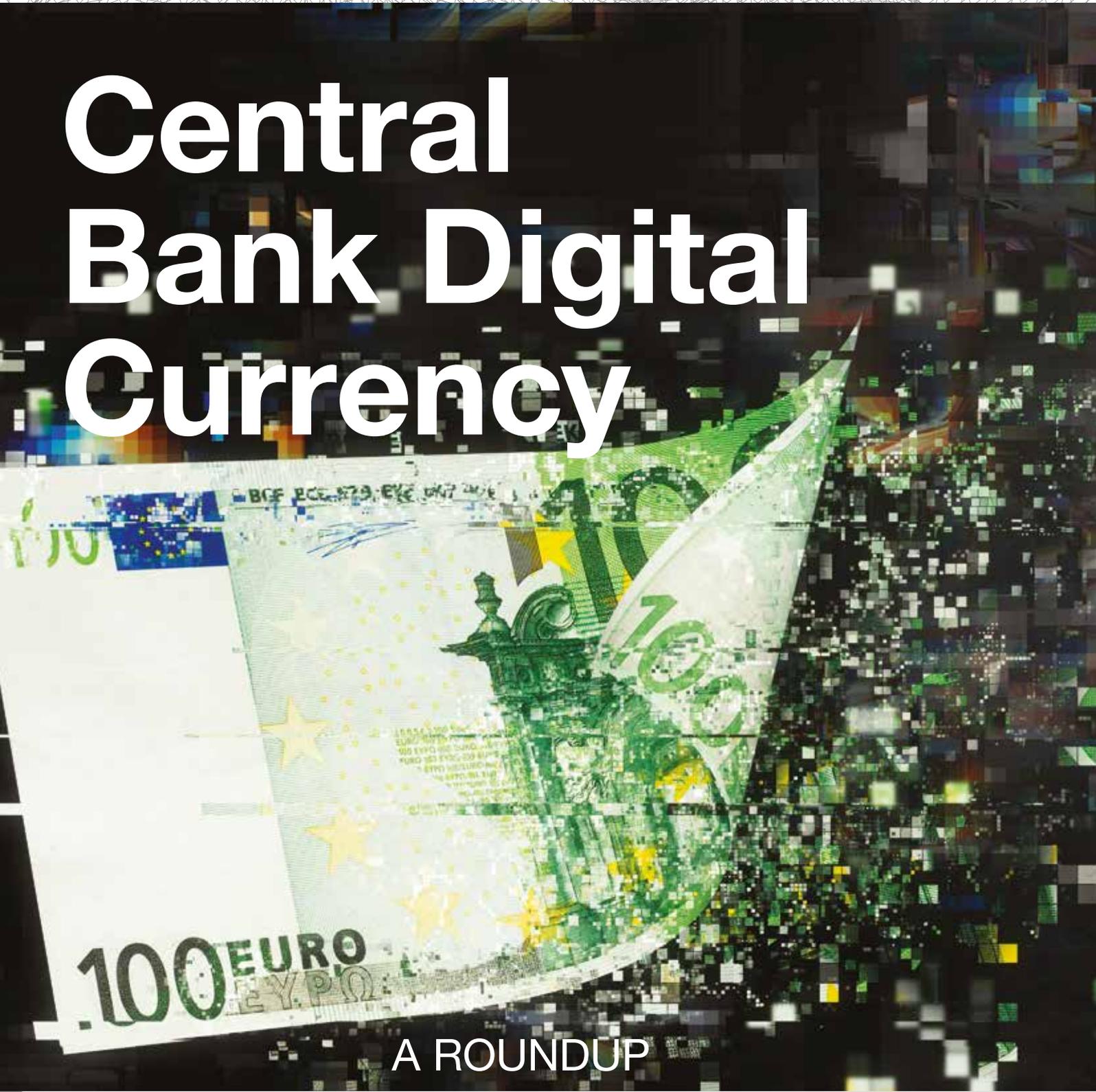


INFOSECURA

Central Bank Digital Currency



A ROUNDUP

A magazine for the security printing industry worldwide, published four times a year by Intergraf in Brussels and mailed to named members of the security printing community, such as security printers, their suppliers, banknote issuing, government and postal authorities as well as police forces in more than 150 countries.

