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PAYMENTS UNBOUND

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Connecting the world through payments

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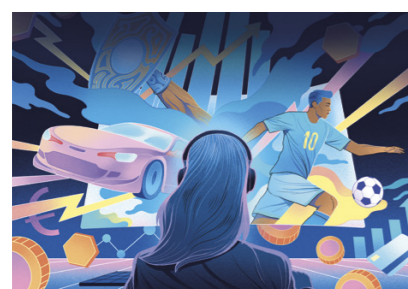
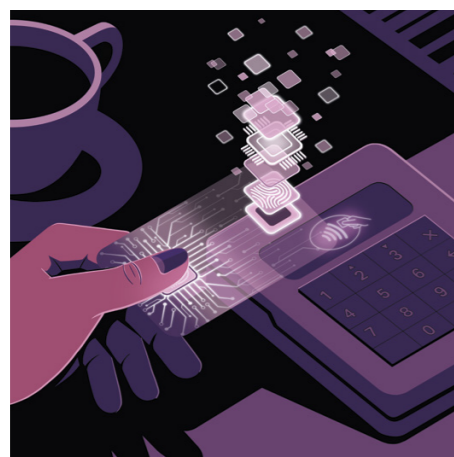
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FIRST WORD

Every payment is a moment of connection, whether it's between a business and a supplier in a new market, a gamer and a virtual world, or a fintech and a community they're finding new ways to serve. As technology continues to transform the global economy, making it more dynamic and interdependent, new potential connection points are emerging each day. To make the most of this opportunity, companies will need to innovate and expand their payments capabilities.

Our vision is to make it easier to do this by enabling any company to integrate with a single, integrated payments platform that incorporates the latest advances. Achieving this will not only be a game-changer for payments, it will transform the entire experience for our clients and their customers.

At our core, we at J.P. Morgan Payments believe payments should be instant, smart, and invisible—while also reliable and secure—to drive value for a business. We have observed and believe that a modern payments platform, in order to successfully do so, needs strength across several areas.

One of them is security. Newer methods of payment require strong protection standards. Take biometric payments, as an example. Customers are increasingly able to pay for goods and services with a scan of their face, finger, or palm. It is therefore important to manage who owns the data, who tracks the data, who gets access to it, and how that data is protected and encrypted. These are complex challenges, and as innovation accelerates, next-gen approaches to security and privacy will be required.

Another area is regulatory awareness and understanding. As businesses grow to accept payments from anywhere, there is an obvious need to stay informed on regulatory requirements. Countries around the world all have different requirements when it comes to payments. Even within countries, regulations can vary by state or region, which is complex for businesses of any size to navigate. New payment solutions can only work when they are in line with both domestic and international rules, especially solutions that involve conducting transactions across borders and in multiple currencies.

An additional part of the equation involves supporting new and evolving use cases. This could include helping the payments and product teams in an organization to collaborate,

or it could be enabling gamers to buy digital items while they are playing, or it may involve supporting new customer journeys, such as paying for services via a connected car or smart TV.

Finally, it's important for a payments platform to help make the user experience easy and seamless. Merchants want fast, low-cost payments and easy reconciliation. Research and experience show that consumers want the payments process to be intuitive and invisible, safe and secure, across any channel, offline and online. This is only possible when a platform is designed to accommodate security, regulation, and use-case innovation.

A critical step for us in evolving our payments platform has been creating and growing a network of partner companies that help us cover every aspect of the payments landscape. Combined with our infrastructure and unique breadth and scale, this makes our client offerings hard to match. These strategic partnerships let us find synergies. For example, fintechs are often experts in specific technologies or aspects of consumer experience but may not have the scale and expertise to navigate the intricacies and requirements of regulatory bodies around the world, or the financial viability to withstand economic swings. As a global bank, we are strong in all of these areas and can help fintech partners strengthen their own capabilities—what we like to call "fintech with foundation". That means our clients and their customers using our platforms can have the best of both worlds when using our services.

We believe that when these capabilities and partnerships work in harmony, payments technology not only improves business outcomes and consumer experiences, but that the work we are doing can also help drive positive change.



By Takis Georgakopoulos
Global Head of Payments,
J.P. Morgan

How? Well, in this volume of *Payments Unbound* we take a look at those unexpected connections and explore how they are changing the world: From helping to tackle inequality through to enabling new forms of carbon capture. Enjoy the magazine, and may it inspire you to make connections of your own.

Checking out the future of retail

Amazon talks payment challenges, AI commerce, and where biometrics goes next

TRILLION-DOLLAR QUESTIONS

In a world where convenience is king, friction in the checkout process is bad for business. Studies show that around 80 percent of consumers will avoid standing in a line in-store, even if it means leaving to visit a competitor or abandoning the purchase entirely. The same is also true in e-commerce: A recent survey shows that 90 percent of shoppers cite limited payment options as a reason for cart abandonment.

Frictionless checkout has therefore become a holy grail for retailers. As a retail juggernaut, Amazon is at the forefront of the quest to find new ways to deliver seamless experiences both online and in the physical world. The aim, says Dilip Kumar, VP of Applications at Amazon Web Services (AWS), is to give customers “the gift of time.” We asked him about Amazon’s recent work...

You recently announced that your cashierless “Just Walk Out” technology is a good fit for small-format stores. Where in particular do you think it has potential, and why?

Just Walk Out technology shines in smaller stores because in these locations customers are usually on a “mission-driven” shopping trip, wanting to make quick purchases of relatively few items. It means they can shop just like they would in any other store but without standing in line to pay or scanning items at self-checkout.

Our vision for Just Walk Out technology has always been to go where people put a premium on convenience. And I think that we are still very early in the evolution of this technology. Places where you are consistently standing in line present an opportunity for Just Walk Out: Airports, universities, hospitals, car-charging stations, stadiums and more. I also feel like we’re barely scratching the surface in terms of geographic expansion. Just Walk Out technology is currently available in the U.S., UK, Australia, and Canada. But there’s no reason why it can’t work in Brazil or in South Africa or in Japan, as the appeal for retailers to extend store hours, whether staffed or not, is reasonably universal. In fact, the response from shoppers to Just Walk Out in small-format stores has been so strong that we will launch more third-party Just Walk Out stores in 2024 than any year prior, more than doubling the number of third-party stores with the technology this year.

What’s a big challenge that you think we still need to solve around in-store frictionless payments?

The payments industry is extremely complex. There are a lot of parties involved. One of the challenges is getting to real-time payments without increasing fraud risk. What are the right checks and balances to achieve

that? These things normally cause delays, but I feel this is a big potential area of progress.

How do you see AI “conversational” commerce improving in the future?

I think it’s going to keep improving because of how good we’re getting at both near-field and far-field acoustic technologies and machine learning models that can understand voice intent and actions. Better voice input combined with artificial intelligence will result in ever greater efficiencies. It will be particularly important in many places where voice input is superior to text-based inputs, like driving. With today’s in-car dashboard, people can use voice prompts for a limited set of actions such as selecting music, making calls, or asking for directions. I think the applications will naturally increase over time as the technology becomes more sophisticated. People will be able to use car AI assistants to get personalized recommendations on the best places to stop along their route for food or coffee, or perhaps they’ll use it to approve purchases that the assistant—if it knows enough context about them—anticipates they might need.

You offer Amazon One, your payments tech, to non-Amazon merchants. What is your strategy for getting them to see you not as a competitor but as a potential partner?

AWS has had a long history of providing services to companies, so this is no different. When we launched this service, we knew people shop in more places than just our Amazon locations. Life happens when you’re at a stadium, at college, at an airport, or on vacation. We knew that our success included solving our customers’ problems in these places, so we’re looking to provide Amazon One—our palm-recognition service for identity, payment, entry, age verification, and loyalty membership—to a wide range of customers and partners. We don’t ask these businesses to replace other forms of identity or payment technologies to be able to use our offering. We want Amazon One to be able to fit in alongside other solutions for identity and payment, so customers will always have choice. We always think about this as a partnership.



Dilip Kumar
Vice President
of Applications,
AWS

THE INSIDE TRACK

START

Finance with a mission

SPOTLIGHT

Payments can be a powerful force for good. They are often leveraged in smart ways by projects designed to drive positive economic outcomes that might include better financial management, business growth, or wealth creation.

We spoke to five organizations and individuals for whom paytech is a crucial part of accomplishing a societally beneficial mission, whether that's lifting indigenous people out of debt through automatic payments, equipping women artisans in India with e-commerce tools, or connecting charities with grants.



Clip Bringing digital payments to a country that runs on cash

The mission
A decade ago in Mexico, only the largest merchants could accept card payments. SMEs and micro merchants would only accept cash, thereby shutting them out of many business opportunities—both in-person and online—and restricting their growth. Clip wanted to change that.

The strategy
In 2012, Mexican fintech Clip introduced a card payments peripheral that connected to the headphone jack of a smartphone, effectively turning the device into a ready-made point-of-sale (POS) terminal. This provided any merchant with a smartphone the ability to accept

any type of card payment. Today, Clip's offering has expanded to a complete suite of commerce solutions for merchants, including accessible payments solutions that can easily be installed straight out of the box, such as a variety of card readers, terminals and points of sale. Clip also offers financial services, enabling even the smallest businesses to get access to credit. "Our hardware is the Trojan horse," says Xavier Casas Turu, Clip's Director of Corporate Development. "It's the first venture into sophisticating their business and going from pen, paper and cash to digital inventories, in-person card acceptance, e-commerce payments and financial services."

The impact
Today, hundreds of thousands of merchants in Mexico use Clip for online and in-person payments, and the app ranks above Instagram and Facebook in Mexico's app stores. Yet there is still massive room to grow: Out of an estimated 12 million merchants, more than 10 million still do not accept digital payments, and around 77 percent of the total transacted volume in Mexico is still in cash.

"When a solution comes in that makes payments simple and accessible," says Casas Turu, "it is always traditionally underserved merchants who benefit, given that they didn't have access to those services before."

The SEWA Trade Facilitation Centre Helping informal workers in India gain access to financial tools

The mission
Almost 90 percent of workers in India are "informal"; are not accounted for, are without any formal employer-employee relationships, and are hardly covered under laws. Women in particular experience this type of employment.

The strategy
The SEWA Trade Facilitation Centre (STFC) assists Self-Employed Women's Association (SEWA) members belonging to the informal economy to be producers, owners, shareholders and managers. The goal is to enhance their incomes, savings and assets, and ensure socioeconomic security, sustainable employment and poverty alleviation among poorer rural

and urban women and their families. The STFC has a designated Livelihood Recovery and Resilience Fund (LRRF) that enables access to bank loans from regulated commercial banks. The LRRF also has initiatives to provide emergency relief to SEWA members who face challenges brought about by major climate shocks, such as floods.

The STFC facilitates training on e-commerce platforms, digital banking, and mobile wallets, which have helped support enterprises through challenges, including Covid and India's 2016 state demonetization program that took many banknotes out of circulation.

Beyond helping its members access the formal banking system, STFC also

encourages them to avoid punitive debts. "We ensure that microfinancing facilities are available to our members," says Rehana Riyawala, SEWA's Vice President. "That avoids the need for high-interest, informal money lenders."

The impact
Now in its 52nd year, SEWA has 2.9 million members across 18 Indian states. Looking ahead, building resiliency against climate change for its members is a major focus for SEWA. One goal, for example, is to enable members' small enterprises to tap into green financing opportunities in the global banking market, helping them access investment streams targeted at sustainable development goals.

SOURCES: WWW.JPMORGAN.COM/PAYMENTSUNBOUND/SOURCES
ILLUSTRATION: SELMAN HOSGOR

American Financial Solutions Lifting local indigenous communities out of debt

The mission
Washington is among the top 10 U.S. states for credit card debt. In a cost-of-living crisis, with interest rates rising over the past two years, people are increasingly vulnerable to taking on debt from unscrupulous lenders or to racking up too much credit without support. People living in poverty are most at risk. In Washington state, this often includes local indigenous communities and former military personnel. The question is, how can they be better supported?

The strategy
American Financial Solutions (AFS) is a national nonprofit credit counseling agency based in Seattle, Washington. Founded in 1999, a large portion of

their local efforts support underserved populations struggling with debt, particularly indigenous peoples and other BIPOC communities. Director of Operations, Jessica Williams-Oestmann says their work is all about "getting out there on the streets and talking. How to budget, manage debt, improve your credit score, buy a home."

AFS works with people to create workable debt plans to clear what they owe, setting up automatic payments to make steadily cutting down debt as easy as possible. The organization is also developing a secure online payment portal to make it easier for users to make one-off payments or catch up on ones they've missed. Longer term, the ambition is to integrate a wider range

of payment options and streamline the process, so that users can take advantage of an app or text with click-to-pay functionality.

The impact
In January 2024 alone, 208 clients completed a debt management plan, six were supported to make their first home purchase, and 46 avoided foreclosure on their home by seeking counseling with the agency. The organization is now working on adding video counseling to improve access to its services and is pushing for instant decisions from creditors. AFS has also adopted 72-month terms for eligible creditor accounts, enabling clients to make more affordable monthly payments.

Fundify Identifying hard-to-find funds for the charities that need them

The mission
"All charities have the same problem," says Fundify Co-Founder, Jeff Breen. "They depend on grants to survive, and they can't find good data on where to find these grants." In the UK alone, Breen says there are some 27,000 grant opportunities, totaling £8 billion (\$10.2 billion) of charitable funding that is up for grabs. Yet charities lack the time, resources and knowledge to find them.

The strategy
Breen describes Fundify as "a single place to get verified, up-to-date data on funding opportunities." In essence a search engine for grants, Fundify cuts

down the effort involved in finding and applying for financing. Breen's team is also building the UK's first AI-powered research bot for such grants.

The platform offers a tiered model: Larger charities and organizations pay a monthly subscription, but according to Breen, "if we come across someone with an educational or welfare need—they could be in poverty, have lost their job, live in a deprived area, or have a disability that makes it difficult to work—we make all the grant information available for free." Tiered payment models are an effective way for at-risk individuals and low-income communities to access vital goods and services, similar to how the

pharma industry has created affordability in developing markets to ensure access.

