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REVULUIIUN

How digital wallets are driving the connected-car economy & reshaping the future of payments

VOLUME 1

THE MONEY



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A NEW ERA IS UPON US

The power of digitization will transform every aspect of payments. That is why J.P. Morgan, together with WIRED, is exploring this revolution and its impact on customers, businesses, and the very nature of currency. **Welcome to the first issue of this exciting new collaboration.**



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onsider your payments experience and how staggeringly different that is from how you paid for something 20 years ago. Now think about what underpins that experience – namely, the processing infrastructure - and how that is still pretty much recognizable from the payments world of 2002.

How did we achieve such transformation in the customer experience without upheaval in the underlying architecture? Through the rapid growth in digitization across the consumer payments experience – both between individual consumers and between businesses and customers – led by fintechs who saw the potential to add a slick, intuitive front-end experience to age-old bank-owned systems.

The conventional view is that this trajectory will continue. I, however, believe that is only half the answer.

The other half, where I see the true transformation in payments, is combining both the payment infrastructure and the digitized user experience at scale. This will provide contextual, data-driven services and insights for customer personas and industry verticals, changing not just consumer experience, but institutional behavior as well.

In doing that I believe we can bring instant, invisible, real-time frictionless payments to the world. This vision is something completely unique to J.P. Morgan Payments. We embrace this problem, and we run towards it, and what surprises people is how fast we move when that matters. We're here to make payments as magical, powerful and

effortless as taking a breath. We don't do this on our own, but with those payments pioneers – our clients, our fintech partners, regulators and all parts of the industry across the globe.

For people that really want to change how payments are happening around the world, we are headed toward an incredibly exciting future driven by what I believe to be the convergence of three important trends.

The first is the emergence of richer digital wallets reflecting our interconnected, multichannel, and global lives. This allows customers and merchants to collect and interact with others across a much wider variety of products and services than previously available or imagined, such as fiat money (current or future), loyalty money and rewards, virtual money such as NFTs, digital money (crypto or CBDCs) and Web3 value.

The second is a payments infrastructure consistent with an increasingly smart environment where payments are embedded in consumer experiences such as driving, shopping, working and common domestic tasks. This will require innovation in identity technology and identity data protection, with payments and information exchange to



enable instant, no-cost communication. This is one of the most exciting use cases for blockchain technology and associated digital deposits.

Lastly, the reactive-to-active shift in consumer behavior. Previously, the universal behavior was browsing on websites and more recently, in mega-marketplaces where the information and options to transact were presented. We now follow a more active and bespoke shopping approach where we actually experience the product (think: "see it in your room", in-game purchasing or leveling up add-ons, influencer channels, super apps, social platforms, the metaverse). This requires truly omni-channel experiences and embedded finance.

Our purpose with WIRED, as leading journalists reporting on the future as it happens, is to give you a view into how the digitization of your payments business can drastically alter the landscape for not just your bottom line but, more importantly, for your customers' lives. You hold in your hands an exploration of that future.

Together, we are embarking on a world-changing journey. Thank you for joining us on this journey.



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

WIRED Op-Ed

DIGITAL CASH IS COMING, BUT WILL IT REALLY BE **BUILT ON BLOCKCHAIN?**

Over 100 countries are exploring 'central bank digital currencies', but it may not be the crypto coup some imagined...

ash is in a death spiral. Driven partly by the pandemic, payments in cash plunged to a record low in 2020, according to the Bank of England, and with retailers increasingly going card-only, it is predicted that by 2031 banknotes and coins will account for just six percent of UK transactions. A similar pattern is being replicated across much of the world. So where does that leave the millions, often society's most marginalized, who do not have access to bank accounts and credit cards, and therefore depend on cash for daily life? The answer may well lie in central bank digital currency (CBDC).

Unlike cryptocurrencies, which are built around distributed autonomous communities rather than a centralized authority, CBDCs are digital money in the national unit (e.g. sterling or euros) issued by a central bank directly to consumers and businesses. They differ from credit or debit cards, bank transfers, and apps, because when we pay with those we are essentially using our own money guaranteed by the financial institution that provides our account. Instead, CBDCs are backed by central banks, and carry the same guarantees as the cash in our pockets. Their proponents argue that they will help promote financial inclusion and open up access to digital payments to the unbanked, largely because governments can make CBDCs cheap or free to use, and available to entire populations in a way that private banks and credit card firms cannot. Today CBDCs are evolving at different speeds around the world. The International Monetary Fund (IMF) says around 100 countries are at varying stages of exploration, ranging from research and testing, to distribution;





the Bahamas' 'Sand Dollar', for example, has been in circulation for over a year, while the e-CNY - the digital version of China's renminbi, or 'digital yuan' – reportedly has 261M individual users and 4.5M shops. However, while there is a lack of consensus among the world's central banks surrounding their design and implementation, there had been widespread conviction that CBDCs would harness crypto's underpinning blockchain technology, specifically because of its ability to track every transaction on an immutable distributed digital ledger, which could provide a bulwark against fraud.

That conviction is disappearing fast. Despite blockchain being seen by investors as a durable technology with myriad practical applications – VCs plowed \$25.2BN into blockchain startups last year - a report from the Bank of International Settlements (BIS) and the World Bank, published in April 2022 and which interviewed nine central banks, found that blockchain or digital ledger technology (DLT) has an inherent weakness: namely, relative lack of speed.

