J.P.Morgan x WIRED

VOLUME 2

PAYMENTS UNBOUND

THE NEW WORLD OF COMMERCE

The expanding universe of digital marketplaces

The virtual care economy lifts off

Space: The finance frontier

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PAYMENTS UNBOUND

CONTRIBUTORS

MEET OUR EXPERTS

Here are a few of the thinkers and innovators who have contributed to the volume:

Tomer Barel, Chief Operating Officer at Melio on the secrets small businesses can teach large enterprise (p.18)

Matt Bennett, Senior Vice President of Care Delivery at Evernorth on how to bring greater transparency to US healthcare pricing (p.42)

Lisa Callahan, Vice President at Lockheed Martin on why we are entering a new era for space exploration (p.35)

Nick Caton, Chief B2B Officer at AB InBev on digital platforms enabling transparency, innovation and growth in B2B trade (p.29)

Josh Janos, Vice President of Marketplaces at Macy's Inc on the virtues of brand-built marketplaces (p.28)

Gonzalo Martín de Mercado, Business Development Officer at the ESA on the new financial mechanisms required for space exploration (p.36)

Christopher Newman, Prof., Space Law & Policy at Northumbria University of Newcastle on how space could reinvent the concept of money (p.34)

ILLUSTRATOR: NASH WEERASEKERA

Contents

A new dawn of commerce is upon us

In the current operating environment, with economic growth slowing and interest rates rising, it is more important than ever for businesses to develop alternative revenue streams. That's not only about meeting your customers wherever they are, but making those engagements as seamless as possible. One way to do this is through frictionless payments options or by embedding helpful financial services directly in the user experience. The goal is to first connect with customers, and then make their journey as intuitive and convenient as it can be.

In this issue, we look at how commerce is evolving. There has been a major shift, with new kinds of online marketplaces transforming almost every industry, as our feature starting on p.26 explores. These digital platforms, designed to efficiently connect buyers and sellers, were once mainly associated with e-commerce, but are gaining traction in every sector, from healthcare and gaming to the automotive world. At the same time, the big e-commerce players are not standing still. They continue to expand their platforms, improve their offerings across all channels, and create new integrated online-offline experiences. Think of stores that allow customers to scan QR codes to pay with online accounts and arrange deliveries through their phone.

Importantly, the goal of this new breed of marketplaces is not just to sell directly to consumers. When I speak with companies, they are often looking to build platforms that can serve many different participants in their ecosystem; including suppliers, sellers, developers, content creators, and advertisers. A consumer goods company may develop a marketplace to allow small retailers and mom-and-pop stores to easily order new stock, helping it to generate more sales. It could even include competitor products on the platform. After all, a buyer will often want to purchase a basket of products from multiple brands rather than a single supplier. The marketplace can take a cut from these products, while simultaneously building a stronger customer relationship. So, the key for companies is to develop an open ecosystem mindset and think about the partners that can help them build that offering as well as grow alongside them.

Payments are an important enabler of this vision. They connect at every touchpoint in the marketplace, whether it's billing, statements, pay-outs, or collecting funds. But they are also moving beyond being a back-end function. Now, when we strategize with a company, it is often about how payments can act as a revenue generator, a customer acquisition tool, or as a vital competitive differentiator.

Take a ride-hailing app: by embedding payments through a digital wallet, it can make transactions invisible, which encourages greater usage and keeps customers in the ecosystem. Once you have that engagement, it is then possible to offer the user related services—such as food delivery or bike rental—which can further increase monetization opportunities. On the pay-out side, being able to provide the app's drivers and delivery workers with a fast and flexible way to access their earnings helps to build a stronger supplier base. This shows some of the diverse ways that payments can help the company build a winning product.

But as payments become more diversified, they also become more complex, creating a major bearing on a company's offering. Can they also offer financing? Can they offer credit underwriting-related services? The list is extensive.

This is why partnership is crucial. An experienced provider can help a company set up their payment architecture and manage the regulatory environment. After all, if consumers want payments to be invisible, then so do companies, allowing them to focus on what they do best: serve their customers with ease, efficiency and choice, providing the best offering tailored to their unique needs.

I believe that partnerships across the entire payments ecosystem will play a vital role in supporting small and medium enterprises to intuitively develop customer-first solutions, transforming the future of shopping. That future is now.

Welcome to Payments Unbound.

By Lia Cao,
Global Co-Head of
Corporate and E-commerce
Sales & Solutions
J.P. Morgan Payments

SOURCES: WWW.JPMORGAN.COM/PAYMENTSUNBOUND/SOURCES
ILLUSTRATION: ADI GILBERT

THE INSIDE TRACK

START

What's the secret to re-commerce?

Levi's Chris Jackman shares what the brand has learned from launching SecondHand

BILLION DOLLAR QUESTION

Re-commerce is a new term for an old idea—selling second-hand goods online. But it is an area that has enjoyed notable growth and innovation in the past few years, as consumers are increasingly placing value on sustainability and the circular economy. This trend has been especially prominent in the apparel industry, partly in response to concerns over 'fast fashion', where a high volume of new product lines are released each season in response to trends-resulting in unnecessary waste. Fashion re-commerce is now a $20 billion a year industry, and many brands are developing their own platforms to sell pre-owned versions of their own products. One example is Levi's, which has recently launched SecondHand, a new re-commerce concept dedicated to Levi's vintage and used clothing. We spoke to Chris Jackman, Vice President of Global Consumer Marketing at Levi's, to ask: what are the key elements for a successful re-commerce business?

Alleviate concerns over product quality

One of the most important factors for any re-commerce site is ensuring the quality of products. Brands trading in their own items have an advantage as they can better authenticate the goods. Jackman describes the process at Levi's: "We get our products through trusted partners and loyal consumers who bring them to our stores where our style experts examine the garments and approve only quality pieces. What's labeled 'vintage' is truly vintage and just not a two-year jean."

Build customer loyalty

In order to avoid cannibalizing your own products, it is important to use re-commerce as a way of engaging with your customers and strengthening relationships. A tactic at Levi's is allowing people to trade in their existing products in exchange for credit or vouchers. "SecondHand provides a great opportunity for the brand to re-engage with current and lapsed consumers," says Jackman, "and reach new consumers." These include those with an interest in vintage items, who can then be enrolled in loyalty programs and targeted with personalized offerings.

Provide a returns process

"Many re-commerce platforms don't accept returns," says Jackman. This can be a major barrier to customer trust. After all, no-one wants to purchase a second-hand product only to find it is not what is expected, and then be stuck with it. Levi's decided to provide returns and accept exchanges. The company's view is that for brands to be successful with re-commerce, they need to offer the same experience as they would for their regular product lines.

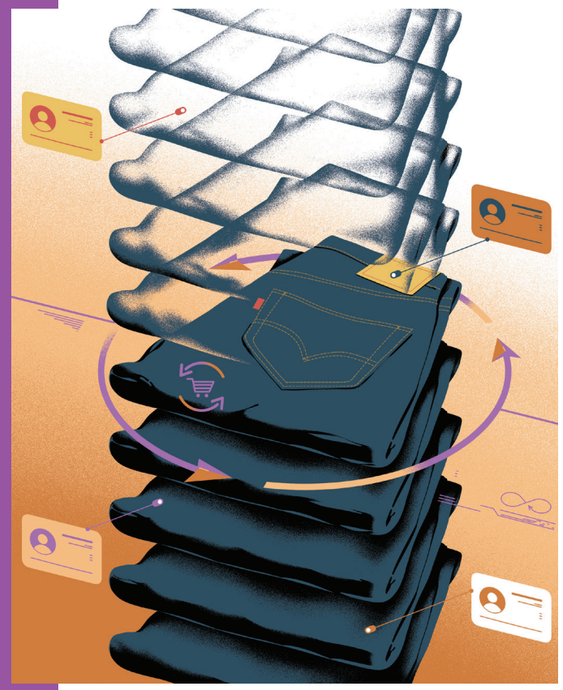
Innovate with payments

There is much scope for innovation when it comes to payments. Re-commerce customers are often buying second-hand to save money, so would likely be attracted to low interest 'buy now, pay later' options, or other tools that can help reduce the financial burden. Meanwhile, brands also need seamless systems to manage pay-outs, so customers can instantly get credit, cash or other remuneration for their trade-ins. "We believe in flexibility," says Jackman, "and are always looking for ways to improve the shopping experience for consumers."

Put sustainability front and center

Arguably the biggest driver for re-commerce is the increasing consumer focus on sustainability. "The environmental protection agency (EPA) estimates that nearly 17 million tons of textiles are dumped in landfills in a year," says Jackman. In the 2021 financial year, he continues, "our SecondHand program reclaimed or extended the life of 28,000 units of clothing in the US". Brands should closely track the environmental impact of their re-commerce activities and share the information with their customers, so they clearly understand the benefits.

BY J.P. MORGAN



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Meet the startups changing the way we pay

Stephany Kirkpatrick's Orum is one of a number of new companies disrupting everything from financial access to customer experience

STARTUP SHOWCASE

When Stephany Kirkpatrick was growing up in Portland, Oregon, her family wasn't well off. "My father was an immigrant from Yugoslavia, and we didn't always have a lot," says the 41-year-old, who is now based in New York. "We were constantly thinking about how to do more with less. It very much shaped who I am today." It's perhaps why she became a Certified Financial Planner—and also why that experience struck such a chord. It brought home the fact that financial infrastructure and services could often be exclusionary. And it made her want to do something about it.

In 2019, Kirkpatrick founded Orum. "The idea was: how can I help those who have less, have more?" She concluded that focusing on payments—solving people's money-movement problems—would make a notable difference. "For people in underserved communities, the inability to access money quickly is crippling. Oftentimes, the fastest payment rails are not offered by the smaller, community banks that serve these populations, so communities are left stranded on nights, weekends or holidays. For people that live paycheck to paycheck, faster access to their money could be the difference between avoiding overdraft fees or paying rent on time."

On some occasions, it can take days for money to move from one financial institution to another. Orum's fix is to analyze the available payment rails that a company or consumer might have access to, and select the optimal route for each payment—similar to how a cell phone might select the best carrier network to ensure the fastest connectivity. As a result, Orum is able to cut payment transfer times from days to minutes—or even seconds in the best-case scenarios. What's more, the platform runs all day, every day, so it is not restricted to bank operating hours or delayed by public holidays.

It was quite an undertaking. There are more than 11,500 financial institutions in the US, so figuring out how to connect them, determine which payments they accept, and then come up with a methodology to plan the smartest route was a challenge. Orum spent two years developing its proprietary software stack. But the opportunity, says Kirkpatrick, is enormous. At present there are 250 million households in the US that could use faster payments, yet only 61 percent of US instant-access deposit accounts offer them, according to The Clearing House, a banking association which operates payments infrastructure in the US.

"For people in underserved communities, the inability to access money quickly is crippling."

"Personally, I'm very motivated by the constant need to leave the world better than I found it," says Kirkpatrick. "There are hundreds of millions of Americans that can have access to a better financial system if we keep working on this problem."

orum.io ***BY J.P. MORGAN***

Stephany Kirkpatrick is championing faster, smoother payments.

PHOTOGRAPHY: JASON MADARA

SOURCES: WWW.JPMORGAN.COM/PAYMENTSUNBOUND/SOURCES
ILLUSTRATION: ADI GILBERT

Sanket Karuri
Chief Product Officer, Beam

Beam: Access to critical funds for all

What it does: In today's challenging economic environment, vulnerable communities are struggling to access critical public benefits to make ends meet. These funds can be the difference between a family paying rent or being evicted, or a student continuing with their higher education. The problem is that administering social welfare programs isn't an especially straightforward task. Beam aims to simplify the process, partnering with public institutions for fast delivery of funds to those who need them most. Its software is able to help administer a wide range of programs, from rental relief and public utility benefits to cash assistance. Beam also supports partners in conducting outreach and prioritization to vulnerable communities, so they can understand which government programs are suitable and available.

