



CAPITAL MARKETS TECHNOLOGY 2022



Five Technology Design
Principles for Digital
Capital Markets

THE SPEED-READ

The information revolution is impacting every business, but capital markets firms are really feeling the effects. The industry is facing a perfect storm of negative publicity, ongoing fee compression, value chain rebalancing, continued automation and disintermediation, and increasingly challenging talent acquisition—just to name a few of the forces at work. Add to that an unyielding current of new regulations, and the picture is bleak—especially for those that don’t engage in wholesale redesign.

To offset these negative fundamental trends, leading capital markets firms should adopt five organizational design principles: intelligent and automated, data-led and client-centric, open and accessible, agile and resilient, and simple and homogeneous.

By creating agile organizations or “living businesses,”—companies designed to achieve and maintain perpetual customer relevance—firms could transform themselves. Doing so, Accenture believes that investment banks, for example, have the potential to not only increase return on equity (RoE) by up to an estimated three to four percent, but they could also drive cost-income (CI) ratios back to lower and more acceptable levels.

THREE ELEMENTS OF COMPRESSIVE DISRUPTION

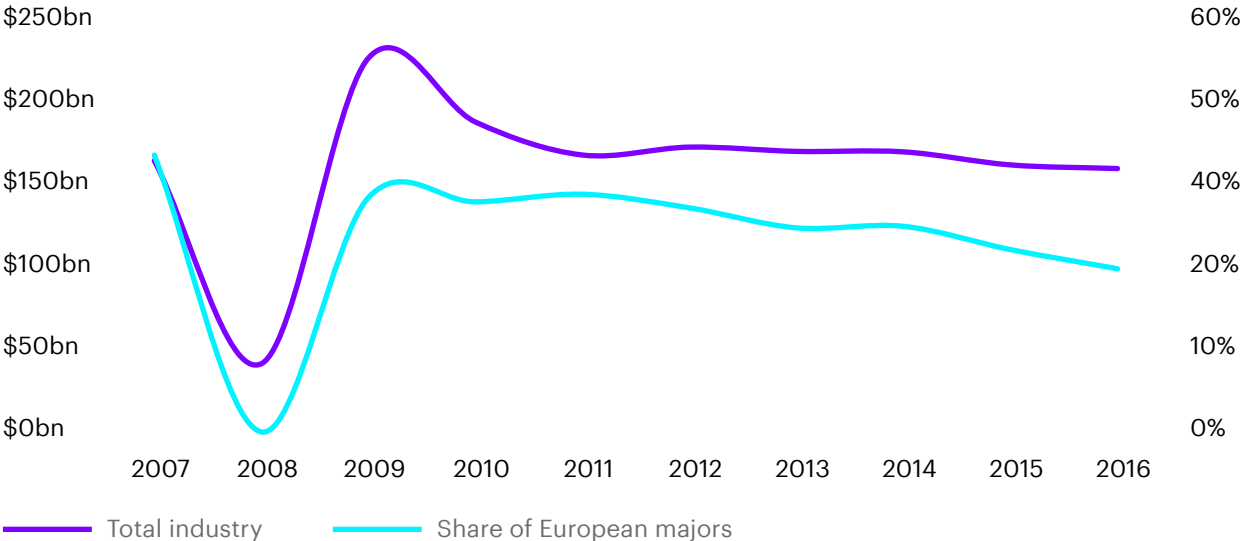
Shielded by large balance sheet requirements, regulation and network effects, global capital markets players are unlikely to experience the kind of big-bang disruption that Uber and Netflix have wreaked in their respective industries. Nonetheless, the global capital markets industry is facing a perfect storm of “compressive disruption” that’s forcing change and reinvention. This form of disruption is characterized by a more gradual erosion of revenue and profit, compressing the amount of free capital available to invest in the new technologies and ways of working required to keep pace with evolving customer expectations and economics.¹

In the capital markets industry, compressive disruption is evident in three key symptoms: stagnation in the overall revenue pool, increased competition for this shrinking pool of revenue, and weak financial returns even after significant cost-cutting.

STAGNATING REVENUE

Following the global financial crisis, top-tier investment banks and boutique advisory houses have seen their pool of revenue stagnate or fall in real terms (see Figure 1). While falling margins, low rates, low volatility, regulatory tightening, the rise of passive investments and the plentiful supply of private equity have created significant headwinds, two additional trends are worth noting.

Figure 1: Revenue for global and European investment banks is flat-lining



Source: Accenture Research

European investment banks

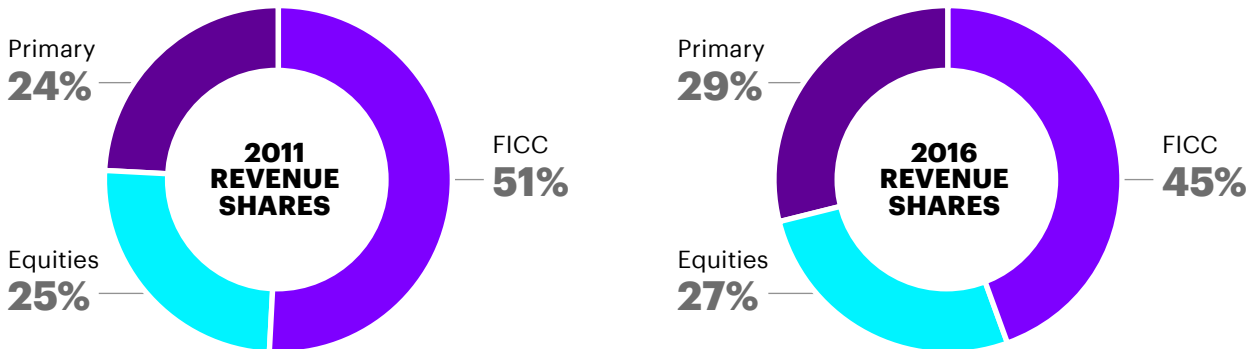
First, as Figure 1 shows, the revenue share of the leading European investment banks shrunk from nearly 40 percent to just 27 percent between 2007 and 2016. This shift reflects not only deliberate business closures by certain leading players, but also a reduction in the level of capital allocated to these businesses due to fear around business model sustainability. UBS is a key European example of such restructuring. Yet, even in this environment of reduced competition, the industry's financial returns remain weak overall.

FICC businesses

Second, fixed-income, currencies and commodities (FICC) businesses, which once dominated the landscape, have seen nominal revenue fall sharply and their share of the shrinking revenue pool dwindle (see Figure 2). Interest rate rebounds and periods of increased volatility may provide profitable relief for some players, but global markets and investment banking participants cannot rely on these events alone to deliver sustainable profits.

Despite an uptick in volatility in early 2017, the most recent Coalition IB Index pegs global FICC revenue at \$38.5 billion for the first half of 2017, compared to \$57.7 billion for the same period five years ago.²

Figure 2: The FICC share of revenue is shrinking



Source: Accenture Research

INCREASED COMPETITION

Despite the anemic revenue backdrop outlined above, capital markets players are still dealing with the rise of non-bank competitors in both primary and secondary businesses.

Primary businesses

The most visible area is in the high-return corporate advisory world, where boutique firms have meaningfully changed the competitive landscape (see Figure 3).