The impact
Time is money, and cutting time spent seeking funding is a fundamental part of Fundify's value for users. "For every funding application that goes in, charities spend on average 32 hours researching, and then eight more hours writing bids. That's a full working week. We reduce that process to about 25 minutes," says Breen, who believes the solution can eventually be scaled worldwide. "For a small organization, if they find £3,000, that might be enough for their entire operating costs for that year."

AND WHAT'S J.P. MORGAN DOING?

After decades working in technology, Alan Torrance, Head of Open Source for Payments at J.P. Morgan, became aware of a pressing challenge. "We see a huge digital poverty gap," he says, "where a lot of children are not getting access to digital technology, or the resources on how to create with it." He realized that the skills he learned working in payments tech could help.

Torrance founded Make It Happen to "support these children to become digital creators who can harness

technology and create their own amazing futures." The charity supports schools to hold a competition for students to design their "dream apps" on paper. The project has been generously supported by J.P. Morgan colleagues, who have donated their time and expertise. Volunteers from global J.P. Morgan tech centers judge the entries and then create each school's winning app. These are made available online, so kids can start to play with and write simple code.

Core to the project is the idea that putting tech in kids' hands can help them understand and solve real-world challenges. There have been payments-related apps, such as a marketplace for chores to enable young people to negotiate for after-school "work", with transparency for wages and responsibilities built in. Further, young app users can take the physical cash they've earned and upload it to a digital wallet, where they can explore the

concept of digital money and spend it on their favorite pay-to-play apps. Since its inception five years ago, over 50,000 pupils in 260 schools have taken part. "These are big numbers, but the thing that matters the most to me is that there are some rural schools that have participated, with just 11 children," says Torrance. "Reaching out to small schools and pupils in low-income communities matters, so that every child can get this opportunity."

TRENDS WATCH

Tectonic shifts

The world of payments is changing faster than ever

Globalization has been under pressure in recent years. The Covid pandemic and geopolitical conflict have led companies to relocate supply chains or build supplier networks closer to home. Some countries have also been imposing export restrictions on vital goods such as food, fertilizer, and raw materials. According to the International Monetary Fund (IMF), the number of trade barriers introduced each year has tripled since 2019.

However, despite the headwinds, the world is not atomizing. New trade patterns, new relationships and new markets are emerging. Payments innovation will play an important role in easing these changes, making businesses more efficient and agile, reducing the cost of transactions, and supporting the frictionless movement of money across borders. Here is a closer look at some of the major payments trends that are happening around the world right now...

1 LATIN AMERICA

NEAR-SHORING BECOMES BIG BUSINESS

Global instability has led to a growth in near-shoring, whereby companies move supplier networks close-by. The U.S. for example, is looking to Mexico as an alternative and less risky manufacturing location. Mexican near-shoring generated some \$30 billion in foreign direct investment in the country in 2022, according to Credit Suisse. Central America, which has form in the garment industry and increasingly in auto parts, is also seeing growth as a U.S. outsourcing option. Meanwhile, further south, popular new locations include Brazil and Colombia. As U.S. companies adapt their logistic strategies, innovative forms of supply chain finance will emerge—the volatility of various currencies in Latin America means some trade finance loans may need integrated FX-hedging. And, if businesses split their supply chains between countries, it will require cross-border payments, often in currencies they haven't dealt with before.



2 NORTH AMERICA

A HUB FOR OMNICHANNEL EXPERIMENTS

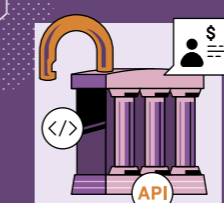
Digital payments in the U.S. are expected to hit a total value of \$3 trillion in 2024, more than double that of 2020, according to Statista. This rapid growth is partly being driven by retailers offering more integrated omnichannel experiences: Payments solutions that work across all touchpoints, from point-of-sales terminals to smartphones, online stores and marketplaces. New technologies which reduce friction at checkout and improve security are helping spur the omnichannel trend. Biometric authentication, such as palm scanners or facial recognition, is gaining traction; Amazon-owned Whole Foods recently announced its adoption of palm recognition tech nationwide. The FedNow Service's real-time payments infrastructure, launched in 2023, will accelerate this shift. The scheme allows consumers and businesses to make instant payments from their bank accounts, at any time, and will greatly reduce usage of cash and checks.



3 UK & EUROPE

OPEN BANKING LAYS THE GROUNDWORK FOR A2A

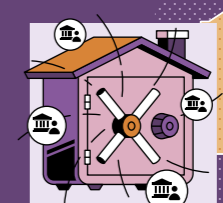
The EU's second Payment Services Directive (PSD2) was introduced to grow innovations such as open banking, which required banks to develop standard ways to share transaction data with fintechs and other third parties. Under open banking, payment initiation service providers (PISPs) are permitted to transfer money straight from a consumer's account to a merchant's—the basis for account-to-account (A2A) payments. A2A is promising because it cuts out intermediaries, making payments faster and cost effective. The UK in particular is looking at ways to promote A2A. Despite leaving the EU, the UK is a pioneer in open banking; today, more than one in seven British consumers use such services. As the EU continues to make progress with open banking and real-time payments, the European region could become a hub for A2A payments tech, bolstered by the expansion of the EU's SEPA Instant scheme, which allows payments to be settled within 10 seconds.



4 MENA COUNTRIES

THE RISE OF IN-HOUSE BANKS

Major companies in the Middle East and North Africa (MENA) are looking to create in-house banks to simplify their accounts payable processes and reduce costs. The complexity of their current set-ups is partly a product of strong growth and international expansion. For firms operating across the many countries of MENA, it can be common to have hundreds of accounts spread across different banks. This results in complex payments processes, with varying reporting formats for different banks, while holding numerous accounts can result in high fees. In-house banking has the treasury operating a single account and centralizes key functions like account management, multi-currency payments, and cash consolidation. The number of physical bank accounts is then reduced by replacing them with virtual equivalents, which reduces expenditure. Plus, the centralized structure of an in-house bank can provide real-time visibility over cash balances.



5 APAC COUNTRIES

GENERATIVE AI SET TO TRANSFORM TREASURY

Companies in Asia-Pacific (APAC) will triple spending on generative artificial intelligence (GenAI) to \$3.4 billion in 2024, according to Infosys. GenAI is a category of machine learning that can analyze huge volumes of data based on plain language prompts and output text or visuals. Research suggests that East and Southeast Asia leaders in digital finance, and treasury teams, will be fast adopters of this technology. With GenAI tools, treasurers will be able to upgrade the speed and quality of their data management. A simple prompt such as, "Do we have enough liquidity for the week?" could not only produce a rapid answer, but also relevant graphs and context. This would allow non-programmers to interact with complex data sets. Beyond ad hoc analytics, GenAI could also be used to routinely parse huge volumes of data to identify errors and anomalies, helping with account validation and fraud management, which are both long-standing treasury challenges.



SOURCES: WWW.JPMORGAN.COM/PAYMENTSUNBOUND/SOURCES
ILLUSTRATION: MANUEL BORTOLETTI

Can carbon removal make payments sustainable?

The promise of direct air capture is huge—but scaling it is challenging

We all know what needs to happen to mitigate the climate crisis. Keeping global heating to within 1.5°C above pre-industrial levels will require industries, individuals, and nations to work together to achieve global net zero by 2050. But to get there, simply cutting back won't be enough. Carbon will need to be actively removed from the atmosphere—at least 10 billion tons per year by 2050, according to some estimates.

This has spurred a surge of interest in carbon removal technologies. Many of these take the form of an add-on to carbon-intensive industries. They trap emissions as they're released from an industrial facility, such as a power plant or cement factory, and the carbon is then stored often by burying it deep underground. Another, more emergent category, however, has particularly caught imaginations: Direct air capture (DAC). This involves pulling carbon from the ambient atmosphere, meaning it can remove carbon that has already been emitted by vehicles, households or industrial processes. It has piqued the interest not only of governments, but businesses who wish to offer climate-related products—payments companies included.

A number of startups are proving the concept of DAC. Take Climeworks, a Swiss company founded in 2009. Its Orca facility is the largest direct air capture plant in the world. Opened in Iceland in 2021, the plant can suck 4,000 tons of carbon dioxide straight out of the atmosphere every year—equivalent to the emissions generated by around 500 American homes.

The technology works by running the air through specialized filters to capture carbon so it can be stored underground, and money is duly flowing into this space. Investment in DAC hit a record of \$6.4 billion in 2022. Yet there are challenges to solve for it to begin neutralizing emissions to a meaningful degree.

Below: Carbon-capture at the source of production will be a key area.



REALITY CHECK

“We know we can do it,” says Dr. Emily Grubert, a Professor of Sustainable Energy Policy at the University of Notre Dame. “But I don't think people have really fully thought through the implications of how difficult it would be to do that relative to mitigation.”

Beyond technical challenges around efficiency, there are practical ones. Companies and governments need to figure out where to store the carbon that's captured—and some communities have resisted it coming to their neighborhoods. “They just really don't want to be dumping grounds,” says Grubert. “This is effectively waste.”

There are also economic challenges, complicated by the fact that to fund carbon capture, DAC companies need to be able to sell carbon credits. This means they currently have to rely on a market that is fragmented and opaque.

To understand the problem, we need to understand carbon credits. At their most simple, they are contracts for the removal or neutralizing a ton of carbon. One of the most common mechanisms involves simply paying for conservation efforts in tropical rainforests, or for reforestation of degraded areas. But the market has struggled with the challenges of verifying and pricing carbon, as well as with scandals over mislabeling and accounting of offsets. For the market to work—and therefore further support DAC expansion—these credits need to be traceable, verifiable, and transparent.

“Guardrails are needed to make sure that what we're measuring and reporting and verifying to then be used as carbon credits is a very robust process,” says Dr. Ankita Gangotra, an Associate at the World Resources Institute who is researching avenues to



Above: Climeworks' Orca facility in Iceland.

decarbonize the industrial sector.

Yet within this challenge also lies an opportunity for DAC. One of the appeals of carbon removal tools, like direct air capture, is that their results are not theoretical: They are measurable, and hence easier to account for. That's important—customers, whether they're big businesses or consumers, need to feel sure that the credit they're paying for represents a genuine mitigation.

The payments industry has become increasingly interested in this area because it already engages with the credits marketplace. Some have developed tools to make buying carbon credits easier for consumers. Several payments businesses have integrated emissions trackers into their products, allowing customers to see the emissions associated with their purchases and to buy offsets.

Bringing carbon reduction close to the consumer at the point where they're making a transaction helps them make a more informed decision. It also expands access to carbon credits, deepening and securing the market—which contributes to improving the carbon credits ecosystem on which the success of DAC partly depends.

Against this backdrop, Climeworks, for example, has

Today, the U.S. has the means to capture 20 million tons of carbon a year; that's only between one and five percent of what's needed by 2050.

signed deals for carbon credits with major companies. Climeworks is about to unveil Mammoth, its second facility in Iceland, which will have a nameplate removal capacity of up to 36,000 tons per year. By 2050, the company wants to be able to sequester a gigaton of carbon annually, according to Ann-Kristin Koch, Climeworks' Chief Communications Officer.

The promise of technology like this has spurred governments around the world to help solve the associated challenges. The United States plans to invest at least \$3.5 billion in carbon capture and storage technologies. But it's important to keep that in perspective. It's a huge sum, but still a long way off what the country needs to meet its climate goals.

Today, the U.S. has the means to capture 20 million tons of carbon a year; that's only between one and five percent of what's needed by 2050. Even those who are working to develop and popularize these innovations admit that they're not a silver bullet—merely part of the suite of things that need to be done to prevent a climate catastrophe.

“Our technology alone will not be sufficient to mitigate climate change,” Climeworks' Koch says. “We need to do everything we can to reduce emissions.” **By WIRED**

COINAGE CORNER

As the pace of change ratchets up, the jargon arrives thicker and faster. Here are four new terms to make you sound plugged-in

Payvidor

When “healthcare provider that also offers health insurance and functions as a payor” is a mouthful, turn to this portmanteau.

Fediverse

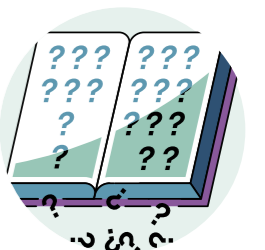
A “federated universe” (i.e. a decentralized ecosystem) of social networks that are interoperable with each other. A potential new realm for payments.

Machine customer

An AI-equipped device that can reason across its own needs, its owners' needs, and then buy things accordingly. Like, say, a car that can order its own new parts. What could possibly go wrong?

