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The new physics of financial services

How artificial intelligence is transforming
the financial ecosystem

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Introduction

Dear colleagues,

Much ink has been spilled on the role of artificial intelligence (AI) in financial services. But the bulk of it has been about technical requirements or near-term trends. For those trying to understand the strategic implications of AI in the industry, the body of work has been slim.

Deloitte Consulting LLP (Deloitte) recently joined with the World Economic Forum (the Forum) to address this gap. Over ten months, we conducted a half-dozen global workshops and more than 200 interviews with experts. The results of that research are contained in the Forum report, *The New Physics of Financial Services: Understanding how artificial intelligence is transforming the financial ecosystem*. This document is a summary of those findings.

Our aim is to help financial executives, regulators, and policy makers gain clarity around the ways that AI is:

- Changing the operating models of financial institutions
- Affecting strategic priorities and competitive dynamics
- Raising challenges for public policy

Since 2015, Deloitte has worked with the Forum to gauge the forces of change in financial services. Our work represents four years of research into ways that technology is disrupting the financial services ecosystem. We hope the results help to guide your own journey into the industry's future.

Sincerely,

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More from the Forum and Deloitte

The future of financial services (2015)

The future of financial infrastructure: An ambitious look at how blockchain can reshape financial services (2016)

Disruptive innovation in financial services: A blueprint for digital identity (2016)

Beyond Fintech: A pragmatic assessment of disruptive potential in financial services (2017)

Underpinnings

What is artificial intelligence?

No one quite agrees. Every definition has its variation—slight and not-so-slight.

Part of this has to do with the “AI effect,” which seems to happen with every breakthrough in AI technology. No matter the capability, someone finds a reason to conclude that the underlying programming isn’t real intelligence at all. And so the AI target moves again.

But it’s difficult to have a productive discussion without establishing some kind of common rhetorical ground. In that spirit—and without claiming anything other than a desire to reflect what experts appear to mean when they mention AI—we offer the following non-technical definition.

Artificial intelligence is a suite of technologies, enabled by adaptive predictive power and exhibiting some degree of autonomous learning, that dramatically advance our ability to:

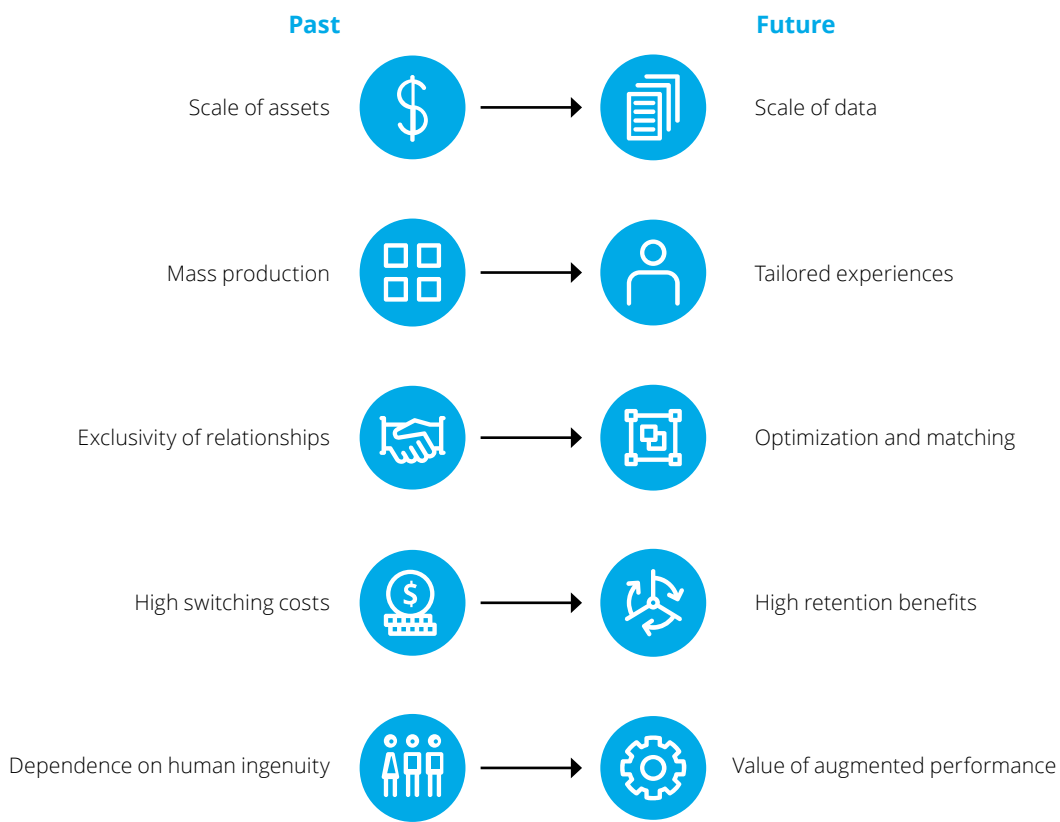
- Recognize patterns
- Anticipate future events
- Create good rules
- Make good decisions
- Communicate with other people

These advances are rapidly changing what it takes to build a successful business in financial services.

To get an idea of how profound this change is, consider the old paths to industry dominance. Large assets provided economies of scale. Physical locations and standardized products drove cost-effective revenue growth. Direct access to markets and connections to investors discouraged competition. It was difficult to switch providers, so customers tended to stay. At the same time, process efficiency was a function of human labor and know-how.

