

CashTech: Taking Cash Forward

How technology and innovation can create
a sustainable, future-proof cash cycle

2021

 CashEssentials
cashesentials.org

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Highlights

CashTech is the encounter of cash and technology. It brings together innovative companies who leverage software and modern communications technology to improve cash services: access to cash; acceptance of cash; and the efficiency of the cash cycle for all stakeholders.

→ CashTech provides a compelling addition to the traditional cash infrastructure

Comprised mostly of dynamic young start-ups, such as Sonect (Switzerland), SoCash (Singapore); viafintech (Germany) and Shrap (United Kingdom), CashTech realised early that cash services must integrate seamlessly into the lives of users to stay relevant, as cash retains its importance in an increasingly digital world.

As banks reduce their cash infrastructure (branches, ATMs and cash centres) in most advanced economies, CashTech has moved quickly into the open lane. Increasingly, it appears as a compelling addition and complement to traditional channels for the distribution and circulation of cash.

→ CashTech combines innovation and inclusion

Yet CashTech start-ups are intent on bringing banks further into the CashTech tent – together with retailers and consumers – to keep cash viable amid heightened global awareness of its enduring role, in terms of inclusion, fairness, resilience and the protection of privacy.

Cash continues to hold dominant market positions. Though the amount of cash in circulation is growing faster than GDP in most countries, investor and media interest has focused more on those seeking to displace cash, than innovators working to facilitate its use.

This White Paper seeks to redress the balance. During the coronavirus pandemic, central banks have recorded exceptional spikes in cash demand, as people increase their precautionary holdings. This has confirmed the prevalent role of cash as a store of value in a crisis¹. Citizens on tenterhooks, in the face of a pandemic, have turned *en masse* to the “rainy day” safe haven of cash and the sense of stability it provides in uncertain times.

But cash-users are holding more and spending less. In the era of the smartphone, the pandemic has changed the way we shop, dramatically reducing consumption as large sections of the economy have shut down. The pandemic has also boosted online shopping and contactless payments, in part due to mislaid fears about cash as a vector of viral transmission.

Long central to its appeal, the tactile nature of cash – helping us budget, spend more wisely and educate our children about the value of money – must not be allowed to become a performance handicap for physical money. As with any financial product, the capacity for cash to change will be integral to its continuing success.

→ Cash possesses unique attributes unmatched by digital payment alternatives.

Cash is universal; anonymous; trusted and resilient; a mainstream payment and monetary instrument that is also a bedrock for the unbanked, elderly and vulnerable.

Retail payments have experienced unprecedented innovation and diversification during the last decades, driven by evolving retail models, technological innovation and deregulation. Yet despite the increased use of electronic payments around the world, there is scant evidence that a shift away from cash has occurred. Quite the opposite. Never has there been so much cash in circulation.

Innovation, driven by more progressive market incumbents as well as new entrants, has contributed substantially to making cash more accessible and sustainable for business. It has also served to make the cash cycle shorter, more efficient, and bring cash closer to the people for whom access to cash is a fundamental right.

This is the technology we call, CashTech, making cash perfectly suited to the digital world.

This paper aims to provide an overview of where we are in terms of CashTech innovation, and to encourage its continuation, by supporting the work of innovators, start-ups and scale-ups.

The first section focuses on the ever important economic and social role of cash. The second section looks at some of the challenges facing cash, especially in the context of the digitalising world. Section three will give a concise account of how CashTech is addressing these challenges.

CashTech offers solutions, and herein, they are...



1.

Forever Cash: cash plays a vital and enduring economic and social role

1.1

Cash is an important payment and monetary instrument

The last decade has seen an exponential growth in new ways to pay. Debit and credit cards have been joined by new payment instruments like contactless cards, mobile payments, digital wallets, in-app and biometrical payments, not to mention crypto-currencies. Some of these have been launched by the traditional banking sector. However, the most spectacular innovations have often been developed by non-bank actors, including telcos and BigTech.

M-Pesa is a mobile money service allowing its users to deposit, withdraw and transfer cash via text messages on a mobile phone. The program was launched in 2007 by Safaricom and Vodacom in Kenya and Tanzania – where the program is extremely popular – and has since expanded to Afghanistan, South Africa and India, and more recently to Romania and Albania. The service allows users to deposit cash into an account stored on their cell phones and to send balances using PIN-secured SMS to other users, including participating retailers, which act as banking agents. Money transfers can be instantly redeemed for cash.

Alipay is a mobile and online payment platform, established in China in 2004 by its founder, Jack Ma. In 2015, Alipay overtook PayPal as the world's largest mobile payment platform and currently counts over a billion users. It is the world's leading mobile payment service provider and the second-largest payment service organization in the world. In 2020, its parent company, the Ant Group was set to raise \$37 billion in what would have been the world's largest IPO before it was halted by the Chinese authorities.

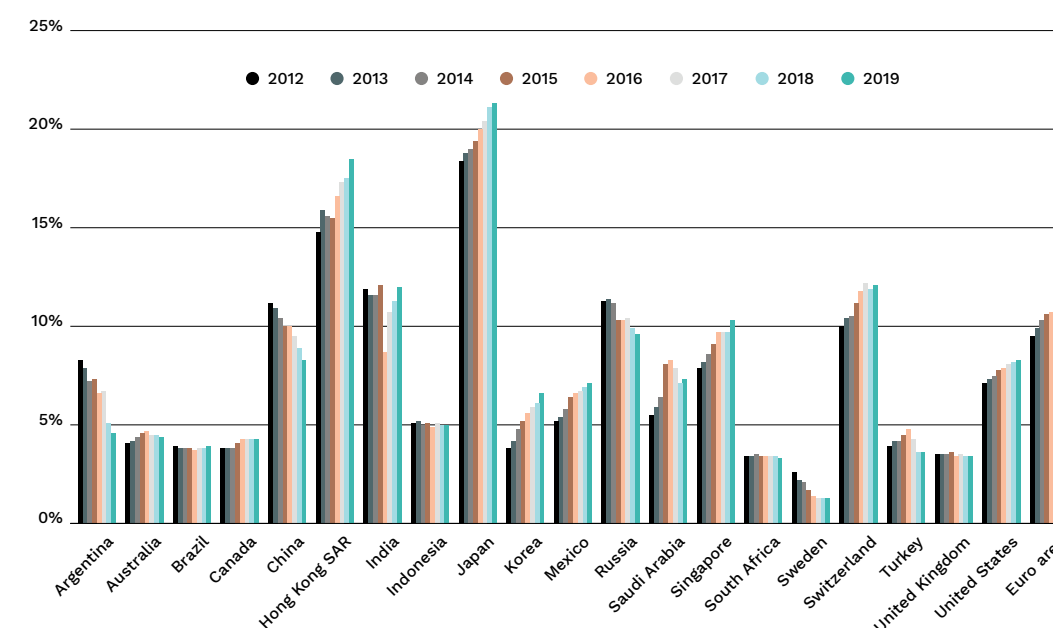
United Payments Interface (UPI) is an open payments platform launched in India in 2016 by the National Payments Corporation of India jointly owned by the Reserve bank of India and the Indian Banks' Association. It allows users to make instant transfers across bank accounts on a mobile platform. Since June 2020, UPI users with the app on their phones are able to withdraw cash from merchants.

Many governments and companies have been seeking to restrict cash usage to drive innovation in payments. Policy measures have included: fees for cash withdrawals or deposits; refusal to accept cash and tax reimbursements paid only to bank accounts (Siekman, 2017), limitations on cash payments, the withdrawal of high-denomination banknotes. Some academic economists have called for the outright abolition of cash (Rogoff, 2016; Rogers Hummel, 2018). But these initiatives, while seemingly progressive, have had many unintended and dangerous consequences, particularly for unbanked or underbanked consumers. True innovation should always seek to include all consumers and not be divisive.

Yet cash continues to be a major payment and monetary instrument. Bank for International Settlements data shows, not only that the amount of cash in circulation is continuing to grow, but that it is doing so faster than GDP in the vast majority of countries (See Chart 1). Significantly, a number of the world's most mature economies, advanced in terms of payments technology, have very high levels of cash in circulation and high growth (Japan, Hong Kong and Switzerland, for example). A sign of the complexity of the global cash ecology, is that total cash in circulation (the value of banknotes and coins in the economy, not including Central Bank inventories), varies between countries by a factor of 16 – from Japan at the top of the list (most cash in circulation), to Sweden at the bottom of the list (least cash in circulation). Some 600 billion banknotes are estimated to be in circulation worldwide. Banknotes are not only the most widely used payment instrument, they are also the most widely used product.

Chart 1: Cash in circulation in relation to GDP

The chart shows the value of banknotes and coins as a percentage of GDP.