Soundbox

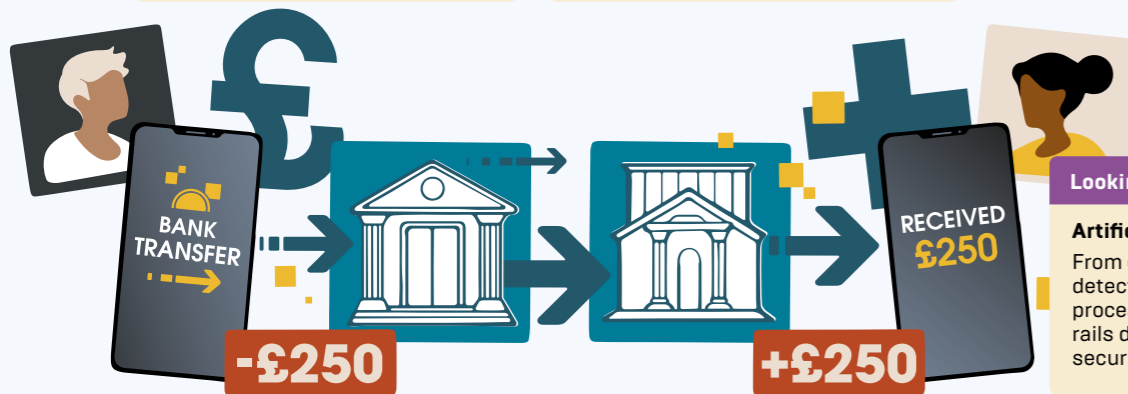
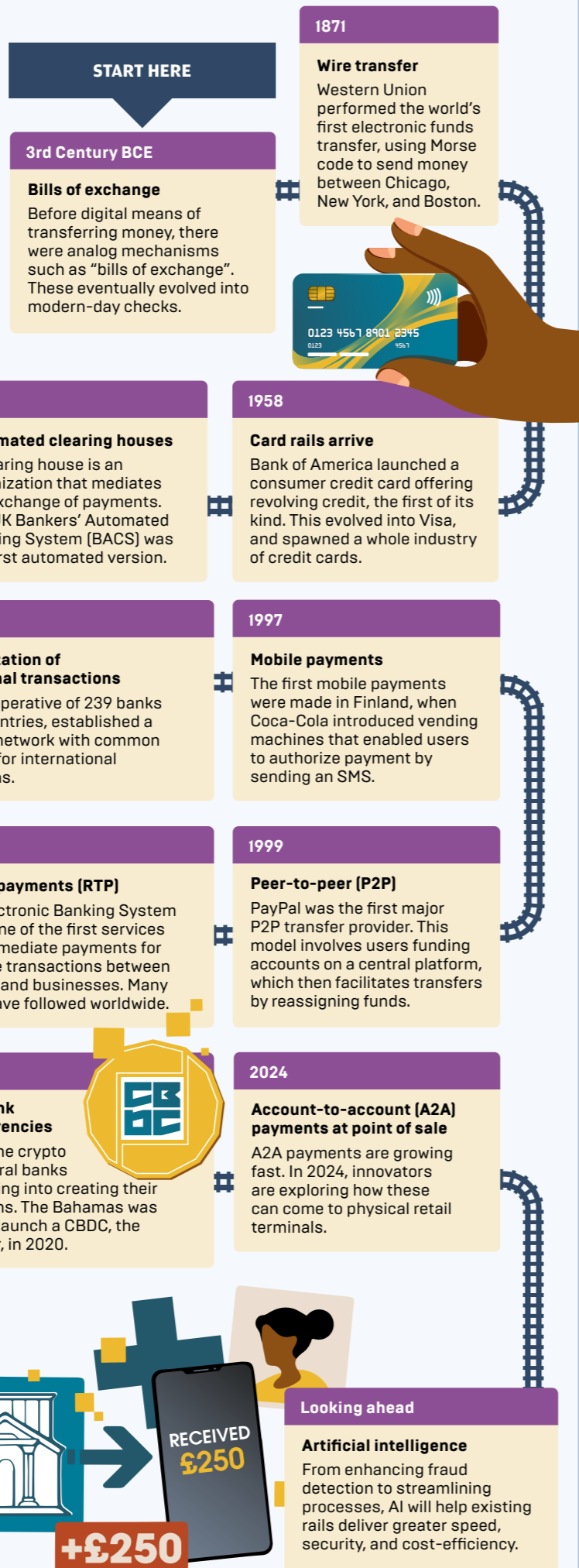
A cashier-assisting speaker that provides an auditory alert when a digital payment is successful. Popular with small merchants in India.



Tracking the evolution of payment rails

Payment rails are the underlying networks and infrastructure that enable funds to get from A to B without the transfer of physical money. They ensure that when a payment is initiated by one person or institution, it is received by the intended beneficiary. From wire transfers and cards to online transactions and real-time settlement, payment rails have experienced a dramatic evolution.

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SOURCES: AS PER WIRED, MAY 2024
ILLUSTRATION: ADRIÀ VOLTÀ

What’s the future for Western ‘super apps’?

Super apps create a single interface to unify a broad ecosystem of services such as messaging, e-commerce, and transport. With consumers making all of their purchases within one walled garden, the user engagement and data benefits for the app owner are obvious and substantial. These apps have become a major part of the Chinese technology landscape, so we asked two leading experts: Could the concept successfully break through in Western markets?

Don’t expect Asian-style super apps any time soon...

...But we might see “quasi-super” versions



Dan Prud’homme, an Assistant Professor at Florida International University’s College of Business

“The first reason is that the U.S. has a history of a more fragmented app market. Generally speaking, the country has a lot more competition and less customer capture by any one app today. This fragmentation also applies to many Western markets more broadly. And there is just this general aversion in the West to knowingly relying on a single firm for the majority of everyday products and services.

The West also has an aversion to feature bloat. I think Western customers generally like less clutter than Asian customers when it comes to interfaces and apps. The other consideration is the comparatively slow adoption of digital payment systems [in the West]. A decent definition of a super app would include a common payment system embedded in the app. In the U.S., But even there, there’s still some aversion: Certainly a lot more so than in Asia. And in areas of continental Europe, cash is still the norm.

Finally, there’s the regulatory landscape. At the time the super apps started out in China, there were far fewer restrictions than you see in Western countries. That allowed them to become large, but it’s not something that the Western companies have the luxury of avoiding today.

This being said, there is certainly room for “super-ish” apps in Western markets. In fact, we already have several in the U.S.”

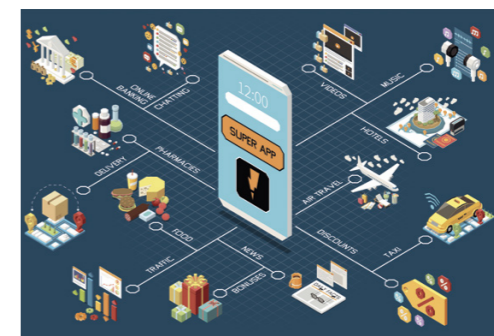


Gopi Billa, Leader of Deloitte U.S. Financial Services Strategy and Market Sensing

“The business-to-business side is where we’re likely to see this play out first. The U.S. has 30 million small businesses, give or take. To run a business, they have to go through selling, marketing, managing inventories, accounting, and legal forecasting among other considerations. That’s currently spread across multiple apps. So app companies realize the value in stitching all these together in one bucket. Companies are already trying to get into this space.

On the business-to-consumer side, people have been moving into the super app space, or what I would call “quasi-super apps”, for a fairly long time.

By 2025, we’re likely to start seeing some of the changes in this space play out at scale. You’re definitely seeing the development of super



apps in travel and hospitality. You have ride-hailing companies moving from transport and food delivery into hospitality. You see it in entertainment, where you have audio-streaming companies going beyond radio into podcasts, and a bunch of other services. Then you have logistics

more broadly, where e-commerce giants are trying to push services like medical consultation, pharmacies, and groceries, in addition to content streaming and e-commerce, which takes it more into the super app space.

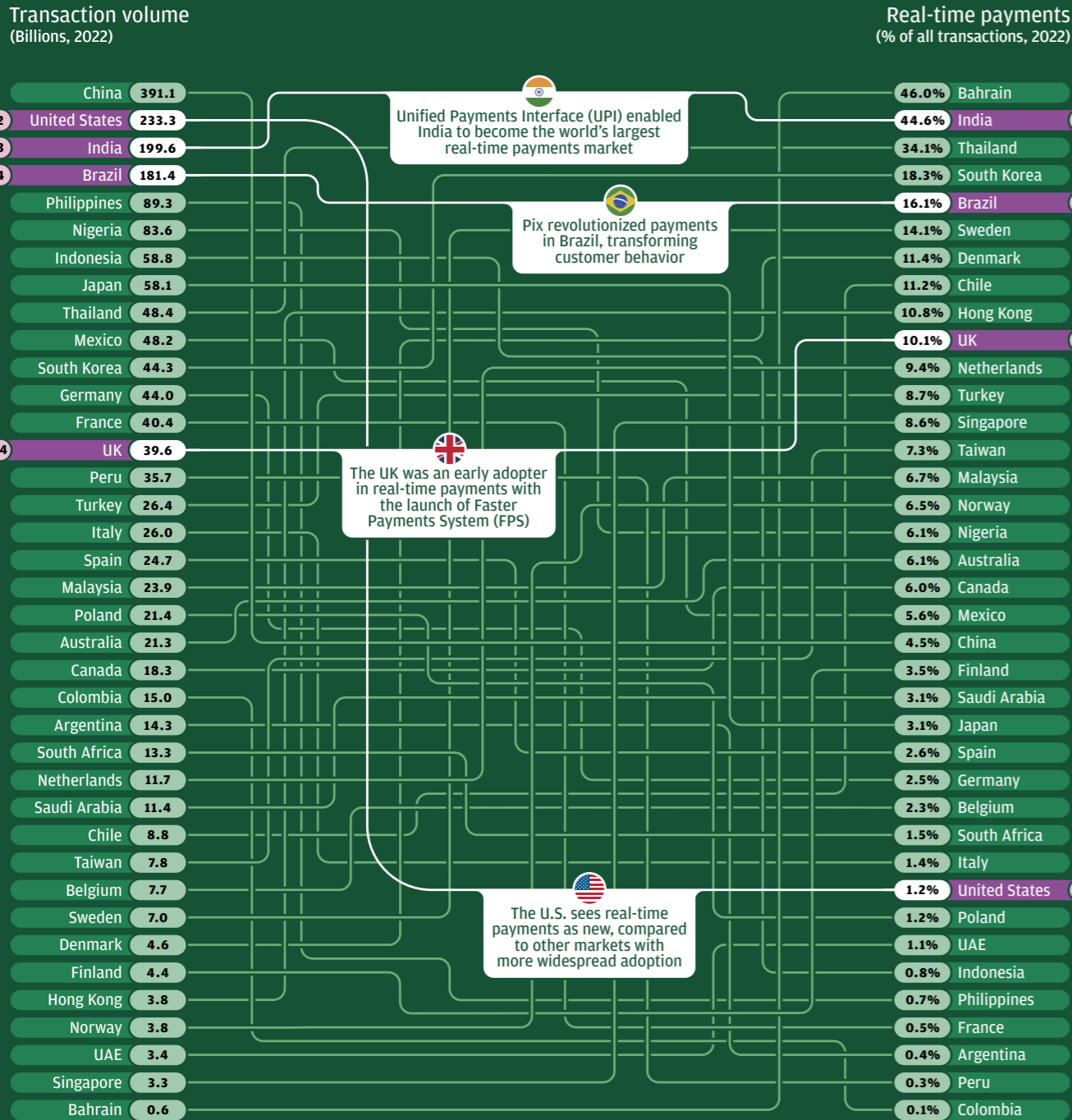
Regulations are making it harder for tech companies to profit from acquiring third-party user data, or sharing their own data with other companies. But you don’t have an issue with that regulation if all the apps are running on your infrastructure.” **By WIRED**

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SOURCES: AS PER WIRED, MAY 2024
ILLUSTRATION: ADRIÀ VOLTÀ

REAL-TIME PAYMENTS ADOPTION ACROSS MARKETS

Delving deeper into the total number of financial transactions by volume and the percentage of which are made through real-time payments



Sources: ACI Primetime 2023, FIS The Global Payments Report 2023

KEY MARKET MILESTONES

Examining the significant milestones of the real-time payment platforms in the U.S., UK, India, and Brazil

Sources: Chase - International Real-Time Payments 2023, www.npci.org

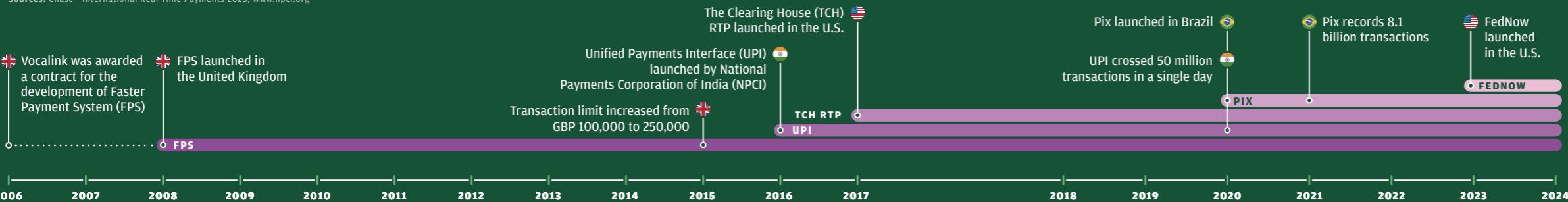


ILLUSTRATION: SET RESET

HOW THE U.S. COMPARES TO THREE KEY MARKETS

A closer look at real-time payments in the U.S. compared to the UK, India, and Brazil

● Real-time payment transactions, per adult per month



Brazil's 'Pix' real-time payments network has strong branding and is free for certain P2P payments, boosting adoption.



India's UPI real-time payments system is one of its most popular payment methods due to high adoption, ease of use, and cost-effectiveness.

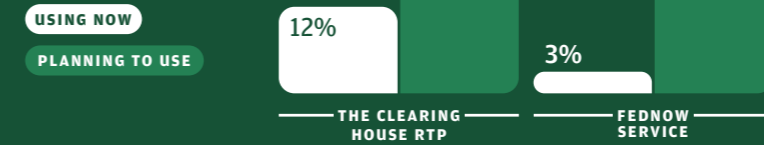


Real-time payments are significantly cheaper than traditional retail payment methods.



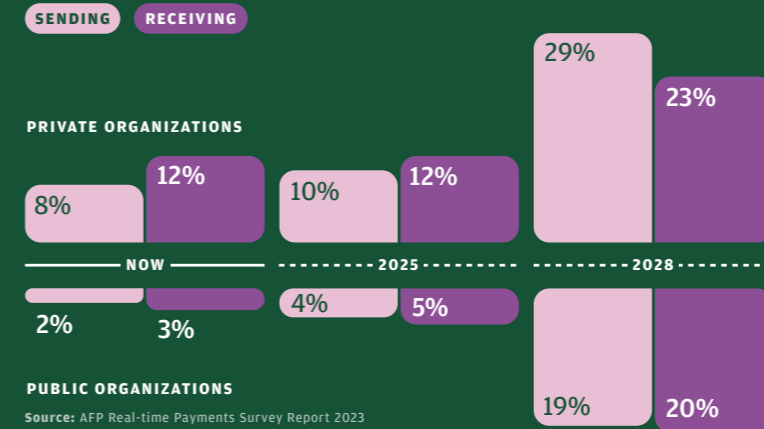
The Clearing House RTP – reaches 67% of U.S. DDA accounts nationally
 FedNow Service – is expected to include many small banks, increasing financial inclusion

Future real-time payment adoption plans



Real-time payment predictions

Organizations predict more than half of their transactions will be real-time by 2028.