Eventually, AI will transform every one of these building blocks. Technology will make operations efficient enough that asset size, although still important, will no longer be sufficient on its own to build a successful business. As a result, competition to achieve scale of data flow-through will be more important to sustain cost advantages. Meanwhile, revenue will come not from standardization but from the highly customized products and personalized interactions that AI makes possible. Neither will exclusive relationships be a differentiator; in a digitized world, providers will be known for their ability to create well-matched connections. Customers will stay with an institution, not because it's hard to walk away but because their benefits are better there than anywhere else. Process efficiency will result from the interplay of human and artificial strengths.

Figure 1: AI is reshaping the building blocks of success in financial services



From these new building blocks, an unfamiliar environment will appear, one that has been reassembled to:

- **Deliver new kinds of value.** Product and service innovation will lead to greater financial inclusion and a sleeker, more personalized customer experience.
- **Reshape operating models.** Financial institutions will become leaner, highly networked, and more specialized. They'll also become more dependent on the capabilities of large technology players.
- **Upend competitive dynamics.** Data sharing will become critical to competitive success. The advantage will go to first movers and large-scale players in an increasingly bifurcated market.
- **Take public policy into uncharted territory.** AI will raise questions that challenge government and society, prompting the need for a new set of norms to protect humans, regulate machines, and remake the financial infrastructure.

The result? A great upheaval—of capabilities, resources, relationships, and potential. Old bonds will break. New ones will form in unexpected ways. The center of gravity will shift, and where it comes to rest depends on the choices that stakeholders make today.

AI: A glossary

Experts disagree on what AI is—or isn't. And even a consensus on the technical attributes of AI wouldn't necessarily help business leaders understand what the technology could do for their organizations.

But in the ongoing global conversation about AI, certain terms come up again and again. Here's a selection of those terms, along with what they mean in the context of advanced computing technology.

Term	Capability
Customization	Generate rules from specific profiles and apply general data to optimize outcomes
Decision making	Generate rules from general data and apply specific profiles against those rules
Foresight	Determine the probability of future events
Interaction	Communicate with humans through digital or analog mediums
Pattern detection	Recognize regularities in data

Value creation

AI is changing how financial institutions get and keep customers. Even as it commoditizes traditional points of differentiation, AI offers the opportunity for significant market innovation. The one certainty is that firms must adapt their products and services for the day when AI automates customers' financial lives—or much of it, anyway—and improves their financial outcomes.

A new proving ground for customer loyalty

Historically, financial institutions have relied on price, speed, and access as ways to attract customers. But online platforms are making it easier for customers to compare prices. Emerging technologies are reducing instant product and service delivery to a basic expectation. And thanks to digital distribution, there's less need for intermediaries in the course of doing business.

As the old levers become less effective, new ones are coming up in their place. They include:

- **Customization** of offerings to customers' specific financial needs and objectives
- **Engagement** through ongoing and integrated interactions beyond financial services (such as offering forecasting services to merchants or booking repairs for auto damage)
- **Curated ecosystems** based on data from consumers, corporate clients, and third parties

These levers will provide stronger ways for financial institutions to compete on value, retain customers, offer differentiated advice, and provide one-stop solutions. They're becoming possible because AI breaks the tradeoffs between better service and cost.

That said, some of this requires competing with existing offerings in different industries. And firms may need to move forward before knowing what the natural equilibrium of price will be in a platform economy—or the margins institutions might expect to earn.

Examples

Integrated services beyond financial products	RBC is piloting a forecasting tool for car dealers to predict demand for vehicle purchases based on customer data. By offering this tool alongside their lending solutions, RBC motivates auto dealers to offer RBC lending products more frequently. ^{1,2}
Ecosystem curation	Lloyds Banking Group committed US\$4.1 billion a year in a digital strategy that positions the company to combine banking and insurance services and pursue new API-enabled propositions. The aim is to be an ecosystem provider and a "trusted guardian of data" in the age of many providers. ³
Data and insight at scale	Ping An's suite of finance, medicine, cars, and housing apps has attracted over 880 million users, 70 million businesses, and 300 partners. The firm uses the data they generate to close service gaps and improve the overall quality of offerings. ⁴
Foreshadowing in the tech industry	Companies such as Google and Amazon are using their technological advantage and scale of data to satisfy customers' increasing preference for engagement and relevant, valuable experiences. ⁵

Implications



Granular insight into customer behavior becomes critically important—inside and outside of financial services

Institutions will need to be highly focused on delivering what customers actually want. This means getting to know customers beyond financial services and looking for opportunities to improve their day-to-day lives.



Product development and a willingness to experiment become critical skills for institutions

To succeed, incumbents must harvest new resources and ways of working, including technical AI skills, product development capabilities, and datasets. They'll also need to cultivate a bias for innovation and experimentation.



Large tech firms have distinct advantages in attracting new customers

Tech companies ordinarily capture user attention—and data—through free products and services. The financial services these players offer end up benefiting from the existing service shelf.



Margins are squeezed in institutions that fail to develop new differentiators

Institutions that procrastinate in creating new ways to differentiate their products face an uphill battle at preserving margins, especially once technology normalizes traditional metrics like price and speed.

