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10th **ADVANCED** 2016 Payments Report





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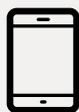
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Overview

Towards invisible payments

This year the report is sponsored by Wirecard, the global financial services and technology company, which holds a banking license. Wirecard is a key player and innovator in the digital payments world and helps a number of companies, ranging from FinTech start-ups to large entities, retailers and airlines meet their digital payments needs.

The Advanced Payments Report (APR) combines views and perspectives obtained from industry executives, the results of an online survey, and continuous research and monitoring of events in the payment industry. It highlights key advanced payment trends. While its focus is on payments, payments cannot be detached from the broader fabric of integrated financial services in today's digitally connected world.

A question that arises continuously in this interconnected world is whether the banking industry is ripe for disruption? The answer to the question from many start-ups would be a resounding "yes" as they discover and fill the gaps in products and services offered by traditional financial institutions. "We actually are trying to change banking entirely. We are trying to displace what we think is a fundamentally broken system," said Mike Cagney, CEO of Social Financial or SoFi, a financial services start-up, in a recent interview with CNBC.

But despite the billion dollar valuations, innovative business models and promises to unlock an alternative financial universe, the impact of new players on the banking industry has been relatively less disruptive. Unlike the travel industry where online booking engines and mobile travel apps disrupted the agent assisted model and where new players continue to innovate, or the seismic shift caused by Uber, Lyft, or Didi in the taxi industry, or the popularity of Airbnb which offers

an affordable alternative to hotels, banking industry stalwarts have so far proven more difficult to displace.

One reason for this resilience is that banks as custodians of customer deposits and lenders of funds have highly developed risk management systems that ensure they do not fall foul of rules and regulations designed to protect consumers, the institutions themselves and the economy in general. As such many start-ups tend to partner with financial institutions to comply with licensing laws. They also do so to take advantage of the widespread distribution networks of banks and their access to cheaper sources of funding such as deposits.

In payments, however, not only start-ups but also large technology companies are investing in innovations and new technologies. Mobile wallets continue to cause a stir in the payments industry. The wallets are designed to offer convenience to consumers by allowing them to store their payment cards, loyalty vouchers and even travel documents such as boarding cards for easy access and use. But wallets have long been the subject of much debate, discussion and controversy. Wallets developed and rolled out by mobile network operators (MNOs) struggled to attract consumers, and some had to be closed down with industry momentum now shifting to mobile device manufacturers such as Apple and Samsung.

Apple Pay, introduced in late October 2014 in the United States, significantly revived the sagging interest in mobile payments and was quickly followed by Samsung Pay (US and South Korea) and Android Pay (US only) in 2015. Apple Pay has expanded in February 2016 in China and is set to roll out in additional countries in 2016. It is still early days for these wallets, and transaction volumes are not entirely representative of their future potential. Digital wallets have come a long way when it comes to ease of use and simplicity of set-up. For example, it takes minutes - not days - to 'provision' or register a customer to start using one of these wallets and for some of these wallets, there is no need to open the app in advance - your fingerprint does that.

While these wallets are designed for in-store point-of-sale (POS) environments, they will also be used for all types of digital purchases. Other wallets that store funds (and not payment cards) have prospered in markets like India and China where use of payment cards is still not mainstream. Prominent examples include Alipay and WeChat Payment in China and Paytm in India.

Making money flow better across the globe is still a focus for a number of start-ups. This has been the historic preserve of banks and money transfer operators (MTOs) but companies such as Worldremit, TransferWise, TransferGo, and Remitly have leveraged innovative business models to play in an industry which carries risk and where traditionally it has been difficult to differentiate other than on price.

On the cutting edge of digital commerce are advances related to the Internet of Things (IoT). The IoT is a term coined by an MIT researcher to explain the next evolution of the Internet, the super-connected Internet in which not only computers, mobile phones, or tablets will be connected but all types of 'things'; home appliances and machines that we use every day, such as cars and even planes; things for sports, such as tennis rackets, cricket bats or golf clubs; and billions of other things, including wearables such as clothes, watches and shoes.

The IoT will create a complex demand for payments across individuals and businesses because of the sheer number of things connected and the complexity of services that will become available. Global commerce will expand. Commercial payments will range from large transactions between businesses down to micro-transactions between multiple individuals located anywhere in the world.

Banks and payment intermediaries will always have a role to play in payments, facilitating payments via bank accounts or credit cards because consumers trust these mechanisms and they provide recourse should something go wrong.

“
The IoT will create
a complex demand
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”

Or, perhaps, they may not? While bank transfer systems and credit card services are continually improving in speed and security and adapting well to the evolving Internet, digital currencies are designed specifically for the Internet and these may, in time, become more and more relevant for digital micropayments as new IoT services are rolled out.

Innovations that validate transactions and confirm contracts to support systems of value exchange will be equally important in the future. Blockchain, a technology inherent to the concept of Bitcoin, for example, may find use cases that go beyond digital payments to provide universal open standards for validating all types of financial transactions.

Wherever the future may lead us, one thing for certain is that in order for innovations and new services to be successful, regardless of how sophisticated or technical their development or delivery may be, they will need to be intuitively simple for consumers to understand and use.

Daniel Kahneman, the behavioural psychologist famous for his work on how people think and make decisions, and winner of the noble prize for economics in 2002, describes in his best seller, "Thinking Fast and Slow", the key to how consumers think. Most consumers are lazy - or in Kahnemann's polite scientific jargon - consumers tend to be "cognitive misers" who make decisions and judgement

calls based on quick and instinctive impressions (intuitive or "fast" thinking), not wasting their cognitive resources on analytical deductions and logical thinking (deliberate or "slow" thinking).

Future successful systems of value exchange will be entirely digital and in order to be successful, they will need to be designed for the ultimate cognitive misers, operating quietly in the background where, says Christian von Hammel-Bonten, EVP Global Product Strategy at Wirecard, the key challenge for payment

providers will be "to make themselves invisible but not redundant. The key to success for all forms of commerce will be a seamless, efficient and secure payment experience."



Where Digital Meets Physical Blurring boundaries

Advances in the development of mobile devices have created the phenomenon where consumers can easily research products and shop at their convenience – anytime, anywhere. New technologies have blurred the boundaries of physical and online commerce, enabling new ways for merchants to communicate with their customers.

Leading retailers, technology companies and social media platforms are continuing to explore opportunities to promote deeper engagement between businesses and consumers. For example, Facebook is working on bringing businesses onto its Messenger app, which allows consumers to interact with a business through conversation threads. Consumers can ask questions, make reservations or purchase products or services by text-messaging a merchant.

Once the consumer opens a thread to communicate with a business, that thread will stay there forever. This allows that business to know its consumers better as well as keep in touch with them. While David Marcus, a former president of PayPal and current VP of Messaging Product at Facebook suggests that Facebook is merely taking “the first baby steps” toward transforming interactions with businesses, the Chinese messaging app, WeChat has already allowed its users to order taxis, check in for flights, pay utility bills, make doctors' appointments – all without leaving the app. Amazon, on the other hand, allows its users to communicate with buyers in the Amazon marketplace via email with its Buyer-Seller Messaging Service. While businesses on messenger is popular in China, the concept is still fairly new elsewhere. Nonetheless, the potential impact of messaging on commerce is great. It might blur the boundaries between different sales channels even further.

Omni-channel

Omni-channel, a multichannel approach to sales, used to be a buzzword but now has become an expectation that merchants cannot ignore. “An in-store transaction will replicate the same customer experience as an e-commerce transaction: browsing for goods with a smartphone, a tablet or an in-store kiosk, adding items to the physical shopping cart or the virtual basket and then checking out by paying with the smartphone. The customer will not distinguish between online and POS experiences as they will be completely blurred,” says Susanne Steidl, Executive Vice President Issuing Services at Wirecard AG.

Omni-channel capabilities bring a unique set of opportunities for merchants, allowing them to provide consumers a frictionless shopping experience regardless of whether the customer is shopping in a store or online using a desktop or a mobile device. Through these channels, merchants can also increase brand awareness and loyalty. However, there are challenges. Providing detailed product information and embedded payment functionality over a number of distinct channels can be difficult and expensive.

All three key stages of the purchase transaction in which merchants engage with consumers – pre-purchase, purchase and Post-purchase – are being impacted by the changing focus of retailers on providing a seamless shopping experience across all channels.

“
64% of survey respondents
believe that mobile
self-checkout apps will help
create a seamless shopping
experience

”

The future of payments for physical retail stores

> Large retailers will continue to move away from traditional POS terminals to mobile ones and will include value added services

76%

> Mobile self-checkout apps will help create a seamless shopping experience; it will win adoption from big-box retailers in the next 2-3 years

64%

> More payments will be embedded in the commerce transaction and the merchant will own the payment experience

62%

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Pre-purchase

Consumers may use the Internet to ‘channel-surf’, i.e. research an item through one channel and purchase it via another. ‘Showrooming’ is a well-established practice in which consumers purchase items online, having researched and tested them out in a physical retail outlet.

Interestingly, only 60% of webroomers have showroomed but 90% of showroomers have webroomed according to Merchant Warehouse. The evidence therefore indicates that consumers – whether they are ‘channel-surfers’ or not – like to purchase in a physical retail environment.

Both trends are frowned upon by retailers, although some – such as John Lewis in the UK – have embraced them by encouraging shoppers to check product details using the retailer’s app while in-store.

Another useful crossover between the physical and online retail environments is the ‘end-less aisle’ approach now being adopted by some retailers.

Consumers are provided with in-store kiosks that have access to the retailer’s full product offering and stock levels so that most out-of-stock scenarios are avoided. Staples and a number of other large omni-channel retailers use this approach to great effect.

Purchase

Purchasing is now being made easier through initiatives like the ‘suspended basket’. Merchants such as Burberry would like to introduce a facility through which consumers could order products via any channel (even in-store), the products would be retained in the consumer’s account basket for a pre-established period of time, and the consumer could amend the basket and initiate payment via any other applicable sales channel.

Payment at POS is no longer simply a matter of inserting or swiping a card at a fixed checkout location in a store.

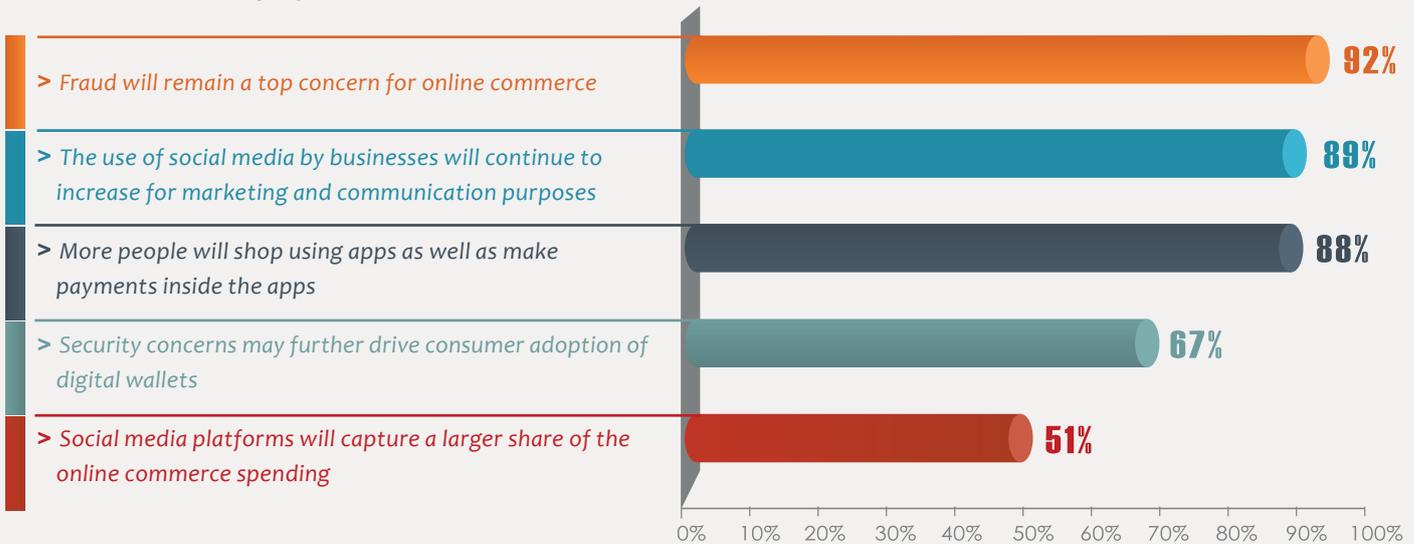
Use of Mobile POS (mPOS) terminals in-store is becoming more widespread. This year’s survey results indicate that a high percentage (76%) of industry executives believe that retailers will replace traditional POS terminals for mobile devices that include additional value added services (VAS) such as data analytics and inventory management applications.

New models have emerged where purchasing in a physical environment requires limited interaction with sales staff, either at a contactless kiosk or ‘in-app in-store’, such as using the PayPal application to pay for goods on a mobile handset while in a physical retail outlet.

64% of survey respondents believe that mobile self-checkout apps will help create a seamless shopping experience, especially from the largest retailers in the next 2-3 years.



The future of payments for online commerce



Post-purchase

Many pre-omni-channel retailers did not have centralised payment management systems; i.e. they had separate ordering platforms, sales reconciliation systems and payment service providers for each channel. Processing a refund in-store of goods purchased online was therefore a challenge if both channels had different merchant acquirers and sales reconciliation platforms were located in different countries.

However, omni-channel retailers are now benefitting from a consolidation of service providers and are selecting those that provide integrated back-office solutions combining the ordering, payment and reconciliation functions into a single platform.

The Amazon book store

Amazon opened its first physical retail store in Seattle, USA, at the end of 2015 and has introduced some innovative policies there that place it firmly within the blurred boundary of where physical retail meets the online environment.

The Amazon Book Store is stocked with books that have been selected using Amazon’s recommendations algorithms, so that post-purchase feedback from other consumers is put to good use. Consumers can scan book barcodes at a kiosk or use their amazon apps to price check potential purchases or to read customer reviews. Webrooming is therefore actively encouraged and consumers can get dynamic pricing based upon the current price of the book in Amazon’s online store,

ensuring that the pricing is competitive against physical book store competitors as well as online retailers.

Amazon recently filed for a patent for a physical retail store in which consumers could purchase items (books or potentially an extended range of products that are available) simply by lifting them from the shelf and exiting the store. Although it is not yet known how the consumer making the purchase would be identified, once they have been identified in-store and made their way through the ‘transition zone’ (check-out) with their selected item, the item would be identified through an RFID tag and registered as sold. The consumer would then receive an email notification from Amazon that the purchase has been logged in their Amazon account, and that payment has been processed using their preferred payment method.