INTERGRAF

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Editor-in-chief: Beatrice Klose

Editor: Manfred Goretzki

Editorial office and publisher:

Intergraf, 130 A, Avenue Louise

B-1050 Bruxelles

T. + 32 2 230 86 46

F. +32 2 231 14 64

securityprinters@intergraf.eu

Advertising inquiries: Manfred Goretzki

Covid-19 and CBDC



It has been difficult to get away from news about COVID-19 in the last three months. The headlines in the press spoke of little else, except for the reactions of governments to the general threat. We still don't know what 'the time after' the pandemic will look like, when 'social distancing' will be much less strict, and the economy will slowly come back to life. Will familiar habits, such as shaking hands or kisses on cheeks and indeed

the physical exchange of banknotes between buyer and seller return or not? There is a directness in such an exchange, that card payments and contactless payments lack. Not that paying via a card terminal is without danger, as the coronavirus may survive longer on a plastic keypad than on a banknote.

Much of the news that did come in over the last three month was about plans or proposals to increase electronic means of payments and of identification. In the ID sector this includes proposals for an immunity passport, according to one idea, an app or QR code on a smartphone. The technical side of this can or has been solved, the medical one is still a long way off.

On the banknote side, the most interesting development has been in the 'central bank digital currency (CBDC)' area, where we now have a real observable pilot project. China has introduced a 'digital Yuan' in a geographically limited area. If the trial succeeds and is extended over the whole country, it could have enormous consequences though-out the world. (See article page 6). In Europe the appetite for CBDC is not that great, although the Banque de France has also made a real transaction with CBDC, but with the 'wholesale' kind instead of the 'retail kind' as China did. We are giving a general overview of the CBDC situation.

So after the pandemic, will banknotes be under greater pressure or will the population rediscover its affection for cash? It could go either way, a renaissance for banknotes or a gradual but accelerated fade-out. The increase in the value of Euro banknotes in circulation during the COVIN-19 crisis shows that banknotes are still wanted, but not necessarily for all the purposes they are intended. As a medium of exchange and a unit of account they are being more and more replaced. This was shown in the shops in the immediate (legal) roaming area of the editor that displayed notices saying "no cash please". Although the number of such shops was tiny, as all the others were shut at the time. In the mentioned 'roaming area' shops have now reopened but many still display "no cash, please" notices. As for the third characteristic of cash, as "store of value", cash is doing great.

Finally, the pandemic is also a time of defiance. We are all in this together and we will overcome our difficulties together. In this spirit we announce that Intergraf Currency+Identity will go ahead on March 23 to 26, 2021 in Lyon. Although it may be wise to add a silent "inshallah" (God willing) to this.

The Editor

INTERGRAF CURRENCY+IDENTITY LYON, 23 to 26 March 2021

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These are the title words of a famous French song of defiance, sung from before the French revolution until the 2nd World War.

We may well see a new world when we emerge from the current pandemic. Whatever this world will look like, we will all have to work together to create and recreate what we need. In every part of society, a good way to start is to listen and to communicate. In our industry, as in any other, we have to take stock to see what is available and what is needed, especially in terms of ideas and technical solutions. Intergraf Currency+Identity will be the first and best opportunity to do this.

There will be few highlights in the annual conference and exhibition calendars in the currency and identity area this year. But for next year, we can be reasonably confident that one of the major international conferences will go ahead: Intergraf Currency+Identity conference and exhibition on 23 to 26 March, 2021 in Lyon, France.

THE PROGRAMME

Intergraf Currency+Identity is a conference where central banks, government agencies and law enforcement can and will discuss how to react to and manage the changed world that will face us all after the Coronavirus pandemic. Most far-seeing experts insist it will not be simply going back to what was there before. It will be a changed world. But what are the options?