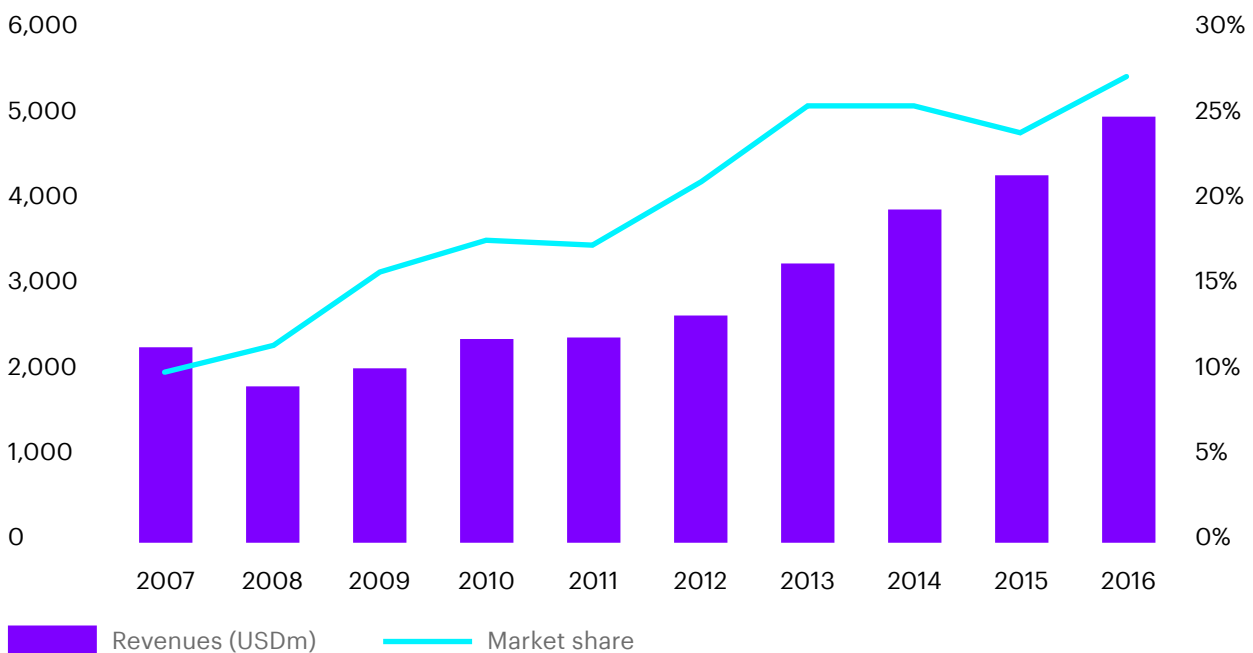
Independent firms, such as Moelis & Company, Greenhill and Evercore, have nearly doubled their revenue and more than doubled their market share over the last decade. Considering that this high-margin business tended to be the reason other products and services were conducted at loss-leading prices, the impact on shareholder returns is clear.

This development of smaller firms is not new; it's a return to a market structure seen more than 20 years ago. Nonetheless, it's a trend that's exacerbating the pressure on returns in investment banking businesses.

Secondary businesses

The effects of disintermediation are also evident in the rise of non-bank liquidity, particularly in mid-corporate and high-growth segments, and growing interest in all-to-all exchanges in traditionally dealer-led markets. Forty-eight percent of market participants identified buy-side to buy-side trading as the most likely new source of liquidity in the next several years, with 22 percent believing that non-bank market makers will also play a key role.³ Increases in both will be necessary to fill the liquidity gap as banks scale back their capital commitments. Dealers will remain the core source of liquidity in these markets, but allowing digitally native providers to gain a foothold may open the door to wider competition if aggregation or direct acquisition takes off.

Figure 3: Boutique advisory houses are on the rise



Source: Accenture Research

WEAK RETURNS

Capital requirements for balance sheet-led businesses (mainly secondary businesses) have increased so much that they have destroyed shareholder value generation at even the purest of investment banks. Attempts to reduce capital usage by management teams has made pure advisory business an even larger share of the revenue stream.

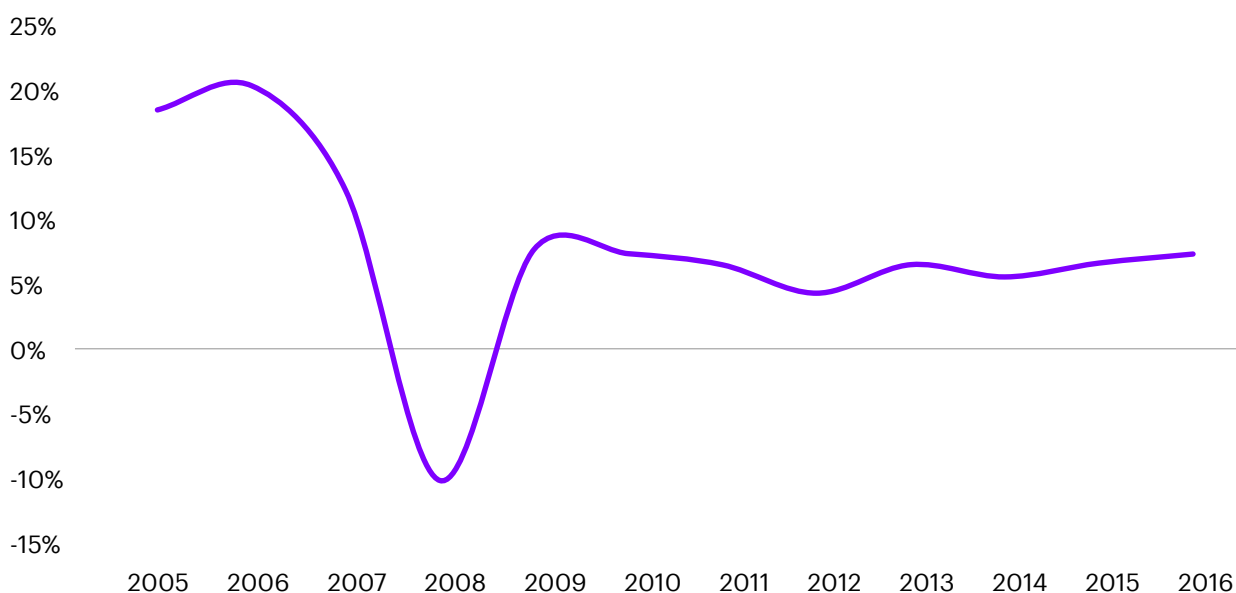
Looking at return on equity for the larger players in the sector, returns above the cost of capital have been inconsistent at best (see Figure 4).⁴ This is despite deep and prolonged cost reduction programs, many of which bear significant fruit. According to our research, one bank alone has cut more than \$5 billion, or 25 percent, from its non-asset-gathering cost base this decade.⁵ In real terms, that amounts to a near halving of the overall cost base.

Legacy infrastructure

The sheer size and scale of legacy infrastructure is a particularly challenging issue for the industry. Banks are struggling to achieve sustained profitability because the complex infrastructure established to support global and fixed-income markets is often vastly oversized and nearly always siloed. Many have restructured, ruthlessly reduced costs and even exited businesses.

