White Paper

Fintech in Capital Markets 2018: Boosting Productivity Through Technology Innovation

By Philippe Morel, Charles Teschner, Pierre Paoli, Franck Vialaron, Valeria Bertali, Kimon Mikroulis, and Boris Lavrov

March 2018

Introduction

After three years of buoyant activity, 2017 marked a net slowdown in capital markets fintech equity investment.[1] Investment was less than half that of the previous two years, and the lowest since 2012, with venture capital firms in particular reducing their funding.

Investment banks, by contrast, invested more in 2017, accounting for 16% of the total, their highest proportion on record. However, the increase came from Tier 2 & 3 players. Tier 1 investment fell as large banks focused more on integrating the previous year's investments. Investment-bank-backed fintechs received around half of all 2017 equity funding.

Bank investment strategies also diverged. Tier 2 & 3 players invested mainly in industry-wide fintech initiatives, whereas Tier 1 banks, which have been active buyers of fintech equity for longer, took a more balanced approach, often seeking competitive advantage through standalone investments.

Change-the-bank (CTB) spend among investment banks has been flat in recent years (a four-year CAGR of around 1%), suggesting that, despite rising fintech investment, they have underspent on innovation, probably owing to legacy IT constraints. In addition, only a small proportion of CTB spend is true innovation, with as much as 80% focused on legacy system upgrades.

As digitalization takes hold in capital markets, weak investment is a hindrance that may undermine growth and open the door to competitors. Financial institutions that invest in technology, on the other hand, operate more efficiently and are more productive, particularly in less-commoditized business lines such as fixed income, currencies and commodities (FICC).

Banks and underinvested capital markets incumbents can remedy the situation, but only by changing direction. Technology must be put at the heart of strategic decision making

---

[1] Capital markets includes investment banks, securities services, exchanges, market infrastructure providers, and the asset management ecosystem.

and recognized as the key enabler of innovation and new revenue streams. CEOs are required to lead the transformation, adopt tech-inspired paradigms such as Agile, and move from a product/relationship archetype to a service-focused model with automation at its core.

Key Takeaways

- 2017 marked a slowdown in capital markets fintech equity investment, but investment banks increased their participation.

- Average equity funding increased to $8 million per round, from $6 million in 2016, as capital markets fintech investment moved past the seed stage toward series A & B rounds.

- Investment in Execution fintechs was dominated by non-banks, while two-thirds of investment bank financing focused on Pre-trade.

- Tier 2 and Tier 3 players invested mainly in industry-wide fintechs, aiming to improve their cost position.

- Tier 1 banks took a more balanced approach and often sought out competitive advantage through standalone investments.

- The hot technologies in capital markets were artificial intelligence and machine learning for Pre-trade and Execution, and robotic process automation and distributed ledger technology for Post-trade.

- Investment banks have underspent on innovation. CTB spend has been flat, and their CTB-to-revenue ratio has been lower than that of non-bank liquidity providers.

- Investment banks invested in fintechs to influence strategic direction and counter legacy constraints of CTB spend.

- Technology is a particular productivity enhancer for non-commoditized asset classes that are relatively less automated.

- IT investment in FICC can produce productivity gains three times higher than the same investment in Equities.

- Client mix, product offering and technology talent will influence digital priorities, sourcing strategy, and the fintech engagement model.

- Investment banks need to adopt tech-inspired paradigms such as Agile to accelerate digital transformation.

Capital Market Fintech Investment Has Fallen

Equity funding of capital markets fintech fell by more than 50% last year from the highs of the previous two years. (See Exhibit 1). Investment in 2017 was $570 million,

compared with $1,198 million and $1,179 million in 2016 and 2015 respectively. There were mitigating circumstances — the 2016 total included a $400 million transaction and in 2015 there were three transactions above $100 million — but the trend was downward nonetheless. The number of investment rounds also fell sharply, with just 70 deals over the course of 2017, compared with 185 the previous year.