"Each ledger's change must be synchronized between all entities' nodes, which takes time," wrote the BIS paper's authors. "As a result, transaction throughput in DLTs is lower than in traditional designs". Of those central banks interviewed that were not considering a DLT-based infrastructure, decreased transaction throughput was the main reason given. Separately, MIT researchers in collaboration with the Boston Fed reached a similar conclusion, when a test of processing technologies found a blockchain-based digital ledger had "pretty significant bottlenecks", according to Neha Narula, director of MIT's Digital Currency Initiative at the MIT Media Lab.

So, if not DLT, then which infrastructure will ultimately

prevail? The short answer is that it's unclear. China's frontrunning e-CNY, which has been rolled out to users in 23 pilot cities across the nation, does not use DLT, but is instead centrally managed by its issuer, the People's Bank of China. Critics worry, however, that centralized control could allow the Chinese authorities to snoop on users in real time. A US initiative, meanwhile, is taking a strikingly different approach. The ECASH Act, introduced earlier this year, would direct the US Treasury to "develop and pilot digital dollar technologies that replicate the privacy-respecting features of physical cash", which would mean offline transactions using secured hardware devices rather than a smartphone app. Other countries are road-testing yet more approaches. Indeed, with 105 nations, representing 95 percent of global GDP, now exploring a CBDC, central bankers are busily building a veritable Tower of Babel. Consensus is still a long way off. **BY WIRED**



Billion-dollar questions: How will the metaverse change payments?

Meta's Stephane Kassriel, Head of Commerce and Financial Technologies, speaks about freeing creators, next-gen security and the future of VR Shopping

magine rolling up for a party at a L.A. mansion in

your new customized sports car. Inside, you hang out with famous sports-stars and musicians, maybe you even catch a private performance, or peruse a new exhibition from an artist. You like a piece of work, so you pay for it on the spot, or you see someone wearing a cool pair of sneakers and instantly get your own version. It sounds like a fun evening. Now, imagine you can do it all from your living room via an internet connection, a virtual reality (VR) headset and an online avatar. This is the promise of the metaverse, a hypothetical version of the web made up of interconnected 3D virtual worlds where you can work, socialize, and transact in real time.

Although the technology is still in progress, the commercial opportunities are potentially enormous. The market for virtual goods is already approximately \$200 billion a year. It's been estimated that the total GDP of the metaverse could eventually reach \$3 trillion. Of course, this figure includes both the economic impact of those spending money in the metaverse, as well as those working it – the millions of creators developing new digital artifacts or providing online experiences. And that is what is so exciting about the metaverse, that it will be much more

comprehensive and multi-faceted than the current ways of engaging with the internet, acting more like a digital twin of the real world. From a technical perspective, for this vision of the metaverse to come about, there needs to be seamless interoperability between different virtual worlds, so users can easily navigate between them. There will also have to be sophisticated economic structures to support commercial activity. For example, mortgages to finance virtual property sales, collateralized with digital non-fungible tokens (NFTs). Perhaps most importantly, the metaverse will require a robust and standardized payments infrastructure, so people can easily pay for the goods and services they consume.

One company that has been pioneering the shift to metaverse is Meta, which rebranded from Facebook in 2021 as a sign of its commitment to this emerging space. As well as creating the tools and platforms to allow people to experience the metaverse, Meta is also developing the next-generation payments models to support commerce in the virtual space. We spoke to Stephane Kasriel, Head of Commerce and Financial Technologies at Meta, to get his thoughts on connected commerce and the future of payments in the metaverse.



How will the metaverse impact the way we shop?

While the metaverse is not fully realized, we're already seeing signs of how people will use it for shopping. For example, billions of dollars are spent every year on digital goods in video games yet we can see that expanding beyond the world of games. We recently surveyed 30,000 shoppers around the world and learned that younger consumers are nearly 1.5 times more likely to crave an immersive experience. Meanwhile, 80 percent of all the people surveyed believe artificial reality (AR) and virtual reality (VR) technology will improve their lives, and 60 percent are interested in AR while shopping. So, we think the metaverse will have a huge impact on consumer behavior and enable entirely new forms of commerce. We're excited to see creators and brands push the boundaries of what is possible with, say, digital clothing and shopping, as they experiment with new ways to share who they are and what they make.

In your opinion what is the most exciting development in payments, and how is it impacting Meta?

Today, Meta Pay is an easy, secure way for people to shop, send money and donate to causes they care about across our technologies including Facebook, Messenger, Instagram, and WhatsApp, as well as anywhere people see the Meta Pay button while shopping online. What excites me about the future of payments is the opportunity the metaverse presents to make these experiences even more simple and seamless. Ultimately this is all in service of unlocking economic opportunity. To support this, we're working on building a single wallet experience that enables interoperability – in other words, making your ID, your avatar, and your digital goods portable as you travel through different environments in the metaverse.

How can payments be used to support digital creators?

The benefit for creators is that they'll no longer feel locked into islands of content. As a creator, you're going to want to have a relationship with your fans that can extend beyond the confines of a single platform and be able to sell a subscription or package that your fans and followers can take advantage of in multiple contexts. So, our role will be, to a large extent, unlocking the economic potential of the metaverse for people and creators.

What are the payment challenges in the metaverse?

Logging in and making payments inside of a VR experience will be fundamentally different and will also come with unique security challenges that don't yet have a solution. This gives us an opportunity to create something new and better. An example of what I'm talking about is two-factor authentication. This is a feature that works well in the non-virtual spaces we are familiar with. But if you're in the metaverse, and you've got your VR headset on and you're just having fun, the last thing you want to do is to pause all that to go look at your phone to get a security code. So, we want to come up with something that works as well as two-factor, in terms of security, but that operates very differently. **BY J.P. Morgan**







t started with a bang.