Killer app: It's an "end-to-end" solution. Beam also provides identity verification and security measures to ensure funds go to the right people, as well as access to real-time payments (RTP) rails—or digital payments systems such as Zelle—to ensure funds are received as quickly as possible.

What's next? In the coming months, Beam is looking to expand into disaster relief. In the aftermath of a hurricane or flood, it will be possible to send relief payments directly to people's mobile phones, providing vital aid in a time of crisis. ***bybeam.co***

Brent Ho-Young
Co-Founder and CEO, Dream Payments

Dream Payments: A seamless pay-in and pay-out experience

What it does: When Dream Payments was founded in 2015, its original goal was to help merchants sell their products or services, whether that was in store, on the road or in the homes of their customers. The first offering was a mobile payments tool, which had a smartphone application and a connected payments terminal. From there, Dream Payments pivoted. It began working with financial institutions to embed its technology in their core payments processes, allowing them to offer sellers the same type of frictionless, mobile-first payments solutions that typically only come from smaller fintechs.

Killer app: Dream Payment's technology is cloud-based, which means merchants can simply log in to their portal via a smartphone, or other device, and see every aspect of the payments they have processed, from anywhere.

What's next? Billions of dollars of business-to-business (B2B) payments are still done manually by check each year—it's slow, insecure, and inefficient. That's why, this year, Dream Payments can give merchants the same seamless functionality for pay out as well as pay in. Merchants will be able to easily set up vendors to pay suppliers, staff or contractors from their mobile application. ***dreampayments.ca***

Dimitri Dadiomov
CEO and Co-Founder, Modern Treasury

Modern Treasury: Building payments infrastructure gets easy

What it does: Movements of money are effectively the central nervous system of many companies. For some, this is mainly a backend function, but for others it is a core part of their product or service. Take an online marketplace, a payroll company, or a mortgage lender. How efficiently that business can receive or transfer funds is vital to being competitive. Launched in 2018, Modern Treasury aims to provide a seamless integration between a company and its banking partners.

Killer app: Via a single easy-to-use API, Modern Treasury allows businesses to send and receive payments quickly and accurately via any method, including Automated Clearing House (ACH), RTP, wire transfer and more. Payments can also be centralized into a single dashboard with accurate tracking, reporting and reconciliation.

What's next? Consumers are increasingly using digital platforms to purchase high-value assets and make large transactions. This has created a need for those businesses to adopt fast, secure, transparent payment systems—often for the first time. This presents a new group of customers to Modern Treasury, which can take the pain out of building modern payments infrastructure. ***moderntreasury.com***

REGIONAL TRENDS WATCH

What's next for Asia-Pacific?

Asia-Pacific (APAC) is a region like no other in the world, being home to a multitude of currencies, languages —and regulatory regimes

Macroeconomic volatility and uncertainty, higher cost of funding, and the need to diversify supply chains are particular concerns for businesses operating in the APAC region. But what sets APAC apart is the access to enormous technology talent pools that are adept at resolving problems through the use of artificial intelligence, process automation, and data analysis.

One result of this is the region's leadership in adopting new real-time payments methods, plus API and cloud-based payments technologies, which has led to the emergence of popular digital wallets and sophisticated digital banking providers. These in turn are transforming e-commerce and leading the swift rise of new business approaches, such as direct-to-consumer, usage-based pricing, and subscription models. Meanwhile, online platforms that once catered to a single niche are expanding through partnerships with firms in other sectors, giving rise to multi-industry, region-wide ecosystems.

This has made the region a cradle of innovation when it comes to fintech, and a must-follow space for those interested in where payments go next. Here are six telling developments...

By Madhav Kalyan
Head of Payments Asia Pacific, J.P. Morgan

1 INDIA

COULD ITS REAL-TIME PAYMENTS SYSTEM GO GLOBAL?

India's Unified Payments Interface (UPI), which allows instant peer-to-peer and person-to-merchant payments via mobile devices, is fast expanding internationally through partnerships in several countries including Singapore and the UAE. The National Payments Corporation of India (NPCI) is also enabling UPI capabilities using phone numbers for accounts in India held by Indian residents residing overseas. Developed by the NPCI in 2016, UPI is a major reason that India leads the world in real-time payments (RTP) – an estimated eight billion RTP transactions happen every month. The country's central bank also recently launched India's Central Bank Digital Currency (CBDC), the digital rupee. While still in its initial stages, a digital rupee on an interoperable blockchain can help facilitate real-time cross-border transactions without intermediaries and usher in an era of cheaper, more efficient currency management.

2 MAINLAND CHINA

MOVING TOWARDS DIGITAL CURRENCY

With the expansion of the digital renminbi or 'e-CNY' pilot for retail users in 23 cities in 2022, China became the largest economy to offer a Central Bank Digital Currency (CBDC) at scale. Users are now able to access their e-CNY in wallets on mobile apps. In parallel with the launch, the country's popular online platforms are now allowing for e-CNY as a method of payment. Supported by the country's existing retail payment infrastructure, the e-CNY system will help bolster China's digital economy through a more secure form of currency, enhance financial inclusion, and drive greater efficiency. e-CNY has so far been used primarily for domestic retail payments, but there is potential for adoption across corporate and personal businesses in the near future.

3 HONG KONG SAR, CHINA

EXPANDING RMB TREASURY CAPABILITIES

A major international financial center in Asia, Hong Kong serves as an important gateway to mainland China and is the largest center for conducting offshore renminbi (CNH) financing activities. As the renminbi (RMB) grows in popularity as an international payment currency, there is increasing demand from both foreign multinationals and China headquartered companies for CNH payments capabilities, such as flexible CNH FX rate optimization. The city's central bank is also committed to expanding RMB liquidity in the region through enhancements to the RMB Liquidity Facility, as well as introducing additional risk management products such as Swap Connect.

4 SINGAPORE

BLOCKCHAIN IS ENABLING INNOVATION

Singapore continues to make strides when it comes to pioneering innovative ideas across the payments ecosystem. In 2016, the Monetary Authority of Singapore (MAS) along with industry players including J.P. Morgan, began experimenting with blockchain under the banner 'Project Ubin'. Over five years, this explored how distributed ledger technology (DLT) could be used in everything from decentralized netting of payments to the 'delivery-vs-payment' (DvP) settlement process commonly used for securities. The success of this work is paving the way for commercialization such as a joint venture among DBS Bank, J.P. Morgan, Temasek and Standard Chartered which plans to operate a blockchain based, multi-currency clearing and settlement platform called Patrior. Now, the MAS continues to work on key initiatives to further advance DLT usage such as instant cross-border exchange and settlement of foreign currency transactions, as well as the programmable digital Singapore dollar. Current work on decentralized finance (DeFi) applications looks at how tokenized government bonds, Japanese yen and Singapore dollar deposits can demonstrate new models of trading, clearing and settlement.

5 JAPAN

NEW IDEAS CHANGING CASH DOMINANCE

Despite a plethora of digital payment choices in addition to credit and debit cards, cash remains the dominant medium of exchange in Japan. That is likely to change as the authorities have introduced a "Cashless Vision" with an aim to increase cashless transactions to 40 percent by 2025. To help achieve its goals, the Japanese government is set to introduce a system that will allow companies to pay a portion of salaries into e-wallets on mobile devices by spring 2023, alleviating the need to draw cash from ATMs. Such convenience coupled with discounts offered by these new payment providers will likely help drive the shift towards a cashless society. The transition to cashless payments is also expected to help overseas workers receive salaries without needing to open bank accounts, further expand financial services innovation in the market, and promote growth.

6 AUSTRALIA & NEW ZEALAND

ALTERNATIVE PAYMENTS METHODS SURGE

The digital payment landscape in Australia and New Zealand has undergone significant changes in recent years. Cash and checks have been largely replaced as major forms of payments, with digital alternatives such as e-wallets, real-time peer-to-peer transfers and 'buy now, pay later' (BNPL) services achieving mainstream adoption. According to the Australian Treasury, almost half of the country's population today make contactless payments using mobile and wearable devices. Real-time payments, launched in 2018, already account for a third of total peer-to-peer payments, and there are more than five million active BNPL users today. The trend towards a more digitized payments ecosystem is only expected to grow, driven by the rise in e-commerce, high mobile penetration and changing consumer behaviors that favor more instantaneous as well as convenient forms of payments.

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

Is ‘Pay By Brainwave’ the future?

Tech companies are working hard to make brain-computer interfaces a reality. They have the potential to upend our world including how we pay—but will BCIs really happen?

REALITY CHECK

Imagine typing on your computer just by thinking. Or ordering something online without having to lift a finger. Thanks to brain-computer interfaces (BCIs), this may one day become possible. In theory, you could be sitting at home and thinking, “I’m hungry for pizza,” and a pop-up message on your smartwatch or smart glasses would present the menu from your favorite takeaway. Instead of ordering by manually scrolling down and pressing buttons, the application would read your thoughts—and in no time, your pizza would be delivered to your door.

For online businesses, forever in pursuit of seamless, frictionless customer experiences, this is a vision of nirvana. Right now, it’s pure science fiction—but how likely is it to become reality?

BCIs already exist. They work by acquiring brain signals, analyzing them, and relaying them to external devices. These use machine learning to translate those signals into machine-understandable commands, enabling humans to interact with technology with their mind. So far, BCI applications have mainly been in medicine—for example helping patients with impaired motor abilities to move robotic limbs. But they are edging towards non-clinical usage in areas such as gaming. Researchers are also exploring using thoughts to send emails and browse the web. “This is a transformational technology that will change who we are as humans,” says Rafael Yuste, a Professor of Biology at Columbia University. Indeed, this year a number of tech companies are expected to either bring their BCIs into clinical trials or release data on trials already underway.

But for all their promise, BCIs are riddled with challenges. Until now, most BCI successes have involved the invasive form of the technology, which requires implanting electrodes directly into the brain to record its signals. Because such a procedure is medically risky and governed by strict regulations, it’s hard to imagine these sorts of BCIs becoming commercially pervasive. “It certainly inhibits broad and rapid distribution,” says Timothy Marler, a senior research engineer at the RAND Corporation. Non-invasive neurotechnologies instead record brain signals from outside the skull via a wearable headset. But, this has a drawback: the strength of the signal of interest can be lost among the brain’s background noise, which makes it difficult to detect the relevant information.

There are also issues with processing the signal, even where you can detect it. Say, for example, you want to add extra cheese to your pizza—you’d need an algorithm to decipher the specific brain patterns related to this command. The problem, explains Camille Jeunet-Kelway, a research scientist at the French National Center for Scientific Research, is that too often these algorithms are prone to error. What makes it harder is that each of us has different brain patterns, much like how our voices have different accents. These algorithms must therefore be modulated to the individual using the device. Not only that, but the user also has to learn to generate “clean” commands via their brain patterns. This can be achieved through neurofeedback training, but it takes time. “If at the origin the user does not generate a high-quality signal, then the best recording methods and algorithms will be useless,” Jeunet-Kelway says. For now, this makes a powerful one-size-fits-all technology difficult to fathom.