Key questions to consider

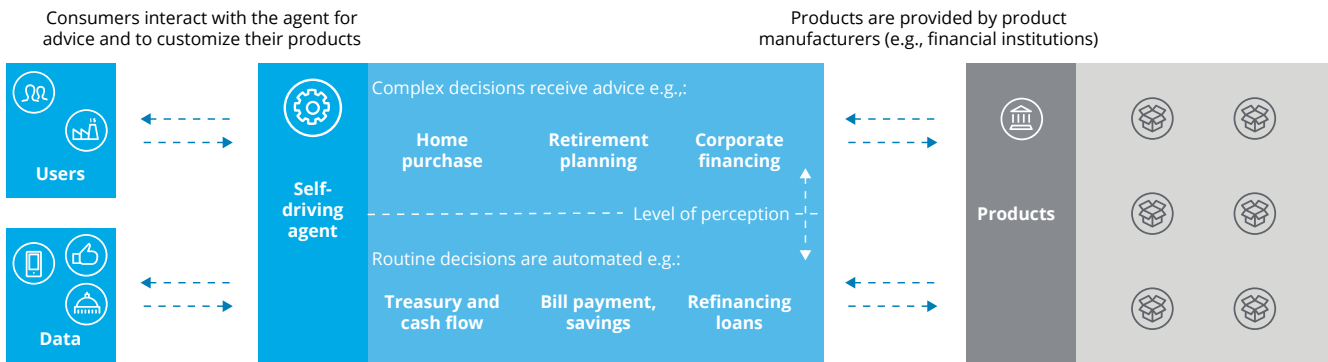
- What are the most effective offerings companies can pursue?
- What does it take to be sustainably different?
- How can institutions go about implementing this change in mentality? What capabilities do they need to build or acquire?

Self-driving finance

Financial advice, part of every product, is often generic and impersonal. It also tends to be overly reliant on subjective advice from different customer service agents. The product and customer information needed to improve financial outcomes can be hard to pull together, both within and across institutions.

Enter self-driving finance. In this reimagined experience, consumers interact with an AI-based agent for advice and product customization. The self-driving agent offers guidance on complex decisions such as homebuying, retirement planning, or corporate financing. At the same time, it automates routine transactions such as bill payment and refinancing. Products come from financial institutions, as they do today with human agents.

Figure 2: Self-driving finance could transform the delivery of financial advice



AI enables self-driving finance in three key ways. First, the technology can compare products and providers to arrive at an optimal price and fit for the customer. It also can personalize both the advice and the products it offers to a degree that isn't economical for human agents to do. Finally, a self-driving agent can manage day-to-day finances entirely behind the scenes. It avoids fees, monitors for better deals, and more on the customer's behalf, without the customer having to intervene.

In every scenario, it's data—from customers, groups, third-party platforms, and financial institutions themselves—that sustains the agent and informs its decisions.

Still unknown is who delivers the self-driving agent. Will it be incumbents, new entrants, or large technology companies? Neither is it clear how the interests of consumers will align with those of product manufacturers and self-driving agents. Put another way, the accountability framework for algorithm-driven decision-making has yet to be determined.

Examples	
Next-gen personal financial management	Early personal financial management apps assessed the user's financial situation but offered no actionable insights or recommendations. Now, firms like Clarity Money and MoneyLion are using AI to offer personalized advice about refinancing, debt management, and more.
Consolidation of financial lives	Citi's mobile app provides customers with a 360-degree view of their financial lives across all banks and providers. ⁶ Meanwhile, chat platforms like WeChat enable interoperability across different financial services verticals.
Automation of savings and bill payment	Apps like Acorns round up customer transactions and transfer the balance to a savings account. On the payments side, startups like Tally aggregate all of a customer's cards into one account and pay each bill through a single line of credit.
Customer-centric banking infrastructure	New, cloud-based infrastructure lets institutions treat an entire product portfolio as a single balance sheet to enable dynamic customization and pricing. For example, Thought Machine's core infrastructure treats products as smart contracts so banks can quickly customize and deploy them through a wizard or direct code.
Financial management via multi-provider platform	Increasingly, multi-provider platforms are looking to fortify their offerings through personalized recommendations of products and features. One example: Credit Karma, which has found success as a lead generator for loans, aims to build financial advisor tools and extend their control of customer experiences. ⁷

Implications



Owners of customer experience earn the largest margins

Those who face customers will likely keep them because self-driving agents become more accurate as they collect more data. This lets customer experience owners exert market power and nab the lion's share of profits.



Customer interaction is much less frequent

As the customer experience becomes automated, fewer interactions take place between provider and customer. But the interaction points that do persist become increasingly important and centered around advice.



Product manufacturers reshape themselves around algorithms

Tech companies ordinarily capture user attention—and data—through free products and services. The financial services these players offer end up benefiting from the existing service shelf.



Conduct risk is larger and rarer

As self-driving agents take over sales activities from sales staff, conduct risk significantly declines. But when misconduct does occur, it does so at a much larger scale.

Key questions to consider

- How can companies stand out in a self-driving future?
- What “quick wins” can financial institutions achieve to delight customers?
- What does channel strategy look like with a self-driving channel in the mix?