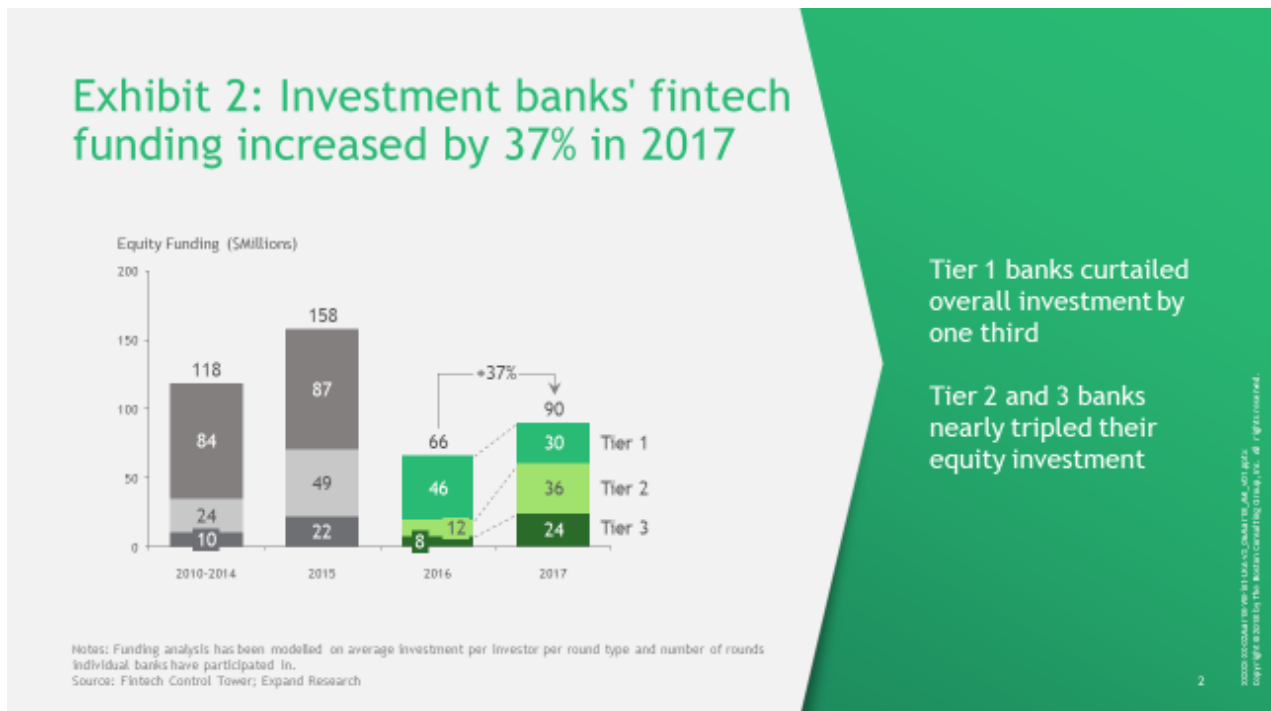Exhibit 1: Equity funding in capital markets fintech was down by 52% in 2017
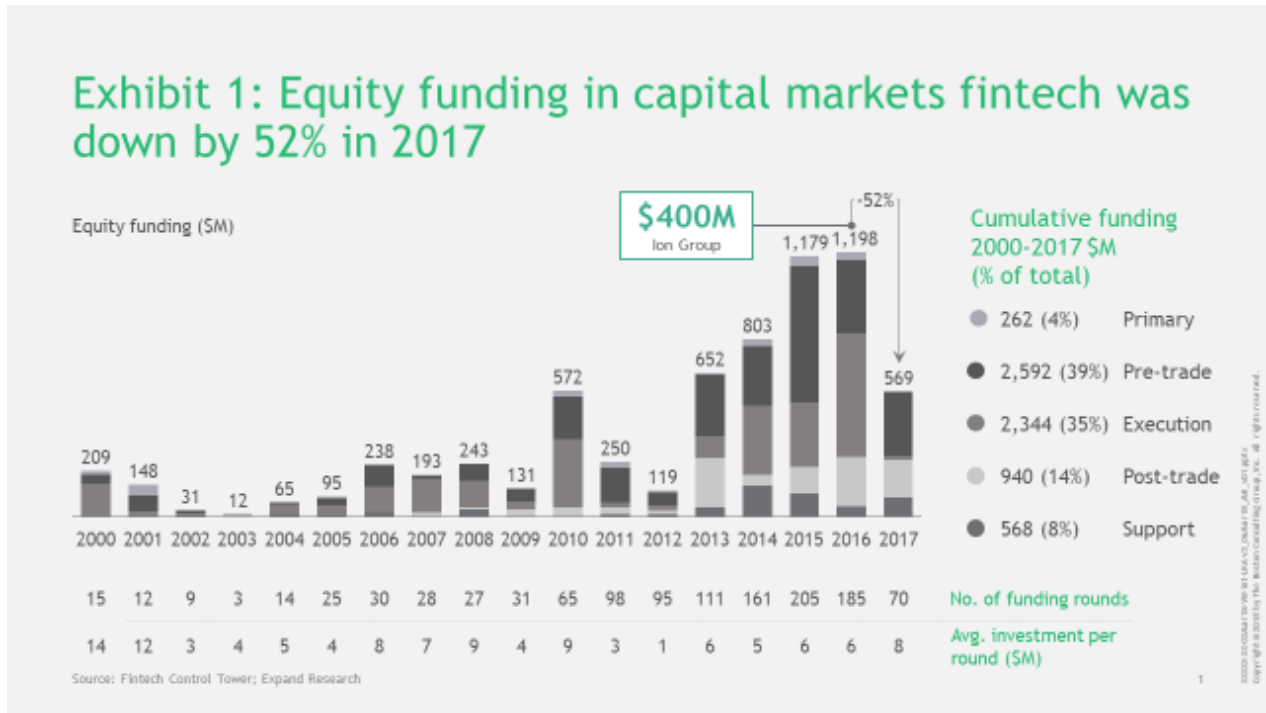
Capital market fintechs can be broadly categorized into five value-chain segments: Primary markets, Pre-trade, Execution, Post-trade, and Support, which includes businesses such as cloud services. Bank funding has tended to focus on Pre- and Post-trade fintechs, while Execution fintechs have been mainly funded by venture capital firms and exchange players.

