems do not communicate with one another</p> |

Syndicated Loans

Future-state process depiction

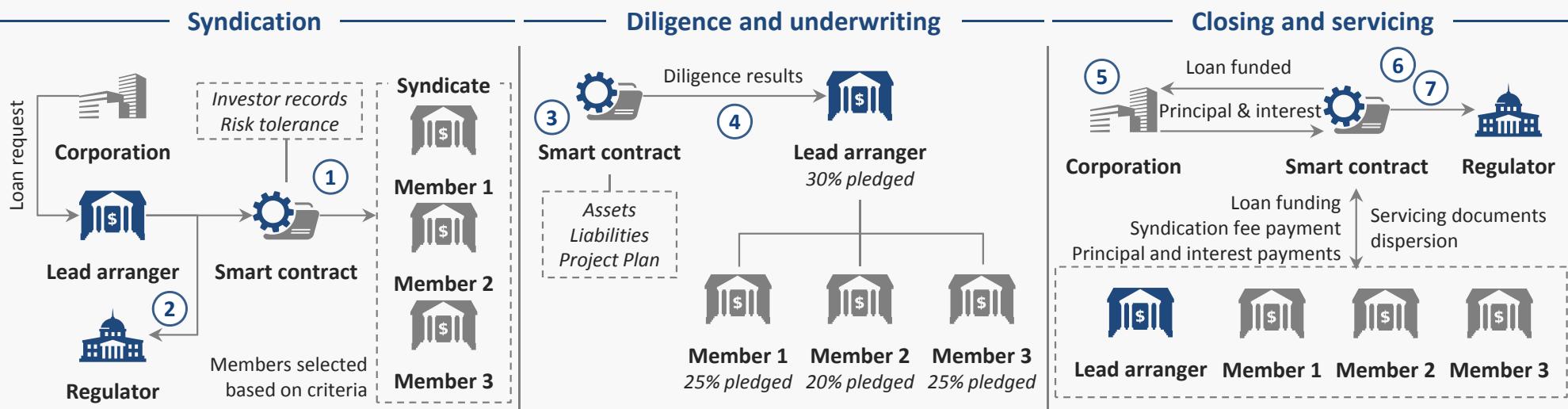


Future-state process description

- ① A corporation requests a loan from an FI acting as the lead arranger
- ② Leveraging the corporation's digital identity, the lead arranger performs KYC activities in real time through the DLT's record-keeping functionality, which also provides regulators with a transparent view of activity
- ③ The investor's financial records and risk tolerance stored on DLT automates the selection process, reducing the time it takes to form a syndicate
- ④ Leveraging the corporation's financial information and project plan data accessible through the DLT, diligence activities are automated via a **smart contract**
- ⑤ Key attributes from the diligence process are populated into the underwriting template, streamlining the process and reducing time through the DLT's transfer of value capability
- ⑥ Smart contracts eliminate the need for a third party to fund the loan, disperse funds and facilitate the loan servicing process
- ⑦ Embedded regulation facilitates the review of financial details to ensure AML procedures are followed appropriately

Syndicated Loans

Future-state benefits



Future-state benefits

- ① **Automated syndicate formation:** through programmable selection criteria within a smart contract, syndicate formation is automated, reducing the time for a corporation's loan to be funded
- ② **Embedded regulator:** throughout the syndicated loan life cycle, regulators are provided with a real-time view of financial details to facilitate AML/KYC activities
- ③ **Automated diligence and underwriting:** corporation financial information analysis and risk underwriting are automated, reducing the execution time and the amount of resources required to perform these activities
- ④ **Technology integration:** diligence systems communicate pertinent financial information to underwriting systems, streamlining process execution and reducing underwriting time
- ⑤ **Reduced closing time:** loan funding is facilitated in real time, eliminating traditional t+3 settlement and centralized lead arranger operations
- ⑥ **Servicing disintermediation:** activities are executed via smart contracts, eliminating the need for third-party intermediaries
- ⑦ **Reduced counterparty risk:** the disbursement of principal and interest payments throughout the loan life cycle is automated, reducing operational risk

Syndicated Loans

Critical conditions

<p> Building risk rating framework for syndicate selection</p> <p>   </p> <p><i>FIs must develop a framework that provides guidance for rating and sharing counterparty performance information on the distributed ledger</i></p>	<p> Standardizing diligence and underwriting templates</p> <p>   </p> <p><i>FIs must standardize financial attributes to facilitate the automated population of diligence and underwriting templates</i></p>	<p> Providing access to financial details on the distributed ledger</p> <p>   </p> <p><i>FIs and loan requestors must be willing to store pertinent financial information on the distributed ledger</i></p>
<p>Why?</p> <p>Automated syndicate formation relies on a robust counterparty rating system that lead arrangers can leverage for syndicate member selection</p> <p>Challenge</p> <p>Aligning FIs around a single standard for counterparty rating requires an enormous amount of coordination and governance</p>	<p>Why?</p> <p>The automated population of diligence and underwriting templates requires standardized data fields to move information from one system to another</p> <p>Challenge</p> <p>The myriad diligence and underwriting collection vehicles across FIs will make alignment around one format difficult</p>	<p>Why?</p> <p>To facilitate automated syndicate formation, due diligence review and underwriting template creation, pertinent financial details must be accessible through the distributed ledger</p> <p>Challenge</p> <p>Given no legal precedent or liability model is established to mitigate the risk of storing proprietary financial information on the ledger, participation is uncertain</p>

Critical condition categories



Syndicated Loans

Conclusion

Summary

- **Underwriting automation:** Underwriting activities can be automated, leveraging financial details stored on the distributed ledger
- **Regulatory transparency:** Compliance officials are provided real-time tools to enforce KYC requirements
- **Cost savings:** DLT can provide a global cost reduction opportunity within the process execution and settlement subprocesses of syndicated loans

Outlook

- Applications of DLT within syndicated loans are currently being explored at the proof-of-concept level with a number of incumbents, focusing on:
 - Smart contract settlement and servicing
 - Automated underwriting
- Opportunities exist for FIs to reduce closing-time operational risk and manual activities:
 - Loan funding executed via smart contract
 - Account servicing facilitated via smart contract
 - Automated underwriting activities

Key takeaways

- **Manage loan life cycle via smart contracts:** Syndicated loans can be managed using smart contracts on DLT – KYC verification, due diligence review, underwriting automation, loan funding, payment dissemination, etc. – as the loan moves through the syndicated loan life cycle
- **Execute servicing disintermediation:** Traditionally performed by a third party, closing and servicing activities are executed via smart contract, eliminating third-party fees

Unanswered questions

- **Automated AML activities:** What are the implications of making KYC information more public? Is this a key step to mutualizing KYC information among FIs?

Section 5.4

Deposits and Lending: Trade Finance

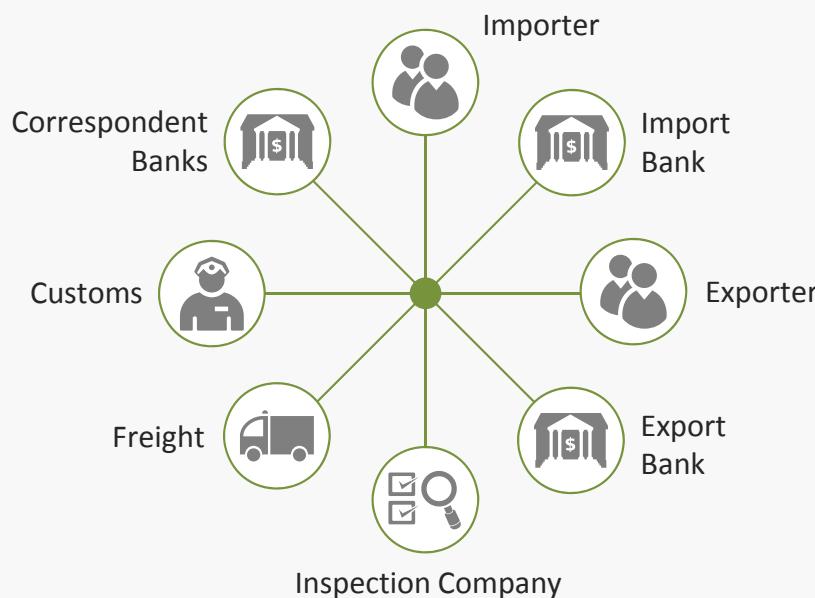
Trade Finance

Introduction

Current-state background

Trade finance is the process by which importers and exporters mitigate trade risk through the use of trusted intermediaries. FIs serve as the trusted intermediary providing assurance to sellers (in the event the buyer doesn't pay) and contract certainty to buyers (in the event that goods are not received). Regardless of counterparty performance, payment and delivery terms (e.g. prepayment, piecemeal or upon delivery) are documented in a letter of credit or open account contract vehicle. FIs command a fee for documentation/oversight of payment terms and for taking on the risk position of either the importer or exporter.

Key ecosystem stakeholders



Overview

- **Financing dominates world trade:** Today's trade operations are facilitated through financing. US\$ 18 trillion of annual trade transactions involve some form of finance (credit, insurance or guarantee)¹
- **The trade finance market is large:** Since financing has become such an integral part of trading, the market has grown substantially to more than US\$ 10 trillion annually¹

DLT has the potential to optimize the regulatory and operations costs of trade finance. This use case highlights the key opportunities in the end-to-end trade finance process

Trade Finance

Key market participants

Market participant	Role	Description
	Importer	<i>Core</i> An entity requesting a cross-border product/service
	Import Bank	<i>Core</i> An FI that assumes risk on behalf of the importer
	Exporter	<i>Core</i> An entity providing the cross-border product/service
	Export Bank	<i>Core</i> An FI that assumes risk on behalf of the exporter
	Inspection Company	<i>Supporting</i> A company that verifies that the goods shipped match those on the invoice
	Freight	<i>Supporting</i> The transport of goods by truck, train, ship or aircraft
	Customs	<i>Supporting</i> The country authority responsible for controlling the flow of goods
	Correspondent Banks	<i>Supporting</i> An FI that provides services on behalf of import/export banks

Trade Finance

Current-state process depiction



Current-state process description

- | | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>① An importer and exporter agree to the sale of a product at a future date and time</p> <p>② The financial agreement is captured within an invoice, which identifies the quantity of goods sold, price and delivery timeline</p> <p>③ The importer provides a bank with a copy of the financial agreement for review</p> <p>④ The import bank reviews the financial agreement and provides financials on behalf of the importer to a correspondent bank, which has established a relationship with the export bank</p> | <p>⑤ The export bank provides the exporter with the financing details, which enables the exporter to initiate the shipment</p> <p>⑥ A trusted third-party organization inspects the goods for alignment with the invoice</p> <p>⑦ Local customs agents within the export country inspect the goods based on the country code</p> <p>⑧ The goods are transported by freight from <i>Country A</i> to <i>Country B</i> and local customs agents within the import country inspect the goods based on the country code</p> | <p>⑨ Following inspection, the goods are delivered to the importer, which provides a receipt notification to the import bank</p> <p>⑩ Upon receiving notification, the import bank initiates the payment to the export bank through the correspondent bank</p> |
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Trade Finance

Current-state pain points



Current-state pain points

- Manual contract creation: the import bank manually reviews the financial agreement provided by the importer and sends financials to the correspondent bank.
- Invoice factoring: exporters use invoices to achieve short-term financing from multiple banks, adding additional risk in the event the delivery of goods fails.
- Delayed timeline: the shipment of goods is delayed due to multiple checks by intermediaries and numerous communication points.

- Manual AML review: the export bank must manually conduct AML checks using the financials provided by the import bank.
- Multiple platforms: since each party across countries operates on different platforms, miscommunication is common and the propensity for fraud is high.
- Duplicative bills of lading: bills of lading are financed multiple times due to the inability of banks to verify their authenticity.

- Multiple versions of the truth: as financials are sent from one entity to another, significant version control challenges exist as changes are made.
- Delayed payment: multiple intermediaries must verify that funds have been delivered to the importer as agreed prior to the disbursement of funds to the exporting bank.