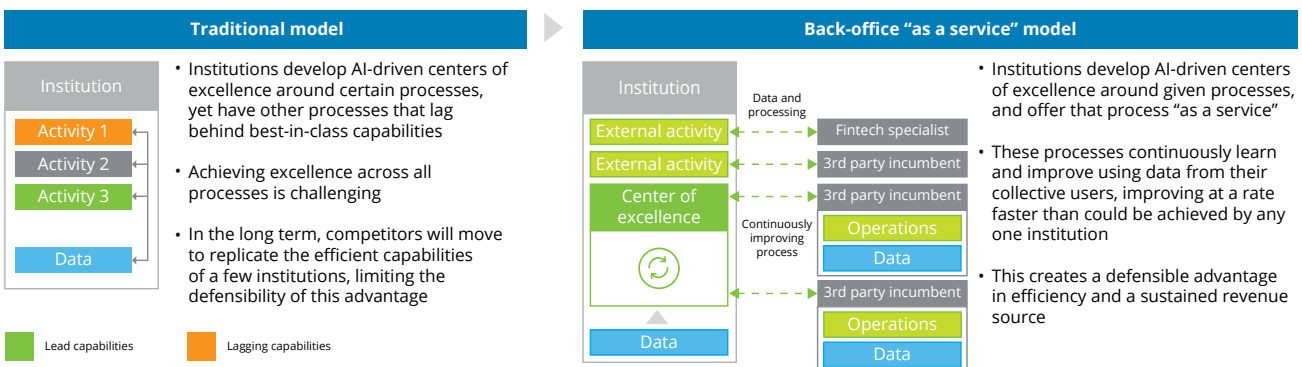
Operating models

AI isn't just for the front of the house. It also holds out exciting changes for the back office, potentially improving it to the point where institutions make parts of it available as a commercial service. But here, as elsewhere in the organization, AI's effect on talent can be a speed bump. To preserve their competitive position, firms will have to carefully manage the interplay of talent and technology.

From cost center to profit center

AI may end up prompting firms to turn their centers of excellence into services, while outsourcing most other back-office capabilities. Why? Because it's hard to excel at everything, and over time competitors are likely to replicate the processes that are efficient but not best in class. At the same time, the processes that do achieve excellence under AI could improve so rapidly that it becomes impossible for others to catch up. At that point, the center of excellence becomes both a defensible advantage and a sustained revenue source for the institution.

Figure 3: AI-enabled back-office functions will allow firms to turn their centers of excellence into services



That's not to say AI won't affect other parts of the back office. Intelligent technologies are coming along at a time when financial institutions are looking to modernize their operations, for example by using cloud-based architecture. Moving to the cloud makes it easier to "plug and play" with third-party services. It also makes it easier to turn internal centers of excellence into commercial offerings. And if the commercial offerings are enhanced with AI, they can bring in more data for the technology to learn from and continuously improve.

Early movers have the advantage in this profit-center scenario. In the open-source AI environment, it's not so difficult to mimic algorithms. It's a lot more difficult to amass high volumes of quality data.

Existing software-as-a-service offerings provide a blueprint for AI-based outsourced services. With that, incumbent institutions still must figure out how to build centers of excellence that are attractive service offerings. Another quandary is how to protect the value of proprietary data when firms must share that data with competitors in order to achieve minimum requirements of efficiency. The effect of data regulations on outsourced back-office processing might impact the globalization of financial services. Finally, concerns about data security and cloud architecture have yet to be resolved.

Examples

Modular microservice architecture

IDC estimates that by 2021, 80 percent of application development will take place on cloud platforms using microservices and cloud functions.⁸ On the back end, cloud infrastructure makes up one-third of all IT spending in financial services and is growing at over 20 percent CAGR as institutions push to migrate legacy technology onto modern platforms.⁹

Virtuous data cycles

AI can help institutions continuously improve their services in what is sometimes called a virtuous data cycle.¹⁰ Google Translate, Spotify's Discover Weekly, and Facebook's timeline algorithm are examples of services built on AI that have been progressively improving over time as users interact with them. Those who start from scratch in trying to compete with these services face a steep uphill battle.

Externalization of best-in-class processes

BlackRock and Ping An are two examples of incumbent financial institutions that developed respected internal services, then made them commercially available. BlackRock CEO Larry Fink has stated that he wants Aladdin to make up 30 percent of BlackRock's revenues.¹¹ Ping An's OneConnect is its internal advanced technology infrastructure, covering everything from core banking technology to advanced AI capabilities. They have transformed this technology into a service offering used by nearly 500 banks across China.¹²

Implications



Operational efficiency stops being a competitive differentiator

Back-office processes become increasingly uniform across financial services as most institutions consume similar capabilities, forcing institutions to look for new differentiators.



Market power favors service providers

As service offerings become increasingly efficient, institutions that use those services face high switching costs, allowing providers to charge high margins for them.



Redundancies decline while concentration goes up

As financial institutions rely on a diminishing number of critical systems, systemic risk rises as flaws within those systems acquire an outsized impact on financial services.



Talent shifts from financial institutions to service providers

Once institutions become mostly consumers of capabilities, the balance of jobs shifts to service providers, making roles look considerably different.

Key questions to consider

- What capabilities does it take to build an AI center of excellence?
- What process areas should institutions build out internally versus outsource?
- How will data regulations impact the globalization of financial services?

Finding a balanced approach to talent

In the context of AI, talent is a touchy subject. The near-term focus for AI appears to be on doing the same things better. This could lead the industry to shed jobs faster than they create them. But letting this happen in the absence of a long-term talent strategy could cause financial institutions to stumble as they attempt some of AI's bigger opportunities.

