

2023 FSI Predictions

*Emerging developments and trends in the
financial services industry (FSI)*

Deloitte Center for Financial Services



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Insights

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Industry spending on quantum computing will rise dramatically. Will it pay off?

Many financial services firms will load up on quantum technologies to enhance capabilities and gain a competitive edge. But they may need to play defense first.



The age of quantum computing is fast approaching, and the financial services industry should prepare now. Increased capital investments and patent filings for hardware technology indicates spending on quantum-related capabilities will likely grow quickly over the next few years.¹ Globally, the financial services industry's spending on quantum computing capabilities is expected to grow 233x from just US\$80 million in 2022 to US\$19 billion in 2032, growing at a 10-year CAGR of 72% (figure 1).² Firms that are working on developing quantum-related capabilities now could enjoy a competitive advantage as these capabilities mature.

Quantum computers are expected to radically enhance computational capabilities for complex mathematical operations, such as financial simulation and modeling.³ They could also pose a risk to cybersecurity.⁴ This risk arises from their potential ability to implement an algorithm developed in 1994 by Peter Shor (Shor's algorithm), which would render a lot of current-day cryptography obsolete.⁵ Although the timeline for such an attack to be mounted is uncertain, the need to mitigate the cybersecurity risk is so significant that the time to act is now.

On the software and services side, two factors are driving rapid adoption: increased demand due to quantum cybersecurity vulnerabilities and the coalescence of entrepreneurial firms with point solutions that, in aggregate, provide a comprehensive mosaic of cybersecurity services. These groups are guided by solution aggregators that identify emerging technologies and guide entrepreneurs in their collaboration efforts.⁶ The point of this process is to harness emerging technologies to help provide broad solutions while mitigating the risks normally associated with implementing leading-edge technologies.

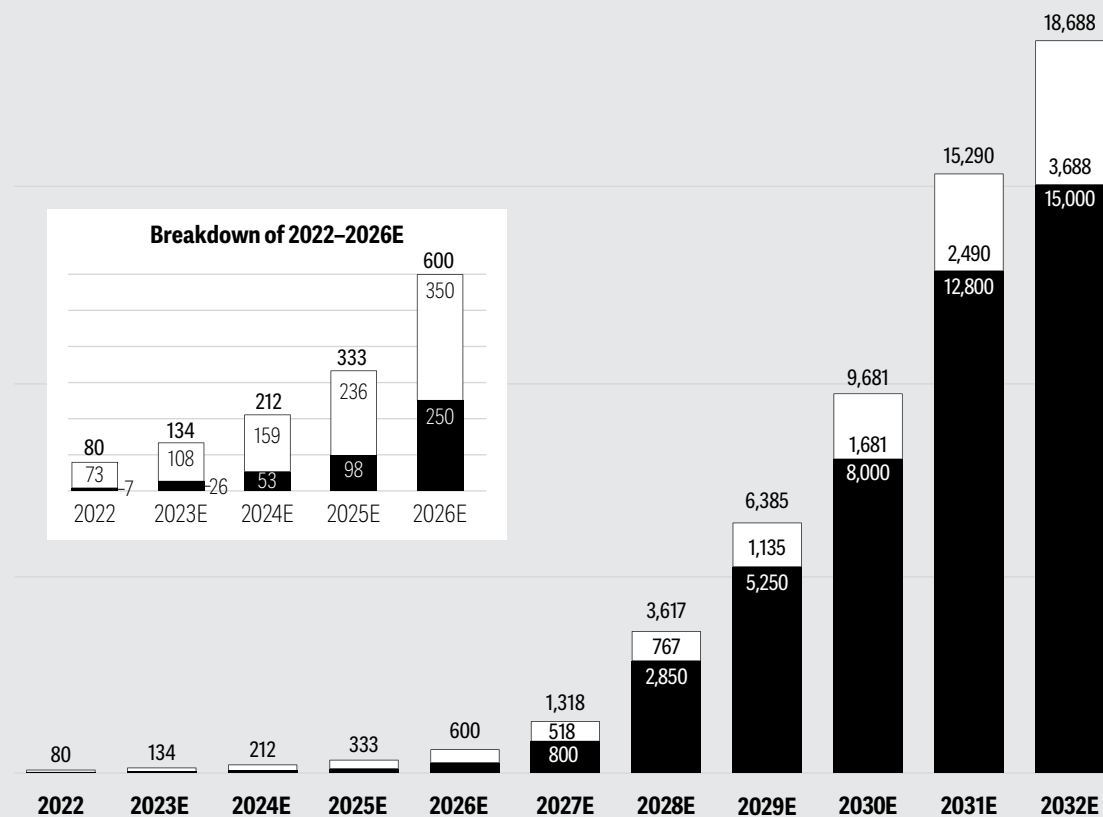
As technology develops and vulnerabilities grow, adoption of quantum computing-focused technologies will likely increase dramatically. On the growth side of the coin, there may be less urgency, but some firms are preparing nonetheless to generate revenue and delight customers with quantum computing enabled capabilities. But before those goals can be achieved, firm leaders may need to play defense—as with more power can come more threats.

Figure 1

The financial services industry's spending on quantum computing is expected to rise significantly

FSI spending on quantum computing capabilities (US\$ million), 2022–2032

○ Spending on defensive capabilities ● Spending on offensive capabilities



Note: We calculated defensive spending using the median quantum cryptography market size estimates of multiple market research reports with adjustments to get the share of the FSI spending. The offensive spending is a summation of the estimated spending on quantum computing talent and hardware by FSIs.

Source: Deloitte Center for Financial Services analysis.



Defending their turf: Protecting assets and enhancing cybersecurity on a quantum playing field

FSI's defensive spending in regard to quantum computing over the next few years is expected to focus on mitigating quantum-computer powered cybersecurity attacks. Data is important to industries such as financial services that handle large amounts of monetary transactions and maintain a record of vast volumes of sensitive client information. FSIs will likely be the primary target for quantum computer cyber attacks and data breaches. Industry vendors warn that quantum computers, when commercially available over the next couple of years, will likely be able to break public key encryptions, which secures 90% of all global

encrypted data.⁷ In fact, in the United States, a single quantum attack that disrupts access to the Fedwire Funds Service payment system for one of the five largest financial institutions would lead to cascading financial failures impacting the US GDP to the tune of US\$2.0– US\$3.3 trillion.⁸ Some hackers are even harvesting encrypted data now with the intention of decrypting the data retroactively using a commercially available quantum computer, making this cybersecurity threat a current, not future, problem.⁹

INNOVATION IN POSTQUANTUM CRYPTOGRAPHY (PQC)¹⁰

Some firms are preparing to counter the potential threats that quantum computers bring. PQC has been in development for several years. PQCs are new quantum-resistant cybersecurity techniques that will have to be deployed to secure data and transactions in the future. One such emerging quantum-resistant technology uses a blockchain approach to encrypt data at the record level with a hardware-enhanced, postquantum cryptography-secure key for each data element. The innovation in this approach is twofold. First, data is secure inside the perimeter, rather than being another fence around unsecure data elements. Second, with the blockchain approach, the data and its administrative records are immutable, and tampering is traceable.¹¹ PQC will likely emerge with capabilities to mitigate risk based on new, government-approved techniques, coupled with novel approaches.¹²



When the National Institute of Standards and Technology postquantum cryptographic standards are finalized and published for use in 2024, this could serve as the foundation for a regulatory push toward quantum-resistant cryptography in the financial services industry.¹³ With the upgrade from current cryptography to quantum-resistant cryptography, all current sensitive information may have to be reencrypted and cryptography algorithms

upgraded to be quantum-resistant. The new setup will likely require significant investment in hardware, software, communications, and infrastructure. Investment in system upgrades and regulatory compliance will likely drive the quantum-resistant cryptography market for the financial services industry over the next 10 years.

Playing to win: How quantum computing can help organizations improve customer engagement and generate additional revenue

Financial services firms are also using quantum computing to get ahead. These offensive use cases include Monte Carlo simulations, portfolio optimization, risk minimization, and complex derivative calculations.¹⁴ Quantum computers may also be used to improve the ability of AI to derive useful information from large volumes of data.¹⁵ Firms can also leverage the power of quantum computers to elevate the customer

experience by processing customer inputs and behavior to predict their needs in near real-time.¹⁶

FSIs' spending on quantum computing offensive use cases is lagging defensive spending because full-scale quantum computers are not commercially available as of mid-2023.¹⁷ Even so, spending on quantum technologies such as quantum annealers, for specific use cases, has started at firms that have made the strategic choice to be



“If you accept that there is a finite probability that a quantum computer capable of breaking asymmetric cryptography will exist, say within the next ten years, how long will it take you to upgrade your cryptographic infrastructure, and what is the expected lifetime of your data? If you do not yet know the answers to these questions, the time to act is now! Once you know these answers, you can start to prioritize your efforts and be better prepared once standards are finalized.”

—Colin Soutar,
Managing director,
Deloitte & Touche LLP

leaders in quantum computing. These firms are expected to switch to more powerful quantum computing hardware when it becomes commercially available.

Exploiting the advantages of quantum computing requires different expertise than what is learned through programming and architecting traditional IT systems.¹⁸ For this reason, a few FSIs, among them Goldman Sachs, JPMorgan Chase, HSBC, and Barclays, have formed teams to figure out the problems they want to address with quantum computers and programming solutions to be effective in a quantum computing platform.¹⁹ Quantum computing capabilities can help organizations to create an information advantage over competing FSIs that can be sustained for at least the initial phase of quantum computing adoption, which may last several years.

If quantum computing reaches mass adoption in the early 2030s as expected, the information advantage will likely shift to information parity. However, the quantum capability will be no less valuable. It will likely become a necessity for at least a few areas of operation, where speed and comprehensiveness contribute to the value of business process optimization.

Firms that plan to be early movers on the offensive side will likely have to start exploring and experimenting with the potential use cases of quantum computing. On the defensive side, firms can start by inventorying their data and systems for the upcoming transition to postquantum cryptographic standards. With the combination of urgency and opportunity, quantum spending in FSIs has already begun and spending will likely accelerate for at least the next 10 years. At some point in the future, we may even see a time when quantum computing is the norm, and it is just called “computing.”

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Acknowledgments

Authors Mohak Bhuta and Doug Dannemiller wish to thank the following Deloitte Center for Financial Services colleagues for their insights and contributions: Patricia Danielecki, Sean Collins, Neerav Shah, Alice Hartnett, Seth Raskin, and Paul Kaiser.



Embedded insurance is poised for exponential growth

Carriers should assess new distribution partners sooner rather than later to capitalize on embedded finance opportunities.



Among the emerging trends on the financial services horizon, embedded finance may end up having the biggest impact on the industry's makeup and infrastructure. Embedding large-scale insurance and banking products or services at the point of sale could not only disrupt long-time distribution channels over the rest of this decade, but may also result in the creation of an entirely new set of alliances with nonfinancial services partners—many of whom may be unfamiliar with the transactions they are facilitating.

There are already many bullish predictions being circulated about the growth potential of embedded insurance. Forecasts for embedded sales of property and casualty (P&C) insurance alone by 2030 range from US\$70 billion¹ in the United States to US\$700 billion globally.² Deloitte predicts that if as much as 20% of the US personal auto market goes the embedded route by 2030, at least US\$50 billion in premiums could be diverted away from the industry's traditional distribution channels.

Embedded insurance as a concept is nothing new. For years, tourists have routinely added travel insurance when purchasing airfare, while consumers have added warranty coverage when buying major appliances.

What's likely to change rapidly is the volume of insurance premiums for major lines built into another type of third-party transaction, with potentially vast implications for both legacy providers and intermediaries. Including auto or homeowners' insurance—with the sale of a vehicle or residence—for example, would bypass traditional sellers such as insurance agents, upend direct-to-consumer sales from insurers, or even exclude legacy carriers altogether.

One way to avoid disintermediation is for traditional insurers to consider collaborating with noninsurance product and service providers to integrate the sale of their coverages into the initial transaction process. In other words, they can follow the adage: "If you can't beat them, join them."

First movers may enjoy significant competitive advantages in what could quickly become a game of musical chairs. To avoid being left without a seat in the embedded market, insurers should be actively seeking potential alliances with an embedded partner—or at least consider how they might compete against carriers that do join forces with a product or service provider.

Auto insurance could see the greatest disruption with embedded sales



Out of all the insurance coverages being sold to individual consumers and business owners, those with the most to lose or gain from a boost in embedded sales are likely in the auto insurance industry. US personal auto insurers wrote US\$267 billion in premiums in 2022,³ accounting for nearly two-thirds of the personal lines segment and one-third of all P&C direct premiums written.⁴

Such sales make up the majority of the books of business of many national brand insurers, with 68% of the industry's auto premiums coming through direct-to-consumer sales or handled by their exclusive agents.⁵ Independent agents account for 32% of the market, with auto insurance being their biggest single volume generator, averaging 18% of their total book of business.⁶ Embedded sales would bypass these traditional channels and instead filter volume through auto dealers and manufacturer websites.

If as much as a fifth of personal auto insurance is embedded in vehicle sales by 2030, the source of many of those premium dollars for carriers may simply be swapped from current distribution outlets to auto dealers. However, legacy insurers themselves could be left out of the loop if auto manufacturers start up their own embedded underwriting operations.

Selling insurance at the time a vehicle is purchased is already more the rule than the exception in some countries, such as India.⁷ But while the concept may still be relatively new in the United States, there are already multiple test drives underway.

Tesla was one of the early entrants with its 2019 launch of Tesla Insurance, offering policies for certain models in a growing number of states priced according to how drivers perform on the road as monitored by the vehicle's sensors.⁸ Other auto manufacturers have followed suit, including Ford Insure, which is partnering with Nationwide Insurance.⁹

Meanwhile, Root Insurance, an InsurTech startup, is working with Carvana to embed its auto coverage along with the sale of used vehicles. Together, they are integrating the entire transaction—from quote to payment—within the platform's checkout process, with customer information prefilled so that a buyer may skip data entry and jump directly to customizing coverage.¹⁰

“Talking to consumers at the time when they really need insurance—like when they're purchasing a vehicle—is a lot better customer experience than being bombarded with advertisements to try to get somebody to a website [that describes] a product they're not very excited about in the first place,” according to Root Chief Executive Officer Alex Timm.¹¹



Potential obstacles to embedded sales

The road to widescale embedded finance in general likely faces several possible speed bumps, particularly from a regulatory perspective, since the consumer business hosting the embedded transaction “will, in effect, deliver the financial service to the customer ... [and] will have significant control and influence over the customer digital experience,” according to a recent Deloitte UK report.¹² The result will likely be a shared-responsibility model when it comes to compliance in areas such as data protection, privacy, and consumer complaints, the UK report noted.¹³

For example, auto dealers offering coverage as part of their embedded insurance sales pitch will likely have to be trained and licensed as insurance agents in each state.¹⁴ In addition, insurance regulators may raise questions about transparency in how embedded coverage is priced, as well as whether customers may feel any pressure to buy insurance from the auto dealer to get the best deal on their vehicle.

Maintaining alliances and partnerships could pose other practical challenges, such as the following scenarios:

- What if a customer is dissatisfied with how their claim is handled by the insurer whose policy was embedded in the vehicle’s sale? Will that reflect badly on the auto manufacturer?

- What if the customer buys or already has an additional vehicle from another auto maker? Will embedding insurance in the second vehicle’s sale keep buyers from getting the discounts and service convenience provided to those bundling coverage for multiple cars?
- What about those who bundle auto coverage with their homeowners’ insurance purchases in return for a premium discount—a very popular option in the current US market?¹⁵

Another potential risk of embedded insurance is that it might weaken direct consumer relationships with a carrier, with buyers opting for solutions embedded in the platforms of their preferred e-commerce, product, or service provider, rather than the insurer. Ultimately, such ecosystem relationships could become a more significant factor than the breadth of an insurer’s products or services in winning consumer loyalty.

These are just some of the challenges that may surface for insurers. But given the huge growth potential of the embedded market, “playing it safe” by not engaging early on could end up being the riskiest move of all.

INSURERS COULD LEARN FROM EXAMPLES IN EMBEDDED BANKING AND PAYMENTS

Insurers keen on experimenting with embedded coverage should look at how banks, payment firms, and fintechs have been doing in this space. Embedded finance has already taken root and even achieved significant scale in banking and payments—with the latter becoming particularly prevalent in e-commerce and service transactions, such as ride-shares. According to JPMorgan Chase, embedded payments accounted for over US\$1 trillion in global payment volumes in 2022.¹⁶

In addition, embedded finance could facilitate short-term credit advances to merchants and offer greater insight into customer behavior and trends to

spur development of new products and services. It should also integrate with business or accounting software, allowing users to access banking capabilities with a single click.

As financial transactions become more digital, and elements of the Internet of Things are incorporated into more properties and devices—such as appliances, wearables, homes, and commercial buildings—the potential for embedded finance, including insurance, is likely to expand meaningfully. These capabilities could enhance customer experience and convenience by seamlessly integrating financial services into everyday transactions.