There was continued investment in Pre-trade fintechs in 2017 — e.g. Symphony ($63 million) and Kensho ($50 million) — and further support for Post-trade fintechs, including blockchain-focused R3 CEV ($107 million) and Digital Asset Holdings ($40 million). In the longer run, Pre-trade and Execution are the most-invested segments across the value chain, accounting for 39% and 35% respectively since 2000.

The average amount invested per deal rose to $8 million in 2017, from $6 million in 2016,

and was focused on Series A & B rounds. Higher per-deal commitments suggest investments are becoming more targeted.
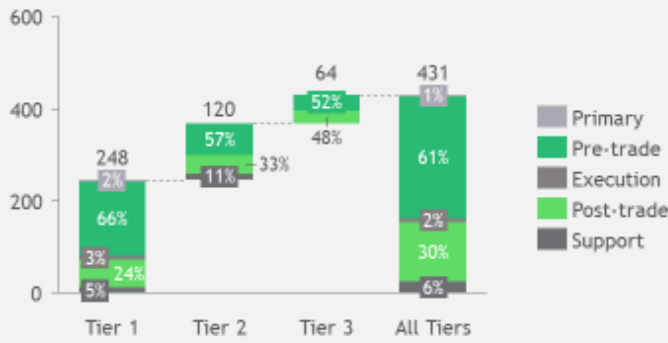
Among investment banks, fintech funding increased by 37% in 2017, with smaller banks nearly tripling their investment. However, Tier 1 institutions invested just $30 million, less than their Tier 2 counterparts which invested $36 million. Tier 1 banks invested $46 million in fintechs in 2016 and $87 million in 2015. (See Exhibit 2).

Exhibit 2: Investment banks' fintech funding increased by 37% in 2017

Equity Funding ($Millions)

Tier 1 banks curtailed overall investment by one third

Tier 2 and 3 banks nearly tripled their equity investment

Notes: Funding analysis has been modelled on average investment per investor per round type and number of rounds individual banks have participated in.
Source: Fintech Control Tower; Expand Research

Looking at the spread of investment-bank investments over time, Tier 1 banks have been significantly active since 2010, while Tier 2 and 3 banks started later in the boom cycle in 2014, which is one reason for their much lower cumulative investment. (See Exhibit 3). Since 2010, Tier 1 banks have invested $248 million while Tier 2s have invested $120 million and Tier 3s have invested $64 million. Tier 1 investments have been applied to activities across the value chain, whereas Tier 2 and 3 players have mostly focused on Pre- and Post-trade.

Exhibit 3: Investment banks mostly invested in pre-trade and post-trade

When choosing where to invest, Tier 2 & 3 players have tended to be followers. More than half of their participation has been focused on industry-led initiatives such as distributed ledger consortiums and capital markets utilities. Tier 1 players have taken more of a balanced approach, also seeking competitive advantage through standalone investments. (See Exhibit 4).