The patent for this approach is still pending but it would be an interesting development for a retailer to introduce exiting a retail location with a product as a payment authorisation from the consumer.

Proliferation of digital payments options

According to eMarketer, retail e-commerce sales are expected to reach \$1.9 trillion in 2016 and consumers are expecting an ever-smoother payment process. While payment cards are commonly used for digital payments in some markets, there are hundreds of payment methods worldwide, and many seek to bypass the card rails using alternative forms such as online bank transfers, mobile carrier billing and virtual currencies.

Social commerce and buy buttons

Any business without a social media presence in 2016 is certainly lagging and 89% of our respondents believe that the use of social media platforms by businesses will continue to increase for marketing and communication. However, only 51% think that these same platforms will capture a larger share of the online commerce spending. Facebook, the leading social network is looking to do just that by transforming its 'pages' for businesses from a place to grab business information and interact, to a place to buy. If successful, Facebook could become a social network filled with mini shopping websites or 'pages'.

"Buy buttons" look set to be the key facilitators for this integration. Developed only a few years ago, they already have made significant inroads in 2015. Buy buttons enable consumers to buy directly within a webpage or app without having to leave the site. Google, Twitter and Facebook are running trials with them and PayPal's first acquisition as an independent company was Modest, a start-up that develops them.

Pinterest is a visual discovery app, where consumers can explore anything from clothes to furniture. It launched buy buttons or "buyable pins" in mid-2015 and is considered the perfect social network for social commerce. Shopify's 2015 survey highlighted that 96% of users go to that site to research a product before buying. While the idea may be great, there are difficulties with implementation, such as merchants having to provide real-time inventory updates. Also a large number of pins may be unobtainable due to no longer stocked items, which may lead to customer confusion.

Google, Twitter, amongst other social platforms are all looking for a way to get a piece of the e-commerce pie and it is not surprising to see why. According to Forrester Research, consumers spend 14% of their smartphone time

on social media and 5% on shopping. The integration of these two activities by the tech giants would enable them to share a portion of the trillions of dollars to be spent online in the coming years, as well as increasing the inherent value of their ads.

In-app payments

88% of our respondents believe that more people will shop using apps in the future as well as make payments inside the apps. According to a 2014 consumer behaviour survey by Forrester, consumers spend 85% of their time on smartphones in apps so the opportunity for in-app payments is significant.

Uber is gaining popularity with its streamlined ordering and seamless payment process in which the payment card is registered initially, sometimes with a simple photo, and then automatically charged after delivery of the service. Apps like Uber have revolutionised the way we order and pay for taxis, and the model continues to gain traction in other on-demand industries. Apps such as Delivery Hero (Germany) and Deliveroo (UK) are reshaping the takeaway business, while Washio (US) and Laundrapp (UK) target the laundry business. The rising success of these apps proves the value consumers place on convenience, of which in-app payment is a core feature.



Digital wallets are growing mobile

67% of respondents believe that online security concerns will drive adoption of digital wallets. The convenience and recognised security of these wallets have helped drive their growth, especially the familiar brands such as MasterPass, Visa Checkout (which has moved away from the "wallet" connotation), PayPal and Alipay. PayPal parted ways with eBay, and the renewed independent focus is working for the company as total payment volume grew 27% to \$282 billion in 2015. Alipay, set up by Alibaba in 2004 before being spun off

under Ant Financial, processed an estimated \$778 billion in 2014. This reported figure, already dwarfing PayPal's 2015 number, is likely to be significantly larger in 2015 as it boasts a 65% market share of the Chinese online payments market.

Interestingly, both wallets have seen significant growth in mobile with 28% and 65% of transactions initiated via a mobile device for PayPal and Alipay respectively in 2015.

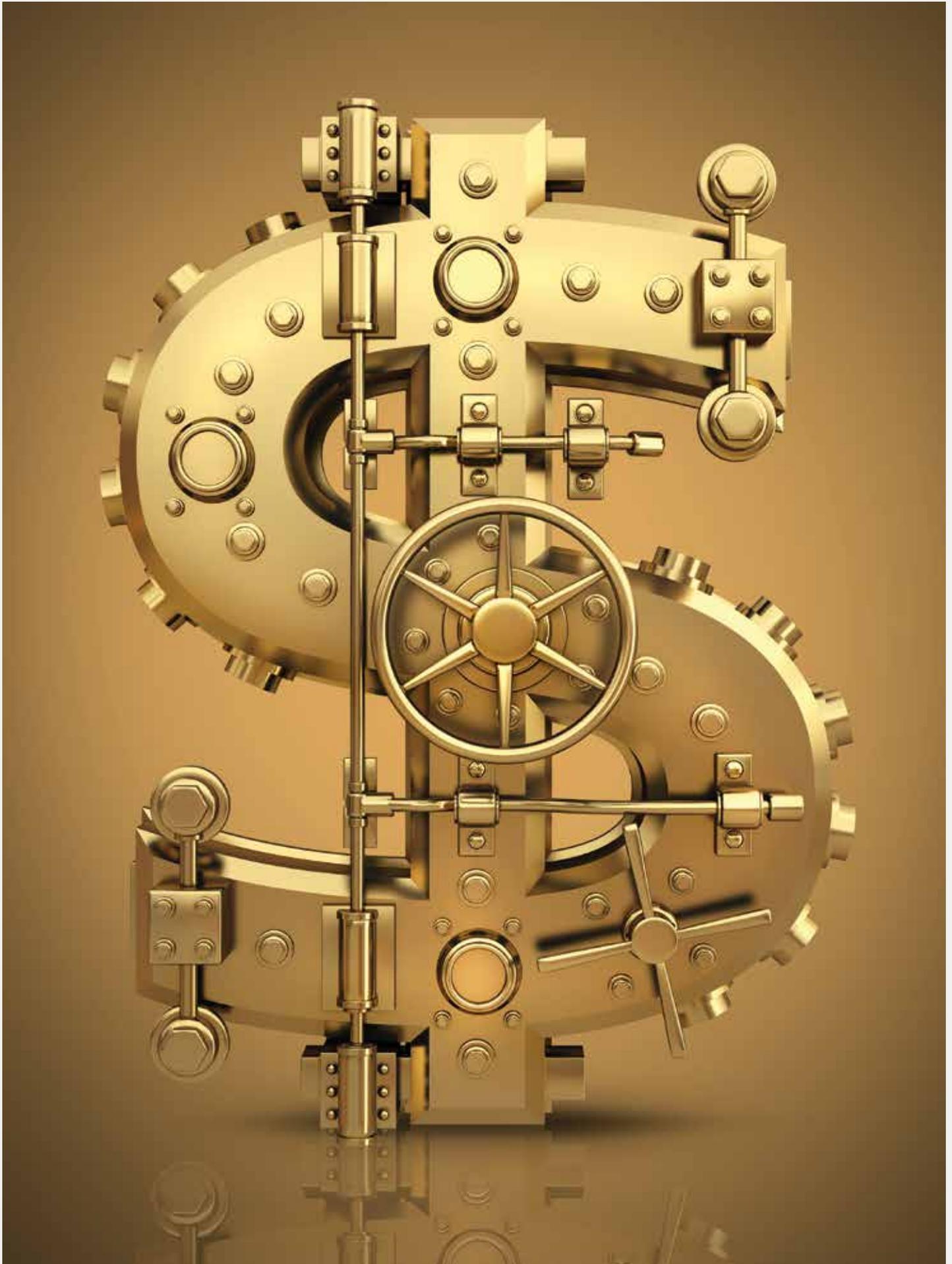
Battling on against fraud

92% of our survey respondents believe fraud will remain a top concern in the future of online commerce. This concern is well noted when you consider that large e-commerce and m-commerce merchants lose 1.4% and 1.7% of revenues respectively to fraud according to the 2015 True Cost of Fraud Study.

3D secure continues to be one of the key defences for online card payments but the mechanism is dated and provides a poor shopping experience, reducing conversion rates and negatively impacting merchant revenues. The user experience becomes even worse on mobile devices with many merchants simply refusing to install it on their apps, which could be problematic, as 21% of total e-commerce in the US in 2016 is expected to be via mobile.

New ways for securing card payments online are being piloted across the world. Getin Bank in Poland and BPCE in France have both launched pilots for cards with dynamic card verification codes (DCVC). The DCVC replaces the static three-digit security code on the back of the card with a changeable code that is altered electronically every hour. Other methods to tackle fraud involving device fingerprinting, biometrics, geo locating and behavioural analytics continue to be developed.





Mobile Wallets Half empty, half full

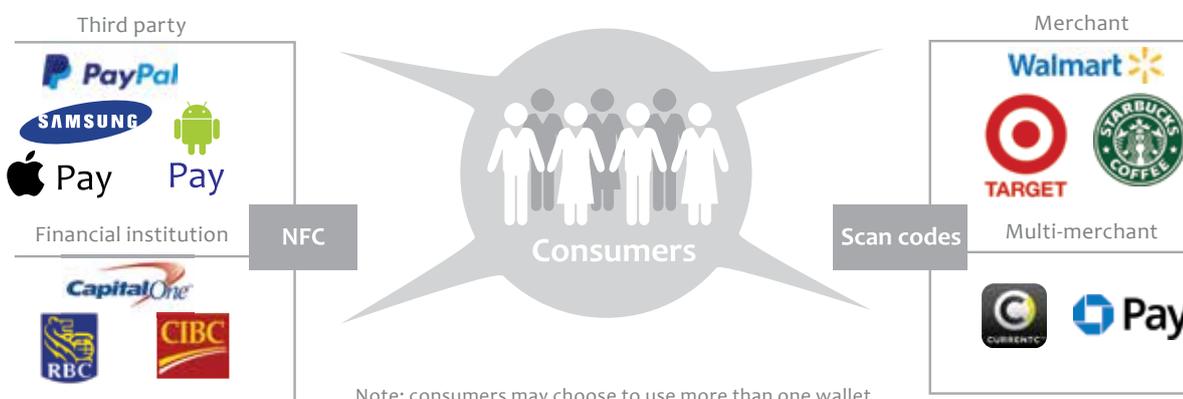
Industry surveys in developed markets report slow adoption or declining usage rates of mobile payments among consumers. The industry is divided in its evaluation of this data. Some observers say that the low usage rates are indicative of a weak consumer value proposition and are very sceptical for the future of mobile wallets. Others, however, are more optimistic and believe the glass is half full, not half empty.

Mobile wallet taxonomy

A mobile wallet – also called an mWallet, digital wallet, or eWallet – refers to an application used on a mobile device that can store payment credentials that enable a customer to make payments online, or in stores via contactless technologies.

Consumers have no shortage of choices today, and more options are expected to be introduced over the next few years. EDC has segmented the mobile wallet offerings into four categories, as depicted in the diagram below:

► **Third party wallets:** provided by entities outside the banking system such as mobile device providers and mobile network operators (MNOs)



They conclude that it is only the beginning for the mobile wallet and the opportunity to achieve its potential can be realised as the consumer value proposition is strengthened, negative perceptions of security are addressed, and widespread acceptance is finally achieved. Edgar, Dunn & Company (EDC) 2016 survey results reflect both perspectives but respondents in general are optimistic with 66% indicating that mobile wallets will continue to grow significantly, despite a complex and already competitive landscape.

► **Merchant wallets:** proprietary to a single merchant and typically tightly integrated into that merchant’s online digital strategy

► **Multi-merchant wallets:** designed to be accepted by multiple merchants who have opted into the programme. They include merchant-specific loyalty capabilities as well as payments

► **Financial institution (FI) wallets:** offered by Financial institutions to address the needs of consumers who prefer to use the payment services from their trusted FI and do not really trust other entities to protect their payment credentials. Both open (multiple FIs) and closed (single FI) models exist

Third party wallets

Since the launch of Apple Pay in 2014, followed by Android Pay and Samsung Pay in 2015, wallet solutions have been provided to users across most operating systems with enhanced security and usability. As noted in the table below, the solutions have many elements in common but which differ in key areas, including the ability to incorporate loyalty programmes and related incentives:

	Apple Pay	Android Pay	Samsung Pay
Launch Date (initial market)	Oct. 2014 (US)	Sept. 2015 (US)	Sept. 2015 (South Korea and US)
# of POS Locations	> 2M	> 2M	~30M worldwide
Connection	Near Field Communication (NFC)/ Secure Element	NFC/HCE	NFC/HCE and MST (mag stripe transmission)
Authentication	Tokenisation, Fingerprint	Tokenisation	Tokenisation, Fingerprint
Loyalty Programme	Support reward programmes and store-issued cards	Tie into retailer's loyalty programme; coupons/ discounts	Tie into retailer's loyalty programme; coupons/ discounts
In-app Acceptance	Yes	Yes	Yes
Fee	Charges issuer a transaction fee (US)	No fee arrangement	No fee arrangement

Additional wallet solutions include:

- ▶ **PayPal:** expected to launch NFC capabilities within its mobile app in the latter part of 2016. The US and Australia are expected to be its initial markets
- ▶ **Vodafone wallet:** launched in 2013, it has enabled users to make NFC payments via their Visa and MasterCard cards since 2015. It is available in Germany, Italy, the Netherlands, Spain and the UK. PayPal has announced a partnership that will enable PayPal to be used within the Vodafone wallet
- ▶ **Alipay wallet and WeChat wallet:** Serving the needs of Chinese consumers, both enable users to make e-commerce and face-to-face purchases. Both wallets are expanding to provide purchasing options for travelling Chinese consumers. Alipay is accepted in stores in Hong Kong, Singapore and South Korea. WeChat wallet plans to partner with over 10,000 retailers in Japan over the next three years

Merchant wallets

Merchants view the mobile wallet as a way to enhance relationships with customers and to interact with them on a much more direct and personal level. For many, the mobile platform is key to their digital strategy and their omni-channel approach. Integrating payments within their mobile apps is a logical development toward reducing the friction in the payment process. Merchants are actively investing in the development of proprietary wallets, targeting their most loyal customers, in which they can provide incentives that deepen relationships with those customers. The Starbucks app, the leading example of a merchant wallet, demonstrates the positive impact of a wallet on a company's brand.