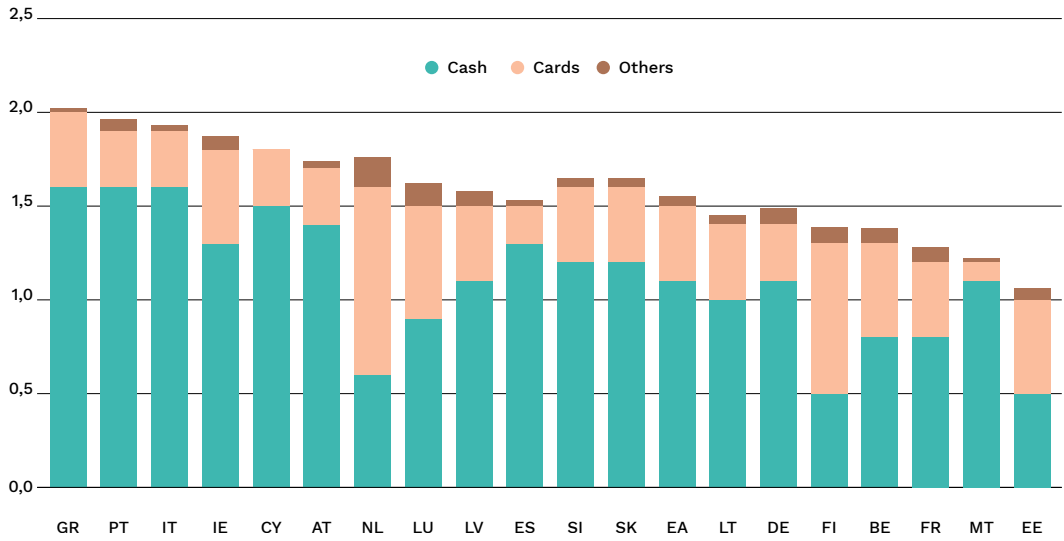
Sources: Bank for International Settlements; CashEssentials

Cash demand is growing, but how is cash used? Due to the anonymous nature of cash, its market share as a transactional instrument is difficult to measure.

The European Central Bank's latest payments survey records that cash remains the most common way to pay (See Chart 2), accounting for 73% of all physical retail payments in the Euro Area in 2019. More than half of consumers said they preferred to pay with cash, though the proportion who prefer digital payment has increased during the pandemic¹.

¹ Lagarde, 2020

Chart 2: Average of POS and P2P transactions per person per day, per country and per payment instrument

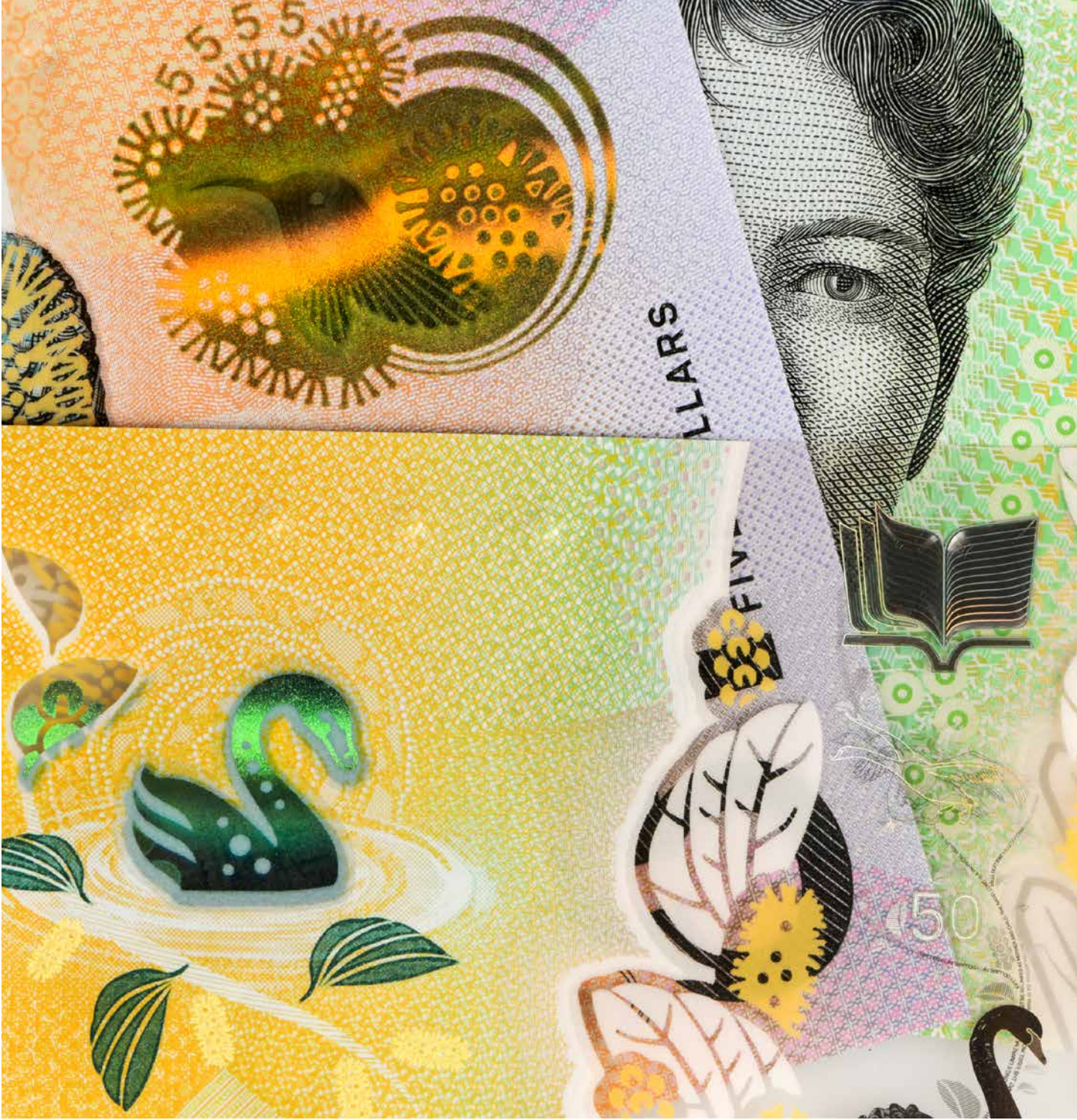


Sources: Calculation based on data from ECB (2019), De Nederlandsche Bank and Dutch Payments Association (2019) and Deutsche Bundesbank (2017).
Notes: “EA” refers to the Euro area (all 19 countries). The category “Other” includes direct debits, credit transfers, bank cheques, mobile phones (e.g. parking app), crypto-assets and other and the answer option “Don’t know”.

Cash is the only non-electronic payment instrument. Cash remains dominant in person-to-person transactions (in-home services; giving money to relatives; charities and churches). A Deutsche Bundesbank study estimates that 93% of the value of all person-to-person transactions was attributable to cash payments².

The pandemic has had a brutal impact on retail payments, as the shutdown of whole economic sectors – air travel, cultural events, restaurants... – combined with lockdown policies around the globe, have led to a sharp reduction in transaction volumes, whether cash or digital. Besides the drop in volumes, the pandemic has also changed the way we pay, with a shift to online payments as well as contactless payments. This as consumers and retailers have attempted to reduce the handling of cash, cards and card terminals or keypads, accused – sometimes irrationally – of posing a risk of transmitting the disease. However, it is uncertain whether this behaviour will be permanent³.

At the same time, a number of countries have seen a huge surge in cash in circulation. In the US, cash in circulation has increased by \$200 billion between February and September 2020. In the euro area, the value of euro banknotes increased by €107 over the same period, a 10% year-on-year increase. This is ap-



proximately twice the size of the spike of October 2008, following the collapse of Lehman Bros. Other countries have seen similar patterns: Australia, Argentina, India, Israel, Russia, Sweden...⁴

Some government actions during the pandemic have made clear both the role of cash as a public good, and the role of those who provide it as, in the words of US authorities, “Essential Critical Infrastructure Workers”. France’s Economy Minister described cash as a vital activity for the survival of the nation’s economy, while the New Zealand government deemed financial services to be essential services, including those that enable access to ATMs⁵.

2 Beermann, 2019
3 Megaw, 2020

4 Goodhart and Ashworth, 2020
5 Governments call cash supply vital, CashEssentials, 2020

1.2

Cash possesses unique attributes, unmatched by digital payment alternatives

Cash is universal — available to all, regardless of age, gender, ethnicity or wealth. For the most vulnerable, it is often the only form of social and financial inclusion. Obviously, businesses and government bodies who refuse cash disadvantage people who don't have, or can't have, traditional bank accounts or qualify for credit cards. In the US, fully one quarter of adults are under-banked or unbanked, and most of these individuals are likely to be from racial and ethnic minorities, be less educated and have lower incomes⁶.

Cash is a crisis haven. Despite misleading attacks on viral “dirty cash”, Covid-19 has brought cash's unique crisis role into clear focus. We knew that demand for cash rises after a financial schism⁷; we now also know that it rises, and to astonishing effect, in a more immediate societal crisis like a health pandemic. At the pandemic outset, a ‘dash for cash’ saw a surge in demand for both currency and bank deposits⁸. But London Centre for Economic Policy Research academics, expecting a “subsequent reversal”, witnessed little sign of that; rather, that the “increase in currency usage continued”, pushing demand for cash higher in the US and Canada, Euro Area, Australia, Brazil and Russia⁹.

Cash is resilient. Perhaps most evidently so in its role as a back-up payment solution in the retail payments infrastructure. Digital systems may be ‘convenient’, but are regularly subject to outages and failures. As the former trader turned cash activist, Brett Scott describes it: “Cash does not crash”¹⁰. To wit, when natural disasters did not stop during the pandemic: megafires in the US and Australia; seasonal floods in Asia; earthquakes in the Philippines and Puerto Rico¹¹, cash did not falter. In the Australian fires, when electricity went down — either because power lines were destroyed or the current diverted — people could still pay in cash for food and other essential items. The Visa outage of 2018 meant millions of people, ‘nudged’ towards dependence on digital payment, would have been stranded if not for the back-up solution of cash. According to the United Nations, over 7,000 extreme weather events were recorded since 2000, claiming over a million human lives and affecting over 4 billion people.