“Within a decade we will see non-invasive decoding of simple commands and speech in the consumer electronics market”

Against this backdrop, however, there has been progress. Firstly, work has been done to improve methods for recording brain signals through the scalp. Non-invasive BCIs typically use electroencephalogram (EEG) headsets, but the signal-to-noise ratio can be improved by amplifying the signal before it is processed. Another option is to use magnetoencephalography (MEG) headsets, which are less sensitive to irrelevant brain signals that contaminate the command. Secondly, advances are being made in processing the signal: a recent paper explores decoding speech with a non-invasive headset using AI. “This particular paper is the first time that researchers have used advanced deep neural networks to decode, so that’s the breakthrough,” Yuste says. “I think within a decade we will see non-invasive decoding of simple commands and speech available in the consumer electronics market, which could open the door to decoding mental activity and intentions.”

All of this has heightened awareness of the social risks surrounding BCIs, particularly concerning data privacy. The way BCIs read signals from the brain is not specific to the action, which leaves ancillary data that could detail our private thoughts, desires and emotions. “Even though all the noise might not make sense now, there’s no reason why, in a few years, a machine won’t be able to decrypt it,” says Frederic Gilbert, a neuro-ethicist at the University of Tasmania, Australia, who studies BCIs.

Yuste believes we should learn a lesson from how difficult it has proven to regulate social media after it became ubiquitous. Long before advanced applications such as ‘pay by thought’ emerge, ethical guardrails should be established. “Since we already know the negative sides of neurotechnology, we can put a protection in place now,” he says. “Let’s not wait until it’s too late.” ***BY WIRED***

SOURCES: AS PER WIRED, FEB 2023

ILLUSTRATION: ED TUCKWELL (FOLIO)

SPEAKING PAYMENTS

As the pace of change accelerates, the jargon arrives thicker and faster. Here are three new commerce terms to make you sound plugged-in...

Friendshoring
Offshoring? Nearshoring? So last year. The buzzword right now is ‘friendshoring’, which means locating parts of your business in politically aligned countries to reduce risk.

Real-time payments
These lightning-fast transactions make funds available in your account within seconds, 24 hours a day including weekends and holidays. Abbreviate to RTP for added credibility.

MACH
No, nothing to do with airspeed. This stands for ‘Microservices, API-first, Cloud-native SaaS, and Headless’. That’s all the things a “best-of-breed enterprise technology ecosystem” needs to be, in the eyes of non-profit industry body, the MACH Alliance.

How paper money evolved

The story of paper money is a story of innovation—one that's still being written today...

VISUAL TIMELINE

Paper money can be traced back to the promissory notes of ancient China, Carthage, and the Roman Empire, over 2000 years ago—but the banknote as we know it today emerged in the 7th century and is still evolving. The main driver of its development has been the battle against counterfeits. With each advance in technology, forgers have been given new tools, and banks have been forced to devise ever-more ingenious innovations to foil them...

START HERE

7th century

Paper money emerges Chinese guilds issue 'receipts of deposit' as a means for merchants to avoid carrying large amounts of heavy coinage.

1661

First European banknotes issued in Sweden.

1730s

Specialist inks and papers up their game Devised by Benjamin Franklin during the American Revolution as an anti-forgery device, these gave the notes a hard-to-copy look. This was a response to the British government's attempts to destabilize the American economy with fake banknotes.

1853

First fully-printed notes Issued in the UK. With fixed denominations, these no longer required a cashier to sign by hand or otherwise fill them out.

1861

Paper money first issued in the US, and authorized by Congress, as a means to provide emergency funding for the Civil War. Known as "greenbacks" due to the color, the US Dollar would go on to become the world's foremost reserve currency.

1940s

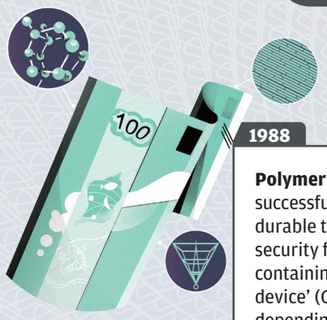
Metallic security thread Incorporated by the Bank of England to thwart Nazi plans to flood the country with counterfeit currency. By 2021, 95 percent of notes in global circulation include a security thread.

1967

World's first ATM Introduced by Barclays Bank, England.

1975

Machine-readable banknotes made possible by Giesecke + Devrient (G+D), a German firm which created the first automatic banknote processing machine, the ISS 300, allowing banks to rapidly check notes for authenticity and condition.



1988

Polymer notes and holograms are first successfully issued in Australia. Polymer is more durable than paper and enables additional security features, such as a transparent window containing a hologram or 'optically variable device' (OVD). An OVD's appearance differs depending on the viewing angle, and it cannot be scanned, photocopied, or easily replicated.

1996

Omron rings, a secretive pattern of machine-readable circles hidden in the design, are rolled out globally. Disguised, for instance, as musical notation, the rings allow software to recognize (and refuse to copy) a banknote.

2016

Arrays of tiny 'micromirrors' are introduced by Germany's G+D to create striking, hard-to-replicate holograms. This concept hails the next generation of OVDs.

The Future

Dawn of digital banknotes? As of 2022, several governments in the Caribbean and Africa have launched a CBDC, with pilots currently underway in China and Russia. The US ECASH Act seeks to create 'digital dollars' that can be used without an internet connection and aren't tracked on a blockchain, emulating the privacy and usability that has served paper money well for centuries. ***BY WIRED***

SOURCES AS PER WIRED, FEB 2023

TWO SIDES OF THE SAME COIN

What will it take to make 'Digital ID' happen?

If it goes mainstream, it could transform finance. Experts face off on the best approach

ILLUSTRATION: ADI GILBERT, JOE MALDION. IMAGE: GETTY/ANDRIY ONUFRIYENKO

Digital transactions have made our lives more convenient, but fintech innovators are keen to solve remaining frictions. Checkout pages on the web often require filling out forms and sharing banking details, for example, and there are opportunities for fraud. That's where digital ID systems can potentially help. These allow individuals to digitally store their personal information in a robust, secure, and convenient app, which can be used to share credentials quickly and securely. And with the EU planning to launch a digital ID wallet in 2024, it's a topic that's rising up the agenda. Yet, there are challenges to solve before digital ID becomes mainstream, which is why they are a feature of so few economies. So, what's the main factor that will spur mass adoption?

"Build trust through state involvement"

Raul Kaidro, Chief Executive Officer of Estonia-based RaulWalter, which implements "digital ID" in the public and private sector

"Before we see broad utilization of 'digital ID' systems, we need to build trustworthiness. This is because inherent in the capture, storage, and use of any personal data are risks of privacy violations, data theft, and identity fraud. The problem I see is that for most people, it is not clear how and where this data will be stored, or who will make sure that it remains secure and confidential. What happens to the data after the service has been delivered?

"When you rent a car, for instance, what kind of information will be passed on to the rental company? Will they collect everything, including your credit history and perhaps the list of your traffic violations? Moreover, how can a service provider making decisions based on the data submitted be sure that the data received is accurate and legitimate?

"For electronic identities to be adopted, they must be trusted across the spectrum of services within the nation, and eventually across borders. In order to make this happen, governments must take initiative for firstly creating, and then managing and protecting, our digital IDs. The reason I say this is that, when it comes to passports—a physical certificate of citizenship—everybody trusts them because there is only one place you can legally get one: the State. Why should it be any different for electronic identity?"

"Make integration as simple as possible"

Mark Heymann, Executive Head of Business Development at South Africa-based Direct Transact, which runs the digital identity platform 1dentity

"The first step to creating a digital identity is confirming your identity. This becomes the definitive source against which your ID or passport, photos, company documents, and address information can be verified against. To do this, you must go to a digital verification agency, which is straightforward. But when the customer goes to a service provider, such as a car rental agency or a bank, their systems are not always capable of pulling the information they need as part of the onboarding process.

"What we've seen is that there's a legacy layer that is not modernized, which means the onboarding process can be clunky and slow. This requires people to take physical papers and ID documents, and I think this is a major barrier for large businesses looking to integrate digital identity.

"Customers also have to become comfortable with the fact that banks, for instance, have their information. What customers don't like is having their information shared without them explicitly giving consent. Moving forward, I'm confident we're going to see more and more individuals controlling their own data and sharing it with institutions, who can use that information based on the consent they've been given. That's why we have to simplify the integration barrier." ***BY WIRED***

SOURCES AS PER WIRED, FEB 2023

Currency pulse

How corporate money flows around the world

Global businesses move nearly $23.5 trillion across borders annually, for everything from paying staff overseas to importing supplies. As one of the world's top providers of foreign exchange by volume, J.P. Morgan issues payments in over 120 currencies and receives payments in more than 40. Based on 2017 to 2022 data from J.P. Morgan's Corporate and Investment Bank, this visualization charts a unique perspective on the international economy and some of its recent key shifts...

J.P. MORGAN PAYMENTS

Currency transactions to the top five forex destinations

DATA VISUALIZATION: SET RESET

ORIGIN

Currencies with $1m+ in transactions
Top 6 currency pairs (% of global total)

N. AM: USD, CAD, MXN

ASIA PACIFIC: INR, CNY, THB, JPY, AUD, HKD, SGD, TWD, KRW, SAR, NZD, VND, PHP, AED, ILS, MYR, TRY, QAR, BHD

EUROPE: EUR, GBP, CHF, SEK, DKK, NOK, PLN, RUB, CZK, HUF, RON, HRK, BGN

AF: ZAR

S. AM: BRL, PEN, CLP

INR → USD: 31%
CNY → USD: 7%
USD → CNY: 6%
USD → EUR: 14%
EUR → USD: 4%
USD → GBP: 5%
USD → CNY: 5%

DESTINATION

% of global total

TOTAL VALUE

USD — US DOLLAR — 47%
TRANSACTIONS — 10%

EUR — EURO — 16%
29%

CNY — CHINESE YUAN — 7%
1%

GBP — POUND STERLING — 6%
12%

INR — INDIAN RUPEE — 5%
6%

CHANGE IN VALUE OVER TIME

Percentage growth, 2017 - 2022

COVID-19 PANDEMIC →

US monetary policy during COVID-19 enabled increased liquidity to support businesses

+61%

+84%

Dip in **EUR** and growth in **CNY** likely due to corporations moving their subsidiaries (and money) to China

+228%

+80%

+513%

+30%

Q4 sees the traditional end of year transfer spike

+266%

+381%

Massive amounts of Chinese products were purchased during COVID-19

A relaxing of Chinese policy opened up more of the market to JPMC clients

+128%

+183%

GBP had a greater negative swing during COVID-19 than other top currencies

+186%

+24%

+90%

GBP mimics **USD** and **EUR** as shown in this dip. There is typically a high correlation between these trade lines

+17%

+187%

Growth in **INR** mutual and investment funds as India became a more attractive

+55%

+55%

Huge amount of global expansion due to growth in online retail and cross-border commerce

+79%

+217%

2017 '18 '19 '20 '21 '22 '23

FOR FURTHER DETAILS CONTACT YOUR J.P. MORGAN REPRESENTATIVE

Ways to win: Advice from small businesses

The secrets SMBs can teach large enterprise

It's usually the world's biggest corporations that take the lion's share of headlines and opinion pieces. Big budgets, big campaigns… but are they missing the bigger picture?

When you operate as a small business, it's easy to feel like David and not the Goliath that small businesses (SMBs) collectively represent. At a time of high inflation and low consumer confidence, staying afloat is harder for smaller firms without large cash reserves to fall back on. But with the agility innate in this community, comes strength.

Here, we look at what the SMB community can teach larger enterprises about rethinking payments to build resilience.