Intergraf Currency+Identity will give the floor to those that need to deal with that new situation, e.g. the customers of our industry. The tools, systems and processes they have available will be there to examine in the exhibition, where the need for new solutions and the offer of new solutions will meet. It is a unique opportunity to shape not only our industry but give those it serves, the people who are relying on currency and identity and all that this entails, what they need in this new environment.

The conference programme focuses on present and future problems and solutions, beginning

with the key note by Daniel Hulme, on Artificial Intelligence and the future of business and including, among others, the activities of the Bank of England regarding Central Bank Digital Currencies (CBDC) presented by Sarah John, the BoE's Chief Cashier and Director of Notes and on the ID side, Matthias Schwan of Germany's Bundesdruckerei asking: Lost or stolen passport? Just download another one. That may not be the future, but what will the future be? Intergraf Currency & Identity will explore together with you, the delegates.

THE EXHIBITION

The currency and identity supply industries firmly believe that not only Intergraf Currency+Identity will go ahead on March 23 to 26, but that its products and services will be of greater importance and urgency than for a long time in the past. The proof: over 50 per cent of the exhibition booths were sold within half an hour after the exhibition space sale opened. Now there are only 30 booths left. Book your booth now and get ready for Intergraf Currency+Identity 2021 - two and a half days to promote your products and services to a global audience of vetted currency and identity experts and decision-makers. Online booking only - www.intergrafconference.com.

We very much look forward to bringing our community together and meet you all in person in Lyon, next March. ■

THE PASSING OF A GUIDING SPIRIT

Efthimios Matsoukis, former Chairman of Intergraf's Committee of Experts died June 21st, 2020.



Intergraf's Team was deeply saddened by the sudden passing of our former Chairman of the Committee of Experts, Efthimios Matsoukis. As a member of the Committee of Experts from 1991 to 2003 and then as its chairman from 2003 to 2016, he shaped the Intergraf Conference and led it from a relatively modest event to its present size and importance. He was also instrumental in the launch of Intergraf's certification scheme for security printers and suppliers.

Efthimios was a worthy representative of the character of his native Greece in its role of the cradle of European culture and philosophy. One could imagine that he modelled himself after Socrates and

Plato. He was ever thoughtful and considerate, tolerant and understanding and not without a quiet sense of humour. He also had great public spirit. He was active in the Greek Printing Federation, which he led 'into Europe', fostering cooperation with Intergraf and with fellow European security printers. Efthimios started his involvement with the Intergraf conferences by helping to organize the 1991 event in Vougliameni near Athens. His chairmanship began at the 2003 edition in Montreux, Switzerland, enabling him to preside over a string of ten successful and growing events.

Efthimios Matsoukis was a much liked and respected member of the Intergraf family. He will be missed. ■

Coronavirus and cash

The question «can I catch the coronavirus from banknotes?» seemed to have been on everybody's mind in the early stages of the pandemic. The general answer was, yes, but not more so than from any other commonly touched surface and less so than from many. We have to wait until we are back to 'normal' to see how banknote circulation was affected.

One of expected - and welcome - reactions to the spread of the coronavirus the world over has been to make people question where the virus could come from, where and from what they could be infected. The European Centre for Disease Prevention and Control states that the main path to transmission is via small respiratory droplets through sneezing, coughing, or when people interact with each other for some time in close proximity (usually less than one metre). These droplets can then be inhaled, or they can land on surfaces that others may come into contact with, who can then get infected when they touch their nose, mouth or eyes. The virus can survive on different surfaces from several hours (copper, cardboard) up to a few days (plastic and stainless steel).

Taking these facts, several news outlets - TV and printed press - warned against the use of cash. CNN wrote on March 7, "the on-going spread of coronavirus is forcing institutions around the world to rethink one particularly germ surface that most consumers touch every day: cash." Reuters wrote that South Korea's central bank had withdrawn cash from circulation in order to "quarantine it" and submit it to "deep cleaning" and even burnt some of it. Several similar instances in other countries were reported. Reuters also wrote on March 6, that the US Federal Reserve has begun quarantining physical dollars that it repatriates from Asia before recirculating them in the US financial system as a precautionary measure, while the UK daily *The Telegraph* wrote on March 2, that "banknotes may be spreading the new coronavirus so people should try to use contactless payments instead, the World Health Organization has said."