Cash is tangible. Microbusiness owners (less than five employees) in particular still report that cash makes profit and loss quicker to apprehend — to “feel” profits when they arrive, and what passes through the till in physical money compared to cards. Regarding individual spending, a long line of research indicates that cards boost willingness-to-pay (by as much as 200%, according to Richard Feinberg's

6 Carrns, 2020

7 Lehman Brothers collapse, 2008; Greek debt crisis, 2011

8 Hauser, 2020

9 Goodhart and Ashworth, 2020, p.2

10 Scott, 2018

11 Muñoz, 2020

landmark 1980s experiments¹²). There is also substantial evidence to suggest that credit card users are more likely to underestimate or forget the amount spent on recent purchases¹³. Monitoring household spending and budgeting — based on card outlays only — is thus difficult, according to further research, for lower earners and the liquidity-constrained¹⁴. Plus the credit card companies are unhappy because, of course, they don't generate revenue when we use cash.

There's an all-important if oft-overlooked **educational** value in cash. Cash helps non-specialists and the young (and not so young), understand money and its function — as do books in terms of making sense of language, whatever the ‘digital transformation of the reading experience’.

Cash is remarkably secure and provides protection against the increasing threat of cybercrime. The report, *Fraud in cash and electronic payments: taxonomy, estimation and projections*, by Santiago Carbo-Valverde and Francisco Rodriguez-Fernandez, provides an empirical estimation of the value of fraud with cash and card payments for the period 2014–2018 in 52 countries in Europe, North America, Central and South America, Asia-Pacific and Africa¹⁵. It concludes that fraud with cash has been decreasing 1.7% annually while fraud with cards has been increasing 16.2% annually. The illegal economy linked to cash in 2018 was 0.93 times the value of 2014. However, total card fraud per transaction almost doubled (1.82).

Cash is anonymous. It enables the protection of personal privacy — allowing ‘off the grid’ transactions without trace, which allows people to keep **data** on their spending to themselves. Usually this is about freedom, about the human desire for a “certain level of personal privacy”, and not a criminal activity enabler¹⁶. Related is the notion of **trust**. As more big technology companies embrace the payments business, and central banks research digital currency projects, privacy-conscious individuals are increasingly concerned about the surveillance implications of private firms and/or governments keeping records about their personal private preferences, including what they buy and sell¹⁷.

12 Feinberg, 1986

13 Prelec and Simester, 2001

14 Hernandez, Jonker and Kosse, 2017

15 Carbo-Valverde and Rodriguez-Fernandez, 2020

16 Beerman, 2019

17 Jenkins, 2018





1.3

Good bed fellows: cash and the digital economy

The capacity of cash to evolve and adapt to the digital economy has been recognised by, one might suggest, the smarter end of big-tech and retail. Acknowledging cash's enduring consumer appeal, e-commerce giant Amazon allows shoppers (via "Amazon PayCode") to buy on-line and later pay in cash. Another product line ("Amazon Cash") enables customers to load cash into a balance at a physical location, and make purchases later on-line¹⁸. A new "Walmart.com app is offering customer options to a cash-centric customer," Walmart spokesman Ragan Dickens said¹⁹.

Cash on delivery is a payment solution where goods ordered online are either delivered to, or collected by, the buyer at an agreed delivery point and paid for in cash. According to a 2015 survey by The Nielsen Company, 36% of online shoppers used cash on delivery to make purchases within six months of the survey. Cash on delivery is a more popular choice in India (83%), Nigeria (76%), the Philippines (73%), Russia (70%), United Arab Emirates (68%), Saudi Arabia (59%), Colombia (57%), Poland (57%) and Thailand (56%)²⁰.

Shoppers can also pay cash online using checkout payment solutions. On a merchant's website, the shopper chooses the cash option and receives a voucher or barcode. The customer presents the barcode to a retail partner or kiosk and pays for the purchase. The merchant is notified when the payment is settled and proceeds to ship the item. In Germany, viafintech with its service Barzahlen/viacash is a market leader (trading as viacash outside Germany), with a network of 16,000 partner stores where customers can settle their e-commerce transactions, as well as pay utility bills or undertake basic banking transactions such as cash withdrawals and deposits.

Ride-hailing operation Uber, initially based its business model exclusively on digital transactions. But the firm came to see the benefits of accepting cash payments as they expanded into underbanked markets in Asia, Africa and Latin America. Today, about 40 per cent of Uber's ride payments world-wide are settled in cash, to the benefit of clients, riders and drivers²¹.

¹⁸ Rooney, 2019

¹⁹ Wolfe, 2018

²⁰ Cash on line? Yes, we can, CashEssentials, 2020

²¹ CNBC, 2019



2.

Cash faces new challenges in an increasingly digital world

2.1

Challenge n°1:
access to cash

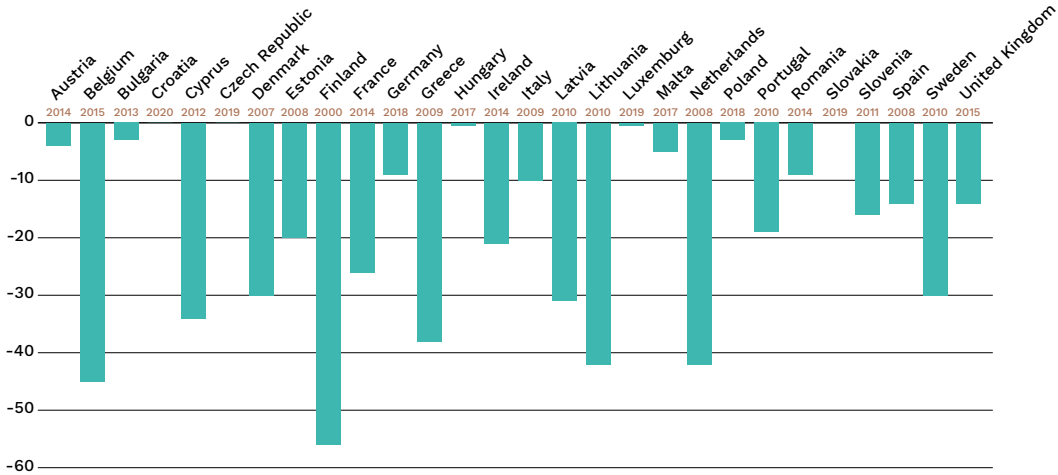
Ready access to cash (or not), has become an increasingly potent industry and public policy issue, due mainly to ATM and bank branch closures in many advanced economies and, in some markets, an industry trend towards cash machines that charge for withdrawals²².

Coronavirus has exacerbated access issues for certain groups in society, notably the poor and the elderly. In the UK, for instance, this has led to the creation of access-to-cash mapping and information campaigns in select communities ('where are the ATMs?'). This has proved to be of assistance at the margins²³.

But the conundrum is that, as banks close ATMs (See Chart 3) to save money (together with branches, which can be multiple ATM hubs), consumers still require cash, having to invest more time and money to obtain it. As people are, in the language of economic theory, 'nudged' towards using less cash – 'nudged' being a euphemism — banks argue that the ATM network, part of the broader cash distribution network, has become vastly inefficient with too many machines clustered in the same areas. The pandemic hasn't helped, with many cash machines either standing idle in airports or over-used in shopping centres. CashTech can make a major contribution to relieve the 'storm and stress' of a cash cycle in need of review and reform (See section 3.1).

Chart 3: The Shrinking ATM Network

For each country, the chart indicates the year during which the total number of installed ATMs peaked and the bars indicate the decline in the number of ATMS since the peak.



Source: ECB Statistical Data Warehouse; CashEssentials

22 Hunt, 2020

23 Daily Express, 2020

In many countries, governments have been tackling the problem and have introduced policies to reduce what has been sometimes referred to as bank desertification. In Sweden, a new law came into effect on January 1st 2020 requiring banks to provide an adequate level of cash services. The law was designed to protect the more fragile people such as the elderly, migrants, those with disabilities, or those who do not have access to digital payments. In the UK, an independent Access to Cash Review recommended guaranteeing consumer access to cash, ensuring that consumers can obtain cash wherever they live or work. In France, some municipalities are funding the installation of an ATM to support local businesses.

But access to cash is not just access to ATMs. Alternatives channels such as cashback – where the customer pays, say, 50 euros for a 20-euro item and gets the difference in cash – has been boosted by the closure of thousands of ATMs and bank branches across Europe and the US. Simple, effective at point-of-purchase, cashback helps to attract customers to shops, which is especially important in remote locations. When it occurs face-to-face, cashback serves to highlight the role of cash as a driver of financial inclusion and non-discrimination in an increasingly complex payments landscape.



2.2

Challenge n°2: acceptance

In parallel to access to cash, a second challenge is its acceptance by retailers.

With cash infrastructure shrinking, it becomes more and more difficult and costly for retailers to deposit cash into their bank account. In some cases, this has led retailers to decline cash altogether.

In other cases, card schemes and digital payment providers have encouraged and incentivised merchants to refuse cash. “We’re focussed on putting cash out of business”, Visa executive vice-president Jack Forestell told a recent investors’ meeting. “To Visa, a cashless culture means convenience, security and ease of use. That translates to freedom for consumers and merchants alike,” Forestell said, providing that freedom excludes the use of cash²⁴. In 2017, Visa announced half a million dollars in give-aways to fifty US restaurants and food vendors. Why? To help pay for contactless payments technology — as long as those selfsame businesses pledged to refuse to take cash.

But acceptance is also sometimes challenged by regulators. In many countries, governments have imposed limitations on cash payments while others have mandated the acceptance of digital payments. 17 of 27 Member States of the European Union have introduced cash payment limitations, with thresholds ranging from €500 in Greece to over €14,000 in Poland. In India, the tax authority announced that from February 2020, retailers with annual sales exceeding Rs 50 million will be fined if they fail to provide solutions for the acceptance of digital payments²⁵.