In September, 2011, Google posted a video on its YouTube channel promoting a new mobile payments service. It was a reworked version of a famous scene from the sitcom Seinfeld, and showed George Costanza looking at a poster for something called Google Wallet. Intrigued, he tears a reminder strip off the bottom of the poster, and tries to cram it into his leather wallet, which is already overstuffed with cash, receipts and bank notes. It's the final straw, the wallet explodes in a shower of cards and paper, and its entire contents are scattered to the wind.

The answer? A digital wallet. Google had partnered with Mastercard, CitiBank and others to let people make payments in a store simply by "waving their phones at a special cash register", as one commentator of the time described it.

Osama Bedier, then Google's VP for Payments, announced that this was "just the beginning" of the digital wallet story - and he was right. Today, digital wallets are used for nearly 30 percent of global in-store payments, and are also used online for more than half of all global e-commerce payment transactions. Usually available as an app, the leading wallets include those that come with your phone, such as ApplePay for iPhones and GooglePay for Android phones, as well as the likes of Paypal, Venmo and Cash App.

The technology may be complex, but the principle is simple. The digital wallet stores your encrypted card details and when you make a payment, either in-store, via near-field communication between devices, or online, those details remain secure thanks to tokenization: the wallet generates a single-use token made up of random numbers, rather than sending your actual card information.

Apart from security, key to the wallet's success is its ease of use – no more rooting around for your credit card or having to enter all your payment details for an online transaction. For online merchants, that's a real boon: consumers using



THE DIGITAL WALLET **WILL PLAY A KEY ROLE IN TECHNOLOGIES THAT WILL TRANSFORM OUR LIVES**

wallets complete transactions far more frequently than those who don't.

Digital wallets ease the path towards the ultimate goal of an omnichannel experience – one that allows seamless payments across any channel, whether it's online, in-store, or on emerging channels such as smart speakers. But it's the in-store part of the equation that's the biggest challenge, according to Sanjay Saraf, Managing Director, Global Head Integrated Payments Group at J.P. Morgan Chase. The pointof-sale hardware in physical stores hasn't kept pace with the speed of payments software development, he says, but that's changing as both Android and Apple have introduced 'tap-on-phone' payments. This means a merchant can now use a mobile phone as a contactless payment terminal, without the need for any additional equipment.

"That changes the game for omnichannel going forward," he says. "You're already seeing it in restaurants and bars and clothing stores, where staff are carrying small, handheld devices, and the checkout counter is no longer the only place to pay."

E-commerce is changing, too, as online marketplaces grow and evolve. Mimicking the success of specialists such as Amazon, eBay and Etsy, an increasing number of traditional companies are creating digital marketplaces of their own, such as Siemens with its Digital Exchange marketplace. Typically, the idea is for a company to expand its core offering through third-party products and services. And the marketplace boom is seeing a new wallet trend: seller wallets. These online digital wallets, provided as a service by marketplace owners, function in a similar way to consumer digital wallets, but in the opposite direction, making it easier to distribute funds to what could be a huge number of sellers using different banks and in different territories.

"Success for a marketplace hinges on how many sellers it can attract, because if their inventory is good, they're going to get more consumers," says Saraf. "The first thing that sellers look for is 'How am I going to get paid?' The seller wallet helps to simplify everything and can be transformative for the marketplace ecosystem."

Still only a little over a decade old, the digital wallet has plenty more evolving to do and is likely to play a key role in technologies that will transform our lives. That includes areas such as the increasing intersection between payments and the Internet of Things, and the development of digital identity wallets, plus a whole world of new possibilities conjured up by the emergence of Web3.

But in the meantime, one wallet-based development that's "definitely going to take center stage" in the US and UK in the near future, says Saraf, is the 'super app'...



SUPER APPS ARE THE NEXT BATTLEGROUND

In 2010, Mike Lazaridis, the founder of BlackBerry,

coined the term 'super app' to describe "a closed ecosystem" of many apps that people would use every day because they offer such a seamless, integrated, contextualised and efficient experience."

To say that WeChat has taken that ball and run with it would be an understatement. Launched by Tencent as a simple messaging app in 2011, it has grown to become China's "app for everything", offering more than a million 'mini-apps' on its platform. These provide WeChat's 1.2 billion monthly active users with a massive range of everyday services, from social media to shopping, booking travel to playing games, and much, much more – all accessed via this single super app.

WeChat is by no means alone – Ant Group's Alipay boasts a similarly huge number of mini apps, while Meituan, originally a Chinese food-delivery app, has branched out to offer other services, mainly in the tourism and F&B sectors - a route also followed by Colombia's Rappi. In Southeast Asia, Gojek and Grab have evolved from ride-hailing apps into providers of everyday services. And in India, super apps are proliferating, with the likes of Paytm, Tata and Reliance.

The pattern has been set: establish a core, trusted service, and then add more services and experiences via a single sign-in. Customers benefit from the ease of moving around this ecosystem without the need to enter new passwords or payment details, and are thus more likely to hang around. The super app owner enjoys significant efficiencies in development costs and customer acquisition, as well as the ability to acquire increased amounts of user data - which can then be used to make the entire experience more personalized.