Two of the largest merchants in the United States announced their mobile wallet plans in December 2015:

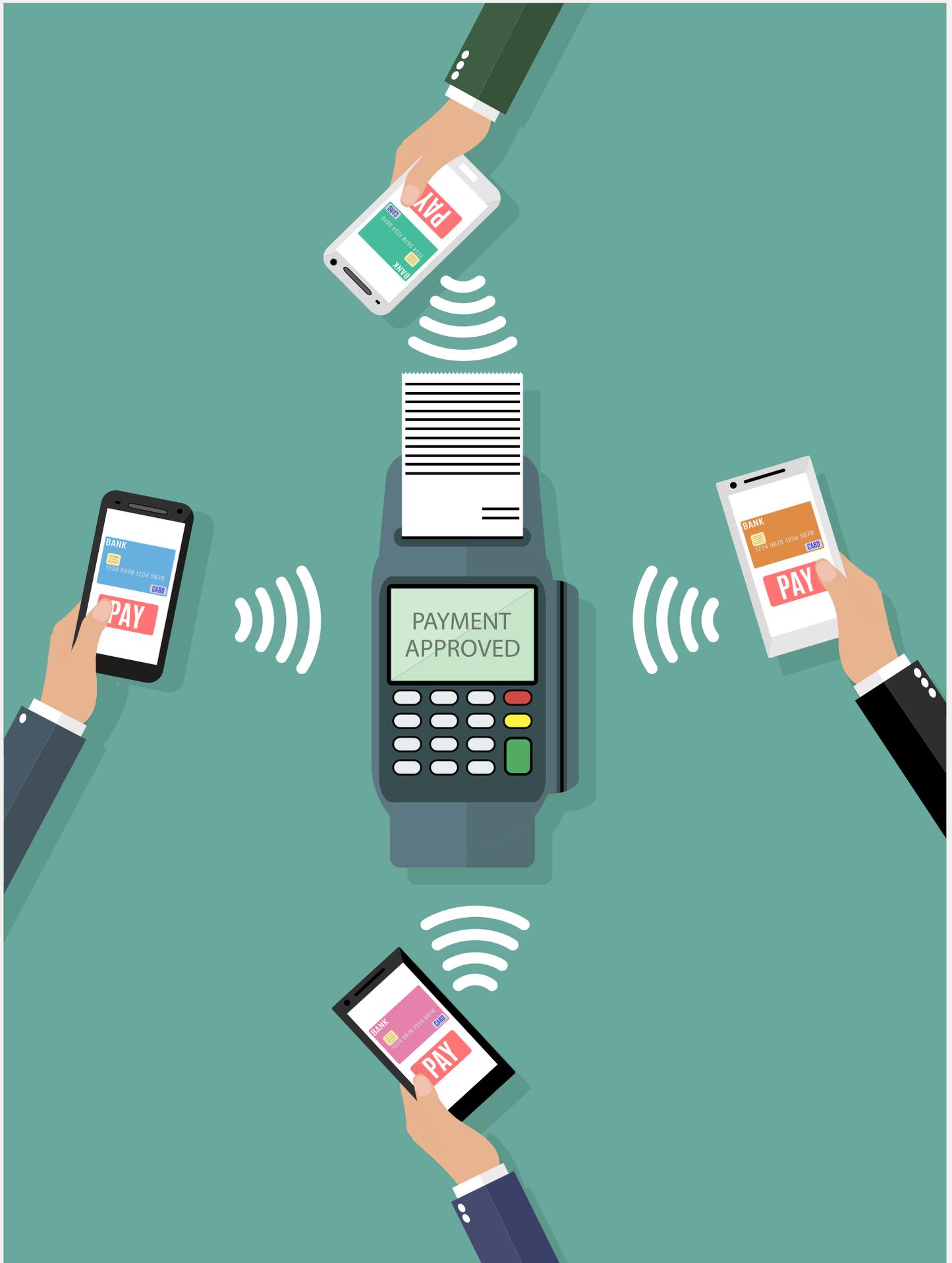
▶ **Walmart** launched a pilot of its own mobile payment wallet, Walmart Pay. The pilot is active in selected US stores and allows shoppers to pay with any major credit card or debit card as well as Walmart's own gift card. It uses Walmart's existing smartphone app in which shoppers select their payment method, activate the camera and scan a QR code displayed at the register. Customers can then put their phone away while the system connects the register and the basket of goods being purchased with the payment method selected. An e-receipt is sent to the app. Nationwide rollout in the US is expected by mid-2016

▶ **Target**, the fourth largest US retailer, is widely expected to develop its own mobile wallet leveraging its app. Target's wallet is expected to partner with existing card products as well as its private label card and may also rely on barcode/QR code scanning. Rollout is unlikely until 2017

Multi-merchant wallets

These wallets provide payment services integrated with loyalty and promotions at merchant locations that participate in the service. Acceptance is not ubiquitous as with the major credit cards, but merchants are incentivised to promote the service to consumers. The two leading examples are:

▶ **Merchant Customer Exchange (MCX)**, a consortium of some of the largest US merchants, pioneered the multiple merchant wallet solution and is now in market trials with its CurrentC solution. CurrentC enables consumers to



pay directly from their bank account, use store cards and gift certificates (but not credit or debit cards). Developed with the twin objectives of strengthening merchant relationships with their customers and of placing payments at the centre of the customer experience, the retailer's loyalty programme is integrated with CurrentC so that offers and promotions can be delivered directly to consumers. It utilises scanned QR codes as the interface into the POS systems

► **Chase Pay** will be launched in mid-2016. Chase, in partnership with MCX, will leverage MCX's QR code based technology and merchant acceptance network for Chase Pay. Chase will pre-populate its customers' Chase credit and debit cards into the wallet, but it does not currently accept non-Chase cards. Chase Pay promotes lower, flat merchant fees to incentivise merchant acceptance. In addition to MCX merchants, Chase Pay will be accepted at Starbucks, which is an extension of Chase Paymentech's acquiring relationship with Starbucks

Financial institution wallets

Financial institutions are also actively investigating the opportunity to provide their customers with wallets that carry their branding. They are motivated by competitive pressures to avoid being disintermediated by technology companies like Apple and Google or by the emerging merchant wallets. Financial institutions want to leverage their relationship of trust with their customers while ensuring that the core competencies of facilitating payment transactions remain relevant to customer segments who are digitally savvy and expect to see services delivered via their mobile devices.

Some notable examples include:

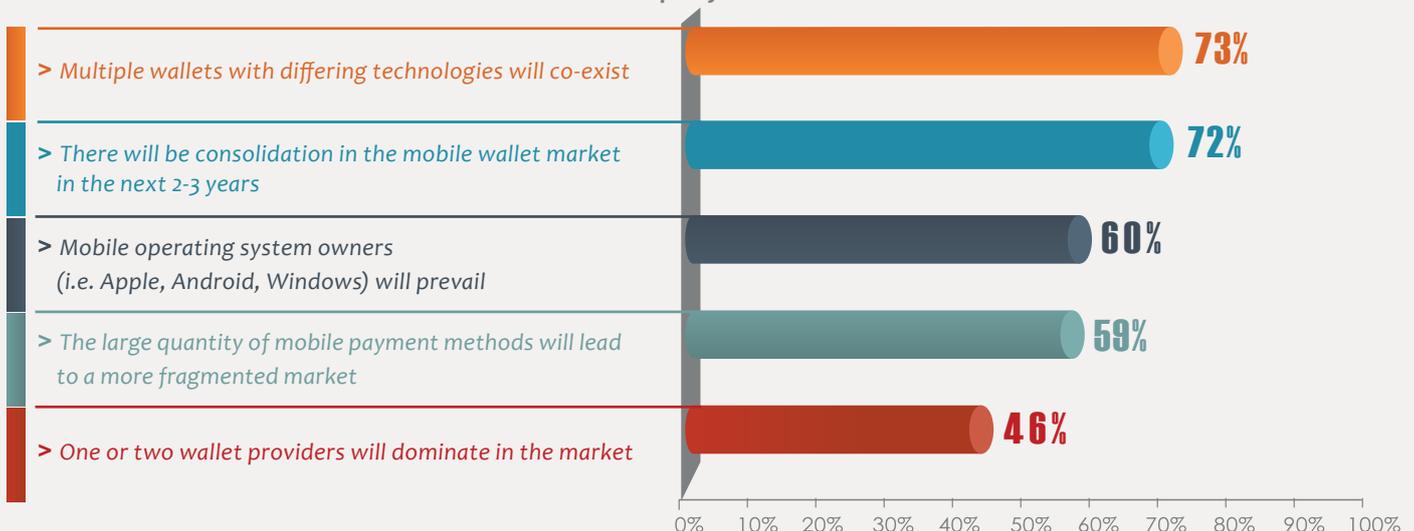
- Both Ugo and Suretap in Canada have evolved into open wallets with multiple FI partners. Ugo participants include Toronto Dominion, President's Choice, MBNA and Cuets Financial. Suretap's leading FI is CIBC
- The Capital One Wallet in the US is integrated into the bank's mobile banking app
- Banks and other providers in Europe have been focusing on collaborative person-to-person payment solutions which are discussed in a separate section of this report. BKM Express, developed by BKM, the interbank card centre in Turkey offers wallet holders the ability to make online, mobile, and even person-to-person payments

Glass half-full

Survey participants are optimistic about the future potential of mobile wallets. 66% responded that they agree or strongly agree with the statement that proximity payments are successful and will continue to grow. The continued growth of contactless acceptance points and the introduction of more robust rewards and incentive programmes will likely fuel that growth.

This year's survey respondents overwhelmingly believe that consumers will continue to have multiple choices for their mobile wallet needs. Despite a high expectation (72% of survey respondents) of consolidation among wallet providers, 73% of survey respondents believe that multiple wallet providers and technologies will continue to co-exist. Only 60% of those surveyed believe that mobile operating systems as a group will prevail and even fewer (46%) believe that only one or two providers will dominate the market.

How the so called "mobile-wallet" will play out



Personal Payments Making money flow

The most successful mobile P2P services are located in emerging markets, especially in Asia and sub-Saharan African markets such as Kenya and Tanzania. P2P payments initiatives vary substantially from market to market, offering an increasing array of methods, transfer speeds, technologies and business models.

Emerging markets paradoxically present opportunities for payments via mobile devices due to a lack of financial infrastructure and low penetration rates for bank accounts. More than 100 mobile operators in Africa have launched mobile money services, the most celebrated of which is M-Pesa, launched in Kenya in 2007. 92% of Kenyans sent or received a mobile P2P payment in 2015. Tanzania is also a key market as mobile operators have joined efforts and enabled interoperability between different money services - Airtel Money, Tigo, M-Pesa and Zantel's EzyPesa.

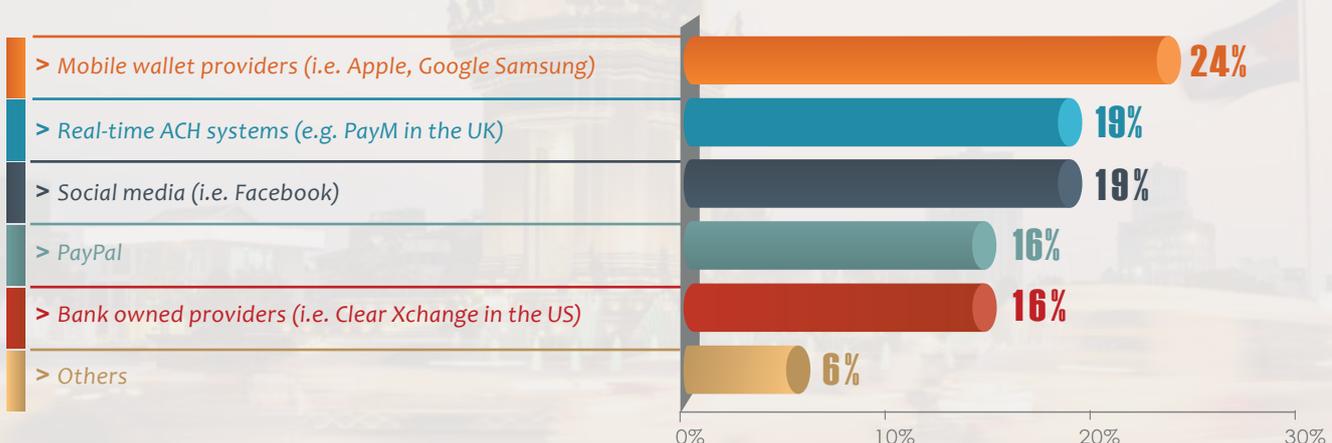
In developed markets

Personal or person-to-person (P2P) payments in developed markets often refer to payments needed to settle small personal obligations, such as for shared expenses, and are typically paid in cash or cheques, but other methods are available.

Our survey revealed that respondents see promise in some of the new actors in the personal payments area. Mobile wallet providers win the top spot for the entities most likely to lead in the future followed by real-time payment systems and payment services provided by social media players.

Digital P2P payment services, whether offered on a desktop computer or over a mobile device, have struggled to take off in markets with mature payment infrastructures and high use of electronic payment methods such as payment cards and bank transfers. PayPal is the clear exception in many ways, having pioneered online personal payments. A resurgence in such payment services is underway as providers believe that P2P payments driven by intuitively simple mobile apps will prove popular, especially with younger consumers. PayPal may appear ahead of the pack but others are gaining ground.

The type of player more likely to win the P2P payments battle



In the US, Venmo – a mobile P2P payment service and part of the PayPal group reported total payment volumes of \$2.11 billion, a 200% year-over-year increase in Q3 2015. Venmo has even engrained itself in popular vernacular in the US: “I will pick up the tab and you can Venmo me later”. Square Cash, clearXchange and Pop Money are other popular P2P payment options offered by both new entrants and banks.

Payment messaging

A common trend in P2P payments in Asian markets is their integration with messaging apps. WeChat, the most popular app in China with 550 million active users, launched its payment feature in 2014 and it has been used by 80% of its users to date primarily for micro-payments and mobile games.

In 2015 during the Chinese New Year, WeChat users sent more than 1 billion virtual ‘red envelopes’ – a Chinese gift tradition - filled with money within 17 hours.

A popular option was sending an envelope to a fixed number of recipients within a group and the first to click on the link would earn an unspecified portion of the total envelope value. Tenpay, one of the two main wallets in China, supports this payment function on WeChat. WeChat, currently supporting nine currencies including USD, GBP and Euros, is adding B2C and overseas payment features.

Today, WeChat absorbs most of the transaction costs. However, as of March 2016, a fee of 0.1% will be levied on digital transfers to bank accounts when the sum exceeds 1,000 yuan (approximately US\$153). P2P payments between WeChat accounts will remain free of charge. KakaoTalk in South Korea or Line in Japan are also examples of instant messaging apps with P2P payment services.