The acceptance of cash has also been affected by changes in the way we shop. As consumers shop more online or in-app, merchants have been offering more digital payment options. Physical store concepts have also evolved as illustrated by the Amazon Go cashierless stores. While it is possible to pay cash in these situations, in some cases merchants are either ill-informed or prefer a digital-only model. The Amazon Go story is quite compelling as the company eventually announced it would accept cash amid intensifying criticism that refusing to take cash was discriminatory against the unbanked.

Cash and the coronavirus blame game

The coronavirus pandemic has aggravated the trend as some retailers opted to refuse cash following misleading information that banknotes and coins could contribute to spreading the virus. Several health organisations – including the World Health Organisation and the Frankfurt Health Office – as well as a number of central banks – including those of Austria, Canada, England, the euro-area, Finland and Germany – have since minimized the risk of transmission of the dis-

²⁴ Visa so desperate for business?CashEssentials, 2017

²⁵ Lepecq, 2020

ease through notes and coins²⁶. They have not entirely lifted consumer and merchant concerns. Furthermore, the perception that cash could spread pathogens has cynically created an opportunity, or pseudo opportunity, for opponents of cash to misuse their position — to attempt to build on their extant power. But many of the key arguments in favour of cash remain untouched by Covid-19, undiminished and intact (See also section 1.2.).

The coronavirus has led some organisations to mobilise to protect the acceptance of cash by shops and restaurants. A telling episode was the expression of consumer association support for the Senate-sponsored Payment Choice Act in the US (redolent of an earlier initiative by European consumer associations²⁷. The campaign included a letter signed by more than 50 organisations arguing that the right of American citizens to pay with cash was fundamental and must be safeguarded. Quoting a Federal Reserve study dated May 2020, the letter highlighted that nearly a quarter of US adults are unbanked or underbanked, their number highest among racial and ethnic minorities, the low-paid and less educated, and the urban and rural poor. Of course, the situation has been made worse by the pandemic.

**“A non-discriminatory right to access cash is ‘everyone’s right’”,
said campaign co-organiser Susan Grant,
of the Consumer Federation of America.**

²⁶ Auer, Cornelli and Frost, 2020

²⁷ US consumer associations call for mandatory cash acceptance, CashEssentials, 2020

2.3

Challenge n°3: efficiency

The essential efficiency challenge for cash currently is that, as traditional bank infrastructure shrinks in mature markets (ATMs, branches and cash centres), the cost of cash increases for users, notably consumers and retailers. The result is a vicious circle. By way of example, just as consumers must travel further than in the past to withdraw cash, so must small retailers do so to deposit cash in a bank account.

The academic literature is remarkably inconclusive about the comparative costs of payment systems, including cash, for all players along the chain from central and commercial banks to non-financial companies (front-office and back-office operations)²⁸. Costs depend on country-specific circumstances, based on unit costs (differently defined), and the scale of cash usage alongside other payment methods. Plausible, first glance criteria, like costs per payment transaction based on fixed costs, or costs as a percentage of sales, vary between countries, while transaction amounts have a major bearing and influence on outcomes²⁹. With the limited availability of data, cost-based studies typically rely upon approximations and simplifications, so the robustness of results regularly becomes a critical issue³⁰.

Still, as we shall see, based on select criteria, cash is often cheaper and faster than digital payment.

For retail, high credit card costs

A pro-cash consideration in the cash-versus-digital argument, is the vast cost of credit cards for shops, forced in mature markets to meet growing costs for essentially the same service³¹. In the UK, retailers spent £1.3 billion with third parties for the right to use credit cards in 2018, up by £70 million year-on-year. Each transaction cost retailers an average of 5.85 pence per transaction, a 17% rise over 12 months. These additional costs were largely driven by the fees paid to ‘partner’ credit and debit card companies, which had increased by more than 50% since 2017³². The British Retail Consortium, among others, continues to urge action to improve the regulatory architecture around card payment fees, to expand and simplify the system to cover the full range of transactions and prevent abuse by monopolistic card companies. In the US, the squeeze on retail is even tighter, because interchange or “swipe fees” paid to banks to use cards and the processing associated with those fees – paid to credit card industry Titans – are higher than in the UK and Europe.

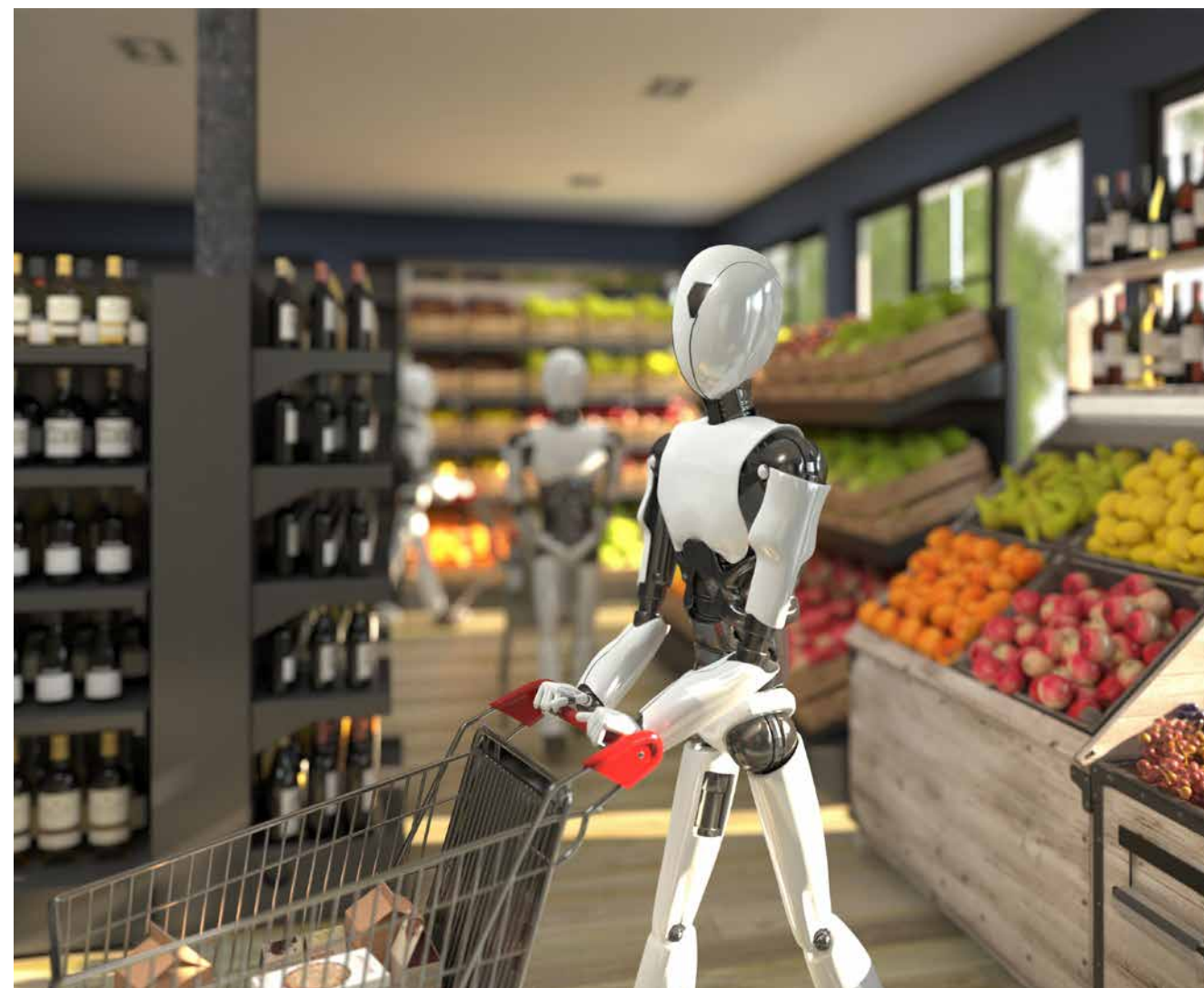
²⁸ Abele and Schaefer, 2016

²⁹ Krüger and Seitz, 2014

³⁰ Abele and Schaefer, 2016

³¹ Thaxton, 2019

³² Calls for action on card fees, CashEssentials, 2019c



For commercial banks, the high costs of distribution

Commercial banks, meanwhile, must absorb the costs associated with distributing physical money, providing customers with access to cash and accepting it again with little return. Unsurprising then, that commercial banks and card issuers like Visa and Master Card, are incentivised to promote cash substitutes, so spend huge sums of money endorsing card payment. Cash, by contrast, has achieved its success as a payment instrument with no marketing spend³³. As CashTech start-up founder Sandipan Chakraborty has signalled, it took Visa and Mastercard more than 50 years to attain only 15% of the global market for consumer payments at point-of-sale³⁴.

A recent study by two academic economists found that cash is the cheapest payment instrument³⁵. Based on 19 different components, it measured the main cash and debit card cost items for both consumers and retailers in 52 countries. The report concluded that unit costs for debit cards were almost three times more expensive than for cash. It found that for an average retail transaction of about 60 dollars (across the measured countries), the transaction cost on a cash payment was about 50 cents; on a debit card, about \$1.50. There were regional variations, but cash was cheaper in all nations.