It's entirely possible that the business models and competitive dynamics that AI generates will lead to net new opportunities for talent. And success in these new business realities will be predicated on distinctively different strategies around roles, culture, and rewards. Failure to adapt could result in:

- **Stalled capacity for innovation.** Initial efforts of experimentation remain siloed, with only small segments of talent being exposed to new opportunities.
- **A myopic focus on the near term.** That is, eliminating redundancy does little to address a hierarchical, bureaucratic environment opposed to new ways of working.
- **Strategies that reward the status quo.** Rewards, recognition, and retention work against the ultimate vision for business growth.

In short, the industry confronts an historic under-investment in talent and technology. To head this off, financial executives should weigh what to do differently to manage their talent needs. What kinds of talent do firms need for new business models? How can humans keep pace with technological transformation? Then there's the role of government during this period of change. More on that later.

Examples

AI in the back office

The back office of a financial institution often has thousands of people processing customer requests or tackling reporting needs. For a European bank where 70 percent of applications were paper-based, digitization and automation enabled staff to spend 70 percent less time processing forms.¹³

AI in the front office

JP Morgan's asset management group is developing a software robot equipped with machine-learning capabilities to boost the efficiency and profitability of its trading desk.¹⁴ Another area of opportunity for financial institutions: contact centers, where services like Amazon Connect offer cloud-based, AI-driven solutions to replace the facility and staffing of these sizeable environments.¹⁵

Reskilling in an AI-powered organization

Confronting a significant mismatch between the human knowledge and capabilities they need today and those they will need to remain competitive in coming years, incumbent institutions like Scotiabank, BNP Paribas, and BlackRock have begun prioritizing efforts to reskill their workforce.^{16, 17, 18}

Cultural shifts in an AI-powered organization

Beyond reskilling, financial institutions must reshape their organizational cultures to attract and retain sought-after skills and capabilities. This can include broadening roles, pushing decision-making authority to the individual contributor level, and building attractive environments that enable the adoption of AI.

Implications



Institutions remain unsure of the skills they need

Efforts to reskill lack a clear view on the roles and responsibilities that institutions and individuals need. Without a longer-term vision and coordinated strategy, some institutions have a skills deficit and some individuals are out of work.



The value of talent requires new investment

Too many firms see talent strategies as an administrative hurdle versus a strategic enabler. Institutions search for a new framework to understand how the success of other investments depend on the evolution of their talent.



Resistance to change leads to a number of false starts

The most significant roadblock to change comes from people, thanks to insufficient time, effort, and investment allocated at the onset of transformations.



People management becomes a competitive advantage

Financial institutions that create new talent experiences via elevated and evolved policies, processes, and structures become leading executors of business transformations.

Key questions to consider

- What could financial executives do differently to manage talent transformation more effectively?
- What are the specific talent archetypes that financial services will need to evolve and perform within new business models?
- How can financial institutions accelerate transformations when training, learning, and adapting takes place at human speed?

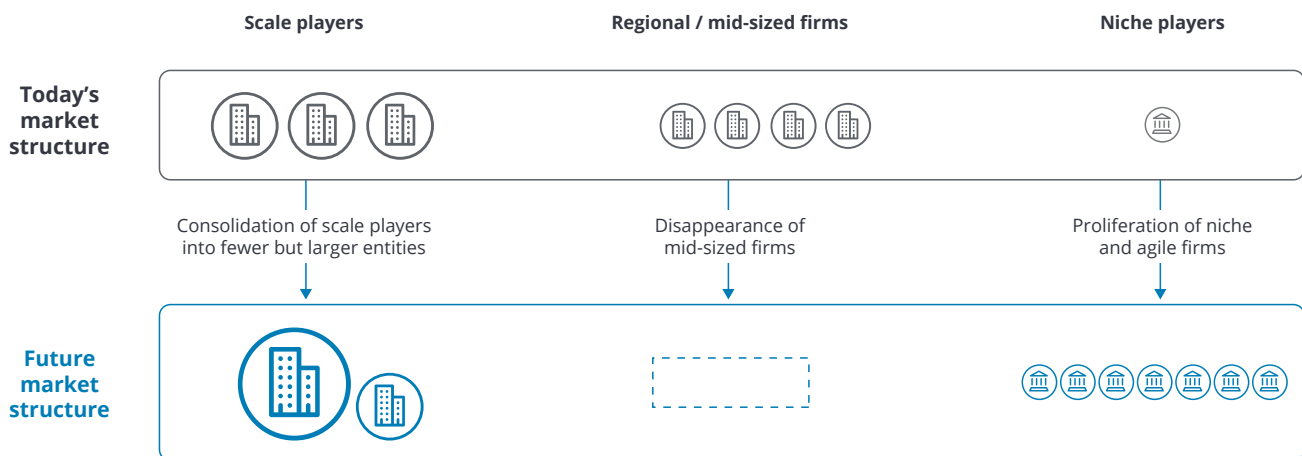
Competition

As AI reduces search and comparison costs for customers, financial services providers will find themselves at extreme ends of the market. This will amplify returns for large-scale players and create new opportunities for niche and agile innovators. With every institution vying for diversity of data, more firms will join forces with competitors and potential competitors—a strategy fraught with strategic and operational risks.

Bifurcation of market structure

The economics of AI will push market structures to extremes, giving the advantage to large-scale players and agile innovators. If this happens, mid-sized firms can become a thing of the past.

Figure 4: The economics of AI will push market structures to extremes



Why? For one thing, AI platforms—having noticed that price drives many financial products such as loans and insurance—will aggressively push customers to switch to lower-cost providers. For customers with different needs, optimization algorithms will find the niche products that fit them best. AI will also make it cheaper for firms to create products in response to this demand.