This legacy architecture is also ill-equipped to provide the insights required to improve customer service and drive growth in today's digital world. New approaches are needed. Instead of redesigning its legacy stacks for trading in the dealer-to-dealer market for treasuries, for example, JPMorgan is leveraging third-party technology from high-frequency trading firm Virtu Financial.⁶

Figure 4: Return on equity for top nine global investment banks



Source: Accenture Research based on Capital IQN

Regulatory burden

Two major pieces of regulation—the second Markets in Financial Instruments Directive (MiFID2) and the fundamental review of the trading book (FRTB)—present both structural and technological challenges for investment banks.

A wide-ranging update of the nearly decade-old MiFID, MiFID2 aims to increase trade transparency (including trade costs) via best execution and unbundling, drive liquidity toward more structured trade and reporting venues, and improve monitoring of trading behavior. Because it applies to a wide range of asset classes, most investment banks will be impacted. Though most press coverage has focused on the future and economics of investment research, that's far from the whole story. MiFID2 will not only impact revenue streams and necessitate new compliance investments, but also facilitate the digitization of customer engagement in ways that are likely to create threats and opportunities for capital markets players.

Although FRTB is not due for implementation until the end of 2019, its impact could very well exceed that of MiFID2. Not only will banks have to redesign risk models, largely away from simple value-at-risk (VaR) techniques, but the data collection requirements will be far more onerous. Data currently presents a key barrier to internal model use; in some areas, the required data simply does not exist.

The technological challenge of capturing and interpreting this new data burden comes at a cost. Even if a model passes muster with regulators (no easy feat), firms still face capital costs. The last quantitative impact study of this new rule set (QIS4) estimated a 40 percent increase in capital costs for the industry—a figure that will challenge already weak returns and potentially drive marginal players out of certain product lines.⁷

If nothing, MiFID2 and FRTB are reminders that regulators have become important agents of change for global capital markets players and investment banks—over and above structural changes in customer behavior, the cyclical impact of low rates and low volatility, and disruptive new entrants.

The rise of non-bank liquidity

A recent Greenwich Associates study put forward that one in five government bond investors and one in four interest-rate derivative investors either trade with or plan to gain access to non-bank liquidity providers.⁸ That's because non-bank liquidity providers are using technology to offer better pricing and tighter spreads than traditional dealers and ultimately gaining market share.

This shift not only reduces investment banks' ability to make flow margin as the intermediary of choice, but also robs those businesses of the information advantage they gain from interacting with both sides of these markets.

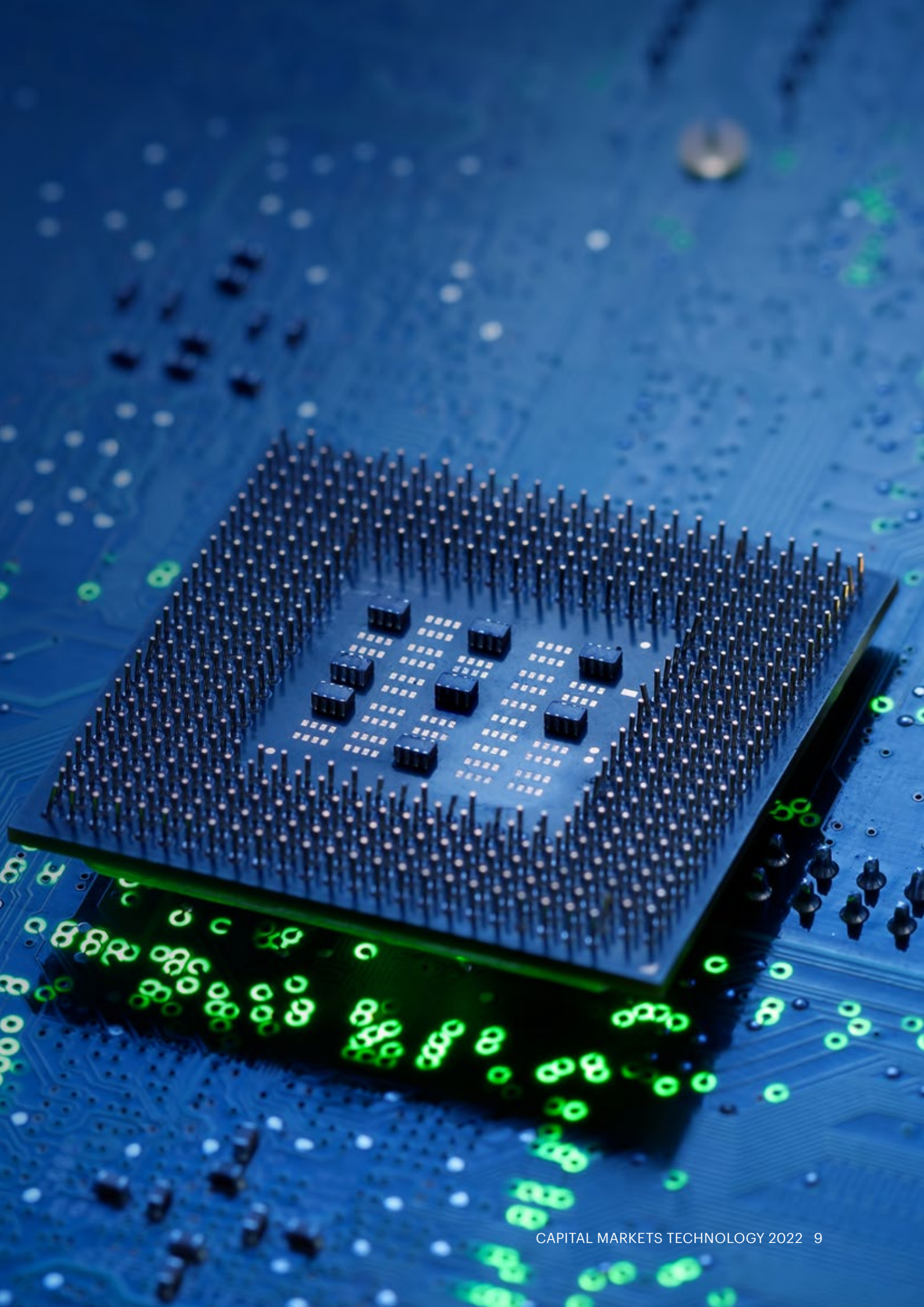
The solution lies not in cost-cutting, but rather strategically rethinking the exact shape of businesses—especially as regulations such as MiFID2 may begin to create an unlevel global playing field.

GLOBAL CAPITAL MARKETS IN 2022

In five years from now, the capital markets industry will still need to perform similar functions as it does today, but its roles and activities may change. The nature of these shifts will depend on regulation and economics, and will likely be won or lost based on a firm's ability to successfully combine business and technology to address shifting expectations.

Between now and 2022, the industry will be shaped by automation, self-service expectations, and the continued rise in non-bank liquidity and execution providers. In this context, technology offers a way for firms to get ahead. Yet global market players that choose to be "fast followers," particularly those in intermediary functions, risk

seeing their rivals accelerate beyond reach. Firms that choose to proactively harness these technologies can use various strategies to break the cycle of compressive disruption, but it will require significant change that goes far beyond the current portfolio of technology-led, cost-cutting programs.