Payments over Facebook Messenger may also gain momentum thanks to Facebook Messenger’s huge user base which is similar to WeChat. Apple is also looking to gain a foothold in P2P payments. Apple lodged a patent application in 2015 that focused on P2P payments encryption. Rumours suggest that the transfers could be linked to Apple’s iMessages.

Banks

A key issue that could tip the balance in favour of banks is security. Six Swedish banks decided in 2012 to leverage the country’s banking infrastructure to launch Swish, a P2P payment service which has 4.5 million users (in a country of 9.5 million inhabitants). Other similar initiatives such as Paym in the United Kingdom have achieved moderate success, having been used for approximately 0.8 million transactions with a total value of £42million in 2015.

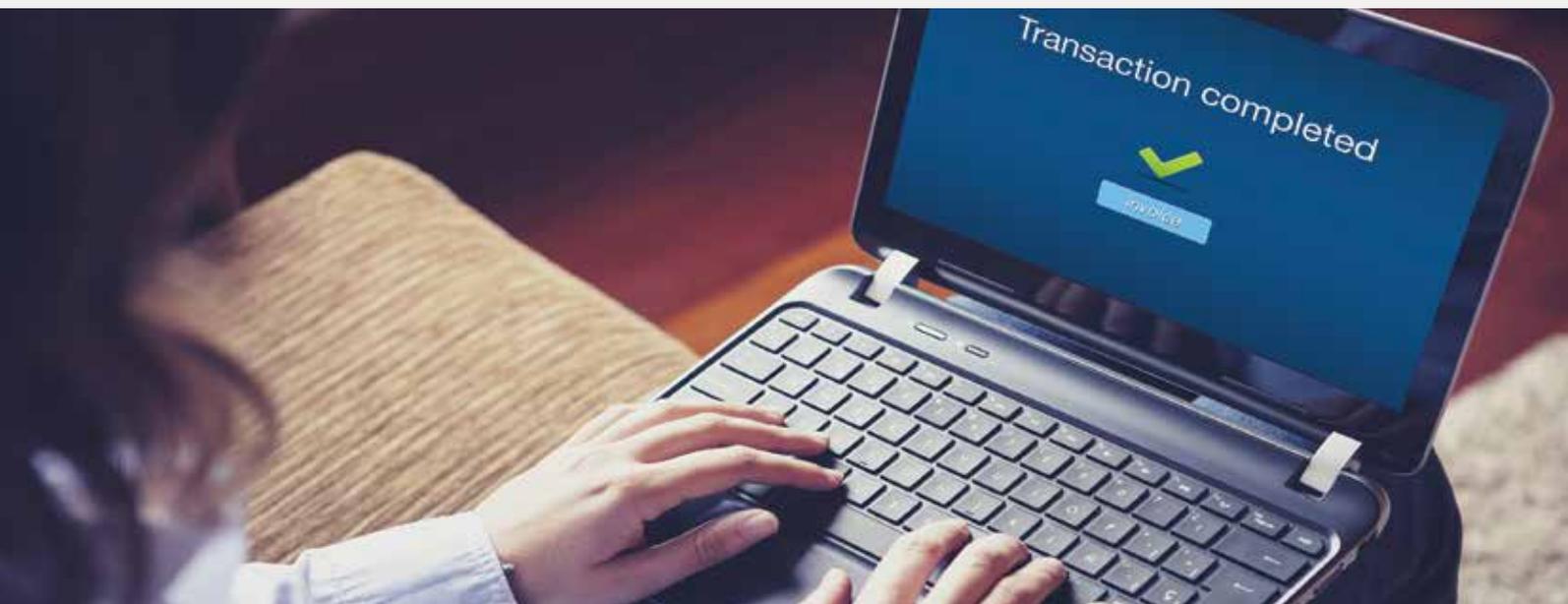


Cross-border personal payments

“International” or “cross-border” P2P payments, also referred to as international remittances or international money transfers, represent a very different industry dynamic. The industry is presently dominated by Money Transfer Operators (MTOs) such as Western Union and MoneyGram and banks who have been facilitating payments via bank accounts across markets for many years.

International remittances are highly attractive for several reasons:

- ▶ **High Revenue Potential:** Remittance service providers trusted by their customers are able to charge fees as well as earn foreign currency conversion revenues. Price comparison sites and many non-profit entities monitor remittance prices to ensure consumers are aware of what they are paying but many tend to trust their providers even if they know there are cheaper alternatives available
- ▶ **Stable Demand:** Remittances are necessary and represent the primary income for families back home. Many migrant workers live on minimal budgets so that they are able to send most of their earnings back home to their families. Even better-off migrants need to remit funds to pay for mortgages or other obligations at home
- ▶ **Expanded Opportunities:** Beyond individual remittances, companies can focus on international payments that businesses have to send to suppliers in other markets. These transactions represent higher transaction values and can be more profitable



But there are significant challenges that face companies who want to enter the remittance business:

- **High costs:** Revenues may be high but so are costs. New entrants soon realise that while they can charge fees and earn on foreign exchange conversion, the costs of running a remittance business can be significant. Cash handling agents (who take cash from senders or pay cash out to beneficiaries) charge high commissions which can eat up more than half of generated revenues. The costs of developing a fully compliant risk management infrastructure are also prohibitive. Regulations to mitigate against risk are becoming more stringent and compliance costs are increasing
- **Steep penalties:** The penalties for non-compliance are substantial and can drive companies out of business. A few years ago, a large global bank was fined nearly USD \$2bn because its internal documentation processes were inadequate even though there was no evidence of fraud

Intense competition: the cash guys

Incumbent MTOs hold an advantage when it comes to cash based remittances. The physical agent networks take a long time to recruit. Agents have to be trained and monitored regularly. Competition can be categorised into three tiers based on the breadth of their services:

- **Tier 1:** Giants like Western Union and MoneyGram rely on long standing agents ranging from small corner stores in remote areas to large banks with whom they have established trusted relationships over many years. They charge high fees but in exchange they offer speed (often as quick as 15 minutes) and flexibility (there is likely to

be an agent nearby who is ready to dispense cash to the beneficiary)

- **Tier 2:** Large companies that tend to focus on specific corridors – usually the major ones. A well-known example is DoLex which specialises in the US to Mexico remittances, the largest corridor in terms of total payment volumes transferred

- **Tier 3:** Smaller entities who focus on a single corridor and usually have a physical presence in migrant areas

Even cash based remittance specialists need bank accounts so that customers can deposit cash in a bank branch. But banks, wary of the risks of non-compliance and the heavy fines that come with it, have been closing down bank accounts in some markets, driving many small players out of business.

Banks

Banks mainly deal with money transfers from one bank account to another. Although this is their core competence, it can take 5 days or more for funds to reach a foreign bank account. Unlike card transactions where global networks such as Visa and MasterCard

exist, there are no international interoperable networks, to facilitate and automate international bank transfers. SWIFT, a messaging standards body, covers messaging between banks, but the actual funds transfer involving clearing and settlement is done through a complex web of correspondent banks, dominated by the global giants. The process takes time and is expensive.

Intense competition: currency exchanges

To fill the gap, international currency exchange houses offer better services, often lower or no fees, and better exchange rates than banks. They do not have widespread agent or branch networks and often use local banks to do quick local bank transfers. In general, they attract rate sensitive customers who have cross-border payment needs (e.g. to pay for purchase, upkeep of foreign property or pay suppliers of their small business).

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...in the business of
international money transfers
someone and something
unsavoury always gets through
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its acquisition by PayPal), as if to confirm the industry truism that no matter how much one spends on the risk management systems, in the business of international money transfers someone and something unsavoury always gets through.

Remitly, a Seattle based start-up, is aiming to emulate the success of Xoom and boasts fellow Seattleite, Jeff Bezos as an initial seed investor. Its core focus is on mobile - offering services through a highly usable mobile app. In 2015, it bought Talio, a picture messaging app which has Snapchat-like features. Set-up by ex-Amazon software developers, it joins a cast of thousands in the

Fintech world who believe that a combination of three factors (1) convenient and slick mobile interface (2) good customer service, and (3) competitive pricing, can disrupt any industry. Like Xoom it is concentrating on US to India, the Philippines, and Mexico flows – 3 corridors which account for 35% of remittances sent from the US.

Intense competition: the new guys

Most start-ups and new players are targeting account based remittances through creative mobile apps. Xoom was an early challenger that focused on key US remittance corridors to India, Mexico and the Philippines. It was successful by providing immediate credit of funds transferred by senders (an innovative feature in a market where bank transfers take 3 days to clear and settle), and offering multiple cash out scenarios. While it extolled the virtues of its advanced risk management systems, it fell victim to a fraud amounting to USD\$30 million, impacting its stock price in early 2015 (prior to

Another company World Remit, is carving out a separate business segment of “South-South” money flows (such as South Asian workers in the Middle East sending money home) which, according to the World Bank, are now larger than “North-South” flows (migrants in the richer Western markets of Europe and North America sending funds to poorer countries).

TransferWise and TransferGo are perhaps more well-known than any of the companies mentioned above because of the significance and breadth of their marketing and advertising campaigns, the range of early celebrity investors, and the general success in appearing in Fintech and general news on a regular basis.

The international money transfer industry has been the focus of many start-ups, but the industry has not been very hospitable to new entrants in the past. New players hope that a combination of technology and innovative business models can enable them to capture profitable market share from industry incumbents in specific corridors, if not on a global basis.

Real-Time Payments In the blink of an eye

Advances in technology are bolstering innovation such as the Internet of Things (IoT) and autonomous vehicles, which would have belonged to the realm of science fiction just a decade or two ago. This ongoing transformation has raised consumers' expectations to the point where everything related to information is expected to be available 24/7, in real-time and on any device.

Translating these expectations to the payments industry means that any person or institution should be able to exchange funds with any other party across the world in real-time and in a secure manner, over the channel of their choice. Significant progress has been made in specific areas, but today's reality is still far from this vision.

The main stay of electronic funds transfers between bank accounts has been via Automated Clearing House (ACH) transactions. Early technology infrastructure for ACH transactions, implemented decades ago, processed payments in batches and required a few days to clear and settle transactions. In those days, the Internet was not yet a factor and concerns around security and privacy were not so critical or public. But end-user expectations for banking and payment services have increased alongside the rapid rise of other online and mobile services. Similarly, security concerns driven by the frequency of large scale data breaches now feature prominently in the minds of users and providers alike.

In response, ACH systems have received over the years many add-ons and new layers to enhance their speed, security and user experience features. However, the core design and processes of ACH platforms continued to stay the same, while the increasing complexity of added layers has diminished their ability to fulfil the demands of today's use cases effectively.

Real-time payments

Bank-to-bank real-time payments are not new and have been in use in Japan since 1973, but widespread adoption across several markets is only taking place now. A dozen markets have implemented these since 2001, with the UK, Mexico and Chile being the more prominent examples based on the widespread use of real-time payments in their respective markets.

Today, there are at least 20 additional markets implementing or planning to implement real-time payments. Two initiatives in particular bear close watching: The Fed Payments Improvement in the US and the cross-border instant payments initiative in Europe.

Together, the US and European Union account for 46% of

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The interoperability between different payment networks will grow gradually

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the global economy. While they share similarities around the size and the complexity of linking to thousands of financial institutions, their regulatory frameworks follow very different approaches. Implementation in Europe is being mandated, while in the US it is not. This lack of mandate in the US may result in a challenging environment to generate a much desired ubiquity and widespread adoption, especially if multiple solutions co-exist and interoperability becomes an issue.

The solutions implemented in these two regions will set the standards for future global roll outs. Europe has decided to adopt ISO 20022, and while solutions in the US are still under development, they are likely to adopt the same standard as well.

Beyond speed

While the speed of payments, by definition, is clearly the key feature of real-time payments, next generation payment infrastructures promise much more. These include improvements to other core features including enhanced security, richer data, improved end-user experience and network interoperability.

Enhanced security is at the top of the requirement list for real-time irrevocable transactions. There are two critical aspects to consider. The user needs to be securely authenticated, and account credentials need to be protected both when the data is at rest and on the move. The concept of a robust user authentication is evolving from the enforcement of strong password policies to incorporating a combination of multiple-factor authentication, digital signatures and the use of biometrics (e.g. fingerprints, palm-prints, facial and voice recognition, eye scans, and heart-rate). To protect account credentials, a combined use of account aliases, directory services, dynamic tokens, and end-to-end encryption will become the norm to guard against fraud from data-breaches. The standards will continue to evolve with time and will need to balance user experience, with cost and security. For a more detailed discussion please refer to the section on security.

Support for richer-data will greatly enhance the value provided by payment systems to its users by streamlining processes, enabling advanced analytics and eliminating the need to reconcile information that currently travels over different systems. Whether it is a real-time notification of payment, delivery of an electronic

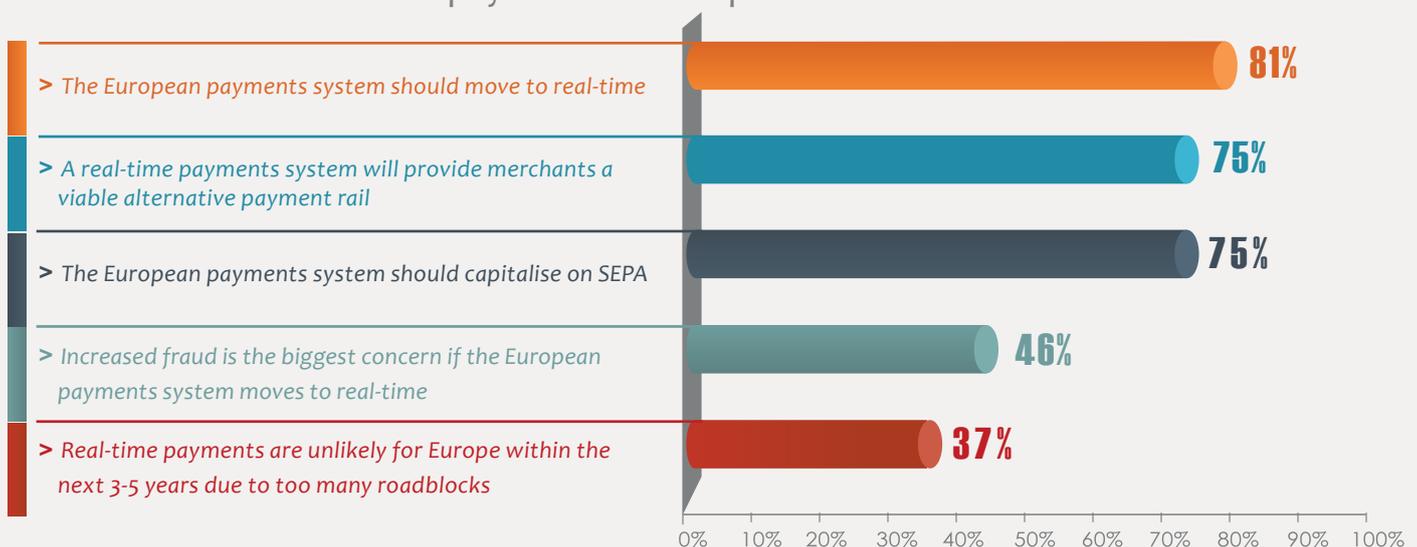
document (e.g. invoice, description of benefits, payroll slip details, tracking number) or the simultaneous integration of supply-chain and payment information into an Enterprise Resource Planning (ERP) system, it is fair to assume that a great number of transactions will benefit from enabling a rich bi-directional information exchange together with the payment transaction itself.