Trade Finance

Future-state process depiction



Future-state process description

- ① Following the sale agreement, the financial agreement is shared with the import bank through a smart contract
- ② The import bank reviews the arrangement, drafts the terms of the letter of credit and submits it to the export bank for approval
- ③ The export bank reviews the letter of credit; once approved a smart contract is generated to cover the terms and conditions of the letter of credit
- ④ The exporter digitally signs the letter of credit within the smart contract to initiate shipment
- ⑤ Goods are inspected by a third-party organization and the customs agent in the country of origin (all requiring a digital signature for approval)
- ⑥ The goods are transported by freight from *Country A* to *Country B* and inspected by local customs agents prior to being received by the importer
- ⑦ The importer digitally acknowledges receipt of the goods, which initiates payment from the import bank to the export bank via a smart contract

Trade Finance

Future-state benefits



Future-state benefits

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| <p>1 Real-time review: financial documents linked and accessible through DLT are reviewed and approved in real time, reducing the time it takes to initiate shipment</p> <p>2 Transparent factoring: invoices accessed on DLT provide a real-time and transparent view into subsequent short-term financing</p> | <p>3 Disintermediation: banks facilitating trade finance through DLT do not require a trusted intermediary to assume risk, eliminating the need for correspondent banks</p> <p>4 Reduced counterparty risk: bills of lading are tracked through DLT, eliminating the potential for double spending</p> <p>5 Decentralized contract execution: as contract terms are met, status is updated on DLT in real time, reducing the time and headcount required to monitor the delivery of goods</p> <p>6 Proof of ownership: the title available within DLT provides transparency into the location and ownership of the goods</p> | <p>7 Automated settlement and reduced transaction fees: contract terms executed via smart contract eliminate the need for correspondent banks and additional transaction fees</p> <p>8 Regulatory transparency: regulators are provided with a real-time view of essential documents to assist in enforcement and AML activities</p> |
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Trade Finance

Critical conditions

 <p>Providing transparency into trade finance agreements</p>	 <p>Enabling interoperability with legacy platforms</p>	 <p>Rewriting regulatory guidance and legal frameworks</p>
 <p><i>Bills of lading and invoice details must be transparent within the smart contract to reduce counterparty risk</i></p>	 <p><i>To ensure smart contracts containing the details of the financing agreement flow through the trade finance process, FIs and technology providers must ensure the ledger is interoperable with many different platforms</i></p>	 <p><i>Agreed upon procedures must be established within the end-to-end trade finance process to provide regulators with a real-time view of bills of lading, letters of credit, etc.</i></p>
<p>Why?</p> <p>Ecosystem participants must have a transparent view into invoice and bills of lading details to ensure factoring and double spending are not taking place</p>	<p>Why?</p> <p>The creation of letters of credit/bills of lading and goods inspection documentation requires stakeholders to integrate the developed DLT solution with legacy systems</p>	<p>Why?</p> <p>Compliance officials must have a real-time view of financing details within the smart contract to enforce regulatory guidelines</p>
<p>Challenge</p> <p>FIs and shipment carriers must establish procedures and liability models that govern the transparent sharing of financial information</p>	<p>Challenge</p> <p>FIs, customs, freight, importers and exporters utilize multiple technology solutions that may be incapable of interfacing with the ledger</p>	<p>Challenge</p> <p>Given the lack of legal/regulatory precedent, the procedures that facilitate the use of smart contract reporting to regulatory agencies will be difficult to establish</p>

Critical condition categories



Trade Finance

Conclusion

Summary

- **Letter of credit automation:** Letter of credit creation can be automated leveraging financial details stored on the distributed ledger
- **Regulatory transparency:** Compliance officials are provided real-time tools to enforce AML and customs activities
- **New product opportunities:** DLT within global trade networks will yield new product opportunities for incumbents (or innovators) around lending and securitization of trade obligations
- **Cost savings:** DLT can yield cost savings associated with letter of credit creation, process automation and fraud reduction

Key takeaways

- **Manage letters of credit via smart contracts:** Letters of credit can be managed using smart contracts on DLT – capturing shipment details, financial information and payment data as the letter of credit moves through the trade finance process
- **Consider correspondent banking disruption:** DLT utilization can fundamentally disrupt the role of correspondent banks as FIs work directly with one another

Outlook

- The application of DLT within trade finance is currently being explored at the proof-of-concept level with a number of incumbents, focusing on:
 - Letters of credit encapsulated in a smart contract
 - Electronic invoice ledger
- Opportunities exist for FIs to reduce counterparty risk and fraud by:
 - Providing transparent invoice factoring
 - Reducing bill of lading double spending via transparent tracking

Unanswered questions

- **Pricing:** What is the impact on financing fees (taking into account the cost of implementation) as correspondent banks are eliminated from the trade finance process?
- **Level of disruption:** how will the import banks and export banks ensure that they are not disrupted by new or existing market participants?

Section 5.5

Capital Raising: Contingent Convertible (“CoCo”) Bonds

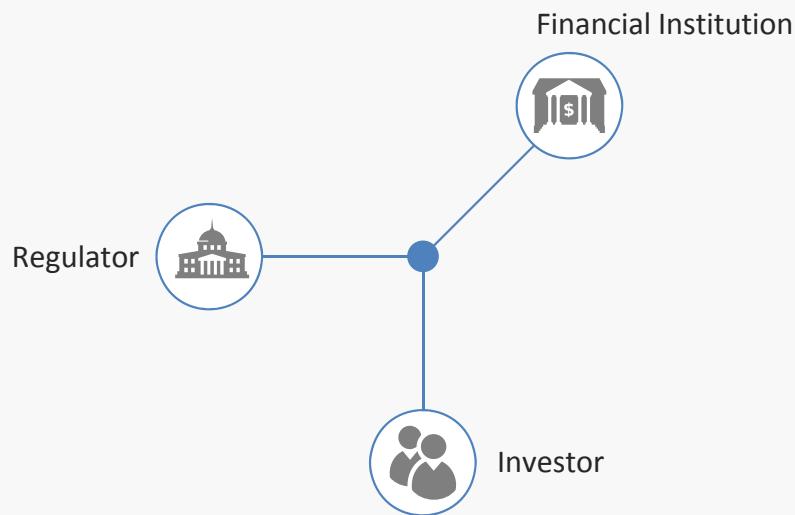
Contingent Convertible (“CoCo”) Bonds

Introduction

Current-state background

Contingent convertible (“CoCo”) bonds are financial instruments that enable banks to increase their capital ratio in case it falls below a predefined threshold. Unlike traditional bonds, “CoCo” bonds provide banks with the ability to convert the bond into equity if a capital ratio condition is met (e.g. bank capital falls below 7.5%) or a discretionary circumstance is determined by the bank/regulators. Today’s banks are responsible for calculating their own capital ratio, and regulators do not have insight unless they request a stress test.

Key ecosystem stakeholders



Overview

- **“CoCo” bond issuance has flatlined:** After experiencing continued double-digit market growth since 2013, issuance flatlined in European markets in 2015
- **A primary concern has been uncertainty:** After being developed as a mechanism to reduce the need for bailouts during financial crises, no “CoCo” bonds have required conversion to equity, making the market largely untested so far
- **Another key concern is the extreme volatility of these instruments:** While yields have been historically high, recent events have had significant impact. High market volatility, fuelled by regulator stress tests in 2016, eliminated all yields within six weeks

DLT has the potential to embed regulation into business processes. This use case highlights key opportunities to reduce volatility and uncertainty regarding this instrument and potentially to increase “CoCo” bond issuance in the future

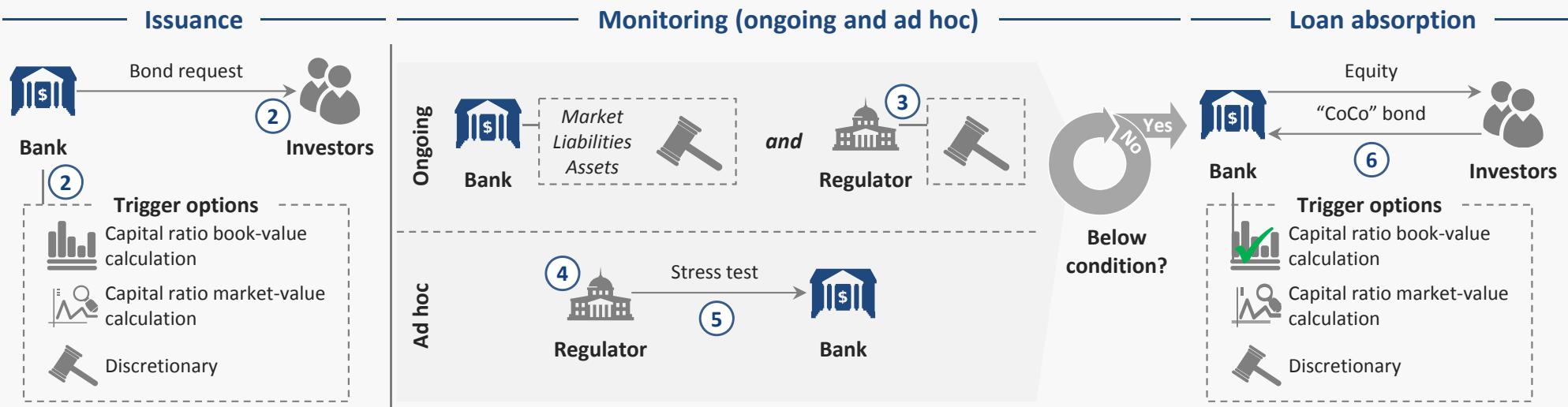
Contingent Convertible (“CoCo”) Bonds

Key market participants

Market participant	Role	Description
	Financial Institution	<i>Core</i> The institution that issues "CoCo" bonds and solicits investment from investors
	Investor	<i>Core</i> The individual and/or institution that agrees to the terms outlined during bond issuance and invests in the asset
	Regulator	<i>Supporting</i> The entity that ensures market stability; FIs adhere to their predefined loan absorption mechanism criteria

Contingent Convertible ("CoCo") Bonds

Current-state process depiction

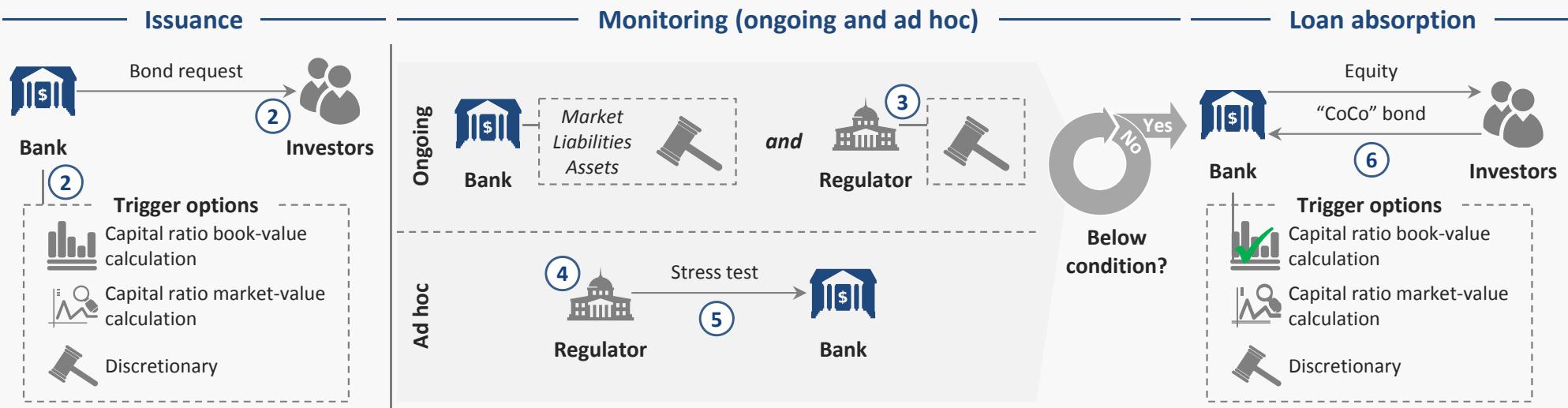


Current-state process description

- ① To initiate issuance, the bank determines a trigger option through a book-value or market-value calculation (e.g. bank capital falls below 7.5%) to activate loan absorption (conversion of a "CoCo" bond to equity)
- ② After determining bond attributes (e.g. trigger and maturity date), the bank issues "CoCo" bonds to raise funds from a broad set of investors (including retail, banks, hedge funds and insurance companies)
- ③ The issuing bank and regulator monitor the trigger to determine if loan absorption needs to be activated through two ongoing and one ad hoc mechanisms:
 - a Bank analyses trigger (no frequency mandated by regulator)
 - b Bank and regulator make discretionary decision (e.g. market performance)
 - c Regulator requests point-in-time stress test to assess capital ratio
- ④ If any monitoring mechanism results in requiring loan absorption to be activated (e.g. bank capital falls below 7.5% or discretionary action is taken), the "CoCo" bond is converted into equity at a predetermined conversion rate