A similar trend is evident in lending at the point-of-sale through buy-now-pay-later offerings. Banks can also supplement shopping experiences with personal financial-management tools or integrate credit options into health care apps. In addition, embedded finance could grow to become more relational, covering not just a single purchase, but multiple transactions over time. For example, in the future, prospective homeowners may rely on a single platform—served by financial institutions—to obtain a mortgage, buy insurance, and manage household expenses.

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Acknowledgments

The Center for Financial Services wishes to thank **Sam Friedman** (Retired) for his extensive contributions to the development and authorship of this article.



Property conversions: Will today's office vacancies become tomorrow's work-from-home locations?

New government incentives and shifting market dynamics could make it worth US real estate owners' time—and money—to move forward with office-to-residential conversion projects.



With the shift to hybrid work models, there is much more unused office space available that, if converted to residential use, could help mitigate the dearth of affordable housing in the US market. To date, the economics of such a shift is not supported by the differing pricing dynamics in these two asset classes. But a variety of developing factors may make conversions more attractive and feasible for investment. The Deloitte Center for Financial Services predicts that office-to-residential conversions could become profitable within the next five years. We estimate that around 14,700 affordable units in central business district (CBD) areas across the country can be added by 2030, assuming approximately 20% of converted square footage can be earmarked for affordable housing.

Estimates suggest that there is just shy of one billion square feet of available office space in search of tenants in the United States,¹ nearly 1.5 times the amount from the end of 2019.² With a shortage of nearly three million homes,³ the US housing sector has emerged as a likely recipient of the unused downtown office space. So far, the US commercial real estate industry has been slow to respond: Between 2016 and 2021, there were, on average, 31 housing conversions from office products per year, totaling 188 projects.⁴ And while many Americans are still working from home, at least part of the time—a trend that will likely continue—only 217 conversion projects are in the immediate pipeline for completion.⁵

Government and business leaders appear to be taking notice.⁶ Some political leaders at the local and state

levels have put forward legislation or called for action specifically supporting office-to-housing initiatives. These actions could provide incentives for real estate developers to provide Americans with clean, affordable, and safe places to live. Here are some of the initiatives in the works so far:

- At the end of 2021, Chicago's La Salle Central TIF district had a balance of US\$197 million in tax increment financing that they planned to make available to developers, with a priority on underutilized space. These would include those prime for conversion from commercial to residential space.⁷
- Washington, D.C. launched a US\$2.5 million, 20-year tax abatement program for owners who add at least 10 housing units and change a building's use in the downtown D.C. area, and of those units, 15% must be set aside for affordable housing.⁸
- California set aside US\$400 million in incentives for office-to-affordable-housing conversions. The state already had more than 50 applicants and roughly US\$105 million already allocated as of early March 2023.⁹

City governments have provided these types of incentives for conversion projects before. In the early 1990s, New York City passed the 421-g tax abatement program, incentivizing 13 million square feet of downtown Manhattan conversions. And Philadelphia passed its own abatement program in 1997, resulting in 180 building conversions.¹⁰

Could it pay off? Yes, but not right away



When considering these types of conversions, one of the biggest challenges owners and developers face is whether—and when—their investments will pay off. We anticipate that, by 2027, shifts in rents, valuations, acquisition costs, and conversion costs, in addition to added government-backed incentives, could allow developers to achieve a net profit on conversions of underutilized office space in favor of residential space (see sidebar for further information).

Layout aside, two valuation assumptions could deter developers in the near term: comparable rent and high vacancy. The median asking rent for an apartment unit in the United States is around US\$22 per square foot (psf). With US office rents still averaging US\$37.38 psf,¹¹ a 41% pricing concession in addition to an amortized cost of conversion is a tough pill to swallow. Additionally, developers would be unlikely to convert a building with a below-average vacancy that is still operating best as an office building.



What's behind our prediction? By filtering the estimated total inventory of CBD office buildings in the United States with asking rents less than US\$35 psf with at least 30% vacancy, we estimate that approximately 170 million square feet of CBD office space is viable for conversion.¹² We considered any buildings with a class A designation to be unlikely for future conversion, as vacancies are unlikely to persist in the long term due to flight-to-quality tenancy trends supporting occupancies in this class profile. Therefore, of the total CBD space assessed viable for conversion, class B and C products totaled 70 million square feet and were used in our conversion feasibility model.

Figure 1

Deloitte's office-to-residential conversion viability assumptions

	2022	2027
Office fundamentals		
Avg. office rent US\$/sf (Class B and C)	29.5	28.5
Avg. cap rate (Class B and C)	7.4%	7.7%
Developer office acquisition and conversion		
Acquisition US\$/sf	398	372
Conversion cost US\$/sf	201	150
Revenue from multifamily sale		
Avg. multifamily rent US\$/sf	21.8	25.4
Avg. cap rate	5.0%	4.7%
Avg. sale US\$/sf	438	545
Profit US\$/sf	(161)	23

Sources: CoStar, "Oxford Economics data," accessed April 7, 2023; Deloitte Center for Financial Services forecast assumptions.

The Deloitte Center for Financial Services forecasted rent declines for class B and C office assets, coupled with shifts in cap rates to the mid to high 7% range, which would price class B and C offices at approximately US\$372 psf by 2027. This is down 6.6% from today's prices, or a trajectory of -1.4% compounded annually. As hard and soft costs could abate with inflation-reduction efforts over the coming years and added benefits of increased government incentives, potentially offsetting conversion costs by as much as US\$55 psf,¹³ we assume the cost to convert could near US\$150 psf on average over the same time frame, down from US\$213 psf at the end of 2021.

Offsetting these costs of acquisition and conversion for developers are the anticipated increased implied value of new residential assets upon completion. Assuming continued multifamily rent growth and corresponding compressions in cap rates, multifamily assets could trade for approximately US\$545 psf in 2027, up from US\$438 psf at the end of 2022. Multifamily properties would need to sustain a 3% compounded annual growth rate for rents over the next five years to achieve these valuations. Assuming this valuation growth trajectory, 2027 would be the first year in which revenue from the sale of residential assets could be expected to offset the costs of acquisition and conversion.

Over the years, high conversion costs may have deterred developers from converting underutilized office buildings into affordable residential buildings. However, since 2020, several new government-enabled incentives have been announced to provide supply-side solutions to help address both the shortage of affordable housing and the increasing number of vacant office spaces. Several regions are making progress in developing tax policies that will make these conversion projects feasible, with several developers already moving at the opportunity:

- **25 Water Street, New York City.** The biggest conversion project in the country to date will transform a former office building into 1,300 new apartments over the next two years.¹⁴ The building was purchased in December 2022 for US\$250 million, and the developers closed on a US\$536 million loan to finance the redevelopment.¹⁵
- **One Wall Street, New York City.** This conversion was completed in February 2023. The 1.25 million square foot building now holds 500 housing units that have recently gone up for sale.¹⁶

- **4750 Wilshire Boulevard, Los Angeles.** Construction started earlier this year to turn the former 144,300 square foot building into a mixed-use opportunity. The plan is to convert the top two floors into 68 housing units while retaining 30,000 square feet on the ground floor for continued office use. Developers also plan to add amenities such as fitness centers and pools.¹⁷

A combination of some of the benefits provided by local governments can make the math work for conversions at scale. In particular, government incentive programs can help make conversions more feasible by easing restrictions around zoning and density, providing direct financial subsidies and tax abatements, and waiving off or redistributing infrastructure upgrade costs to a longer time horizon.



Real estate owners can help jumpstart progress through collaborations

Currently, real estate owners face financing issues due to elevated interest rates. But they don't have to go it alone. Public/private collaborations with lenders focusing on community development, government agencies, and impact funds may help with this transformation. Affordable housing remains the top of agenda for the federal government, with US\$213 billion planned in government incentives to support affordable housing under the US\$2.25 trillion infrastructure plan.¹⁸ Proposed legislation was modeled after the 2022 Revitalizing Downtowns Act, which aims to provide tax credits for such conversions.¹⁹

More centralized land use planning, inclusionary zoning, and state-level initiatives can make way for more market-rate developments with designated affordable housing that can help address the affordable housing gap. Distress in the office sector could lower valuations in the next two to three years. This may provide an opportunity for collaborations among developers, government bodies, and lenders to prop up the affordable housing shortfall and revitalize downtowns. Stronger relationships between developers and local and state municipalities could be what's needed right now, especially in addressing the dearth of affordable housing in the United States.

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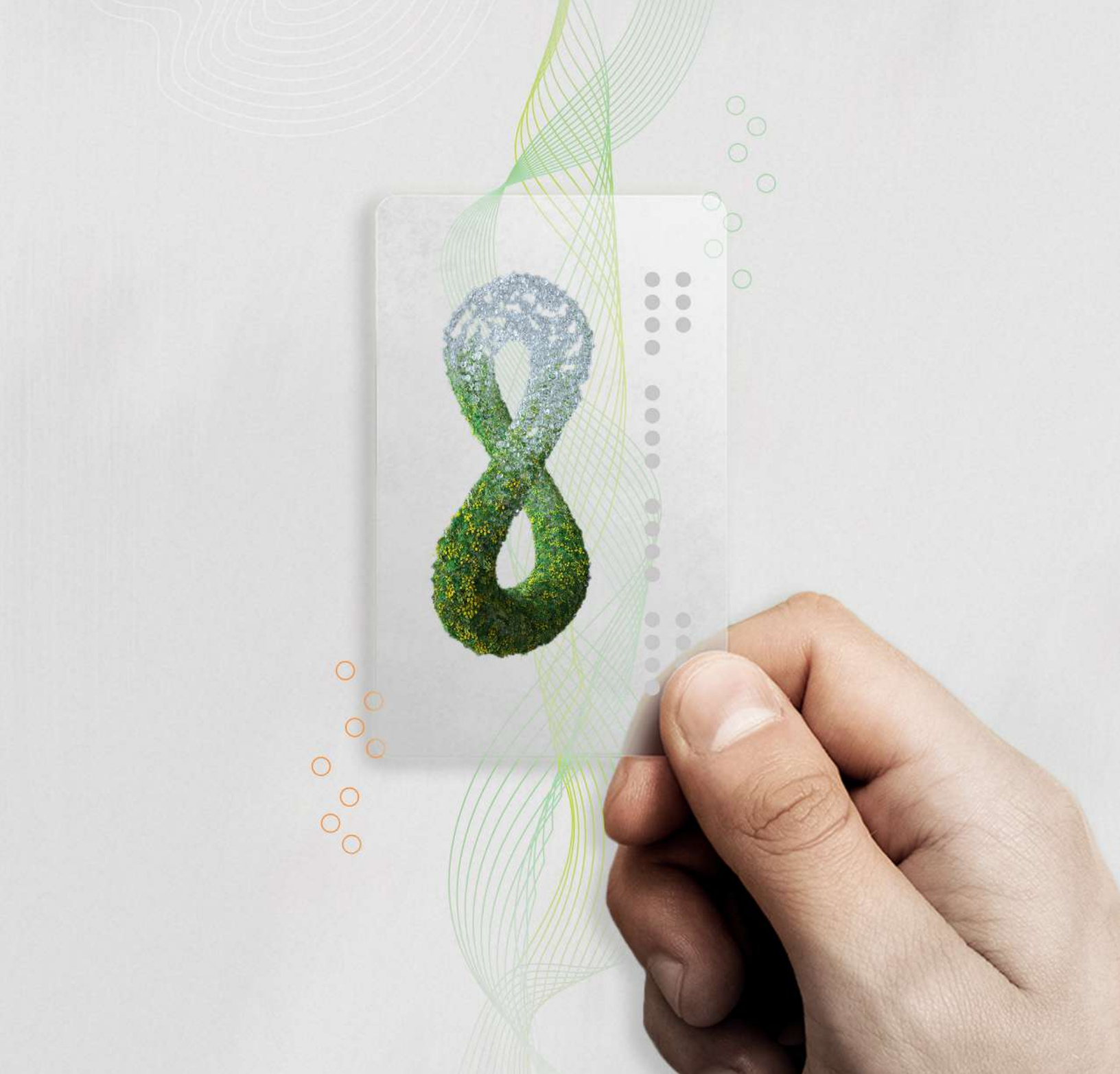
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Acknowledgments

The authors wish to thank **Gaurashi Sawant** and **Samia Hazuria** for their extensive contributions to the development of this report. They would also like to thank their colleagues **Darin Buelow**, **Renea Burns**, and **Jeff Smith** for their insights and guidance.



Consumers will increasingly use their wallets to help fight climate change with carbon-offset purchases

“Do you want a carbon offset with that?” More and more consumers may be asked this question when making travel arrangements, ordering food, or negotiating a new mortgage rate.



Carbon offsets will increasingly be embedded in many purchasing decisions that retail consumers make each day. Deloitte predicts consumer purchases of carbon offsets will become pervasive and grow into a nearly US\$100 billion market in developed economies by 2030.¹

Deloitte expects new carbon-trading networks to emerge that cater to the heightened demand for tailored, localized, and niche actions to help mitigate climate change. There is already a growing appetite for products that have a sustainability label; roughly two-thirds of US consumers say they would pay more at the pump for gas that offsets its greenhouse gas emissions.² Moreover, an international survey conducted by Shopify last year found that two-fifths of consumers say they would pay a higher price for climate-focused products.³ Demand for offsetting will likely only grow as younger people, who often voice a preference for sustainable products,⁴ gain purchasing power.

Several categories of consumer spending, including food, transportation, and entertainment, could easily incorporate an option to purchase carbon offsets. We estimate that a small percentage of these expenditures will include a supplemental offset, leading Americans to spend \$21.3 billion a year to mitigate the environmental impact of their purchases by 2030, adjusting for expected inflation. If these habits are mirrored in other developed economies, then global consumers in developed economies will collectively pay nearly \$100 billion to offset goods and services at decade's end.⁵

While there may be those who reject environment, social, and governance principles, the majority of Americans remain concerned about the carbon footprint of the items they buy.⁶ Despite the surge of inflation in 2022, the market for sustainable products accounted for 17.3% of purchases in the United States last year, according to Circana and the New York University Stern Center for Sustainable Business.⁷ These products experienced

a five-year compound annual growth rate of 9.48%—nearly double that of conventionally marketed products—and consumer behaviorists do not expect those preferences to wane.⁸

Carbon offsetting is becoming more common in the travel and tourism industry. Tour operators such as World Expeditions, Bamboo Travel, and Intrepid purchase offsets to neutralize the impact of their consumers' trips.⁹ Stand-alone organizations that offer travelers carbon calculators and the option to offset activities are gaining in popularity as well. Cool Effect, for example, has retired five million tons of carbon emissions and generated US\$36 million for emerging countries since it launched in 2016.¹⁰

In addition, more than 50 global airlines now offer carbon offsetting to passengers,¹¹ and some carriers reward loyalty points to customers who purchase carbon-credit units when booking their flights.¹² Hotels are also beginning to offer carbon-neutral packages to guests,¹³ and large employers, such as HSBC, are incorporating offsets into their low-carbon policies for business travel.¹⁴ After making more informed decisions about conferences and flights, some companies may purchase offsets when they exceed their “carbon budget” allotments.¹⁵

Other industries are encouraging consumers to make sustainable choices as well. The American tea company, Harney & Sons, reports that one out of four customers choose to offset their transactions, which usually equates to 2%–3% of the purchase cost.¹⁶

Several startups have also developed application programming interface (API) software—a code that makes it possible for applications to communicate—bridging apps, devices, and services to shared back-end systems. These APIs can link carbon-offset crediting to web and mobile platforms, so businesses can quickly embed a widget that will calculate an order's emissions and offer users the ability to offset it. EcoCart, for example, which partners with brands such as Walmart

Canada, Siete Foods, and Cotopaxi, reports that 60% of e-commerce shoppers use this functionality when checking out online.¹⁷ Retailers and service providers will likely continue adding capabilities to offset products or shipment and transportation to boost customer loyalty. Carbon Checkout, a one-click offsetting application cofunded by the European Innovation Council of the European Union, has formed over 2,000 e-commerce partnerships since launching in 2015.¹⁸

Most major segments making up the US\$23 trillion global retail industry—food and beverage, clothing, entertainment and lifestyle, and fuel—can easily incorporate carbon-credit purchasing options into their payment platforms. Large retailers such as Walmart, Amazon, and Alibaba could provide a boost to offsetting practices on their own. Given that consumer spending accounts for two-thirds of US economic activity,¹⁹ these brands' transactions could channel a significant amount of new funding to climate action projects around the world.

Financial firms will play a pivotal role empowering consumers to purchase offsets

More payments firms are empowering consumers to reduce their carbon footprint as well. For example, Visa allows banks in the Asia-Pacific region to enroll in Eco Benefits, which calculates the carbon footprint of transactions for consumers and allows them to counterbalance emissions in a mobile app.²⁰ The card user can elect to offset individual purchases, set up monthly offsetting payments, or pair frequent transactions with an automated purchase of offsets.²¹ Similarly, the California-based climate finance company Aspiration has a suite of digital products that makes it easy for retailers, banks and payment processors, and travel

booking platforms to embed climate action into their payment and checkout flows—automatically allowing customers to measure and tackle their impact with every purchase.