When we consider the development of such a fast and efficient payment rail and combine that with today's trend in opening up payment rails through APIs (Application Programming Interface); it becomes apparent quickly that such a payment system could provide the basis for many new customer experiences and true innovation that make good use of its additional capabilities. That is true for banks as well as Fintech innovators.

Lastly, and key to the success of any payment system, the interoperability between different payment networks (domestic and cross-border, closed loop and open loop) will grow gradually, driven by competition, converging capabilities and more mature standards. We are likely to see big differences in speed between the different markets driven largely by the local payment cultures.

The progressive modernisation and interoperability of the global payments infrastructure will not be determined as much by technology limitations but by the ability of competing financial institutions and other stakeholders to cooperate and align their objectives in an industry that tends to be quite fragmented and is regulated differently around the globe. This cooperation will not come easily or fast, as the future role of financial institutions as well as their business models, competitive advantages

The outlook for real-time payments in Europe



and market shares are at stake. Ultimately, it will be the pressure applied by the innovators against the ability to resist the revolution by some traditional players that will determine how the payments industry will look in a decade or two.

Timeline of adoption

In Europe, the respondents to our survey were significantly more in favour of moving the European payment system towards real-time (81%) than their US counterparts (68%). This is likely due to the longer history of real-time payments in Europe and the momentum generated by the establishment of SEPA. It is also due to the strong role both by European and national regulators to reform and modernize the payment systems.

In the US, there is still a sizeable majority of respondents in favour of moving to real-time payments, but the market is more diverse in its views due to the absence of a mandate which gives the players more leeway to make their own decisions. It is likely that there will be several competing players vying for market share. The absence of a mandate also places much higher importance on the question of payment profitability and return on investment on payment infrastructure projects. It is not an issue of stopping the real-time payments train that looks ready to leave the station, but of timing when

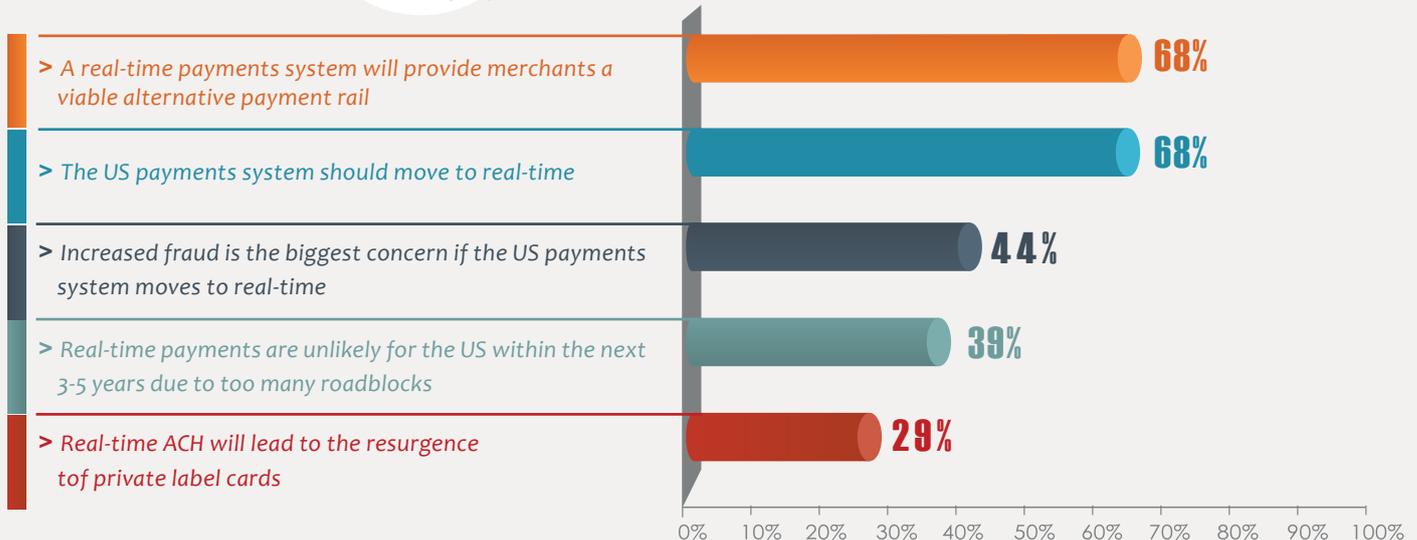


to climb aboard in the interest of maximising current payments profitability versus the future ability to compete effectively in the digital age.

The most interesting learning from the responses is that both the US (68%) and European (75%) respondents believe real-time payments will arrive at the merchant POS in due course to provide a credible alternative to existing payment systems. If successful, pioneer services such as ZAPP in the UK that provide mobile payments via bank accounts at the POS, are likely to trigger similar initiatives elsewhere. This is likely to revolutionize the global payment landscape over time.

Lastly, it appears that both US and European respondents expect this new world of real-time payments to happen sooner rather than later. While fewer than 40% of respondents indicated that real-time payments in both Europe and the US were unlikely within the next three to five years, it would appear from many conversations since the survey was sent out that this timeline is rapidly becoming more widely accepted. The European Payments Council has set targets for late 2017. In the US the timeline is less clear-cut, but potential providers have already launched partial offerings (Early Warning P2P) or are expected to launch first offering end 2016/ 2017 (The Clearing House). This will be followed by multi-year efforts to achieve ubiquity.

The outlook for real-time payments in the US



Security - Authentication

The price of convenience

In today's online and mobile commerce environments, customers struggle with the frequency with which they are being asked to come up with new, extended and increasingly complex passwords and deal with cumbersome multi-factor authentication processes. The sheer number of innovations in payments is exciting, but while customer satisfaction is of paramount importance to any business, security cannot be set aside.

Of course, everyone can agree that the industry should deliver both convenience and security. Unfortunately, these two elements often influence the payment experience in two different directions. As pressure increases in the development of strong and convenient authentication, regulators and providers are looking to new technologies, biometric sensors in particular, for solutions.

Strong authentication – a regulatory reality

Despite gaining attention around the world over the past 10-15 years, strong authentication has long been a concept without a formal definition. Since January 2013, when the European Central Bank (ECB) published its final recommendations for the Security of Internet Payments, the concept of strong authentication has been formally defined within the European Union. As the deadline for implementation of the Second Payments Services Directive (PSD2) into

national laws approaches, consumer authentication will become an even more important aspect of the payment process. PSD2 contains a significant adjustment to the guidelines for payment service user authentication, with the purpose of ensuring that payment providers can confidently confirm consumer identity.

Under current plans, providers will be required to apply “strong customer authentication” whenever an electronic payment transaction is initiated by a consumer, and requires the combined implementation of at least two independent authentication elements:

- ▶ Knowledge-based authentication: something that only the user knows
- ▶ Possession-based authentication: something that only the user possesses
- ▶ Inherence-based authentication: something that the user is (the most prominent example being biometrics)

These new guidelines are expected to further accelerate the current migration of authentication processes away from single-factor authentication and towards multi-factor authentication solutions.

Authentication will also be required to support the open banking and payments APIs currently being investigated as a precursor to defining the third party provider (TPP) interfaces to the banking system, as defined in PSD2.

Strong authentication continues to be a hot topic in many markets. In the US, the Federal Financial Institutions Examination Council (FFIEC) continues to publish regular online authentication guidelines in order to reflect the fast evolving nature of consumer behaviour and security landscapes.



The security vs. convenience dilemma

Strong authentication in the payments and banking industry has always been prone to a “security vs. convenience” dilemma. Consumers are constantly being presented with new and evolving payment options, from mobile wallets to wearables, by a wealth of providers (e.g., Apple, Google, Samsung, Venmo and Stripe to name a few). The drive to deliver innovative and convenient payment solutions is intriguing, but also typically plagued with new security vulnerabilities.

As security measures continue to become more sophisticated and complex alongside an almost constant drive to deliver a seamless and positive experience for consumers, there may be conflict between the direction in which the industry is heading and the one where regulators wish to guide it.

Banks and other financial institutions have continued to employ a range of products that offer many levels of security. They face a real challenge in today’s environment that goes beyond providing additional complex authentication and security layers. Customers need to be able to complete their transactions or banking needs securely, while being able to avoid having multiple barriers put in their way.

The impact of new guidelines by financial service

regulations on transactions of both European Union and non-European Union consumers could be significant, requiring providers that are regulated in the European Union to change their customer authentication procedures in order to comply. These changes may be extended to cover all customers in order to maintain a consistent customer experience.

Passwords

Our use of passwords in today’s society is critical. We log in to dozens of systems and services every single day. According to a study from UK organisation Cyber Streetwise, an average person must remember 19 passwords on a regular basis, spread between their financial passwords, social networks and e-commerce activities amongst other things. As the number of online services continues to increase along with the complexity of security, users are prompted to create or change passwords on a continuous basis.

Authenticating consumers quickly and securely has become a frustrating but critical requirement for all industries – none more so than for financial and banking institutions. With new multi-factor authentication standards, the challenge will be how to guarantee security and compliance without jeopardising the customer experience.

Biometrics and smartphones

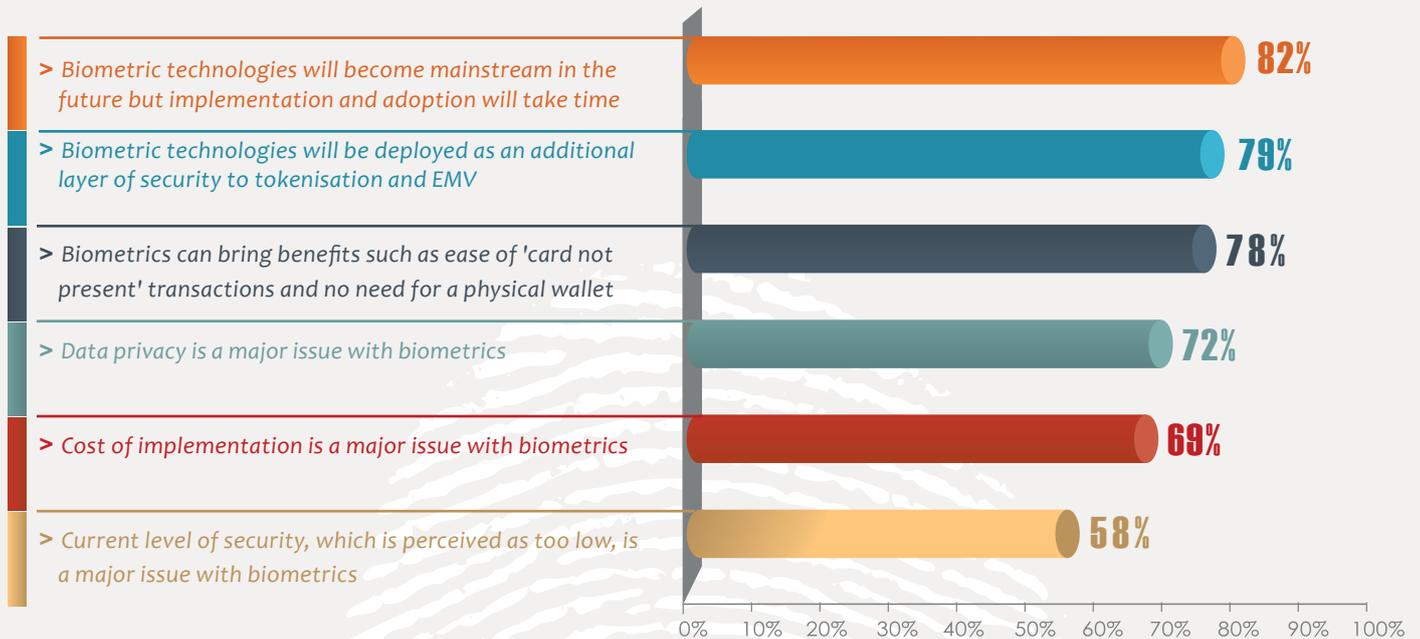
The world has long been fascinated by the concept of biometric technology. Movies such as James Bond and Minority Report have hinted at a society where our inherent physical characteristics are fundamentally linked to our digital identity. These technologies are certainly not new. However, what has long been a slow and gradual evolution has reached a tipping point. Your face or fingerprint, iris or even heart beat could be used to authorise payments.

Given the prevalence of smartphones that natively support biometrics and push notifications, there is an opportunity to finally provide a secure and convenient experience, not just in the financial industry but also in e-commerce and social networks.

The core feature of using a mobile device as an authentication channel is that consumers can authorise a transaction with a single tap of their phone, enabling a secure authentication and providing a significantly better user experience.



The benefits and concerns of biometrics



As smartphones continue to become powerful tools for delivering financial services, their use in authentication is expected to increase. Banks and other service providers are investing in and experimenting with various technologies in order to improve payments security and the use of biometrics is becoming increasingly common. According to research conducted by Gartner, 30% of mobile devices will use biometric authentication in 2016.

Industry expectations and trends

This year's survey respondents recognise the potential for biometric technologies with 82% indicating that they believe biometrics will become mainstream, although there are concerns that implementation and adoption will take time. Respondents identify authentication as a core use of biometrics with 79% indicating that it is likely to be used as an additional security layer.

While other biometric authentication options have yet to achieve significant adoption, the use of fingerprints is becoming commonplace. Fingerprint authentication is moving into the mainstream with the introduction of Touch ID in Apple handsets and its integration into Apple Pay in 2014. Other providers, such as Samsung Pay, have also put fingerprint biometrics at the centre of their payments play.