³³ Seitz and Krüger, 2017

³⁴ Schneider, 2020

³⁵ Cash is cheapest payment instrument, CashEssentials, 2019



Not only cheaper, faster

A Deutsche Bundesbank study concluded that cash was the cheapest and also the fastest payment option. On average, each cash payment costs just under €0.24³⁶. Payments made by girocard or SEPA direct debit came to just under €0.33 and €0.34 respectively in the study, while credit card payments with PIN amounted to €0.97, credit card payments with signature €1.04 each. The study found that paying with cash took about 22 seconds, when card payments requiring PIN entries took almost 30 seconds. When a signature was required, the transaction took almost 40 seconds³⁷.

Cash has become expensive for banks to distribute through bank branches, ATMs, and cash-in-transit companies. Major retail banks spend hundreds of millions of dollars every year to manage and distribute cash, between five and ten percent of annual bank operating costs, according to McKinsey³⁸. At the same time, retailers struggle when paid in cash, having to collect, count and reconcile, before bringing cash back-to-bank in any case. ATM fees for consumers have increased dramatically in many markets over the past two decades. Every year for the past 15, American bank customers have been charged more to access their own money³⁹. Last year alone, the amount British consumers paid to take cash out of ATMs rose by £29m to £104m⁴⁰. CashTech offers a better way of recirculating cash more efficiently, by leveraging innovation and technology.

³⁶ Cabinakova et al., 2019

³⁷ German cash quick and cost efficient, CashEssentials, 2019a

³⁸ McKinsey & Company, 2018

³⁹ Wisniewski, 2019

⁴⁰ Warwick-Ching, 2020



3.

Innovation
is improving
the efficiency
of the cash cycle

Just as coronavirus is forcing much of business to reinvent itself, so is it spurring innovation in the cash cycle, with social distancing, confinement policies and retail closures prompting new ways of handling and distributing cash.

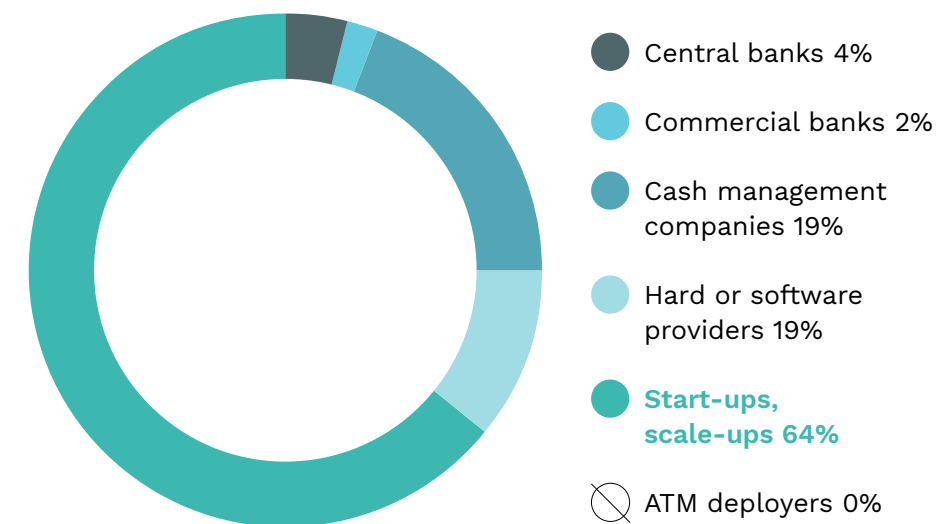
Innovations developed during the pandemic include:

- In India, several banks have launched mobile ATM services, with vans transporting ATMs in cities to predetermined places for fixed periods, so providing cash services while eliminating travel-time risks;
- The government of the Indian Tamil Nadu region distributed cash with essential food items to the poor during a three-week national lockdown; the main beneficiaries were pavement vendors, construction and other informal sector workers.
- In South Africa, the Post Office (SAPO) plans the roll-out of 10,000 “cashless ATMs” in convenience shop businesses known as Spaza. Grant recipients insert their card in the cashless ATM, and receive a slip to buy goods from the shop or obtain cash. A pilot is taking place in 40 locations in Kwa-Zulu Natal province.
- In the UK, single-use cash vouchers are enabling people who cannot leave home to ask a trusted friend or volunteer to withdraw cash at any Post Office (the scheme is also open to banks, building societies and credit unions).
- A Kuwaiti bank is providing a door-to-door cash delivery service to elderly, special needs and Premier Banking customers.
- Cash management, transport and logistics company, Prosegur Cash SA, has introduced a combination of electric and hybrid trucks to its cash transporting fleet in Spain and Germany and is expecting to reduce its carbon emissions by up to 25%.

The European Payments Council (EPC) recently issued a paper looking at ways of optimisation with a view to reducing the manual handling of cash and shortening the cash cycle. “We can foster recirculation by having the ability for merchants – for example, in a shopping mall – to replenish ATMs on, or nearby, the premises themselves, with banknotes received from their customers under specific security requirements and regulations,” said the EPC’s then Cash Working Group chair. “Last but not least, ‘cashback’ could be used by retailers and consumers for further recirculation,” defined as the right to recirculate banknotes checked for authenticity and sorted for fitness, by banks and cash-in-transit companies, according to strict central bank criterion⁴¹.

In a 2020 CashEssentials webinar, almost two thirds of participants indicated that they expected CashTech start-ups to drive innovation within the cash cycle. (See Chart 4).

Chart 4: Which organisations will be the main innovators in the cash cycle?



Source: CashEssentials CashTech Webinar

The CashTech market is highly competitive but the spirit and outlook among start-ups across the sector is remarkably collegial. To paraphrase one CashTech CEO, firms are looking for cross-sectoral solutions, seeking to build business (and businesses) around those solutions. The *particular* successes of the following companies are moving societies towards a *general* paradigm shift, in the way we use, pay for, and view cash in the smartphone era.



3.1

Increasing Access

CashTech firms like Sonect, SoCash and viafintech, are providing ordinary consumers with easy and convenient access to cash. As stand-ins for ATMs, they are attractive to banks, for whom – as we have seen – cash machines have become costly (equipment provision; annual maintenance; security risks). For retail and especially small shops, CashTech reduces cash in-store, earns commission fees and brings in additional customers.

Swiss start-up **Sonect** is making cash more accessible by allowing users to make withdrawals via their smartphones without having to visit an ATM. Put another way, Sonect is a cash withdrawal network minus the costly infrastructure.

The platform connects those who want to withdraw cash with those who have it, usually a local store. In this way, small retailers not only farm out their cash, they earn a commission and gain additional walk-in customers. The cash cycle is shortened, leading to savings for both banks and shop owners.

A Sonect client connects using a smartphone and requests a withdrawal amount. Generating a barcode, the app performs a geo-location-based search, displaying participating nearby shops. The shop cashier scans the barcode to settle the transaction, and the cash is handed to the client. Sonect has become the single largest cash distribution network in Switzerland and is planning international expansion to Europe and Latin America.

Singapore start-up **SoCash** is making cash more accessible by enabling app-based cash withdrawals, forgoing ATMs. SoCash has customized the ‘cashback framework’ to enable almost any shop with a banking relationship to become a bank touchpoint. The firm’s focus market is the countries of the ASEAN group (Association of South East Asian Nations), where infrastructure severely lags fast-growing demand. ATMs are often hard to find and users frequently have to wait in long queues.

Using what SoCash founder Hari Sivan calls “a hardwareless, totally software-driven approach”, SoCash is helping to build a kind of self-scaling banking market where costs are typically diminishing, similar to the evolution of other industries like telecoms, transport and logistics. Serving as ATM stand-ins, SoCash has integrated some leading regional banks at the forefront of digital technology. As well as facilitating debit card cashback services, SoCash enables a customer to deposit cash, or even apply for a modest loan, through small retailers like mini-marts.

SoCash sees the future payments ecosystem characterized by increasing convergence between banks and retailers, with CashTech serving as a kind of tech-charged bridge between the two.

Fact sheet

Company	Sonect AG
Founded in	2016
Founder(s)	Sandipan Chakraborty (CEO & Founder), Arindam Bajpayee (CTO & Co-Founder)
Main solution(s)	Cash withdrawal via app
Market(s)	Switzerland and planned for other European market
Brands	Sonect

What are the origins of your company?

On a cold winter’s night in Bern in 2015, Sandipan Chakraborty needed to pay a baby-sitter but had no cash. Walking through the wind and snow on his way to an ATM, he passed a pizzeria (among other small retailers) and thought: “You have the cash but don’t need it now and will have to deposit it at the bank later, anyway. I need the cash right now and don’t have it. It doesn’t make sense. Why can’t the pizzeria and I just exchange the cash, so saving us both a trip to the bank?”

Sonect was founded the following year in Switzerland and is today operating with a network of more than 2,300 shops.

What services do you offer?

Sonect is a location-based match making platform that connects those who want to withdraw cash with those who want to deposit cash – typically, a local shop owner. We do this by converting a shop into a virtual ATM. Thus, any shop can pay cash out to their customers via our app solution. Sonect democratises the process of dispensing cash via ATMs, by eliminating a significant portion of the value chain to reduce the operational costs of cash.

Who are the founders and what is their background?

Sandipan Chakraborty is the founder and CEO of Sonect. Before founding Sonect, he worked for more than 12 years at Credit Suisse, specialising in payments, core banking and regulatory compliance. He believes technology change management is necessary to adapt any human behaviour, particularly in the payments space.

What are the main challenges you face?

Our solution can make life much easier and simpler. However, it requires customers to change their behavior. And that change takes time. The smartphone has only just begun to be accepted as a payment solution; it is much less so as a means of withdrawing cash. As we are pioneers on this path, we have to first prepare the ground for others to walk on.

What are your thoughts on the future of cash?