Contingent Convertible ("CoCo") Bonds

Current-state pain points

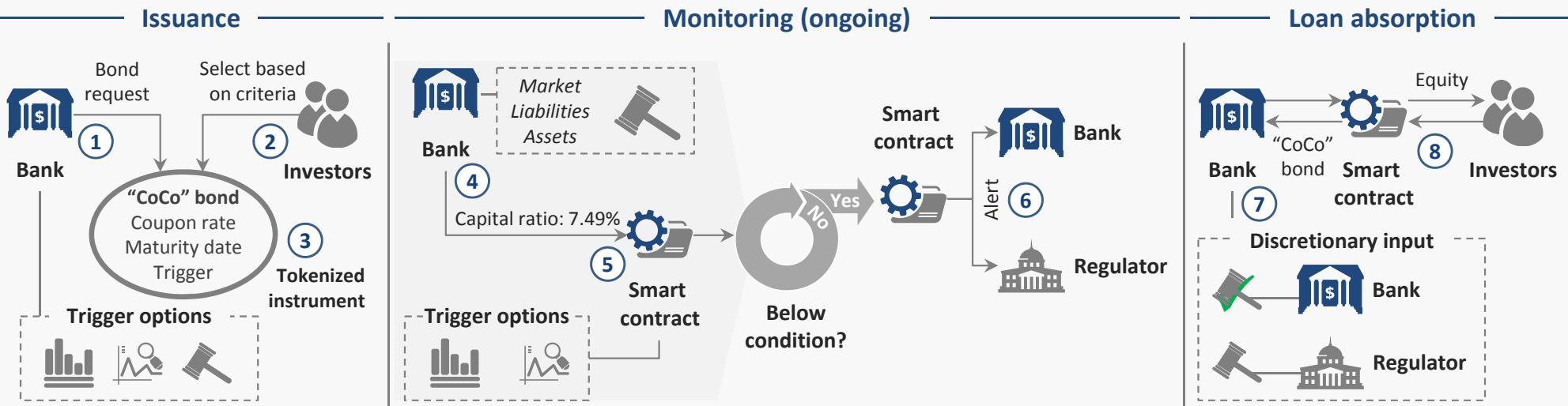


Current-state pain points

- ① **Limited participation:** limited rating information within the "CoCo" bonds market limits participation from large institutional investors
- ② **Inconsistent trigger calculation methods:** banks can complete capital ratio analyses through book-value (using internal models) or market-value (comparing stock market capitalization to assets) calculations
- ③ **Ambiguity:** regulators lack insight into capital ratio (aside from requesting point-in-time stress tests) and whether loan absorption may need to be activated in the future
- ④ **Lack of real-time reporting:** regulators must rely on public-facing, point-in-time stress tests to assess the health of the banks and "CoCo" bonds market
- ⑤ **Market fear:** bank equities are susceptible to extreme volatility as investors fear stress test results
- ⑥ **Delayed activation time:** since trigger condition calculation frequency is not regulated (e.g. bank capital ratios may be calculated quarterly), "CoCo" bonds may not be converted into equity immediately after the condition is met

Contingent Convertible (“CoCo”) Bonds

Future-state process depiction

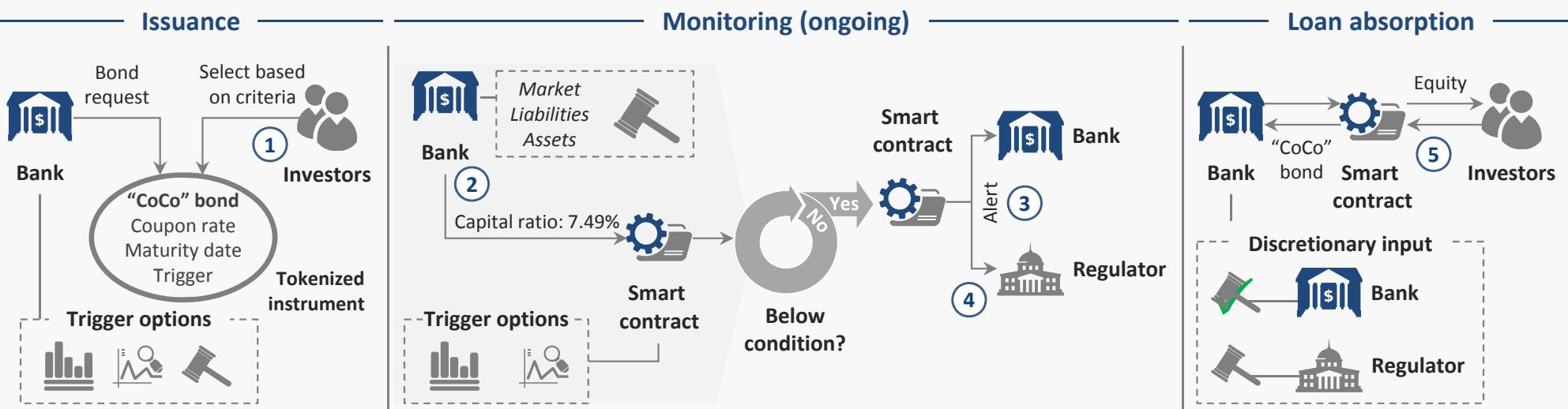


Future-state process description

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| <p>① Similar to the current state, the issuing bank determines the trigger option through a book-value or market-value calculation to activate loan absorption, and initiates bond issuance</p> <p>② The bank issues a tokenized “CoCo” bond to raise funds from investors, utilizing the record-keeping functionality of DLT</p> | <p>③ The tokenized bond includes key attributes, including a loan absorption trigger, issuing bank, coupon rate and maturity date</p> <p>④ The bank analyses the current capital ratio to determine if loan absorption needs to be activated</p> <p>⑤ The latest calculation is added directly to the tokenized asset for the bond, providing investors and regulators with transparency into the status of their issued “CoCo” bonds</p> <p>⑥ If the trigger is reached, regulators and bank leadership are notified in real time through a smart contract</p> | <p>⑦ After a bank or regulator provides discretionary input into conversion (can be automated in the future), loan absorption can be activated through a smart contract</p> <p>⑧ The “CoCo” bond is converted into equity at a predetermined conversion rate</p> |
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Contingent Convertible ("CoCo") Bonds

Future-state benefits



Future-state benefits

- ① **Increased participation:** up-to-date capital ratio information stored within DLT can increase confidence and lead to developing a "CoCo" bond rating system, enabling large institutional investors to participate within the market
- ② **Improved calculations:** integrating capital ratio calculations directly into DLT can improve data input maturity and calculation frequency across banks
- ③ **Real-time reporting:** regulators can be notified in real time through a smart contract if a "CoCo" bond trigger is reached
- ④ **Reduced stress tests:** since regulators have access to a bank's capital ratio in real time, bank equity volatility can be reduced as the likelihood for point-in-time stress tests decreases
- ⑤ **Real-time activation time:** since the frequency of the trigger calculation and reporting increases through DLT, the time to convert a "CoCo" bond into equity after the condition is met significantly reduces

Contingent Convertible (“CoCo”) Bonds

Critical conditions

 <p>Standardizing attributes for soliciting investment</p>	 <p>Streamlining trigger calculations across FIs</p>	 <p>Developing processes to act on real-time trigger notifications</p>
 <p><i>Regulators across markets must initiate conversations with FIs that issue “CoCo” bonds to develop standardized attributes that can be used by investors to make data-driven investment decisions</i></p>	 <p><i>Regulators must impose standards for FIs to streamline their methodologies behind trigger calculations, and the frequency that results will be entered into the tokenized “CoCo” bond instruments</i></p>	 <p><i>Regulators and bank leadership must develop the business processes required to act on real-time trigger notifications to determine if loan absorption should be activated at that FI and across the market</i></p>
<p>Why?</p> <p>Data fields and templates must be standardized to tokenize “CoCo” bonds across FIs within the distributed ledger</p>	<p>Why?</p> <p>Investor confidence in “CoCo” bonds can only increase if standardization exists within the calculation process and, subsequently, loan absorption</p>	<p>Why?</p> <p>Since the viability of “CoCo” bonds is in question due to loan absorption, transparency is required in order for investors to continue investments</p>
<p>Challenge</p> <p>Each market requires different data to be provided when issuing “CoCo” bonds; data field units are currently not standardized across FIs</p>	<p>Challenge</p> <p>Each FI currently calculates trigger values independently and with varying degrees of automation</p>	<p>Challenge</p> <p>Regulators may require a significant process overhaul since they are traditionally restricted to point-in-time stress tests to analyse an FI’s capital ratio</p>

Critical condition categories



Contingent Convertible (“CoCo”) Bonds

Conclusion

Summary

- **Improved monitoring:** Ongoing monitoring can be standardized across FIs while ensuring that regulators receive real-time notifications of impending loan absorption activation
- **Increased investor confidence:** Ensuring that processes exist to improve visibility into monitoring and loan absorption will increase investor confidence and, potentially, participation

Outlook

- No significant applications of DLT within the “CoCo” bond life cycle have been reported or discussed within blockchain research released to date
- While benefits associated with process execution and reporting costs exist, a majority of benefits are ancillary and focused on improving market stability
- Opportunity exists for regulators to push standardized capital ratio calculations across FIs and to reduce volatility associated with requesting point-in-time stress tests

Key takeaways

- **Ensure educated and empowered investors:** Tokenized bond instruments can enable investors to make informed, data-driven decisions; improved monitoring processes can reduce market uncertainty
- **Allow point-in-time stress tests to become irrelevant:** Smart contracts can alert regulators when loan absorption needs to be activated, while ensuring that “over-reporting” is not a concern

Unanswered questions

- **Business drivers:** Since loan absorption is an indication that a broader crisis may be taking place, is reduced market volatility enough of a driver to warrant investment?

Section 5.6

Investment Management: Automated Compliance

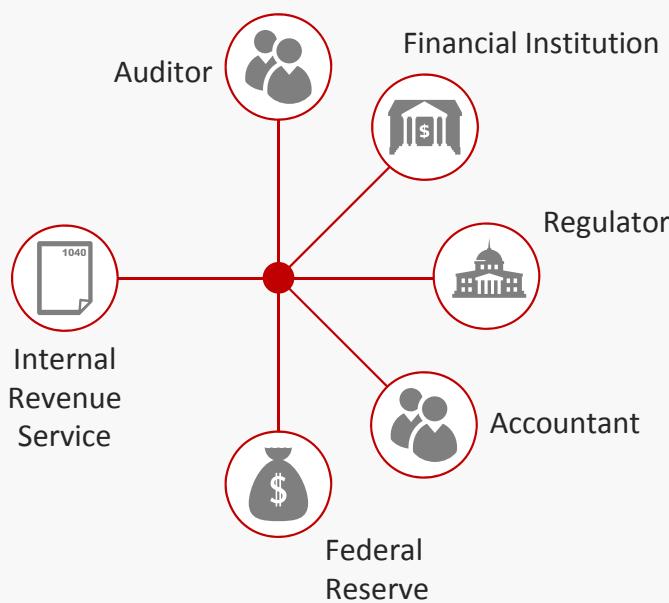
Automated Compliance

Introduction

Current-state background

FIs are responsible for complying with and reporting on a multitude of regulatory requirements. These activities may be executed internally by a functional area within the organization or via a third party. Audit, tax, CCAR and routine Securities and Exchange Commission (SEC) filing (10K/10Q) are just a few compliance-related activities that add additional cost to FIs' annual spend.

Key ecosystem stakeholders



Overview

- **Compliance costs are high:** Compliance activities are a major portion of the cost overhead FIs deal with. In 2014 the largest FIs spent US\$ 4 billion in compliance-related activities¹
- **Auditing costs are high:** Auditing represents one of the largest annual compliance costs for FIs. On average, public companies paid in excess of US\$ 7.1 million in audit fees in 2013²

DLT has the potential to increase operational efficiencies and provide regulators with enhanced enforcement tools. This use case focuses on the key opportunities in the financial statement audit process to highlight an automated compliance solution

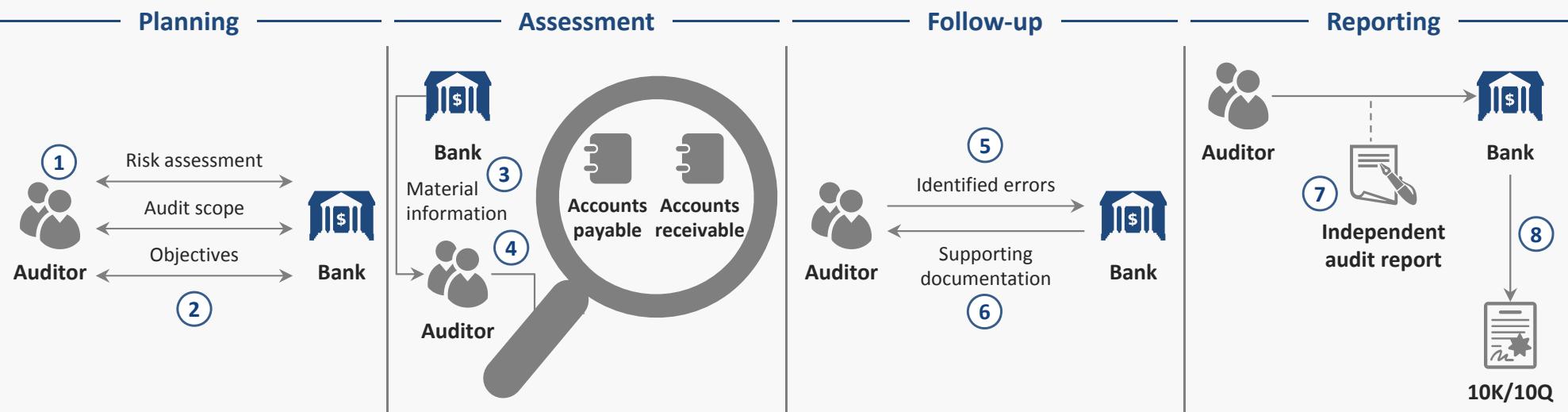
Automated Compliance

Key market participants

Market participant	Role	Description
 Auditor	<i>Core</i>	Individual(s) who perform(s) the financial statement examination and provide(s) reasonable assurance of the financials via the audit opinion
 Financial Institution	<i>Core</i>	An entity providing the financial statements and requesting the audit opinion
 Regulator	<i>Supporting</i>	A monitor who verifies adherence to audit activities (e.g. the CCAR regulator is responsible for verifying requisite capital is on hand to conduct operations)
 Accountant	<i>Additional participant</i>	Individual(s) responsible for reviewing, preparing and filing the tax statements on behalf of the FI
 Federal Reserve	<i>Additional participant</i>	The US government organization responsible for supervising and regulating banking institutions
 Internal Revenue Service	<i>Additional participant</i>	The US government organization responsible for tax collection and tax law enforcement