Source: AFP Real-time Payments Survey Report 2023

Money's new need for speed

DATA VIZ

In 2008, the UK blazed a trail. That was the year when it launched its Faster Payments System (FPS), designed to streamline smaller business-to-business and bank-to-bank transactions. But its timing—at the very beginning of the smartphone revolution—meant that the FPS underpinned a far bigger shift in the digital economy¹. Today, millions of individuals and businesses in the UK use the near-instantaneous settlement system to pay for goods and services online and in-person, often using their smartphones as the conduit.

Over the past decade and a half, more than 50 other markets have put in place their own real-time payments systems², looking to create infrastructure that reduces the friction of digital payments, and which creates a solid platform for technology companies, from small startups to massive global businesses, to build out their own services and tools.

Despite the benefits of real-time payments, merchants haven't always jumped to adopt it. In markets where payment cards are ubiquitous, brick-and-mortar and digital retailers don't necessarily see an immediate need to add new payment methods. But in some markets—such as India, where the UPI real-time payments system is becoming the preferred mode for low-value transactions—merchants are highly motivated to start using real-time payments infrastructure. In those markets, where card penetration is low, real-time payments systems offer an alternative to cash^{3,4}.

Transacting at speed does create risks. Real-time payments are quick and irrevocable, making them easier for fraudsters to exploit than slower transfer systems. Authorized push payment (APP) scams—where a fraudster convinces an individual to send them an instant payment by pretending to be a legitimate business, friend, or love interest—have risen since the adoption of real-time payments. In 2022 alone, £485 million (\$616 million) was stolen in the UK via APP fraud⁵. Customer awareness and consumer protection rules are catching up, but this fraud presents a huge challenge for governments, consumers, banks, and payment companies.

Still, the global real-time payment infrastructure is only going to continue growing. The U.S. Federal Reserve launched its FedNow service in July 2023, transforming the payments business in the world's largest economy⁶. And with new data standards, such as ISO 20022, which will allow greater interoperability between financial institutions and payments networks, real-time payments are likely to increasingly cross borders. In this infographic, we explore the state of play right now...

1 www.thebanker.com/How-UK-s-Faster-Payments-changed-the-world-1645464864
 2 https://www.aciworldwide.com/prime-time-for-real-time-report
 3 www.npci.org.in/npci-in-news/knowledge-centre/partner-whitepapers
 4 www.statista.com/statistics/865546/credit-card-ownership-rate-brazil/
 5 www.ukfinance.org.uk/news-and-insight/press-release/over-psi2-billion-stolen-through-fraud-in-2022-nearly-80-cent-app
 6 https://data.worldbank.org/indicator/NY.GDP.MKTP.CD

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Master the art of collaboration

The changing profile of payments means once disparate teams must work more closely. Here's how treasurers and product are bridging the gap

COMMUNITIES

Payments were historically considered a back-office function, but they've evolved into a key strategic focus for many global companies. This shift requires product and treasury teams to collaborate more than ever—which is easier said than done. Both teams have different outlooks and priorities, so how can they effectively communicate their needs and work together?

To answer that question, we spoke with both a product lead and a treasury lead at two major global fintechs, who have considerable experience in creating successful internal partnerships. Here, they offer three essential tips for getting along better—and getting the best results from both teams.

THE PRODUCT PERSPECTIVE



Amit Levi, SVP of Product Management at Papaya Global

Papaya Global enables international organizations to manage their payroll across more than 160 countries, automating processes and simplifying complex issues such as regulations, compliance, local benefits, and taxation. Unlike most payroll companies, Papaya offers payment processing on behalf of its clients in the local currency of various markets. To provide this functionality, Papaya's product and treasury functions must operate in close collaboration. Here, Levi shares three principles for success:

1) Identify the problem

When teams have different areas of expertise, it's crucial to clearly define the company's objectives. This keeps everyone working toward the same goal. "Many companies have a technology, and they are searching for a problem," says Levi. "In our case, we are led by a problem which is very well-defined—global payroll payments. And that makes our collaboration much better. First, we understand the business problem, the pain points, and then we develop the right technology solution as a team."

2) Ensure everyone leans in equally

Product should see treasury as a copilot rather than a support



team. This approach enables creative thinking, which can lead to solving specific customer challenges. A good example is a recent Papaya project in which the business handled complex payroll needs for the maritime industry. "These employees are constantly moving around," says Levi. "They lack reliable internet connection, which rules out many mobile tech solutions." Papaya's teams jointly came up with a payments card that workers can use in various local currencies. Since Papaya also supports a variety of payment rails, the company was able to incorporate cross-currency functionality, as workers wanted to exchange money between themselves as well as send it back home in their country's local currency.

3) Align while working

There's no such thing as overcommunication between treasury and product, as pain points can arise when groups work in silo. "Sometimes payments will ask for a technical solution, such as a new payment method, but it is not feasible, or it is not worth the investment because too many other companies do it and it is not a differentiator," explains Levi. Alternatively, a product architect can create a solution without considering regulatory limitations that results in treasurers being unable to support it and the organization being unable to use it. Non-stop communication is therefore key to success, and each team should view part of their job as educating the other.

SOURCES: WWW.JPMORGAN.COM/PAYMENTSUNBOUND/SOURCES
ILLUSTRATION: JOE WALDRON

2) Create a shared language

After creating the right structure for successful collaboration, treasurers should help product to build a shared technical language. That's because jargon can quickly divide the groups. "It may seem mundane, but one of the key things is agreeing on vocabulary, on semantics, on defining things with the same word," says de Rougé. "Having a clear definition of the goals, the target, the task, and the language can help a lot for a fruitful collaboration." He adds that active listening is just as important.

3) Keep scanning the horizon

It's crucial for treasurers to keep tabs on industry trends, as these insights can help inform product development. Treasurers at Boku identified the need to integrate multiple real-time payments into its platform. For them to build this innovation, they need close collaboration with product, as both groups need to carefully navigate local laws, licensing requirements, and compliance elements. "I think this has been one of the great collaborations between product and treasury at Boku," says de Rougé.

WHAT'S NEXT?

What product trend should be on treasurers' radars—and vice versa?



Adam Lee, Chief Product Officer at Boku

A forecast from Product:

"Payment methods like QR codes have taken off in many developing markets, where they have started to displace cash," says Adam Lee, Chief Product Officer at Boku. "But what about developed markets? My prediction is that QR codes could start to erode the monopoly that cards have in many markets in Europe and North America, especially as open banking gains momentum."



Jonathon Nash, Senior Director, Global Payments at Papaya Global

A forecast from Treasury:

"At some point there will be a shift in paradigm for the global payment industry," says Jonathon Nash, Senior Director, Global Payments, Papaya Global. "Blockchain-based technology like central bank digital currencies (CBDCs) will become much more important. A new world is coming, and it's something companies need to monitor, or they will miss the train."

THE TREASURY PERSPECTIVE



Charles de Rougé, Head of Banking and Settlement at Boku

Boku is a payment technology company that has built a global network of localized payment solutions tailored to the needs of the world's largest digital merchants. It helps companies grow internationally by allowing customers to pay using their preferred local payment method, which includes Direct Carrier Billing (DCB), digital wallets, and account-to-account (A2A) schemes. Building the global infrastructure to support settlement capabilities for over

300 payment methods in 70 countries required Boku's treasury team to work closely with product. Here, de Rougé offers his advice for others doing the same:

1) Decide who from treasury collaborates with product

At Boku, treasury serves two roles: It manages all the corporate treasury tasks, but it also supports clients' needs and collaborates with partners. Boku has thus split its treasury team into two units. The first group is Boku's corporate treasury unit, which manages the company's cash, handles accounting, and deals with auditors. The second group works most frequently with product development to design and launch new customer-facing solutions. "Formally separating those two units has made collaboration and innovation much easier, as everyone knows who to work with," explains de Rougé.

Scan the QR code to visit Payments Unbound.com



How “SoftPoS” is remaking the way we pay

“Software point-of-sale” has a prosaic name, but transformative implications

IDEAS BANK

Since the pandemic, it has become second nature to rely on our phones for all kinds of new functions: To check in and out of venues, to carry proof of ID, and—most notably, of course—to pay. Near-Field Communication (NFC) technology has steadily transformed our smartphones into wallets that can be used in ever more places. A UK banking industry body found that contactless payments increased by 30 percent to 17 billion between 2021 and 2022. In contrast, cash payments fell to 14 percent of total payments compared to 54 percent in 2013.

Now, mobile devices have a new trick: The ability to accept contactless payments. Dubbed SoftPoS (“software point-of-sale”), also known as tap-to-phone, this technology turns any NFC-enabled smartphone or tablet into a secure contactless payment terminal, able to accept payments with just a tap of a customer’s phone or card. No dongle required.

The benefit to the merchant is simple: It eliminates the need to buy expensive point-of-sale hardware and allows the ability to operate wirelessly anywhere. Companies are already forging partnerships to trial the technology, and adoption is predicted to skyrocket. According to one forecast, contactless payments volume will rise from \$195 billion to \$408 billion globally between 2022 and 2027, as part of which SoftPoS adoption will grow from six million to 34.5 million merchants over the same period.

Although the idea itself has existed for a short while, recent security standards have spurred an uplift in SoftPoS adoption. We are now beginning to see first-hand the possibilities it unlocks. Most obviously, it is making shopping experiences more seamless. Picture a customer browsing for shirts on a shop floor. A stylist can step in, help the customer to pick out something they want—or check for stock online—and close the sale on their phone or tablet right there among the rails. SoftPoS is therefore seen as an enabler for the emerging concept of “endless aisles”—the idea that customers should be able to access a retailer’s full online stock while in the physical aisle, buying in the shop, and having products shipped to their homes.

The ability to transact quickly and securely on cell phones has implications well beyond retail. Transport companies can

take payment on platforms and in transit. One Northern European rail operator, for instance, has already enabled train conductors to accept payment with their phones, with the goal of shrinking queues. Workers who are always on the move—from taxi drivers to window cleaners, plumbers to delivery drivers—also stand to benefit, as they can readily accept payments on their phones wherever they are. SoftPoS is particularly attractive for merchants in developing economies, where access to expensive payment terminals, and indeed hardwired connectivity, may be limited.

As SoftPoS contributes to broader momentum in the NFC-enabled payments space, it will help create an enabling

context in which planned improvements in NFC technology may come to fruition. These are outlined in the industry’s current road map, and all SoftPoS users stand to benefit. Ambitions to extend the range of NFC, for example, mean that where a customer might currently have to hand over their device to pay a cab driver, they may eventually be able to pay from the backseat. More significant, perhaps, will be the arrival of mooted “multi-purpose taps”. These facilitate multiple actions in a single tap. In the very act of paying, reward

points could be added to the consumer’s brand loyalty card or a digital receipt sent directly to their handset.

Further down the line, SoftPoS has the potential to turn online shoppers’ personal devices into a card terminal. After finding something you want to buy on an e-commerce app, you could simply tap your physical card onto your own smartphone to pay. It would erase the hassle of inputting card details and remove the risk of storing a “card on file” with the merchant.

Fundamentally, however, these innovations are driven by the need for physical commerce to compete with the virtues of the digital world. Customers are accustomed to the convenience of a simple click bringing them anything they desire. They want that experience in the real world, too. Businesses that provide it have an opportunity to gain an edge.

By WIRED



“Conversational analytics” is the next frontier in payments

Conversational analytics is set to disrupt payments, and it may point to a future where AI agents work alongside treasurers

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Last summer, researchers from Harvard Business School conducted an experiment with consultants at a major professional services firm. Participants were given 18 different tasks designed to mimic work at a top consulting company. The consultants using generative artificial intelligence (AI) outperformed their colleagues by every measured metric, completing tasks, on average, 25 percent

quicker while producing 40 percent higher-quality results.

The ability for generative AI to help solve domain-specific corporate problems through a natural language interface creates obvious opportunities. One that is attracting particular interest is the notion of “conversational analytics”—using plain language to query data, create reports, or run complex analysis without having to write code or use technical software.

Conversational analytics is potentially a powerful tool for payments professionals. “The idea is to train generative AI to be part of a corporate treasury team,” says Tony Wimmer, Head of Analytics and Insights at J.P. Morgan Payments, who is building a conversational analytics assistant for corporate treasurers. “We want to engineer it to understand the job of a treasurer. So when the treasurer asks certain questions, it knows the right answer.”

Tools like this may also let corporate treasurers with no coding knowledge instantly translate plain language questions into the equivalent database queries, gaining insights—complete with accompanying charts and graphs—that it might currently take data analytics teams many days to produce.

These tools will continue to evolve. Key players in the tech industry envision a new kind of AI assistant, often referred to as an “AI agent”, that can not only operate as described above, but also

“The idea is to train generative AI to be part of a corporate treasury team.”

carry out multi-stage actions autonomously. One company founded by AI industry veterans recently launched an AI agent that can perform office tasks such as reading and replying to users’ emails; another new startup has showcased an agent that can handle many of the tasks of a software engineer, fully managing coding projects from writing to deployment. One can imagine potential applications of AI agents for treasurers: Perhaps it could optimize cash flows, troubleshoot accounting problems, or simply look after everyday admin.

The technology is not perfect. Generative AI is prone to “hallucinations”—errors, essentially—and these tools will need to be rigorously tested and monitored by humans as they evolve. And whether you think we will ever see general-purpose AI agents that can function as a true, fully fledged “co-worker” is largely a matter of whether you think AI will come to match human intelligence. But it doesn’t seem like a stretch to imagine that, for certain professions and tasks, we may have specialized agents who can lend support. And it seems like even less of a stretch to imagine conversational analytics going mainstream in a way that lets payments professionals work more effectively.