Cash is still the major payment method globally, aside from in some developed countries. Even in countries putting an increasing focus on digital payment methods, cash remains systematically relevant. Given such sustained global relevance, we believe that cash is here to stay. However, we need to make cash usage simpler, more accessible, and cheaper. That is why Sonect was founded.

What are your plans for future expansion?

In the future, Sonect plans to expand further into Europe, and Mexico. In 2019, Sonect acquired a license to operate in the European Economic Area via the National Bank of Lithuania.

3.2
Increasing Acceptance

German start-up **viafintech** recognizes that, as most consumer payments are often still made in cash, it makes good business sense to help consumers use cash more effectively.

Dostoyevsky’s adage that “money is printed freedom”, is frequently quoted in Fintech literature as stemming from people’s “ever-increasing fear of government control”⁴². To those fears might be added trepidation around big tech: “a society where big data is leading to the increasing monetization of personal information (and) anonymity (is) becoming scarcer and more valuable”⁴³.

As viafintech’s Andreas Veller describes it, viacash doesn’t require personal or financial information from the end customer. The idea is that viacash digitally connects retailers with businesses – constituting the cash-in cash-out infrastructure – that want to execute cash transactions with their customers. Viafintech has developed a portfolio of products ranging from bank account deposit and withdrawal, to bill payment and the payment of online purchases.

Other companies facilitating cash acceptance include:

- Netherlands-based **Cashly** provides online payment solutions, where a company offers a network of payment points for processing cash transactions. This opens the door on a range of on-line cash payment options for e-commerce purchases and bills.
- US bill-payment service provider **PayNearMe** allows consumers to pay bills using cash at literally thousands of retail stores across America.
- Irish start-up **PipIt**, alive to the socially enabling powers of cash, uses app technology in a payment service expressly designed to help migrants pay cross-border bills using cash, often their preferred means of payment. PipIt’s ‘collection partners’ (retail stores and post offices) pay the firm a commission on transactions. In most cases, there’s no cost at all for the migrant client (aside from the face value of the currency send).

42 For example, see Seitz and Krüger, 2017, p. 768
43 Lepecq, 2018, p. 43

Fact sheet

Company	viafintech
Founded in	2011 (founded as Cash Payment Solutions GmbH)
Founder(s)	Achim Boensch, Sebastian Seifert, Florian Swoboda
Main solution(s)	leading pan-European cash-transaction platform that connects retailers and consumers
Market(s)	Germany, Austria, Switzerland, Italy, Greece (2020)
Brands	viacash and Barzahlen/viacash

What are the origins of your company?

The company viafintech was founded in 2011 and launched its first product “Barzahlen” (European brand name is viacash), in 2013 in Germany.

The original idea was to enable the possibility of shopping online and paying offline via a barcode in local shops. Instead of providing sensitive account or credit card information to an online shop through regular payment methods, our service required no personal or financial data from the end user, except an email address to send the barcode to.

Once the retail partner network was established, covering basically every region of Germany, many other cash deposit or withdrawal services were enabled; for example, bill payment and especially banking. Today, for many partner banks, such as N26, bunq, Hype, DKB and TAR-GO, this is our most valued service.

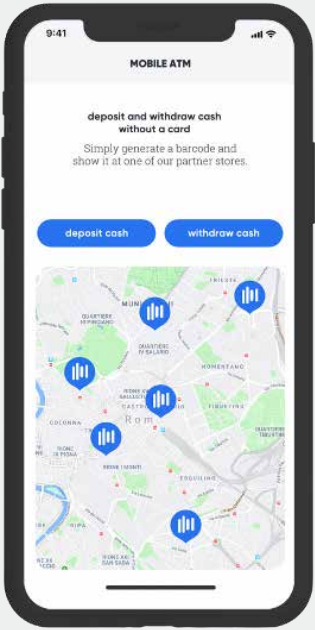
What other services do you offer?

Viafintech is the leading pan-European transaction platform for cash. However, our broad network of stores allows us to perform several additional financial services, many of them also cashless. Our focus lies in connecting retailers with consumers. Through our brands, viacash and Barzahlen, we offer 21st century platform solutions for cash deposits and withdrawals.

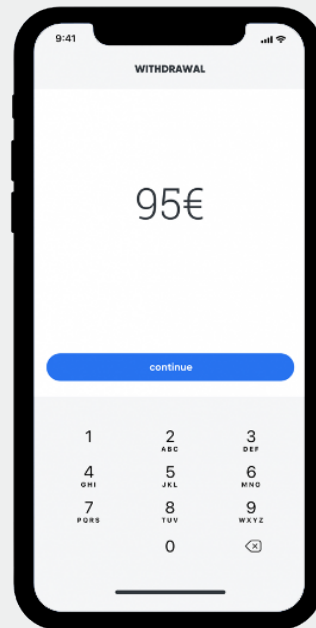
Through our services, banks can offer their customers cash withdrawals and deposits while shopping. Our vision is to replace the classic bank branch and, together with our retail partners, become the place where everyone can manage his or her most basic banking needs. We implement various services through barcodes such as bill payment, couponing, money transfer and top-up.

How does this work in three simple steps?

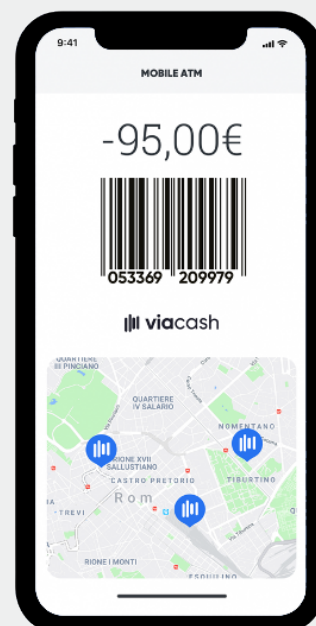
STEP #1 — sign into banking APP
Open your banking app and choose a transaction: Deposit or withdrawal



STEP #2 — Choose amount
Enter the amount you want to withdraw or deposit



STEP #3 — withdraw or deposit
Scan the barcode at the checkout at a viacash retail partner and withdraw or deposit cash



Who are viafintech's founders and what is their background?

The company was founded 2011 by Achim Boensch, Sebastian Seifert and Florian Swoboda. They met while studying at WHU – the Otto Beisheim Graduate School of Management. Today, the company is still managed by Achim Boensch and Sebastian Seifert, together with Andreas Veller, an experienced former McKinsey consultant and Junichi Takemura.

What are the main challenges you face?

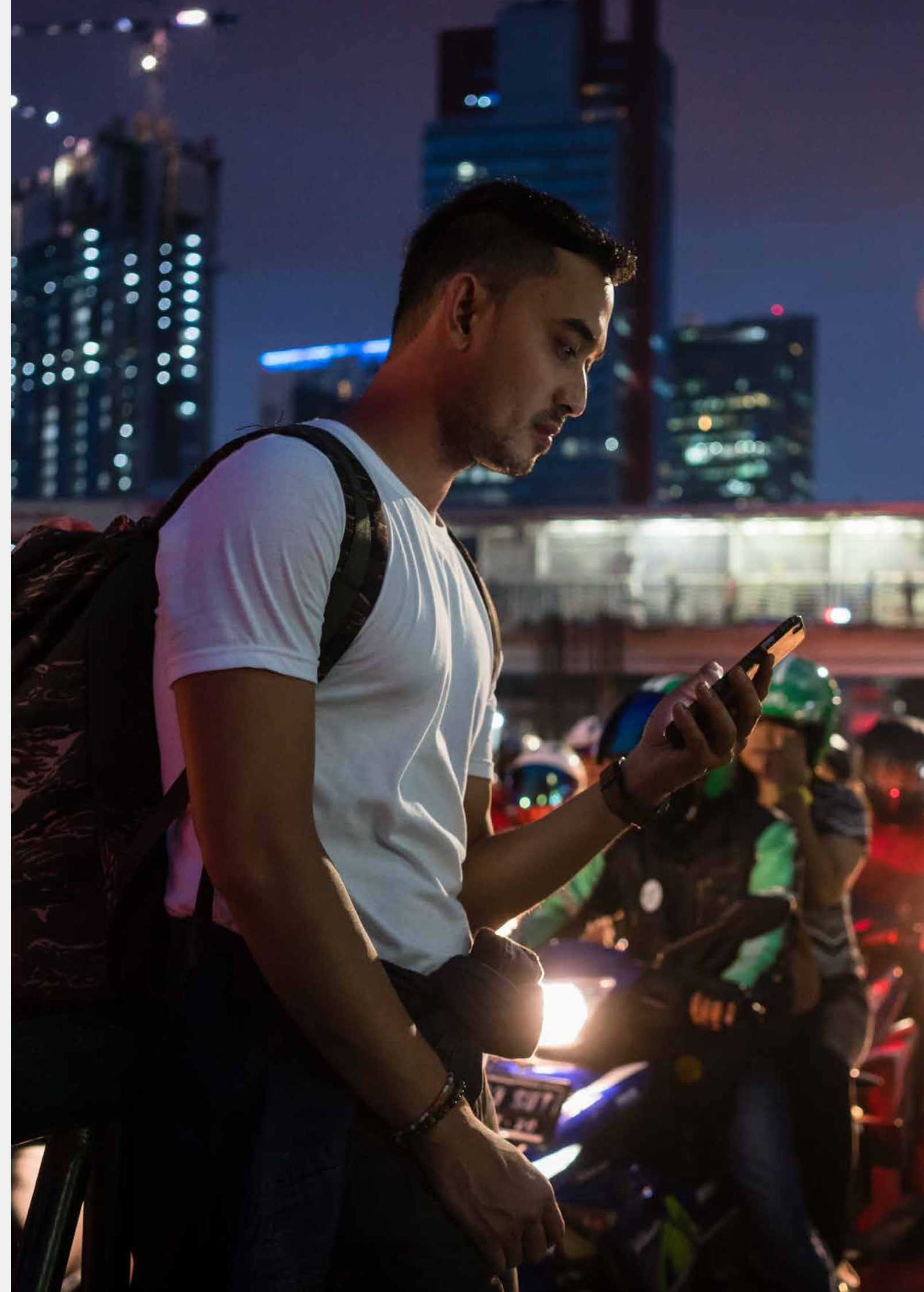
As we are currently expanding in many European countries, we face mainly regulatory challenges, that need to be solved individually in each country. Aside from that, there are market competitors that we have to surpass in speed to market and service offering.