The digitization of carbon-market infrastructure could make it easier for carbon credits to be divvied up and sold on mobile apps, payment transfer systems, and as embedded-finance functionalities on user platforms. Blockchain technology, for example, can remove impediments to suppliers by making it easier for like-minded consumers to raise funds for small-scale or niche activities, such as improving cookstoves for refugees.





Carbon-offset opportunities will be increasingly personal and relevant

Carbon offsets can help connect consumers to climate change mitigation projects that may be more meaningful to their daily routines, especially if the carbon credits they're offered include relevant cobenefits. For example, a student placing a coffee order online will be able to pay an upcharge to fund a rainforest preservation project in Brazil, where the drink's coffee beans were sourced. Similarly, outdoor music venues can extend the option to buy carbon credits that fund conservation efforts in the countries where the performing artists are from.

Over time, the momentum for these carbon transactions can spur local economies. Popular restaurants may choose to recommend carbon credits that help nearby farmers upgrade to more regenerative practices, for instance. Cities and regions could also launch campaigns that link ticket sales for popular events such as sports games with biodiversity projects that repair local habitats. Research universities can help execute these projects or verify their benefits to the region. When consumers begin to see the benefits of their investments in their own neighborhoods and backyards, their trust in the carbon-offset market should grow.

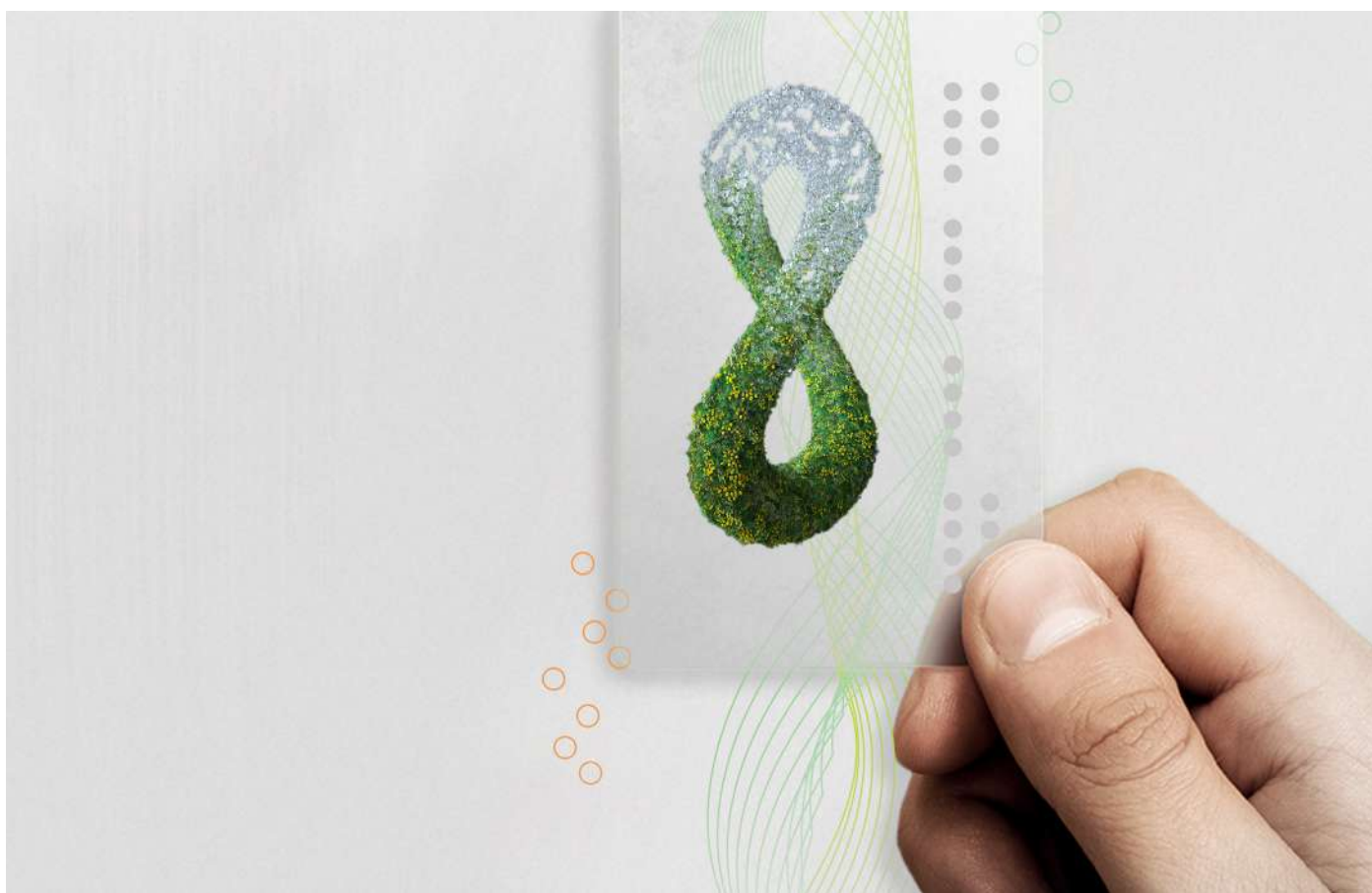
Financial institutions could also enable carbon-credit financing to happen behind the scenes. For example, embedded insurance tools such as telematics apps may

reward safe driving behaviors with carbon credits that offset the car's emissions. Other fintech-enabled transactions, such as food delivery or ride-sharing platforms, may offer a premium tier with environmental benefits. Sweden's Braathens Regional Airlines has been marketing this concept in Europe with its "Green Class" ticket that costs about US\$30 extra but adds more biofuel to the passenger's trip and invests in carbon-reduction projects.²² Many US consumers would think highly of such a service, according to a 2016 study from the United States Department of Energy. About 75% of surveyed Uber riders say they would push a "Go Green!" button and pay a minimum of US\$5.95 to offset a 10-mile trip at least once.²³

Banks may also offer tailored carbon credit options in digital wallets based on consumers' most frequent purchases. Individuals may choose to buy carbon credits in advance, especially if they have a lot of travel or emission-intensive activities planned. They could also gift them to environmentally conscious friends and family. Some tech companies have begun partnering with payment platforms to allow customers to exchange rewards points for carbon credits. One collaboration between Ascenda and Patch estimates that global card users only need to convert 10% of their unused reward currencies into carbon credits to offset the equivalent of one year of emissions for the entire United States.²⁴

Similarly, residential real estate businesses should also be heavily engaged in carbon markets because their clients are increasingly demanding carbon-neutral properties. As of 2019, the real estate industry accounted for 38% of greenhouse gas emissions.²⁵ In addition to new legal requirements and net-zero obligations, consumer demand should bring about more demand for carbon credits as well. Many tenants would pay more for premium accommodations, which can include buildings certified as carbon neutral.²⁶ Homebuyers could also be lured by new incentives, such as offers of lower mortgages for residential units that have favorable environmental ratings.

Of course, many of these advances could be predicated on setting up an efficient, transparent, and frictionless voluntary carbon market. Banks should play a pivotal role in propping up and sustaining the carbon-trade ecosystem, which will include acting as key partners to new participants. As financial intermediaries, they can add liquidity, assist with pricing carbon-credit assets, and reduce counterparty risk in nascent trading platforms. Banks could work with rating agencies and exchanges in vetting carbon credits for quality and supplying added assurance on certification labels. Finally, they can serve as a bridge to consumers by lending back-end infrastructure to payment functions on nonfinancial apps and websites.



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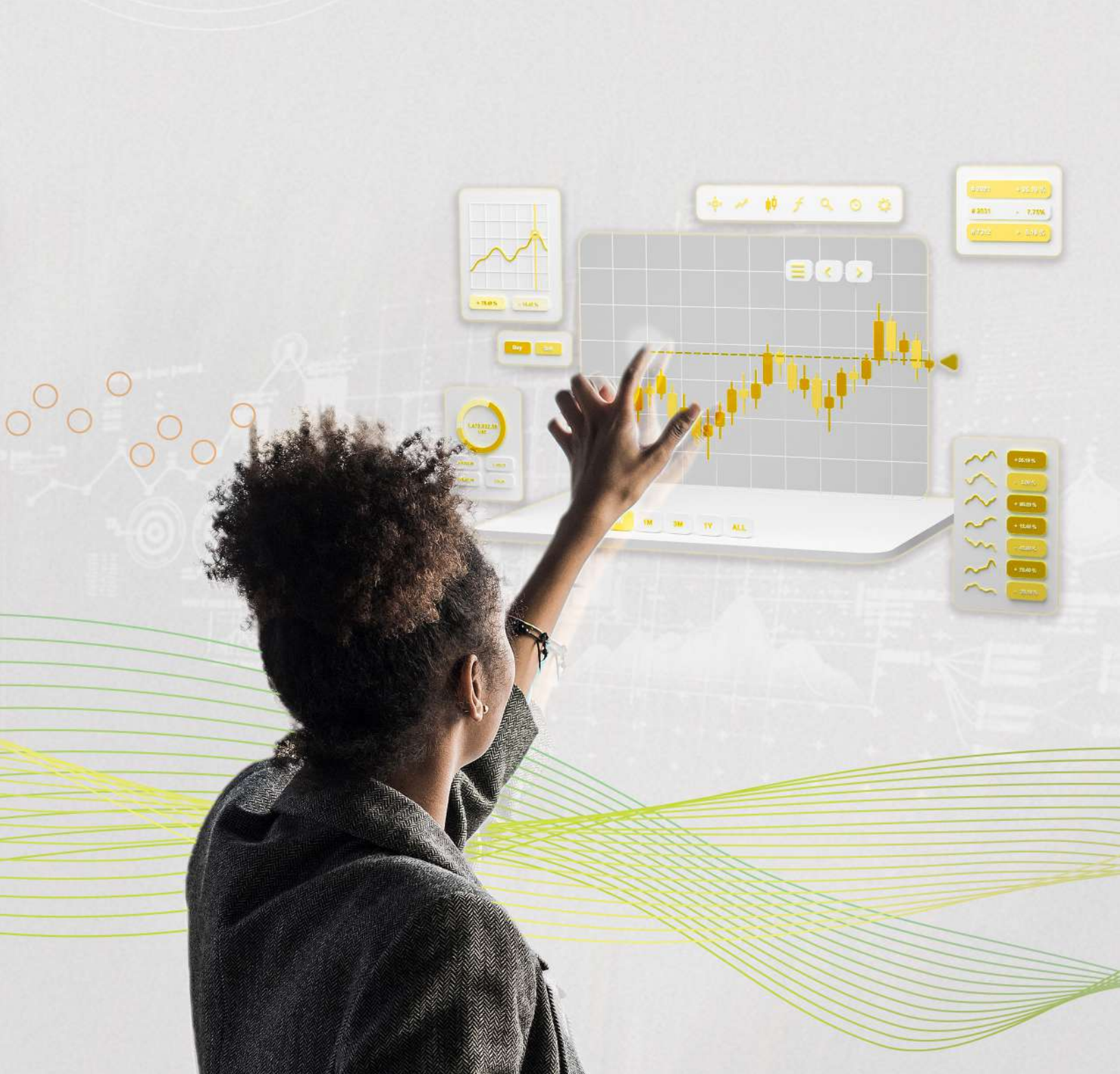
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Acknowledgments

The authors would like to thank the following Deloitte Center for Financial Services colleagues for their extensive contributions and support: **Jim Eckenrode, Patricia Danielecki, Samia Hazuria, Karen Edelman, and Paul Kaiser.**



Fueled by better information: Why investment management should embrace alternative data

Investment management leaders should seek opportunities to invest in new data resources or they could put their organizations at risk of falling behind.



Vast growth in new data sources and types could be a boon for the investment management sector, where access to the fastest, most reliable, and most relevant information has been important to generating alpha. Some might consider data as the new oil, a ubiquitous resource that fuels many processes—except much more abundantly available. Over the next few years, advancements in storage, capture, and analysis technology are expected to drive steep growth in data volume and availability. Deloitte estimates that by 2030, the global revenue generated by alternative-data providers across all industries could grow by as much as 29x, at a compound annual growth rate of 53%, and possibly reach US\$137 billion.¹ The investment management sector is expected to be at the forefront of this growth.

This alternative data largely consists of novel types and forms of data such as satellite images, social media posts, geolocation data, news feeds, and communications metadata that are different from the traditionally structured financial data investment management

firms currently use.² So, investment managers may need detailed planning and additional targeted measures to utilize these alternative data sets in their investment decision processes. Organizations that are unable to leverage alternative data's full potential could operate at an information disadvantage, which could put them at risk of falling behind their peers in their quest for growth in assets under management.

Alternative data has become much more accessible to investment management firms since many companies across industries have started to clean, package, and sell “exhaust data”—data generated at various points in their supply chain—to create an additional income stream.³ In fact, the number of alternative data sets applicable to financial services increased by ~36% over the last two years and the number of alternative-data providers increased by ~29% over the same period.⁴ So organizations that make investment decisions without incorporating inputs from these alternative data sets could leave out more information than they include in their investment decisions.



Many investment managers realize the importance of including alternative data in investment decisions. Investment managers are turning to alternative data to drive process improvement; cater to client demand; find information for new investment strategies such as environmental, social, and governance; and model key performance indicators in innovative ways, with new data sets to extract meaningful insights for alpha generation.⁵ According to a recent survey, 98% of investment professionals agree or strongly agree with the view that the use of alternative data is becoming increasingly important to identify innovative ideas to boost alpha.⁶ Another survey revealed that four out of five alternative investment managers plan to increase their budget for alternative data.⁷ About half of these respondents who plan to increase their budget for alternative data expect an increase between 26% and 50%, and about one-fifth of them expect an increase up to 75%.⁸ These statistics support the rising importance of alternative data in the investment decision process.

Hedge funds were driving the use of alternative data a decade ago, but now the growth is more evenly distributed among all types of investment management firms.⁹

Due to this increasing demand for alternative data, the total revenue generated by alternative-data providers globally is expected to exceed revenue from traditional financial-services data providers in the next six years (figure 1).¹⁰ Investment management firms could be the significant drivers in this tremendous growth journey of alternative-data providers. As the utilization of alternative data becomes mainstream, organizations that rely primarily on their traditional financial data for making investment decisions may be unable to make fully informed investment decisions.

Yet, a recent survey suggests that most firms are still battling basic tasks, such as combining data from different sources and processing raw alternative data into a usable format.¹¹ Furthermore, many investment managers are struggling with data analytics capabilities to encapsulate the elements of the research process on a common platform.¹² Many investment managers are still using spreadsheets to make investment decisions, potentially hampering their ability to institutionalize processes to achieve consistent quality in the investment decision process.¹³



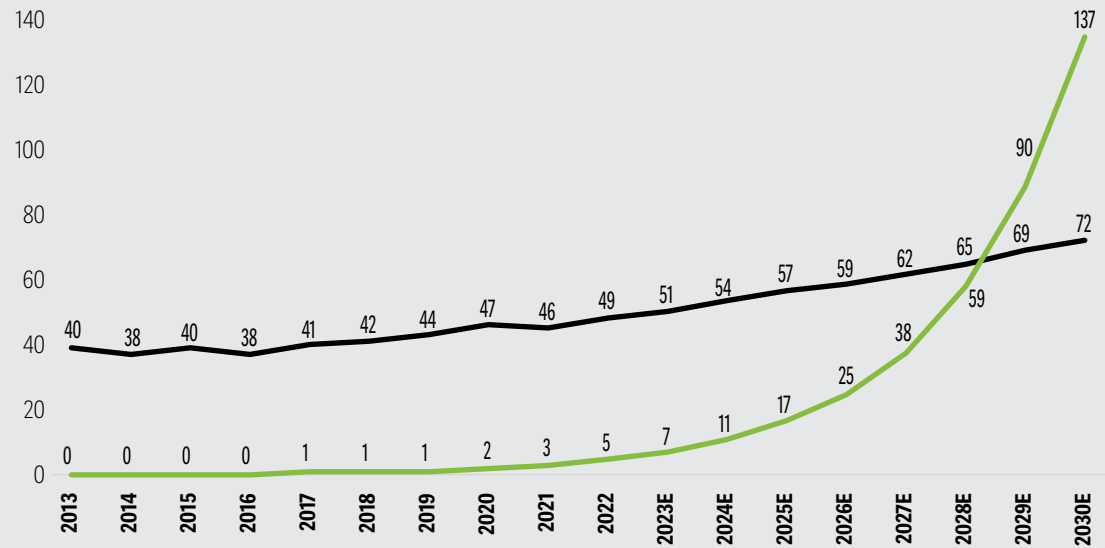
Figure 1

Alternative data provider revenue is expected to surpass traditional data provider revenue by 2029

Global data provider market size by revenue

● Traditional financial services data providers ● Alternative data providers

Revenue US\$ billion



Note: We calculated the global market size of alternative data providers using the average of market size estimates from multiple market research reports. The US market size estimates for traditional financial services data providers, gathered from market research reports, were divided by the percentage share of the US in the global outstanding fixed income and listed equity market to arrive at the global market size of traditional financial services data providers.