Automated Compliance

Current-state process depiction

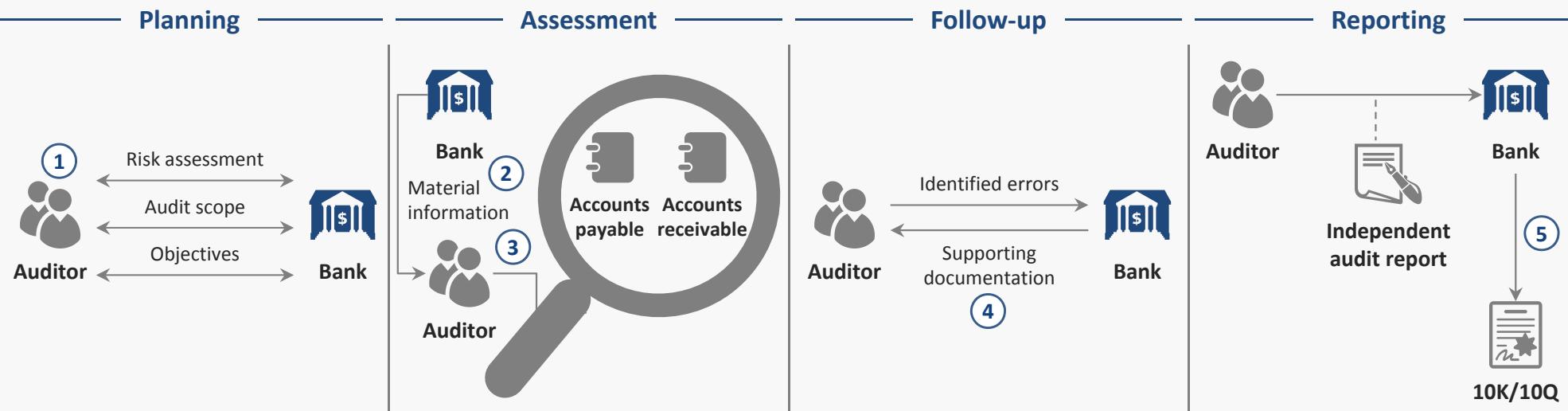


Current-state process description

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| <p>① Annually, auditors coordinate with the bank to perform the required audit of financial statements</p> <p>② Members of the audit team work directly with the bank to perform an initial risk assessment and align on the scope, objectives, timing and resources required</p> | <p>③ The bank provides the audit team with copies of financially material data and access to the systems that enable analyses to be conducted</p> <p>④ Auditors evaluate the information provided for completeness and conduct tests for accuracy in parallel to performing the evaluation</p> | <p>⑤ Throughout the process, auditors work directly with the leadership and representatives from the bank to address identified errors within the data and testing exceptions</p> <p>⑥ As exceptions are identified, the audit team requests additional information to determine the depth of the concern</p> | <p>⑦ At the conclusion of the evaluation, the audit team releases an opinion of the overall financial health of the bank in the form of an independent audit report</p> <p>⑧ The bank uses the results of the report to populate its quarterly and annual filings (10K/10Q)</p> |
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Automated Compliance

Current-state pain points

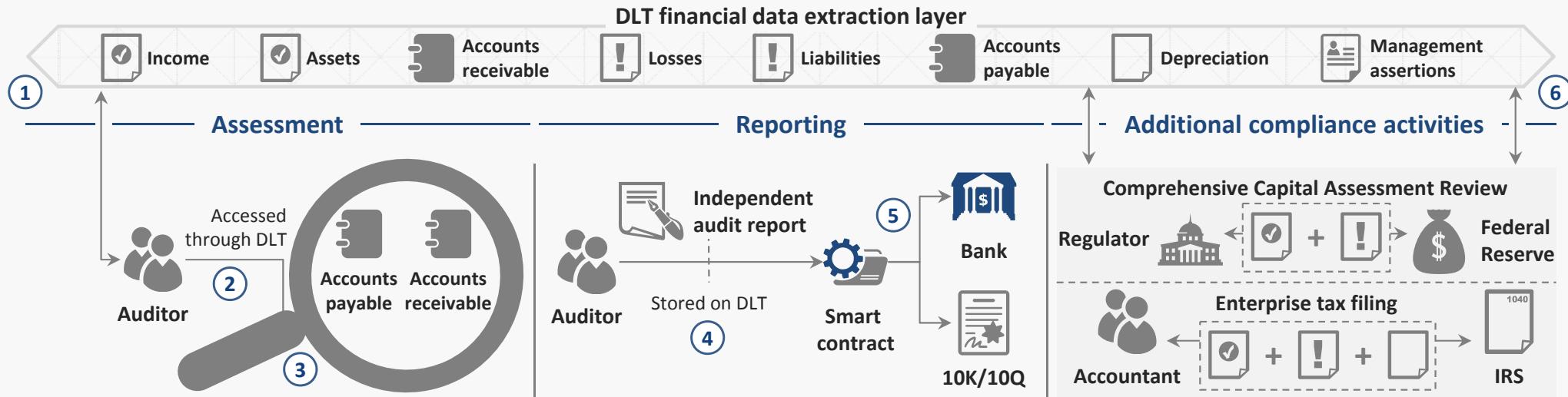


Current-state pain points

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| <p>1 Resource-intensive: scope formation, risk assessment and audit planning require representatives from multiple functional areas, reducing productivity as individual employees cannot complete their daily activities</p> | <p>2 Time-intensive review: pulling sample data for audit review is time-intensive and inefficient due to dependency on manual activities</p> | <p>4 Resource-intensive: exception and error follow-up requires additional interaction with representatives from multiple functional areas, further reducing productivity</p> | <p>5 Lack of technology integration: information provided in the independent audit report does not feed directly into quarterly and annual filings (10K/10Q), duplicating efforts</p> |
| <p>3 Lack of technology integration: information is copied from source systems and provided to auditors, adding inefficient manual processes that increase the likelihood of errors</p> | | | |

Automated Compliance

Future-state process depiction

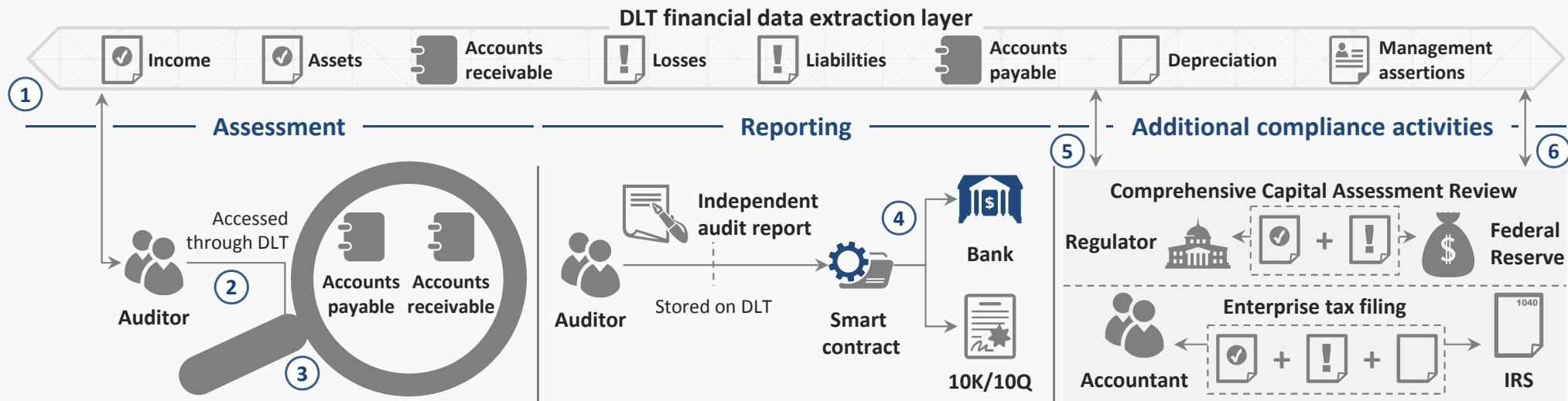


Future-state process description

- ① Financially material information is accessible to auditors in real time through the use of a financial DLT enabled data extraction layer. Since auditors have authorized access to this data, representatives and leadership of the bank do not need to be involved with audit planning and data distribution
- ② The audit team performs an audit evaluation using data directly from the DLT, eliminating errors generated from manual activity and the requirement for follow-up
- ③ Auditors develop the independent audit report and store it on the DLT for real-time access by the bank and regulator
- ④ A smart contract facilitates the movement of information from the audit report to financial reporting instruments, minimizing duplicate efforts
- ⑤ In the future, DLT is uniquely positioned to seamlessly execute and automate compliance activities such as:
 - Comprehensive Capital Assessment Review (pictured)
 - Enterprise tax filing (pictured)
 - Real time tasks for trading in financial instruments (e.g. insider trading)
 - Processing information about new regulatory developments

Automated Compliance

Future-state benefits



Future-state benefits

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| <p>① Data transparency: enabling data stored within financial systems to be accessible via DLT through the financial data extraction layer provides immutable and transparent records that are updated in real time</p> <p>② Automated review: financial information accessible via DLT enables an automated review via audit software, reducing the time and resources required to perform these activities</p> | <p>③ Reduced errors: audit teams have authorized access to financial data, eliminating errors generated by manual activities and streamlining the update process</p> <p>④ Integrated systems: reporting activities executed via DLT facilitates the creation of quarterly and annual filings, reducing duplicate efforts</p> | <p>In the future, DLT can enable additional compliance activities to be seamlessly executed through automation:</p> <p>⑤ The bank provides Federal Reserve officials with authorized access to facilitate automated capital analysis and store results on DLT</p> <p>⑥ The bank provides tax accountants with authorized access to real-time financial data to facilitate tax calculations and automate IRS tax payments</p> |
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Automated Compliance

Critical conditions



Providing compartmentalized access to data



The DLT solution must ensure access can be authorized at the financial category level (e.g. assets, liabilities, etc.)

Why?

To mitigate risk, external users should only have access to financial data that is material to their compliance activity

Challenge

Current DLT solutions authorize access to the ledger as a whole and do not provide the capability to partition access



Automating faster and efficient enforcement of regulations



FIs and regulators must transition to a real-time cadence for sharing financially material information

Why?

Providing regulators with real-time transparent access to financial data enables the regulatory enforcement of compliance-related activities

Challenge

Given no legal/regulatory precedent, establishing a shared arrangement between the regulator and FIs will be arduous



Enabling interoperability with legacy platforms



Legacy platforms of FIs and regulatory agencies must be capable of feeding data directly into and extracting data from the distributed ledger

Why?

To facilitate process automation, technology platforms must be capable of transmitting and receiving data on the distributed ledger

Challenge

FIs and regulatory agencies use multiple technology solutions that may be incapable of interfacing with the ledger

Critical condition categories



Stakeholder
alignment



Technology



Regulatory



Governance

Automated Compliance

Conclusion

Summary

- **Process automation:** Audit examination activities are executed via automated audit software, dramatically reducing the time and resources required to perform the audit
- **Regulatory transparency:** Audit officials are authorized access to pertinent financial information to execute the audit examination
- **Cost savings:** DLT can provide major cost savings in process execution and reporting

Outlook

- Applications of DLT within automated compliance are currently being explored at the proof-of-concept level with a number of incumbents, focusing on:
 - Continuous auditing
 - AML/KYC verification
 - Automated tax filing
- Opportunities exist for FIs to reduce headcount and manual activities:
 - Eliminating planning/follow-up activities
 - Automating assessment/reporting activities

Key takeaways

- **Audit continuously:** The convergence of automated audit software and access to real-time financial information facilitate continuous auditing, which provides greater confidence in the financial health of the organization
- **Extract financial data:** Financial information stored on a distributed layer facilitates the automated execution of additional compliance activities (e.g. CCAR, tax filing, etc.)

Unanswered questions

- **Continuous auditing:** Will more frequent financial statement audits (potentially continuous) have adverse effects on investor decisions?