“If we get this right, then that’s the productivity gain that people are currently talking about,” says Wimmer. “Then humans can focus on the more value-adding tasks of making decisions, aligning people, driving culture, solving organizational issues: The things that really only humans can do.” **By WIRED**

SOURCES: AS PER WIRED, MAY 2024
FUTURE CAPABILITIES OF CONVERSATIONAL ANALYTICS ARE UNDER DEVELOPMENT; FEATURES AND TIMELINES ARE SUBJECT TO CHANGE AT THE BANK'S SOLE DISCRETION.
ILLUSTRATION: GARY NEILL



Can payments innovations fix supply chains?

Digitalizing logistics payments could banish pain-points and reveal new revenues

W

e are living through a global supply chain reset. First, Covid-19 and a volley of geopolitical shocks prompted businesses to reroute their operations for greater resilience. Now, economic pressures have put supply chains under

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scrutiny once more. Price rises across energy, materials, and logistics are driving companies to make cuts and increase efficiency in their internal teams and external supplier networks. Meanwhile, higher interest rates mean that businesses have to carefully steward every dollar of working capital, or risk missing out on attractive returns.

The logistics sector is looking at a number of strategies to meet these requirements. A crucial one is arguably the most obvious: Modernizing the payments process. Traditionally, supply chains have been beset with inefficient, labor-intensive practices. For example, many freight companies in the U.S. still have largely manual workflows. They send paper invoices and get paid via check. This process can be frustratingly slow, with payments taking days or weeks to arrive. Even worse, it exposes companies to a higher risk of fraud and traps their data, which hinders cost-effective decision-making.

A more serious challenge is reconciliation. “About 20 percent of the time there’s a discrepancy, meaning the invoice amount or other details don’t match what was expected in the contract. It can sometimes take up to 60 days to solve the issue because companies aren’t empowered with high-quality data to understand the root cause,” says Matt McKinney, Co-Founder and CEO of Loop, a logistics-AI audit and pay solution built for shippers and logistics service providers.

The supply chain is a network of networks, and each point of payment friction at every phase adds cost.

The supply chain is a network of networks, and each point of payment friction at every phase adds cost. Ultimately, someone has to pay for the capital that’s locked up—they may need to take an expensive bridge loan to make up the shortfall.

“The supply chain runs on data. Friction in the payments is fundamentally a data problem: Purchase orders don’t match invoices. This is a bad problem for people to solve, but a great problem for AI,” continues McKinney. One strand of innovation is using AI to extract and centralize all supply chain and spend data that is trapped in physical documents and manual workflows. With accurate, centralized data, both sides can easily correct invoice errors and have an understanding of why the issue occurred. This is something Loop facilitates, and

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it also allows payments to be made quickly and simply via the optimal method, be it ACH, wire, or real-time payments. This is more significant than it might seem. Large companies can have hundreds of people devoted just to processing checks and solving reconciliation issues. These resources could be better deployed elsewhere.

Once payments are digitalized it opens up new financial possibilities. Take dynamic discounting. This is when preferential terms are offered in return for prompt payment. For example, a business could offer to pay a supplier in seven days, rather than the standard 30 days, if that supplier was happy to offer the business a discount in return. This effectively acts as an additional revenue stream for the business, while the supplier gets its money quicker, which can improve its cashflow position. It’s a time-worn idea, but in digital form it can be turbocharged, something being explored by working capital solutions provider Taulia. The company uses predictive analytics and artificial intelligence to analyze factors such as company size, revenues, geography, and other indicators to better understand a supplier. It then calculates the optimal discount to offer that supplier, so as to maximize potential yield without putting undue stress on that company. In fact, vulnerable suppliers can be actively identified and given more accommodating rates.

While startups such as Loop and Taulia are driving notable improvements in supply chain payments, there is still much to be done. Cross-border payments remain one of the biggest challenges, as they can be slow and expensive. Some organizations are exploring blockchain as a way of completing transactions around the world at low cost and lightning speed, but this is still in the very early stages. The J.P. Morgan blockchain division has completed some feasibility testing in this area, but there remain a number of technological and regulatory barriers to its wide-scale adoption for moving fiat currency.

Still, the progress that is being made in supply chain payments means that businesses are in a stronger position than ever to find new efficiencies. By using the best digital tools available today to make incremental gains, companies can realize meaningful benefits. Those that get this right might just recast the role of their supply chain altogether. What was once a cost center could become a profit center. **By J.P. MORGAN**



The rise and rise of ecosystem-based businesses

Companies are realizing that they can be stronger together by pooling expertise, technologies, and products to take advantage of market opportunities they couldn't otherwise reach

The global economy is going through a major reorganization. Businesses are evolving beyond their individual platforms to create ecosystems, integrating their services into a single consumer experience. This shift is having a significant impact—McKinsey estimates that business ecosystems could generate between \$70-\$100 trillion in sales by 2030, representing approximately 30 percent of the total world economy.

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To understand the impact of ecosystems, we need to understand how they work. According to Jason Tiede, Global Head of Corporate Development and partnerships at J.P. Morgan, ecosystems have three main characteristics:

Firstly, they comprise a network of companies that enter into an intentional business relationship. The participants sell diverse but complementary products and services that are often from different industries and involve different business models. They may even be competitors.

Secondly, they have a shared client base interested in all these products and services, as this set of customers makes it lucrative for the businesses to partner.

Thirdly, they constantly evolve, because much like a biological one, a business ecosystem is ever-changing.

A good example of an ecosystem is electric vehicle charging stations. The electricity provider, automotive company and retail outlet all work together to let a customer charge their car. Other businesses can also be involved—a phone company, for example, can help direct the driver to the charging location.

Usually at least one participant orchestrates the venture, and all of the businesses share in the profits. This financial sum is typically greater than a single participant could generate on their own, and it incentivizes them to work closely to provide the most frictionless customer experience.

Seamlessness, in particular, is the quality that distinguishes successful ecosystems. Imagine that a driver is low on battery and their car automatically routes them to the nearest charging station, while an app on their phone allows them to pre-order their coffee. Or the charging station sends a push notification to the driver when electricity prices are low, allowing them to purchase charging credit ahead of time at a cheaper rate. Strategies like these are what drive ecosystem growth.

Connecting the dots

Payments play a crucial role as a layer of connective tissue between the companies that make up a business ecosystem. To maximize convenience, customers must be able to transact across a wide range of businesses with a single swipe, tap or voice

Payments play a crucial role as a layer of connective tissue between the companies that make up a business ecosystem.

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command. They don't want to enter their payment details each time they make a purchase or go through an onboarding process whenever they're routed to a new company on the network.

Building this type of effortless payments experience is complex because it requires particularly close cooperation between the different ecosystem players. All participants must also support a wide range of payment methods so customers can pay how, when, and where they want. Those payments have to be fast, but speed can increase the risk of fraud, which means it must be carefully balanced with security considerations.

A number of companies are vying to help ecosystems navigate these challenges. J.P. Morgan, for example, recently launched the Payments Partner Network, a "one-stop shop" to connect businesses with payments operators. "We have a network of hundreds of payment partners spanning most industries and use cases," says Andy Woodbridge, who supports J.P. Morgan Payments and Commerce Partnerships. "It ensures we can support our clients for all their needs in various shapes and forms across the payments landscape." For instance, a company may want to set up a new payment gateway to accept digital wallets; they can then use the network to easily see a list of verified providers and choose one that can best meet their needs.

Future evolutions

Innovations in payments will help ecosystem businesses evolve in new ways over the years ahead. "Just as data can easily flow between countries, in the coming years there will be a more seamless flow of money across borders," predicts Tiede. Several countries already have domestic real-time payment infrastructures and there are now governmental and regulatory efforts to sync these schemes together. Faster cross-border transactions will allow ecosystems to expand their scope and scale, and better integrate businesses from multiple countries or regions into the network, while also increasing their potential customer bases.

Another important consideration is trust. Ecosystems comprise various businesses that may take different approaches to risk, so it's likely we'll increasingly see trusted parties anchoring networks in an agreed set of frameworks such as business fraud controls, consumer protections, and data safeguards. This, in turn, should boost consumer confidence and, as ecosystems spread their wings internationally, allow participants to enjoy a step-change in resilience and growth.

Building ecosystems isn't easy. But a future where a business doesn't tap the potential of its ecosystem? That might be an even tougher call. **By J.P. MORGAN**



DEEP DIVES INTO A CHANGING WORLD

FEATURES

GAME ON

Payments innovations have shaped the evolution of video games. Now, the industry is leveling up once more

ILLUSTRATION: RUNE FISKER



Think how formidable you would need to be to go up against Spider-Man, Batman, and the X-Men all at once, and still come out on top. Imagine having enough left in the tank to take on James Bond and the Terminator, as well.

That powerhouse exists, and its name is *Call of Duty*. The world's most popular shooter game series has total sales of over \$30 billion, a sum greater than five of the largest movie franchises in history added together.

CoD's success highlights the sheer scale of the gaming business. An industry that generated revenues of \$15 billion back in 1975 now accounts for around \$200 billion a year, making it bigger than the movie and music industries combined.

The gaming industry's ascent has hinged on its ability to evolve and adapt its business models over time, and this evolution is ongoing. To an arcade owner in the 1970s, new ideas such as subscription streaming or play-to-earn would have seemed incomprehensible. And as the gaming economy has transformed, it has transformed gaming itself. Innovations in how we pay for and access games have influenced game design, audiences, and revenues—changing the make-up of the industry and the kinds of games we play.

Here's how we got here, and what's happening at the cutting edge...

FROM COIN SLOTS TO CONSOLES. GAMING'S PIVOT FROM ACCESS TO OWNERSHIP

Until the 1980s, arcade machines dominated the video game market. Players slipped coins into the slots of large cabinet-sized boxes housing classic offerings such as *Space Invaders* or *Pac-Man*, and could play until they were defeated. At its peak in 1982, arcade gaming was generating \$27 billion a year in revenue.

But arcades were not the only game in town. Consoles had been in existence since the early 1970s, and as the 1980s drew to a close, a new generation of higher quality devices emerged into the limelight. Microprocessor technology had improved, so businesses could offer arcade-level experiences via a device the size of a shoebox. All the customer had to bring to the party was a television. This expanded gaming audiences significantly—not least among younger players.

A defining feature of consoles was the ability to buy cartridges containing new games. The range of titles multiplied, and longer-form, more complicated games slowly became the norm. After all, this new era was about ownership rather than access and, particularly with the advent of save points, you could replay to your heart's content. Arcades quickly seemed decidedly old-fashioned. By 1998, arcade revenues had fallen to \$7 billion a year, while consoles' had soared to \$11 billion.

The humble cartridge engendered a new industry model. Publishers would sell copies of games that were compatible with particular hardware. That range of hardware expanded to include handheld consoles and computers—by the mid-1990s, PCs were rivaling consoles in revenues—and players continuously invested in ever more powerful devices and libraries of games to play on them. Unit sales—whether physical or digital—remain a prominent market today. Console games and hardware alone represent around \$50 billion in revenues a year.

While the business model itself may be well established, innovations in payments technology are changing how users engage with it. These stand to broaden audiences and, as a result, grow revenues.

Take “buy now, pay later” (BNPL), which has surged in recent years. This lets consumers split payment over a number of months, often with zero interest. It tends to be easier to get approved for BNPL finance compared to a credit card. This has been a boon to manufacturers of gaming devices, as it makes it easier for more consumers to get their hands on big-ticket items, such as consoles.

Payment orchestration tools are also allowing games retailers to increase their reach. Most e-commerce games stores heavily rely on cards. Digital wallet options like PayPal are limited, as is the ability to pay by mobile app or QR code. These are popular payment methods in many countries around the world, and not harnessing them creates friction in the consumer experience. In addition, online payments are only going to become more important. By 2025, e-commerce will be the leading channel for console sales, while around 90 percent of games are already purchased online. The solution potentially comes courtesy of fintech startups that allow games retailers to add hundreds of different payments options to the checkout process, without having to integrate each one individually.

In the future, we may also see innovation in how unit sales of games are priced. “There will be more dynamic pricing based upon data on who's playing and who's spending,” says Duncan Bowring, a Director at Accenture Gaming. “Instead of a regional strategy, pricing could be more personalized. This will allow companies to maximize revenue without impacting engagement.” Modern consoles are internet-enabled, which means user information can easily be collected and analyzed. For a new game launch, a games company could analyze how each player interacts with their titles and what their purchase history is, and provide them with an individual price. Clearly, there are watch-outs here: Retailers will not want to confuse or irritate customers. If pricing seems exploitative or random, they may take their business elsewhere. But get it right, and it could be a way to attract buyers who otherwise wouldn't be spending on the title at all.



THE SUBSCRIPTION SURGE

Today, standalone sales are only part of the picture. Subscription models are becoming increasingly mainstream, offering the consumer a return to the “pay for access” model of the arcade, albeit with exponentially more convenience.

The history of subscriptions in gaming traces back to the rise of PC gaming in the 1990s, when the internet enabled massively multiplayer online games (MMOs) to take off. These huge online worlds allow millions of people globally to explore virtual landscapes, complete quests, fight enemies, and collaborate with other players, all on a single platform. The format exploded in popularity during the 2000s, spurred by leaps in internet speeds, computer processing power, and cloud computing adoption. Games such as *World of Warcraft* became cultural phenomena. MMOs also changed the gaming payments landscape. They were predominately available as free-to-use

Subscription gaming payments hit approximately \$16 billion in 2023 and will grow by 40 percent by 2027.

up to a certain point, but a monthly subscription fee was required to unlock further levels.