DIGITAL BANKING VERSUS BANKING DONE DIGITALLY

To create value, capital markets players must move beyond process replication, and revisit the core design and architecture of the firm and industry.

Many investment banks have attempted to update their legacy systems in the past. By replicating existing processes with newer technology, they have been able to achieve incremental efficiencies and cost savings. In this guise, “going digital” has often taken the form of a technology or channel change.

Transformational change in other industries has not been achieved by simply introducing new technologies to the old stack, but rather through the re-evaluation of long-held and widely accepted assumptions about what is possible. As one fintech industry commentator said, “It takes NASA \$300 million to put an asset in space; it takes \$30 million for SpaceX to do so... but they also try to land the rocket.”⁹

Digital leaders have used combinations of new technologies to create radically different business and value propositions. They have used platforms, created and/or contributed to ecosystems (both shared and open), moved from a product-based mindset to a customer-centric one, and maintained consistent service across multiple touchpoints and channels (both proprietary and shared). The global capital markets industry has mirrored this with its thinking around blockchain technology, evolving from a cost-mutualization play to collaboratively evaluating ways to fundamentally alter the fabric of capital markets.

Ultimately, banking done digitally forms a strategy that is dictated by technology. Becoming a digital bank means forming strategies empowered by technology. Achieving the latter requires investment banks to understand the key organizational imperatives required to win, and how to orchestrate business and technology around those imperatives.

FIVE TECHNOLOGY DESIGN PRINCIPLES FOR 2022

Accurately envisioning 2022 today is not possible. Growing volatility means a small change in assumptions could have profound impacts on projections. This industry dynamic—often described as “volatile, uncertain, complex and ambiguous”—makes it increasingly complicated to project a future state and execute an appropriate strategy.

Indeed, regulatory and political regime changes, interest rate uncertainty, the rate of emerging technology maturity and adoption, and firms’ ability to unlock pan-industry network dynamics are among the factors that will have a significant impact on future markets. Gone are the days of multi-year big bets and commitments, if they ever truly existed before.

What’s important, however, is that the leading global capital markets organizations of 2022 will likely have achieved two key objectives:

- First, they will have used technology as a competitive advantage, moving beyond simple adoption and redesigning the end-to-end operating model with customers at the core (see the “Digital banking versus banking done digitally” sidebar on the previous page).

- Second, they will have designed an organization that assumes uncertainty, anticipates change, and is capable of deploying resources with pace and purpose.

To make that happen, they will depend on a set of five winning design principles.



1. INTELLIGENT AND AUTOMATED

Deploying technology and organizational designs that use machine intelligence to automate and amplify human creativity and intuition.

As a suite of technologies, intelligent automated systems can provide an effective method to reduce process costs. Robotic process automation technologies are already being deployed and scaled across the back office. In some instances, self-learning systems are also being used to handle exceptions and optimize workflow productivity. Intelligent and automated organizations go even further, moving beyond process replication to redesign processes for the new technological reality.

As the technology advances, firms operating in the capital markets industry are quickly adopting more intelligent automation technology. The explosion of available data has fed a number of use cases that aim to help with the comprehension of more, and more complex, data. These include content extraction from unstructured data (e.g. videos, images) to support sales efficiency, anomaly detection (as part of know your customer or anti-money laundering monitoring), and broader sets of data analysis methods (prediction, tooling and classification).

Many investment banks and buy-side firms are investing in artificial intelligence to aid with pattern recognition, with the goal of deriving alpha-generating insights (e.g., Goldman Sachs' investment in Kensho and UBS and Deutsche Bank's investment in Sqream).¹⁰ This development follows a long history of algorithmic trading and experimentation with machine-learning techniques among hedge funds and large asset managers (e.g., BlackRock's Aladdin platform).¹¹

Thinking about intelligent systems as an extension of the workforce instead of the technology estate can help firms realize other benefits. Automated systems make it possible to build workforces that are sensitive to business needs and can be rapidly retrained, redeployed and rescaled at speed. Both human and machine workforces leverage platforms and external marketplaces to augment specific skills or scale on demand, as dictated by market and business strategies. Here firms are embracing collaboration, running proof-of-concepts with multiple start-ups, open-source technologies and university data science labs in non-sensitive areas of the bank as a way to enlarge and enrich their talent bases.

Artificial intelligence is also being deployed to augment human capabilities. One organization is using the technology to de-silo functions and accelerate sharing of key operational and client information, leveraging advanced search and discovery tools to create a smart data broker that can funnel key information where it's needed.

When artificial and human intelligence are combined, a powerful set of capabilities becomes available. Numerai, a hedge fund, shares encrypted financial datasets with a virtual workforce of 7,500 data

scientists—many of whom work for other funds or outside the industry—to generate advanced machine-learning allocation algorithms. To align the distributed workforce, the company has created an Ethereum-based cryptographic currency called Numerai to encourage participating scientists to collaborate rather than compete.¹²



2. DATA-LED AND CLIENT-CENTRIC

Expanding the catalogue of data that's captured and analyzed to create real-time views of client needs and behaviors, and inform service design.

The capital markets industry is no stranger to data, but the volume and diversity of data is changing rapidly. Data lake architectures are allowing a combination of structured and unstructured data types, sourced both internally and externally. “Exotic” datasets, including the use of satellite imagery, direct-from-source transaction information, Internet-of-things data, and freight and customs data are increasingly being used to gain an edge in today's advisory-focused and insight-led market. With the deployment of more Internet-of-things platforms and the publishing of more open APIs across industries (e.g., European banking, post-Payment Services Directive 2), the race for data will intensify as firms look to find an edge or sell data to those who can.

As the cost of storage continues to drop, firms will be able to store almost everything. But making sense of all this data will require a coherent data strategy and management framework, and analytical tools to identify clear signals through the noise. Smart systems can help by finding patterns in data and uncovering insights. Intelligent agents can understand natural-language questions, conduct analysis and produce detailed reports. They can also be proactive, using graph analytics and machine-learning algorithms to identify patterns in huge datasets, and alert sales staff and relationship managers.

Many of these technology capabilities could become commoditized by 2022—even when powered by the promise of advanced computing technology, such as quantum computing. Firms can differentiate themselves by orienting this data-rich approach around a clear, detailed and specific understanding of client needs. Doing so means complementing quantitative datasets with qualitative datasets to better understand the context in which clients engage with services. That understanding needs to be de-siloed, shared and incorporated across the full range of services, channels and touchpoints.

Using human-centric design principles turns individual customer profiles into a coherent set of services, built around their objectives. Far from being static, these “living services” learn and evolve, using contextual awareness to adapt and intuitively learn user habits and preferences. That might take the form of trading platforms that understand client intent, and orchestrate “next-best-step” workflows and related data feeds in real time, to maximize execution speed and efficiency.

3. OPEN AND ACCESSIBLE

Providing the capability for customers and the ecosystem to engage deeply and seamlessly with the organization, and extending your reach and capabilities beyond the boundaries of the firm.

Digital leaders make it as easy as possible for customers and partners to do business with them, reducing friction across the commercial journey. New digital standards of integration and interoperability, including open application programming interfaces (APIs), open-source software and shared platforms, can help firms integrate seamlessly with customers and extend the reach of their partner ecosystems.