Section 5.7

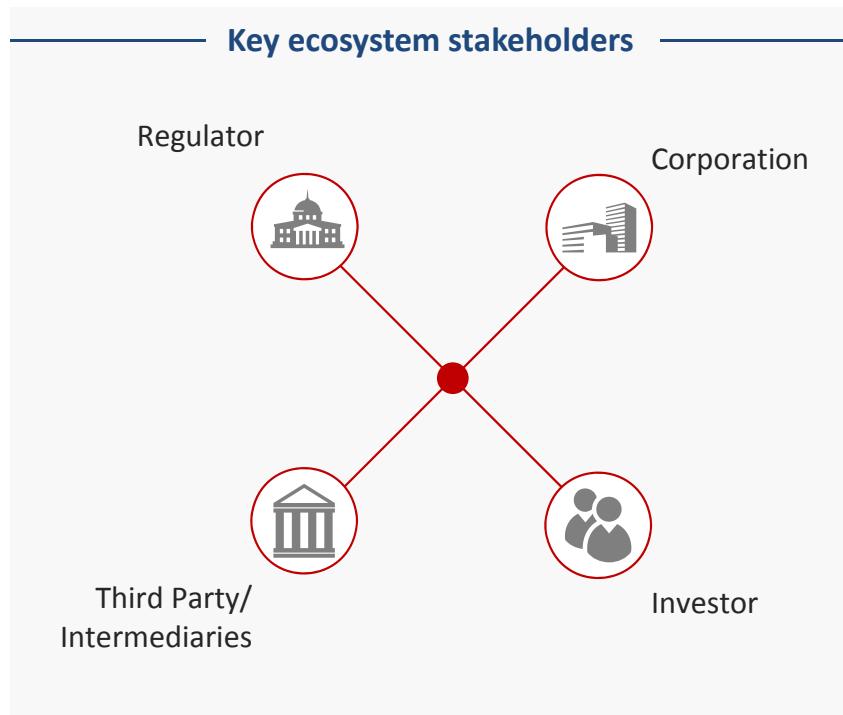
Investment Management: Proxy Voting

Proxy Voting

Introduction

Current-state background

Proxy voting facilitates remote investor voting on topics discussed during annual corporate shareholder meetings without requiring attendance. To ensure investors are able to make an informed decision, corporations are responsible for distributing proxy statements. Currently, a third party is responsible for delivering these statements to investors in partnership with intermediaries that track order execution. Investors conduct a manual analysis before casting their vote directly to the third party.



Overview

- **Retail investor participation is low compared to institutional investor participation:** On average, institutions voted 83% of their shares, while retail investors voted 28% of their shares¹
- **As a result, significant participation in elections is lacking each year:** From 1 July to 31 December 2015, approximately 24 billion shares remained “un-voted” as a result of this turnout¹
- **Efforts are being launched to improve retail participation:** As investor activism strengthens, leadership is recognizing the need to engage all shareholders throughout the voting process

DLT has the potential to transfer value irrefutably. This use case highlights the key opportunities to improve retail investor participation in proxy voting

1. ProxyPulse: First Edition 2016, ProxyPulse.

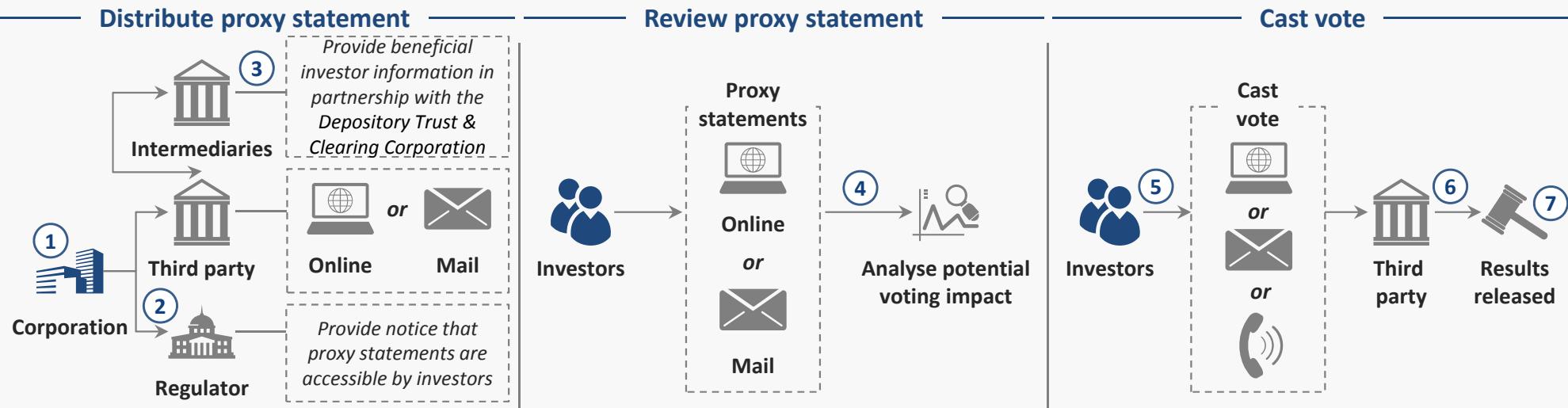
Proxy Voting

Key market participants

Market participant	Role	Description
	Corporation	<i>Core</i> The publicly traded entity that would like to improve proxy voting response rates by implementing a DLT solution
	Investor	<i>Core</i> An individual and/or institution that participates in the voting process by receiving proxy statements and casting a vote via phone, mail or online channels
	Third Party/Intermediaries	<i>Supporting</i> Entities that facilitate the proxy voting process, while ensuring that statements are distributed to all beneficial investors
	Regulator	<i>Supporting</i> A monitor who ensures proxy statements are distributed to all investors and the voting process is completed without any illegal or suspicious activity

Proxy Voting

Current-state process depiction

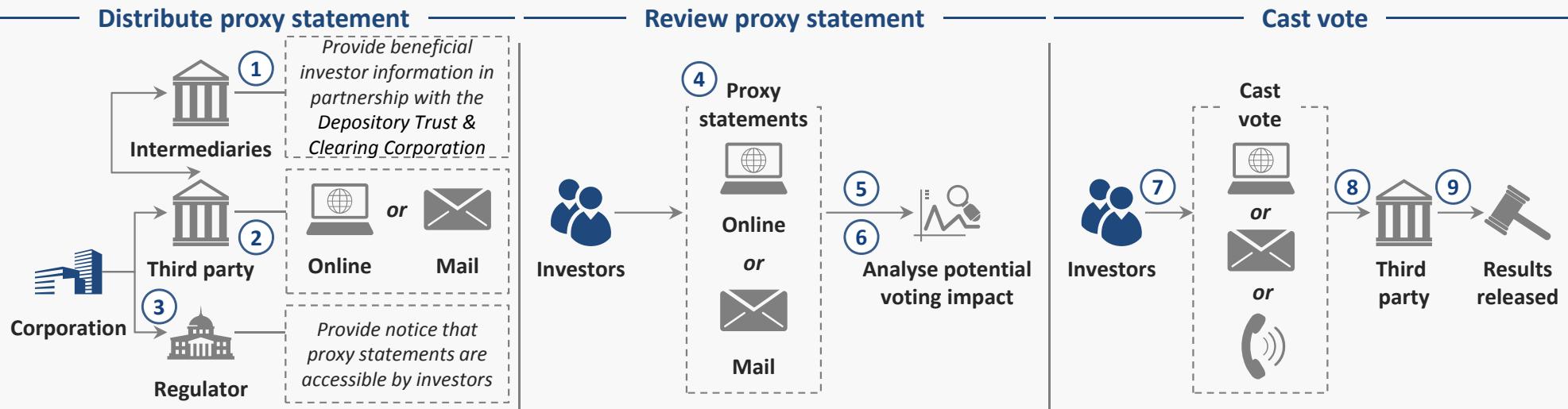


Current-state process description

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| <p>① The corporation develops a proxy statement internally in partnership with various teams, including general counsel and accounting</p> <p>② The corporation simultaneously provides a third-party organization with the documents to distribute to shareholders (via online and mail) and notifies the regulator that the proxy statement is available</p> <p>③ The third-party organization works with intermediaries to obtain beneficial investor information that may not be available</p> | <p>④ Investors analyse the proxy statement to determine the potential impact of the votes being solicited during a corporation's shareholder meeting</p> | <p>⑤ Investors cast their vote directly to the third-party organization either online or by mail or phone</p> <p>⑥ Results are not shared with investors or the corporation throughout the voting process</p> <p>⑦ During the shareholder meeting, votes cast by attendees are aggregated with those submitted by proxy and announced</p> |
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Proxy Voting

Current-state pain points

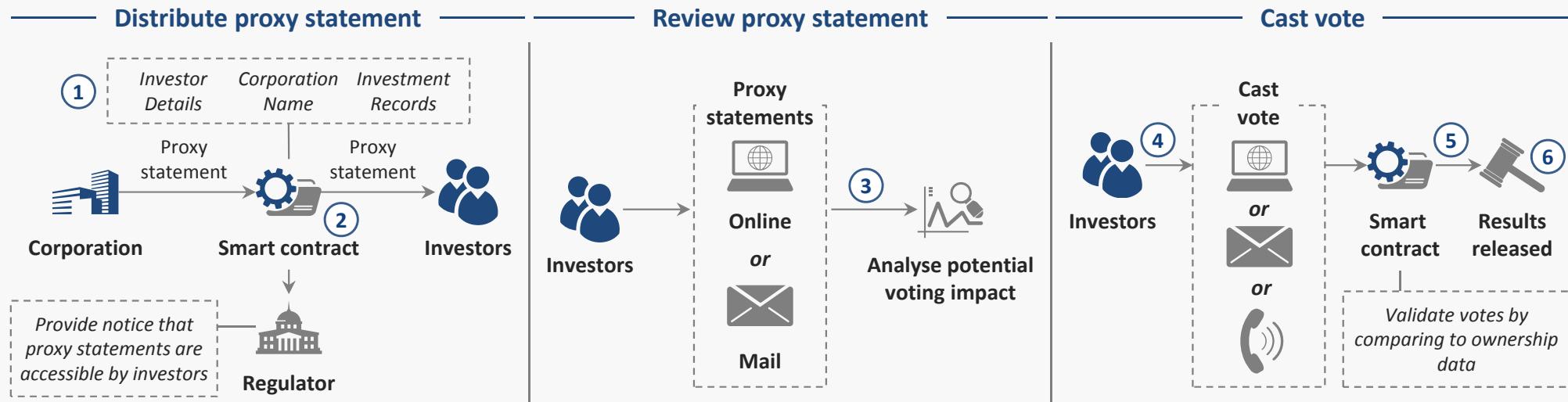


Current-state pain points

- ① **Ambiguity:** a single view into the total population of registered and beneficial investors does not exist without intermediaries
- ② **Costly distribution process:** since the online portal for statement distribution can only occur if an investor has “opted-in”, significant print and mail expenses are incurred
- ③ **Limited distribution:** depending on the market, proxy statements cannot be shared with institutional investors, restricting the number of potential votes that can be cast
- ④ **Misleading representation:** summaries within proxy statements can provide a misleading view into a corporation’s health
- ⑤ **Error prone:** in some cases, minor data errors are uncovered by institutional investors conducting detailed analyses
- ⑥ **Manual intensive process:** given the length and unstructured format of proxy statements, investors have to manually determine the information that will help facilitate an informed decision
- ⑦ **Minimal retail investor participation:** in the United States (and other countries worldwide), a majority of shares owned by retail investors go unvoted each year
- ⑧ **Lack of transparency:** the corporation and voters do not receive insight into the process until they are made available by the third party
- ⑨ **Voting discrepancies:** the number of shares held by investors may differ from the number of votes cast; depending on the regulation, these votes are either adjusted or not counted

Proxy Voting

Future-state process depiction

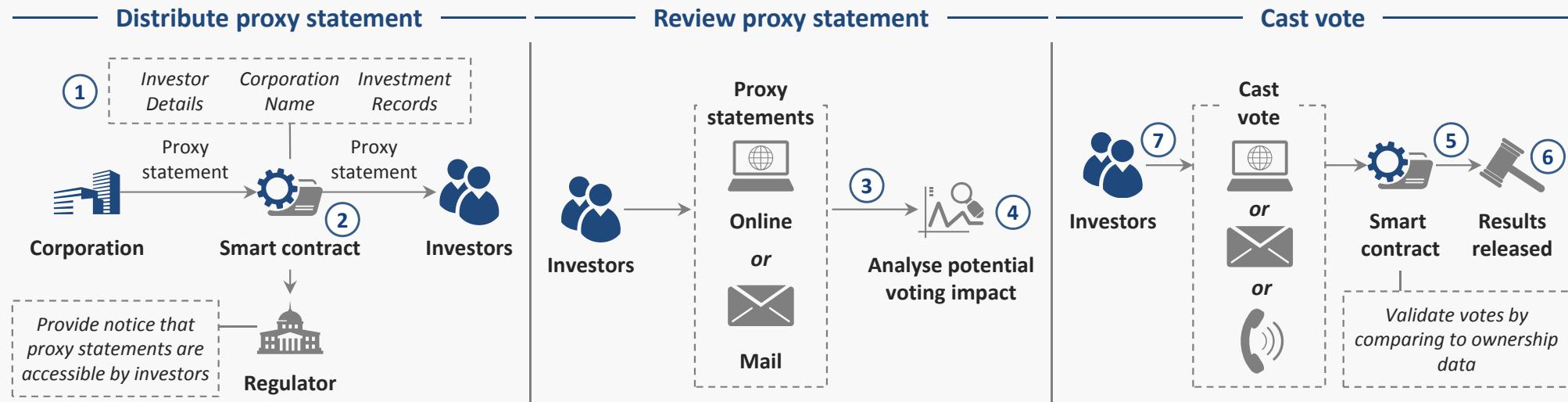


Future-state process description

- ① As orders are executed to invest in a corporation's equity, DLT stores investment records including the number of shares
- ② After a corporation has finalized its proxy statement, a smart contract ensures that it is sent to all investors (via an online portal or mail) and the regulator is notified that the documents are available
- ③ Investors analyse the proxy statement to determine the potential impact of the votes being solicited during a corporation's shareholder meeting through DLT's transfer of value capability
- ④ Investors cast their vote either online or by mail or phone directly into the DLT as a tokenized asset through back-end infrastructure integration
- ⑤ A smart contract ensures votes are valid by comparing the number of votes cast to ownership data
- ⑥ Results are shared with the corporation and/or investors in real time or during a shareholder meeting