Source: Deloitte Center for Financial Services analysis.

Incorporating alternative data in the investment decision process may not be a plug-and-play situation. For many investment management organizations, it could take several years to fully integrate alternative data across the organization.¹⁴ To be successful, organizations may need a detailed and structured plan with targeted action steps to completely leverage the full potential of alternative data. When an increasingly higher proportion of information becomes available through alternative sources than through traditional financial data, organizations

that haven't gone the extra mile to institutionalize alternative data could make less-informed decisions than their more data-centric competitors. Less-informed decisions may lead to a loss of alpha and lower Sharpe ratios, which could negatively impact organization profitability and competitiveness. Leading investment management organizations are already integrating alternative-data sources in an effort to generate information advantage.

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Acknowledgments

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Higher deposit costs will challenge banks, even after interest rates drop

Most US banks will need to reassess their funding and liquidity strategies and how they retain deposit customers. How banks transform these moments into sustainable growth could help define their future success.



Deloitte predicts the average cost of interest-bearing deposits for the US banking industry in 2024 and 2025 to remain elevated at 1.7% and 1.5%, respectively, even as the fed funds rate declines from the recent peak.¹ This may crimp bank profitability in the medium term.

The US banking industry has been on a tumultuous ride since the sudden collapse of Silicon Valley Bank in March 2023. Plugging deposit outflows was a dominant concern for multiple regional banks. And, despite stronger-than-expected earnings in the first quarter of 2023 and extraordinary support from regulators,² the trials seem far from over—at least for the subset of banks in question.

Even as fears around banks' stability seems to have subsided and overall deposit outflows have declined,³ customer demand for higher deposit rates is expected to remain elevated, possibly for a long time. In fact, recent Deloitte research shows that savings intentions have become stronger, suggesting consumers are focused on replenishing depleted savings.⁴

After years of near-zero deposit rates, many banks were compelled to offer higher rates as the recent fed funds rate hike cycle kicked in. Clearly, the era of cheap deposits had come to an end. For instance, the cost of interest-bearing deposits (including certificates of deposit, money market deposit accounts, and savings deposits) rose by 73 basis points (bps) to 0.99% by the end of 2022, up from 0.26%, a year ago.⁵ This rise translated into higher deposit betas—i.e., the proportion of change

in the federal funds rate that is passed on to customers.⁶ This trend only accelerated in Q1 2023, when the goal of retaining deposits was paramount. Of the top 30 US banks, almost half had cumulative deposit betas higher than the previous rate hike cycle in 2015–19.⁷

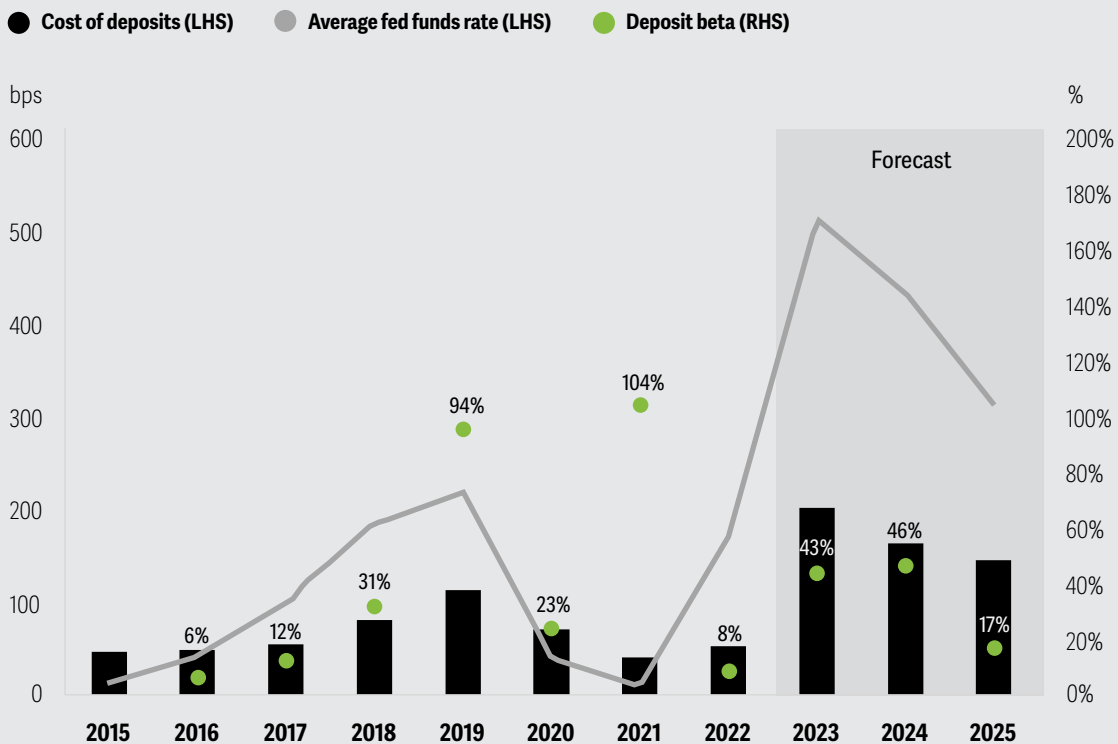
Market consensus points to a pause and/or drop in the fed funds rate once the surge in inflation reverses and/or the economy goes into a downturn. Given these expectations, the Federal Open Market Committee projects the fed funds rate to decline to 4.3 and 3.1 in 2024 and 2025, respectively, from a high of 5.1 in 2023.⁸ Inflation appears to be slowing down already; it dropped to 4.9% in April 2023—the first time it dipped below 5% in two years.⁹

In a rising rate environment, deposit rates tend to be more “sticky”; they generally grow more slowly because banks are reluctant to pass on higher federal funds rates to their customers. In a falling rate environment, deposit rates are more “flexible” with banks looking to drop rates.¹⁰ As such, rates are typically “downwards-flexible and upwards-sticky,”¹¹ making their relationship asymmetric. However, in some ways, the next two years could defy this principle.

In fact, the Deloitte Center for Financial Services estimates the average cost of interest-bearing deposits in 2024 and 2025 will remain at 1.7% and 1.5%, respectively, even if Fed funds' rates drop (figure 1).¹² This will result in lower deposit betas even as the Fed fund rate comes down from the recent peak, a historical anomaly. As stated above, one would expect deposit betas to be much higher in a downward-sloping rate environment.

Figure 1

US banks are expected to continue to face high deposit costs, which will result in lower deposit betas than is typical for a declining rate environment



Note: The historical Fed funds rate is from FRED; 2024 and 2025 Fed funds rates are sourced from FOMC projections as of March 22, 2023.

Sources: Deloitte Center for Financial Services estimates based on S&P Market Intelligence data, FRED, and FOMC projections.

These forecasts are based on a regression model with a number of independent variables, including the federal funds rate, deposit mix, changes in the share of interest-bearing deposits, loans-to-asset ratio, and market valuation. Our forecast reiterates the importance of deposits for bank funding. Banks that have a higher share of deposits to liabilities, a lower share of time

deposits, and generally more stable deposits, may face less pressure to keep deposit rates high, and thus, have lower deposit costs.

Going forward, the industry might be hard-pressed to bring down their deposit costs, and lower deposit betas, even as the Fed funds rate declines.



Customers are in the driver's seat—and they will likely continue to expect higher rates

After nearly a decade of earning low to zero interest rates on their deposits, customers appear to be back in the driver's seat. Many have become more sensitized and savvy, and armed with information, and as a result, they are demanding higher rates on their deposits. Many have already switched their cash into higher-yielding time deposits.¹³ The average share of interest-bearing deposits in the US banking industry increased to 72% in Q1 2023, from 69% a year ago.¹⁴

Additionally, many depositors moved their funds to higher-yielding money market funds offered by both banks and nonbanks, and T-bills. For instance, the flows into money market funds climbed to a record high in March 2023, increasing by US\$416 billion from March 8 to May 3, 2023, to a total of US\$5.3 trillion.¹⁵ This coincided with about US\$512 billion in deposit withdrawals during the same period.¹⁶ The convenience of digital banking has made these money movements all the more easy.¹⁷

Competitive pressure should remain elevated



The competitive dynamics in the deposit market have taken a new dimension since March 2023 when a few regional banks came under stress. The limited pool of available cash could see increased competition from banks of all sizes, money market funds and T-bills, and also fintechs and nonbanks. Digital-only banks, for instance, will likely continue to offer higher Certificate of Deposit (CD) rates; they are also offering variations on typical features such as a CD with no early withdrawal penalty.¹⁸

Several banks have also hiked rates and extended new marketing campaigns.¹⁹ Financial institutions, such as Capital One, Citigroup, and Synchrony, for example, are marketing one-year CDs with rates in excess of 4%.²⁰ Yet, responses vary across the industry. The average deposit beta for top US banks in the current hike cycle as of Q1 2023 stands at 41%, 600 bps lower than the last cycle's peak deposit beta in 2015–19, despite current rate hikes already far beyond the last period's peak. The cumulative deposit beta differed from 69% to 19%—a substantial range.²¹

The type and stickiness of deposits in banks' portfolios can also play an important role. Many banks with a portfolio skewed toward retail deposits have enjoyed a softer cushion when compared to commercial deposits. In fact, among the top 30 banks, those with strong retail deposit portfolios had an average deposit beta of 34% compared to 45% for banks with strong

commercial deposits.²²

Banks should expect changes and new applications of supervisory tools and regulatory frameworks. These may include: Modification of the tailoring rules implemented in 2019 that reduced compliance requirements for smaller and less complex banks; recalibration of thresholds for capital and liquidity; and potential new CCAR scenarios, including more severe stress testing assumptions for liquidity. There could possibly be higher deposit insurance fund (DIF) fees, and reevaluation of assumptions about deposit stickiness by supervisors and banks alike, and how these factor into modeling. There could also be sharper scrutiny by examiners on safety and soundness.

Another new and notable item is how recent bank deposit runs were “fueled” by social media.²³ Regulators have warned banks about the perils of social media-driven information flows. This has added a new dimension to how banks manage their exposure across multiple risk stripes, including liquidity, operational, and reputation.

These additional changes to current regulations and supervisory practices should increase the funding pressure on banks that are not already facing the severest regulatory constraints. (See Deloitte's report, *Prepare for more stringent regulation and agile supervision after bank failures*.)²⁴



Actions banks could take to help offset the impact of higher deposit costs

Higher deposit costs (and lower deposit betas) will have a detrimental effect on banks' ability to generate strong net interest income, unless they are also able to raise lending rates, resulting in downward pressure on net interest margins in the medium term. This should be particularly challenging for banks that have less diversified business models and that are exposed to concentration risk. These new factors will likely force banks to reassess the true cost of deposits and how they may be deployed. Lower profits may also affect market valuations.

As a result, many banks may be forced to charge higher lending rates to borrowers. This may create a delicate balance between asset quality and loan volume in the future. Diversifying revenue streams and focusing more on fee income should be pursued with greater vigor.

Recent events have also reiterated the importance of scale and stability. Some banks may not have the incentives to remain small or below certain asset thresholds. As a result, more M&A activity within the banking industry is likely.

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Acknowledgments

The authors would like to thank the following Deloitte Center for Financial Services colleagues for their extensive contributions and support: Jim Eckenrode, Patricia Danielecki, Samia Hazuria, Karen Edelman, and Paul Kaiser.



Fasten your seat belts: Real-time, business-to-business payments are preparing for takeoff

Banks and payments firms will help usher in a new era of safe, more efficient, instant domestic and cross-border value exchange among businesses.



The practice of real-time payments (RTP) is almost 50 years old. In April 1973, Japan became the first country to pioneer a real-time gross settlement service with the Zengin system, which operated during business hours on working days.¹ Although progress was slow, RTP has now been adopted in more than 70 countries.² And more countries and services are expected to join.

In the United States, instant payments became a reality with The Clearing House's (TCH) RTP system, which processed 49 million real-time transactions worth US\$22.7 billion in 4Q 2022, growing 10% each quarter.³ And the Federal Reserve-backed FedNow launched recently in July 2023.⁴

One of the significant factors behind the growth in RTP in the United States is payroll processing, which allows employers to offer instant payroll capabilities and employees immediate access to their earned income.⁵ But real-time payments services could be utilized much more broadly.

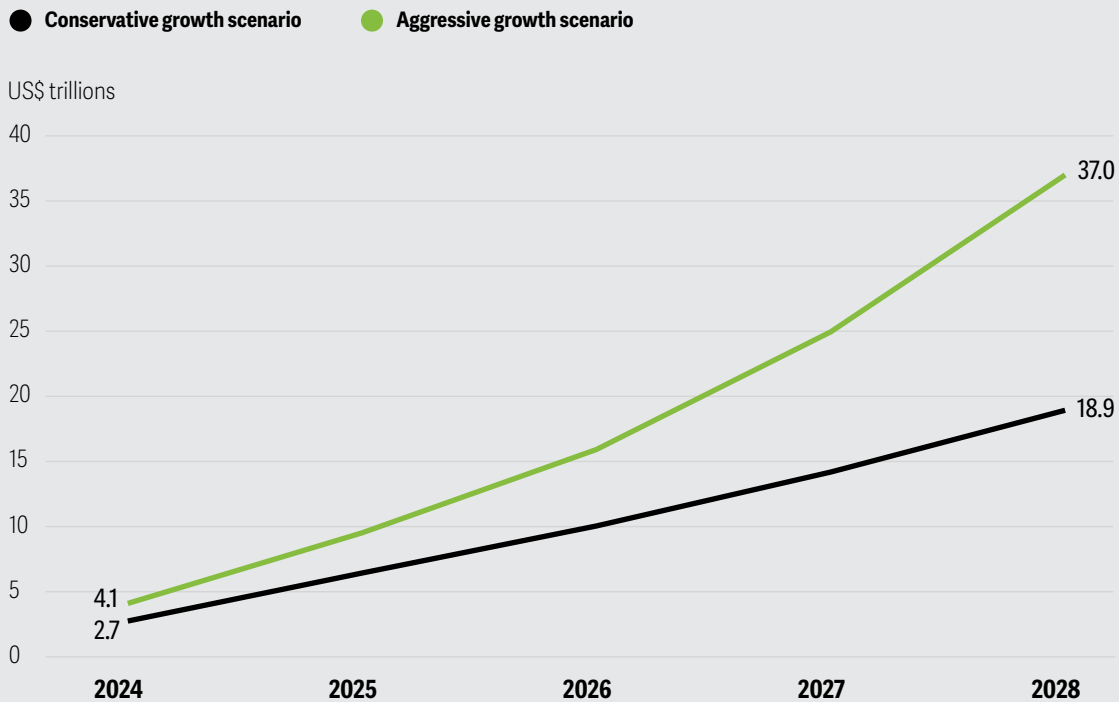
B2B payments should present one of the strongest growth opportunities in real-time payments for banks and payments firms. In a conservative growth scenario, Deloitte predicts that real-time payments could replace US\$18.9 trillion in automated clearinghouse (ACH) and check-based B2B payments in the United States by 2028 (figure 1). In an aggressive growth scenario, that number could jump to US\$37.0 trillion. And here's why.



Figure 1

US businesses could transition a share of their regular ACH payments and checks with multiday settlement windows to real-time payment rails over the next five years

Expected shift in B2B payments from regular ACH and checks to real-time payment rails, 2024–2028



Source: Deloitte Center for Financial Services forecasts based on Nacha's B2B ACH transaction data and the Federal Reserve's commercial check transaction data.



Most B2B payments are slow and vastly inefficient

For decades, paper-based B2B payments have been fraught with inefficiencies. They are slow and often expensive.⁶ Consider the US\$8.9 trillion in commercial-check payments in the United States that companies still use for record-keeping purposes.⁷ Meanwhile, many of the nonpaper-based B2B ACH payments are still handled through an end-of-day batch process and settled within two to three business days. Yet, it remains one of the most cost-effective payment methods, as US businesses made US\$52.5 trillion in ACH payments in 2022.⁸ Same-day ACH can offset some of these inefficiencies for businesses at a domestic level.

And the US\$37 trillion cross-border B2B payments⁹ can be even more complex, expensive, and time-consuming. The challenges businesses had with B2B payments in supply chain financing during the pandemic is one example.