What are your thoughts on the future of cash?

Despite the rapid growth of digital payments, the demand for cash remains high in Europe. Although 72 % of transactions (in Europe) are still made in cash, we expect this to decline in the future. Hence, there is growing demand for digital solutions for cash to cover the transformation from a cash-centric economy to a more cashless world.

What are your plans for future expansion?

We are constantly expanding our retail partner network in existing markets, Germany, Austria, Switzerland and Italy and Greece. We are currently internationalizing to other European countries, like Greece, France, Spain, Portugal, UK and Poland.



3.3

Improving Efficiency

Cash and specifically coins dominate the micropayment end of the market but costs are high for handling, transportation, storage and security.

British start-up **Shrap** is making cash more efficient by offering a viable, digital alternative to coins. The app enables users to spend in cash but instead of receiving physical coin as change, they receive their change electronically and instantly in Shrap. Participating retailers set up a digital float, which is directly debited when change is issued, in a free, anonymous “micro-transaction” with the client. Easily downloaded to an android or IOS device, the app serves to reduce the physical handling of coins and hence reduce the vast amount of coinage ‘lost’ in an economy, ‘down the back of the sofa’ or simply discarded.

There are two types of accounts: a commercial account, associated with a verified business, or an entirely anonymous personal account, which uses an email or mobile telephone number to link the business and personal accounts. For a business client, Shrap reduces or eliminates the need to maintain a physical coin float. A business client holds a digital float on Shrap’s platform, which allows the business to issue change electronically when a customer makes a cash purchase. The Shrap solution has the potential to vastly improve the efficiency of cash and, in turn, the future acceptance of cash by businesses due to the cost savings achieved by only having to deal with notes.

For individuals, the Shrap solution avoids the need to accept physical coins as change when using cash and provides a freely transactable eco-system for individuals to use their stored change.

Shrap provides a hybrid app / card-based replacement for coins that seeks to replicate the features of cash – free and anonymous to use, bearer-based and inclusive of all in society – while incorporating the best of digital: convenient, efficient and secure.

Other firms helping to make cash more efficient include:

- US start-up **VizyPay** uses a Cash Discount Program to provide unlimited monthly credit card processing for a flat low fee, based on the merchant’s monthly processing volume. The program implements a small increase in price to all customers, while giving a discount to those who pay with cash.
- French start-up **Cashway** offers a range of virtual cash solutions including a virtual cash bank agency, whereby a customer deposits cash at a registered deposit point and credits his bank account. Other solutions include bill payment in cash and online cash payments.

Fact sheet

Company	Shrap Ltd
Founded in	08.05.2018
Founder(s)	Chris Forero-Slee, James Cummins
Main solution(s)	Coin replacement
Market(s)	Retail, P2P
Brands	Shrap

What are the origins of your company?

Shrap is an independent start-up, founded in Bournemouth, UK, in 2018. Faced with bags full of spare change, our founders decided that there had to be a better way. So we built Shrap, the simple alternative to coins.

What services do you offer?

Shrap replaces the need for coins – so supports the continued use of cash – by making it more efficient and easier to use. For businesses, Shrap provides a way of giving change digitally when a customer makes a cash purchase, eliminating the need to maintain a coin float. The ‘change’ that customers collect on Shrap, can then be spent back with those businesses with no fees.

For all of us, when we use cash, there is no longer the need to accumulate coins as a result. We think coins are inconvenient and difficult to use. With Shrap, you simply collect your change on your phone or Shrap card, store it and spend it – anonymously and free-of-charge.

Who are Shrap’s founders and what is their background?

Chris Forero-Slee, co-founder and CEO of Shrap, is a tax law graduate with more than 15 years experience as a financial adviser and in the investment platform industry. He held executive

management positions for nine years at Platform One and more recently at Novia Global, the first two UK-based platform companies to enter the international market.

James Cummins is co-founder and CTO of Shrap. Having spent a number of years developing software for US-based start-ups, he founded a specialist consultancy and software development house, DualMode, in the UK in 2014. James Cummins has helped to build a number of successful tech start-ups, ranging from fintech disruptors to e-learning revolutionaries.

What are the main challenges you face?

As a young startup, our challenge is to spread the word about the coin revolution!

What are your thoughts on the future of cash?

We believe that cash – or at least the key attributes of cash – will remain indefinitely, regardless of the physical form. We are fiercely independent and believe that Shrap must retain the features of coinage and cash more generally: free to use; anonymous; based on a universal measure of value; and with no barriers to using or accepting it. We see Shrap as a core component of a more efficient and sustainable cash infrastructure.

What are your plans for future expansion?

Following Shrap’s successful beta program, the service is launching across the UK in and subsequently into key international markets.

4.

Conclusion

This paper has given voice, form and definition to a selection of start-ups and innovators active in the market space we term, CashTech.

The CashTech *raison d'être* is neatly captured in the truth of the following statements: the march of digital is unstoppable; and the persistence of cash – as a preeminent method of payment, store of value, driver of financial inclusion and crisis refuge – won't end any time soon. In Europe, “the Eurosystem will continue to ensure that all citizens have access to banknotes at all times,” says ECB president, Christine Lagarde. Other central bankers have made similar statements.

It would be prudent then, for all sides in the argument about the future of cash, to look for business opportunities in a still cash-heavy world payments market.

CashTech isolates pain points in the cash cycle and offers solutions to make it sustainable going forward. Innovation contributes to cash's long-term tenability amid stiff competition from alternative payment options, by increasing access, acceptance and resilience and lowering costs. To paraphrase one CashTech CEO, we are all on a mission to optimise the global market for cash.

CashTech offers a three-way win, for banks, retailers and consumers, by making the cash cycle shorter, more efficient and vastly reducing costs. Not by seeking to overturn cash, nor to cut banks, hardware manufacturers or cash carriers out of the cycle, but by making cash more directly the affair of those who actually use it. In fact, CashTech is about augmenting, not diminishing, the payments system.

- For **consumers**, CashTech makes cash more readily accessible, shops providing a readily available high-density cash distribution network.
- For **retailers** – becoming stand-ins for ATMs – CashTech means the value-add of offering major new services to customers, like cash withdrawal, deposit and cashback, with the attendant benefits of additional foot traffic and cross-selling.
- For **commercial banks**, intent on revising their business models away from loss-making ATMs – and in many places they are loss-making – CashTech is shorthand for future cost-savings.

Cash is the only form of central bank money accessible to the general public, therefore maintaining a tangible link between the public and the central bank – a tie that is important for maintaining trust in the central bank; indeed, in the whole financial and economic system.

Using innovation to maintain rather than undercut banknotes and coins, ultimately means safeguarding society's means of exchange. Cash has long been the cornerstone of the payments system and, precisely due to the power and reach of the digital revolution, has perhaps never been more important. Consider that big ticket private players, like the card companies, already with inordinate power in the marketplace, would like to see the regulatory structures governing payments further devolved into private hands (ideally, their own).

The *particular* successes of the CashTech start-ups described in this paper, Shrap; viafintech; SoCash; Sonect and others, signal a *general* paradigm shift. When in some circles cash is viewed as a 'dinosaur', battered by misleading information regarding coronavirus, CashTech offers "life-style ways", or simply just ways, to better access cash and make payments.

As banks move away from cash, cash is moving away from banks. CashTech puts retailers and small shops *en route* to become alternative, supplementary channels for the distribution and collection of cash. (Not replacements: bank ATMs distribute large amounts of cash, which small shops often cannot do). The customer needing cash simply switches on their smartphone, chooses a CashTech free app – there's nothing to buy – and goes to one of the vast network of partner retail outlets to obtain cash.

Banks are withdrawing from cash due to high fixed costs. They won't opt out where cash is profitable, but they will, and are already, where margins are under severe pressure. There's a limit to how much banks can support expensive infrastructure (the costs passed onto customers). Banks are becoming increasingly dependent on fees to provide cash services and here, too, there are limits to the preparedness of banks to impose them. These are major forces that will drive the move to CashTech in the future, rather than, or as much as, the 'convenience' of digital payments.

CashTech also poses new challenges and opportunities for central banks around the quality of notes in circulation and counterfeit detection, and in terms of regulation. What might be the implications of CashTech for central banks if their role in the distribution of cash is altered? Central banks are responsible for the quality control of bank notes in circulation and regulate commercial banks to ensure they comply. Would shops then be responsible for the issue of clean notes, for verifying banknote authenticity and quality? What policy changes are required?

CashTech is about making the system more efficient for all, about finding a set of broad and inclusive solutions that, eventually, can be tailored to fit all stake-holders.