Key to the success of any super app is an integrated digital wallet: a safe, virtual place to store encrypted card details or to keep a cash balance ready for use. "At the end of the day, the wallet is the most important element," says Arik Shtilman, CEO and Co-founder of Rapyd, a fintech infrastructure provider. "You need some kind of sticky point that means people will keep going to the app and using it. Typically, it's because they have a balance in the app that they want to spend."

Shtilman adds that the super app wallet can also enable an in-app loyalty program, which further increases engagement. Tata's super app, Tata Neu, for example, offers NeuCoins, which users earn whenever they shop, dine or book travel within the app. These can then be redeemed on future purchases.

Until very recently, the super app trend had been slow to take off in the US and Europe. The first movers have come mainly from the payments sector, as they attempt to establish themselves as the go-to destination for all our financial needs. Last September, PayPal launched a super app in the US offering a range of services, including savings accounts, buy-now-pay-later (BNPL), messaging and even crypto trading. And this year Block acquired BNPL company Afterpay, adding to the services on its Cash App that include stocks and crypto trading as well as sending and spending money. The digital wallet at the heart of both companies' core payment offerings provides the ideal springboard to create a broader financial services ecosystem.

For super apps in the finance space, there's a world to play for. Offering a broad range of products and services in the same place - and subsequently being able to charge less for them than individual providers – is a prospect that will set alarm bells ringing for legacy banks. As a report by KPMG put it, "While the rise of super apps in the East may seem like a fairly peripheral trend to the banking sector, the reality is they have the potential to up-end it."

Super apps are likely to disintermediate banks from their customers, deliver better services thanks to their wealth of data, and increasingly leverage their growing reputations in financial services, the report concluded. A recent survey by PayPal and PYMNTS.com of consumers in Australia, Germany, the UK and the US found that seven in ten were interested in the idea of a super app, and four in ten said they would increase their banking activities on one.

However, those who were polled also had worries around data and security. To Harinder Sakhar, CEO of Paytm Labs, the R&D arm of Paytm, whose super app for payments and financial services is used by more than 400 million consumers in India, their concerns are understandable. "As more services and offerings are added to an app," he says, "the attack surface grows, introducing potential vulnerabilities for bad actors."

Paytm has launched its own fraud risk management platform, Pi, that uses AI and machine learning to protect customers and clients from online attacks by connecting data signals across the customer journey. As well as using it in-house, Paytm also offers it to other companies building their own super apps.

Sakhar believes that if western companies can overcome super app security concerns, there could be "huge wins" for whoever gets it right. "I anticipate seeing more integrated services and embedded fintech offerings from brands consumers already love and trust as the stepping stone into super app status," he says. "We'll have to wait to see how some of those smaller steps play out to find out if a true super app will take hold in the US and the UK."

Adit Gadgil, Global Co-Head of e-Commerce at J.P. Morgan Payments, believes Western consumers will ultimately enjoy a multiplicity of super apps. "I see continued growth in this space," he says, "and more partnership opportunities for merchants, banks, and platforms to work together."

MEET THE INTERNET OF PAYMENTS

We're accustomed to waving our smartphones at the

till, but London-based startup Walletmor lets you simply wave your hand. In August this year, the company's 1,000th customer paid \in 199 to have a biopolymer payment device subcutaneously implanted under the skin on the side of their hand. The size of a small safety pin and about half a millimeter thick, it consists of an integrated circuit and a metal sheath that acts like an antenna. Once it's been linked to an online digital wallet, it acts like any contactless card or smartphone: just move your hand over the payment terminal, and *ker-ching*.

Whether Walletmor is the future of in-store payments remains to be seen. However, there now exists many equally convenient – but considerably less invasive – wearable payment devices, from smartwatches and wristbands to an array of rings, key fobs and jewelry.

The phenomenon is part of a much wider trend where payments and the Internet of Things intersect: the Internet of Payments (IoP). In this new paradigm, payments are initiated and completed through internet-connected devices – not just wearables but also cars, domestic appliances and more. Amazon Echo users are already accustomed to paying bills via voice commands, while Samsung's Smart Fridge lets users order groceries via a built-in screen, as well as getting meals delivered via Grubhub. According to J.P. Morgan, the global IoP market could be worth \$240bn by 2026.

Henk Kuipers, Innovator at Rabobank, believes a pay-per-use model will play a major role in the development of the IoP ecosystem, because usage of connected devices can be easily monitored online via sensors – and this usage can be automatically charged for. He has carried out several



proof-of-concept projects, including creating a pay-per-use heating system in his own home and a robotic milking machine on a farm, with payments by the liter. In both cases, the money was collected in wallets on a private blockchain, as the systems were not connected to the main banking system. This kind of service can be cheaper for consumers, as they only pay a fee for actual usage, and merchants can use the payment data to personalize services and to offer incentives.

In a range of sectors, the potential for this model is

considerable, from co-working spaces offering desks by the hour, to industrial equipment hubs that provide, say, forklifts on a pay-per-use basis. "The concept incentivizes the shift from ownership to usage, which will stimulate manufacturers to develop products that last longer and can be repaired more easily, and are even designed in such a way that you can reuse all the raw materials," says Kuipers. In other words, it could usher in a more circular economy.

But the road to the Internet of Payments is not a straightforward one. News stories about Wi-Fi baby monitors being hacked by strangers are evidence that the security of IoT devices is a concern, which is amplified when payment is added to the mix.

"I think there's still a lot of work to be done in terms of securing IoT devices and not allowing them to be open to others," says Veronique Steiner, Head of High Growth Tech EMEA at J.P. Morgan Payments. She adds that there will also need to be safeguards around the payments themselves. "I think you'll need thresholds and identity checks, especially for bigger payments," she says. "Payments should be completely embedded and seamless - but at the discretion of the customer."