While the popularity of using fingerprints for authentication is growing, there are ongoing discussions around the true level of security provided. Security

researchers have demonstrated that they are able to replicate fingerprints in order to fool technologies such as Touch ID into giving a false positive identification. Despite these flaws, the reality is that consumers have taken to these technologies. Adoption is on the rise and availability continues to grow as multiple device manufacturers are embedding the technology into their smartphones.

The Fast IDentity Online (FIDO) Alliance, a non-profit organisation founded in July 2012, comprising companies such as Google, Visa, MasterCard, PayPal, Bank of America and Microsoft recently published its final specifications on how to "kill" the traditional password. The FIDO Alliance has a focus on leveraging existing biometric capabilities, particularly those already available in mobile smartphone devices, such as voice recognition and fingerprint sensors.

Banks around the world are beginning to adopt fingerprint technology in order to authorise payments via smartphones and development is underway to deploy iris detection in front-facing cameras. Fujitsu, for example, is developing iris scanning capabilities for future phones. A number of banks have already introduced voice recognition systems in their telephone banking services, which verify customers based on their speech patterns. Systems such as these will again deliver the security and convenience that customers require – using similar systems, customers will be verified as they speak with a representative, reducing the overall authentication time.

Corporate Payments Facilitating trade

Electronic payments are becoming an increasingly important component of B2B commerce. Optimising payments enables businesses to solve some pain points, such as the reliance on manual processes, the lack of visibility, cash flow issues and the costs involved in processing transactions. Many businesses also focus on optimising payments in order to automate processing practices, improve data reporting, and increase controls and potentially revenues.

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A few non-bank payment providers are targeting businesses
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Identifying internal pain points and understanding business needs

Feedback from buyers (corporations, SMEs) and sellers (B2B merchants) indicates that there are some internal pain points and business needs to overcome and address when designing innovative solutions in payments, which may vary by payment method.

1. Examples of internal pain points

Pain points for buyers	Pain points for sellers
> Slow, manual and inefficient processes	> Low acceptance of appropriate payment methods (e.g. no local payment methods acceptance), including online payment methods
> Reconciliation of business expenses being time-consuming	> Manual processes to authorise, capture and reconcile transactions
> Costly solutions (e.g. card surcharging, etc.)	> No automatic data and financial reconciliation
> Lack of control and transparency over expenses (e.g. concerns about employee spending)	> Lack of comprehensive fraud prevention solutions
> Absence of appropriate solutions for SMEs	> Basic data and tailored reporting
> Current procedures non-compliant with internal policies (e.g. travel policies)	> Lack of smooth flows for real-time payments, etc.
> Lack of data and tailored reporting	

2. Examples of key payment needs

Buyers payment needs	Sellers payment needs
> <i>Electronic payment and invoicing (or e-invoicing)</i>	> <i>Easy and fast checkout, e.g. 1-click</i>
> <i>Integration with internal systems (e.g. ERP, accounting)</i>	> <i>Fast processing of payments and increased cash flow</i>
> <i>Easy payment and invoice reconciliation systems</i>	> <i>Accepting large range of traditional and alternative payment methods, via various channels (e.g. online, EDI, etc.)</i>
> <i>Payment controls and flexibility</i>	> <i>Visibility on cost of accepting payments</i>
> <i>Cost-effective and improved cash flow</i>	> <i>Real-time payments</i>
> <i>Competitive foreign exchange rates / transparent rates</i>	> <i>PCI DSS compliant payments and for all sales channels</i>
> <i>Secure payment solutions</i>	> <i>Offer value-added services (e.g. DCC offering)</i>
> <i>Better data and customised reporting</i>	> <i>High level of security (e.g. tokenisation)</i>
	> <i>Better reconciliation, enhanced data and customised reporting, etc.</i>

The shifts in payments adoption and acceptance

Buyers and sellers are increasingly looking to adopt and accept innovative payment solutions. The buyers' aims when adopting new payment methods are decreasing costs, facilitating the purchase process and optimising internal practices. For sellers, payments have also become strategic to reduce costs and optimise processes as well as to increase revenues. Traditional payment methods, e.g. paper cheque, plastic credit cards, etc. have been used – by the buyers – and accepted – by the sellers – in the B2B space for decades. While the trends clearly differ across countries, the shift towards electronic and automated commercial payments is undeniably global.

On the buyers' side

B2B payments adoption and growth vary by market and sector. B2B payments encompass a large range of products such as commercial cards, bank transfers, direct debit, cash and cheque.

Specifically, commercial cards represent a category of

card products used by buyers to pay for various goods and services related to their business, especially for travel and entertainment (T&E) expenses. The use of commercial card solutions is evolving and has grown mainly amongst corporations, and to a lesser extent SMEs. Large corporations recognise there are benefits associated with these solutions such as faster processing, tighter monitoring, automated expense reporting and financial benefits obtained from cards issuers. Therefore, issuers of commercial cards continue to focus on capturing T&E spend, although many are recognising the opportunities to capture a greater variety of B2B spend.

Commercial cards encompass a number of products with different functions.

> Corporate and business cards are commonly used to pay for T&E expenses such as hotels, taxis and flight tickets. 'Procurement' departments mainly use purchasing cards to pay for B2B purchases. Corporations are progressively moving away from physical to digital solutions – from plastic to virtual products

> Issuing payment providers have further developed their solutions to provide more digital products. Therefore,

there has been a growing demand for lodge accounts (e.g. AirPlus Company Account) and virtual cards (e.g. WEX, eNett single use cards), allowing corporate clients to control and optimise better their travel budgets

- B2B card industry has also seen an increased usage of private label / closed-loop payment methods, such as fuel and fleet cards, issued to businesses by independent operators (e.g. Fleetcor, DKV, etc.) and oil companies (e.g. Total, Aral, etc.)
- There is also a rising interest in other products amongst corporate clients. Commercial debit and prepaid cards appear to be gaining traction in markets such as the UK and Italy, especially for large companies (e.g. a rising demand for prepaid cards, mainly for T&E and payroll to better manage business expenses)

On the sellers' side

A large number of B2B merchants do not have a clear understanding and knowledge of payments; there are some opportunities for providers to help sellers in this space, as payments have become a strategic component of their business.

Today, these merchants accept 'standard' payment methods, such as bank transfer, direct debit, cash and cheque. Payment acceptance policies can vary depending on the market. Due to several factors mentioned earlier, merchants are increasingly accepting (or planning to) additional payment methods such as credit/debit cards (with international and domestic payment schemes), purchasing cards, direct banking, local payment methods.

Similar to buyers, sellers perceive the benefits of accepting cards such as the capability to accept payments online, faster processing, improved reconciliation and invoicing, processing by handling (requiring fewer resources). With the increase of e-commerce, in B2C and progressively in B2B, a number of merchants are increasingly willing to develop a comprehensive online payments strategy. B2B merchants are starting to develop a payment acceptance policy to define which payment methods to offer, e.g. accepting alternative payment methods, for which segments of the client base and for which channels, etc.

What is the future of commercial or B2B payments?

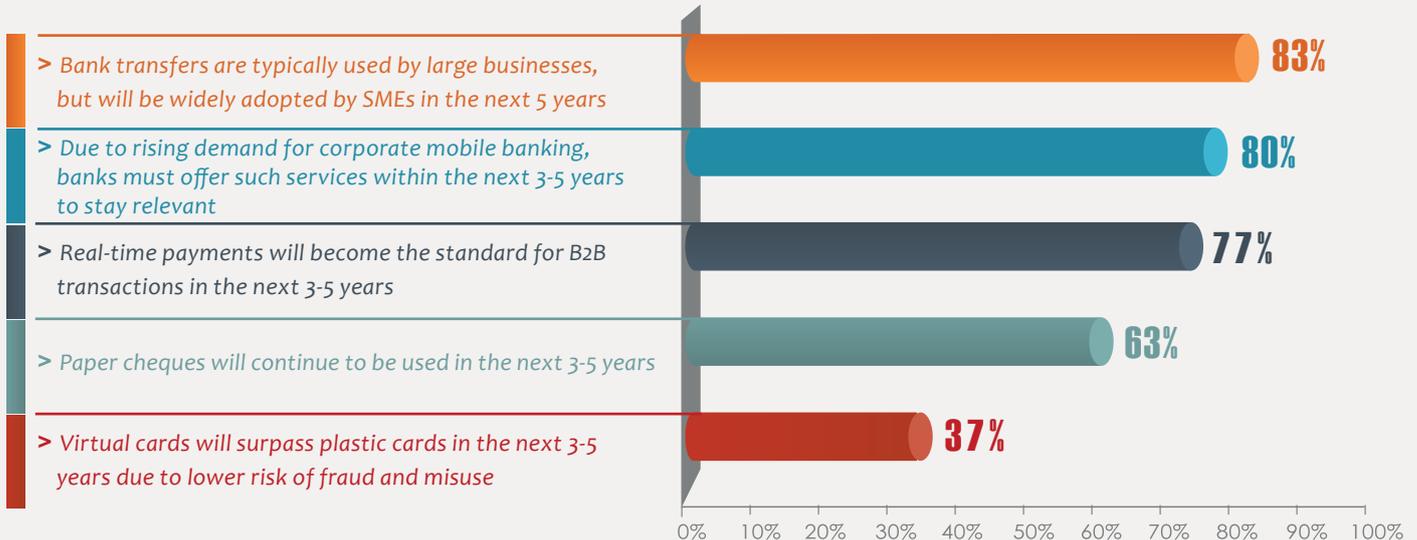
Four key trends have been identified:

- Bank transfers will gain traction amongst SME segment
- Corporate mobile banking will become a must-have offering for banks
- Real-time payments will be a critical component
- Cheques still have a future in B2B

1. Bank transfers

As shown in the chart below, an overwhelming majority of the respondents think that bank transfers will be widely adopted by SMEs in the near future. 83% of the sample agrees that bank transfers are typically used by larger businesses, but will gain traction amongst SMEs in the next 3-5 years. The shift towards globalisation is pushing SMEs into a more complex environment.

The future of commercial/ B2B payments



As SMEs become global, they have to adapt their treasury, cash management and payment strategies. They are therefore increasingly using the services offered by banks to send and receive international payments, which can be costly.

Banks have traditionally offered B2B payments to large corporations and more recently to SMEs. However, alongside with globalisation, industry structural changes and increasing competition, as well as disruption from new technologies, banks are being urged to develop alternative and innovative solutions to address B2B players' needs, as new entrants have already begun to target some markets. A number of non-bank payment providers are targeting businesses, including those which are not currently being serviced (or not fully) by traditional banks, e.g. SMEs looking to increase their international footprint.

► **Earthport**, providing cross-border electronic payment services, launched its first compliant gateway for real-time payments in August 2015. By simplifying the cross-border payment system, its network gives businesses transparency into costs and settlement time to transact internationally.

► **Currency Cloud**, a company based in the UK, allows businesses to offer their customers' access to foreign exchange through a simple API that links to Currency Cloud's cloud service. The company effectively competes with banks to win business from financial services companies whose business is to transfer and exchange money for others (individuals or other businesses).

2. Corporate mobile banking

The 2013 survey results indicated that the main uses of mobile devices for businesses in terms of alerts and messaging, account monitoring and workflow management are all seen as highly relevant. This year, 80% of the respondents agreed that banks must offer a corporate mobile banking solution due to rising demand from corporates and small businesses. The usage of corporate mobile banking is gaining traction amongst businesses though the adoption is slower than in the B2C space, because of the lack of offerings and security concerns.

3. Real-time payments

Real-time payments is becoming a 'buzzword' in both B2c and B2B worlds, and for buyers and sellers globally.

By accessing products and services offered as 'real-time', businesses would have a better experience with simpler and faster processes, cost reductions and transparency amongst other benefits. Respondents even believe that real-time payments solutions will not be a differentiator in the near future since they would become 'a must-have'. 77% of the sample surveyed agreed that 'real-time payments will become the standard for B2B transactions in the next 3-5 years'. However, offering real-time payments represent a challenge for banks as the costs related to the investment in real-time infrastructure can be significantly high.



4. Cheques

Cheques will not be 'checked-out' by businesses. They are still widely used and accepted for payments in countries such as the UK, France and the US. While there is a decline in cheque volumes, they continue to form a vital part of the payments landscape, especially amongst businesses and other organisations (e.g. for charities, cheques are the primary payment method). This trend will potentially remain since 63% of the survey respondents believe that paper cheques will continue to be used in the next 3-5 years.

Continuous evolution

The world of B2B payments is evolving at a fast pace. Businesses, both from the buyers and sellers' perspectives, are looking for new B2B payment initiatives in order to increase controls, efficiency, security, compliance and reduce costs. It is expected that banks, 'fintechs' and payment technology companies will increasingly partner to offer digital solutions to improve the entire process of using or receiving payments. The trend towards electronic means of payment is clear, although it is still complex to predict exactly how electronic payment methods are likely to evolve in the long term.

Financial Inclusion

The work is far from over

Everyone needs access to banking and financial services, regardless of their economic status or geographic location. However, a surprisingly large number of people, especially the disadvantaged and low-income segments, are excluded from the formal financial system.

According to the World Bank, 38% of the world’s adults are unbanked and only 4% indicated that they do not need an account. This situation is even more unfavourable in developing economies where 59% of adults do not have a bank account. The Gates Foundation states that this number increases to 80% among adults living in extreme poverty. Account ownership varies drastically market by market, providing insight into the prevalence and complexity of financial inclusion.

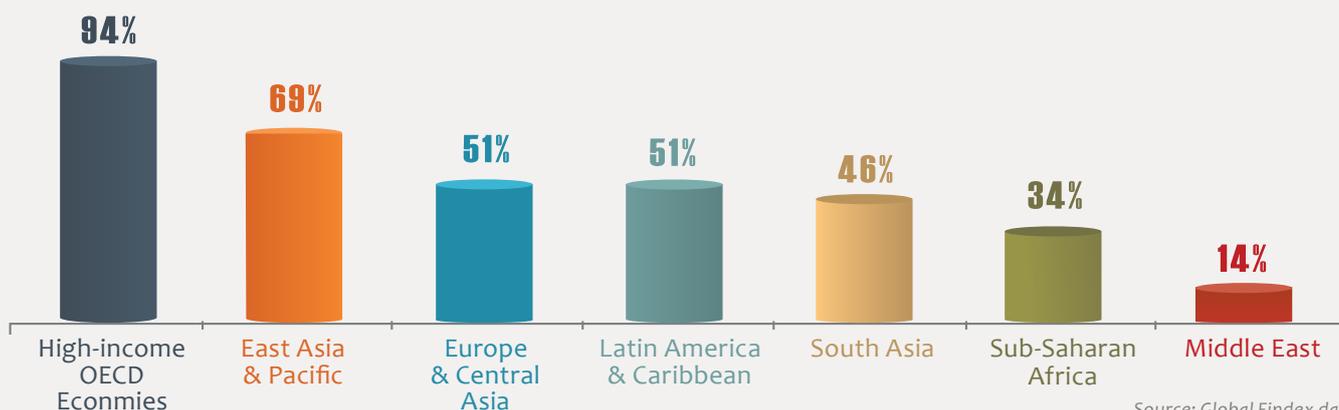
For financial service providers, these consumers may be too risky to serve with limited profit potential. Existing financial service products are not suitable for many consumers because of the nature of these products. For example, minimum balance requirements for deposit products are restrictive and exclude the poorest customer from having an account.