While that seemed to be the opinion shared by much of the press at that time, the World Health Organisation (WHO) did not make such a statement. "WHO did NOT say banknotes would transmit COVID-19, nor have we issued any warnings or statements about this," WHO spokeswoman Fadela Chaib wrote in an email. "We were misrepresented," she added. The WHO correction was supported by a host of central banks and eventually much of the press coverage of virus-contamination by banknotes also changed.

CENTRAL BANKS DEFEND CASH

Many central banks were very supportive of the use of cash. The Banque Centrale du Luxembourg (BCL) said: "The Eurosystem conducts regular research into the potential impact of the production and circulation of Euro banknotes on public health, including in relation to viruses. Further investigations regarding the corona virus are carried out. So far there is no evidence of the coronavirus having been spread via Euro banknotes. Germany's Robert Koch Institute recently confirmed that "virus transmission through banknotes has no particular significance".

Austria's Nationalbank OeNB wrote: "Infectiology scientists point out that both the coronavirus (SARS-CoV-2) and influenza viruses are droplet infections and therefore objects, such as banknotes and coins, do not pose an increased risk of infection. There is no evidence that corona or influenza viruses can be transmitted via banknotes. The likelihood of being infected with cash is furthermore far less than with other objects that already pose a low risk of transmission."

It was not only the Eurosystem and its member central banks that defended cash vigorously. Sweden's Riksbank said: "There is nothing to indicate that there is a risk of being infected by the coronavirus via banknotes and coins." The Bank for International Settlements wrote: "Scientists note that the probability of transmission via banknotes is low when compared with other frequently-touched objects. To date, there are no known cases of Covid-19 transmission via banknotes or coins. Moreover, it is unclear if such transmission is material compared with person-to-person transmission or transmission through other objects or physical proximity. The fact that the virus survives best on non-porous materials, such as plastic or stainless steel, means that debit or credit card terminals or PIN pads could transmit the virus too."

"Everyone needs to remember that all shopping and payment methods involve surface contacts and good hand hygiene remains essential. Cash is just one of a number of frequently touched surfaces we encounter. The same is true for any other payment device whether it's a card, phone or watch," said Christian Hawkesby, Assistant Governor, Reserve Bank of New Zealand.

"The risks posed from handling Canadian bank notes are no greater than those posed by touching other common surfaces such as door-knobs, kitchen counters and handrails. Canadians handling cash should follow the public health guidelines on COVID-19 and wash their hands as they would do for other activities," Bank of Canada said.

The earlier misinformation about cash and the spread of the virus led some retailers to refuse cash to limit potential exposure. The Bank of Canada countered: “Refusing cash could put an undue burden on people who depend on cash as a means of payment. The Bank strongly advocates that retailers continue to accept cash to ensure Canadians can have access to the goods and services they need,” a statement echoed by many central banks.

As in any crisis, thieves and scammers were quick off the mark to cash in. “The South African Reserve Bank (SARB) has been made aware of fake news that involve a scam claiming that it is ‘recalling’ money from the public. It is believed that criminal elements are visiting the homes of members of the public telling them to hand over banknotes in their possession because the banknotes have been contaminated with the Corona virus. [...] The SARB has neither withdrawn any banknotes or coins nor issued any instruction to hand in banknotes or coins that may be contaminated with the COVID-19 virus,” the bank said in a statement.