Kuipers believes that in the future, devices will increasingly communicate between themselves and initiate payments autonomously, without the need for human intervention. Using computer vision, your smart fridge will realize you're running low on milk and communicate with an online grocery to order some more. In terms of payments, it doesn't get any more seamless than this. The digital wallet will have a crucial role to play in this future, he says, not least because the question of identity verification for devices will become an even more pressing one.

"Wallets are not just useful for payments but also for identity," he says. "And if we can use a wallet not only to identify ourselves but also to let devices identify each other, then a whole lot more things become possible."

IDENTITY, REIMAGINED

"It's not a wallet. It's Google Wallet" proclaimed this

summer's relaunch of the Google Wallet brand name. Back in 2018, seven years after its original launch, it disappeared after merging with Android Pay, to become Google Pay. But now it's back, and the Google Pay app is no more (except in the US, India and Singapore, where it's a way to send money to friends).

Like Apple's Wallet, Google Wallet can also store loyalty cards, tickets for travel and events, a vaccination card, and even a digital car key if you happen to own the right BMW model. Significantly, it will also become a place to store digital ID verification, following Apple, whose wallet already supports mobile driving licenses in certain states of the US. Both companies have ambitions in the rapidly growing world of digital ID wallets. According to Gartner, the technology will reach mainstream adoption within the next two to five years, becoming part of our daily lives both online and in the real world. Rather than carrying physical documents around with us, we'll use digital wallets to share our driving license when we hire a car, to prove our age when we buy alcohol, to prove who we are when we open a bank account, and much more.

"I'd say it's more like five years than two," says Antonio Mugica, founder of Folio.ID, which offers a digital wallet app that stores users' encrypted ID documents in a vault on their mobile device, where they can be accessed only by means of facial recognition technology. The app matches your selfie with your photo ID when you upload it, verifying it's yours. Mugica believes one of the strengths of the Folio app is that it can not only store physical ID documents, but also has the capacity to accommodate government-created digital IDs.

Governments around the world have long been invested in the concept of digital identities to help their citizens gain



access to public services and also prove who they are when onboarding to private service providers. And now they're increasingly embracing the idea of the digital ID wallet. The US, Canada, Europe, Australia and New Zealand are just some of the places where legislators are progressing down this road.

The French multinational Thales, which helps governments and businesses in the identity management and data protection sector, is a prime mover in this space and has developed its own "citizen-centric" digital ID wallet.

Their promotional video shows a student using her government-issued wallet in a range of scenarios, from proving her identity when she goes to sit an exam, to allowing a doctor to access her medical records. To prove her credentials, the wallet displays a QR code for that examiner or doctor to scan. In short, says Thales, the wallet "gives the right access to the right data to the right person". For the consumer, that enhances convenience. For the ID issuer, there are cost savings in not managing physical documentation, plus there's the ability to communicate directly with the user, sending push notifications and document updates as required.

"I believe we're going to enter a multi-wallet digital ID ecosystem," says Kristel Teyras, Market Owner of the Digital Identity Services portfolio at Thales. "Some countries will consider that the identity of their citizens is a question of sovereignty, so they'll drive their own initiatives for a digital ID wallet. Others will say there's also room for, say, Apple, Samsung or Google wallets as well, and it will be up to the citizen to decide which one they prefer. But at the end of the day, governments will still need one single platform to orchestrate all the different flows of identification authentication signatures."

Last year, the EU Commission announced a framework for a European Digital Identity, with the aim of making wallets available to all EU citizens which can be recognized across the continent. That would mean, say, a French person might move to Greece and could prove their identity in all the same ways that they could at home using their ID wallet.

Europe will in effect act as a "huge laboratory", as Teyras puts it, for the development of digital ID wallets, as member countries pilot their solutions. "We'll learn best practices and also the pitfalls" she says. "That will accelerate deployment."



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WILL'WEB3' SPARK A WALLET REVOLUTION?

One form of digital wallet that until recently has enjoyed

a relatively narrow field of use is the crypto wallet, which is used for holding the private keys that prove ownership of cryptocurrency. While hardware versions exist, online versions are more common, in the form of apps or other software, and they've generally been used by those who invest in crypto or trade it as a speculative asset.

That could start to change, thanks to an idea dubbed Web3. The pitch goes like this: Web 1.0 was the early web; then Web 2.0 came along and made the web interactive with social media and user-created content. That made the online experience more dynamic but, in the eyes of some, it came at a cost. It gave rise to tech giants, and turned consumers - and their data - into the product. If you believe the hype, Web3 will solve the web's ills - and it will do that through blockchain.

Blockchain is best known as the technology behind peer-to-peer currencies like Bitcoin, but that's not all it can do. It can also run decentralized computer programs known as "smart contracts." These can be used as the basis for decentralized web applications such as search engines or social media sites.

The business models for these decentralized applications (or Dapps) aren't about user data. Instead, the typical model is that people who use or help run the

YOUR DIGITAL WALLET IS GOING **TO BE THE GATEWAY TO A WHOLE DECENTRALIZED WORLD**



Dapp are rewarded in tokens. These tokens are considered valuable because they may confer voting rights over the governance of the Dapp, or they may be used for in-Dapp purchases. The Dapp's value is thus held by the community engaging with it, and - so the theory goes – this aligns the interests of those running the Dapp with those using it.