In a survey of global business executives, about two-thirds of respondents said they typically pay US\$10–US\$50 in cross-border fees; a similar proportion paid

0.25%–3% in foreign exchange fees.¹⁰ And about 70% reported delays of up to 10 days in receiving or sending cross-border payments, with businesses in Singapore and Germany reporting the longest delays.¹¹ When asked about their payment methods, more than one-half used wire transfers (one of the most expensive methods) and bank transfers; 28% used e-checks; and 17% used physical checks and cash.¹²

Some of these issues may not just be related to the payment, but to the nature of the transactions and the parties themselves. Transitioning to real-time payments, therefore, may not be a panacea for all challenges, but it should help address some. For instance, real-time payments can improve corporate treasurers' and finance teams' payments experience. In a 2022 survey of US finance executives, 47% of respondents said that creating a B2B payments customer experience similar to P2P payments is their most important payment-transformation initiative for the year ahead.¹³ In another survey of US real estate executives, although only 1% used real-time payments, 84% of them believed that RTP will replace checks for making payments.¹⁴

Benefits of B2B RTP could extend beyond payments



In addition to driving business growth across borders and giving access to new markets, real-time payments would also add more transparency to the otherwise fragmented and unpredictable B2B payments landscape. Many RTP systems use International Organization for Standardization (ISO) 20022 messaging standards that enable two-way communication, such as “request for payment,” “request for information,” and “confirmation of payment.” Based on the ISO 20022 standards, RTP would also allow banks to overlay richer insights and value-added services and help modernize B2B transactions end to end, such as automated matching of purchase orders to invoices, virtual account services, e-invoices for payment initiation, and account reconciliation for B2B clients. These value-added services could be even more important in an increasingly networked economy, where businesses are more intertwined, and faster flow of information and faster transfer money go hand-in-hand. They would become table stakes.

In particular, real-time payments could benefit many small and mid-sized businesses that are challenged by limited transaction visibility, high processing costs, manual invoicing and accounts payable processing, and payment delays in their B2B payments.¹⁵ The speed of real-time settlement should free up businesses’ working capital, reduce the need to maintain high cash buffers, and increase the velocity of money in the economy.¹⁶ It could also give these businesses flexibility to pay and receive payments closer to the due date. Complementing real-time payments with real-time balance and transaction reporting could improve cash visibility. In addition to faster money flows and richer data, RTP could help businesses mitigate check kiting (where fraudsters take advantage of the float time it takes to settle checks in order to transact against uncollected funds).¹⁷



Taking off the runway in the B2B RTP space domestically and across borders

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any banks have started to launch RTP integrations for their corporate clients in the United States. In 2019, Wells Fargo and HSBC offered their US business customers application programming interfaces (APIs) to integrate to the TCH RTP system, allowing them the ability to send and receive faster payments.¹⁸

Aiming to be early movers in this space, payments network firms have launched their own cross-border real-time payment services for businesses.¹⁹ Similarly, some technology organizations and fintechs are experimenting with digital currencies to facilitate decentralized cross-border value exchange over blockchain.²⁰



Instant B2B payments across borders are in the pilot stage—for now

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ross-border B2B payments is another untapped market with enough room for multiple solutions to coexist at a global level, including truly interoperable real-time payment rails in the next five years. In 2022, SWIFT, TCH in the US, and EBA Clearing in Europe launched a pilot platform

for cross-border payments in USD and Euro, called Immediate Cross-Border Payments (IXB).²¹ This platform aims to expand to other currency corridors as well. In a bilateral exchange, Thailand and Singapore enabled cross-border payments between the two countries by linking their real-time payment networks.²²

OVERCOMING FRICTION IN RTP

Despite general enthusiasm, however, some banking institutions may be conflicted about promoting RTP, given the risks. While faster payments benefit clients, it would risk banks' float income in today's high-rate environment, pushing them to search for alternative revenue sources. Moreover, faster payments would mean banks and payment firms would have a shorter window to detect anomalies, decline unauthorized requests, and safeguard consumers and businesses against fraud.

And, with the irrevocable nature of most real-time payments, payers may not get the benefit of chargebacks as they get with payment cards. While authorized credit push payments in these RTP systems are safer than debit pull transactions, fraudsters could discover malicious and more sophisticated ways to deceive businesses and banks. For example, the United Kingdom witnessed a spike in authorized push payments (APP) fraud, where payers are manipulated into transferring

real-time payments to fraudsters impersonating as payees.²³

Invoice-verification capabilities, therefore, will likely become even more important in the context of faster payments. Banks and payments firms should be creative in offsetting potential loss in float revenues and bolster their risk management and fraud defenses.





For a smooth B2B RTP flight: Considerations and ideas

Banks should prepare to support direct integration of transaction data into clients' enterprise resource planning and other back-office systems to offer real-time or near-real-time insights on payments transactions and liquidity positions. But this can only become a reality when and if banks modernize their core systems for corporate payments. Cloud solutions can help accelerate banks' access to RTP systems.

Moreover, banks and payment firms can collaborate with fintechs to add digital overlay value streams for businesses on top of real-time payments.

Talent will likely be another key priority. Specialists who genuinely understand ISO 20022 appear to be in short supply in the industry. Training professionals across business lines and processes to create "skill at scale" should help enable a smoother transition in payments processing and support client education and engagement efforts.

Banks should also check and validate RTP instructions, given the irrevocable nature of payments. They should focus on using emerging technologies, such as artificial intelligence and data analytics, and bolstering controls, such as dual approval and multifactor authentication. More collaboration between banks, payment firms,

fintechs, and regulators will likely be required to hone defenses, promote awareness among businesses, and develop new leading practices.

Over the next few years, banks can do their part in helping clients adopt successful and safe real-time payments systems. Given the potential benefits, successful implementations may not only improve operational efficiency; they could also empower clients with insights to make better decisions to manage their money and business relationships.

ABOUT THIS PREDICTION

Our B2B real-time payments prediction uses historical B2B ACH and commercial check transaction data from the National Automated Clearinghouse Association and the Federal Reserve, respectively (2013–2022), to forecast their dollar transaction volumes up to 2028. Our research and technical discussions with Deloitte payments specialists helped build two scenarios for the percentage shift from B2B ACH and check payments to RTP. Applying these percentages to the forecasted ACH and check volumes yielded us numbers that could shift from these traditional methods to real-time payments from 2024 to 2028.

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Acknowledgments

The authors would like to thank **Tushar Puranik** and **Shalvi Saruparia** from Deloitte Consulting for their insights and the following Deloitte Center for Financial Services colleagues for their extensive contributions and support: **Jim Eckenrode**, **Patricia Danielecki**, **Samia Hazuria**, **Karen Edelman**, and **Paul Kaiser**.



More autonomous trucks are hitting the road. How should insurers be changing lanes on coverage?

Get ready for disruption! As premiums shift across multiple lines of business, traditional products and processes may not cover it. It's time for carriers to start experimenting.



Deloitte estimates advancements in self-driving technology may eliminate the need for around 380,000 long-haul truck drivers in the next five years.¹ This alone could have a major impact on workers' compensation insurers, with a potential loss of around US\$3 billion in premiums.² But widespread adoption of autonomous vehicles could also result in a shift in premiums across multiple insurance lines, including commercial auto, product and professional liability, and cyber coverage.

Imagine an insurance underwriter driving on an interstate highway, overtaking a convoy of three long-haul trucks. While passing the first truck, he glances to his right, anticipating a cursory smile from the driver—only there isn't one! He speeds up, but to his bewilderment,

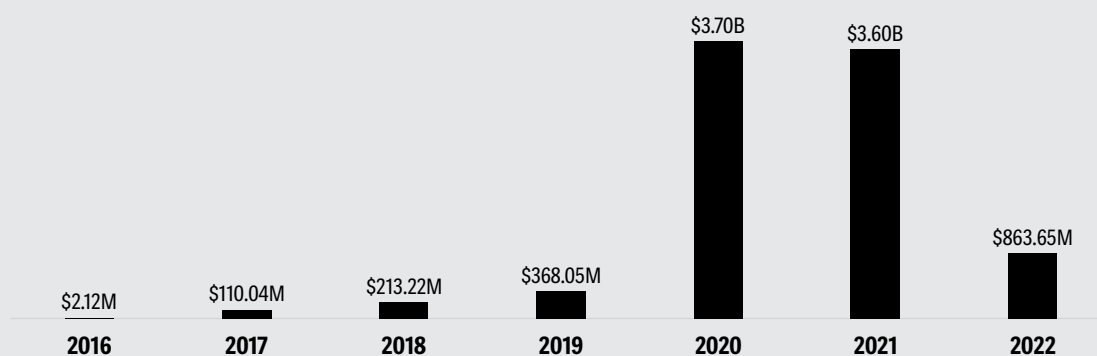
there is no one driving the second truck, either. He exhales in relief when the driver on the lead truck sees him staring wide-eyed, giving him a wave. The underwriter spends the rest of his trip thinking about the insurance implications of how to cover such “ghost” trucks, a challenge that insurance executives should be pondering now, rather than later.

A growing number of driverless vehicles are already on the roads in some states, and they are only going to get more visible with time.³ The challenge facing insurers is how to underwrite risks that may emerge with driverless commercial fleets, and which lines might be tapped for coverage—with traditional policy lines likely to lose premiums while others benefit from shifts in exposure.



Figure 1

Venture capital invested in autonomous trucking, 2016–2022 (in USD)



Note: Data has not been reviewed by PitchBook analysts in line with PitchBook citation guidelines.
Source: PitchBook Data, Inc.

THE CASE FOR GROWTH OF AUTONOMOUS TRUCKS

Among the factors propelling the growth of autonomous trucks, one that stands out is the shortage of human truck drivers in the United States. The American Trucking Association (ATA) reported a driver shortage of 78,000 in 2022, close to the high of 81,000 during the pandemic year of 2021, when demand for remote shopping peaked.⁴ Driven by demographic factors such as retirements and difficulties recruiting young people into the profession, the driver shortage is most acute for long-haul truckers.⁵ If current trends continue, the ATA estimates that the industry may need to recruit 1.2 million new drivers over the next 10 years to account for driver churn, attrition, and growth in demand for truck operators.⁶ This demand is unlikely to be met by human drivers alone. Thus, there is a strong imperative for growth of autonomous driving technologies to offset the anticipated shortage of human drivers.

In addition to helping alleviate the driver shortage, autonomous trucks could be more efficient than those driven by humans. Regulations permit live operators to drive a maximum of 11 hours daily, although an average driver spends only 6 to 6.5 hours behind the wheel. Self-driving trucks can let companies triple the driving time to 17 hours daily.⁷ Various studies claim autonomous trucks to be more fuel-efficient as well.⁸

The pandemic highlighted the importance of resilient supply chains for the economy. A recent Deloitte survey of US and Europe transportation providers and manufacturers revealed that 51% are actively adopting autonomous vehicles for fleet transportation to help alleviate supply chain challenges or improve supply chain operations.⁹ The promise of autonomous trucks also led investors to heavily increase funding. According to PitchBook data, venture capital invested in autonomous trucking grew almost

tenfold in 2020 to US\$3.7 billion, followed by a nearly identical sum in 2021. That figure dropped in 2022, in line with an overall decline in venture capital funding activity in 2022 owing to macroeconomic conditions. And as investors await a return on their initial investments, the total still was more than twice as high as in 2019 (figure 1).¹⁰

Despite these economic, demographic, and technological tailwinds, the road ahead is not likely to be entirely smooth. For example, while several states allow the running of self-driven trucks, interstate transport may still need federal clearance. Also, the rollout of autonomous trucks has been concentrated in US Sunbelt states, as the technology is still to be proven under weather conditions such as snow and fog.¹¹ There also may be opposition from truck-driver unions concerned about the loss of jobs.



Self-driven trucks may improve performance for commercial auto insurance

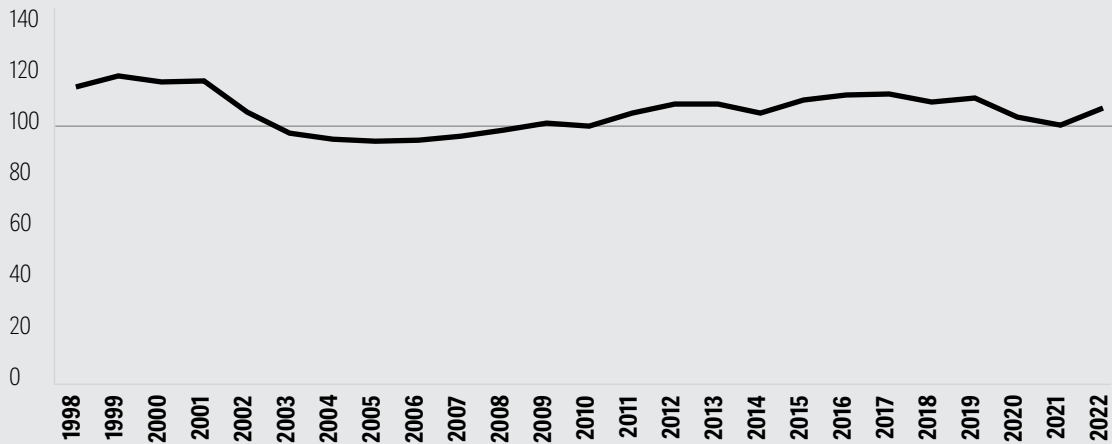
Commercial auto, which generated an average of US\$34.9 billion in annual premiums over the past decade, has consistently been one of the US insurance industry's worst performing business segments.¹² Starting in 2011, the segment posted underwriting losses for 10 straight years, until a pandemic-related decline in accident frequency (thanks to having fewer passenger vehicles on the road) helped it generate an underwriting profit in 2021 (figure 2). This turned out to be an anomaly; the commercial auto industry will likely continue reporting negative underwriting returns unless there is a strong catalyst for change. Widespread adoption of autonomous trucks could be that game changer, as well as being a major disruptor of the commercial auto insurance market.

A 2015 study by the United States National Highway Traffic Safety Administration revealed that 94% of all motor vehicle accidents were caused by driver-related factors such as impaired driving, distraction, or illegal maneuvers.¹³ While there has yet to be sufficient data gathered to show that autonomous trucks may be less likely to be in accidents than those steered by human drivers, it could seem intuitive that eliminating live drivers may also remove many of the human causes of accidents, which could lower loss frequency.

However, autonomous driving could also create an entirely new set of risk exposures—many of which wouldn't be covered by most of current commercial auto insurance plans.

Figure 2

US commercial auto combined ratio (% of premium, USD)



Source: US P&C Industry data sourced through S&P Capital IQ, accessed May 16, 2023.

Shifting liabilities may result in premiums changing lines

As more autonomous vehicles hit the road, new causes of loss will emerge that would have major implications for traditional commercial auto insurers. Even in vehicles with human drivers aided by assisted driving technologies, assessing causality may become quite challenging. Accidents in tech-driven vehicles could be caused by software errors, manufacturing defects, network outages, GPS flaws, failing sensors, or cyberattacks.¹⁴

Such occurrences would likely fall in the purview of product liability coverage, or even professional liability insuring those whose code or algorithms malfunction. Or would it? What if a self-driven truck hits a pothole or an icy patch and veers off the road, which would likely still be covered by traditional commercial auto policies? Incidents like this could lead to some complicated claim adjustments, and even increased litigation over who or what is responsible for an accident. As self-driving technology prompts changes in the underlying exposure,

it can be hard to predict how much premium dollars might shift from payments to traditional commercial auto insurers to other types of policies. But even if only 20% of such premiums move into these other coverage lines, that would represent a loss of US\$7 billion annually from commercial auto coffers.

Rising technological complexity and interconnectedness could vastly increase the cyber vulnerability of autonomous trucks and fleet operators. Industry data shows modern vehicles contain about 100 million lines of code.¹⁵ The amount of code will only increase rapidly with increasing autonomy of vehicles. As the cyberattack surface would rise exponentially with multiple targets and points of access, cyber insurance would assume a much larger proportion of insurance costs for autonomous truck owners/operators than what it is now.

One almost certain net loser, however, would be workers' compensation insurers. Driving-related injuries account for approximately 25% of all workers' compensation claims.¹⁶ Thus, any reduction in accident frequency due to assisted driving technology could directly benefit the profitability for this line. But even though autonomous vehicles could lessen the impact of the anticipated shortage in truck drivers (see sidebar, "The case for growth of autonomous trucks"), full-fledged autonomous vehicles, estimated to eliminate the need for 380,000 jobs, would also eliminate the need for workers' comp coverage for those self-driven trucks. This could result in a loss of around US\$3 billion in potential workers' comp premiums.



What worked for human-driven trucks likely won't work for driverless trucks

Insurers have decades of data on human-driven vehicles to help ascertain the type of products the market needs and determine pricing. But for autonomous trucks, insurers do not have any historical data to work with. Akin to the evolution of cyber insurance, carriers may take years to figure out what works for the market; they may sometimes burn their hands in the process.

Still, first movers will likely have an advantage. They may be well-positioned to understand the lay of the land and craft unique coverages for the emerging commercial trucking industry. One possible avenue could be to form

relationships with autonomous truck manufacturers to embed multiple coverages with the sale of the vehicles. Liberty Mutual, for example, has taken a head start with multiple partnerships to assess the safety of autonomous vehicles and better understand the risks.¹⁷ AXA XL has launched a single customizable policy for autonomous vehicles, covering vehicle and component manufacturers, fleet owners, operators, and software developers.¹⁸

Exploring with new coverages and relationships early can also prove to be a good sandbox, helping carriers prepare for a larger disruption from widespread adoption of consumer autonomous vehicles down the road.

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Acknowledgments

The authors would like to thank **Shreeparna Sarkar** of the M&A and Restructuring Services (MARS) for helping with the venture capital investment data.



Could technology innovations help reverse the climate change trajectory? Not without a lot more money.