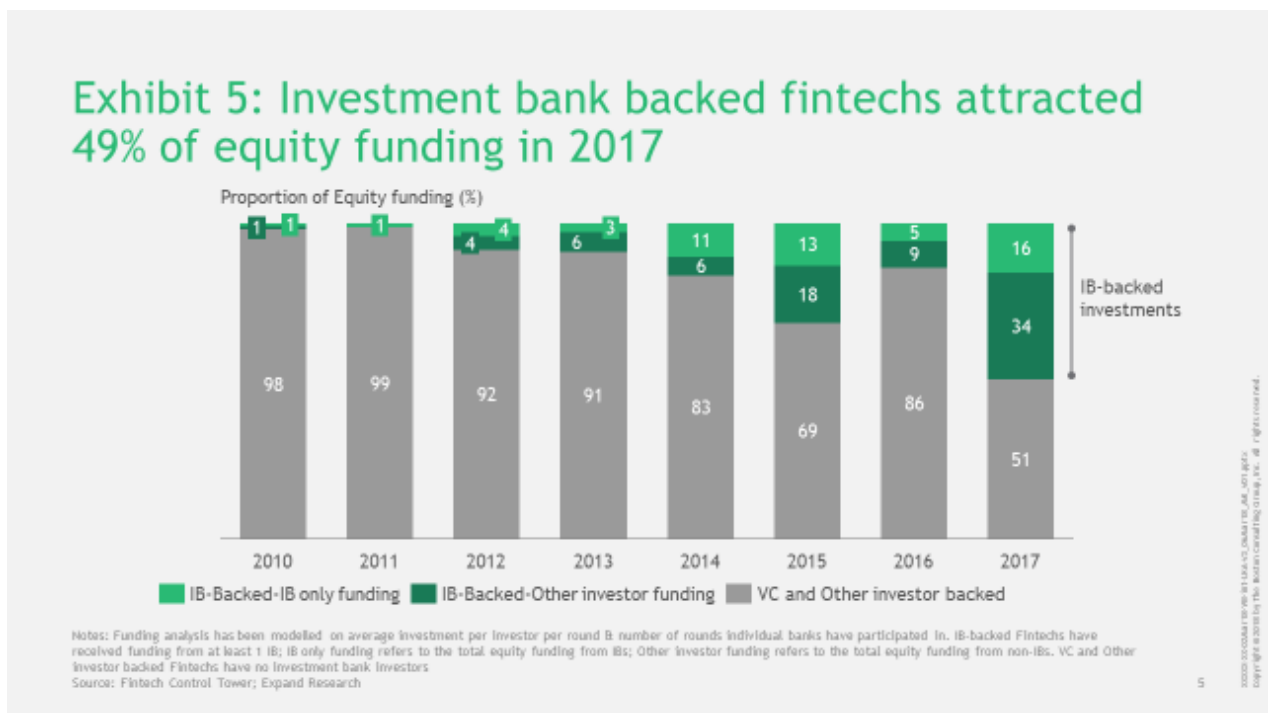Exhibit 4: Tier 2/3 IBs are more focused on industry-wide initiatives
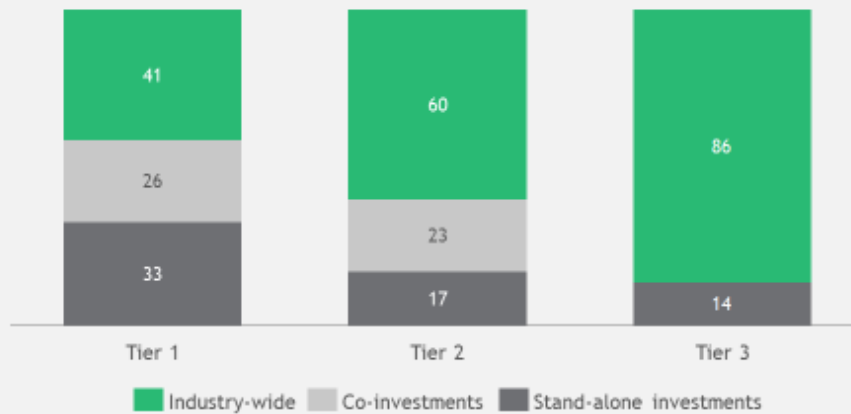
Investment-bank-backed fintechs received around half of all 2017 equity funding, and investment banks accounted for 16 percent of funding commitments over the year. In both instances the totals were the highest on record. (See Exhibit 5). Venture capital continued to account for the highest proportion of funding, but its share was lower than in previous years.

Exhibit 5: Investment bank backed fintechs attracted 49% of equity funding in 2017

Proportion of Equity funding (%)

Year	IB-Backed-IB only funding	IB-Backed-Other investor funding	VC and Other investor backed
2010	1	1	98
2011	1		99
2012	4	4	92
2013	6	3	91
2014	11	6	83
2015	13	18	69
2016	5	9	86
2017	16	34	51

IB-backed investments

Notes: Funding analysis has been modelled on average investment per investor per round & number of rounds individual banks have participated in. IB-backed Fintechs have received funding from at least 1 IB; IB only funding refers to the total equity funding from IBs; Other investor funding refers to the total equity funding from non-IBs. VC and Other investor backed Fintechs have no investment bank investors
Source: Fintech Control Tower; Expand Research

Since 2010, equity funding across all segments has mainly occurred at early stages (Seed and Series A). Primary and Post-trade are particularly young segments in those terms, while Pre-trade and Execution are more mature. Support is the most advanced, with 60 percent of funding at Series B or later. Many of the fintechs in "Support" also service other areas of banking and have a larger addressable market. (See Exhibit 6).

Exhibit 6: Most fintechs have received early stage funding
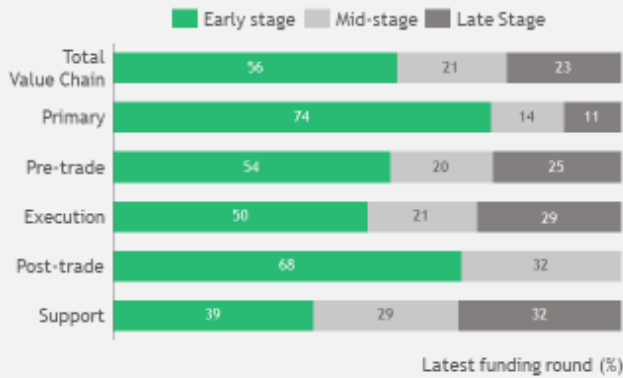
In general, exits from capital markets fintech start-ups in recent years have been through acquisitions rather than IPOs, and fintechs have been more likely to succeed when they were industry-backed or partnered with large "anchor clients" rather than trying to effect change from the outside.