If Web3 becomes reality and we end up with a web based on blockchains, the crypto wallet would be central to navigating it. Some draw a parallel with the function of the current internet's browser. "I actually think it's more than that," says Tyrone Lobban, Head of Kinexys Labs and Kinexys Digital Assets at Kinexys by J.P. Morgan. "It will be your browser, plus your banking app, plus your passport and all of your identity pieces, all rolled into one."

"Your wallet is how you will access all of Web3," agrees Taylor Monahan, a veteran of the crypto wallet world who's currently CEO of MyCrypto, a crypto wallet manager which she founded in 2018, as well as Global Product Lead for MetaMask, a crypto wallet used for interacting with the Ethereum blockchain, where most of the Dapp action is centered. In the past two years, the number of MetaMask's monthly active users has mushroomed from one million to 30 million, thanks to what the company terms "a frenzy of interest" in finance Dapps, NFT marketplaces, play-to-earn games that reward players in crypto or NFTs, and new metaverse worlds constructed on blockchains.

"At the moment, we tend to think of a crypto wallet as something that just holds financial assets, but increasingly it's going to become the gateway to a whole decentralized world," says Monahan. "And if you have a phone or computer, you can access this new world through your wallet."

Web3 - and its possibilities for decentralized finance apps (De-Fi) – promise to revolutionize many aspects of the financial system, including payments, promising g reater ease and efficiency in transactions.

According to Alex Bouaziz, Co-founder and CEO of Deel, an international payroll and compliance platform, a glimpse of the future can be seen in the increasing number of people around the world who are choosing to be paid in cryptocurrency via, say, a Coinbase crypto wallet.

"Sometimes, their home currency is very volatile, so there's an obvious advantage in being paid in a digital stablecoin like USDC," he says. "But as well as that they also get their money in a couple of minutes, versus being paid by SWIFT – which usually takes three to five days, but sometimes can take weeks."

The crypto wallet of the future may also solve an age-old friction with how we use the web. Currently, as individuals navigating the internet, we depend on organizations to issue us with login credentials so that we can use their services, or else we use an outsourced credential such as 'Log in with Facebook'. However, Web3 will allow us to take full possession of our own identities. This summer, the World Wide Web Consortium, which develops protocols and guidelines for the web, launched the official web standard for decentralized identifiers (DIDs), which allow a person, group or thing to uniquely identify themselves in Web3. DIDs reside in digital form on a blockchain and validate verifiable credentials that can be stored in a crypto wallet. "The Web3 wallet will revolutionize how we think about identity and payments on the internet," says Gadgil. "Historically, if you've signed up to a shopping app or shopping website, you've typically used your email to identify yourself, and then provided more details, if needed.

That's going to change with the crypto wallet. Because you will now own your identity, you'll have the ability to take decisions in terms of what you share, how you share it and where you share it – and in a provable way."

This new form of identity verification could solve the issues mentioned earlier around security for devices connected to the Internet of Things. Because DIDs apply not only to people but also to things, they allow devices to recognize each other, and they are also interoperable across different blockchains. Imagine a supply chain that is run using an interconnected system of sensors, robots and machines. The machines would be equipped with wallets holding both verifiable credentials and digital currency. Smart contracts on a distributed ledger could automatically trigger payments when goods arrive, with no humans involved.

It's a scenario that would have been little more than science fiction back in the days of George Costanza's exploding wallet, but Lobban is convinced that the worldchanging possibilities of Web3 are now not too far from being realized.

"We're seeing big tech companies getting very heavily into this space, whether it's the metaverse or things around digital identity or blockchain-based assets," he says. "I think there's now a recognition that it is an easier way to do business and actually creates the opportunity for new products, new services and new experiences. And that's all going to be possible through a wallet." **BY WIRED**











How connected cars are driving the future of payments

Fintech is taking the auto world into the fast lane

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or decades, car companies competed on how much horsepower they could pack under the hood, while still leaving enough space for drivers to actually get in the vehicle. In the coming years, however, when automakers talk about high performance, they will probably be referring to computational power – terabytes, not torque, and RAM rather than revs. Engineers at Toyota already joke that the main role of a car's wheels is to stop all the computers from dragging along the ground. What is being described is the era of the software-defined vehicle – where the quality of the electronics and software is more important than the mechanical hardware. And the tipping point has already happened. A modern car today may contain 150 computers and more than 100 million

A key element of this evolution is connectivity. The real-time relay of data to and from the vehicle is transforming

the mobility ecosystem. In a world run from our smartphones, cars are rented on-demand via an app. If a passenger is bored on a long journey, they can stream the latest movies and games to the vehicle's onboard screens. Even driving itself is expected to become optional as 5G wireless and a new generation of sensor technology enable autonomous vehicles. Meanwhile, infrastructure providers such as electric vehicle (EV) charging stations use connectivity to manage their equipment and to meter and charge customers. By 2030, 95 percent of all new cars produced will be connected, compared with 50 percent today.

What links these services together is a combination of data transfer and processing, coupled with seamless, integrated payments. After all, the new generation of applications has to be paid for and with as little disruption to the end user as possible.

Welcome to the future of motoring...

What is a connected car?

In its simplest form, a connected car is a vehicle that is able to wirelessly connect to the internet and communicate bi-directionally with other devices. But as Tristan Attenborough, Global Head of Energy, Power, Renewables & Metals/Mining at J.P. Morgan, explains:

"When we think of the 'connected car' we have to ask ourselves the questions, 'Who are we connecting, and why? What are they interested in being connected to?"