DIRTY MONEY

The Eurosystem, as well as much as the press coverage of the effect of the coronavirus on banknotes, concentrated on paper money. But by now a large number of banknotes in circulation are printed on polymer. Is there a smaller risk of coronavirus infection from polymer notes than from paper notes? Some people think so. In March the Confederation of All India Traders (CAIT), suggested to the Finance Minister to replace the Indian rupee banknotes, currently printed on cotton paper, with polymer notes, to combat the spread of the coronavirus. CAIT thinks that “even if due precautions are taken, use of cash cannot be avoided and as such it becomes one of the most easy carriers for spreading any virus”. The letter, quoted in in the BFSI newsletter of the *Economic Times* states “It is also to be noted that in India most of the people while counting currency notes, generally put fingers in mouth for easy counting of notes and people do not care much about hand sanitation which may lead to spread of any kind of virus.”

Some paper notes are doubtlessly dirty. A study made in 2015 in India revealed that rupee notes collected from street vendors, grocery stores and money exchanges carried fungi (70 per cent), bacterial populations (9 per cent) and viruses (<1 per cent). Banknotes printed on cotton substrates, as they absorbing more moisture than polymer notes can harbour more bacteria than the latter. In circulation, all banknotes can pick up and transmit bacteria and viruses just like any other surfaces, but not necessarily more so. Polymer banknotes

also have the potential to transmit bacteria from one party to another, but on a much smaller scale an article in “*Central Banking*” states, without giving further details.

One problem is our lack of knowledge. “We do not know [how long the virus lasts on banknotes], but we estimate not longer than two hours,” said Stephanie Brickman from the World Health Organization, according to an article in EuroNews (06/03). “The virus will not survive for very long on surfaces, particularly on a dry surface like a banknote,” Brickman added. She said that while it could be “possible” to contract the virus “by touching a surface or object” banknotes are not considered “a main source of infection.”

Often scientific advice is contradictory. Ultimately, more information is needed for the “persistence” of this virus on surfaces, says Sizun Jiang, a virology expert at Stanford University. “General studies of coronaviruses indicate that they can persist for days on hard surfaces, while this number can increase with lower temperatures and higher humidity,” he added.

“Disinfecting and bringing new notes into circulation would benefit more psychologically than actually reduce the infection rates drastically,” Sizun said and added that new banknotes in circulation would be just a small fraction of notes already in use. “More importantly, there are countless other surfaces that we interact with frequently,” he added. Minimising contact with surfaces, avoiding crowds, and resisting touching your face are better ways of containing the virus”.

IN SPITE OF ADVICE, CASH USE DECLINES

Cash usage in Britain has halved in the past few days, according to Link, which operates the UK’s biggest network of ATMs, The Guardian wrote on March 24. Although Link said the ATM system was operating at its normal standard and that it was working closely with banks and regulators to ensure that cash continued to be available, there are concerns that many vulnerable people may become unable to pay for the basics they need. “Both the government and retailers need to find a way to ensure that the millions of people who rely on cash, and may not have a bank card, can still pay for essentials during this difficult time.”

It looks as if all central banks can really do is to calm the public in order to keep all payment channels open. Improving public information on those aspects of the cash cycle that ensure that only clean and fit notes are in circulation and any additional measures taken as part of the coronavirus crisis should be a part of this reassurance. ■

China launches CBDC pilot

As the following articles in this issue show, Central Bank Digital Currency (CBDC) is a hot topic in many European central banks. But while Europe is discussing how to integrate CBDC into the current payment landscape and the regulatory framework surrounding privacy, money laundering and terrorist financing, the People's Bank of China (PBOC) went ahead with an actual pilot.

China began exploring the concept of CBDC in 2014 because of the technological upheaval in its financial system. A decade ago cash was dominant, last year mobile transactions accounted for four of every five payments, reaching 347trn yuan (\$49trn). Such a change exposes the financial system to risks, hence the pilot of CBDC. If successful, it could change how central banks manage both liquidity and physical cash, *The Economist* commented. It could also have major implications for the world's financial and political system.

The discussions around CBDC at central banks are becoming more and more detailed but only a few have run trials and none has gone as far as China, which appears set to become the first country to put a central-bank digital currency into limited use. China's four largest commercial banks began internal tests this April, and China's central bank (PBOC) has stepped up its development of the e-RMB, which is set to be the first digital currency operated by a major economy.