The subscription model is now the fastest-growing segment in gaming, and has opened the door to new approaches. A number of online monthly subscription packages allow gamers to purchase and access hundreds of games instead of buying individual titles. The games are hosted on distributed cloud servers, so players can download and play for as long as they hold an account, or—in some instances—stream them on-demand without having to store them on their local device. For consumers, this means more games for less money spent. For businesses, it presents a stable and predictable revenue stream, and a way to continue monetizing a library of older titles. Top-tier games are often not included in subscription packages, which makes it an important opportunity for independent developers who often

struggle to compete against the big releases.

Microsoft pioneered this trend with the launch of Xbox Game Pass in 2017, which currently provides access to a library of more than 500 games. Although subscription gaming is about four times smaller than direct sales in terms of revenue, it is not short of momentum. Last year, there were around 180 million active games subscriptions globally.

Right now, a number of companies—some outside the traditional gaming arena—are competing to be the go-to games streamer. Amazon has launched Luna, for instance, a service that offers games for smart TVs, while other firms targeting this space include Sony and NVIDIA. According to Omdia, subscription gaming payments hit approximately \$16 billion in 2023 and will grow by 40 percent by 2027.

How big will this get? The adoption of games streaming will likely be determined by the extent to which networking technology can keep up with computing. Games that are computationally demanding can suffer from frustrating pauses in play, meaning that these services can't match the experience of top-flight console games. But they are improving, and future strides in networking speeds and bandwidth may solve the issue.

If that happens, we could imagine a future in which it's commonplace for players to buy a subscription and then stream games across any device. "A lot of people can't afford a \$500 console every handful of years," says Brad Manuel, Founder of game-tech company Livewire. "If cloud-gaming's successful and internet speeds can keep up, it hypothetically removes the need for consoles. You can play from your Smart TV, your PC, your phone, wherever." This could broaden player demographics, improve user engagement, and also make it possible for niche titles to find a larger audience.

If the subscription model becomes more mainstream, gaming companies will increasingly have to tangle with the challenges associated with running a subscription business. Maintaining card-on-file records for a multitude of customers, for example, is a headache. Emerging techniques, such as systems that update card details automatically by using data taken straight from Mastercard and Visa, can help with this.

But the games world also has some industry-specific opportunities to solve some of those subscription-related challenges. One issue, for instance, is the need to make it easy for subscribers to voluntarily pause or cancel their subscriptions. Although this can hurt short-term revenues, it builds trust and makes it more likely customers will return in the future. So what if the game itself could be used as a means to incentivize players to keep up their membership? Perhaps if they maintain a subscription for a set period of time, the subscriber would earn digital goods or currencies that can be spent in the game, or which can be put towards hardware upgrades. Another approach may be to allow gamers to earn digital assets while playing, which can then be put towards monthly subscription payments, boosting loyalty while making the offer more affordable.

BONUS ITEM: COULD DIGITAL WALLETS MITIGATE FRIENDLY FRAUD?

Video games are hugely popular with children. According to the National Institutes of Health, young people between eight and 17 spend an average of 1.5 to two hours a day engaged in virtual play. But this comes with a risk: The child could borrow a credit card or smartphone from a parent, and then buy hundreds of dollars of digital goods or in-app purchases. This is known as "friendly-fraud". Because the transactions are unauthorized, the parent or guardian will typically demand a chargeback. With an embedded wallet, chargebacks become much easier and cheaper to manage. If someone wants to reverse a transaction, the money can just be returned to their digital wallet, without having to involve a card company or bank and incur the related costs and fees.

IN-GAME TRANSACTIONS TAKE OVER

Despite the feeding frenzy around streaming, the largest revenue driver in the gaming industry by far is in-game purchases. These account for around 75 percent of total revenues, and have been largely driven by the rise of mobile gaming.

Just as the console supplanted the arcade, the smartphone has now taken over from the console to become the most popular gaming device in the world. People carry these mobile computers with them at all times and the graphical and processing power of smartphones is good enough to support games that are relatively computationally demanding. Companies, such as Backbone, are making controllers especially designed for smartphones to improve gameplay and mimic the console experience.

The reason in-game purchasing is so commonplace in these titles comes down to the idiosyncrasies of the digital economy. When smartphone apps were taking off around 2010, games developers soon encountered a problem. The vast majority of apps available to download on smartphones were free. As a result, game makers found they had no pricing power. Even a nominal fee of \$0.99

would severely impact download numbers. So, a new monetization strategy was devised, whereby the game was provided for free but players could then buy digital items—weapons, abilities, costumes—or access to additional gameplay. Mobile gaming revenues exploded. Some games are now designed entirely around generating revenue in this way. *Fortnite* is an online, multi-player battle game that is free-to-play but makes billions of dollars a year from in-game purchases. And

More games companies will have to tangle with the challenges of running a subscription-based business.

the model has even spread beyond free-to-play: Games available for standalone purchase now offer a wide range of digital add-ons. As Jordan Schuetz, a community organizer of SF Game Development, the largest free game development meetup in San Francisco, explains: "With a lot of new games you pay the \$80 purchase price upfront, but you're then spending hundreds more on digital items. That's just kind of what games need to do now to make a serious profit."

The rise of in-game purchases was predicated on new payment mechanics. The first major development was when the main mobile app stores enabled the ability to make a seamless micro-transaction while the game is in progress. This was the spark that ignited the market for digital items. But further innovation could be necessary. For example, more games are being made for AR or VR headsets, where players are completely immersed in the action. "Some devices use eye tracking, so wherever you're looking on the screen you can basically interact with it. You can 'pinch' a virtual item with your fingers," says Schuetz. "We could

Game platforms will also increasingly end up holding cash on behalf of creators who are frequently underserved by traditional finance.

see stuff that links your AR headset with your phone, and it takes your payment data, so you can pay by pinch."

Many games have also developed their own virtual currencies to support in-game purchases, like *Fortnite's* V-Bucks. Players buy blocks of this currency, which they then use in increments to pay as

they play. This approach speeds up transactions, as each individual payment does not have to be processed by a bank, which is vital as players want to minimize interruptions in fast-paced games. "Virtual currencies let players choose how to enhance their experience with immersive currencies themed for that virtual universe," explains Benjamin Stoner, Product Management Executive for Gaming at J.P. Morgan. "And they give developers greater flexibility for strategic pricing optimization, such as rewarding higher spend with additional virtual currency or incentivizing repeat purchases—instead of a player paying \$5 for a virtual sword, they pay \$5 for 60 coins, spend 50 coins on the sword, and have an extra 10 coins for next time."





SOURCES: WWW.JPMORGAN.COM/PAYMENTS/INSOUND/SOURCES

and media,” says Benjamin Stoner from J.P. Morgan. “Key B2B segments, like the software engines on which games are built, are relied upon by game developers worldwide and have embraced marketplace models. Embedded banking adds significant value to that enablement layer and opens up entire new business models.”

Game platforms will also increasingly end up holding cash on behalf of creators who are frequently underserved by traditional finance. This money—known as “third-party money”—requires advanced treasury management and meeting a host of regulatory requirements.

Adopting cutting edge payments innovations could become a competitive advantage in this space. Take real-time payments, for example, which would appeal to creators because it would allow them to access their funds instantaneously. This is already happening in other media. ByteDance, the parent company of video platform TikTok, allows its creators in the U.S. and Europe to receive instant payments to their bank accounts.

Getting payments right “can help to open up the accessibility of the creator economy”, says Accenture’s Duncan Bowring. “Along with new technology like

ByteDance, the parent company of video platform TikTok, allows its creators in the U.S. and Europe to receive instant payments to their bank accounts.

generative AI, creators of all sizes, from all parts of the world, will have the tools and platforms at their disposal to bring their visions to life and reach a global audience.”

Video games are often looked at as a leading playground for innovation. They help audiences escape to and embrace alternative personalities and unimaginable worlds, and they are rapidly bridging the physical and digital

divide through immersive experiences. Alongside innovation in games themselves has also come major advances in how we transact. In the more popular games, the player is so involved in the action they almost feel like they disappear. Payments need to act the same way, becoming so seamless and intuitive that they are practically invisible—just another mechanism at the disposal of the gamer.

By helping players level up, conquer new territories, and better express themselves, payments technology can play a crucial role in enabling the wider industry to innovate further. And Stoner says those innovations are happening faster than ever. “Right now,” he says, “it’s game on.” **By J.P. MORGAN**

FROM PAYMENTS TO PLATFORMS

Games have come a long way from the 1980s, when *Donkey Kong* hit arcades as the first ever platform game. In 2024, “platforms” are all the rage in a different sense: A platform business model that can allow games companies to expand revenues. Once a game gets large enough, companies can go beyond simply selling in-game items and build comprehensive marketplaces where huge communities of users can create and sell their own digital items, giving way to bustling creator economies.

Today’s three most popular PC games all operate as platforms in which players are able to expand their playing experiences with content made by independent creators. *Roblox* allows players to spend “Robux” on entire games built by other users, who then receive a portion of those revenues. In 2023 alone, *Roblox* paid its creator community an astounding \$741 million. *Minecraft* has also distributed hundreds of millions of dollars to creators. Meanwhile, *Fortnite* is evolving its platform approach by monetizing creator content, such as cosmetic character enhancement, games, and other experiences. The aim is to eventually distribute 40 percent of *Fortnite*’s revenues to creators.

Elsewhere, Twitch, a platform where gamers can live-stream themselves while they play, also operates as a marketplace. Video creators can charge a subscription fee for their channels or get a cut of advertising revenue generated by their livestreams. Twitch also sells

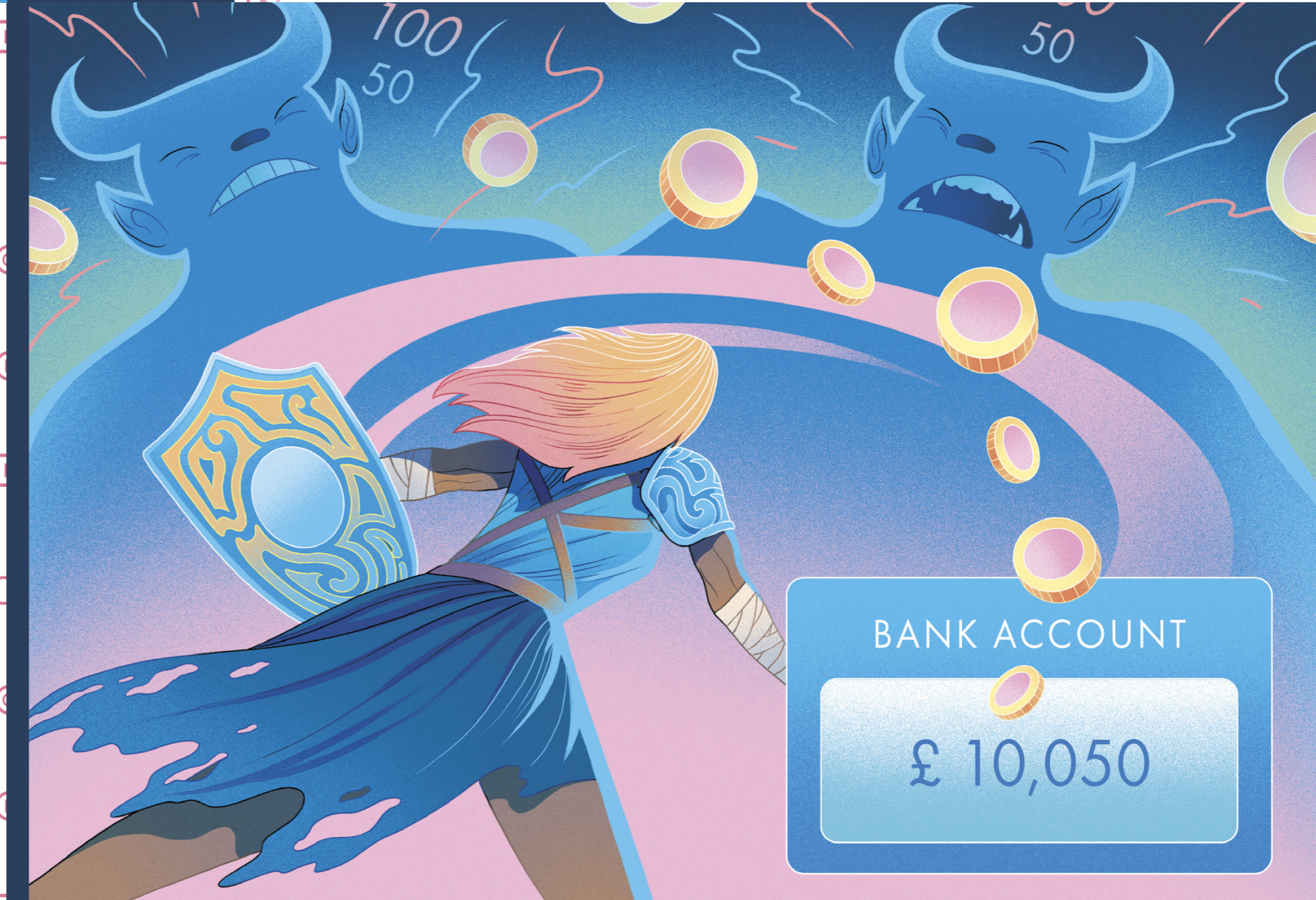
video games and digital items to its millions of monthly viewers.

Building a bi-directional payments facility that can handle pay-in and pay-out functions is vital to support this level of interactivity, and if done right can be a valuable asset. After all, creators can come from all around the world. When you make a pay-out to another country, there is a foreign currency (FX) conversion. If the developer manages the transactional FX themselves then they can charge a margin and generate revenue. This is called embedded banking, when platforms make third-party financial services available to users through direct integrations.

“The growth and adoption of platforms in the video game ecosystem go beyond consumer-facing games

BONUS ITEM: WILL DIGITAL WALLETS ENABLE GO-ANYWHERE ASSETS?