Do more with less

All businesses are facing challenges in the current economic climate. Larger companies typically have bigger cushions and are able to prepare themselves more effectively for periods of economic downturn. But why waste valuable resources when you don't have to? SMBs typically don't have that kind of cushion—so take a leaf from their playbook.

"To remain competitive, SMBs are being tasked with making the same decisions we are all facing on a personal, business, and societal level," says Tomer Barel, Chief Operating Officer at Melio, a digital payments platform that specifically supports the small business community. "That means figuring out which activities are essential and trimming away or outsourcing the rest."

The problem is, it can be costly for SMBs to pay for outsourced work. One way around this is to use digital platforms to automate tasks that previously would have been done manually. Business-to-business (B2B) payments are a good example. A commonly cited figure is that 50 percent of B2B payments are still done via check in the US—many large enterprises have yet to make the switch. But a new range of digital tools can not only automate these payments but overcome the barriers to implementing those processes in the first place. Melio's app, for instance, allows both sides of the transaction to use whatever method is convenient for them. An SMB may want to pay via a credit card, but it's vendor may wish to receive a regular electronic funds transfer. Melio can sit in the middle and receive the credit card payment, and then send a transfer itself. "Melio's intense focus on developing digital solutions that cater to business owners' needs builds on J.P. Morgan's core payment functionality, allowing small businesses to thrive," states Melissa Smith, Head of Specialized Industries for Middle Market Banking, J.P. Morgan.

Engineer flexibility

SMBs tend to not have cumbersome legacy infrastructure—often they were born in the cloud—so they can jump relatively quickly to better software whenever it emerges. Larger firms typically do not want the risk or expense of changing a tool that is heavily embedded in their processes and functioning adequately. But this can leave them vulnerable in the long-term, and this is why it's essential that all companies think hard about digital transformation.

Consider the benefits that can come with being able to switch to optimal payments systems. Firstly, there are financial benefits. Cutting a check comes with a cost, plus three percent of the mail in the US gets lost. Engaging directly with their bank, as many SMBs do, enables a conversation to find the lowest cost solution and explore more ways to pay on their terms. Overall, this leads to a better customer experience – and potentially getting paid faster.

Secondly, modern systems save time, freeing businesses up from back room tasks and enabling them to get out there and compete in the market. Jennie Hernandez, Co-Founder of new startup Patriot Welding Supply, agrees: "Having a digital payments solution saves me from having to write a check, put a stamp on it, get an envelope and mail it. It is invaluable—time I can spend on winning new work."

Learn from your community

Collaboration across the SMB community allows for knowledge sharing that is often lacking for large corporations.

So what's one piece of payments advice from the community that larger companies may wish to heed? "As our small business users tell us every day, their main priority is serving their customers who are demanding easier ways to pay," says Barel. "From providing more flexible payment options for B2C transactions to dedicating more time to customers by simplifying B2B transactions, how a small business manages payments plays a big role in customer satisfaction." In large firms, it's rare that a single person in the company will understand the whole customer journey and payments, especially, can be an afterthought. If they examine that side of the customer experience in greater detail, they have a better chance of building long-term loyalty and value. ***BY J.P. MORGAN***

ILLUSTRATION: ALEX MELLON
SOURCES: WWW.JPMORGAN.COM/PAYMENTSUNBOUND/SOURCES

FRESH THINKING AND PROVOCATIONS

IDEAS BANK

IMAGE: GETTY/ANDRIY ONUFRIYENKO

IMAGE: GETTY/BARTLOMIEJ WROBLEWSKI SOURCES AS PER WIRED, FEB 2023

Quantum computers will redefine encryption

The post-quantum world could be years away. But the time to prepare is now

WIRED OP-ED

Quantum computing could prove transformative. A new generation of super-fast machines that harness the randomness and uncertainty of quantum physics have the potential to upend finance and break cryptography. But right now, we're in a period of quantum uncertainty ourselves.

Like many new technologies, quantum computing offers both an opportunity and a threat—but it's the latter that requires immediate attention. Data security is paramount to anyone handling payments, from data communications to record keeping, and quantum computers have the potential to break current encryption methods.

Companies like Google, IBM and Microsoft are in a race to build fully-fledged quantum computers. Where classical computers use millions of 'bits'—tiny switches that can either be set to 0 or 1—to run their code, quantum computers are built using qubits. Qubits rely on a weird quirk of quantum physics: they can be 0, 1, or in a state called 'superposition' where they're somewhere in between. This gives quantum computers the ability to hold vast amounts of information with a relatively small number of qubits, and to rapidly solve problems that would take the world's best classical computers thousands of years.

Data security is paramount —but quantum computing has the potential to break current encryption technology

It could still be decades before current quantum computing hardware reaches that level. But that doesn't mean you can ignore the threats. Security researchers warn of 'harvest now, decrypt later' attacks, where encrypted data can be stockpiled in anticipation of some future machine that can break into it.

This looming threat has been present since the mid-1990s, when mathematician Peter Shor developed an eponymous algorithm to run on the quantum computers of the future. Shor's algorithm can quickly factor large numbers, and thereby break RSA encryption, a fundamental pillar of cybersecurity.

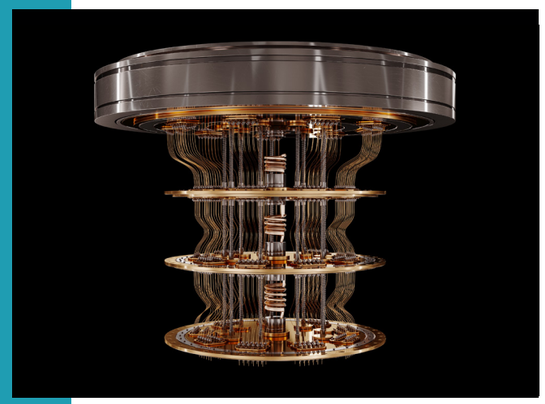
In response, the US National Institute for Standards and Technology (NIST) has been promoting the development of post-quantum encryption algorithms—new ways of securing data that should, in theory, stand up to future attacks from quantum computers. NIST recently published details, drawing new attention to post-quantum cryptography.

The time to start learning about these emerging algorithms is today: that way, your data will be protected both now and in years to come. The level of urgency varies between industries, depending on the sensitivity of the data organizations hold and how likely it is to be relevant in the future. Clearly, companies dealing with payments data are unlikely to feel relaxed.

It will take a few years before NIST has completed its standardization work on new quantum-proof algorithms and is ready to roll them out. In the interim, organizations have a choice. Larger companies may bring in a quantum expert to spearhead proactive encryption efforts, as J.P. Morgan has done recently with Marco Pistoia. For smaller firms, 'crypto agility' may be enough—they might not know what the capabilities of these new machines will be, but they can forge partnerships and make procurement decisions with the future quantum threat in mind. That way, systems can be easily retro-fitted with new quantum-proof algorithms when the time is right.

The same approach can apply to the opportunities as well as the threats. Quantum computers have the potential to transform payments tech: quantum encryption and authentication should make payments even more secure, and the computational might of these machines is likely to power machine learning models and optimization algorithms that are exponentially more powerful than those we have now. That could transform the ecosystem around payments, from fraud detection to behavioral analytics, customer service or treasury management. And the investment required to enter this brave new world may prove to be small: the hardware giants will invest in building the machines and then sell time on them to clients over the cloud, as they do with today's supercomputers. The likes of IBM and Microsoft are already offering quantum-inspired solutions to electric car manufacturers, hospitals and space programs.

There's only one certainty when it comes to quantum: however this story shakes out, it's just the beginning. ***BY WIRED***



Should you be preparing to transact in the metaverse?

Predicting the future is tough—but we can have a better sense of it if we focus on what's happening in the here and now

The metaverse—the grand concept of a shared virtual-reality world that could become the next version of the web—has gradually gained traction in the mainstream. The hype may be cooling, but tech giants and startups alike are still pouring vast sums of money and time into this space. That's led many business leaders to ask: What is our metaverse strategy? Money in the metaverse has become a particular topic of speculation. How will buying and selling take place, and for what use cases? Who will control the go-to payment rails? Will those be fiat or crypto payments? What cut will the hardware gatekeepers take—and how will that shape the metaverse's future?

These are complex, technical questions. But anyone strategizing to successfully conduct business in that future first needs to ask something more fundamental: How likely is it that the metaverse will actually happen in the first place? A helpful way to make a judgment about that is to consider the hurdles that would need to be overcome.

First off: The hardware is not there yet. Virtual reality and augmented reality headsets have made significant progress over the years, but they still have issues with latency—which can cause motion sickness—and the devices can be uncomfortable to wear for extended periods. Latency is not merely a function of headset technology, either: It is also something that needs tackling at the level of internet speed and broadband infrastructure. A future where the metaverse is the default way of experiencing the Web would require generationally better wireless internet and fiber networks. In the meantime, the first iteration of anything approximating what we might call 'the metaverse' is likely to exist in a 2D or handset-based form.

Simulation technology is another challenge. While a raft of companies have made enormous progress on this front, we are still far from enabling an indefinite number of people to interact with each other in a highly detailed virtual world. The current limit for simultaneous users is around 4,000, and most virtual worlds lack the level of desired realism. The major metaverse players are investing heavily in supercomputing and AI in order to turbocharge the race to build advanced artificial realities. But this comes with its own set of challenges, not least those around superconductor manufacturing—such as supply chain snags or technical barriers—and the environmental impact of deploying more powerful computing at scale.

There's also a human question to answer: Will people truly be interested in working, living and socializing in the metaverse? It will be down to developers to convince us this is a place we want to spend our time. In the eyes of some, it will enrich online interaction and create new opportunities to transform areas of our lives hitherto relatively untouched by the web. Education, for example, has never cracked the "remote" model—metaverse evangelists believe that a shared 3D environment is precisely what could change that. Ultimately, whether something remains the preserve of the offline world or shifts into the virtual will depend on convenience and benefits.

Will people truly be interested in working, living and socializing in the metaverse? It will be down to developers to convince us this is a place we want to spend our time. In the eyes of some, it will enrich online interaction and create opportunities

There are arguments on both sides of this debate, so where does that leave businesses? As ever, this is the challenge of predicting the future. Technology doesn't tend to develop along a deterministic path—innovations create unforeseen behaviors which create new use cases and new innovations and so on. It's a cyclical process that makes it hard to see more than a few years out.

Perhaps, then, it is more helpful to speak not of 'the metaverse'—which is a conversation about "what would happen if various things coalesced at some point in years to come"—and better to talk in terms of the real technologies that are evolving today: VR, AR and virtual worlds. Spoken about in plain terms, rather than encumbered with the conceptual weight of 'the metaverse', it can bring clarity of thought. It also doesn't rhetorically sneak in the idea that a particular future is inevitable. Then businesses can ask clear-eyed questions about how those technologies are evolving now; who's using them for what; any use cases they are likely to usher in as they develop from there; and within what timeframes. After that, well, you pays your money... ***BY WIRED***

ILLUSTRATION: MARCUS MARRITT

SOURCES AS PER WIRED, FEB 2023

Payment innovation will drive financial inclusion

ESG matters more than ever, and new finance tools will have a powerful role to play

J.P. MORGAN OP-ED

The spotlight on environmental, social and governance (ESG) factors is rapidly transforming all industries. Most companies are aiming to be more climate-conscious, socially-active and relevant in the eyes of their consumer and investors. It's changing investment, too. According to J.P. Morgan research, total ESG assets under management are now more than $7 trillion.

However, the ESG landscape is continually shifting and, as these goals come into sharper focus, companies are also becoming more nuanced in how they address sustainability. Rather than focus on ESG as a catch-all term, businesses are designing specific initiatives to produce tangible outcomes in each of those three areas, and are looking at the bigger picture of how those outcomes align with agendas such as the United Nations' Sustainable Development Goals (UN SDGs).