Firms have already begun to offer API services, providing seamless integrations that deliver beyond portal functionality. More advanced firms are offering direct access to a wide range of internal systems and capabilities via APIs, while simultaneously uniting several siloed functions on one platform (e.g., Goldman Sachs' Marquee platform).¹³

Leading firms will also use APIs to monetize proprietary datasets and assets (e.g., pricing, risk or clearing systems), providing new opportunities to boost returns on internal investments. Accessible API platforms and developer portals can cultivate an active developer and partner community, leveraging open innovation and the power of the crowd to accelerate service innovation and new product development. Many organizations have begun this journey with hackathon and incubator facilities, but providing open access to core data and technical components can accelerate partner evaluation and ultimately deployment.

Participating and contributing to open-source projects can also provide a way to mutualize the costs of product development and innovation. Some firms are already working collaboratively with peers on common technology and infrastructure challenges. Notable examples include the Symphony Foundation's messaging protocols, OpenGamma's Strata repository of risk analytics, and core distributed ledger protocols from R3CEV and Hyperledger.¹⁴ The invention of crypto-tokens gives contributors a more direct way to monetize open protocols, incentivizing and aligning a wider group of contributors beyond those who will make direct use of the project.

As firms become more transparent, opening services to direct integration via portals and APIs, they will need to strike a delicate balance between a secure security posture, and easily accessible and usable services.

4. AGILE AND RESILIENT

Designing a “living business” that assumes uncertainty and can adapt with pace and purpose to changing market and customer needs.

To remain competitive, agility must be built into both business and IT organizations. Agility is an often-overused term with vague aspirational characteristics. In contrast, organizational agility is a set of practical architectural decisions that facilitates a change in the strategic direction of a business, either proactively or reactively, and quickly brings capacity and scale into the new direction.

Microservice architectures reduce dependency between processes and systems, enabling the quick removal or adaptation of individual parts without significant (i.e., costly and timely) changes and service disruption. Well understood in technical contexts, similar structures are appearing in organizational design. Companies like Amazon and Haier, a Chinese consumer electronics and home appliances company, have adopted decentralized business architectures comprising small semi-autonomous and self-organizing teams.¹⁵ That has allowed both organizations to create entrepreneurial and responsive business units that can be deployed when required without significant upheaval.

Implementing a zero-based organizational design lens ensures each component of the business and IT architectures is aligned with tactical and strategic imperatives. This robust evaluation discipline of the organization’s architecture provides flexibility to push component parts outside the enterprise. Many capital markets players are facing the challenge of sourcing and retaining specialized talent to deliver big step-changes. Investment banks in particular are losing top talent to tech companies and start-ups; in 2016, only seven percent of US graduates saw banking and capital markets as a top industry to work for, down from 12 percent in 2013.¹⁶

External workforce marketplaces can help banks tap into key talent on demand. They may take the form of formal marketplaces for freelance talent (e.g., Upwork, a marketplace for technical freelancers) or specialized crowdsourcing websites (e.g., Kaggle, a platform that runs data science challenges).¹⁷ Another example is an AML consortium, which uses advanced analytics platforms to identify potential risk events before they occur, to address AML monitoring and surveillance industry-wide.¹⁸

Resilience can no longer come from high walls; it requires an immune system that can handle a blow and the ability to adapt quickly to constant change. A proactive and collaborative cybersecurity stance built on intelligent technologies, crowd-based peer networks and “inside-out” security design will help prepare organizations for rapidly evolving threats.

According to Accenture’s 2015 Global Risk Management Study, 82 percent of risk management executives in financial services find that emerging risks in the cyber realm account for more of their chief risk officer’s time than ever before. With the cost of a breach expected to increase 100 percent per year for each of the next four years, it’s not difficult to see why.¹⁹ Advanced technologies and threats—many readily available for purchase online—have created a hazardous digital environment. But new technology can also be used to combat these threats, including artificial intelligence for monitoring, detection and first response, data visualization for front-line staff support and behavioral analytics, and biometric authentication for insider threat reduction.

Global capital markets organizations can tap into a growing ecosystem of vendors and utilities, but they need to ensure a coherent and holistic cyber defense. Interoperability among security products across networking, computing, storage and end-user devices is available through providers such as TestWave and Tripwire, which scale distributed architectures.

With this movement to the cloud, security becomes a shared responsibility with service providers. Making this partnership work requires a willingness and an ability to share information with third parties, governments and industry groups, such as the Financial Services Information Sharing and Analysis Center (FS-ISAC).

5. SIMPLE AND HOMOGENEOUS

Removing unnecessary complexity and friction across the organization, outsourcing and leveraging utilities where possible.

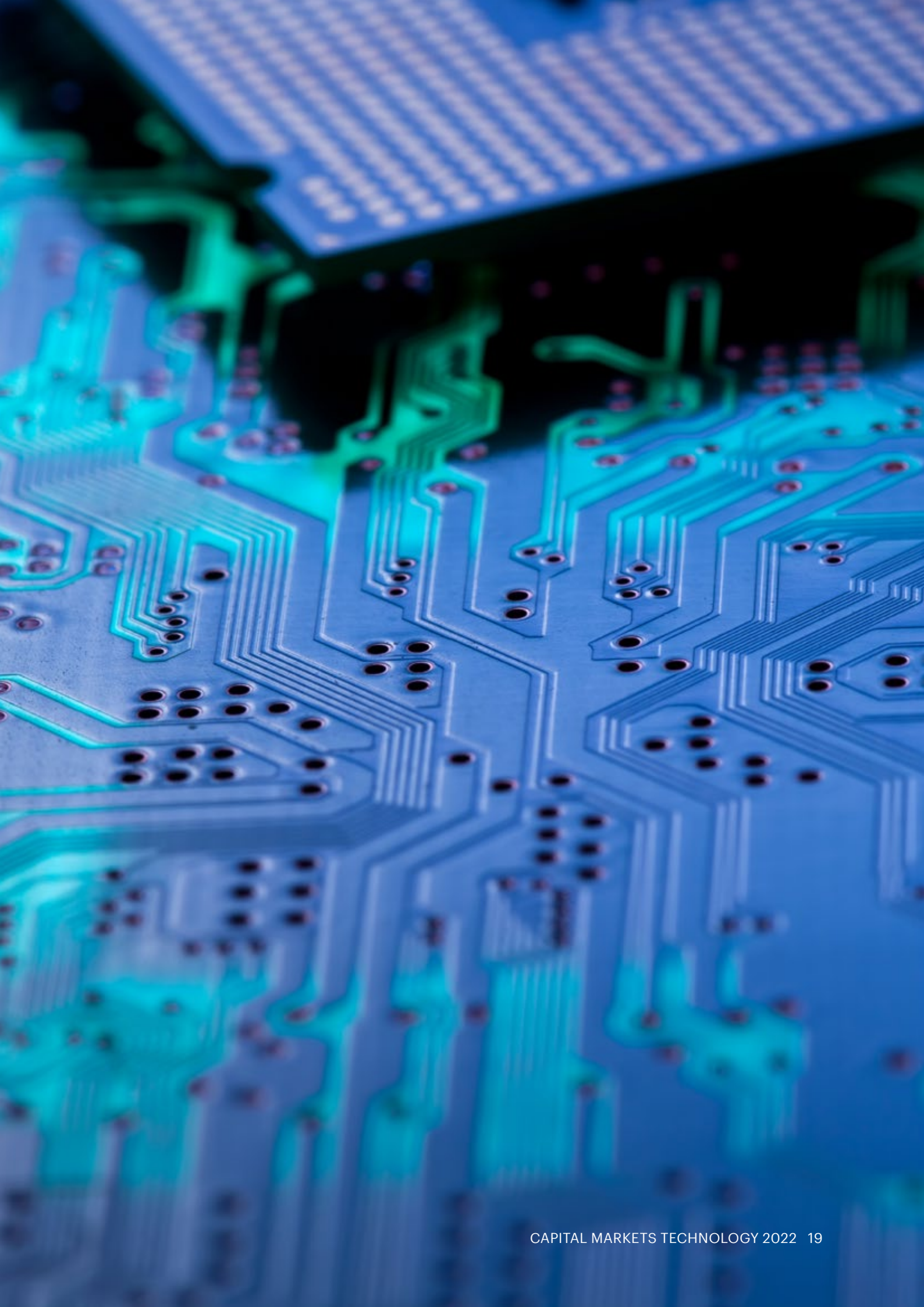
De-duplication and simplification can reduce costs and help prepare organizations for a more agile operating environment. Rationalization, replatforming and redesigning the backbone of an organization along digital principles will enable faster evolution and adaptation to change. Microservice-based business and technical architectures facilitate faster adoption of emerging technologies and rapid reassembly of core components into new complex structures. DevOps-style shared services can be expanded across other business functions to support efficient operations and shared centers of excellence.