All this can make it tough for mid-sized firms to compete. They'll struggle to make the investment they need to stay in the game once larger incumbents become AI service providers themselves.

In this scenario, regulators will need to decide how to respond to the increased consolidation of assets. They also may be pressed to reduce regulatory barriers to enable new entrants. An open question is to what extent consolidation of scale players becomes a cross-border phenomenon, with international firms aggressively expanding in domestic markets.

Examples

Market extremes in asset management

In exchange-traded fund (ETF) markets, automated platforms such as robo-advisors enhance the ability to seamlessly optimize investments and fees. At the other end of the spectrum, a new class of funds—led by innovators who use AI and quantitative investing to deliver differentiated return profiles—can scale rapidly without a substantial increase in their costs or staffing.

Investment gaps between large and mid-tier firms

Firms with fewer assets trail larger investment firms in both AI and digital transformation. A survey by DBR Research finds that 48 percent of banks with more than US\$50 billion in assets have deployed an AI solution, compared to 7 percent for banks with US\$1 billion to US\$10 billion in assets.¹⁹ One reason for this is that mid-tier firms have tighter investment budgets and greater reliance on technology vendors.

Implications



Scale players acquire focus and efficiency

To retain the favor of recommendation algorithms, scale players maximize their economies of scale by focusing on key products and divesting from peripheral activities that may undermine price and performance.



Mid-tier players consolidate

As mid-sized financial institutions become less profitable, they become acquisition targets for scale players.



Lower costs of entry enable a new generation of product manufacturers

Innovative entrepreneurs form new firms and scale them rapidly. These firms look radically different from traditional financial institutions.



Product shelves widen and diversify

As more niche players enter the market and try to fill unique and underserved needs, consumers gain products that are a better fit for their financial requirements.

Key questions to consider

- With the likelihood of increased consolidation in the industry, how will companies navigate greater cross-border activity to thrive or survive?
- What can mid-sized players do to avoid being acquired? Build niche capabilities? Look at selective investments in AI? Or perhaps explore partnerships?
- As operational barriers to entry give way, how will institutions plan for regulatory changes aimed at maintaining a level playing field, enabling competition and consumer protection?

Uneasy data alliances

Data partnerships will have winners and losers. Some firms will be pushed to the periphery. Others will emerge as ecosystem hubs.

Either way, the AI opportunities that institutions hope to capture will likely be short-term ones. Partnerships may be a quick way to get the depth and breadth of data firms need for more accurate models and more complex use cases. Access to end users also raises the possibility of virtuous data cycles.

But the risks of partnerships will be long-term. The customer experience tends to be winner-take-all, especially in platform and self-driving ecosystems. Winners gain excessive market power, enabling them to pit providers against one other. But they also gain more exposure to security and privacy risks that could break apart their partnerships. They might also end up with diminishing power of asset scale if the data gap between large techs and incumbents continues to grow. And then there's partnership lock-in. A too-great reliance on data flows from partnerships can perpetuate relationships that serve firms poorly in the end.

Of course, all these tensions are manageable. Other firms have figured out how. Will financial institutions, especially in light of open banking? Time—as it generally does—will tell.

Examples

Growing alliances

The employee health insurance alliance among JP Morgan Chase, Amazon, and Berkshire Hathaway hints at the power of collaboration.²⁰ The alliance will use big data and technology to align incentives, improve customer engagement, and improve targeted programs for clinical and behavioral health. However, this has given rise to speculation that Amazon may eventually disrupt financial services.

Proliferating upstarts

As the UK Open Banking Standard and PSD-2 take effect, a number of niche providers has emerged. Challenger banks such as N26, and third-party providers such as Squirrel and Klarna, are rapidly expanding across Europe. These players can extract from incumbent institutions the data they need to power their operations—without, in some cases, giving the incumbents reciprocal access.

Growing tensions with technology companies

Technology companies—think Google Pay and Uber's Credit Card—are building products to access and generate financial data. But these initiatives are misaligned to shifts in the industry: data is increasingly important to differentiation, while profits from transaction revenues are in decline. As a result, competitive tensions between technology companies and financial institutions are likely to grow.

Emerging ecosystems in Asia

New financial services ecosystems are emerging in Asian countries. Some of them, like Taikang Life, are layering apps on top of existing tech platforms such as Wechat. Wechat connects customer data with financial institutions and financial institutions with one another. The platform becomes the critical provider, while the financial services provider is interchangeable based on customer preferences.

Implications



Partnership development becomes a critical competency

Developing the right data partnerships while mitigating potential tensions in those relationships allows firms to sustainably develop unique and differentiated products, insights, and experiences.



Large tech companies become critical sources of data and customer experience

Due to their data advantage, large technology firms anchor the financial value proposition. Incumbents partner with these firms so they can quickly access customers and data.



Emerging tensions threaten alliance longevity

By positioning themselves as the critical link across the ecosystem, firms can turn other participants into commoditized service providers. Tensions arising from this may limit the longevity of emerging alliances.



Data sharing restrictions leave firms at a disadvantage

Firms that oppose data sharing struggle to form the data partnerships necessary to develop AI capabilities, which risks leaving them uncompetitive.

Key questions to consider

- What products and services will be most reliant on third-party data to be competitive?
- Who will retain control of the customer experience in partnerships between tech companies and financial services firms?
- How will smaller companies negotiate effectively with large tech companies, particularly if they already have major financial services partners?