Crucially, the way businesses handle payments can play a key role in aiding to reduce inequality, drive economic growth and improve lives. New kinds of payment tools can help promote financial inclusion, especially among low-income earners, micro-communities or those in developing countries. Two key ideas—and places where companies can really make a difference—are earned wage access and remittances.

Earned wage access

Money earned is often spent more rationally than money loaned, and earned wage access (EWA) can help a company's employees gain faster and more flexible access to the money they earn. Employers do this by smoothing out the income cycle to reduce reliance on costly payday loans or other short term credit such as overdrafts and credit cards. Typically, an EWA solution will integrate with an employer's payroll system via an app that provides visibility of wages earned for the month, as well as a tool that allows workers to draw down wages before payday. Functionality can include services such as using earned wages to pay utility bills. In South Africa, J.P. Morgan research observed that users were given access to 25 percent of their salary through an EWA platform, but that only 12-14 percent of funds were actually used on average. This highlights how earned wages are used more conservatively than borrowed money and can help promote financial literacy.

EWA effectively provides the flexibility found in the gig economy—such as real-time payouts—within the traditional corporate payroll space. In a time of inflation and squeezed living standards, these tools can help individuals better manage their living expenses, allowing them instant access to money earned, and avoid unnecessary overdraft fees or late payment charges.

By Yousif Mohammed
Global ESG Lead and EMEA Head of Trends & Advisory, Payments, J.P. Morgan

Remittances

Banks themselves also have a role to play in inclusion. According to the World Bank, global remittances to middle- and low-income countries totalled $626 billion in 2022. These remittances are typically non-commercial payments, sent by foreign workers to family members in their home countries, and can often form key pillars of the economy of these countries. For example, monthly remittances to Sri Lanka are almost $400 million. Low fees on these individual, low-value transactions are especially crucial to the senders—every cent incurred in fees could make a difference to their family back home.

Time is also of the essence. However, cross-border payments are complex and time-consuming, as banking systems are usually closed-loop structures that are specific to each county, with little integration. Banks have been historically slow in addressing these consumer-to-consumer remittance problems, yet a raft of new digital payment tools are being made available by financial institutions, and tech companies are making it much easier and faster to send money across borders. These tools are far more secure than informal channels and can be the first financial product used by many people on lower incomes. They can also form a stepping-stone to accessing further financial services and achieving better financial health.

Remittances can be crucial for families who struggle to pay for basics such as food and rent. A digital remittance solution can cut transfer times by days, which means recipients are able to access the money much more quickly.

At the same time, businesses also need ways to transfer money across borders that mimic the ease of domestic payments systems, with low fees and transparent processes. This can be vital for small businesses with operations, suppliers or workers in multiple countries. The longer term upshot? Sustained and inclusive economic growth.

Providing fast and secure ways for people to receive payments, whether accessing their wages or receiving remittances, can play a major role in supporting equitable development and encouraging global growth.

J.P. Morgan Payments is working with a number of platform providers to help support EWA, while our Xpedite Remit solution can help support low-value, cross-border, cross-currency transactions by using existing payment rails.

ILLUSTRATION: ADI GILBERT. OPPOSITE: NASA EARTH OBSERVATORY IMAGES BY JOSHUA STEVENS, USING SUOMI NPP VIIRS DATA FROM MIGUEL ROMAN
SOURCES: WWW.JPMORGAN.COM/PAYMENTSUNBOUND/SOURCES

DEEP DIVES INTO A CHANGING WORLD

FEATURES

Satellite images of Asia at night— created with data from the Suomi National Polar-orbiting Partnership (NPP) satellite launched in October 2011 by NASA.

MARKET FUTURES

A new generation of digital marketplaces wants to reinvent how we buy. Are you ready?

ILLUSTRATION: JOE WALDRON

rypto Camels Club is a new collection of non-fungible tokens (NFTs) available on the OpenSea exchange. This limited edition of 10,000 digital artworks is designed programmatically—so each is unique—and they can be bought with Ether, a cryptocurrency that runs on the Ethereum blockchain.

Should you wish to purchase a real, non-crypto camel, however, your best bet is to visit Pushkar. Each year, this small desert town in India's North-West is turned into one of the world's largest livestock markets. Over the course of five days in the Hindu month of Kartik—which coincides with October and November—the place is full of pilgrims and typically sees more than 30,000 camels traded, during a tradition that has been going on for centuries.

Whether you are buying a digital asset online, or bartering for a dromedary in person, the fundamentals of how a marketplace operates have remained the same since the dawn of civilization. They bring together a number of different buyers and sellers, providing choice and liquidity within an agreed upon framework.

What has continued to evolve is the technology underpinning these trading venues, partly because they tend to act as catalysts for innovation. The first examples of writing were used to record tallies of agricultural goods, while mathematics was invented to help the trading process.

In the past two and a half decades the major shift has been from physical to online marketplaces. But right now, these digital ecosystems are themselves going through a rapid period of change. Here are four trends you need to know...

THE RISE OF THE SUPER-APP

Today, the total value of online marketplaces is over $2.2 trillion. By 2025, online marketplaces will account for 40 to 50 percent of online spending, with growth in the double digits. In short, they could become the main way people purchase goods and services online. But how did we get here?

Retail was one of the first sectors to embrace the transformative potential of the internet—indeed, the first generation of online platforms, such as Amazon and eBay, helped to pioneer the third-party marketplace concept. As digital technology developed, the nature of these marketplaces diversified, with industry-specific options emerging—for automobiles, say, or room rentals—and, in Asia, the rise of super-apps.

These vast, mobile-based marketplaces sell a range of products and services from different vendors through a single user-interface. Singapore-based Grab, for example, started with taxis, but has now expanded to offer food and grocery deliveries, as well as financial services such as insurance and payments. Like most super-apps, Grab offers a single digital wallet, allowing customers to easily transact across all different types of services. They can then be offered discounts, loyalty points and targeted product offers, based on their user data and preferences. This keeps them hooked in the ecosystem and starts the cycle again.

Super-apps create an incredibly "sticky" experience, and this is why an estimated one in three of the world's population is a user. They remain a hot topic of conversation, as companies in the West would like to emulate the success this model has enjoyed in the East. Take PayPal, for example, which is branching out from payments to bill settlement, crypto transactions and shopping. As other tech companies make forays into the do-it-all app space, analysts are predicting that, in the near future, we'll see them battle to be the go-to platform for consumers. And no wonder: If a tech company can "own" such a large chunk of a user's online activity, the business opportunity is vast. The question, of course, is will users actually want it?

BRAND-BUILT MARKETPLACES OPEN FOR BUSINESS

One emerging marketplace model that already has plenty of proof points, however, is 'brand-built marketplaces'. As businesses expand their digital capabilities, they have realized that they no longer need to passively use another company's platform—they can simply build their own. Take US retailer Macy's, which has recently launched its own "curated digital marketplace" connecting consumers with products from hundreds of third-party brands.

"We can accelerate our digital experience by offering more purchase points, more brands, more categories. It's really about how we can show up best for our customers," says Josh Janos, Vice President of Marketplace at Macy's Inc. "If they are interested in more sustainable products, we can add brands that specialize in that; if there is ongoing demand for outdoor gear, we extend the season and can meet that."

SOURCES: WWW.JPMORGAN.COM/PAYMENTSUNBOUND/SOURCES

But for many consumer goods companies experimenting with this model, the play is not about selling to consumers at all. Instead, they're targeting their base of small retailers. As Manish Jain, Global Head of Consumer Goods and Retail Industries at J.P. Morgan Payments, explains; "It's all about digitization of B2B. You have corner stores, small retailers, bodegas, who are selling toothpaste, soap, cereals, all those kinds of things. They can now replenish their inventory much more efficiently via online marketplaces."

THE B2B OPPORTUNITY: DIGITIZING SMALL BUSINESSES

AB InBev, the world's leading brewer, is connected to millions of retailers around the world. In 2020, the company launched BEES, its proprietary B2B e-commerce platform designed to improve the livelihoods of small-and-medium sized retailers and accelerate the performance of suppliers on the platform. BEES brings retailers from transacting with pen and paper and cash into the digital age; by closing this digital inclusion gap, BEES has enabled AB InBev to better serve business owners, accelerate its business and create new revenue streams.

Now live in 20 markets and with 3.1 million monthly active users, BEES transformed a limited, analog sales model into a digital experience that puts the needs of retailers first. "Through BEES we've put the catalog in the hand of the retailer so they instantly have the ability to see a full portfolio of products that they can purchase. They have transparency over all the pricing and promotions that they didn't have before. Importantly they can order at any time, when it's convenient for them, not necessarily only when the sales rep shows up," says Nick Caton, Chief B2B Officer at AB InBev.

The elevated user experience ignited demand to access a greater variety of products, spurring BEES' transformation into a true marketplace. The platform currently offers thousands of third-party products across multiple categories from more than 200 partner companies. The marketplace model creates a win-win situation for AB InBev. BEES provides a better experience for retailers, improving brand perception and loyalty, while generating close to one billion USD in net revenue, all incremental to AB InBev's business.

Business-to-business marketplaces also enable innovation in financial solutions and services. Consumer goods companies typically extend credit to their retail partners, but it can take weeks or months to approve these loans. With BEES, AB InBev can take a different approach and reduce wait times from weeks to hours. "Because we have a greater connection with our retailers on the platform, we can now apply machine learning and other algorithms to better assess risk which enables us to grant credit more widely and with lower risk, helping solve a big bottleneck for growth of their business," says Caton.

What's more, a digital platform makes it easy for consumer goods companies to move away from the typical invoice model, replacing it with more dynamic options. Shops can opt for split payments, say, or receive automated discounts for early settlements. In emerging markets, simply having a digital payments option in the first place can be transformative. Many small businesses in those markets still rely on cash for B2B

transactions, and these platforms can incorporate alternative payment methods that are suited to their situation. Consider PIX, for example, which was developed by the Brazilian Central Bank. This instant payment service allows users who don't have a regular bank account to scan a QR code and then pay via a digital wallet. Reducing the need for physical cash handling can be a major benefit for small stores, as it may reduce risks, such as the threat of robbery.

It is arguably what customers can learn from their own data that's the most important benefit of a brand-built marketplace. A physical shop may have 3,000 products to manage. The marketplace owner can analyze orders across the platform and provide that shop with insights into which products are selling well for other, similar types of outlets. The data also makes it possible for the marketplace to predict when an item might run out and encourage stores to re-order ahead of time. This type of business intelligence can be invaluable for small retailers and helps lock them into the network.

BEES' data stack warehouses billions of monthly data points to enable personalized shopping recommendations and event-based messaging. "We provide personalized insights to our retailers to educate them on how they can better manage and grow their business," says Caton. "It's a win-win because our business thrives when their business thrives."

RE-COMMERCE'S NEW LOOK

Finding value in overlooked places is what drove the first generation of re-commerce websites—eBay pioneered the model of selling spare or second-hand items online in the 1990s. But pre-used goods are becoming a major area of growth again, and often for high-value products such as consumer electronics and branded clothing. Partly, this is due to the global economic headwinds, which are driving cash-strapped consumers to look for bargains. But it is also due to the growing focus on sustainability and the circular economy.

According to the Business Sustainability Index, 75 percent of US consumers are concerned about the environmental impact of the products they buy. Re-commerce marketplaces are now growing twenty times quicker than the overall retail sector. Take Vinted, a platform for buying, selling and swapping second-hand clothing—it has 45 million users worldwide.