Achieving deep levels of simplification will also require effort beyond organizational boundaries, working with peers across the ecosystem to create shared services and platforms that streamline and de-duplicate industry functions. Distributed ledger technologies offer the opportunity for capital markets firms to fundamentally alter the fabric of markets: the confirmation and exchange of ownership of assets. However, adoption will require the rethinking and reworking of processes and technologies far beyond the core stack. A fully digitized settlement process will feature distributed ledger technologies at the core and interoperable technologies around the periphery, including graph-based analytics capabilities that can analyze patterns across the distributed network, digital contract management systems (e.g., ClauseMatch), trusted data oracles and safeguarded on-chain/off-chain exchanges.

In the Cloud 100 vision developed by Accenture, non-differentiating assets are transferred outside the traditional boundaries of the firm (e.g., all infrastructure and most platforms).²⁰ Some standardized business processes are also executed, and the associated data is managed by external providers encompassing big tech (e.g., Microsoft, Google, Amazon, HP) and an ecosystem of industry utilities and fintech businesses. Firms only retain ownership of differentiating assets, including proprietary processes, algorithms and data. They also manage the deployment, security and integration of those assets across the cloud and their portfolio of service providers.

The degree to which public cloud solutions are used will vary depending on the type of capital markets firm and the business model in use. Global markets players and investment banks that focus on competing in trading markets will likely leverage highly scalable public solutions, while some asset and wealth managers may choose to develop hybrid solutions with a differentiating internal private cloud.

Beyond the cost benefits of moving to consumption-based pricing, global capital markets organizations will gain increased flexibility in the technology stack and faster access to new technologies (e.g., artificial intelligence software-as-a-service).



THE HOW: A DNA OF CONSTANT CHANGE

Global capital markets organizations in 2022 will operate in a state of constant change, continually chasing the next state rather than a static target state. To compete effectively, global capital markets players will need to change their DNA to prepare themselves for frequent and fast changes toward an ever-evolving future state.

Today's digital leaders design strategies that assume constant change. Significant developments and disruptions now appear and scale well within traditional three-to-five-year planning cycles (see Figure 5). Adapting to these developments generally requires significant changes in capital allocation and organizational resource requirements. Much like an oil tanker trying to abruptly change direction, it's currently often a slow process that may cause internal instability and halt forward progress.

To become truly agile, firms need to design their business and technical architectures to be able to constantly evolve toward new business and organizational models. True agility is less about predicting the future and more about designing an organization that experiments and invests in innovation, and can quickly deploy talent and technology to scale the next state.

Leading companies aim to create "living businesses"—organizations that effectively mirror the characteristics of living organisms by perpetually adapting their strategies, services, platforms and ecosystems to new standards of customer relevance.²¹

Adopting the five design principles highlighted in this paper will surely help facilitate this change, but an efficient process of continuous investment in innovation will also be necessary.

Figure 5: Significant change is occurring within traditional strategic planning timeframes



Accenture research based on public sources:

- ⁱ <https://fleximize.com/unicorns/>
- ⁱⁱ <https://www.wsj.com/articles/chinas-lufax-valued-at-nearly-10-billion-in-recent-funding-round-1429164241>
- ⁱⁱⁱ <https://techcrunch.com/2017/03/31/now-whos-the-rich/>, <https://www.crunchbase.com/organization/analyst>
- ^{iv} <https://www.bloomberg.com/news/articles/2017-05-15/world-s-biggest-money-fund-said-to-face-pressure-to-slow-inflows>
- ^v <https://www.risk.net/awards/2442287/interest-rate-derivatives-house-year-citadel-securities>, <https://www.wsj.com/articles/citadel-makes-inroads-into-swaps-arena-1434997210>
- ^{vi} <https://www.fnlonon.com/articles/fxs-new-breed-chips-away-at-dominant-banks-20170623>
- ^{vii} <https://www.cbinsights.com/research/report/fintech-trends-2016/>
- ^{viii} <https://www.cnn.com/2017/08/09/initial-coin-offerings-surpass-early-stage-venture-capital-funding.html>

INVESTMENT AND INNOVATION

The sheer pace of growth of investment in new technologies and business models means developing significant investment capacity must be a priority (see Figure 6). Building this capacity requires a continuous process of unlocking free cash flow from the core business, using zero-based organization methods and leveraging the digital technologies documented previously in this paper.

But the goal is not solely to maximize the total sum of investment dollars available. Firms need to ensure that they are getting the best possible return on their innovation investments by adopting new execution tools and techniques. That requires the creation of an innovation architecture—a set of capabilities and clear governance principles to support the firm’s portfolio of innovation activities.

Figure 6: Capital markets investments in key digital and emerging technologies

EMERGING TECHNOLOGY	IT SPENDING 2017 (US\$ BILLION)	GROWTH RATE 2017–2018
Advanced analytics	2.4	15%
Big data	2.3	3%
Artificial intelligence	1.68	14%
Alternative data	1.4	18%
Cloud computing	1.2	19%
Robotic process automation	0.4	10%
Digitization	0.32	9%
Blockchain	0.17	11%
Visualization	0.12	7%

Note: Categories are not mutually exclusive.

Source: © Opimas LLC - used by permission

GOVERNANCE

Firms need to create an investment capability that is capable of bringing scale and capacity to sudden changes in investment direction. You cannot and should not jump on board every business or technology fad. Instead, you need to establish clear investment governance to assess opportunities as they arise.