The digital currency is expected to launch later this year or in early 2021, but no specific time frame has been announced. The pilot was announced at a promotional event on April 22, organized by the National Development and Reform Commission and attended by representatives from Tencent and Alipay, and major banks. The PBOC digital currency research institute said testing was being conducted in four cities: Shenzhen, Suzhou, Xiong'an and Chengdu, and also areas that will host some of the events for the 2022 Beijing Winter Olympics. The state-media outlet *China Daily* said CBDC had been formally adopted into these cities' monetary systems, with some government employees and public servants to receive their salaries in the digital currency from May. *Sina News* said the currency would be used to subsidise transport in Suzhou, but in Xiong'an the trial primarily focused on food and retail.

Apart from the expected benefits of a functioning CBDC, *The Economist* suspects that China will derive another benefit, namely the new powers that would come with a CBDC. China's version will be a centralised currency, rather like an anti-bitcoin. It will be able to track all digital cash in circulation, making it much harder to launder money or evade taxes. The central bank could also use coding to

control how the money is used. For example, if it issues CBDC to a commercial bank for lending on to small businesses, it could ensure that the money is activated only once transferred to a small firm. And China might find it easier to make nominal interest rates negative: cash would no longer be an alternative to bank deposits because negative interest rates could apply to digital cash itself. With this structure, the digital yuan is likely to overcome the three major hurdles that have prevented cryptocurrencies from achieving scale: price stability, wide acceptability through ubiquitous payment platforms, and legitimacy in the eyes of governments and regulators.

The political ramifications could be severe. An article in the influential US magazine *Foreign Affairs* of 20 May states that US policymakers are unprepared for the consequences. The advent of (a Chinese) digital currency will degrade the efficacy of US sanctions, limiting the country's options to respond to national security threats from Iran, North Korea, Russia, and others. It will also hamper the US' ability to track illicit financial flows. And China, meanwhile, will use the combination of its digital yuan and strong electronic-payment platforms (such as Alipay and WeChat) to expand its influence and reinforce its capacity for economic coercion in Africa, the Middle East, and Southeast Asia.

The US response may require reconsidering the aggressive unilateral use of sanctions and other coercive economic policy tools, which has spurred other nations to seek alternatives to the US-led and dollar-dominated global financial system. The backbone of the United States' financial dominance is the Society for Worldwide Interbank Financial Telecommunication (SWIFT), which facilitates messages between banks about payments orders, and a network of US correspondent banks, which serves as intermediary to execute international payments. Most cross-border payments—nearly \$5 trillion per day—are directed through SWIFT, and most are routed through US correspondent banks, which share information with US authorities to identify illicit activity, such as money laundering and terrorist financing.

But perhaps more important, this system gives the United States enormous leverage over other states, since sanctions that cut a country off from this network are usually a death sentence. Over the past decades, Washington has relied more heavily on sanctions as a core foreign policy tool, increasing both the frequency of their use and the scope of issues they are meant to address.

Nations on the receiving end have in turn become increasingly resentful. But it is not just US

adversaries who see the appeal of having an alternative to dollar-based, cross-border transactions; even some US allies are looking for ways to undercut this leverage. Last year, the governor of the United Kingdom's central bank, Mark Carney, called for an international digital currency that could "dampen the domineering influence of the U.S. dollar on global trade" as Infosecura reported in its Nr 82.

Digital currencies further the goal of avoiding dollar transactions and US financial oversight, since they provide a scalable cross-border mechanism that circumvents the current system. The central banks of Canada and Singapore are already exploring the use of smart contracts to pass messages between digital currency systems, and monetary authorities in Hong Kong and Thailand have tested bilateral payments in their respective currencies without intermediaries. Such initiatives demonstrate the potential to complete cross-border

transactions without SWIFT and without US correspondent banks, two critical pillars of US financial dominance. The European Central Bank has also created a working group with the central banks of Canada, Japan, Sweden, Switzerland, and the United Kingdom to explore cross-border interoperability of national digital currency projects.