Proxy Voting

Future-state benefits



Future-state benefits

- ① **Disintermediation:** since all investment records are stored on DLT, partnerships with a third-party organization and intermediaries are not required; a smart contract can notify regulators of proxy statement availability and ensure distribution to investors
- ② **Streamlined distribution process:** DLT can reduce the costs associated with printing and mailing proxy statements (difficult to compute savings since investor must “opt-in”)
- ③ **Improved accessibility and participation:** DLT can increase the mechanisms that can be used to access proxy statements (e.g. native mobile applications)
- ④ **Future automated analyses:** in the proposed future state, the current proxy statement format will continue to be distributed to investors, but future implementation can enable investors to conduct personalized, automated analyses
- ⑤ **Automated validation:** smart contracts can ensure that voting is aligned to share ownership at the time of the vote
- ⑥ **Increased transparency:** depending on requirements, voting data could be made available to the corporation and/or voters in real time
- ⑦ **Improved accessibility and participation:** DLT can increase mechanisms used to cast votes (e.g. native mobile applications)

Proxy Voting

Critical conditions

 Storing investment records on a distributed ledger	 Integrating legacy voting mechanisms into tokens	 Collaborating across actors to ensure success
    <p><i>Corporations and/or exchanges must store all investment records on a distributed ledger in order to identify beneficial investors without the need for intermediaries</i></p>	    <p><i>To ensure investors have a broad set of mechanisms to cast votes, systems will need to be developed to convert votes cast via mail or phone into tokens that can be stored on the distributed ledger</i></p>	    <p><i>Corporations may choose to partner among each other and/or exchanges to minimize parallel development, while providing investors with confidence that the voting system is not susceptible to corruption</i></p>
Why? <p>Third parties currently work directly with central securities depositors to ensure investors are engaged appropriately throughout the process</p>	Why? <p>Proxy voting must be accessible by investors across demographics to ensure no discriminatory consequences exist during the process</p>	Why? <p>If each corporation develops a voting solution, investors will not be able to standardize analysis across investments; conflict of interest concerns may exist</p>
Challenge <p>Ensuring that all investment records are stored on a distributed ledger with corresponding digital identities will require industry discussion regarding whether equity post-trade activities should also be facilitated through DLT</p>	Challenge <p>To ensure no manual processes exist while converting votes cast via mail into tokens, creative solutions will need to be developed to read voter responses autonomously and with complete accuracy</p>	Challenge <p>Process and liability models must be established to outline alternative procedures in the event the smart contract does not successfully validate and/or count votes</p>

Critical condition categories



Stakeholder alignment



Technology



Regulatory



Governance

Proxy Voting

Conclusion

Summary

- **Streamlined distribution:** Smart contract technology reduces manual processes associated with proxy statement distribution, reducing the time and manpower required to perform the process
- **Automated reconciliation:** Smart contract technology prevents investors from casting more votes than the shares they own and provides real-time updates for error correction, potentially increasing the total number of counted votes

Outlook

- Applications of DLT within proxy voting are currently being explored at the proof-of-concept level by incumbent exchanges:
 - NASDAQ
- Opportunities exist for FIs to improve participation and accessibility to:
 - Proxy statements
 - Vote casting mechanisms

Key takeaways

- **Ensure voting transparency:** The potential exists for DLT to provide a transparent view of voting data during annual shareholder meetings
- **Provide central authority disintermediation:** Investment records stored on the distributed ledger and proxy statements disseminated via smart contract technology eliminate the need for third-party intermediaries and associated fees

Unanswered questions

- **Cost vs benefits:** When voting operations are executed faster and at lower cost, will voting frequency increase? Additionally, will this change the relationship between companies and activist investors?

Section 5.8

Market Provisioning: Asset Rehypothecation

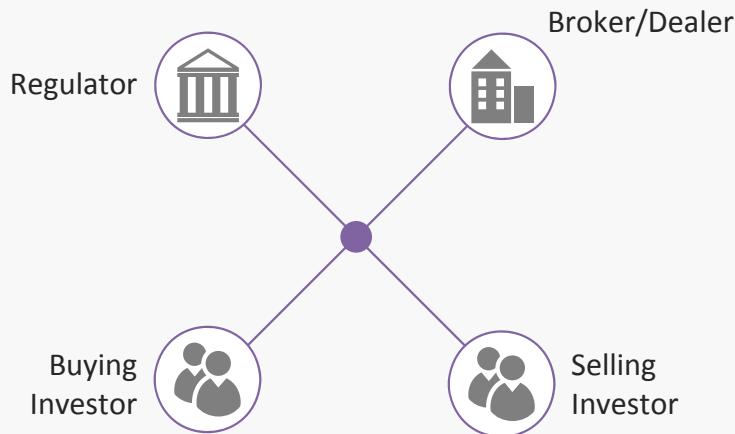
Asset Rehypothecation

Introduction

Current-state background

Asset rehypothecation is a common practice in which FIs securitize existing collateral to reduce the cost of pledging collateral in subsequent trades. As assets are rehypothecated, ownership structures and asset composition can become ambiguous due to the lack of clear transaction and ownership history, exacerbating counterparty risk and asset valuation uncertainty. Regulatory constraints are designed to limit the extent to which an asset can be rehypothecated, but without a mechanism for tracking transaction history, enforcement is not possible.

Key ecosystem stakeholders



Overview

- **The secondary trading market is large:** Secondary trading has become an extremely common practice, driving its volume in the US loan market to US\$ 628 billion in 2014¹
- **Secondary market trading is increasing:** Although the secondary trading market is already substantially large, it continues to grow; between 2013 and 2014 secondary trading volume increased by 21%¹

DLT has the potential to optimize the regulatory components of asset rehypothecation. This use case highlights the key opportunities to improve information transfer in the end-to-end broker/dealer process

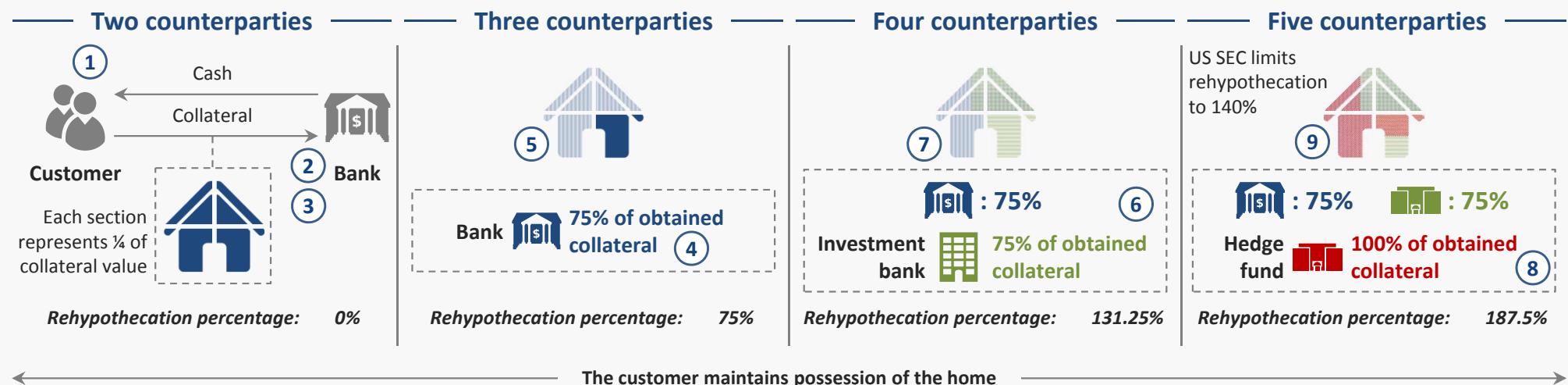
Asset Rehypothecation

Key market participants

Market participant	Role	Description
	Broker/Dealer	<i>Core</i> An entity that assists investors in buying or selling securities
	Selling Investor	<i>Core</i> An entity or individual attempting to sell the security
	Buying Investor	<i>Core</i> An entity or individual attempting to purchase the security
	Regulator	<i>Supporting</i> A monitor that verifies adherence to regulatory requirements

Asset Rehypothecation

Current-state process depiction

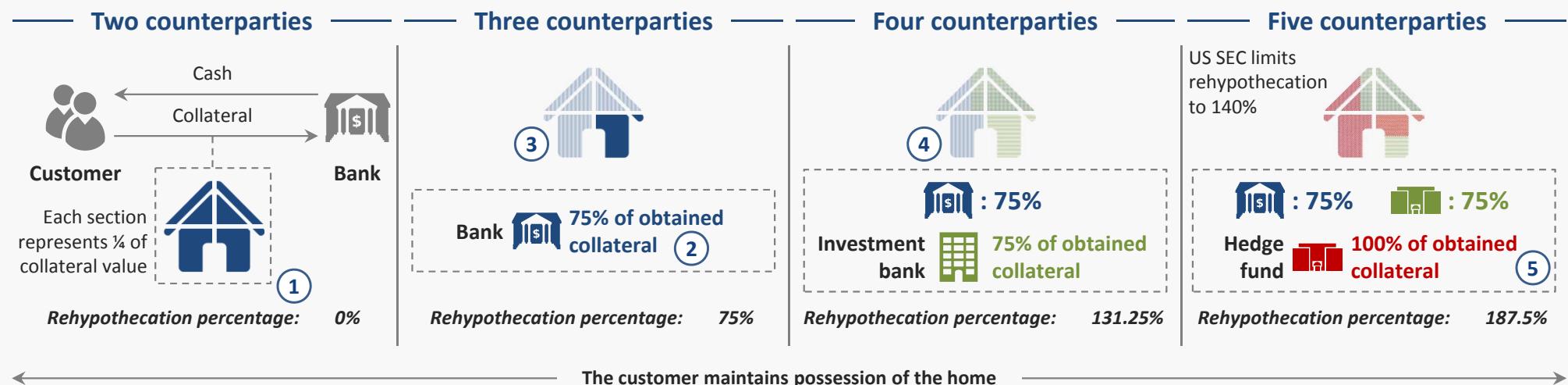


Current-state process description

- (1) A customer acquires a loan from a bank to purchase a home
- (2) In exchange, the customer provides the bank with the house as collateral and authorizes rehypothecation to improve the rate
- (3) During the mortgage repayment period, the bank may use the house as collateral in subsequent transactions
- (4) The bank securitizes a portion (75% within the example) of the mortgage debt along with other mortgages and sells it to an investment bank
- (5) The investment bank now has 75% of the house value in collateral that can be used in subsequent trades
- (6) The investment bank repackages the debt obtained (75% of 75% within the example) into a security (e.g. mortgage-backed), which is further divided into tranches and sold to a hedge fund based on its risk appetite
- (7) The hedge fund has now secured 56.25% of the original house value (that can be used in subsequent trades)
- (8) The hedge fund uses a broker/dealer to sell a derivative in over-the-counter markets, where the underlying asset is the rehypothecated percentage obtained (100% of 75% of 75% within the example)
- (9) The ownership and collateral value becomes ambiguous, creating a scenario where the total value pledged far exceeds origination

Asset Rehypothecation

Current-state pain points

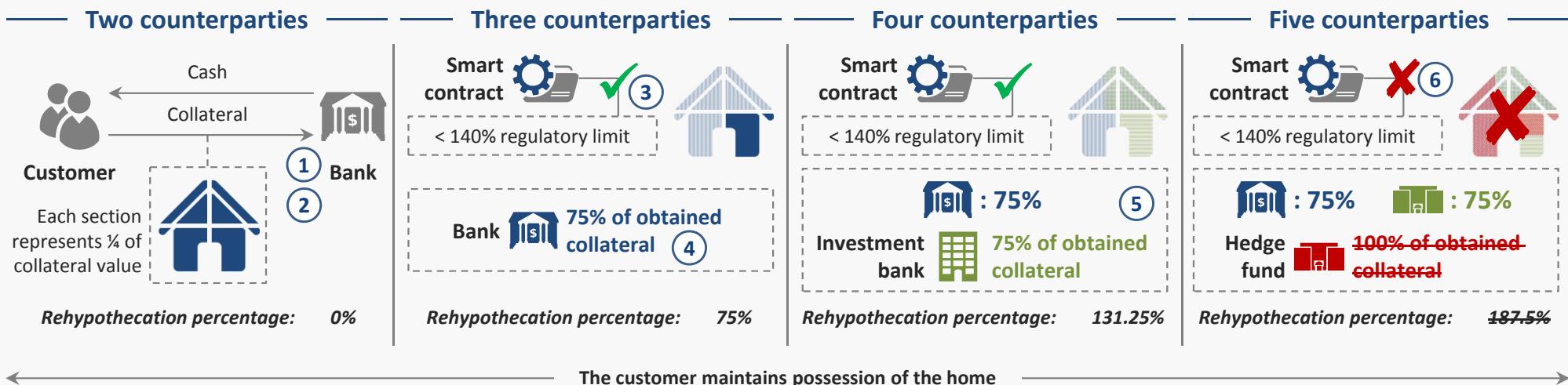


Current-state pain points

- ① **Lack of regulatory reporting:** within secondary trading markets, reporting requirements do not detail the transaction history of the asset (e.g. purchase price, purchase date and loan originator) or other counterparties with claims to the asset
- ② **Counterparty risk:** investors lack insight into additional counterparties with ownership claims to the asset
- ③ **Lack of transparency:** regulators do not have the ability to track securities as they are rehypothecated in the market, making enforcement of regulator limits nearly impossible
- ④ **Security value ambiguity:** since a detailed transaction history is not maintained, each trade leveraging a percentage of the collateral makes it more difficult to determine the true value of the asset
- ⑤ **Systematic failure:** if default occurs with any of the players, a part or even the entire transaction chain is affected, which may have unintended consequences on adjacent operations in the financial system