A variety of re-commerce models have emerged. There are marketplaces which will guarantee authenticity; there are category-specific, curated auctions; there are even companies that offer fractional ownership of high-value assets. Rally Rd, for example, will take an item such as a classic car, securitize the asset, split it into equity shares, and then make these shares available to buy and trade. Instead of purchasing shares in a new tech company, you can buy shares in a 1980s Ferrari.

These re-commerce companies are also leveraging many of the strategies used in more established marketplaces, while adding their own ideas. As Helena Forest, Head of Product EMEA Marketplace Solutions at J.P. Morgan, puts it: "You need to have that killer feature at the core that brings the users back on a daily basis, preferably multiple times per day."

To encourage repeat use, re-commerce sites might use personalized alerts, telling customers when a new piece has become available. Or, in areas such as collectibles, it could be editorialized product lists. StockX, an exchange for vintage sneakers and collectibles, takes a different approach still: it offers the same types of sophisticated tools you might expect in a financial market, such as historical graphs and real-time price updates based on supply and demand.

On the payments side, there is also room to innovate. Re-commerce customers are often budget sensitive, so offering 'buy now, pay later' could have a major impact. Or for expensive items, marketplaces could facilitate a leasing model. Imagine a future check-out scenario that allows a customer to choose between purchase, split payments, rent or trade-in.

"What successful marketplaces have achieved is that they have seamlessly embedded the financial product into the transaction and made those services available both to the buyers and the sellers at the point of use," says Forest. "So, it's not some type of separate product or service that is being offered, it just appears when you need it."

One example of seamless integration of product and payment is ZELF, a fintech that offers one account to handle fiat and crypto assets. It operates over established messaging platforms and integrates with a number of existing re-selling marketplaces, such as for NFTs. When you want to trade a digital good, you send an instant message and it's done. An otherwise technical, convoluted transaction is suddenly user-friendly.

SOCIAL COMMERCE GETS SERIOUS

Adding payments capabilities has long been the goal of many social media networks. Facebook Pay (now Meta Pay) was launched in 2019. It allows users to pay for virtual or physical goods and make peer-to-peer payments. Most social media platforms are working on similar initiatives, and one of the major drivers is the promise of social commerce.

In many ways, social media platforms already perform one half of the market dynamic. They gather huge numbers of people in the same place. But monetizing the user-base by selling advertising is increasingly being supplemented by direct forms of commerce. This might involve making images clickable—if the viewer sees a jacket in their feed, they can simply click it to get a link to where they can buy it. Video, however—which is already a major pathway for social commerce in Asia—is seen as a growth area globally. Like an updated version of The Shopping Channel, this involves celebrities, influencers and other salespeople using live videos to promote goods and services. They will then tag the product or add a link that allows a direct purchase.

Social commerce is forecast to double in the next three years in the US, to reach $100bn in gross merchandise value. Among younger generations, social media platforms are increasingly being used as the primary search engine. If they want to find a new lunch spot or a hot new fashion item, they are just as likely to use Instagram or TikTok to get recommendations.

As social commerce continues to evolve, companies in turn will need to develop new payments capabilities. For example, the ability to tap a screen during a video and buy the product, but without disrupting the live feed. The whole process can be further integrated with smartphone technology for added convenience. Imagine someone is interested in purchasing makeup: "Devices have a camera that can measure the tone of the skin," says J. P. Morgan's Manish Jain. "They can help select what color of that makeup you need, and then you can just complete the sale."

In coming years, online marketplaces will evolve further. Whether it is real-time exchanges for almost any asset, or vast markets for digital goods set in immersive 3D virtual worlds, the one thing all of these venues will need is fast, secure, and easy ways to complete transactions. As Jain says, "If I'm talking about building a whole digital experience on how to shop, I have to build a digital experience on how to pay." ***BY J.P. MORGAN***

SOURCES: WWW.JPMORGAN.COM/PAYMENTSUNBOUND/SOURCES

WIRED

WIRED SPECIAL FEATURE

TO BOLDLY SPEND...

As humanity reaches an inflection point for space exploration, the challenges of transacting off-world are now being taken seriously. Innovators are already searching for answers

Two weeks before Christmas Day, in 2021, a small New Shepard rocket launched from the cold, barren desert of West Texas. Just a couple of minutes after liftoff, the vehicle propelled its six passengers above the Kármán line, the broadly accepted demarcation that represents the boundary between Earth's atmosphere and outer space.

These six passengers on Blue Origin's third crewed spaceflight enjoyed a few minutes of weightlessness as the craft's parabolic arc took it beyond 100 km above sea level. During this brief period, they helped set a record for the most human beings in space at any time, ever. That number was 19.

They joined 10 astronauts living on board the International Space Station, plus three people flying a long-duration mission on China's new Tiangong space station in low-Earth orbit. As a harbinger of things to come, nearly half of these people were space tourists. What's more, the 19 people in space had reached their destination by way of four different vehicles, two of which were developed in part or mostly with private funding.

These few minutes in mid-December offered a glimpse into the future of spaceflight. Governments, certainly, will be heavily involved in the years ahead as humans move beyond low-Earth orbit, out to the Moon, and potentially one day on to Mars.

IMAGE: NASA JOHNSON/ SPACEX

Left: Supply runs from Earth to the ISS are performed by reusable Dragon vehicles, operated by SpaceX, a private space company.

But private companies are playing an increasingly important role—and thanks to the rise of commercial spaceflight, we are finally seeing the dawn of private space tourism. For now, these steps are tentative, such as with New Shepard's missions, or the handful of people staying on board the International Space Station alongside professional astronauts. But the trend is clear: more humans are going to space. And, with government plans for lunar bases, and private companies dreaming of Mars, in the future they will likely go further.

What are the implications for the finance world? Indulge us in some informed speculation, and let's think seriously about how this future might unfold. After all, everyone from economists to space agencies already are.

Clearly, as humans venture further into space, human needs will follow them. At first, the focus will likely be on the basics, such as air, food, water, communications, and power. However, as more humans make the trip, they will start to need additional services, such as entertainment and the ability to pay for things. In low-Earth orbit, of course, any banking needs can be done by tapping into terrestrial banking networks. The International Space Station is connected to the internet, after all.

But further out, at the Moon, it seems unlikely that payment services will be furnished entirely through Earth-based networks. And at Mars, where round-trip communications can sometimes take as long as 45 minutes—provided that NASA's Deep Space Network has the capacity—it seems highly likely that financial and payment services will be partly, if not completely, independent of humanity's home world.

"Once we get away from near-term thinking, maybe even just a couple of decades into the future, we're going to pretty quickly see the notion of value change in space," says Christopher Newman, a Professor of Space Law and Policy at Northumbria University at Newcastle. Traditional objects of value, such as gold, will largely be worthless. The early focus, rather, will be on the essentials needed to keep humans alive, such as food, water, and oxygen. Taxes on these consumables, or credits based on the consumables themselves, such as oxygen tokens, may form the basis of a new currency. "Our concept of money could be completely different on other worlds," Newman says.

HOW HUMANITY REACHED FOR THE STARS

To understand how we've reached an inflection point for exploration and commerce off-world, and therefore what might realistically transpire during the next half century, we need to consider how we got here.

Six and a half decades have now passed since the Soviet Union launched the first satellite, Sputnik, into outer space. During the 15 frenetic years that followed, the two Cold War superpowers sought to outdo one another in spaceflight achievements as they battled for hearts and minds around the world. The United States eventually came out on top, landing a dozen Apollo astronauts on the Moon across six missions. The last of these occurred 50 years ago. Since this final Apollo mission, human spaceflight contracted into low-Earth orbit, and no human has traveled more than a few hundred kilometers from the surface of the Earth.

As the Cold War thawed, budgets diminished. But this inward trend finally began to reverse about two decades ago with two important developments. The first is the rise of commercial space ventures. In 2002, SpaceX was founded, a company that would disrupt the global launch industry,

IMAGE: NASA/SPACEX

Above: A June 29, 2018 SpaceX Falcon 9 launch. Its payload was a Dragon spacecraft carrying supplies to the ISS.

PREVIOUS IMAGE: GETTY IMAGES/THAMRONGPAT THEERATHAMPHAKORN

SOURCES AS PER WIRED, FEB 2023

> "In a couple of decades, we're going to see the notion of value change in space"

and become one of the world's most important players in spaceflight. In 2023, SpaceX will launch more rockets annually than any other country or company in the world, operate more satellites than any other actor, and will carry more people into space than China, Russia, or anyone else. The success of SpaceX has inspired hundreds of other entrepreneurs to start space companies, and they in turn have attracted tens of billions of dollars in private capital to invest in everything from Earth observation satellites, and new rockets to asteroid mining.

The second driver is China's commitment to a serious space program. A year after SpaceX was founded, China launched its first astronaut into orbit. Since then, China has built the second strongest space program in the world, including landing its own rover on Mars and exploring the far side of the Moon.

"This is definitely a different era," says Lisa Callahan, a Vice President at Lockheed Martin who oversees civil and commercial space. "You can just look at it by the number of new companies that have started up in this area, the amount of money that's going into space right now, and the number of new space agencies that are out there."

One consequence of this newfound momentum is an increasing array of projects aiming to take humanity for extended stays off-world. Four US companies are designing and developing private stations that may begin flying in low-Earth orbit as early as 2028. Just as NASA and its international partners have plans to develop research facilities at the South Pole of the Moon later this decade—under the Artemis Program—China has plans for a lunar station as well. SpaceX wants to go further still with Starship, a vehicle the company is building to, one day, settle Mars.

As humans live, work, and play in these new environments, they will want to buy things. How they do so will depend on where they are, and how long they stay.

WELCOME TO THE SPACE ECONOMY

Expedition 1 docked at the International Space Station on November 2, 2000, carrying an American commander and two Russian cosmonauts. Humans have lived continuously in low-Earth orbit ever since then. The vast majority of these have been government astronauts, but a few of them have flown as space tourists. These private fliers required no means of making payments in space, because they purchased all of their needs in advance of their stay on the station, which is operated by the United States, Russia, and about a dozen other governments.

But the proportion of tourists will start to change. It is probably safe to expect that one or two private space stations

will be flying before the end of the decade. NASA and other national space agencies will likely be customers, but these facilities will also be open to private citizens. The possibilities range from basic space tourism to much more exotic uses. One of the four companies developing a private station is Texas-based Axiom Space. They have already announced plans with a United Kingdom-based media company, Space Entertainment Enterprise, to attach an 'entertainment arena' and 'content studio' to the Axiom station. Later this decade, this large, spherical module will allow artists and producers to live stream content from orbit, creating a unique space for making videos or music, and perhaps even enabling new types of sporting contests designed for a weightless environment.

Payments in low-Earth orbit are likely to co-opt the ever evolving payment rails we use here on Earth. Astronauts on board the International Space Station have internet access. That means they can connect to their terrestrial bank accounts and pay bills. This is likely also to be the custom for space tourists, who will want to be connected to the web as they look out windows at the blue marble below and snap selfies. It's likely that space-based operators will sell perks such as showers and spacewalks that tourists will want in orbit. If these or other services aren't paid for in advance or with a pre-loaded charge card, then in theory these tourists can connect to the internet and make use of digital wallets, credit-card networks and other payment processors—although it could be a slow and painful experience until connectivity improves.