An additional US\$2 trillion in private hardtech investment will likely be needed to effectively slow global warming. Here's how financial services organizations can play a leading role in bridging the funding gap.



Most of the total climate funding will likely need to come from the private sector—but so far, there isn't enough.¹ Deloitte estimates that there may be as much as a US\$2 trillion² private funding gap for next-generation climate technologies to achieve the goal of limiting global temperatures to 1.5°C of preindustrial levels by 2030.³

Contrary to popular belief, most “climate hardtech”⁴ innovations may have surpassed the point of technical difficulty. True, direct air capture and aviation decarbonization represent real challenges.⁵ And batteries with gravimetric energy density anywhere near today's jet aviation fuel don't exist.⁶

But what can deter investment is the lack of a viable business model, given that carbon's polluting effects may not be fully priced in. Consumers are often unwilling to pay the “green premium”—that is, the additional cost for less-polluting energy sources.⁷ As Bill Gates points out, “In many cases, clean alternatives appear more

expensive because fossil fuels are artificially cheap.”⁸ For example, green hydrogen, which is derived from water, costs around three times its much more pollutant “gray” counterpart, which is produced from fossil fuels.⁹

Then, there is the difficulty of working out when and how to make a systemic shift—the “chicken and egg” dilemma. Who moves first: the consumer or the producer? Some organizations aim to solve for this exact dilemma by “using their purchasing power to create early markets for innovative clean technologies.”¹⁰

This prediction addresses the current state of climate funding, and the measures financial services institutions (FSIs) could take to help bridge the private funding gap for climate technologies in stages before deployment.¹¹



FSIs are taking steps to help fund next-generation climate technologies



FSI have a broad and pivotal role to play. They should continue to provide support by helping create a market for climate-related instruments and facilitating project finance and term loans for projects that deploy climate tech. While FSIs are adept at this, there may still be significant potential to develop new, innovative financing instruments such as green deposits and emission reduction-linked bonds to fund these types of transformations, possibly affording them new business opportunities.

That said, while the bulk of overall climate funding is likely needed for scale-up and deployment, much remains to be done to fund climate technologies that are not yet commercially deployed. FSIs can support early-tech start-ups *directly* through equity investments or by insuring them.

Some investors have shown their willingness to back climate early tech. For instance, Breakthrough Energy Ventures has invested almost US\$2.5 billion across three funds.¹² Just Climate recently raised US\$1.5 billion from institutional investors, exceeding its target by US\$500 million.¹³ BNP Paribas's Solar Impulse Venture Fund aims to invest €150 million in American and European cleantech start-ups.¹⁴

Blended finance, where philanthropy and/or development finance are used to mobilize private capital, can help hard-to-fund projects, especially in developing countries. Standard Chartered Bank, Société Générale, DWS, and Mitsubishi UFJ Financial Group are some of the active private investors in blended finance.¹⁵



Moreover, large global FSIs are increasingly joining coalitions such as the Glasgow Financial Alliance for Net Zero (GFANZ), committing to align lending and investment portfolios and ramp up green capital. The GFANZ is trying to accelerate country-specific climate finance flows and build a bankable pipeline of projects in countries such as Colombia and India.¹⁶

To stimulate the market for green bonds, government actions like the tax credits embedded in the Inflation Reduction Act (IRA) and Infrastructure Investment

and Jobs Act (IIJA) are intended to address the “green premium” issue referenced earlier. And early returns suggest it might be working: around US\$2.3 trillion have been issued in green bonds so far in 2023, with US\$487 billion raised in 2022.¹⁷ Meanwhile, green loans, typically smaller in size than green bonds and arranged privately, constituted just 2% (~US\$10.4 billion) of the market in 2022. So far this year, 70% of loan instruments originate from Asia-Pacific and Europe combined.¹⁸

GOVERNMENTS AND REGULATORS: LEADING FROM THE FRONT

Industry estimates suggest that about 75% of climate funding will flow from the private sector.¹⁹ But while the private sector may account for the bulk of funding, governments can—and are—playing a role in the net-zero transition through policy interventions and financing.

One potential role for governments to consider is to try redressing the market failure that carbon is underpriced, which could explain green premiums, at least in part.²⁰ Some governments have considered policies to promote low-carbon products by levying

carbon taxes, such as the European Union’s (EU’s) proposed Carbon Border Adjustment Mechanism.²¹

Other policy responses may include tax incentives or government funding, which could *de facto* derisk private investments. The United States’ IRA, which allocates over US\$400 billion in spending and tax incentives to accelerate the transition to clean energy, is expected to help drive investment in carbon capture and green hydrogen.²² Separately, the EU has unveiled its own “Green Deal Industrial Plan.”²³

In addition to government policy action that could help derisk and incentivize private investment, the official sector—central banks, international bodies, and supervisors—will likely continue playing a role in this space. For example, the Bank of England and European Central Bank now have climate goals. The central banks of Japan, China, Singapore, Hong Kong, the United Kingdom, and the EU have implemented measures to encourage green financing, via financing facilities, grants, or changes in monetary policy.²⁴

Accelerate now!



Despite these examples of progress, FSIs' efforts to mobilize private capital to climate tech could be improved. The total issuance of green bonds to date is less than half of the *annual* issuance from 2025–2030 needed to address the stark risks of climate change.²⁵

With blended finance initiatives from US and EU governments coming online, developing a robust, climate-centred financial ecosystem can be paramount in addressing the funding gap. Here are some steps FSIs can consider to help close that gap and meet their own climate commitments:

1. **Understand climate tech.** Financing climate early tech requires that FSIs educate themselves about the technology and get smarter about potential risks and opportunities. They may require setting up centers of excellence that focus on climate tech.
2. **Create innovative financing instruments.** FSIs should use their financial expertise, product frameworks, technology, and geographical reach to create structures that spread risk to facilitate both climate-tech development and deployment.
3. **Build borrower profiles.** FSIs can provide small loans to climate start-ups, which can help them build their creditworthiness.
4. **Address information asymmetry.** FSIs can facilitate market development by sharing information and data within the industry and providing support for new business models that can help create a market for next-generation climate technologies.

5. **Enhance risk management capabilities.** By expanding climate-centric information, firms can manage the financial implications of climate change on a day-to-day basis, generate new insights, and bolster reporting.²⁶

According to the Intergovernmental Panel on Climate Change's 2023 Sixth Assessment Report on greenhouse gases, emissions must peak before 2025 and decline 43% from 2019 levels by 2030 to limit global warming to 1.5°C.²⁷ Given the risk of triggering potentially catastrophic tipping points, bridging the funding gap, and doing so promptly, is important to the broader effort of reducing carbon emissions. FSIs are in a privileged and powerful position: They may hold the key to unlocking the power of groundbreaking climate technology. And they should use it.

METHODOLOGY: WHAT'S BEHIND OUR FUNDING GAP ESTIMATE

Our prediction of the private funding gap for early-stage climate mitigation technologies is based on the difference between publicly available forecasts of current funding growth rates and our analysis of the total funding requirement for the forecast period of 2021–2030. The funding requirement for climate early tech is a function of the total climate funding, calculated as a percentage of GDP, an estimation of technologies that are in concept or at the prototyping stage using [Greenspace Navigator](#), and the fraction of funds likely to flow from the private sector. Lastly, we estimate the potential availability of private funds (i.e., venture capital funding and green bonds) raised by financial corporates, during the forecast period to arrive at the funding gap.²⁸

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Acknowledgments

The authors wish to thank **Taariq Phillips** of Deloitte & Touche LLP, **David Schatsky** of Deloitte LLP, and **Patricia Danielecki** and **Paul Kaiser** of the Deloitte Center for Financial Services, for their contributions to the development of this article.



Unleashing a new era of productivity in investment banking through the power of generative AI

How can generative AI technologies transform investment banking? By bolstering employee productivity and efficiency while supporting superior customer experience and rapid innovation.

Generative artificial intelligence (AI) could well be one of the most transformative technologies for the investment banking industry. Deloitte predicts that the top 14 global investment banks can boost their front-office productivity by as much as 27%–35% by using generative AI.¹ This would result in additional revenue

of US\$3.5 million per front-office employee by 2026. The allure of generative AI powered by transformer models² has not escaped investment bankers' attention. The potential of the technology to transform investment banking activities seems to be vast, and the applications are far-ranging.

Investment banks can benefit from generative AI in multiple ways

AI and automation are not new to investment banking. In fact, machine learning/deep learning algorithms and natural language processing (NLP) techniques have been widely used for years to help automate trading, modernize risk management, and conduct investment research. However, despite the billions of dollars spent

on automating the various functions across the transaction life cycle, there are still a fair number of tasks that are conducted using precious human capital. But large language models (LLMs) could help automate many tasks, not only saving money but also improving worker productivity. It could also free up resources to spark innovation and enable front-office staff to focus more on productively interacting with clients.



Generative AI can have a large impact on productivity across financial services



Results of recent studies on generative AI's impact on productivity look promising. One study by Stanford researchers found that generative AI boosted a call center's productivity by 14%.³ Another study by Massachusetts Institute of Technology concluded that generative AI helped reduce time and improve the quality of work for marketers, consultants, and data analysts.⁴ One common finding is that the technology can level the playing field and can, in particular, assist lower-skilled employees improve their outputs and productivity. Nonetheless, initially, lower-skilled workers may need to exert greater validation efforts.

Given such promise, the industry is swarming with numerous proofs-of-concept (POCs) and experiments. JPMorgan Chase recently applied to trademark a product called "IndexGPT" that offers investment advice to customers.⁵ Wells Fargo is using LLMs to help determine what information clients must report to regulators and how they can improve their business processes.⁶

When Federal Reserve researchers evaluated GPT models' ability to "decipher FedSpeak" (i.e., classify Federal Open Market Committee announcements as dovish or hawkish), they found that the algorithms not only were superior to other methods but also demonstrated reasoning abilities on par with humans.⁷ Several institutions are already using similar GPT models to analyze official statements and speeches produced by central banks.

Vendors to investment banks have also increased their investments in the new technology. Bloomberg recently launched "Bloomberg GPT," a large language model built on 50 billion parameters and tailored for finance.⁸ Similarly, Pitchbook has a new tool called "VC Exit Predictor" that uses a machine learning algorithm to predict a startup's potential growth prospects.⁹





How generative AI can help investment banking front-office operations

Generative AI should be especially fruitful in areas where the output generation effort is high and validation is relatively easy.¹⁰ In the investment banking context, this capability can enable front-office employees to do their jobs better across a spectrum of activities, including marketing, sales, decision support, research, and trading, thereby boosting productivity. Professionals in these areas spend an enormous amount of time creating pitch books, industry reports, investment theses, performance summaries, due diligence reports, etc. Generative AI can help reduce the cost of content creation, enhance analytical capabilities, improve the electrification processes, and even reduce client call transfer rates.

Investment banks such as Goldman Sachs are also leveraging generative AI to help developers and coders create robust code more efficiently.¹¹ Such competence is only expected to improve as these LLMs are trained on more parameters.

Our analysis suggests that the use of generative AI can boost productivity for front-office employees by as much as 27%–35% by 2026, after adjusting for inflation.¹² This translates to an additional revenue of US\$3 million to US\$4 million per employee from an average of US\$11.3 million during 2020–22 (figure 1).

Productivity gains will likely vary by the inherent complexities of the underlying business. We estimate that gains will be the highest for the investment banking division (IBD), followed by equities, and then by FICC (fixed income, currencies, and commodities) trading.

The IBD, which includes equities and debt issuance, mergers and acquisition, and advisory, may benefit the most from generative AI, as it involves more repetitive tasks: We estimate that IBD productivity can be improved by an average of 34%. The technology can help generate initial deal structures and conduct due diligence, compliance, and valuation. In the areas of underwriting and issuance, generative AI can help with prospectus and term-sheet drafting and legal documentation.

Generative AI may also have a profound impact on trading. Automation and low-latency trading infrastructure have already morphed trading dramatically, possibly leading to greater market efficiencies, and reduced transaction costs.¹³ Traders leverage NLP and sentiment analysis to analyze markets, generate synthetic data for risk modeling, and optimize trading strategies. We estimate generative AI's impact on such activities could significantly reduce time to understand market sentiment, catch anomalies, and place orders more easily and at greater scale.

In equities trading, generative AI can help traders quickly analyze, summarize company and industry fundamentals, run valuation models, conduct backtest trading strategies, and offer personalized trading recommendations to both institutional and retail clients.

FICC trading, on the other hand, often demands complex analysis and valuation, since it may also involve swaps/derivatives and a diverse array of trading strategies and risk parameters. Additionally, FICC markets tend to embody more systemic risk, so there is typically more

Figure 1

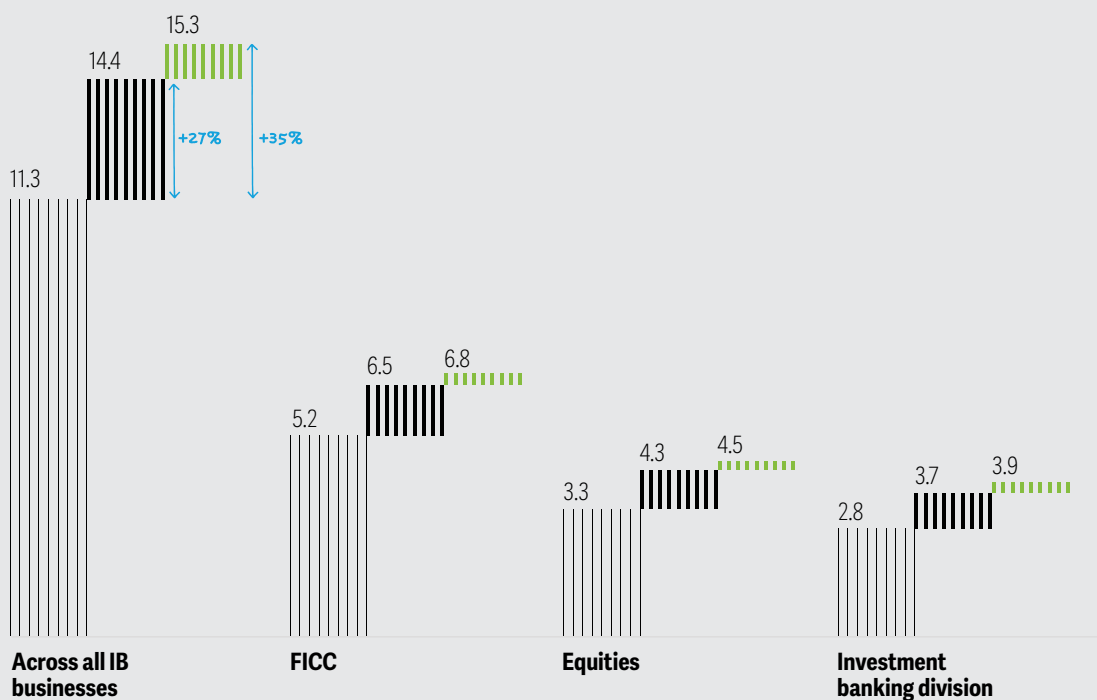
Generative AI will boost productivity unevenly across investment banking business lines

Productivity gains per full-time employee (US\$ million)

— Average 2020–2022

— 2026 base case scenario

— 2026 best case scenario



Note: Investment banking division includes equity and debt issuances, and M&A advisory activities.

Source: Deloitte Center for Financial Services analysis of Tricumen data.

regulatory scrutiny. While this offers space for generative AI to monitor bond yields, assess credit ratings, and provide real-time insights, the market-related uncertainty and volatility would require continuous validation from

seasoned experts. These unique features may dampen productivity gains from generative AI, compared with equities trading.



How can investment banking leaders help prepare their firms for generative AI adoption

Here are some key considerations investment banking leaders should explore when implementing generative AI into front-office functions:

1. **Determining focus and scale.** The benefits of LLMs may not be uniform. In addition to the vaunted gains, leaders should consider the potential ease of execution and the associated risks.
2. **Leveraging productivity gains.** As initial use cases become real, banks will likely have to realign their workforce to more purpose-driven tasks. Reducing mundane activities could help enable new talent, such as junior traders, to scale up faster and develop more valuable proficiencies.

GENERATIVE AI MAY CREATE NEW RISKS AND ALTER COMPETITIVE DYNAMICS

The infusion of generative AI into the investment banking value chain will most likely come with potential legal, reputational, and other operational risks. It may also alter the dynamics with buy-side clients; as they also embrace this technology, the outputs they are able to generate with greater efficiencies may reduce dependency on the sell-side. Some clients may want to independently develop their own value streams and turn to banks only for the most high-value-adding services. Additionally, productivity gains could level the playing field by reducing barriers to entry, and further intensifying competition. But as investments needed to develop these LLMs become more substantial, this technology may also widen the gap among market participants and may put the smaller, boutique firms at a disadvantage.