Asset Rehypothecation

Future-state process depiction

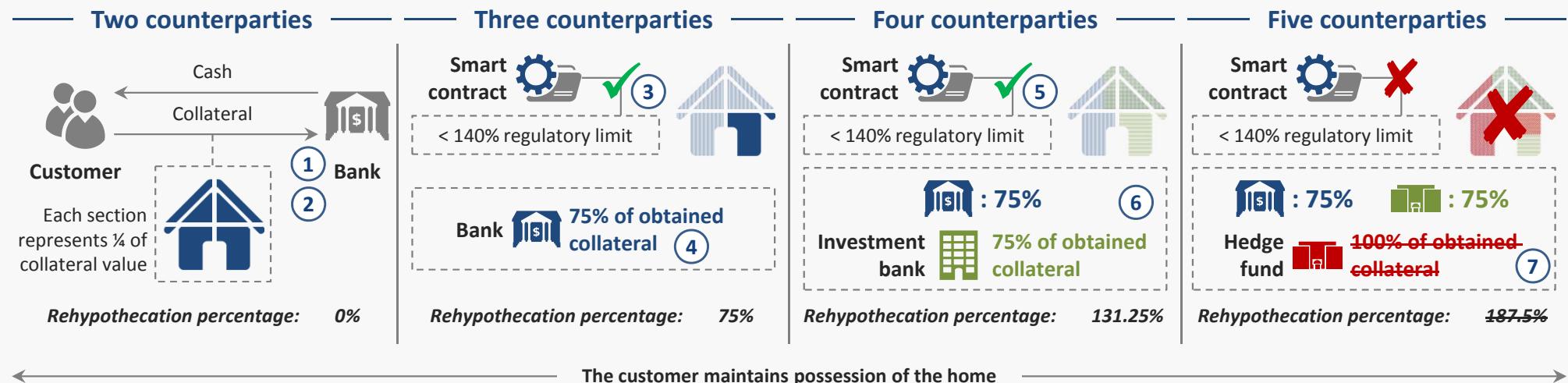


Future-state process description

- | | | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| <p>① Collateral obtained by the bank is tokenized to record the transaction history of the underlying asset on DLT</p> <p>② A smart contract encapsulates the tokenized collateral and facilitates record-keeping and the transfer of value</p> | <p>③ In subsequent trades, the smart contract broadcasts the transaction history details (e.g. collateral value and counterparty information) to participating entities</p> <p>④ Investors receive a transparent view of the asset history along with associated counterparty information (via the counterparty rating system) to enhance trade decisions</p> | <p>⑤ Regulators receive authorized real-time access to view the transaction details and monitor regulatory infractions</p> | <p>⑥ The smart contract restricts the additional hypothecation of the asset once predetermined regulatory rehypothecation limits are met</p> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|

Asset Rehypothecation

Future-state benefits



Future-state benefits

- ① **Transparency:** the collateral value, risk position and ownership history are transparent to investors, aiding in investment decision-making
- ② **Counterparty risk:** counterparties are rated based on transaction history, enabling investors to hedge their risk by selecting a counterparty that best fits their risk profile
- ③ **Automated processing:** DLT increases processing efficiency, reducing manual processes and associated costs
- ④ **Embedded regulation:** regulators maintain a clear view of the asset history (e.g. value, ownership and risk position), enabling the enforcement of regulatory constraints
- ⑤ **Automated enforcement:** a smart contract ensures assets are not rehypothecated over regulatory limits
- ⑥ **Financial stability:** the enforcement of regulatory controls and the transparent transaction history greatly reduce the risk of systematic failure in the event of default
- ⑦ **Disintermediation:** a smart contract facilitates the movement of funds and assets, eliminating the need for costly intermediaries

Asset Rehypothecation

Critical conditions

 <p>Tokenizing assets using a shared standard</p> 	 <p>Fostering engagement among the financial ecosystem</p> 	 <p>Architecting solution to manage over-the-counter (OTC) templates</p> 								
<p><i>FIs and technology providers must work together to tokenize collateral linked assets within the financial system</i></p> <p>Why?</p> <p>To track assets and calculate rehypothecation percentages via smart contract, collateral tokenization is required</p> <p>Challenge</p> <p>A tokenization standard among FIs will be difficult to establish, as will incorporating legacy assets into the distributed ledger</p>	<p><i>FIs throughout the financial system must agree to participate in a tokenized asset trading system and comply to the agreed upon rules and regulations</i></p> <p>Why?</p> <p>To accurately track assets as they move through the financial system, all FIs conducting trades must participate in the distributed-ledger-based solution</p> <p>Challenge</p> <p>DLT is still unproven; a framework for participation must be established and support from the financial services community must be gained</p>	<p><i>Technology providers must design a flexible distributed ledger solution that accounts for non-standard and future formats of OTC templates</i></p> <p>Why?</p> <p>While the ledger will most likely refer to documents stored externally, the solution must be flexible in case modifications to OTC templates are required in the future</p> <p>Challenge</p> <p>FIs and technology providers will need to collaborate to ensure flexibility and minimal downstream impacts to smart contracts</p>								
	<p align="center">Critical condition categories</p> <table border="1" style="width: 100%; text-align: center;"> <tr> <td></td> <td><i>Stakeholder alignment</i></td> <td></td> <td><i>Technology</i></td> <td></td> <td><i>Regulatory</i></td> <td></td> <td><i>Governance</i></td> </tr> </table>		<i>Stakeholder alignment</i>		<i>Technology</i>		<i>Regulatory</i>		<i>Governance</i>	
	<i>Stakeholder alignment</i>		<i>Technology</i>		<i>Regulatory</i>		<i>Governance</i>			

Asset Rehypothecation

Conclusion

Summary

- **Asset tokenization:** Collateralized assets are tokenized and stored on the distributed ledger where transaction history details are stored in perpetuity
- **Regulatory transparency:** Compliance officials maintain a real-time view of asset transaction history (value, ownership, risk position) to assist in the enforcement of regulatory control limits
- **Collaboration:** successful implementation of DLT would require a significant amount of standardization and normalization of static data between market participants

Outlook

- Applications of DLT within asset rehypothecation are currently being explored at the proof-of-concept level with a number of incumbents, focusing on:
 - Gold markets
 - Repurchase markets
 - Asset transfer
- Opportunities exist for counterparty risk reduction and enhanced regulatory enforcement tools:
 - Counterparty rating system
 - Asset transaction history storage
 - Regulatory transparency
 - Smart contract enforcement

Key takeaways

- **Reduce counterparty risk:** The transparent view of asset history (value, ownership and risk position), coupled with a counterparty rating system, assists investors in aligning their risk appetite with potential trade partners
- **Financial system stability:** smart contract technology terminates trades that violate regulatory controls, reducing the propensity of systemic failure within the financial system and improving collateral management

Unanswered questions

- **Asset history tokenization:** Identifying asset value, ownership and risk position is a major challenge in today's financial system, so how will this issue be resolved so that transaction histories can be stored on the ledger?
- Will regulators require OTC markets to comply with this implementation?

Section 5.9

Market Provisioning: Equity Post-Trade

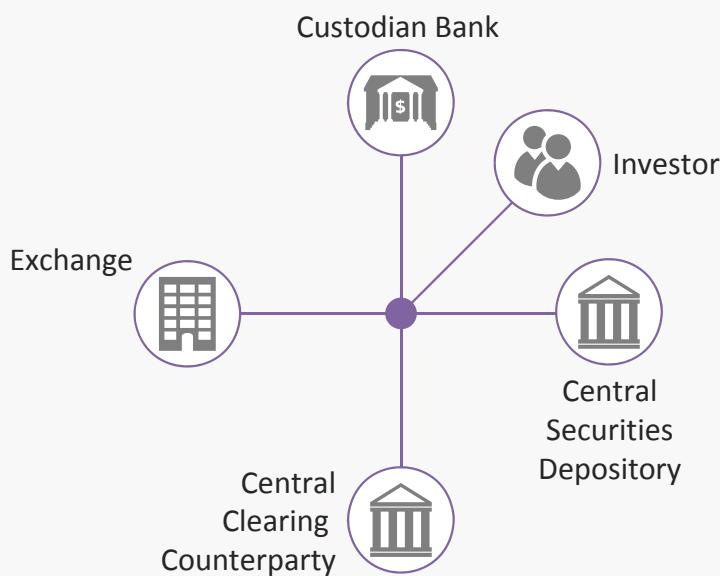
Equity Post-Trade

Introduction

Current-state background

Equity post-trade processes enable buyers and sellers to exchange details, approve transactions, change records of ownership and exchange securities/cash. These processes are initiated after an investor receives confirmation of an executed trade from the exchange. Central Securities Depositories (CSDs), working in partnership with custodians, match trades and validate investor credentials. After successful validation, Central Clearing Counterparties (CCPs) net all transactions and transfer cash/equity to all involved custodians. Custodians store assets in safekeeping accounts in partnership with CSDs, who are responsible for initiating asset servicing (e.g. income distribution and proxy voting) as required.

Key ecosystem stakeholders



Overview

- **Significant volume exists within the equity market:** The NYSE, for example, processes millions of trades and billions of shares each day¹
- **Processes are time-intensive:** Following confirmation of a trade, post-trade settlement and clearing processes take anywhere from one to three days to complete (depending on the market)
- **Intermediaries are costly:** Within the United States, banks, central agency bodies and intermediaries generate approximately US\$ 9 billion in various post-trade activities²

DLT has the potential to improve the efficiency of asset transfer. This use case highlights the key opportunities to streamline clearing and settlement processes in cash equities

1. NYSE: Transactions, Statistics and Data Library, 2016.

2. Charting a Path to a Post-Trade Utility, Broadridge, 2015.

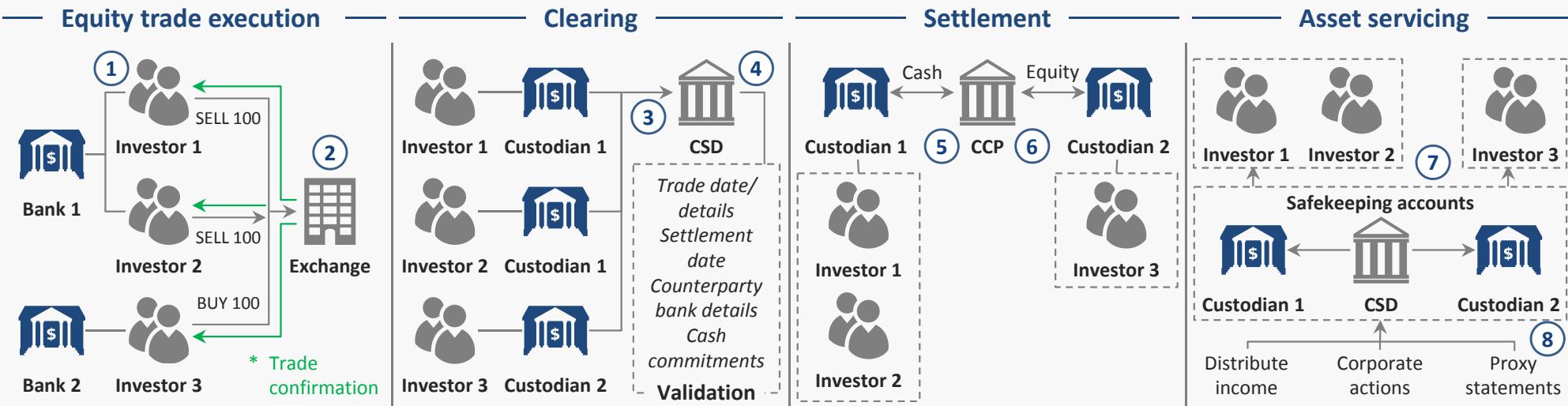
Equity Post-Trade

Key market participants

Market participant	Role	Description
	Custodian Bank	<i>Core</i> An entity that investors use to place trades with the exchange, and that manages post-trade processes and stores assets for servicing
	Investor	<i>Core</i> An individual or organization that instigates equity post-trade processes by initiating a trade
	Central Securities Depository	<i>Core</i> The entity that supports matching trade sections prior to settlement and facilitates asset servicing processes
	Central Clearing Counterparty	<i>Core</i> The central body that manages counterparty credit risk during settlement by acting as the buyer to the seller and vice versa to the buyer
	Exchange	<i>Supporting</i> The entity that matches equity “buy” and “sell” orders on behalf of investors, and confirms them prior to successful post-trade processes