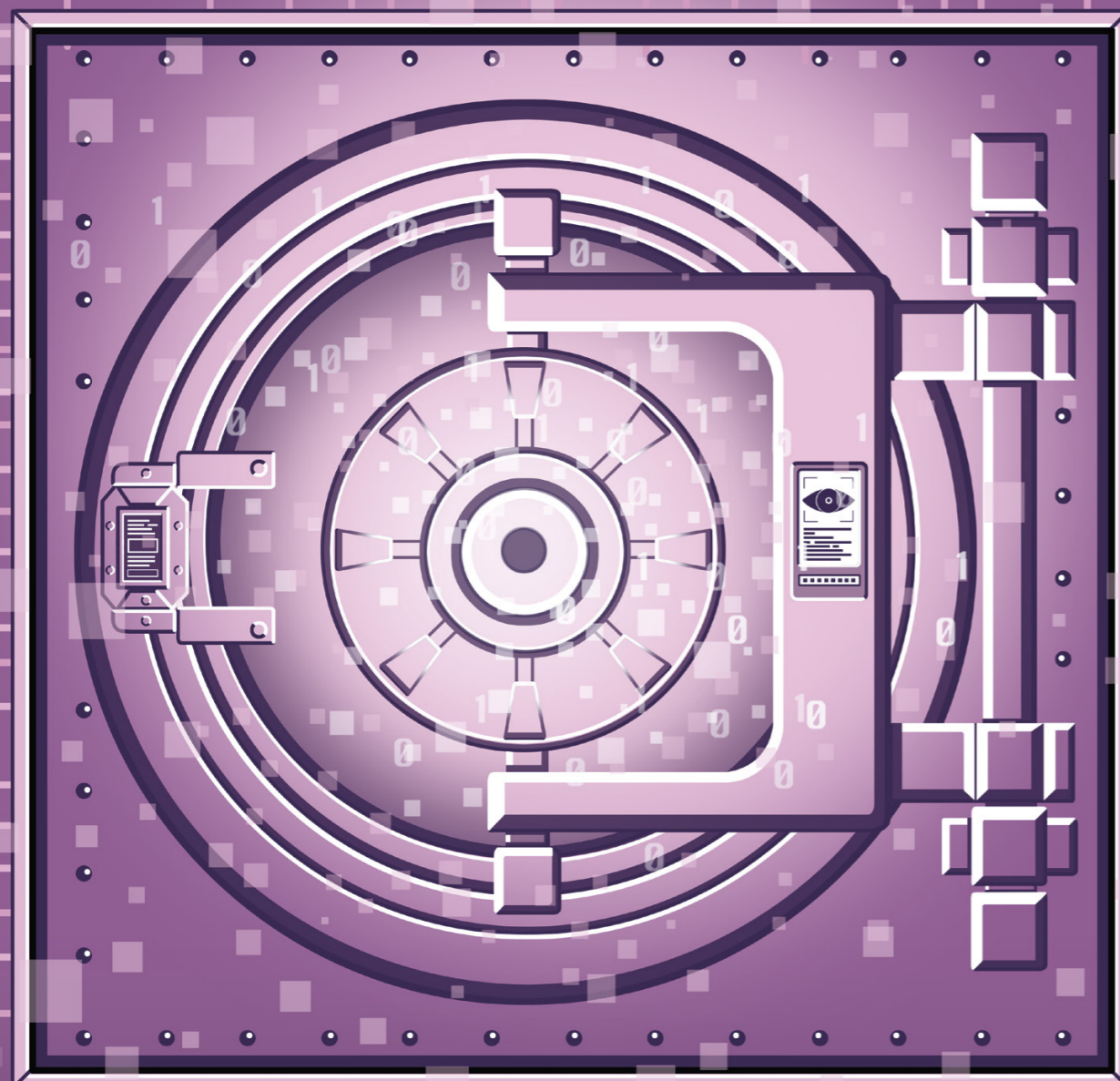
There is talk of developing digital wallets that can be ported between games. As well as virtual currencies, players could store and transfer other forms of value, such as their identity, gaming credentials, high scores, and digital items. The idea is that when they move to a new game, they could take the wallet with them, instantly being able to spend their money, use their avatar, or deploy any other compatible weapons or goods. However, as Livewire’s Brad Manuel says “Global interoperability between games will be extremely difficult due to the different licensing legalities, platforms, game engines, and contracts involved.” It has also yet to be seen whether games developers will embrace such an approach, and whether it makes financial sense to allow players to move their in-game balances about freely.



THE NEW FRAUD FRONTIERS

Cybercriminals are always evolving. A range of emerging innovations aim to neutralize the threats

ILLUSTRATION: STEPHAN SCHMITZ



The message on the clerk's screen looked suspicious. It was purportedly from the Chief Financial Officer of the Hong Kong-based financial services firm where she worked, and it was asking her to make a series of confidential payments. Surely this wasn't legitimate? The colleague offered a video call to discuss it all properly. Having accepted the invitation, the clerk found herself in a meeting with the CFO plus a number of other senior people she trusted. Doubts were assuaged. The money was sent.

In all, the clerk transferred \$25 million via 15 separate payments. Only then did she contact the company's head office and realize she had made a terrible mistake. The whole thing had actually been an elaborate scam.

This happened at the start of 2024, as generative AI was making breakthrough leaps in video capabilities. Using the technology, fraudsters had managed to

replicate a conference environment, and the colleagues supposedly on screen were, in reality, nothing more than digital avatars. Their appearance, voices, and mannerisms mimicked their real-life counterparts, and they were sufficiently convincing that the worker was duped.

Fraud is a significant problem for business, and—clearly—it's becoming more sophisticated. Merchant losses due to online payment fraud are expected to soar to \$362 billion globally by 2028. For every dollar taken by fraudsters, the total cost to organizations is on average approximately three times the transaction value. That's because merchants may incur fees and fines or have to replace stolen goods.

As the world digitalizes, criminals have more opportunities to strike. More than \$10 trillion worth of digital transactions took place worldwide in 2023. By 2028, that figure is expected to rise by more than 60 percent, as consumers and businesses continue their shift from cash to online and mobile payments. This improves convenience, but adds vulnerability. Digital channels presently account for more than half of overall fraud losses. The risks are exacerbated by novel behavior. There is demand for greater choice in payments, from digital wallets and microloans to “buy now, pay later”, pay-by-bank and real-time rails. These new services and tools, and the need for organizations to adapt to them, create new areas of exposure for businesses that offer them.

A dark web product called FraudGPT is a generative AI tool that writes convincing phishing emails and malicious code.

Fraud and its enablers take a wide variety of forms, from social engineering and malware to identity theft and “card not present” scams. Innovations, such as deepfakes, let fraudsters upgrade their methods, opening up new angles of attack or enabling traditional schemes to be performed with greater ease, effectiveness and—crucially—scale. A dark web product called FraudGPT, for example, is a generative AI tool that writes convincing phishing emails and malicious code.

So what can businesses do to keep themselves and their customers secure? Thankfully, just as technology is a boon to criminals, it is also providing organizations with ways to stay on the front foot and shut those threats down.

Here we explore four hot topics in the fight against fraud...

THE NEW FRAUD FRONTIERS

HOW BIOMETRICS ARE TAKING ON DEEPFAKES

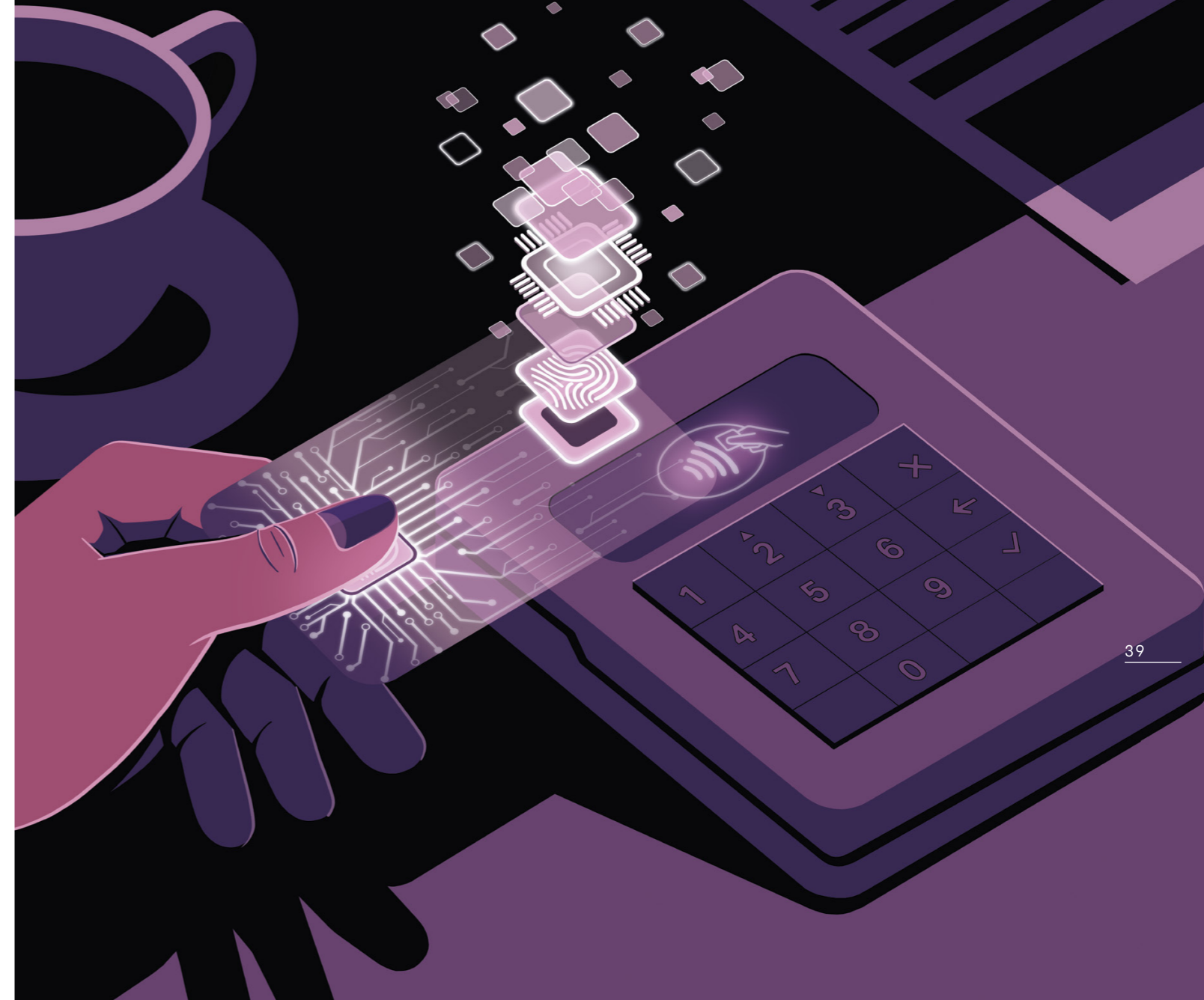
In the late 19th century, the French police officer Alphonse Bertillon had a radical idea: What if, rather than relying on imprecise techniques of interrogation and investigation, law enforcement could identify criminals through unique physical characteristics? Although flawed, “Bertillonage” laid the foundation for fingerprint identification, and thus the modern science of biometrics.

The ubiquity of smartphones with high-quality cameras and touch sensors, combined with advances in computing power and artificial intelligence, mean that biometrics are now an everyday part of the user experience for countless businesses. From logging into an account to completing a payment, users can verify interactions via their unique biological markers. The field of biometrics is evolving fast, and its cutting edge now encompasses everything from facial and voice ID to palm recognition and long-range iris scans.

The strength of biometrics as a security measure, however, has paradoxically created a blind spot for businesses. When a biometric test is passed, it is tempting to accept that at face value. But as we have seen, generative AI can produce convincing deepfakes, and these can fool facial and voice checks—even ones enhanced to detect signs of “liveness”. Breaking biometric security can allow fraudsters to commit identity theft, onboard to other products such as authenticator apps, or simply carry out fraudulent transactions.

Techniques to help businesses combat deepfakes are emerging. One is the use of residual neural networks, which are deep machine learning models that have an aptitude for detecting falsified elements on images and videos. Another involves “challenges” that aim to expose deepfakes by exploiting the limitations of the models behind them. Nasir Memon, the Dean of Computer Science at New York University (NYU) Shanghai, has created a tool, as yet largely untested, that involves cascading challenges. These can be active (requiring the participant to do something such as poking their cheek, say, or holding an object in front of their face), or passive (such as changing the scene illumination by projecting structured light patterns onto the subject). Deepfakes can struggle to pass such tests. “If I don’t know whether you’re a deepfake, I can probe you in some way, send some data in your direction and see how things come back,” he says. Ideas like this can not only help prevent

SOURCES AS PER WIRED, MAY 2024



biometric failures, but could also thwart the kind of social engineering attacks that led to the Hong Kong fraud.

An alternative avenue of research focuses on using secondary factors to support the biometric test. This might involve inspecting aspects of the input for consistency. If the facial scan purportedly comes from a phone whose camera offers a particular resolution, for example, it would clearly be a red flag if the system was looking at a face with a different resolution. Another possibility is to involve secret knowledge; for example a voice-based system might ask the user to say a phrase that only they know.

Since the ongoing evolution of technology threatens to make many anti-deepfake techniques almost obsolete as soon as they see the light of day, that kind of

If the facial scan purportedly comes from a phone whose camera offers a particular resolution, for example, it would clearly be a red flag if the system was looking at a face with a different resolution.

holistic thinking is essential. “Deepfakes are a greater concern when a business is only assessing a limited number of factors for risk. Good fraud detection should involve assessing a bunch of different factors in aggregate,” says Mike Frost, Senior Product Specialist at J.P. Morgan. He also

cites changing payment instructions, use of a new phone number, a change of device or an account being accessed at atypical times of the day as examples of factors that can be evaluated to help build a detailed picture of suspicious activity.

“The tactics that we’ve tried to use are less related to technology and more about practices,” agrees his colleague Steven Bufferd, Managing Director of Trust and Safety Products at J.P. Morgan. “How do we validate it? Are there sources we can trust? Is the change of payment instruction legitimate? Is that a real person? Can we validate based on the information you’ve given us? Trying to ascertain whether a person is real should not just be a technological endeavor, but one in which technology assists and augments human-based best practices.”