3. **Assessing, mitigating, and managing risks.** Generative AI's outputs could require constant validation for hallucination (i.e., fabrication of confident responses that cannot be grounded in real-world data), accuracy, and biases. Banks may need to redesign their existing risk frameworks, risk governance, and, more generally, prepare for a more dynamic risk management.¹⁴
4. **Bolstering stakeholder trust.** Ensuring the credibility of the outputs and convincing employees, clients, partners, and regulators of their validity may be key in scaling generative AI applications. Aligning stakeholder interests and ensuring that ethical and responsible AI practices are adhered to will be paramount.
5. **Integrating generative AI with existing systems, applications, tools, and technologies.** Leaders should consider how these AI tools will fit within the broader context of digital transformation, cloud migration, and data and analytics strategy and operations. Generative AI should be integrated with existing AI and digital infrastructure. Leaders should keep an eye on how other emerging technologies, such as quantum computing, can add to the multiplicative power. Sharing hardware resources and computational and server loads across various technologies and applications will be another challenge.¹⁵
6. **Monitoring advancements to gain a competitive edge.** Generative AI should spur greater innovation and creativity. As LLMs become ubiquitous, though, using generative AI to gain a competitive edge in areas such as cost management may diminish.
7. **Interacting with regulators.** Regulators will likely provide new guidelines for the application of generative AI for data privacy, copyrights, and intellectual property issues. Investment banks should be careful about how they use client and market data and institute new compliance processes. Banks should proactively engage with regulators on these matters and shape new policies for everyone's benefit.
8. **Partnering on implementation.** Fintechs and technology organizations have proved to be effective partners for investment banks in the past. Generative AI will likely require both horizontal and vertical partnerships. Large banks may have to ponder the age-old build vs. buy decision. Smaller institutions may be at a disadvantage in establishing partnerships; they may need to design new partnership models.

Endnotes

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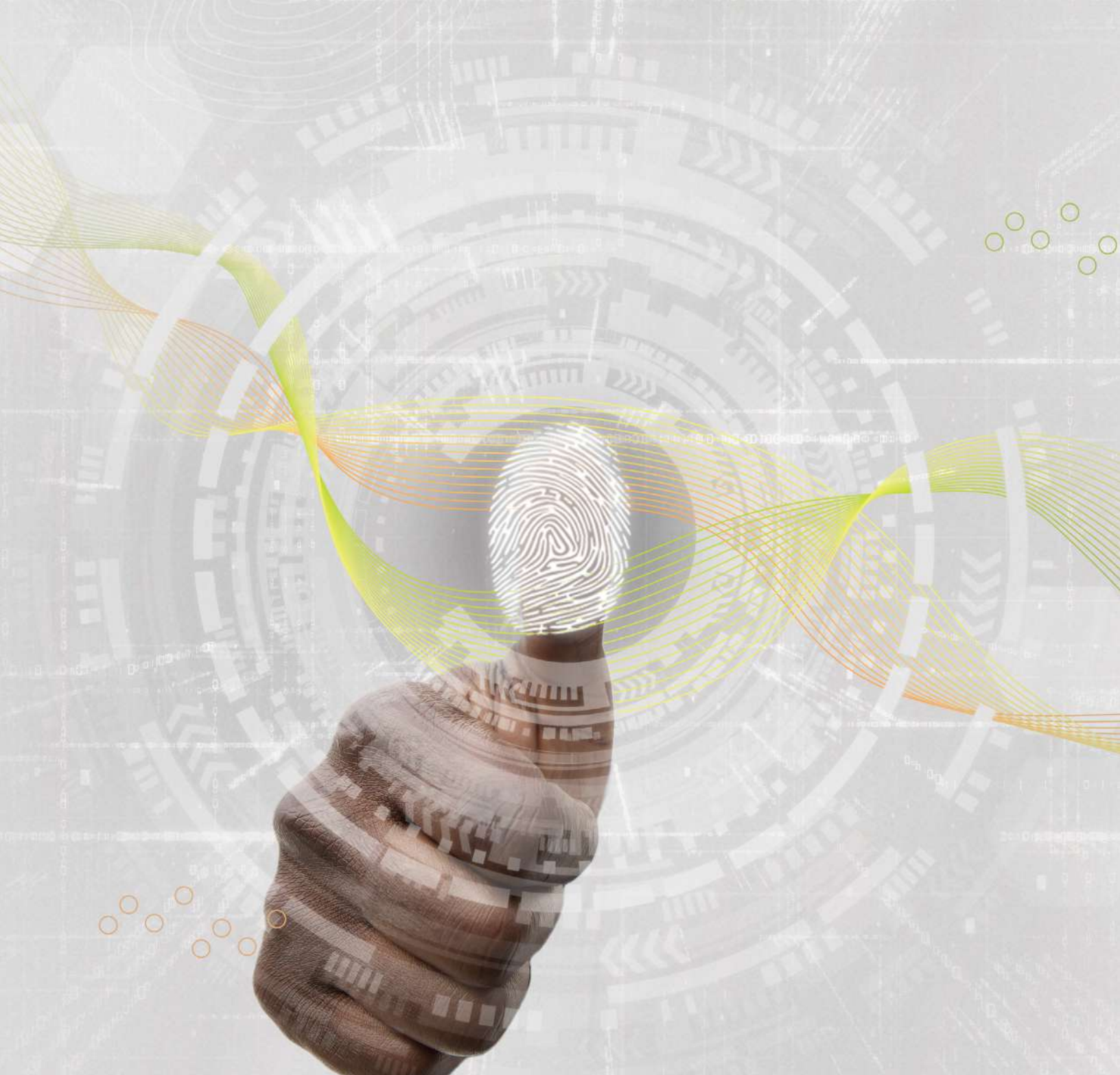
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Acknowledgments

The authors would like to thank the following Deloitte Center for Financial Services colleagues for their extensive contributions and support: Jim Eckenrode, Patricia Danielecki, Samia Hazuria, Karen Edelman, and Paul Kaiser.



Using biometrics to fight back against rising synthetic identity fraud

Traditional security systems seem to be no match for sophisticated identity fraudsters. What can banks do to help stay a few steps ahead?



Synthetic identity fraud—when cybercriminals create new identities with stolen or fabricated data—is the fastest growing financial crime in the United States,¹ and it shows no sign of abating. Not only can bad actors purchase personally identifiable information on the dark web for a pittance,² but advancements in Generative AI are making it easier to produce images and videos in someone else’s likeness—whether they may be real or imaginary.

Deloitte Center for Financial Services expects synthetic identity fraud to generate at least US\$23 billion in losses by 2030,³ prompting many banks and fintechs to develop more advanced biometric security systems to weed out would-be perpetrators. These projections incorporate historical data on the rate of synthetic fraud and expectations of growth in noncash payments in the United States until 2030.⁴ We used the Federal Reserve Payments Survey to find this expected payment volume—excluding prepaid debit cards—and assumed that synthetic identity fraud would grow incrementally each year.

Synthetic identity fraud is both increasing with the rise of digital interactions and becoming more complex as Generative AI and other technologies advance. Many fraudsters concoct entire personas using a mix of real and fabricated information, which are often pinned to social

security numbers taken from children or the recently deceased. These bad actors may spend months or years nurturing their synthetic identities, and more than half have a credit score over 650,⁵ just shy of what agencies consider “good.”⁶ The average payoff is estimated to be between US\$81,000 and US\$98,000,⁷ but a single attack can sometimes result in the theft of several millions.⁸ Synthetic fraudsters may also try to disguise themselves as new customers so they can add themselves to existing bank accounts, or look for lenders who will grant loans to “credit invisible” consumers with no reportable financial history.⁹

What makes synthetic identity fraud notoriously difficult to detect? For a start, fraudsters often create an extensive history in the public domain using their fabricated credentials. They can also correctly enter information to common identity verification questions about their manufactured lives. In fact, 85% of synthetic identities in the emerging consumer sector elude third-party risk models, according to LexisNexis Risk Solutions.¹⁰ These external tools will be increasingly useful for detecting anomalous behavior and reducing false positive rates, especially if they utilize deep learning to analyze multiple characteristics and data points of users’ identities at once. Banks and financial institutions should follow rigorous model risk management procedures to help ensure they are properly monitoring algorithms for performance, transparency, and interpretability.

Stronger biometrics can help to create a wider safety net



Both physical and behavioral biometrics systems can add overlapping lines of defense; they can work together to catch opportunistic hoaxers who would have fallen through the cracks of traditional security checks. Unlike passwords or PINs, physical biometric technology can analyze traits that are unique to each consumer's makeup, such as their palm vein patterns, retina details, vocal pitch, and ear canal shapes. These biometric security tools can improve outcomes for ID verification and authentication, but many emerging solutions are susceptible to low-cost, creative workarounds. Researchers, for example, recently hacked facial identification technology by placing glasses with tape where eyes should be over smartphones owners' faces while they slept.¹¹ Smartphone users have also found a myriad of ways to dupe fingerprint sensors, including with gummy bears,¹² wood glue,¹³ and cheap printed circuit boards.¹⁴ These "deepfakes" have passed through some banks' know your customer (KYC) protocols.¹⁵

To help counteract these fraudulent actions, new and powerful biometric tools can provide additional layers of defense by evaluating whether users are human, testing the veracity of visual artifacts and manipulated recordings, and identifying anomalies that may be atypical of online consumer behavior. These loopholes may create more demand for biometrics capabilities that can assess "liveness."

Financial institutions should expend more effort refining "liveness detection" checks that distinguish human consumers from synthetic identities who use stolen or AI-generated content to act as the face of their alter egos. These tests may use a range of techniques to verify that

a user is responding in real time, for example, by asking them to tilt their head to the side, smile, or blink. Security systems for physical biometrics can compete with the growing sophistication of spoofers by adding elements like skin texture, facial imperfections, perspiration, and blood flow.¹⁶ Banks and card issuers can then evaluate whether the results match up with government-issued ID documents, as well as third-party consortium data and any national ID verification services available to them. They can also check for other indicators of synthetic identity fraud, such as a lack of connections to family members and associates.¹⁷

Banks and card issuers are also planning to significantly expand capabilities in emerging behavioral biometrics tools. These systems can provide continuous authentication by tracking dynamic information about users and learning more about them over time. Moreover, this information can usually be gathered with no additional input from consumers, and it is nearly impossible to replicate. For example, behavioral biometrics technologies aim to analyze a consumer's touchscreen behavior, mobile app navigation, and typing habits. As a result, even if cyber criminals had the correct password for the user they're trying to impersonate, the technology could flag that they're entering a password slower than usual or applying less pressure to the device's screen.

Behavioral biometrics is expected to be particularly effective in spotting synthetic identities, since fraudsters usually type information quickly across multiple forms, copy and paste it from other sources, or use uncommon keyboard shortcuts.¹⁸ The test results can then be supplemented with nonbiometric factors, such as location histories and spending habits, to trigger instant alerts of unusual transactions that require further

review. Moreover, banks can also work more closely with startups and established technology firms to develop multimodal biometric security that evaluates several indicators at once, such as fingerprints, natural speech patterns, and word choice. These enhanced systems may also perform better in a variety of settings and lighting environments and work more effectively with underrepresented consumer groups.¹⁹

Banks and fintechs should take a proactive approach to managing and testing their proprietary and third-party tools, including validation of controls, by feeding them with “synthetic” or artificial biometric data. Synthetic data can be immensely valuable when it is too costly, time-consuming, or sensitive to collect real data that make biometrics algorithms produce more accurate predictions.²⁰ For instance, many current AI systems used for facial recognition have been typically trained on white subjects.²¹ By including digitally generated datasets that include more diverse demographics, the tools can become better at identifying diverse faces. Banks and

financial institutions should also take additional steps to check the maturity of the controls of their banking partners.

One of the biggest challenges facing financial institutions in the longer term is extending biometric security to new and emerging consumer technologies and having them work together to monitor for anomalous activity contemporaneously. For example, financial institutions may need to develop interactive dashboards that may link behavioral biometric systems to new tools for flagging one-time password fraud, SIM swap fraud, and mobile wallet fraud in real time. In addition, these organizations should consider determining how to safeguard biometric data shared between devices connected by a network, including the Internet of Things (IoT). In the longer term, it may also be imperative for businesses to contemplate how the cryptography-breaking power of quantum computers²² could undermine existing processes for biometric authentication.

Biometrics are important to a zero-trust security model



Physical and behavioral biometrics are becoming a more critical component of the zero-trust security model, which assumes all network traffic is malicious. Financial institutions should continually monitor users and devices instead of trusting that the network's security perimeter will be sufficient to prevent breaches. Biometrics can buttress the “never trust, always verify” ethos by adding heightened controls that require hard-to-copy information such as fingerprints at every access point in the network.

Biometric systems may also become increasingly important as digital currencies such as central bank digital currencies (CBDCs) enter the mainstream, and consumers conduct more transactions using digital wallets. The European Union, for example, plans to examine how biometrics can be used to verify and authenticate users of the EU Digital Identity Wallet,²³ where the digital euro will likely be stored. The expansion of these verification systems can offer additional safeguards beyond the banking sector by confirming a user's identity when sharing medical data, taking online exams, or making age-restricted purchases.²⁴





Biometrics can also create seamless customer experiences

Banks and card issuers have another incentive to continue investing in biometrics: Many customers really seem to like it.

Physical biometrics can improve customer experience and reduce abandonment rates in account opening and onboarding processes or other digital transactions due to burdensome security measures. One-quarter of UK adults would exit the account opening process if the identity checks were too time-consuming or complex.²⁵

Some brands are tapping biometrics as an innovative payment method. Panera Bread and Whole Foods Markets, for example, recently unveiled palm payments, which allows users to make purchases by waving their hand over a sensor.²⁶ In just a few years, three billion global consumers are expected to make US\$5.1 trillion of purchases using biometric payments.²⁷ Merchants have also expressed interest in using biometrics to offer personalized services or loyalty rewards to consumers at checkout.

Finally, biometrics can also help facilitate financial inclusion by allowing those who lack formal documents used to establish identity, and who have thus been unable to access traditional financial services, to execute safe and secure digital transactions. It can also expand branchless banking services to mobile consumers and protect the assets of women or other vulnerable individuals by offering them sole access to bank accounts.²⁸ And since consumers could no longer be required to recall complex sequences or credentials, it can improve accessibility for groups with cognitive and learning disabilities.

In the end, biometrics should be a win-win for banks. Not only can biometrics play a critical role in detecting and mitigating fraud, synthetic or otherwise, but it may help expand financial inclusion and provide more secure and seamless customer experiences.

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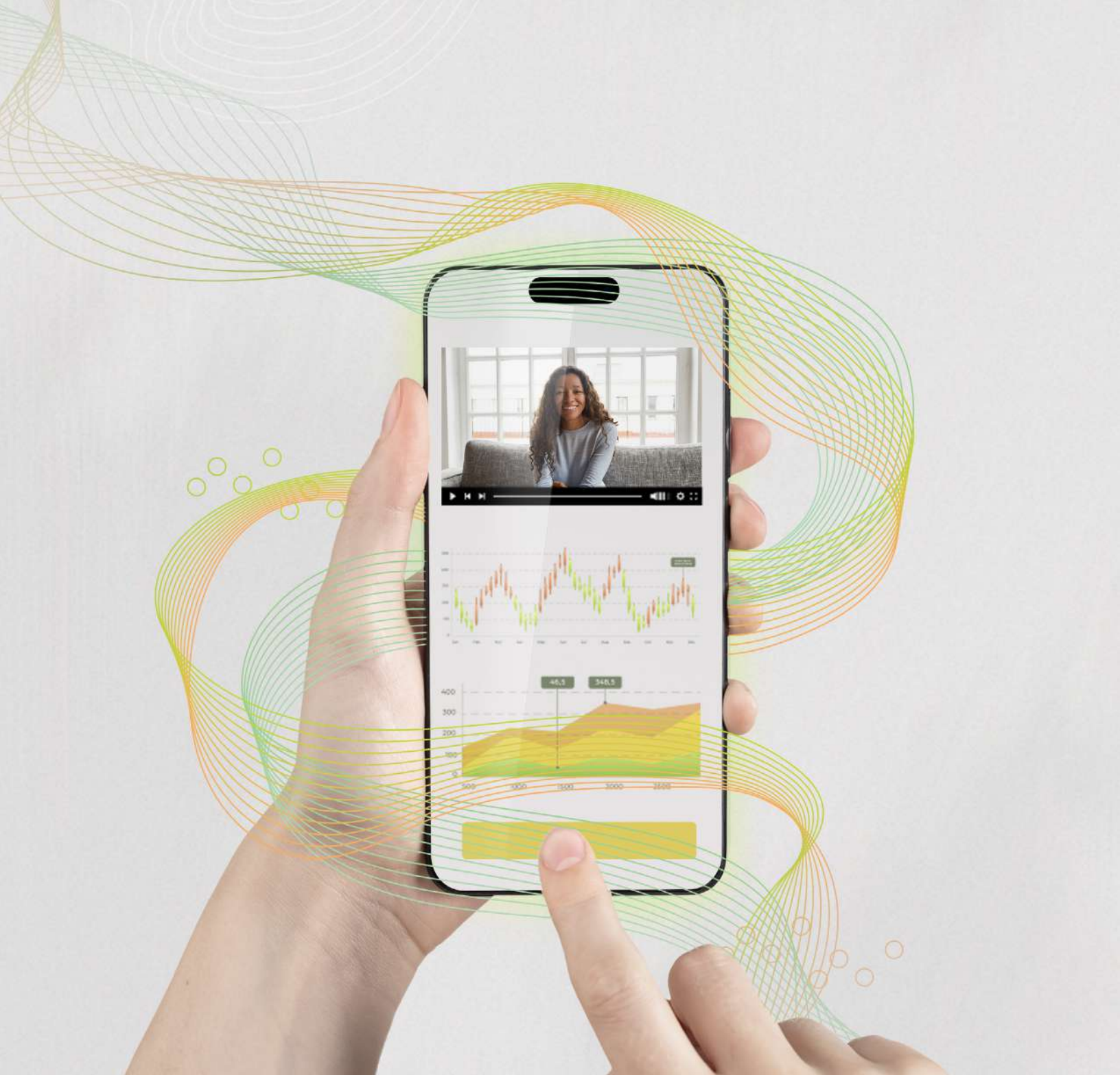
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Acknowledgments

The authors would like to thank **Brendan Maggiore** of Deloitte Transactions and Business Analytics LLP for his contributions to this article.