Fintechs Are Adding Value Through Artificial Intelligence and Smart Analytics

Fintechs are increasingly leveraging artificial intelligence and advanced analytics to add value to capital-markets activities. Machine learning, robotic process automation, and new-breed innovations such as distributed ledger technology, are fairly widely applied, with some 20% of fintechs using them to add value and increase efficiency. (See Exhibit 7). In the fast-growing Regtech ecosystem, more than 60% of companies employ advanced analytics solutions for activities including verification (KYC) and monitoring (trade surveillance). Regtech has grown by roughly 300% since 2007 and attracted $2.2 billion in funding as banks have responded to demanding regulatory obligations and hefty penalties for non-compliance.

In capital markets, machine learning/artificial intelligence are mostly used to enhance Pre-trade and Execution activities such as producing trading signals or servicing client

flow. Robotic process automation is focused on the Post-trade and Support segments, where there are a high number of repetitive tasks, such as payments processing and data reconciliations.

Exhibit 7: Machine Learning/AI is key driver for Pre-trade & Execution; DLT and RPA dominate post-trade
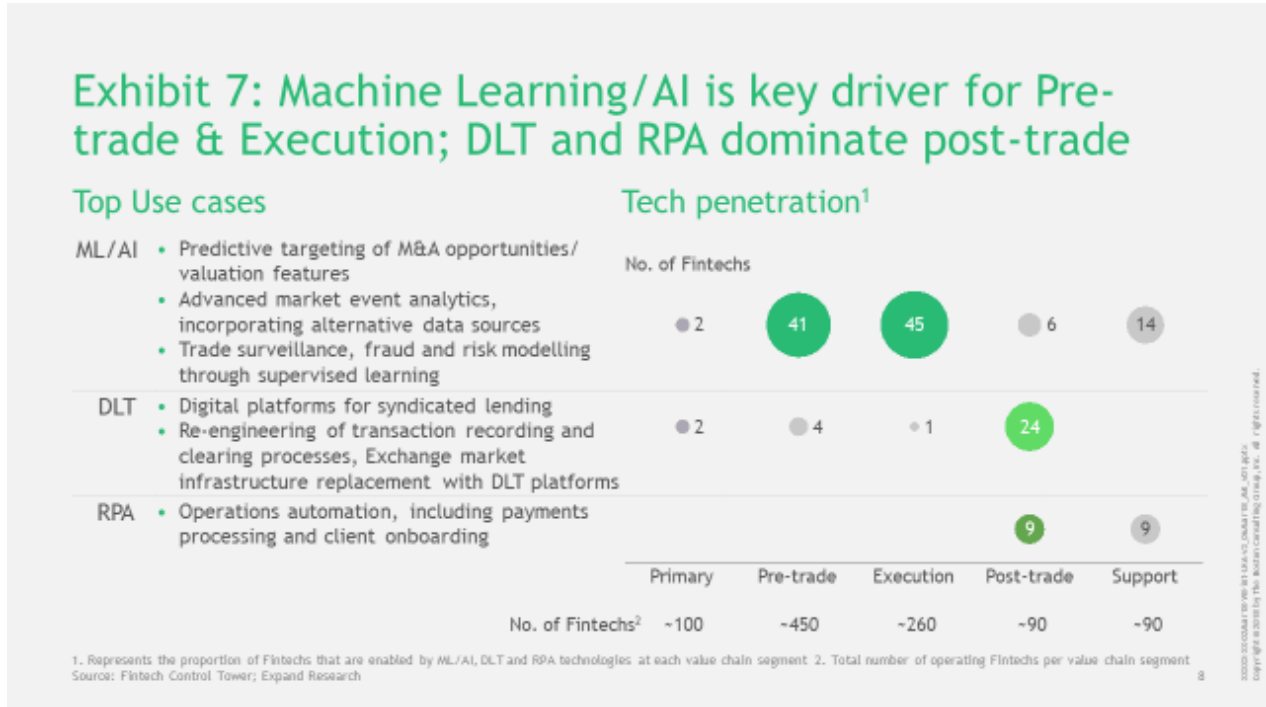
Distributed ledger technology use cases are primarily found in Post-trade (collateral management, securities lending, cash equity settlement and clearing), and some are emerging in Primary (syndicated lending) and Pre-trade. Decentralized ledgers continue to be a nascent solution, but successful initiatives are becoming more common. Open source projects are looking to create enterprise-grade distributed ledger platforms, on which banks and fintech service providers can build the next generation of financial software.

Where They Are Put to Work, Fintechs Are Having an Impact

Fintechs are having an impact across the capital markets value chain. In Primary markets, fintech platforms for facilitating securities issuance have targeted instruments that are inefficiently distributed. One example is a solution that connects dealers, issuers, and investors in private placements, such as in Europe's market for medium-term notes. Similar initiatives exist for investment-grade bonds and equity capital markets. The aim is to make intermediation work better, while providing transparency and electronic audit

trails in line with regulation (e.g., fair allocations). Another focus area is the automation of manual tasks in primary market intelligence, with software, for example, able to intelligently provide matchmaking predictions to help bankers identify prospects with the highest probability of conversion.