References

- Abele, Hanns A.; Schaefer, Guido, K. (2016) *The cost of cash and debit cards in Austria, Journal of Financial Market Infrastructure*. Available at: <https://epub.wu.ac.at/5734/>
- Auer, R., Cornelli, G. and Frost, J. (2020) *BIS Bulletin No 3 Covid-19, cash, and the future of payments*. Available at: <https://www.bis.org/publ/bisbull03.pdf> (Accessed: 17 November 2020).
- Beerman, J. (2019) 'Back to the roots: cash and its core functions', in *Deutsche Bundesbank*. Available at: <https://www.bundesbank.de/en/press/speeches/back-to-the-roots-cash-and-its-corefunctions-805552>
- Cabinakova, J. et al. (2019) *The costs of cash payments in the retail sector*. Available at: <https://www.bundesbank.de/resource/blob/808970/64a7bec1196c6e3677eb09eb3e827191/mL/kosten-derbargeldzahlung-im-einzelhandel-data.pdf>
- Carbo-Valverde, S. and Rodriguez-Fernandez, F. (2020) *Fraud in cash and electronic payments: taxonomy, estimation and projections A report for the International Security Ligue*. <https://cashessentials.org/app/uploads/2020/09/Fraud-in-electronic-payments-Carbo-and-Rguez-April-2020.pdf>
- Carrns, A. (2020) *Who Gets Hurt When the World Stops Using Cash, The New York Times*. Available at: <https://www.nytimes.com/2020/09/11/your-money/cash-credit-cards-coronavirus.html>
- CashEssentials (2019a) *New study finds that cash is cheapest payment instrument, CashEssentials*. Available at: <https://cashessentials.org/publication/new-study-finds-that-cash-is-cheapest-payment-instrument/>
- CashEssentials (2019d) *The British Retail Consortium calls for Action on Card Fees*. Available at: <https://cashessentials.org/news/the-british-retail-consortium-calls-for-action-on-card-fees/>
- CashEssentials (2017) *Paying cash online? Yes we can!, 24/03/2017*. Available at: <https://cashessentials.org/paying-cash-online-yes-we-can/>
- CashEssentials (2020) *US Consumer Associations Call for Mandatory Acceptance of Cash, 02/09/2020*. Available at: <https://cashessentials.org/us-consumer-associations-call-for-mandatory-acceptance-of-cash/>
- CashEssentials (2020) *Governments Announce that the Supply of Cash is Vital to the Economy, CashEssentials*. Available at: <https://cashessentials.org/governments-announce-that-the-supply-of-cash-is-an-essential-and-vital-part-of-the-economy/>
- CashEssentials (2017) *Is Visa so desperate for business they need to pay merchants to go cashless?* Available at: <https://cashessentials.org/is-visa-so-desperate-for-business-they-need-to-pay-merchants-to-go-cashless/>
- CashEssentials (2020) *Who is Framing Cash?* Available at: <https://cashessentials.org/who-is-framing-cash/>

- CNBC (2019) *Uber announces deeper push into financial services with Uber Money, NBC Universal News Group*. Available at: <https://www.cnbc.com/2019/10/28/uber-announces-deeper-push-into-financial-services-with-uber-money.html>
- Daily Express (2020) 'Cash access: FCA commits to fighting coronavirus decline – just how important is this?'. Available at: <https://www.express.co.uk/finance/personalfinance/1299478/cash-access-fca-coronavirus-decline-important>
- Feinberg, R. (1986) *Credit Cards as Spending Facilitating Stimuli: A Conditioning Interpretation*. Available at: [jstor.org/stable/2489426?seq=1](https://www.jstor.org/stable/2489426?seq=1)
- Gelles, D. (2019) *Al Kelly of Visa on the Reagan White House and the Politics of Guns, The New York Times*. Available at: <https://www.nytimes.com/2019/07/01/business/al-kelly-visa-corner-office.html>
- Goodhart, C. Ashworth, J. (2020) *Coronavirus panic fuels a surge in cash demand*. London. Centre for Economic Policy Research. Available at: <https://voxeu.org/article/coronavirus-panic-fuels-surge-cash-demand>
- Guevara Muñoz; Laura Viviana (2020) *The natural disasters of 2020 - LatinAmerican Post, Latin American Post*. Available at: <https://latinamericanpost.com/31709-the-natural-disasters-of-2020>
- Hernandez, L., Jonker, N. and Kosse, A. (2014) 'Cash versus Debit Card: The Role of Budget Control', DNB Working paper No. 429, Netherlands central Bank, Research Department. Available at: https://www.dnb.nl/en/binaries/Working%20Paper%20429_tcm47-309188.pdf
- Hunt, I. (2020) *White paper: Alternatives to sleepwalking (or stampeding) into a cashless society*. Available at: <https://www.shrap.co.uk/white-paper-alternatives-to-sleepwalking-or-stampeding-into-a-cashless-society>
- Improving the efficiency of the handling of cash: 'Recirculation Paper' (2018) *European Payments Council*. Available at: <https://www.europeanpaymentscouncil.eu/news-insights/insight/improving-efficiency-handling-cash-recirculation-paper>
- Jagannathan, M. (2020) *World Health Organization: 'We did NOT say that cash was transmitting coronavirus', Market Watch*. Available at: <https://www.marketwatch.com/story/who-we-did-not-say-that-cash-was-transmitting-coronavirus-2020-03-06>
- Jenkins, P. (2018) 'We don't take cash': is this the future of money?, *Financial Times*. Available at: <https://www.ft.com/content/9fc55dda-5316-11e8-b24e-cad6aa67e23e>
- Krüger, Malte; Seitz, F. (2014) *Costs and Benefits of Cash and Cashless Payment Instruments, Deutsche Bundesbank*. Available at: <https://www.bundesbank.de/en/publications/reports/studies/costs-and-benefits-of-cash-and-cashless-payment-instruments-710096>
- Lagarde, C. (2020) *Payments in a digital world, European Central Bank*. Available at: <https://www.ecb.europa.eu/press/key/date/2020/html/ecb.sp200910~31e6ae9835.en.html>

Lepecq, G. (2020) *India fines Shops not accepting Digital Payments, in the midst of Internet Shutdowns*, *CashEssentials*. Available at: <https://cashesentials.org/india-introduces-fines-for-shops-that-do-not-accept-digital-payments-in-the-midst-of-internet-shutdowns/>

Lepecq, G. (2015) *CashEssentials Beyond Payments*, *Academia.edu*. Available at: https://www.academia.edu/35109368/Cash_Essentials_Beyond_Payments

McKinsey & Company (2018) *Attacking the cost of cash*. Available at: <https://www.mckinsey.com/industries/financial-services/our-insights/attacking-the-cost-of-cash#>

Megaw, N. (2020) 'Visa predicts "permanent" shift in consumer spending habits', *Financial Times*. Available at: <https://www.ft.com/content/90d666a2-621e-487e-8048-e86c047bb3c7>

Prelec, D. and Simester, D. (2001) *Always Leave Home Without It: A Further Investigation of the Credit-Card Effect on Willingness to Pay*, *Marketing Letters*. Available at: <https://web.mit.edu/simester/Public/Papers/Alwaysleavehome.pdf>

Rogers Hummel, J. (2018) *Should Governments Restrict Cash?*, *Cato Institute*. Available at: <https://www.cato.org/publications/policy-analysis/should-governments-restrict-cash>

Rogoff, K. (2016) *The Curse of Cash* / *Princeton University Press*. Available at: <https://press.princeton.edu/books/hardcover/9780691172132/the-curse-of-cash>

Rooney, K. (2019) *Amazon figured out a way for online shoppers to pay in cash*, *CNBC media*. Available at: <https://www.cnn.com/2019/09/18/amazon-figured-out-a-way-for-online-shoppers-to-pay-in-cash.html>

Schneider, O. (2020) *Sandipan Chakraborty: 'Letztlich muss man auch ein wenig verrückt sein'*, *Netzwoche*. Available at: <https://www.netzwoche.ch/news/2020-02-13/sandipan-chakraborty-letztlich-muss-man-auch-ein-wenig-verrueckt-sein>

Scott, B. (2018) *The cashless society is a con – and big finance is behind it*, *The Guardian*. Available at: <https://www.theguardian.com/commentisfree/2018/jul/19/cashless-society-con-big-finance-banks-closing-atms>

Seitz, F.; and Krüger, M. (2017) *The Blessing of Cash*. Available at: <http://hdl.handle.net/10419/162911> www.econstor.eu

Seven moments in Spring: Covid-19, financial markets and the Bank of England's operations - Speech by Andrew Hauser / *Bank of England* (2020). Available at: <https://www.bankofengland.co.uk/speech/2020/andrew-hauser-speech-hosted-by-bloomberg-via-webinar>

Siekmann, H. (2017) 'Restricting the Use of Cash in the European Monetary Union: Legal Aspects', in, pp. 153–178. doi: 10.1007/978-3-319-59846-8_10 Available at: https://link.springer.com/chapter/10.1007/978-3-319-59846-8_10

Thaxton, C. (2019) 'Commentary: The Hidden Price of Cashless Retail', *Fortune*. Available at: <https://fortune.com/2019/04/03/cashless-stores-retail-amazon-go/>

Warwick-Ching, L. (2020) *Consumers pay big price after free cash machines close*, *Financial Times*. Available at: <https://www.ft.com/content/faad904e-48f3-11ea-aeb3-955839e06441>

Wisniewski (2019) *Rising ATM Fees: Why Banks Are Charging Consumers More Than Ever*, *Bankrate*. Available at: <https://www.bankrate.com/banking/rising-atm-fees-how-to-avoid-them/>

Wolfe, D. (2020) *Walmart and payments: Everything you need to know*, *Payments Source*. Available at: <https://www.paymentsource.com/list/walmart-and-payments-10-things-you-need-to-know>