It's not just about the fun stuff – ordering food via your car screen at the drive-through, or automatically playing your favorite music as you start your vehicle. "Once the car is connected you can then bring all types of services into the vehicle," says Raja Kuppuswamy, CEO of J.P. Morgan Mobility Payment Systems. "The biggest limitation right now is the networking itself. With 5G, you will have much faster connectivity, then you will get the best user experience. That's where everything is going at the moment."

Connectivity is also supporting far greater levels of safe, driverless automation than ever before. Take LiDAR - which stands for light detection and ranging. This technology uses laser pulses to accurately map the shape and distance of surrounding objects. In combination with hi-res digital cameras and cloud-based analytics, it allows cars to navigate environments in real-time. LiDAR is already a key part of advanced driver assistance systems (ADAS), such as assisted parking, blind-spot monitoring or collision-avoidance, where the car can automatically correct course if there is a risk of a crash. United with the roll out of ultra-low latency 5G networks, it is now paving the way for the rise in self-driving vehicles.

Whilst the promise of autonomous cars effortlessly ferrying people from A to B grabs headlines, connectivity also offers another major benefit – the ability for drivers to bring their digital footprints into the vehicle with them.

As we live more online, drivers and passengers want to bring their favorite music, video or gaming choices with them. They want to be able to send emails to work, or buy goods from their favorite e-commerce sites. And they want the same experience whether they are in a rental car, a taxi or their own vehicle. "The car is becoming an intelligent everyday companion that supports its users thanks to the constant connection to the cloud and other data platforms," says Knut Krösche, Head of Digital Business & Mobility Services at CARIAD, which is building the automotive software platform for Volkswagen Group GbmH.

Meanwhile, a survey from BMW showed that 73 percent of buyers would switch car brands if they could bring their digital lives with them to the new vehicle.

Re-engineering payments

Stellantis – the merger between Fiat Chrysler and

PSA Group – is predicting \$22.5 billion a year in revenues from software products and subscriptions by 2030. But this is only possible with payments that work simply and seamlessly with a single swipe, touch or voice command across any application. These are known as integrated payments and as in-car consoles become marketplaces for a range of products, these types of payments will become essential. As Ali Almakky, Global Head of Payments Solutions for Mobility at J.P. Morgan states, "When it comes to digitalization, it has to either offer value, savings or convenience, otherwise it just won't happen." For example; if you are driving and want to purchase a new tire, or order coffee and food to be ready at the next rest stop, you will want to avoid having to pull over and start inputting your card details. Likewise, if you want to upgrade your car's software package to offer more advanced features, such as autopilot or access to traffic reports, you



should be able to do so with as little friction as possible.

For providers, this type of seamless payments ecosystem is easier said than done, especially as the range of third-party services grows. Right now, it is still a challenge to create one payment solution, with one log-in, that can work seamlessly with lots of different companies, services or applications. It requires back-end functionality that can onboard multiple different vendors ranging from e-commerce players and software companies, to utilities and financial service firms, and still allow payments to feel effortless to the car's user.

In one solution, the car itself will be the means of storing and transferring funds - essentially a digital wallet on wheels. However, there are concerns that this will add friction to the consumer experience, as users will have to log-in each time they drive. There could be confusion over who is actually at the wheel, while it also limits vendors to targeting consumers only when they are inside the vehicle.

"If I'm a transportation company," says Attenborough, "I want a share of your spending when you're not in your car, when you're on the train or on the bus or getting a taxi or scooter, or you're just walking and you're not in your car. So, if I confine my connectivity to the car, I'm missing out on a big piece of your mobility spend."

The car as a super app

For these reasons, it is likely that the smartphone will continue to play an important role in the payment process. After all, it is something that people take everywhere and is unique to each individual. All of the integration, tokenization and payment capabilities are already there. In this scenario, you would enter the car and automatically pair your smartphone with the vehicle's console. You are then able to access all your different mobility apps, as well as apps for music, shopping and streaming. You can use and pay for any service, without having to log into each one. The car will then act like a type of super app, hosting and integrating all the other relevant apps from the driver's phone.

To Don Frieden, CEO of P97 Networks, which provides payments platforms for mobility, for payments to be seamless this as a key concept that needs to be explored. "I think that the areas we need to focus on are what we're calling single sign-on. How do you have interoperability between my mobile device, my companion app and my connected car? It all has to recognize each other."

Within this vision, there is still room for in-vehicle transactions. When a car goes through a toll booth, or when the tank is filled at a gas station, an instant payment could be taken via a token linked to a card. In-vehicle payments are set to hit \$86 billion by 2025, but around 80 percent of these will be for fuel or charging.

Changing models of mobility

Having payment systems that are too closely wedded to

the vehicle could also become problematic as concepts of ownership change. In the future, users may simply rent cars and hail taxis on demand, as it will be more cost-effective and convenient to use them as needed. An average citizen may switch between multiple different transport types in a day - hopping on a train, using a rented e-bike or riding in a cab. A utility may own the e-bikes, but also be the customer's energy provider, and want to add mobility service to his monthly electricity bill.

As transactions become more complex, the underlying payments infrastructure will have to grow in sophistication. It will have to be able to handle automatic transactions and



one-off payments as well as subscriptions, and hold and distribute funds on behalf of a wide range of stakeholders. If a car company has a curated marketplace available to its users, then it will owe part of each transaction to the vendors. This is known as third-party payments (3PM) and requires stringent account segregation and regulatory oversight. As a result, it is likely that auto manufacturers will partner with financial services firms to build their payment capabilities, due to their expertise in areas like 3PM. This will be enabled by open banking regulations, which will provide greater flexibility in arranging payment options.