In Pre-trade, MiFID II requirements around research unbundling have led to both more clients paying for research and to a greater emphasis among research providers on value-added elements such as aggregation and atomization. Research atomization solutions include index paragraphs to specific instruments and topics to help separate signal from noise. Banks are looking at how research is delivered, distributed, and consumed, and are looking to reduce costs by, for example, using natural language generation software for basic knowledge tasks. The introduction in Europe of the European Single Electronic Format (ESEF), which requires issuers listed on regulated markets to standardize their financial reports, promises to create further possibilities for fintech solutions.

In Execution, the need to prove best execution under MiFID II has increased demand among non-dealers for independent analytics, especially in asset classes with large numbers of trading venues and more bilateral trading, and particularly in FX. Mosaic Smart Data has been able to demonstrate the productivity enhancements gained by applying predictive analytics to client trade data within sales and trading departments. The expansion of all-to-all trading is set to continue across asset classes and, among initiatives, the fintech Algomi is connecting dealers with custodians to provide direct trading for corporate bonds.

In Post-trade, distributed ledger infrastructure will continue to mature and find use cases. The Australian Securities Exchange is replacing its cash equity Post-trade settlement systems with a distributed ledger solution, providing tangible evidence that the technology is gaining a foothold in institutional markets. It is likely that distributed ledger developers will continue to focus their efforts on areas in which the technology can improve relatively inefficient processes in capital markets. SETL is using a permissioned ledger system that enables participants to make payments as well as settle and clear trades of financial instruments instantaneously. It is also deploying a blockchain-powered platform for funds record keeping.

In Support, migration to the cloud is slowly gaining traction. Systems providers have introduced cloud versions of their platforms, and the need to mitigate operational risk has led to the rise of tailored analytics, graph technology, and APIs to track applications, rules, and critical processes. Access Fintech aims to reduce the frictions sometimes encountered when using new fintech providers by creating a single visual display that monitors all vendors and in-house systems that handle the trade lifecycle in real-time.

Investment Bank Technology Spending Is Flat, Undermining Productivity Gains

Over the past few years, investment banks and other capital market participants have focused on cost discipline, with the aim of improving efficiency ratios and hitting RoE targets. *(Please see the BCG report "Global Capital Markets 2017: Mastering the Value Migration").* As a result, total internal IT spending — change-the-bank (CTB), run-the-bank (RTB), and Infrastructure — was flat from 2014 through 2016, and the trend is likely to have continued in 2017.
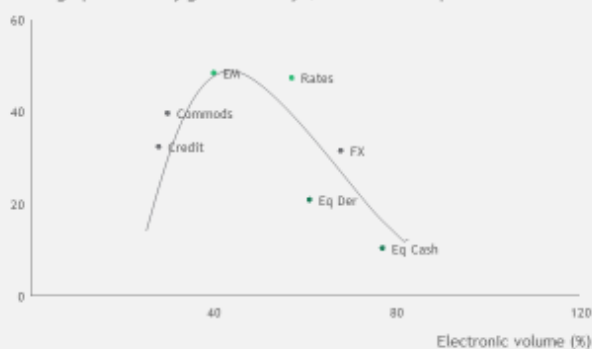
New entrants competing in markets similar to investment banking, such as principal trading firms (PTFs), dedicate a much larger part of their operating expenses to technology. PTF IT spend can range between 20% and 30% of revenues, while most investment-banking-market businesses spend between 8% and 15% of revenues.

Banks still predominantly invest in innovation by building in-house capabilities via CTB spending. Over the past few years, they appear on that basis to have underemphasized innovation. CTB spend has been flat (a four-year CAGR of around 1%), although in 2017 it grew by 5%, according to an estimate by Expand Research. (See Exhibit 8). Still, only 20% of CTB spend is true innovation, with the rest directed to legacy system upgrades, a private Expand CIO survey shows. Legacy systems are old technologies, which can be effective but which often operate in silos across asset classes and geographies.

In 2017, as much as 30% of bank IT spend was on Infrastructure, with 25% for run-the-bank, leaving 45% for CTB. The large proportion of non-innovation spend means that

banks are reducing their ability to be agile, cost-efficient, and responsive to customers. PTFs, conversely, are intensely focused on leveraging the latest technology.

The potential for productivity gains from CTB innovation spend is highest in asset classes in the middle of the electronification curve. (See Exhibit 9). Classes such as Rates and EM are still characterized by voice-dominated trade workflows, and our analysis suggests that productivity gains from investment in FICC IT can be three times higher than the same investment in Equities. By contrast, in commoditized, mostly-electronic asset classes such as cash equities and FX, tighter margins imply diminishing returns from IT investment.