In addition, there are often limited ways to get credit, especially for consumers who have insufficient credit history. Many consumers across the world use cash for many aspects of their household finances as a result. Physically carrying cash for making payments is enormously inefficient and fraught with security concerns.

Excluding consumers from traditional financial services limits the prosperity and growth of individuals, families, communities and local economies. Financial inclusion is about more than having a bank account. It allows everyone the choice and access to financial service products that digitise cash and create an efficient ecosystem to facilitate payments, money management, savings, loans and investments.

Nonetheless, financial service organisations understand the situation and are exploring ways to address it within the markets in which they operate. Potential solutions include creating new products that use the existing financial services ecosystem in-market, redefining the financial services ecosystem or even developing new elements of payments infrastructure. The definition of financial inclusion is not the same across all markets after all, since individual market structures differ dramatically.

Account Penetration
Adults with an account (%), 2014



Source: Global Findex database

Range of development of the financial service ecosystem by market



United States

Some financial institutions in the US are addressing financial inclusion needs by creating new products that operate on existing payment infrastructure. For example, the Mission Asset Fund is formalising the “rotating savings and credit association” (ROSCA) models seen in emerging markets for informal lending and savings circles. They do this by providing an environment for lenders/ borrowers to come together and partner with traditional banks to create personal accounts for each of the members within the circle.

Fintech providers (such as LendUp, ZestFinance, Vouch) are using alternative data to underwrite loans for consumers who would otherwise be denied credit and would have to resort to payday loans, pawn shops or other informal borrowing. Most, if not all lenders report to traditional credit bureaus, which create credit data and help improve consumers’ credit score, thereby helping consumers gain access to other products within the system.

Meanwhile, other institutions are redefining the financial services ecosystem both at the product and distribution level:

➤ **Product:** In the US, financial products traditionally have been offered in product silos within traditional banks.

Some financial institutions are breaking down these silos and putting teams in place to create product suites that are tailored for underserved consumers in their markets (such as Regions Financial “Now Banking”). Further, general purpose re-loadable (GPR) prepaid cards in the US do much more than just store value; they are being used by consumers as transaction accounts and have much of the functionality and services of bank accounts, including direct deposit, bill payment, savings feature, and other services. Companies like IngoMoney, which has its roots in risk scoring for cheque cashing (previously Chexar), are providing remote deposit capture on GPR cards to offer consumers an alternative to cashing a cheque and paying a high fee for the privilege

➤ **Distribution and supporting infrastructure:** Retail establishments such as Walmart and Kmart have been growing in popularity for financial services including cheque cashing, remittances, and other financial service products. Convenience stores are being used as cash-acceptance points for utility payments (e.g. PayNearMe

“
General purpose re-loadable prepaid cards do much more than just store value
”

solution at 7-11 convenience stores). FICO has also developed and is testing a credit risk score based upon alternative data such as utility payments and other publicly available information. The use of this new model has the potential of credit scoring millions of otherwise 'un-scoreable' consumers, thus enabling access to loans and financial services in general

Initiatives that seek to develop new rails within the ecosystem in the United States are in very early stages such as The Merchant Customer Exchange (MCX), a merchant-owned mobile commerce network, but have not yet gained traction.

Emerging markets

Many innovative payments solutions that are created now are built on existing payments infrastructure. Mobile operators and telecom networks in some developing markets, where high percentage of households live in poverty and operate almost entirely with cash, have taken the lead in financial inclusion. They leverage their huge user base, brand and reach to connect financial products offered by banks to their customers. Examples include Smart Money in the Philippines, Tigo in Africa and South America, and of-course M-Pesa is highly successful in Africa.

M-Pesa has over 20 million customers. It is taking a step further in extending its range of core services – i.e. facilitating payment services through the mobile channel - to offerings loans and savings products. The success of M-Pesa may be due to several factors, such as an extensive (over 85 thousand) and incentivised agent

network, the security of not carrying cash around, and the continued commitment of the Board of Safaricom, the mobile operator behind the success of the mobile

payment system.

The majority (69%) of this year's survey respondents believe that new competitive payment products will emerge via alternative payment rails. This is more evident for respondents from emerging markets (77%) compared to developed markets (68%). Increasing competition on payment rails will lead to market expansion and improved financial inclusion.

An eye towards the future

Financial inclusion is a crucial aspect of economic development for most countries across the globe. Although much has been done to increase financial inclusion, there is still much more to do. EDC's survey respondents believe that specific requirements are needed to drive further financial inclusion.

► Innovation, partnerships, and collaboration:

While Fintech start-ups are nimble enough to address the financial inclusion needs of underserved consumers through innovation with the use of big data, new tools and technology, they rely on traditional banking infrastructure. Meanwhile, traditional Financial institutions are attempting to keep up with well-funded start-ups but because the US is a highly regulated environment, oversight into bank soundness and consumer protection is paramount and this has limited bank innovation to some degree. Banks are therefore also looking at ways to benefit from Fintech innovations. In emerging markets, innovations and partnerships with brick-and-mortar stores or players with large and loyal user bases are key to increasing current levels of financial inclusion

► **Government support / alignment:** Government and regulation plays a critical role in sustaining consumer





trust and faith in the system. Potential changes in written regulations have an undeniable impact on the products and the market as a whole. Governments in developing markets could play an even more significant role in increasing financial inclusion by digitising cash and supporting digital financial products. According to the World Bank, 20% of unbanked adults (over 400 million people) receive government payments (wages or benefits) in cash. 79% of the survey respondents believe that regulators/central banks will play an increasingly active role in the shaping of innovation and competition. Survey respondents also supported the potential role of international regulation (versus regulation at a region, market, or local level) as well as regulation over non-bank providers. National identity systems are also viewed as critical in driving financial inclusion within markets

► **Education of stakeholders:** Service providers must be educated that profit is possible and consumers must understand the value proposition compared to alternatives. Product choice and access will not fix everything. Providers need to educate the users of their products and services in a responsible way and should start with the young (e.g., EverFi offers financial service products to financial institutions as well as schools)

► **Customer-centric product and channel design** is economically favourable compared to other options. Consumers need to identify with the financial service provider and feel trust and relevance with the product. The customer experience has to be one that supports these perceptions, and one size does not fit all. Behavioural economics principles are being used and tested to see if customer behaviour and choice can be influenced by product and access channel design (e.g., PayPerks). Developing new layouts of physical financial service branches will also be critical to make the consumer feel welcome and provide an experience that he/she values

► **Access channels:** Mobile is a low-cost channel that has further reach compared to traditional bank distribution channels. Respondents from developed markets more strongly agree that mobile payments have been successful to-date and will continue to grow rapidly for proximity payments compared to emerging markets (69% vs. 54%). As an access point, mobile is not the only solution. Cash conversion points at places like retailers, grocery stores, convenience stores and kiosks in markets where cash is king can potentially influence the adoption of new services and boost financial inclusion

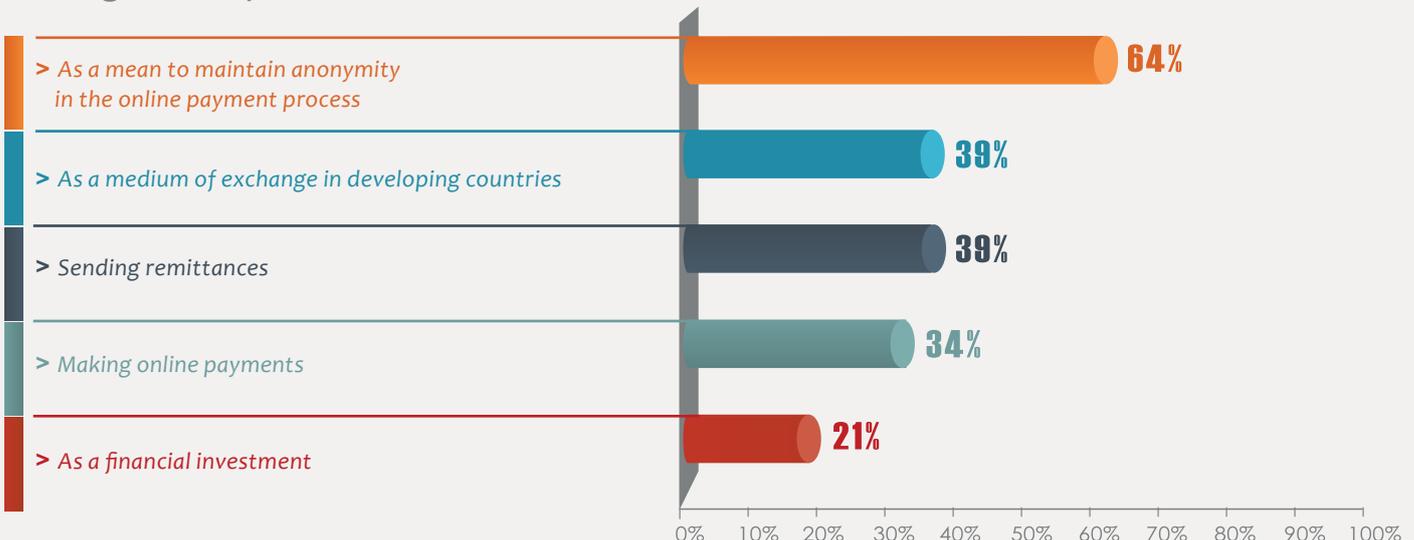
Virtual Currencies & Blockchain - Digitising value

Virtual currencies, also referred to as artificial or digital currencies, have been around for more than a decade. They are electronically created and stored. Like fiat currencies, they are a media of exchange for goods and services, but their values are often controlled by their developers and their acceptance may be limited to certain communities such as specific online games or social networks. Examples of virtual currencies include airline reward points, Amazon coins, Facebook credits (although they no longer exist), and Clash of Clans gems, amongst others.

Bitcoin is a form of virtual currency but is more unique than other currencies because it is open-source and decentralised. Bitcoin was first introduced in 2009 as a “distrust” model, where collective verification of transactions was required. It uses cryptography to control its creation and management by independently-owned computers (a.k.a. miners) participating in the network so no single entity can influence the currency value. The goal was to create an alternative to cash and remove capital control from the government and central banks. Currently, the use of Bitcoin is dominated by exchange trading, with retail adoption largely restricted to niche demographics. However, it has been gaining a lot of momentum in developing countries.

In Argentina, for example, Bitcoin helps to circumvent the government’s restrictions on receiving money from abroad. The government has forced banks to set dollars at artificially low rates in a bid to control inflation. In March 2013, the government set the exchange rate at 5 pesos per US dollar but anyone could trade a dollar bill for 8 pesos with one of the money changers on the street (according to the NY Times). Merchants who accepted US

The greatest potential seen for Bitcoin



dollars were therefore losing money when they converted their dollars into pesos with their banks but they were able to receive fair value from Bitcoin transactions.

While Bitcoin has gained numerous advocates since its inception, it has been facing a mountain of scepticism.

A big concern that consumers have is the volatility of its value (e.g. one Bitcoin was worth over \$1,100 in late 2013, then \$200 in 2015 but has regained value to over \$400 in early 2016). Also, Bitcoin is not trusted by the financial community, who view it as an unregulated and inherently risky digital currency. Its on-going problems with illegal purchases and money laundering certainly do not help its reputation and aspiration for mainstream acceptance. When asked where do you see the greatest potential for Bitcoin, more than half of this year's respondents see it simply as a means to maintain anonymity in the online payment process. Only a small portion of the participants see its potential as a medium of exchange in developing countries, as a financial investment, or as a tool for sending remittances and making online payments.

There are apparently opposite views of where Bitcoin is headed but it is almost certain that the digital currency will not be able to gain widespread acceptance in the near future. Yet, in the short-term, the technology backbone of Bitcoin – blockchain – presents myriad opportunities in a range of industries and has captured significant interest from the media, entrepreneurs and financial institutions.

So what is blockchain?

Blockchain is a distributed ledger or verifiable record of digital transactions, similar to a database but with public visibility of only part of the information. A private key is required to unlock and sign a transaction. There are two main types of blockchain: public and private. A public blockchain is an open and decentralised ledger, owned by no-one but shared and updated by a consensus of miners in the network.

These miners use 'Proof of Work', or complicated mathematical calculations, to prove that a transaction is valid and cryptographically chain every block of transactions to the previous one. As a result, each block

is permanently added to the blockchain in a linear and chronological manner. The benefit of this is that once a digital event is entered into the blockchain, no-one can change or delete any of the records, thus leaving a trustworthy audit trail.



On average, transactions are confirmed by the network within 10 minutes. In addition, decentralised consensus makes tampering very difficult because confirmations from several independent miners are required for a transaction to go through. It also removes the need for an intermediary and avoids a single point of failure, which provides major cost and efficiency benefits.