Public policy

At the center of the AI story lies data. With expansive amounts of data powering the virtuous cycle of improvement, financial institutions may find it practical to pool what they have so they can build common solutions for non-competitive functions. If that happens, firms could not only realize mutual efficiencies in operations—they could make the financial system safer as well.

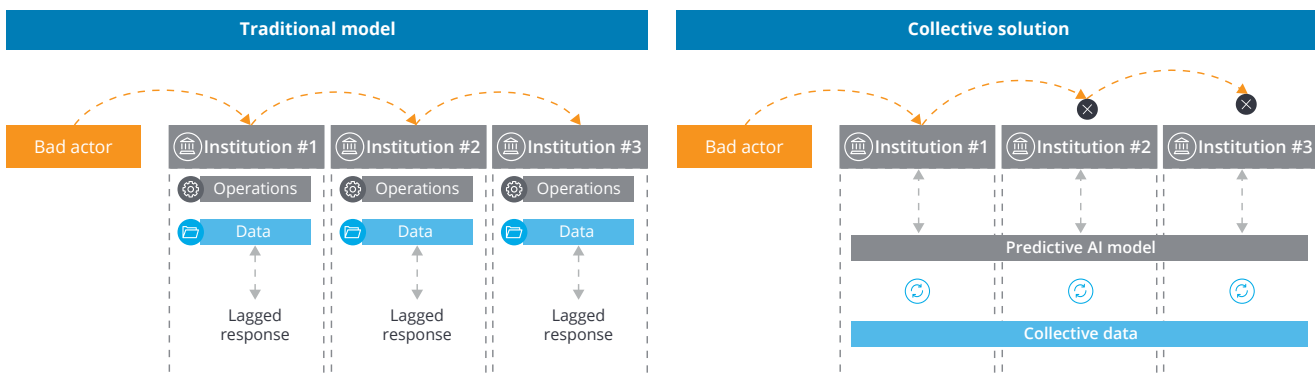
But there are regulatory issues to consider. Rules around data privacy and portability will affect the relative ability of financial and non-financial institutions to deploy AI. On top of this are AI's potential risks to societal and economic well-being. Addressing these issues will go a long way toward encouraging institutions to adopt more transformative AI capabilities.

Collective solutions for shared problems

AI-driven utilities offer a chance to address some of the challenges of today's financial system. They can do this by addressing data asymmetries that impede fraud prevention, anti-money laundering, and other processes intended to make our financial system safer and more reliable. A solution becomes even more important given that a problem with the process at one institution can have a ripple effect on other institutions across the ecosystem.

Since these processes are rarely strategic—and often generic across product categories—institutions might find it's worth trading their proprietary approach for the flexibility and efficiency of a mutual one. AI can then recognize patterns across the shared dataset and develop insights on threats that cross institutional boundaries.

Figure 5: Collaborative AI-driven tools built on shared datasets can unlock a safer, more efficient financial system



Besides leadership and investment, a collective solution requires some means to keep it aligned with the interests of its stakeholders. There also must be agreement on how utilities, collectives, and individual institutions will share liability for errors and compliance failures. Then there's the question of whether cross-border solutions are even possible given the diversity of financial and data regulations. We'll discuss some of those challenges next.

Examples	
Strained budgets	Cumulative financial penalties for noncompliance between 2009 and 2017 totaled US\$345 billion globally, ²¹ with 89 percent of industry executives expecting continued cost increases in global compliance from 2017 to 2019. ²² Besides leverage and capital requirements, there is increased regulatory focus on collective issues such as financial crime, privacy, and data security.
Collective risks	Many have speculated that real-time payments bring real-time fraud. The United Kingdom experienced a 132 percent increase in fraud the year after they implemented the Faster Payments Service. ²³ Thanks to automation, insurance fraud cases are expected to double. ²⁴ Experts have warned that the proliferation of AI technologies could enable new forms of cybercrime and other threats across different industries.
Improved transaction monitoring	Companies like ComplyAdvantage and Shift Technology have shown significant benefits to using AI-based algorithms to monitor transactions. ComplyAdvantage claims to have achieved an 84 percent reduction in false positive alerts for anti-money laundering risk data, while Shift Technology is using AI to help insurers fight claims fraud. ²⁵
Emerging collective utilities	Collective institutions such as SWIFT and EarlyWarning have started developing service offerings that apply AI and the collective power of data against some of the system's biggest threats. SWIFT is launching a new, AI-equipped fraud control system. EarlyWarning is a fraud and risk management technology company started by a collective of the largest US banks.

Implications



The safety of the financial system is radically improved

Real-time scanning, using full-market data, dramatically increases institutions' ability to head off threats and nip malicious activities in the bud.



Efficient compliance becomes a commodity

As institutions share compliance services, they participate on the same competitive plane—removing efficiency of compliance as a competitive differentiator.



Accountability and control become increasingly unclear

As shared utilities take on certain processes, institutions seek to offload accountability to them. Meanwhile, regulators push to hold institutions themselves accountable, even for the processes that are collectivized.



Leadership priorities shift toward competitive imperatives

Institutions gain some latitude in their leadership agendas and investment dollars. As a result, they shift their focus from regulatory and system protection to their own strategic priorities.

Key questions to consider

- What is the right ownership framework for collective utilities to ensure their interests are aligned with their stakeholders?
- How will utilities, collectives, and individual institutions share liability for errors and compliance failures?
- Is it possible to develop cross-border solutions given a growing divergence in financial and data regulations?