Exhibit 9: Asset classes in the middle of electronification benefit most from IT spend

Banks are currently investing around $90,000 annually in FICC CTB IT per business FTE in order to maintain an average level of productivity. (See Exhibit 10). Banks that spend more are seeing productivity gains of up to $37 per $1 of spend, and those with above-average IT intensity in FICC have much higher productivity than their competitors. The variation is lower in Equities, suggesting that banks should prioritise IT spend toward asset classes likely to benefit most, mainly in FICC.

Exhibit 10: IBs investing above $90K per FTE for FICC IT CTB begin to see direct productivity gains

Choose Your Battles Wisely

Banks and other capital-markets participants that invest in fintechs and automation have been able to develop new revenue streams, optimize the balance sheet, and reduce costs. *(Please see the 2016 BCG report "Fintech in Capital Markets – A Land of Opportunity").* Various groups have tended to favor specific investment approaches, however, with exchanges and information service providers oriented toward M&A and strategic partnerships while investment banks have focused on venture capital structures. (See Exhibit 11).

Exhibit 11: Banks and exchanges use different engagement models
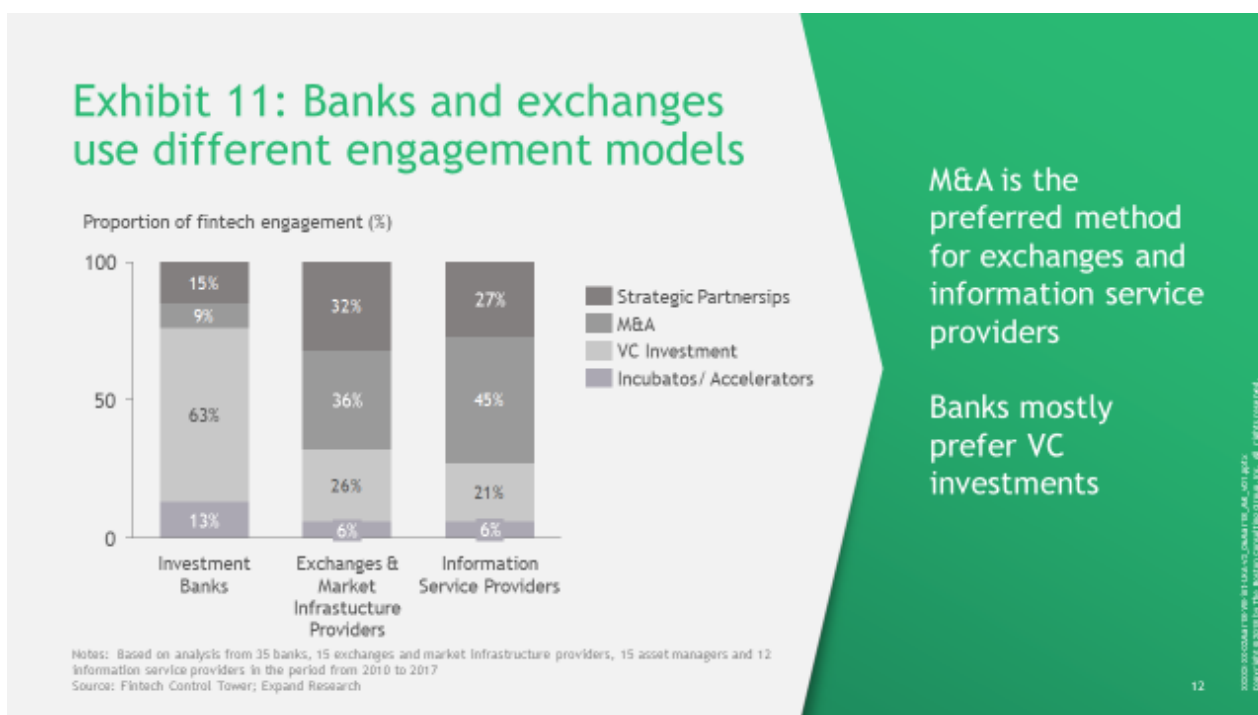
Looking ahead, Tier 1, 2, and 3 players in the banking sector are in a position to tailor their approach to fit individual scale, product offerings, and client mix. Tier 2 and Tier 3 players may seek to enhance their tech capabilities at a lower cost than building expertise in-house, allowing them to maintain their product mix and develop Pre- and Post-trade services. The Tier 1 digital agenda should be broader and encompass technological solutions that enable scale. Tier 1 players can also provide technology to smaller players and generate revenues from IT assets. Unlike Tier 2 and Tier 3 players, they are more likely to prioritize digital initiatives and take the lead on developing technology that

offers them a competitive advantage (such as in Pre-trade and Execution with AI-based in-house pricing tools) and increased efficiencies (such as in private Post-trade distributed ledgers).

Given the multiple options when it comes to technology sourcing, banks may employ a mix of strategies — either building, buying, partnering, or acquiring depending on their assessment criteria. (See Exhibit 12). They may, for example, invest in fintech equity if the technology is specialized, the fintech ecosystem is nascent, or there is an opportunity to capture value. Alternatively, they may partner with other banks and fintechs, particularly when mutual benefits are foreseeable and traditional operating models are being disrupted (e.g., distributed ledger development). Banks may also choose to acquire specific solutions, particularly when the vendor landscape is mature and the technology is commoditized such as in elements of robotic process automation and cloud.