TO THE MOON

Beyond low-Earth orbit, however, space payments are going to require new approaches. Around two dozen countries have signed on to NASA's Artemis Program, which aims to return humans to the Moon later this decade. China, too, has the Moon in its sights. Both countries have the long-term goal of establishing a settlement there, and encouraging commercial growth as well. It is, therefore, not all that far fetched to imagine Moon bases within the next two decades. This is the next logical step, because the Moon is relatively close to Earth, just under 400,000 km away.

Initially, this activity will be government-led, so any private transactions and payments would be limited. But over time, there would likely be commercial businesses that operate primarily on the Moon. These could be tourist businesses, or they might be enterprises engaged in harvesting raw materials. Ice at the lunar poles, for example, could potentially be melted for drinking or irrigation, or broken down to create breathable oxygen or rocket fuel. Or consider the ample silica in the Moon's soils, which could be used to build large solar arrays to provide power. And that's when the payments situation becomes more complex, says Gonzalo Martín de Mercado, a business development officer at the European Space Agency (ESA). "The situation becomes quite interesting, because on Earth we are used to constantly being able to communicate with one another," he says. "But it probably will not be viable to do that on the Moon back to Earth."

This is a challenge for financial transactions. When a credit card is swiped on Earth, the transaction happens almost instantaneously, confirming the validity of the card, and its funds, and transferring money to the vendor. On the Moon, there is at least a two- to three-second time delay in communications due to the time it takes light to travel back to Earth, which could lead to a timeout of traditional credit-card transactions.

> "We were trying to identify what payments in space could actually look like"

Perhaps more importantly, the cost of data transfer will be high between the Earth and the Moon. Firstly, data throughput will be limited by latency effects. Secondly, there's the cost of the infrastructure required to facilitate these communications—either line-of-sight antennas or satellite relays in orbit around the Moon. The government may build some of this infrastructure for its own communications, but private sector investment will likely be necessary for commercial use. Lockheed Martin, for example, is working on a communication service called Parsec that will use a satellite network around the Moon to facilitate communications between lunar settlements and Earth. Infrastructure like that will not come cheap, and one would expect the cost of data transfer will be passed onto users. For this reason, phoning home for every financial transaction could cost more than the goods or services being purchased on the Moon.

This will likely necessitate a separate banking entity. This entity would conduct local transactions, and later have to synchronize that activity with a ledger, or financial institutions, back on Earth. One way this might work is through blockchain. Proponents argue that blockchains have the potential to simplify the infrastructure and jurisdictional requirements of the traditional banking system, and so may provide an appropriate framework for off-world banking. Space, after all, is unlikely to be dominated by any one nation. What's more, if a blockchain served as an intermediate record between Earth and settlements off-Earth, it could help prohibit fraud – an obvious concern when transactions are being reconciled in different locations at different times.

Banks are already thinking about how blockchains could be used to facilitate space transactions. In 2021, J.P. Morgan partnered with a satellite company called GomSpace to demonstrate the concept. It installed blockchain technology on several satellites to show that it was possible to establish and maintain a ledger between the objects. Then, the engineers executed transactions between two satellites in low-Earth orbit. "We were trying to identify what payments in space could actually look like, and how we would enable that," says Tyrone Lobban, Head of Blockchain Launch and Digital Assets at Onyx by J.P. Morgan. "We wanted to prove

Opposite: Earth seen through the Cupola observation module, on board the International Space Station.

IMAGE: ALAMY/NASA/ SPACE SOURCES AS PER WIRED, FEB 2023

specifically that if we had this network that was completely divorced and dislocated from the payments systems on Earth, that you could actually make value movements between satellites. We achieved that."

However, extending such a system through space is not easy, Lobban says. Present-day satellites have limited power and memory capabilities, which are needed for lots of blockchain transactions. And blockchains require constant synchronization of transactions across the network, which will pose problems if large constellations of blockchain-enabled satellites are not established.

NEXT STOP: MARS?

These challenges—plus those time delays and data costs—will only become more extreme as humans push out toward Mars. When this happens will depend on a number of factors, but it's possible SpaceX may be able to self-fund its founder's stated ambition of human settlements on Mars within a couple of decades. Mars is, on average, more than 100 million km away. Although the time delay can be as short as several minutes between the two planets, round-trip communications can also take as long as 45 minutes, depending on the distance between Earth and Mars at that moment. This is a far more expensive proposition than the Moon. It would require communications satellites in orbit around Mars at a cost of hundreds of millions of dollars. And then there is the government-operated Deep Space Network on Earth, which comprises the large satellite dishes that can pick up signals from Mars and other deep space probes. Any commercial augmentation of this network for a Mars settlement would doubtless be expensive, with the communications costs commensurately high.

But that's not all. There are blackout periods, which occur when Mars is located opposite side of the Sun from Earth. Without this line-of-sight, days or even weeks can pass without Mars and Earth being able to talk to one another. NASA, China, and other operators of spacecraft on and around the red planet regularly deal with these blackouts by pre-programming operations. But it would make synchronization of financial transactions over large distances a difficult problem.

At some point, settlers will probably wonder whether they need Earth-based banks at all. Martian settlers will buy goods produced on Mars, and then use them on that planet. While it is popularly believed that the purpose of asteroid mining is to bring precious metals from those bodies back to Earth, a more practical use may be delivering asteroids to Mars so that their minerals and metals can be used there. So, if a Mars company gets metal delivered by a Lunar-based asteroid mining company, what need is there for a financial institution on Earth?

"Because of all this, I think Mars will become sort of an independent planet over time," says the ESA's Martín de Mercado. "It will operate in its own way. And that will require it to create its own financial institutions and financial mechanisms for people that will be independent of Earth."

What sorts of financial institutions this will lead to, and the nature of those transactions, is anyone's guess.

INTO THE UNKNOWN

Northumbria University at Newcastle's Christopher Newman says he believes that because commodities such as oxygen and water will have great value beyond Earth, they may well become bartering chips or even the basis of a currency. For example, workers might literally be paid in credits that can be used to buy a week's worth of oxygen. Certainly, there is no reason to think that US dollars will be printed on Mars, as they're not printed outside of the United States today. In fact, given the costs associated with getting paper or metal coins into space, it is probable that there will be no physical money once you're off-planet. It's far more likely it will be transacted as a digital currency in some form or another.

What actually becomes the basis of such a currency on Mars, whether it is oxygen credits or cryptocurrency, will probably come down to who sponsors the settlement on the surface of Mars. For example, if a company is mining some commodity on the red planet, it might pay workers in a traditional currency, as with coal miners on Earth. However, it seems more probable that such settlements will have a frontier mentality, where the currency might be tokens for basic room, board, and oxygen, or for trading in whatever commodity is being produced there.

An important factor in all of this is the Outer Space Treaty, which dates to 1967, but still holds sway for worlds beyond Earth. Essentially, this prohibits sovereign claims of territory on the Moon and Mars. A NASA astronaut can plant a flag on the South Pole of the Moon, but the United States cannot own that territory. However, what happens if a private company lands a fleet near ice reserves on Mars? And then starts to produce water, oxygen and hydrogen for use by Mars settlers? Perhaps we might end up with private enterprise governing these areas.

As space settlements evolve, they are going to present challenges to the fundamental governance of space as it exists today, Newman says. Under the Outer Space Treaty, a nation is responsible for the actions of its entities in space, even as far as Mars and beyond. But how will that be enforced? For far-flung locations such as Mars, in practical terms there is almost certainly a limit to the effectiveness of Earth's influence.

The laws on these new worlds, therefore, may be a mix of existing treaties and some sort of frontier justice. Payment systems rely on a legislative framework to prevent fraud, ensure fairness and maintain economies. These are likely to vary depending upon the culture of where the settlers come from. For example, Western culture may take a capitalistic approach to transactions, with corporations happy to tax a settler's air. But other parts of the world might wish to enshrine other values. If humans have a right to air, is it therefore acceptable to buy, sell, and trade breathable air as commodities? Probably not.

"I think the Moon is okay to draw a sort of precedent from what is happening on Earth, because we're close enough that we're not going to see some of the difficulties inherent in the distance to Mars, or a colony floating above Venus," Newman says. "But once we start getting there, we really lose the ability to predict beyond science fiction ideas." Only if that fantasy starts to become reality, will we know for sure. ***BY WIRED***

> "It's a different era. Just look at the amount of money going into space"

Below: Large dishes may enable some off-planet financial transactions, but won't work for all.

IMAGE: GETTY IMAGES/WANG YUKUN

SOURCES AS PER WIRED, FEB 2023

IMAGE: NASA/JPL-CALTECH/MSSS

Above: Humans might one day visit Vera Rubin Ridge on Mars—and they may need to buy oxygen and water.

THE NEW TELEHEALTH ECONOMY

Digital healthcare and the 'Internet of Medical Things' is here—and it's going to make access to health systems far more seamless and accessible. It's a huge opportunity

ILLUSTRATION: JÖRN KASPUHL

sing tech to improve access to healthcare is nothing new: an 1879 Lancet medical journal discussed the possibility of using phone calls to reduce patient visits to the doctor's office. By the 1920s, doctors in Australia were deploying radios and text telegraphy, a predecessor of today's text messaging, to diagnose patients in far-flung areas. What is new is how emerging ideas in telehealth are converging with fintech innovations to change the financial side of healthcare.

Telehealth, or telemedicine, is the use of technology to enable healthcare providers such as nurses, consultants, and therapists to treat patients remotely, and to make it easier for people to access care when they need it. Despite digital communication advances over the decades—not least the introduction of the Internet—telehealth adoption remained relatively limited, until the pandemic forced us all online and into our homes for an extended period.

The global public health crisis and a series of lockdowns made at-home, virtual healthcare a necessity. Covid-19 has sharply accelerated user uptake, research, government support, and industry investment in the telehealth industry. As a consequence, the global telehealth market was valued at $83.5 billion in 2022 and is projected to expand at a compound annual growth rate of 24 percent from 2023 to 2030, according to analysts Grand View Research.

The high costs of providing in-person care means telehealth could represent a huge opportunity. McKinsey estimates that $250 billion of current US healthcare spending has the potential to be virtualized. This could include, for example, psychiatric care, regular check-in appointments for chronic conditions, and training for medical professionals—all accessed via each person's preferred device.

According to Jeff Lin, who co-leads J.P. Morgan's Healthcare Payments business: "In competitive markets, like the US, health providers that fail to develop effective digital channels will lose out to those that do, especially amongst younger generations."

Those new digital channels can incorporate payments in smart ways that not only reduce frictions, but improve the delivery of healthcare itself.

CARE AT YOUR (DIGITAL) FRONT DOOR

As the scope of telemedicine and homecare increases, there's a challenge that needs to be solved. The medical world comprises a whole assortment of different entities: a multitude of providers, health departments, and related services such as appointment bookings, video conferencing and transport. Many technologists have taken the view that, in the future, patients will use a consolidated, app-based, digital portal that brings all these disparate elements together into a simple, seamless, automated system.

Evernorth Health Services, the pharmacy, care and benefits solution provider of The Cigna Group, is currently working on their vision of this "digital front door". "We're actively launching a digital ecosystem that creates a seamless patient experience across the entire healthcare network," says Matt Bennett, Evernorth's Senior Vice President of Care Delivery. "Whether it's primary care, specialty care, behavioral care or pharmacy care, the aim is to make it all accessible under one overarching app, with a supported data ecosystem."

HEALTHCARE PAYMENTS ARE RIPE FOR DIGITIZATION

These digital platforms can integrate payment capabilities, or provide options to manage insurance coverage or reimbursement—something which can prove complicated in systems such as that of the US. Because those ecosystems bring together so many elements, payments can therefore be made more efficient, innovative and predictable, providing far greater transparency and control.