Regulatory and ethical dilemmas

Global data regulations are undergoing a period of unprecedented change as governments move to adopt new rules to protect and empower citizens. These rules affect the development of AI in a number of ways, including:

- **Use of cloud-based services.** Regulations on cloud usage by financial institutions vary globally, with stricter restrictions in Europe. In regions with more relaxed rules, technology players have the advantage in developing new capabilities.
- **Use of personal data.** New privacy and data protections limit the collection, transmission, and storage of personal data. As a result, data partnerships are becoming increasingly difficult to manage. Meanwhile, consumers are gaining increasing control over how businesses use their data.
- **Access to financial data.** Regulations in Europe require incumbent institutions to share customers' financial data with third parties (at the request of the customer). But the data sharing is one-way: Third parties needn't reciprocate by sharing their nonfinancial data with financial institutions. This means large technology firms can use financial data alongside a wealth of other personal data to secure a head start in developing new AI models.

Other risks of AI are beyond the scope of financial regulators. They can affect such things as:

- **Financial safety.** AI exposes the industry to broader risks of contagion, as AI demands ever-tighter connections across domestic and cross-border systems.
- **Global and regional economic growth.** AI could polarize global communities as competition around AI development becomes a point of regional conflict.
- **Consumer protection and the public interest.** Despite its potential to democratize financial advice, AI could also perpetuate financial exclusion among segments of the population.
- **Employment and human capital.** AI will reduce the need for labor across routine tasks, leaving some people out of work.
- **Experience of other industries.** AI is susceptible to creating excessive concentrations of market power and driving income inequality.

For all the good AI can and will do, its potential risks to economic and societal well-being are too great to be left to chance.

Examples

PSD-2 and GDPR

The revised Payment Services Directive (PSD-2) of the European Union came into force in January 2018, with the aim of enabling more innovative payments across Europe. Together with the General Data Protection Regulation (GDPR), this requires institutions to carefully balance the need to share data with third parties against the risk of substantial penalties in cases where data is mishandled.²⁶

Open banking

The United Kingdom is one of the first jurisdictions to adopt Open Banking as a mandate across financial services. In 2016, the Competition and Markets Authority reported that "older, larger banks do not have to compete hard enough for customers' business, and smaller and newer banks find it difficult to grow and access the market."²⁷

Emerging Chinese ecosystems

Although China lacks an open banking framework, the system has been very conducive to fintechs and third-party providers. Application programming interfaces (APIs) between incumbent institutions and technology companies such as Wechat and Alipay have allowed these platforms to become interoperability layers to facilitate the flow of data across institutions.²⁸

Examples (continued..)

US-style laissez faire

In the United States, data-sharing alliances are more ad-hoc rather than mandated, with individual banks building bilateral relationships with data aggregators. Regulators have not signaled their intention to implement similar frameworks to the United Kingdom and the European Union.²⁹ But Congress has been listening to testimony from large tech companies such as Facebook, Google, and Twitter on the topic of privacy and data security, which could lead to the emergence of new rules.³⁰

Other potential regulations

Governments around the world are considering radical changes to their data openness regimes. Australia, Singapore, Canada, and Iran—among others—are actively considering some form of the open banking regulatory model.^{31, 32}

Implications



Incumbents must help to shape data regulation in order to remain competitive

Wide-reaching, cross-sector data regulations affecting entire economies determine whether incumbents can get the external data they need to continue owning the customer experience.



Data regulations currently being formulated cast long shadows over financial markets

In many jurisdictions, data regulations remain in development. As these regulations solidify, they affect financial markets for years to come.



Fintechs thrive by using AI to develop unique offerings and open banking to access data

Heightened requirements for data portability erode incumbents' advantage, allowing fintechs to compete more effectively in the big-data realm.



Digital identity systems are critical to managing personal data flows

As consumers gain control over how their data is used, they need an easy way to manage consent and authorization. The likely solution is a digital identity system.

Key questions to consider

- What form will new open banking and data privacy rules take around the world, and how will it affect financial institutions?
- What norms will develop regarding international data flows? How will divergent rules affect cross-border data flows?
- What solution is there to address consumer concerns regarding improper data usage and data sharing?

Concluding thoughts

Understanding and adapting to AI is a journey. It's a journey subject to the headwinds and tailwinds of economic, social, and political change. It's also a journey no firm should take on its own.

The future of financial services lies in its ability to fully benefit from new technologies. AI is a new technology that will make front and back office operations look radically different, create major shifts in the structure and regulation of financial markets, and raise critical challenges for society to resolve. Nothing less than a collaborative effort will triumph over these challenges and unlock AI's benefits for the best interests of business and society.

Where to go from here? We suggest the following:

- Continue with short-term value. However, don't let short-term priorities distract from understanding the long-term implications of AI and making the appropriate investments to prepare for transformation.
- Form strategic collaborations. Rely on open forums to solve for issues collectively. Meanwhile, take advantage of shared capabilities to fulfill supervisory responsibilities.
- Work with policymakers. Concentrate on the ways AI will change various segments across the system as well as on new mitigations to explore.

We'll leave you with this thought. AI in financial services—for individual institutions, the economy, and society—is a long-haul flight. Getting it done, and done well, will take extensive and unglamorous work. Will it add complexity? Yes. Does it represent great progress? Also yes.

The Forum will continue to explore the effects of AI in financial services. If you'd like to discuss the ideas in this report—formally or informally—we'd like to hear from you.

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