It starts with an innovation agenda. Rather than a list of technology ideas (supply-led), an innovation agenda should mirror the strategic imperatives of the firm (demand-led). For “moonshot divisions” (i.e., innovation capabilities working on brand-new industry paradigms), these agendas tend to be broad and question-led. For nearer-term innovation teams, agendas should avoid lofty business aspirations and dig deep to find small, specific points of leverage that can deliver strategic step-changes.

Evaluating opportunities also requires a new approach. Unlike traditional methods, this does not necessarily mean relying on pre-investment business cases based on internal assumptions and historical data. Instead, firms should invest in as many opportunities as possible, focusing initial seed investments on creating business cases based on validated learning (e.g., end-user testing, evidence of customer activity or workarounds, technology feasibility assessments). Firms should then continue to invest in increments, evaluating the venture at each stage with a “persevere,” “pivot” or “park” decision.

To maximize investment efficiency, removing organizational silos within innovation groups is key. This facilitates the pooling of resources for innovation, encourages cross-pollination of ideas and ensures that investments align with the top strategic priorities of the firm. But innovation groups must ensure that they do not become administrative blockers for new opportunities or over-centralized command-and-control centers.

By positioning innovation groups as platforms for the wider enterprise, they can provide talent and tools to support employee ideas and ventures, and encourage the cultivation of an inclusive innovation culture across the organization.

INNOVATION EXECUTION

To maximize investment and execution efficiency, firms need to adopt new ways of working that are more conducive to the experimental work of innovation. Start-ups exemplify these new ways of working, borrowing from techniques found in design, agile software development and adapted lean production principles to quickly formulate high-impact, user-centric solutions, even when operating in resource-scarce environments. But while there is much to learn from these start-up teams, global capital markets players must be careful not to “throw the baby out with the bath water.” Although traditionally less nimble and more risk averse, large corporations also hold a significant amount of assets that can accelerate the scaling of new innovations. An innovation architecture should leverage the respective benefits of start-ups and corporations, and work to mitigate the negative constraints of both. Figure 7 identifies some of the key groups that should be involved.

Crucially, the architecture must not be built as a wholly removed entity. With almost half of firms citing siloed business lines and a lack of collaboration with innovation teams as the biggest blockers to innovation, innovation groups must be careful to not insulate themselves from core business lines.²²

Removing these silos unlocks the ability to harvest valuable end-user feedback, and focuses the innovation group’s targets with key performance indicators (KPIs) that will make a real difference in the organization.

Figure 7: Key groups and roles for building an innovation architecture



Source: Accenture Research

Figure 8: The investment banking stack for 2022

TODAY

EARLY POCS AND UNDER UTILIZATION OF TECHNOLOGIES

Portal based with some omni-channel service provisions across devices

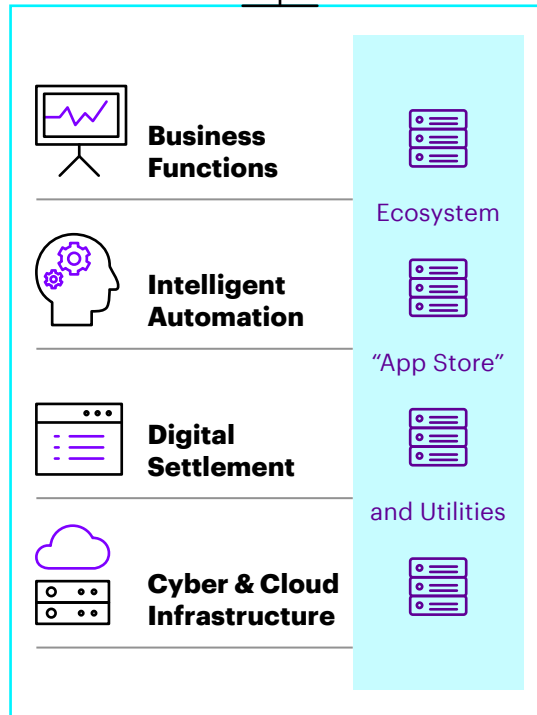
Early adoption of utilities; fintech partnerships supplement offerings

Early use of robotic process automation and artificial intelligence systems

Early client and operational analytics based mostly on internal, siloed data

Digital settlement PoCs, focus on relatively simple transaction flows

Early cloud engagement with private and some hybrid implementations



2022

GREATER BREADTH AND DEPTH OF ADOPTION ACROSS THE STACK

Opti-channel strategies and embedded invisible service provisions in place

Utilities and fintechs fulfill some functions in full

Intelligent systems deliver complex decision-support in collaboration with humans

Analytics on external, shared, and unstructured data drive customer engagement and end-to-end operational excellence

Shared digital settlement platforms go-live; businesses emerge built on-top of new infrastructure

Public cloud provides IaaS and PaaS to majority of functions

Source: Accenture Research

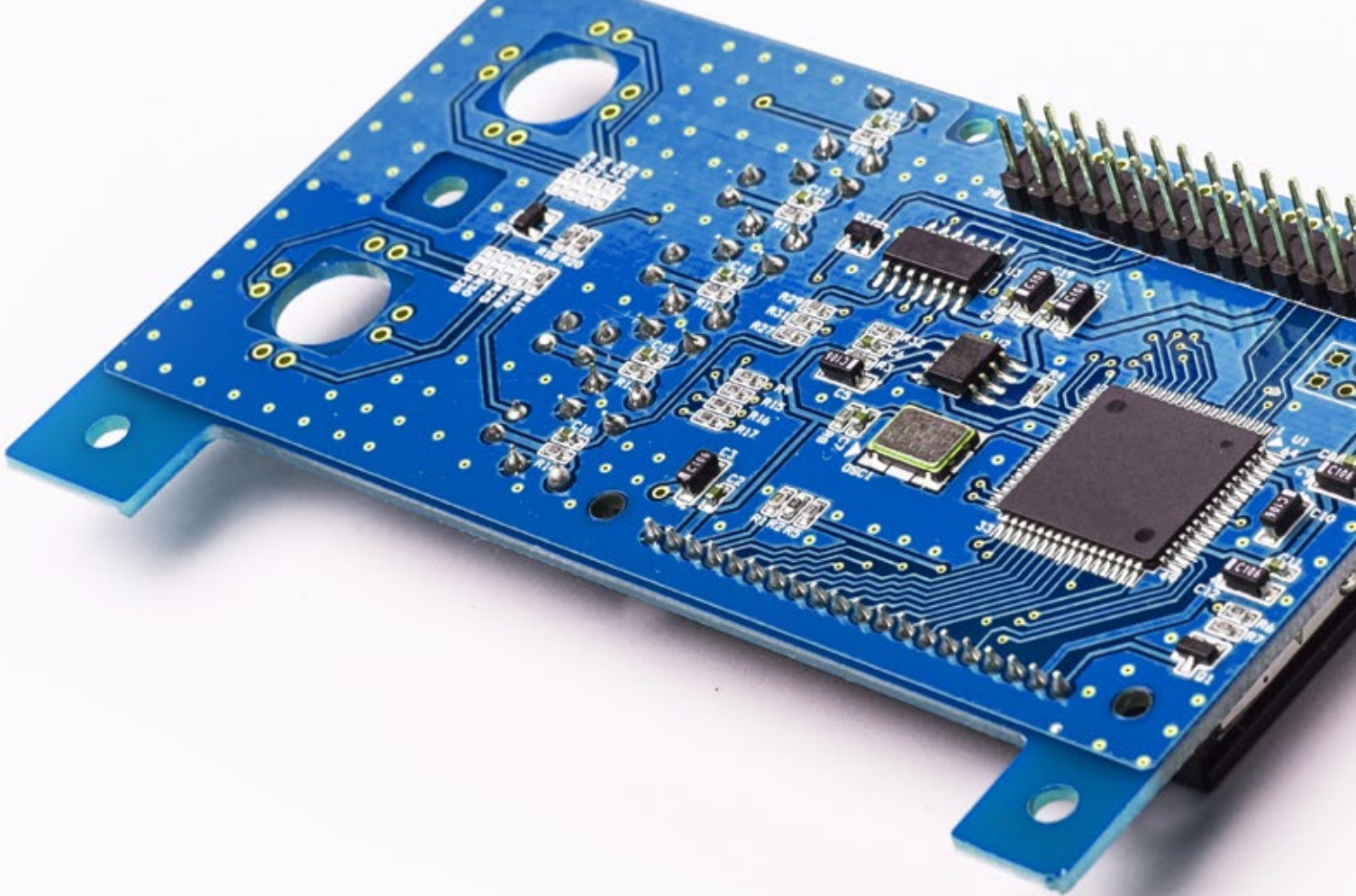
BRINGING IT TOGETHER: GLOBAL CAPITAL MARKETS 2022