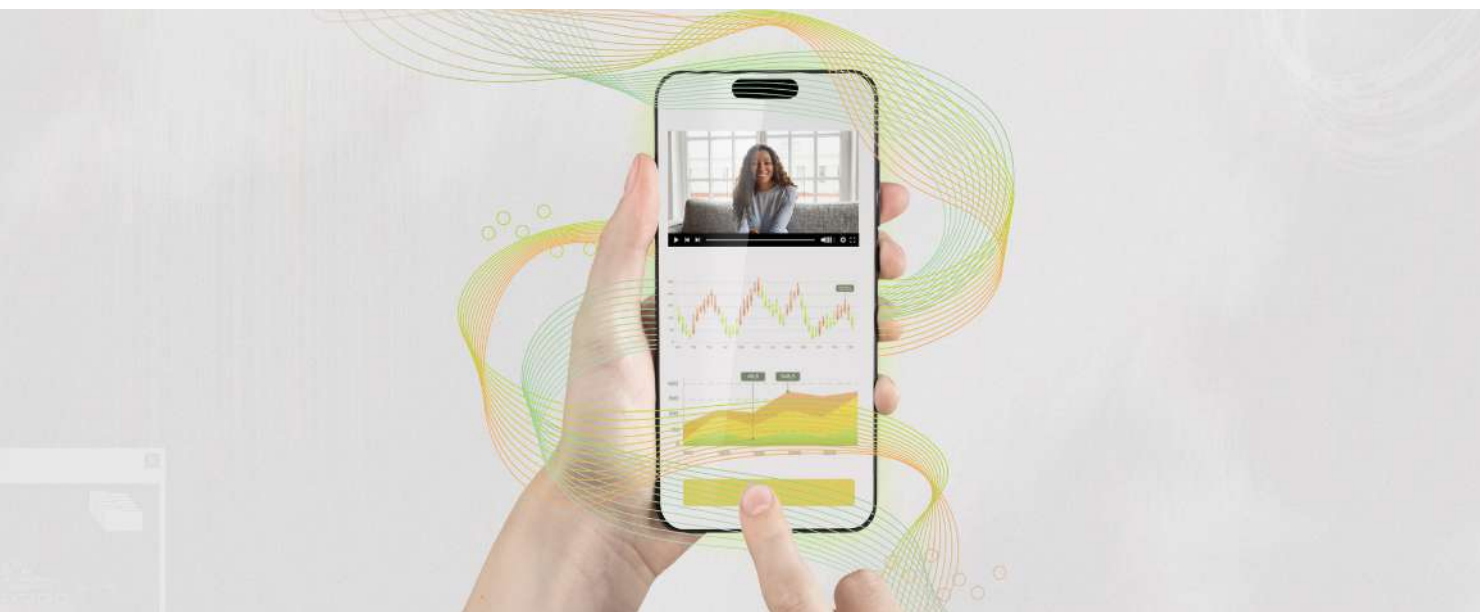
Financial services firms can untap global growth by democratizing financial advice

Personalized financial advice shouldn't just be for the wealthy anymore—and it doesn't have to be. Why advising the mass market could be a win-win financial inclusion opportunity.



Two growing trends—the demand for holistic financial advice among mass-market investors and adoption of mobile wallet platforms—are converging, spurring hope for a true democratization of financial advice. Deloitte estimates net financial wealth held by the mass retail population segment globally to almost double, to US\$22 trillion by 2030.¹ Wealth and asset managers can achieve greater financial inclusion by serving less affluent clients. And now, serving the mass market could provide financial services firms with significant economic opportunities.

The unprecedented disruption in society over the last few years has led to many changes in financial services; greater attention to financial well-being is one.² Today, most financial services industry leaders recognize that their organizations can help support this new dynamic by developing financial inclusion strategies within their organizations.³ These strategies have benefited companies and workforces alike, and there may be good cause to broaden the strategies themselves for even greater dividends.⁴ One possible path is to fully democratize financial advice by servicing individuals at the lower end of the wealth spectrum, i.e., the mass retail segment, which the Deloitte Center for Financial Services defines as the bottom 60% in wealth of each global region's adult population.



The professional advice gap in the mass retail segment is a huge market-making opportunity



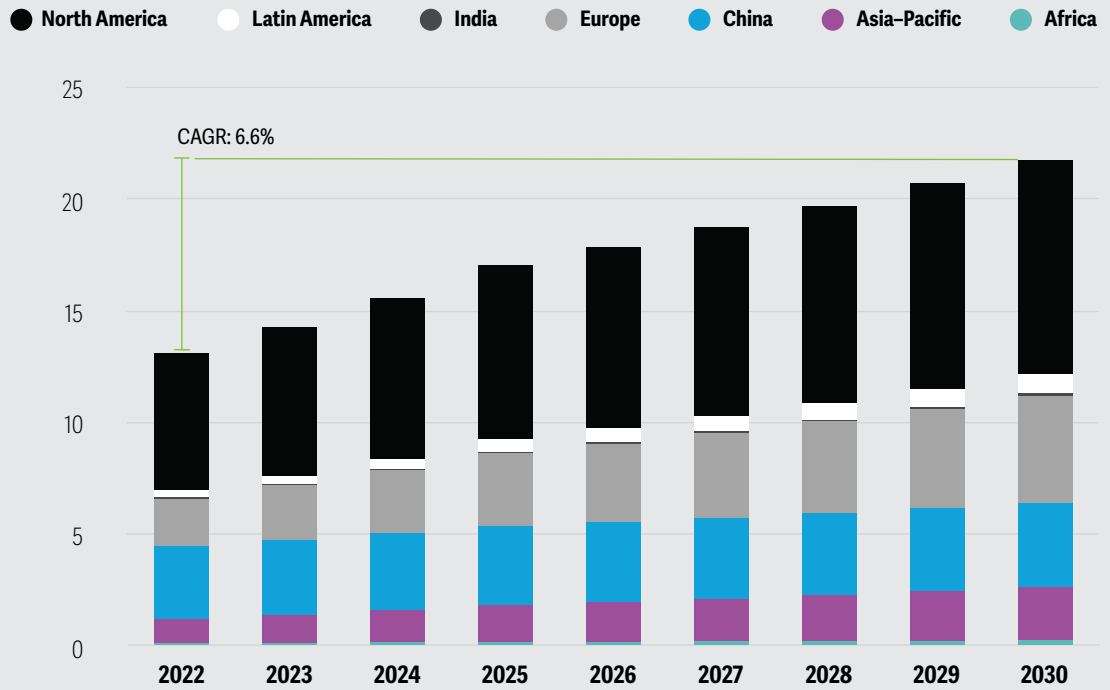
At present, the Deloitte Center for Financial Services estimates this segment to hold around US\$14 trillion in assets.⁵ While some of these assets may already be held in interest-bearing accounts, our research suggests that the majority is not professionally managed. In the United States, almost three in five (59%) consumers seek financial advice but aren't sure how to get it.⁶ In fact, over 40% of people turn to digital sources, including social media, blogs/vlogs, and podcasts, for financial advice.⁷ The top reason respondents reported for not seeking out a registered financial advisor was that people didn't think they had enough money to invest.⁸ The large percentage of people already turning to digital sources for financial advice could mean there may be a huge untapped opportunity for financial advice in the global mass retail population segment.

We estimate the opportunity for assets in this market, to cross the US\$20 trillion-mark by 2030, growing globally at an annual rate of 6.6% (figure 1).⁹ While Latin America could witness the fastest regional growth (13.9% CAGR; figure 2), it is only projected to represent about 4% of the market by end of the decade. The largest share of global assets is in North America, where growth is forecast to be around 6% per annum. We expect Europe's mobile wallet platform adoption to surpass that of China's within the next few years, which would make Europe the second largest opportunity for the mass retail segment, behind only North America, by 2030.

Figure 1

Global mass retail market assets represent an opportunity for financial advice

Total global mass retail net financial wealth (US\$ trillions)

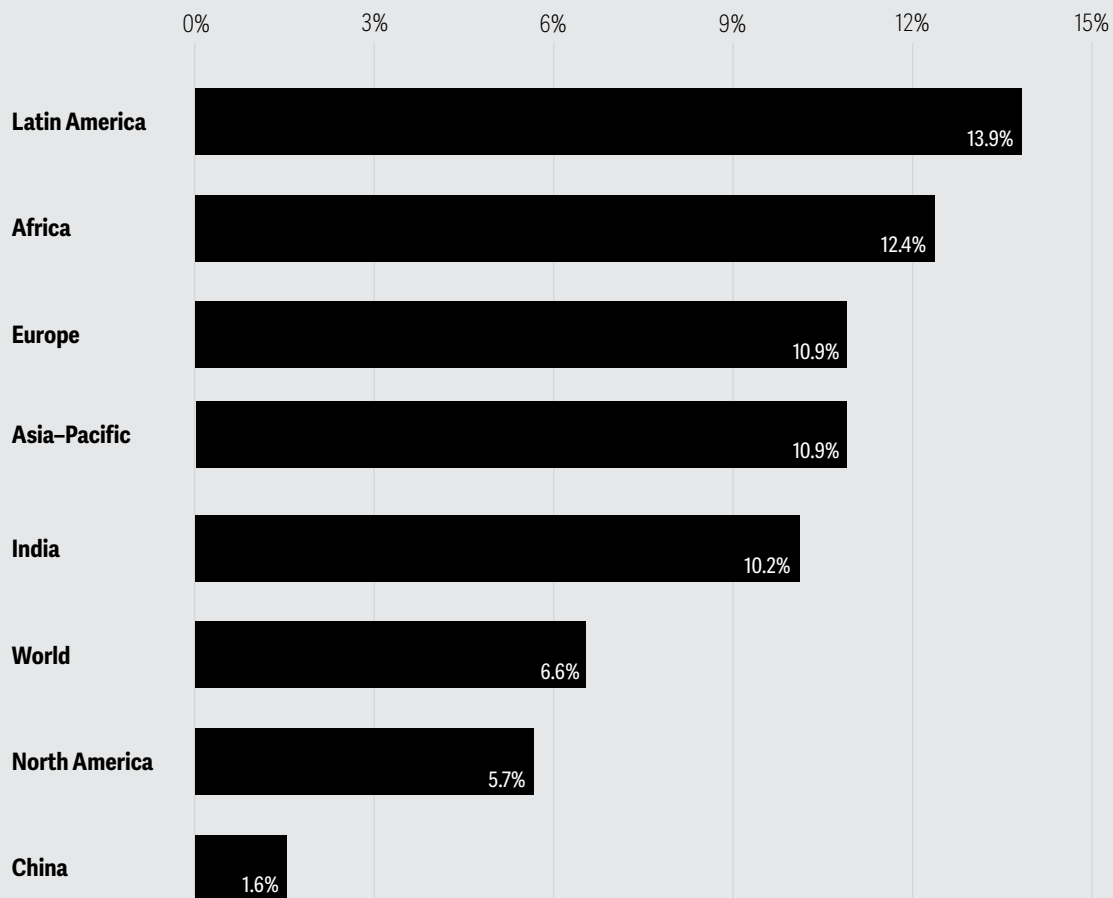


Sources: Deloitte Center for Financial Services analysis; Credit Suisse Global Wealth Report 2022; Boku 2021 Mobile Wallets Report.

Figure 2

Regional growth rates of mass market assets under management are expected to vary widely

Forecasted growth rates, 2022–2030



Sources: Deloitte Center for Financial Services analysis; Credit Suisse Global Wealth Report 2022; Boku 2021 Mobile Wallets Report.



Serving mass market clients is becoming more affordable

Given the sizeable assets held by the mass retail segment, providing financial advice to this market could be an attractive opportunity for the financial services industry. However, getting the economics right has been challenging. Historically, many financial advice providers have shied away from the mass retail segment in part because of high customer acquisition costs and much lower investable asset levels.¹⁰ These challenging market dynamics have contributed to a high client to advisor ratio in order to profitably serve this segment, which in turn, has often limited the ability to personalize advice.¹¹ It typically costs a traditional advisor almost US\$3,000 to acquire a new client. Of this, around 80% is the ‘time cost’ of a human advisor.¹²

Financial services leaders may want to reexamine whether these previous assumptions are still valid today. Robo-advisory—delivering automated advice with minimal human intervention needed—could be a cost-effective and scalable solution to provide advice to clients who have smaller portfolios.

In the past, financial organizations that deployed robo-advisers found it difficult to target potential clients outside of those in the high net wealth segment because providing holistic financial advice in a direct-to-consumer model was very expensive.¹³ Also, it could take as long as a decade for financial services firms using robo-advisers to recoup their customer acquisition costs.¹⁴ But the technology driving robo-advisers has evolved considerably since robo-advisory first appeared when the advice was mainly limited to suggesting potential exchange-traded funds for investment based on the answers to online questionnaires.¹⁵

Robo-advisers are shifting from algorithm-based portfolio adjustments that use predefined sets of rules to fully automated investments fueled by self-learning artificial intelligence algorithms and automatic asset shifts.¹⁶ AI-powered robo-advisers can provide end-to-end, real-time, personalized investment solutions (e.g., portfolio selection, automatic rebalancing, and tax loss harvesting) based on a client’s investment goals and risk profile to deliver recommendations in an interactive, conversational format with lower incremental client servicing costs than human advisers.

Regardless the amount of human interaction, financial services firms should continue to prioritize addressing regulatory requirements, such as those surrounding fiduciary duty. In the United States, the SEC offers guidance for robo-advisers surrounding the presentation of disclosures, ongoing client suitability of advice, and effective internal compliance programs.¹⁷ As more client services are driven through robo-advisory platforms, corresponding increases in client protection should follow. Apart from adhering to regulatory requirements such as conducting an annual review of the written policies and procedures enacted to prevent violations of the Investment Advisers Act of 1940, robo-advisers should also consider instituting procedures surrounding aspects that pertain to their operating model. For example, robo-advisers should consider policies and procedures for testing and monitoring the algorithmic code, as well as adequate oversight of any third party which may have been involved in the development of the code.¹⁸

Aside from the technological advancements that are helping pave the way for more comprehensive automated financial advice at a lower cost, it may also be more cost-effective to reach new clients than previously

believed. One way financial advisory firms can minimize customer acquisitions costs could be by capitalizing on these potential clients who are already familiar and participating in the growing mobile wallet market. Rather than building a platform from the ground up, there may be opportunities to form partnerships with established mobile

wallet platforms to tap into an existing user base. The partnership could involve an all-in-one type of platform where the mobile wallet and robo-advisory accounts share the same platform, or the user could be directed through the mobile wallet to open a robo-advisory account on a robo-specific platform.

Robo-advice for all

According to a recent survey, 75% of millennial respondents were open to using a robo-advisor to manage investments.¹⁹ This may be ascribed to limited investment knowledge or the desire to actively manage a portfolio. On the other hand, only 43% of baby boomers surveyed said they were interested in using robo-adviser platforms, perhaps because they either lack trust in financial advice algorithms, or they prefer a more hands-on approach to choosing their investments.²⁰

But robo-advisers can only truly be inclusive if they serve people of all ages. Older clients may prefer hybrid robo-adviser platforms. These combine

automated advice and human financial advisors, who are available via phone or video. While slightly more expensive than purely automated advice, virtual access to a human advisor can help alleviate trust-related concerns and build credibility over time.

With an almost US\$22 trillion in estimated investable assets by 2030, the global mass retail market may be too great of an opportunity to pass over for much longer. Should financial services institutions succeed in making financial advice more accessible, people who may have previously turned to social media for advice could seek out the industry's vast knowledge and expertise. Ultimately, financial services players can play a large role in making society more equitable, profitably.



Endnotes

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Acknowledgments

Authors **Sean Collins** and **Samia Hazuria** wish to thank the following Deloitte Center for Financial Services colleagues for their insights and contributions: **Doug Dannemiller, Patricia Danielecki, Mohak Bhuta, Neerav Shah, Alice Hartnett, Seth Raskin, and Paul Kaiser.**

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