THE NEW FRAUD FRONTIERS

GOODBYE PASSWORDS,
HELLO PASSKEYS?

In the mid-1960s, MIT Professor Fernando Corbató had an idea. He had built a computer designed to be used by multiple people. Each user would have their own private files, so needed their own account. How to protect that account? Simple: A password.

Corbató is widely credited as the inventor of the computer password, and his creation is still with us today. When a business signs up a new user, they typically secure that account with a password. It's the default, time-tested digital security tool, and it has persisted for a reason. It's straightforward, cost-efficient, and can be easily changed.

Passwords are also insecure. Around 70 to 80 percent of online data breaches are the result of password theft, according to Andrew Shikiar, CEO of FIDO Alliance (FIDO), an industry association focused on reducing online fraud.

Fraudsters have an array of ways to steal passwords, such as deepfake voice calls, phishing emails, or mobile interface attacks, in which the display and touch input of the victim's phone are revealed to the criminal. Too often, individuals and organizations use one password for multiple services, so one breach can lead to further compromises. Advances in technology only heighten the risks. Generative AI is adept at writing code, for example, making it easier to create password-stealing malware that's hard to detect.

"The fundamental issue is that we've relied on knowledge-based authentication for too long," says Shikiar. "There are also major security and usability issues. I think we can all relate to how challenging passwords can be to utilize effectively."

The downsides for businesses are pronounced. If a fraudster obtains a user's password, they might have an unchecked ability to make card-on-file payments or use the account as a springboard for committing further fraudulent acts. In an effort to upgrade password security, many businesses are demanding that users recall increasingly complex combinations of words, symbols, and numbers to access their accounts. That, too, has a trade-off, as it adds friction to the user experience.

No wonder technologists have long wanted to kill passwords. But no viable alternative has presented

itself—at least, not until recently. The answer, according to FIDO, is passkeys.

A passkey is a unique alphanumeric key stored on a user's device (such as a phone, laptop, or tablet). When a user tries to log in to an account, the account-specific private key combines with a counterpart public key stored on the app or website server. If the two keys are cryptographically proven to be a pair, the user can access their account. The promise is twofold: Since the key is not stored externally, it is not vulnerable to data breaches; because it can only be used on the device on which it was created, it can't be used elsewhere anyway. A further upshot is that if a company does not have to store sensitive password data, it reduces business risks, including the possibility of reputational harm.

Passkeys aren't just more secure: The process of using them can also be 40 percent faster, allowing businesses to improve the seamlessness of their user experiences. More than 100 organizations have already adopted passkeys as a sign-in option, including e-commerce companies, fintechs, and the UK's National Health Service.

However, while passwords might be less secure and less convenient for many users, they may be hard to shake. FIDO says that just 39 percent of people it surveyed are familiar with passkeys. "People might not love passwords, but they know how to use them," says Shikiar. "Passkeys are a new concept and people need to become familiar with it." Shikiar points to the growing use of biometrics as an example of how consumer behavior changes as people become more comfortable with technology.

And it's important to note that passkeys also have their downsides. It's harder to sync them across devices, and there are still relatively few apps and websites that support the technology. It can also be a convoluted process to recover access to an account if the user loses all their devices.

"You need to talk about what demographics and areas this is likely to start in. It's going to be younger people that are more comfortable with different technology," says Frost from J.P. Morgan. "And there are going to be certain industries, users, and workloads where there is a business incentive to do away with passwords."

If a fraudster obtains a user's password, they might have an unchecked ability to make card-on-file payments, or use the account as a springboard for committing further fraudulent acts.

THE NEW FRAUD FRONTIERS

CRYPTOGRAPHY
THAT YOU DON'T
HAVE TO DECRYPT

Data breaches are expensive. When a security violation leads to the unauthorized usage or disclosure of confidential data, the average cost to an organization is now \$4.45 million. That's a record high—and more than 15 percent greater than the average cost in 2020.

Data breaches often begin with an act of deception. Fraudsters typically socially engineer employees to open a malicious file or hand over their credentials. The ways that modern businesses operate create extra vulnerabilities. Enterprise computing set-ups often involve cloud environments, which means data can be accessed by more people across a much broader potential “attack surface”. That attack surface can also include supply chain partners, and supply chain vendors are a prominent source of breaches. The professionalization of cybercrime—combined with new hacking automation tools such as XXXGPT—make it more likely that criminals will take advantage in order to steal identities or carry out payments fraud.

To protect their data, businesses encrypt it. But decrypting it each time they need to use it leaves it vulnerable.

To protect data, businesses typically encrypt it. But data then has to be decrypted before it can be used—including for the detection of fraud itself—at which point it potentially becomes vulnerable. Enter homomorphic encryption (HE), which has its origins at the Massachusetts Institute of Technology (MIT) in 1978. HE enables computation to be performed on data while it remains encrypted.

Vinod Vaikuntanathan, an MIT Professor of Electrical Engineering and Computer Science, who is the co-inventor of most modern fully homomorphic encryption systems explains the concept as follows: “You can think of traditional encryption as putting your data inside a locked box. You send that locked box over a channel and the person at the other end has a key. They can unlock the box and

get the answer,” he says. “Homomorphic encryption, on a basic level, is being able to take a locked box and manipulate the contents within without opening it up.”

While this has obvious advantages for data security—businesses could ask a third-party provider of powerful cloud computers to work on data without introducing risk, for example—there is a specific use case for HE in detecting fraud, because HE has the potential to facilitate safe data sharing. In financial services, multiple entities could securely work together to identify suspicious activity. “If you think of two or more banks, they each have their own data about their customers’ transactions. But fraud often operates across many banks, often with small transactions that flow across multiple accounts,” says Vaikuntanathan. “It’s very hard to detect, if your visibility is limited to your own network. So, can we enable people to compute across all that data, and identify suspicious operations? That is something that is being worked on.”

HE is not yet a widespread technology. It’s secure, and simple computations often take just seconds to execute, but when extrapolated to large and complex datasets, especially when paired with equally complex algorithms, there is a significant computational “overhead.” This makes scale implementations often impractical in a real-world financial setting. However, this may change. “That will either happen through finding ways to rewrite your computations so they’re more amenable to homomorphic approaches, which could be assisted by machine learning or via better hardware. There is lots happening with hardware—although unlike with AI, it’s not the compute that’s the bottleneck, it’s memory.”

If the problems can be solved, HE has an opportunity to proliferate—perhaps to the stage where we never need to decrypt encrypted data. “I think we have a reasonable shot of making it in, let’s say, a decade,” says Vaikuntanathan. “I’m putting all my time and energy where my conviction is, which is in inventing new techniques to make this faster.”

SOURCES AS PER WIRED, MAY 2024



THE NEW FRAUD FRONTIERS

THE SYNTHETIC DATA REVOLUTION

Artificial intelligence is giving fraudsters an array of new tools that allow them to increase the scale, scope, and sophistication of their activities. But AI is also a crucial way of tackling the threat. The challenge is that machine learning depends on historical data, and this is often not available for newer forms of fraudulent behavior, leaving businesses on the back foot.

One use case of generative AI, in particular, is that it can be deployed to produce synthetic data, which can help address this problem. Synthetic data is an imitation of a real dataset that can be used to train AI models. It's cheap, can be produced on-demand, and can be designed to include few biases.

Another upshot is it can be used to model less commonplace, edge-case behavior. A payments company, for example, could use synthetic data to build systems that can identify merely hypothesized or forecasted examples of suspicious activity. "If you have a ML model that is able to learn fast, you can come up with some synthetic scenarios that have never happened before and teach your machine learning model to identify that fraudulent activity," says Blanka Horvath, Associate Professor in Mathematical and Computational Finance at the University of Oxford. That might be particularly useful in the context of new technologies, such as real-time payments, where relatively little historical data exists.

Synthetic data can help identify merely hypothesized suspicious activity.

Synthetic data can be applied to a range of scenarios within the payments sector, from identifying money-laundering behavior, to detecting suspicious patterns in payments records, customer journeys,

or transaction histories. One particular advantage for financial services is that it can sometimes be impossible to use real data even when it's available, owing to data privacy regulations.

Synthetic data is not a panacea. It is challenging for businesses to validate whether a synthetic data set is effective, at least in the short term. Is it flagging too much legitimate activity as fraud? How effective is it at identifying anomalies?

There are a number of ways to bridge the real-synthetic gap. Businesses can benchmark the outcomes of synthetic models against those of comparable real-world ones; they can use "adversarial training" to improve the verisimilitude of synthetic data; and they can fine-tune synthetic models on real-world data. It's likely that



DATA POINT

\$2.1 BILLION

FORECAST TOTAL VALUE OF
THE GLOBAL SYNTHETIC DATA
GENERATION MARKET
IN 2028

SOURCE: BCC RESEARCH

SOURCES AS PER WIRED, MAY 2024

augmenting real-world data with synthetic data—with the latter being trained on and modeled against the former—will be especially important to the payments industry.

This configuration can help unearth the broader characteristics of fraudulent transactions. As Steven Bufferd from J.P. Morgan explains: "Our view has been to use internal data and start to model against what we see happening within the real world," he says. Then it becomes a matter of using signals from that data to "pull information that highlights why transactions were fraudulent." This data, he says, can be channeled into scoring models that uncover trends and patterns that can help the company proactively nip fraud in the bud.

THE PATH AHEAD – AND WHAT BUSINESSES NEED TO DO

Tackling fraud is a complex undertaking. The picture is made more complicated still by regulation-related challenges. The increasingly connected nature of payments is driving more cross-border activity, creating uncertainty about which rules apply where and how. Mike Frost from J.P. Morgan notes the tension between this cross-border flow of payments data and the legal requirements in some jurisdictions that compel companies to only hold and process data domestically. "More governments are mandating that data remain within the borders of a nation," he says. "Finding ways to leverage that data for accurate fraud detection while complying with these regulations remains a challenge."

With payments becoming faster, more digital, and geographically broader in scope, both regulators and the payments sector will need to work hand-in-hand to find standards that offer protection without stifling either market competition or consumer choice. That, says Vincent Meluzio, J.P. Morgan Product Solutions Director, will place increased emphasis on the need to establish strong procedures for managing and monitoring identities and the flow of information.

"It's really difficult for fraudsters to get through a web of multimodal indicators."

The need to stay ahead of emerging threats is particularly acute at a time when fraudsters rely less on careful selection and targeting, and more on sheer volume and velocity. So, ultimately, what does a robust fraud-prevention process look like? "An extensive range of validation instruments that create a mosaic of signals, which bring greater clarity to decisions about fraud. Couple that with a strong human element, along with the right kind of automation in the right places," says Meluzio. "This is what makes the human process of "intelligent exception handling" so key. It's really difficult for fraudsters to get through a web of multimodal indicators that arm you with greater context to make a decision, supported by a robust process that you follow through with. And an organizational culture that is disciplined enough to stick to the process, even under extreme pressure."

By WIRED

BEYOND THE BALANCE SHEET

Nicola Bates

PRESIDENT AND CEO, SIEMENS CAPITAL



Siemens Group's niche is helping companies engaged with the physical world integrate with the digital world. Its operations are therefore broad, but they're all

underpinned by Siemens Capital, which provides the business with a wide range of financial products and services. Nicola Bates is its President and CEO.

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In one sentence: What do you do?

We strive to reimagine payments with a focus on the customer experience by integrating payment services into our product lineup, thereby strengthening our competitive edge in the market (and yes, I know this is a long sentence).

What are you working on right now?

Just as Siemens create virtual worlds to solve real-world problems, we in treasury are moving to a virtual banking infrastructure to address our real-world needs. We're also moving towards smart contracts and programmable payments, harnessing advancements in blockchain.

In-office or WFH?

In the Americas region, we are a virtual team. It doesn't matter where we sit; it matters what we do.

How many people are in the Americas team?

We have around 50 people in the organization in the Americas region.

What's the innovation that's most disrupting your world?

24/7 real-time payments present both challenges and significant opportunities. Managing liquidity and dealing with the irrevocable nature of transactions are notable challenges. However, the advantages, including the ability to instantly settle and clear payments, surpass these obstacles, offering substantial benefits.

What's the biggest question facing payments today?

Why are companies still using checks? After years of hard work, Siemens has succeeded in eliminating outgoing checks in the U.S., and we plan to stop accepting check payments by the end of this year. I hope other companies will do the same.

What's the most important quality for being a leader?

Creating a team environment where innovation can thrive.

"We are a virtual team. It doesn't matter where we sit; it matters what we do."

...And what's the trait that's least helpful?

Resistance to change. Complacency is the killer of creative thinking.

Who is your industry mentor and what's the most important thing they've taught you?

Siemens Group Treasurer—and 2023's Adam Smith Corporate Treasurer of the Year—Peter Rathgeb. He encourages me every day to find simple solutions to the most complex problems.

You can have a fantasy power lunch with anyone in business. Who and why?

I know I'm cheating here, but I have two. Paul Polman, for proving at Unilever that if you put purpose first, profit will follow. And Jamie Dimon,

because he's not merely reacting to change, but investing heavily in developing products and solutions that will cannibalize their existing product base. The Steve Jobs of banking.

What's the cast-iron "work tip" you'd like to share with us?

Great colleagues and tough challenges are the best way to attract and keep strong talent. Focus on developing amazing teams.

What is a mistake that taught you something useful?

During one of the first important meetings in my new role, I thought I was there to observe and learn, until I was called on mid-meeting to present. Lesson learned: Check the agenda before arriving at the meeting in case you're on the speaker list!

What's a secret that only people who do your job know?

That payments are the hottest area in treasury nowadays.

Make a fearless prediction: How will payments be different in 10 years' time?

Payments will be invisible, becoming a feature of the product rather than a transaction unto itself.

If you weren't working in payments, what would you be doing?

Pottery on an organic farm in Mallorca.

AI: Are you worried?

No, I'm excited. I expect AI to do the work that no one wants to do, leaving the fun stuff for us humans.

ILLUSTRATION: EWELINA DYPKEK

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Every story is powered
by Payments.



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