Adopting our five design principles will have a visible impact on an organization's structure and talent base. A componentized form will make it possible to take advantage of shared services and platforms across the enterprise, while preventing a return to the siloed inefficiencies of the past. Internally, operational decision-making will be pushed to lower levels, enabling focused leaders on the ground to quickly change directions and spur growth. That creates a more fluid structure, accelerating the realization of a seamless "plug-and-play" ecosystem of third-party providers that will deliver organizational agility.

Official headcounts are likely to decrease as firms carve out operational functions to shared platforms and utilities, and automate the front office, switching traders for engineers and algorithms. At the same time, unofficial headcounts will increase as organizations take advantage of external workforces and communities to access niche talent on demand.

Talent mixes will diverge as global capital markets players follow different strategies. While a technical base will be common across all organizations, the size of their footprints will differ.

Firms seeking technical dominance will knowingly pay a high premium for advanced engineering and data science skills as they compete with firms across industry sectors in an already crowded marketplace. Winning this talent war will require a markedly different approach than in previous decades, thanks to changing attitudes toward work, and new non-salary employment expectations created by start-ups and large technology companies.



Others will direct premiums toward dealmakers, employing tools to measure and augment employees' emotional intelligence and soft skills. Technology skills will still be important, but these firms will employ a new breed of data science and engineering platforms that make advanced technologies more accessible to the wider, non-technical workforce. User interface innovations in voice interaction, and augmented and virtual reality, are already simplifying how we interact with technology, making it possible to communicate in more powerful ways with more powerful outcomes. Many leading technology tools can already be operated with minimal or no technical skills (e.g., Blue Prism, Ayasdi).

FOUR STARTING POINTS FOR TODAY

Change is not cheap, but the adoption of a small set of key trends can not only begin to align the organization with the five technology design principles, but also help unlock the capacity required to invest purposefully in the new business. Based on Accenture's analysis from our project experience and realized benefits with clients, we've seen significant value along the following key interventions:

Digital ecosystem: The emergence of digitally enabled ecosystems that provide component services across technology, processes, skills and data.

Accenture estimates that a broader use of industry utilities could deliver significant savings. In an area such as post-trade processing, using a utility could deliver up to 30 percent or more of savings across the enterprise in a steady state. On typical baseline profiles, that could translate into more than \$10 million of savings per year.

Intelligent enterprise: A virtual workforce that independently completes customer-facing and operational tasks to provide increased enterprise scalability and agility.

Accenture's experience in deploying intelligent automation technologies across capital markets organizations suggests that most firms could reduce FTE costs by up to 30 percent from defined back-office and corporate processes alone.

Client-centric analytics: Real-time analysis and visualization across vast datasets, enabling greater customer insight and responsiveness.

In addition to smarter customer segmentation, and deeper awareness of client profitability and cross-selling opportunities, a better understanding of your customer profile could help streamline and rationalize client support operations. In selected cases, such interventions could generate annual cost savings in the double-digit millions.

Digital settlement: Digitized assets that leverage distributed ledgers to optimize post-trade settlement, re-architect processes and release trapped capital.

Distributed ledger technologies could drive \$8 billion in savings on a cost base of \$30 billion across eight of the top 10 global investment banks.²³ For example, our research shows that significant parts of the trade process—including reconciliation, confirmation and trade-break analysis—could be reduced or completely eliminated, leading to potential costs savings of 50 percent across trade support and middle-office functions.

Together, these interventions could impact cost bases sufficiently to lead to a return to sustainable double-digit RoE and materially improved profitability—not only taking a firm on the path to technology-driven transformation, but also freeing up capital that could be used for more ambitious investments.

There is, however, one area that could yield even greater improvements in returns than the four points mentioned on the previous page: reducing capital requirements. Regulators are consistently pushing for greater capital backing through global frameworks like Basel 3, minimum requirements for eligible liabilities and the FRTB. The panacea would involve using intelligent automation to monitor risks much closer to real time, big data and machine learning to identify forward stress indicators far faster than humans, and anonymized and centralized pooling of balance sheet data (perhaps on a blockchain) to see risks in areas that aren't even on your balance sheet.

When both regulators and management appreciate the power of modern data science and analytics in these areas, then the industry will be on course for a potentially lower-risk banking system without simply choking credit from the economy.

CONCLUSION

The global capital markets of 2022 will deliver the same outcomes and industry needs: they will help companies and governments raise capital, they will help investors find and access returns, and they will help manage financial risks. But the way in which these outcomes are delivered is likely to change dramatically, strongly influenced by new technology paradigms and digitally-led operating models.

As we journey toward 2022, technology will be a way for firms operating in the capital markets industry to get ahead and differentiate. The successful ones will be able to point technology in the right direction, align it to their business needs and execute seamlessly. Technology, after all, is simply a tool that can provide scale and rapid access to insight and information—it rarely determines the service that needs to be scaled.

To lead, firms will need to move beyond purely thinking of digital in the pursuit of cheaper operating costs, to rethinking and repurposing the organization for a fully digitized economy. That means learning to be sensitive to the changing customer—encompassing the functional, emotional and social needs that together drive their expectations and experiences. It means being more open and accessible—being able to use platforms, talent pools and networks to orchestrate services around their clients, while extending their reach. It means designing business and operating models around constant change—continuously unlocking investment capacity to invest in innovation, and building a simpler architecture that supports resilience and agility.

Following these five design technology principles and getting the technology strategy right is imperative, but it's only one side of the coin. The other is taking a view on where value is migrating across the ecosystem, and realigning your business and operating models toward it—not just within today's buy-side, sell-side and infrastructure models, but also across them.

Many firms operating in the capital markets industry have had their ability to fully control their own destiny reduced over the last decade. With the right network of talent and technology, and a commitment to bold change and innovation, the next decade will give them the ability to find new ground in which to thrive.

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