"It's analogous to when you check in to a hotel," says Lin. "At the hotel check-in desk, they give you an estimate of how much you think your stay is going to be, and they ask for a method of payment. In contrast, few people understand how much they may potentially owe when they go to see the doctor."

As Lin continues, "Forty percent of consumers can't pay a bill larger than $400. When you look at the macro conditions of the consumers, and how much they can pay, versus the reality of how large these medical bills are, you realize they may not be able to pay that $2,000, $3,000, $4,000 bill all at once. What options, or what things can you offer to be able to pay those bills in a way that is affordable, convenient, and simple for them?"

These options could include payment plans or financial products common in the retail sector, such as access to low-interest credit, or providing 'pay later' options where appropriate. AI-based systems could also help patients budget better and optimize their expenditure, by tracking their health needs over time and predicting potential upcoming costs.

Providing patients the ability to see all claims, what their liability is, and to easily pay their liability is a key part of Cigna's digital front door strategy, says Scott Lambert, Treasury Managing Director and Assistant Treasurer at The Cigna Group. "It's another place where we can remove friction," he said.

Digital payment systems could also provide a step change in the experience of care providers. "When we talk to hospitals or doctors, they often say it takes sixty to ninety days after the patient visits to actually get paid by a patient," Lin says. "As well as helping patients, scheduled, pre-planned payments can help health providers manage cashflow."

Another emerging model is subscriptions. Health industry

SOURCES: WWW.JPMORGAN.COM/PAYMENTSUNBOUND/SOURCES

"The aim is to make all healthcare accessible under an overarching app"

forerunners are already offering digital care services that are accessed and paid for as part of a monthly package. UK-based blood testing app Thriva, for example, provides on-demand, at-home blood testing and feedback from a general practitioner. Users can subscribe to monthly testing to track their health in both the immediate and long term.

As pricing data becomes more readily accessible, this new level of transparency could also enable users to compare pricing and select the best-value providers. As Evernorth's Matt Bennett puts it: "We go on our smartphones and read restaurant reviews before visiting them. We book hotels after comparing the best rates. We haven't gotten here yet in healthcare, where it's easy and accessible to understand which options are available to you, but we should be able to."

THE INTERNET OF MEDICAL THINGS

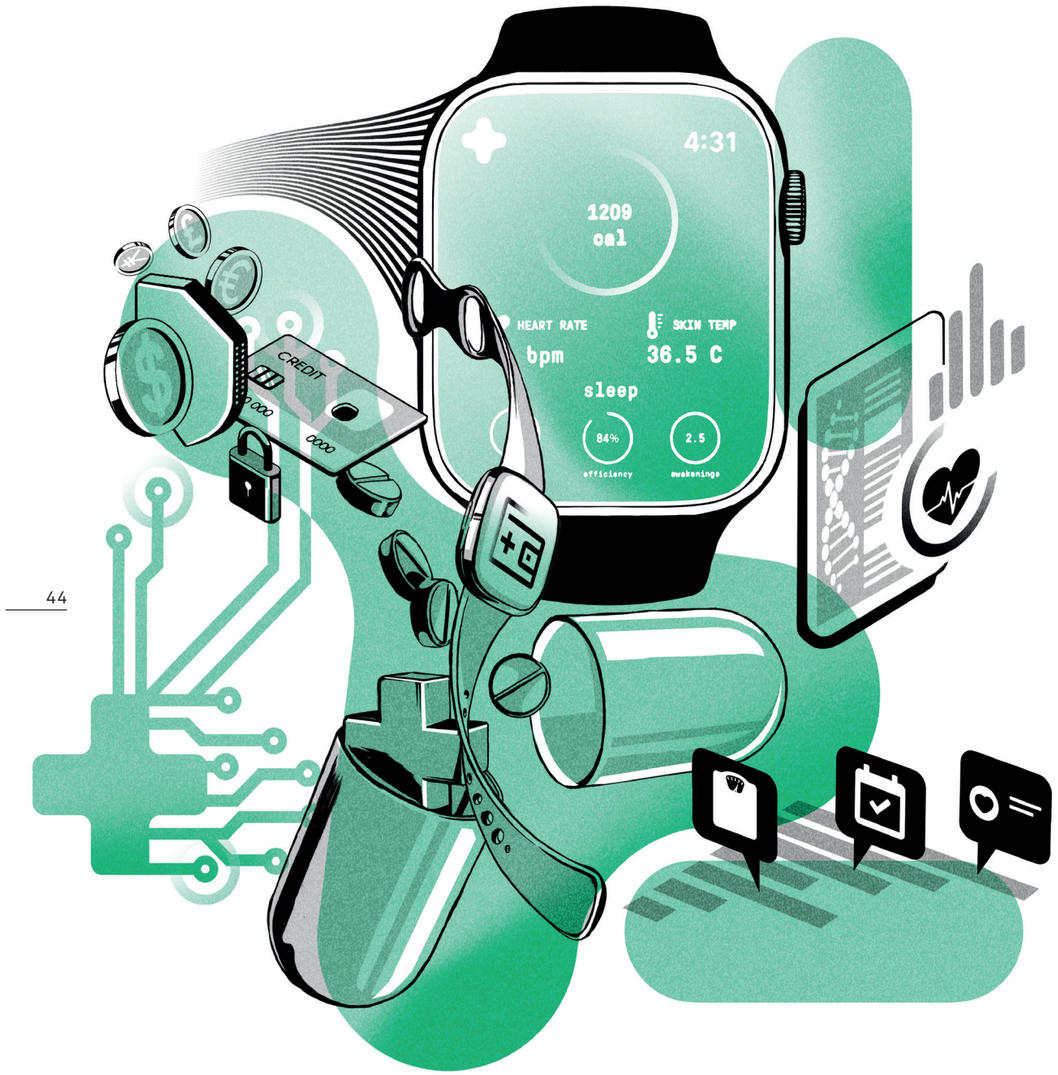
It's not just about money management. The convergence of fintech with the ubiquitous internet of things could bring patients and providers an ever wider set of benefits.

Fast, widespread broadband and cellular internet connectivity has resulted in medical devices that can capture, analyze and transmit vast amounts of patient data. Many of these are everyday household items. Think of smartwatches that can track movement as well as health indicators such as blood pressure, blood oxygen, heart rate, time asleep, respiratory rate and wrist temperature. More specialized medical monitoring devices can monitor and chart the progress of specific health conditions. An implantable pacemaker, say, can send real-time information back to healthcare professionals.

This wealth of health data allows doctors to better prevent medical problems emerging or worsening in their patients. It also allows for more efficient management of chronic disease, which is by far the biggest area of promise for telemedicine. There are 100 million Americans with chronic disease, accounting for 75 percent of all medical spending.

Remote monitoring can not only improve healthcare, but it can reduce costs. Data from medical devices, such as those smart wearables, could be used to dynamically lower healthcare premiums or plans—imagine your insurance payments automatically reducing as data about weight loss or lowered cholesterol is fed back to insurers.

At its most sophisticated, the 'internet of medical things' (IoMT) could also allow payments to improve the delivery of



"You're starting to see telehealth and payments all merging together at once"

healthcare itself. As the IoMT grows, it will likely result in far more automation in financial transactions. Machine-to-machine payments will allow connected devices to buy things on behalf of the patient without human intervention. For example, as a patient starts to run out of medicine, a connected dispenser could automatically order and pay for more. In rural areas, this could be especially useful, ensuring patients keep up with their medication schedules and don't inadvertently run out.

Some believe that permissioned blockchains—distributed ledgers that can only be accessed by approved people—may be an efficient and secure way to automate payments between insurers, healthcare providers, and patients. Set rules and thresholds can be applied to these transactions—known as smart contracts—to make them programmatic and prevent overspending. Once information is recorded in a blockchain it becomes extremely difficult to tamper with, could reduce the chance of fraud, and facilitate highly secure storage and transmission of sensitive patient data.

WILL MEDICINE HAVE A CRYPTO MOMENT?

Data is valuable, and the concept of selling one's own medical information, although controversial, is already being explored by startups. There are major privacy and security issues that surround the emergent field of medical-data-for-sale—but, done ethically, it could give researchers and clinicians access to valuable information.

One non-profit is now attempting to buy medical data—which is anonymized and used for research purposes—in exchange for cryptotokens. Whether this model becomes commonplace is yet to be seen, but blockchain allows information to be stored with much greater security and transparency, which could make it a useful tool for the exchange or even sale of medical data.

Virtual worlds are seen by some technologists as an enabling concept for blockchain, and certainly extended reality is already finding a role in medicine. It has been used to host therapy sessions and addiction counseling, offer consultations and train medical students. Virtual reality (VR) company Amelia, for example, provides psychotherapists and their clients with VR headsets and an electrodermal response sensor that fits on the patient's fingers, to measure their sweat response during sessions. Data, education and feedback on therapy sessions is then accessed via a VR platform. Some believe that, in the future, there is a possibility we might pay for these virtual services with virtual currency, as that may be the most seamless way to transact in these spaces. "As you give consumers more choice and more options to get their care, they start asking about what else is out there from a digital experience perspective," says Lin. "So you're starting to see healthcare, telehealth, and payments all merging together at once."

Some of these ideas may seem far away from our current experience of healthcare. But as Evernorth's Matt Bennett points out, whole industries can transform beyond recognition in a matter of years. "Remember back in the day, when you did all your banking in-branch, you waited in line, you filled out your deposit slip, met with the teller, and so on? Today, it all happens through digital and virtual interactions. The branch is there to support you when you've got a major need—one that lends itself to being in-person. That's our intent as we look to the future. Instead of bringing patients to physical sites and settings of care, how do we use digital, virtual, alternative sites of care, to bring the care to the patient?" ***BY J.P. MORGAN***

SOURCES: WWW.JPMORGAN.COM/PAYMENTSUNBOUND/SOURCES

Payments are more than transactions. They're a possibility for transformation. Payments are the threads that connect every line of business. They drive greater integration and help identify new opportunities. Treasury. Trade. Working capital. Liquidity. Commerce. Payments power the way companies manage capital, and determine the most effective way to use it. Payments do more than you think. They're a strategic growth lever. A way to get to market faster. To pursue new revenue streams. They find cost efficiencies. Uncover market trends. Synthesize treasury data. They can lead to a more promising future, prompting digital transformation and unlocking new ways to process and manage money. Payments generate insights into consumer behavior and information that can fundamentally change how a business acts, reacts and interacts. They find pathways to scale and open doors to expansion. Payments can fast track growth and accelerate breakthroughs. When powered by a single, unified platform, they can simplify your operations. Build relationships. Power global trade. Finance supply chains. And impact your partners, customers and industries in unthinkable ways. Payments can meet modern consumer demands in a world where change is constant and expectations are high. They help insulate your business from risk. Help show customers they're your main priority. And help prepare you for whatever comes next—even economic uncertainty. **It's more than a payment.** It's a way to reimagine how to buy, sell, and grow. How to connect online and off. Payments can optimize your cash flow. They give consumers more reasons to fall in love with your brand. Payments are an invitation to grow, and a commitment to making an impact. They're the promise of groundbreaking technology and innovative points of view. They create an ecosystem of reliable partners and rewarding customer experiences. Payments give visibility into time-consuming financial tasks. They're a way to send, receive and manage your funds instantly. Seamlessly. Fluidly. They keep your infrastructure working in perfect unison, supported by real-time, AI-driven insights. They're a way to tell everyone that you refuse to trade reliability for opportunity. That time is valuable, and that there's value in quality. Payments are a means of improving. Of innovating. Influencing. Because with J.P. Morgan, you don't just see payments. You see their potential.

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