Building a technology in-house is an alternative, and is potentially attractive when there is a lack of vendors, the bank has internal capabilities, or the technology is deemed a potential source of competitive advantage. Both the build and buy approaches require CTB budgets to fund the process.

Exhibit 12: Assess digital initiatives and sourcing strategy against set of criteria

Assessment criteria	Approach		Sourcing Strategy	Choose best approach whilst considering bank tech capabilities
Customer fit	"Customer voice" survey to assess perceived value and benefit		Build	• Lack of appropriate vendors • Internal talent • Tech IP as competitive advantage
Strategic fit	Evaluate compatibility with service, product franchise, resource and capital optimisation		Buy	• Mature vendor ecosystem • Ability to integrate with existing systems
Initiative maturity	Assess existing competitor adoption and underlying technology maturity		Partner	• Mutual partnership benefits • Traditional models disrupted
Size of prize	Estimate potential financial and business impact		Acquire	• Nascent Fintech ecosystem • External talent • "Tuck-in" of tech IP

Putting Technology at the Core

The digital transformation of capital markets is accelerating. To ensure that market participants extract full value from their innovation spend, they must restructure the organization to enable adoption of new tech-inspired paradigms (such as Agile) and create a CIO mandate that goes beyond functional management and includes an influential seat at board level.

In a digital company, the responsibility of driving technological change ultimately falls to the leadership team, and it is the role of the CEO to develop a structure and strategy that integrates technology into the business. With board support, the organization can start to move from a product/relationship model to a service model based on technology and data. Technological assets can be less pure cost centers and more business enablers — and in some instances create new revenue streams. Some capital markets players have set up "innovation groups," operating with fewer constraints than the core IT organization. The mandate of these groups varies and is still being defined, from learn-and-experiment to engage. However, these kinds of initiatives will become increasingly important in making the right investment choices.

Rolling out an innovation strategy should leverage Agile methodologies in which iteration and continuous customer feedback help refine and deliver the ideal outcome. Agile can help the organization adapt to change and empower people to collaborate and make decisions quickly. Such dynamics will be essential in transforming organizational culture and embedding technology in ways of working.

* * * * *

This White Paper has utilized data provided by the Fintech Control Tower, a research framework developed jointly by BCG and Expand Research that identifies initiatives, technologies, and companies that matter most in today's fintech ecosystem — as well as monitors them and assesses their impact. The paper also incorporates analysis from Expand Research's Technology Benchmark, which analyzes more than 30 investment banking peers' technology costs and a combination of business-sizing metrics (such as revenues, business headcount, and total costs). Banks are split across three groups of

peers: Tier 1 (Global IBs); Tier 2 (Regional IBs with global outreach); and Tier 3 (regional IBs) to provide a true like-for-like comparison for the CMIB (Capital Markets & Investment Banking) industry.

* * * * *

About the Authors

Philippe Morel is a senior partner and managing director in the London office of The Boston Consulting Group. He is the Global Leader of the Capital Markets segment of the Financial Institutions practice. You may contact him by e-mail at: morel.philippe@bcg.com.

Charles Teschner is a senior partner and managing director in BCG's New York office. You may contact him by e-mail at: teschner.charles@bcg.com.

Pierre Paoli is a partner and managing director in the firm's London office. You may contact him by e-mail at: paoli.pierre@bcg.com.

Franck Vialaron is a partner at Expand Research. You may contact him by e-mail at: franck.vialaron@expandresearch.com.

Valeria Bertali is a capital markets knowledge expert in BCG's London office. You may contact her by e-mail at: bertali.valeria@bcg.com.

Kimon Mikroulis is a capital markets senior knowledge analyst in BCG's London office. You may contact him by e-mail at: mikroulis.kimon@bcg.com

Boris Lavrov is a project leader at Expand Research. You may contact him by e-mail at: boris.lavrov@expandresearch.com.

Acknowledgments

About BCG

The Boston Consulting Group (BCG) is a global management consulting firm and the world's leading advisor on business strategy. We partner with clients from the private, public, and not-for-profit sectors in all regions to identify their highest-value opportunities, address their most critical challenges, and transform their enterprises. Our customized approach combines deep insight into the dynamics of companies and markets with close collaboration at all levels of the client organization. This ensures that our clients achieve sustainable competitive advantage, build more capable organizations, and secure lasting results. Founded in 1963, BCG is a private company with offices in more than 90 cities in 50 countries. For more information, please visit www.bcg.com.

About Expand Research

Founded in 2001, Expand Research is transforming the way the world's financial markets make business and technology decisions by providing timely decision support and research services on business and technology strategies to leading financial institutions globally. In July 2011, Expand became an independent subsidiary of The Boston Consulting Group. It has offices in London, New York, and Singapore.