There is also the wider transportation industry to consider. Car companies are increasingly operating directto-consumer channels, with people ordering vehicles straight from the website rather than visiting a physical dealership. This requires a payments functionality designed explicitly for customers, who will no longer have to channel their payments and after-sales service through a dealership. Take an example like maintenance and repair:

"My car knows it needs a service, it should prompt a message for me to easily schedule a visit, and even have my transport back to the office booked for me. And then, when I come to pick up my car, I shouldn't have to wait in line to pay, it should have been done automatically ahead of time," says Frieden.

Connected commerce

Payments will play an integral role as companies seek

to monetize the data journey in the mobility space. As well as the function of transferring funds, they also offer rich pools of transaction information, which can be merged with information from other sources, such as navigation apps, to create in-depth models of customer behavior. Energy company Chevron is already advanced in this area. "We are working on predictive modeling on when the customer last filled up and if they're a regular user. We can then predict when they might need fuel and send them messages about a discount or other targeted offers" explains Rod Tos, a manager in Chevron's Customer Experience division.

Chevron is also adding in elements of gamification to the user experience. Through its app it allows users to play games and earn rewards, which can be traded for fuel discounts. In the future, a connected car ecosystem may allow users to redeem loyalty points across a whole range of services. If you charge your car, you could use the points to book a flight. Alternatively, every time you pay with a certain vendor a small deposit is made to an investment account in a financial services app, allowing you to build savings.

Meanwhile, insurers are harvesting data on car performance and driver behavior to create more accurate risk models, which will be reflected in the price of insurance premiums – all enabled by hyper-connectivity and sensors. One approach being considered is offering billing based on a monthly, weekly or even per-trip basis. If a driver gets a high bill, then they would be able to modify their driving behavior to ensure it is lower in the future, encouraging safer driving and giving users more control. "Telematics plus the real-time payments network could result in a really consumer-friendly way to consume insurance," says Tim Dwyer, a Vice President at Nationwide.

Integrating Treasury

As these new mobility services scale, treasury teams will become an increasing part of the conversation. "Whether

its car companies, utilities or energy firms, if the business strategy is set without treasury at the table, it will be a mess at the back end," says Lia Cao, Global Co-Head of Corporate and E-commerce Sales & Solutions at J.P. Morgan.

Although not as exciting as some of the new technology developments, functions like mass on-boarding merchants or enabling rules-based split payments, will be just as important, as will water-tight security. Being able to manage customer IDs and authenticate payments across a wide range of customer channels will be a sizable challenge. **BY J.P. Morgan**



ILLUSTRATION: MARCUS MARRITT

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YOUR DIGITAL WALLET ON WHEELS

The seamless journey isn't just about getting you from A to B, but smoothing every part of the ride





Rent a car on-demand and pay automatically for the number of miles driven

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Seamlessly pay for car upgrades such as firmware, servicing or new parts

Personalized alerts when approaching your favourite shops or restaurants, with the option to pre-order and pay in advance

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Tales from the future: A Trip to Las Vegas

Step inside the fantasy world of 2052, where payments, virtual and reality collide, with a group of keen gamers

e met in a group chat nearly 24,000 hours ago and instantly we knew something was different with us. According to my augmented reality glasses tracker, we'd been virtually engaged for nearly every moment since we first connected, with only the internet crash of 2047 stopping our streak... but I'll save that story for another time.

Beyond our day jobs, we, like most of the world, had developed a passion for i-gaming – an amalgamation of all things gaming, casino and e-sports that had risen alongside the great metaverse convergence. Funnily enough, i-gaming was the tipping point for the masses to fully embrace immersive virtual worlds in their lives.

The comfort of our homes, combined with the ability of limitless self-expression while in virtual reality, typically gave us the edge we needed to win. And because the experience was so seamless, and the need was never there, we had never thought to exchange real names or show our faces to one another. However, our anonymity was about to be tested with the announcement of the Vegas ThrowBack Tournament, an in-real-life super-event designed to bring gamers back to the old school style of playing – face to face and offline. Conversation on the group chat on iS, the super app we all preferred, turned serious. How would we perform in the tournament? Would we know how to interact or even get along?

Temptation won us over – seeing the legends in hologram, and testing our skills against them was irresistible. There was no turning back: we were all in. Using the Connected Concierge plug-in for iS, we traded in NFT credits and booked an all-inclusive week long trip. Made completely seamless by our digital wallets that are now standard place and integrate all our gaming data, winnings and losses in one place. After landing at the Las Vegas airport, the driverless car that picked me up had my personalized "chill mode" ready – temperature set to a balmy 63 degrees, ambient lighting and an iced coffee in holster – while also providing a screen for me to select my clothes for the trip



and amenities from entertainment to sundries. All paid for with a wave of my hand.

The car dropped me off under the porte cochère to meet "Jahphee" the VIP artificial intelligence concierge, proudly announcing they'd be catering to my every whim. I scanned in – confirming my identity, registering my digital wallet and unexpectedly learning the rest of my crew had already arrived.

My anticipation matched the heat and buzz of Las Vegas as I realized I was meeting friends yet had no idea what they actually looked like. I received a haptic ping on my wrist – notifying me of a couple contacts fast approaching. I spun around and instantly knew who they were when I looked in their eyes.

At that moment, I knew the real fun was about to begin. **BY J.P. Morgan**

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