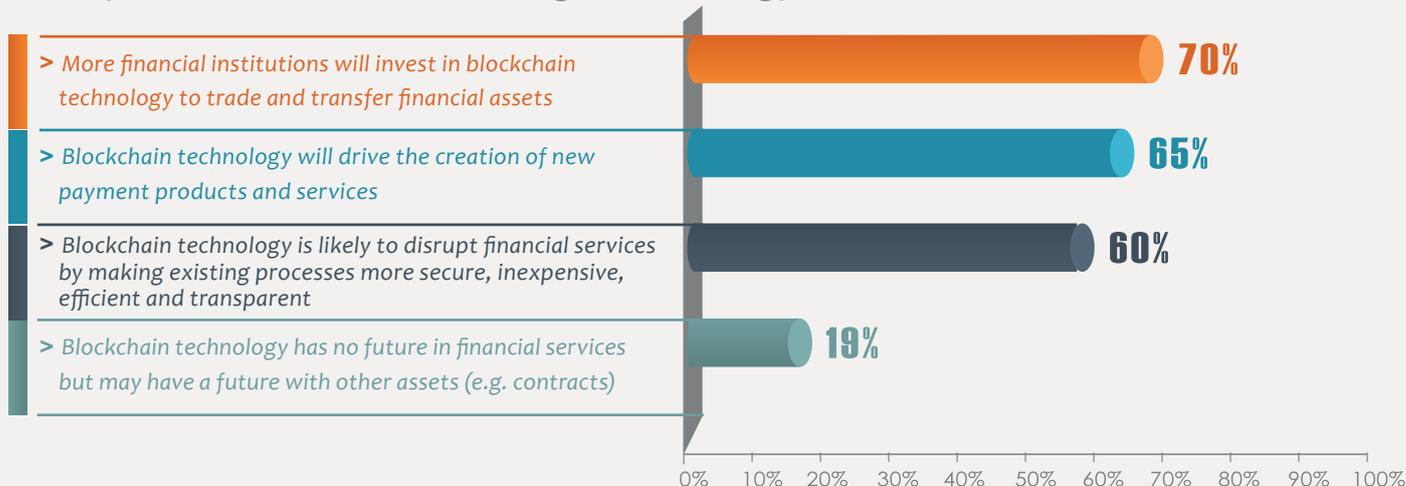
A private blockchain is owned and operated by a group of authorised players. The transaction processors are trusted partners, which probably makes it more attractive to businesses, financial institutions and regulators that are sceptical of the public distributed ledger or concerned about security and privacy controls. Several major global financial institutions including but not limited to Barclays, Banco Santander, Citibank and Goldman Sachs are already investigating blockchain technology for a wide variety of applications (e.g. to speed up transaction processing, reduce operating/infrastructure costs, eliminate deficiencies, improve transparency, etc.).

In future, it may be possible that banks and other financial institutions will operate their own private blockchains. Since financial institutions operate in a heavily regulated environment, these private blockchains will still need to satisfy all the regulatory requirements.

Financial use cases

Any asset can theoretically be transferred electronically using blockchain technology. While current systems are already capable of tracking and verifying a digital exchange, blockchain presents the benefit of doing it in near real-time. A majority of respondents (over 80%) believe there is great potential for blockchain in financial services. More than half believe blockchain technology is likely to disrupt the financial services industry by making existing processes more secure, inexpensive, efficient and transparent.

The potential for distributed ledger technology such as a blockchain



Below are several potential financial use cases:

➤ **Money transfer:** the potential is obvious. The areas around cross-border payments especially business-to-business (B2B) payments and peer-to-peer (P2P) remittances involve many inefficiencies. The infrastructure is outdated and the process is slow and expensive. Blockchain offers a new approach by removing the intermediaries, which makes the process faster and potentially more cost efficient. Align Commerce, a San Francisco-based start-up, is using blockchain technology to improve the cross-border payment process and reduce transaction fees for small businesses

➤ **Stock exchange:** the idea of trading and settling stocks based on blockchain may soon become a reality. According to Wired, the Security and Exchange Commission (SEC) in the US has recently approved Internet retailer Overstock.com to issue company stock via the blockchain-based technology separate from shares traded on the Nasdaq. However, even Nasdaq is looking at ways to use blockchain in its pre-IPO trading arm, Nasdaq Private Markets, and has used blockchain to transfer shares for the first time in Dec. 2015

➤ **Asset and collateral management:** the traceability and immediate nature of transaction processing on the blockchain can tackle inefficiency and reduce fraud in asset and collateral management. The distributed ledger can verify and maybe even execute the contracts between parties under predefined conditions. Financial institutions are exploring opportunities in this area

The use cases mentioned above are by no means exhaustive. The numerous potential applications of blockchain have stimulated tremendous interest in the financial services sector globally. Santander claimed

there are 20-25 use cases for blockchain with the focus on international payments and smart contracts. It estimated that the technology could reduce banks' infrastructure costs attributed to cross-border payments, securities trading and regulatory compliance up to \$20 billion per year by 2022.

Other Financial institutions are jumping on board. UBS set up a research lab in London, focusing on areas such as payments, trading and settlement, and smart bonds. Goldman Sachs, BNP Paribas and ING Bank are exploring ways the blockchain can improve faster transactions and business processes. Rabobank, Westpac, ANZ Bank are partnering with Ripple to investigate the potential use cases of blockchain. Visa is also working on a proof-of-concept for a blockchain-based remittance service and suggests that the blockchain is "no longer a choice" but "something the industry has to live with".

Non-financial use cases

Although the blockchain is a leading-edge technology with great potential to disrupt the financial services industry, it is not specific to financial use cases. While the distributed ledger technology is on its rise to the peak of the hype cycle, many start-ups have emerged with promise to solve numerous non-finance related problems. For example, Ethereum, a decentralised platform, runs smart contracts. Factom is working on a system that secures and proves the authenticity of records that are embedded on the blockchain. Another start-up, Everledger, provides permanent and immutable records of certificates and ownerships of diamonds.

The most prominent examples of non-financial use cases can be grouped into the following categories:

► **Proof of ownership and asset transfer:** title or ownership of insurance policy, home, auto, land, and any other physical or intangible assets can be transferred using the blockchain technology. The current process is complicated and often requires more than one third party involvement to check the history of that property, verify ownership and prepare legal documents before a transaction can take place. Depending on the type and size of the asset, the process may take up to several months. Blockchain may be the solution for this problem by eliminating the intermediaries and speeding up the

each year. Blockchain may be the ultimate solution to this problem. If expectations are met, blockchain could introduce a whole new digital world with records (e.g. health records, voting records, marriage licenses, personal identification such as passports, driver licenses and other government documents) that can be cryptographically proven to exist and belong to a certain individual. The most important factor is that these records are reliable and undestroyable, which help eliminate fraud and corruption

The ability to authenticate the identity of an individual and prove the existence of a thing will save both the private sector and government significantly each year



transaction. Start-ups such as Colu and Bitproof are looking at ways to achieve this goal. Bitproof allows users to certify documents and prove their ownerships. Colu is digitising ownership of properties such as ticketing, music rights and car ID through the blockchain

► **Smart contracts:** the idea of smart contracts is to have transactions automatically executed under the negotiated terms and predefined conditions between the stakeholders without the involvement of a central intermediary or counterparty agent. For example, users A and B can create a contract such that A will pay B \$x on a certain day if a specific goal or condition is met (e.g. a service provided by B was marked as complete, the value in B's account is below a certain level, etc.). Depending on the outcomes, money can be sent to B under the right conditions or remain in A's account. This happens without the need for a third party to trust anyone. The lack of third party interference will increase the efficiency of the process and remove the risk of any discriminatory effect. Many companies are exploring ways to make this a reality. Ethereum, a start-up, is focusing on running smart contracts on its platform. Samsung and IBM are partnering with Ethereum to test the concept of smart contracts with the Internet of Things

► **Identity management:** as fraud has always been a major concern for commerce and even government benefits or documents, the ability to authenticate the identity of an individual and prove the existence of a thing will save both the private sector and government significant amounts

Future of blockchain

Blockchain is still in its infancy, and the technology is unproven. People in the industry have different views on how the technology will develop in the future. Some think public or private blockchains are solutions to problems that the government, financial institutions and enterprises are trying to solve (i.e. reducing IT management costs, facilitating cost-efficient transactions and etc.). Others argue that blockchain cannot be separated from Bitcoin and think it is impossible to run an independent blockchain without using Bitcoin as a store of value and then the digital currency may hinder the disruptive impact of the technology.

While there are different speculations on the blockchain technology, its future will ultimately depend on how all those start-ups and established companies investing in the technology can successfully deliver the promised applications. Then of course, to achieve widespread adoption, it will take time until consumers, businesses and government institutions accept the decentralised nature of the technology.

More financial institutions are expected to invest in the distributed ledger technology whether for trading and transferring financial assets or other applications. The blockchain is expected to make payment transactions faster, cheaper and more secure, and it is certainly seen as one of the most exciting technologies in today's world that can help drive the creation of new payment products and services in the future.

The Internet of Things Towards connected commerce

The Internet of Things (IoT) is the interconnection of uniquely identifiable, smart (contains chips) consumer objects and industrial equipment via the Internet. It enables information to be collected and communicated between objects and users passively or dynamically. While there were only a few billion connected things in 2014, many industry reports estimate that this number will reach 25 to 50 billion by 2020.

There is no doubt that IoT will grow rapidly and spread across industries over the coming years. 93% of this year’s respondents think that IoT will find applications in nearly every field (e.g. connected cars, homes, wearables, healthcare, agriculture, energy, etc.). 85% think that IoT is about smart sensing everything around us, which will ultimately change the way we live, shop and pay.

IoT can be separated into two pillars: Consumer vs. Business.

- ▶ Consumer IoT – if the connected objects or “things” are for consumer uses (e.g. for personal convenience)
- ▶ Business IoT – if the connected objects or “things” are for business uses (e.g. to reduce costs or improve business operational efficiency)

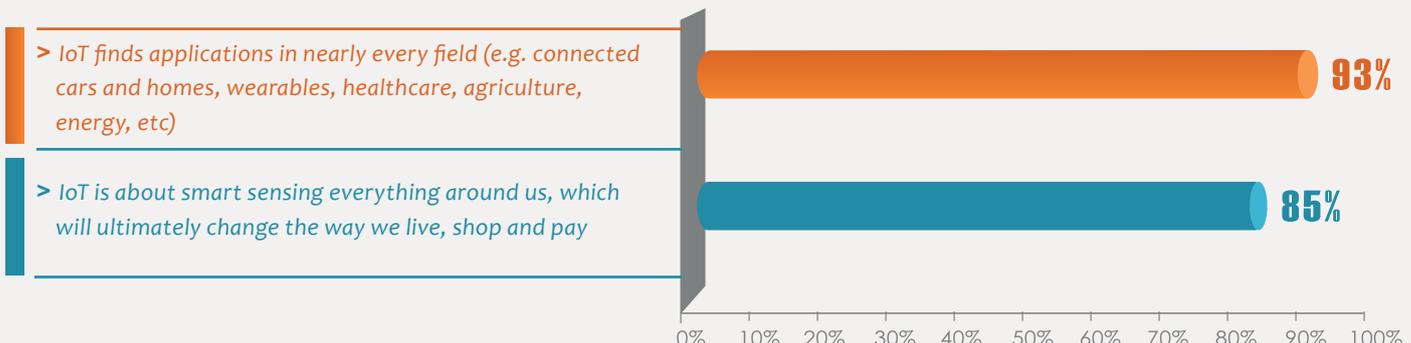
Consumer IoT

There are three main segments under Consumer IoT: wearables, connected home and connected cars. Within each of those segments, there are an unimaginable number of potential use cases that enable near real-time information sharing and new payment opportunities.

“
IoT will ultimately
change the way we live,
shop and pay
”

▶ **Wearables** are smart accessories, including smartwatches, fitness trackers, smart clothing and smart jewellery. Although they are still in the early phases of adoption, fitness tracking is the leading consumer use case for wearables. However, more and more of the newer generation of wearables have begun to offer payment applications. For example, Apple Watch works with Apple Pay, the e-wallet Pebble works with both Apple Pay and Android Pay, Bellamy’s Swatch watch works with China Union Pay, and Xiaomi wristband works with Alipay. Jawbone added American Express cards to its fitness trackers, allowing users to pay for groceries and other

The impact of the Internet of Things

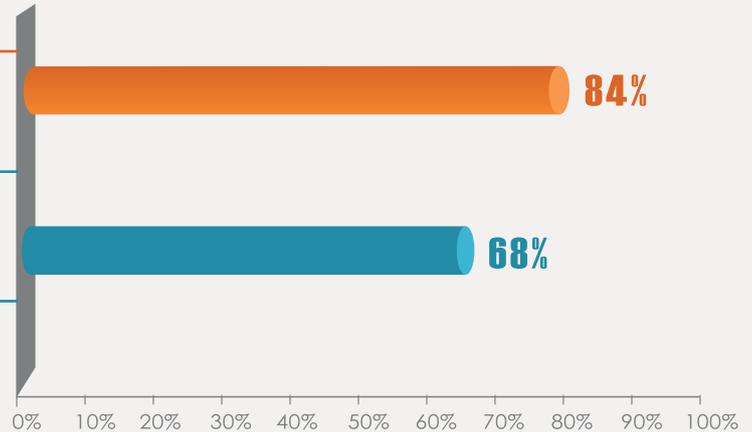




The impact of the IoT on payments

> Security remains the biggest concern as sensitive financial data is involved, data privacy and security related issues need to be resolved

> IoT will revolutionise the payments industry as every connected device can be a vehicle for commerce



► **At the time of purchase** – the long and tedious checkout process at certain websites or the long line in store, select the appropriate payment method that is secure and transparent and maximise the value for consumers (e.g. best rewards)

► **Post-purchase** – the refund / exchange process, insurance / warranty of the product and maintain receipts / invoices

As IoT begins to more effectively address these pain points, consumer interest and adoption are expected to increase.

Challenges

Today, the IoT eco-system remains fragmented and lacks standards for interoperability. There is no clear way to interpret and secure the data transferred between connected devices, which makes it difficult to achieve a framework that allows openness and interoperability. 84% of this year's survey respondents think that security remains the biggest concern as sensitive financial data is involved, data privacy and security related issues need to be resolved.

There are four key aspects related to the security of IoT commerce transactions:

- Certifying the connected objects against any tampering
- Securing all points of interaction, in particular the enrolment process, to avoid any potential loopholes for data breaches in the payment process
- Creating a secure vault that will store payment details and generate tokens
- Using appropriate fraud prevention solutions – this could be based on device fingerprinting of the connected objects as well as additional data to score payment transactions with a fraud rule engine

Security and privacy are very important to consumers as well as to businesses. Trust and authentication must be embedded in all elements of the IoT, including the devices, networks and software apps. However, these issues remain one of the biggest challenges for IoT today.

In addition, the management of big data is another concern around IoT. The connected objects will generate and use a significant amount of data. The challenge will be how to appropriately use this data in the context of commerce without compromising privacy.

The future of IoT is not far away

While there are challenges that need to be addressed along with the fast growing IoT eco-system, the various connected objects will likely change the way consumers shop, pay and live. Given the current IoT market size and its potential growth, there is strong potential for IoT to achieve widespread adoption in the coming years. 46% of the respondents indicate that IoT will become mainstream within the next 3 to 5 years, and 37% believe it will be within 6 to 10 years.

“
84% of this year's survey respondents think that security remains the biggest concern for IoT
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Edgar, Dunn & Company

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ALONG THE VALUE
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