Equity Post-Trade

Current-state process depiction

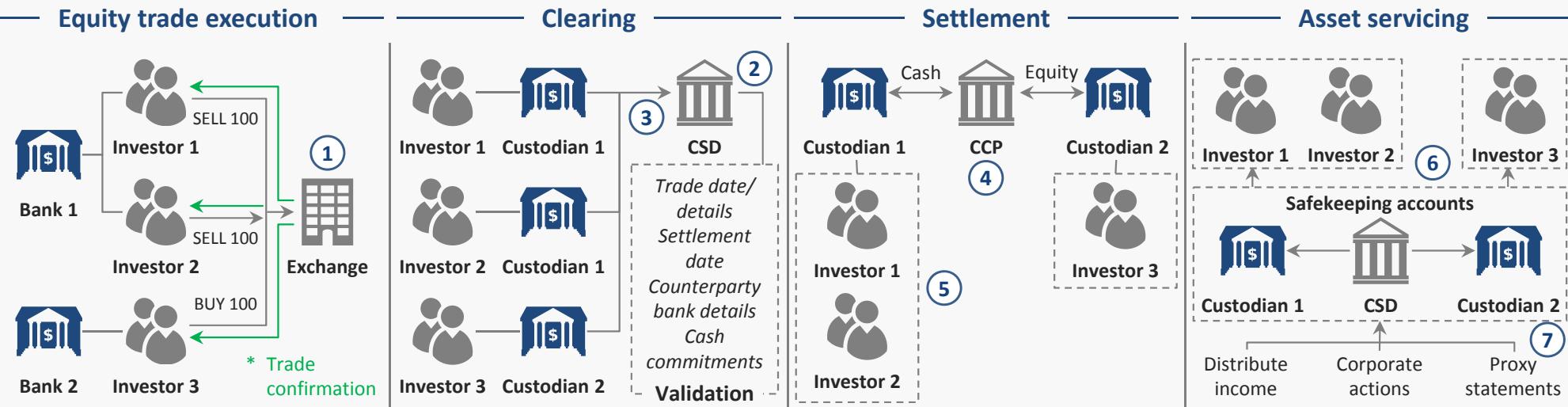


Current-state process description

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|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>① Investors use interfaces provided by the bank of their choosing to place equity trade orders through the exchange</p> <p>② The exchange is responsible for matching the equity trade orders placed by investors across banks in order to confirm trades in real time and initiate post-trade processes</p> | <p>③ Utilizing securities settlement systems, custodian banks send their section of the trade details to the CSD on behalf of the investor</p> <p>④ The CSD is responsible for validating the trade details provided by all custodian banks (e.g. cash commitments and settlement date) and matching all sections of the trade</p> | <p>⑤ After matching all sections of the trade, CCPs determine the “net transaction” across all trades and custodian banks to minimize the number of required transactions</p> <p>⑥ The simultaneous transfer of equity and cash is managed by the CCP between custodian banks on behalf of all involved investors</p> | <p>⑦ After the required assets are transferred, equity and cash are stored in safekeeping accounts managed in partnership by custodian banks and the CSD</p> <p>⑧ As various servicing processes occur, third parties work directly with the CSD to ensure custodian banks and, ultimately, investors are engaged</p> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Equity Post-Trade

Current-state pain points

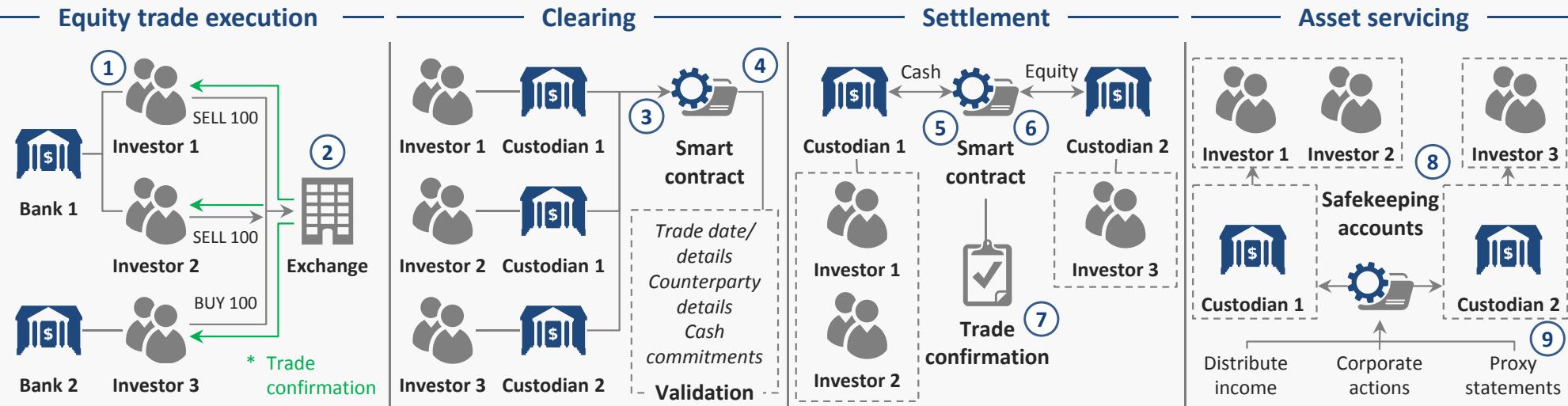


Current-state pain points

- ① **Duration between trade execution and settlement:** despite investors being able to see traded assets in their account shortly after receiving confirmation, settlement occurs t+3, which limits the actions that investors can take in the interim
- ② **Inconsistent data:** as a result of frequent changes to counterparty bank details, CSDs must manually validate a number of transactions prior to settlement
- ③ **Counterparty risk:** custodians must account for the possibility that a counterparty is unable to settle when due
- ④ **Operational risk:** CCPs must account for the possibility that technology and/or manual errors result in inaccurate settlement
- ⑤ **Settlement ambiguity:** investors are inconsistently notified when their trades settle depending on custodian procedures
- ⑥ **Safekeeping account complexity:** since securities settlement systems connect safekeeping accounts across custodian banks at the CSD, custodians have limited flexibility to store assets
- ⑦ **Costly intermediaries:** corporations must involve third parties and intermediaries to initiate asset servicing

Equity Post-Trade

Future-state process depiction

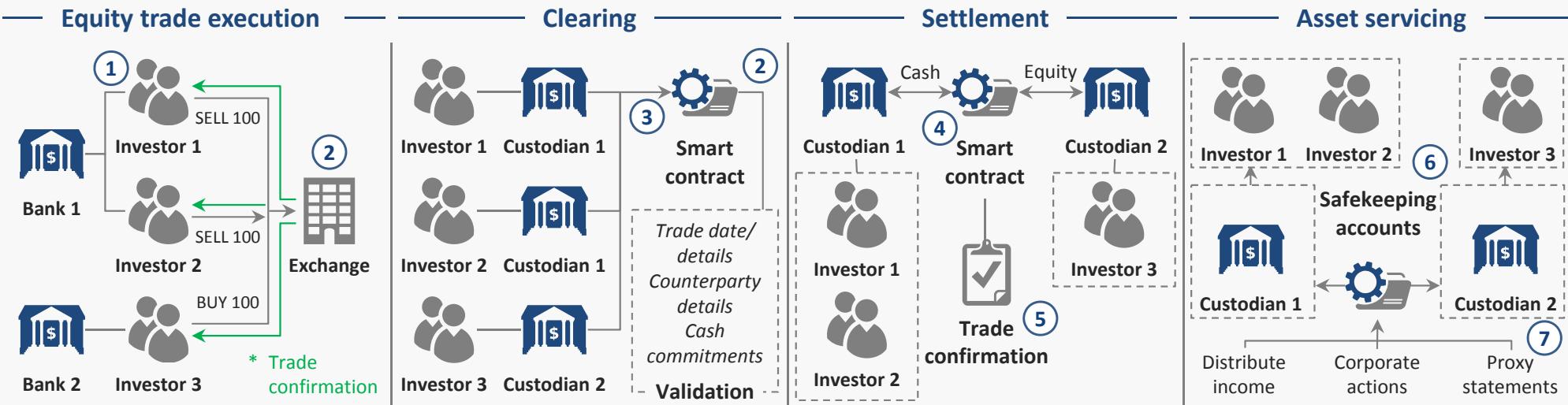


Future-state process description

- | | | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>① Similar to the current state, investors use the interfaces provided by the bank of their choosing to place equity trade orders through the exchange</p> <p>② The exchange is responsible for matching the equity trade orders placed by investors across banks in order to confirm trades in real time and initiate post-trade processes</p> | <p>③ Custodian banks send their section of the trade details to the DLT on behalf of the investor</p> <p>④ A smart contract validates the trade details provided by all custodian banks (e.g. cash commitments and counterparty details) and matches all sections of the trade in real time</p> | <p>⑤ After matching all sections of the trade, a smart contract determines the “net transaction” to minimize the number of required transactions</p> <p>⑥ Smart contracts ensure the simultaneous transfer of equity and cash between custodian banks on behalf of all investors</p> <p>⑦ Confirmation is stored in the DLT to facilitate future processes</p> | <p>⑧ After required assets are transferred, equity and cash are stored in safekeeping accounts managed solely by custodian banks</p> <p>⑨ As various servicing processes occur, smart contracts notify custodian banks and investors in real time</p> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Equity Post-Trade

Future-state benefits



Future-state benefits

- | | | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>① Reduced settlement time: through downstream, post-trade automation and efficiency enhancements, settlement could potentially be reduced to real-time settlement, trade date plus one day or trade date plus two days</p> | <p>② Standardized data requirements: standardizing data fields for trade matching improves the efficiency of existing clearing processes</p> | <p>④ Reduced operational risk: through the use of a smart contract to transfer equity and cash, the likelihood of technology and/or manual errors is decreased</p> | <p>⑥ Reduced account complexity: custodians will be able to store assets with greater flexibility since integration with securities settlement systems will no longer be required</p> |
| <p>③ Reduced counterparty risk: through automated validation, custodians benefit from the reduced likelihood that the counterparty is unable to settle</p> | <p>⑤ Real-time confirmation: by storing trade confirmations on DLT, investors can receive notification of settlement without relying on a custodian</p> | <p>⑦ Servicing disintermediation: servicing activities initiated via a smart contract eliminate the need for third-party intermediaries</p> | |

Equity Post-Trade

Critical conditions



Incorporating “net transaction” benefits within settlement



Custodian banks and regulators will need to work together to determine if and how to incorporate the benefits achieved by netting in order to minimize transactions and money transferred across custodian banks

Why?

CCPs aggregate executed trades to optimize the movement of assets; the inability to perform similar activities may add inefficiencies to settlement

Challenge

Since smart contracts execute commands in real time, batching trades with some predefined frequency may require customization



Achieving multistakeholder alignment across participants



Regulators, custodian banks and exchanges must work in partnership to develop a solution that can handle billions of dollars in daily transaction volume, while providing the economies of scale to benefit players of all sizes

Why?

Given the complexity of post-trade processes, all entities involved must be willing to directly participate with one another to ensure market stability

Challenge

If CCPs will be disintermediated as a result of a successful implementation of DLT, governance and collaboration will be required to ensure a liability model exists in case technology failures occur



Standardizing reference data utilized to match trades



Custodian banks will need to work together to develop a standardized set of data fields that can match trades while providing investor anonymity and confidence in automation

Why?

The inability to standardize this data will cause manual post-trade validation processes to still be required, inhibiting the disintermediation of CCPs and CSDs

Challenge

Since traditional data fields used to match can change frequently (e.g. bank details), significant collaboration is required to standardize attributes that are not prone to constant updates

Critical condition categories



Stakeholder
alignment



Technology



Regulatory



Governance

Equity Post-Trade Conclusion

Summary

- **Process automation:** Clearing, settlement and servicing activities are executed via automation, dramatically reducing the time and resources required to perform these processes
- **Reduced settlement time:** Smart contract technology facilitates customizable settlement timelines (real-time settlement, trade date plus one day, trade date plus two days), reducing the time it takes to exchange assets
- **Cost savings:** DLT can provide a global cost reduction opportunity associated with process execution and fee reduction

Outlook

- Applications of DLT within equity post-trade are currently being explored at the proof-of-concept level with a number of incumbents and FinTechs, focusing on:
 - Private equity trading
 - Clearing and settlement solutions
- Opportunities exist for FIs to reduce costs and improve operational efficiencies:
 - Eliminating fees through disintermediation
 - Executing clearing and settlement via smart contract

Key takeaways

- **Reduce operational risk:** Simultaneous settlement of cash and equity executed via smart contract reduces the likelihood of manual errors and the resources required to execute the process
- **Provide central authority disintermediation:** Settlement and servicing activities are executed via smart contract, eliminating costly fees

Unanswered questions

- **Real-time settlement:** Will the savings associated with transitioning to faster settlement meet or exceed the value of “float” revenues earned today by holding assets during the settlement period?
- What are the settlement implications of operating a “slow lane” and “fast lane” (i.e. real-time settlement and trade date plus three days)?

Section 6

Contact Details

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