The digital yuan could play an especially important role in advancing such efforts, bolstered by China's clear interest in facilitating international commerce in a way that undermines US influence and expands its own, Foreign Affairs states..

These developments and powers are still some way off. Given the risks inherent to such a transformation, China will phase in the CBDC very gradually. Citic Securities estimates that it will take several years for the digital yuan to replace just about 10 per cent of all physical cash in China. ■

European CBDC Round-up

China seems to be far ahead of the Euro zone in implementing CBDC, but China does not have to wrestle with things like privacy and conforming with anti-money laundering regulations. While the European Central Bank is continuously researching what a possible implementation of CBDC would mean, the member central banks of the Euro System are also contributing much scientific work to this question. There have been several research papers, which give a good overview of the problem, starting with one on a particular detail by the European Central Bank.

THERE IS NO BUSINESS CASE FOR CBDC BUT ECB WILL BE READY NEVERTHELESS

Just like about 53 of the 66 central banks recently surveyed by the Bank for International Settlements, the European Central Bank is studying central bank digital currencies (CBDC). Not that the ECB has any intention to introduce CBDC anytime soon, but the bank has to be prepared, should such a financial technological innovation, or disruption, become necessary, Yves Mersch, Member of the Executive Board of the ECB and Vice-Chair of the Supervisory Board of the ECB said in a speech on May 11. Although cash often gets a bad press, demand is not receding and the ECB sees currently no indication that the public at large is willing to abandon the advantages of cash. But the bank is preparing to be ready should things change.

He based his assurance on the fact that some 76 per cent of all transactions in the Euro area are in cash, more than half of the total value of all payments. In crisis times, the demand for cash surges even higher. At mid-March this year, the weekly increase in the value of banknotes in circulation almost reached the historical peak of €19 billion.

The ECB's present debate on CBDCs is therefore

mainly analytical. Whether and when it becomes more of a policy debate will largely depend on the preferences of households, Mersch said. However, the lack of a concrete "business case" for a CBDC at present did not stop the ECB from seriously exploring the optimal design of a CBDC and even to set up a task force on a CBDC within the Eurosystem to be well prepared, should there ever be the need for a policy decision to issue a digital currency.

LEGALLY SOLID DESPITE FANCY DESIGN?

Most of the money issued by central banks is in fact already digital, albeit not called CBDC. This is true for the bulk of the money issued through ECB's wholesale credit operations with its counterparties. What could change in the future, is who would have access to the central bank balance sheets and this is what the discussion on CBDCs is about. A wholesale CBDC, restricted to a limited group of financial counterparties, would be largely business as usual. However, a retail CBDC, accessible to all, would be a game changer. So a retail CBDC is now the ECB's main focus of deliberations.

Could and should a retail CBDC have the same

legal tender status as banknotes and coins, as that status implies that a CBDC would have to be usable at any location and under any condition, possibly even offline? A retail CBDC could be based on digital tokens, which would circulate in a decentralised manner – that is without a central ledger – and allow for anonymity towards the central bank, similar to cash. But a token-based digital currency might not guarantee complete anonymity, which would inevitably raise social, political and legal issues. The ECB is currently looking into the legal questions of using intermediaries to facilitate the circulation of a CBDC and also the processing of transactions in a CBDC.

Alternatively, a retail CBDC could be based on deposit accounts with the central bank. Though involving vast numbers of accounts, it would not be a particularly innovative option from a technological viewpoint. For the euro area, it would mean increasing the number of current deposit accounts offered from around ten thousand to between 300 and 500 million. A CBDC of this nature would enable the central bank to register transfers between users, thereby providing protection against money laundering and other illicit uses, depending on the degree of privacy granted to users.

CUTTING OUT THE MIDDLEMAN – ECONOMICALLY INEFFICIENT AND LEGALLY UNTENABLE

So why have central banks have not chosen to provide retail access to central bank money, when the technology for an account-based CBDC is already largely available. The main reason is that introducing a retail CBDC could have major consequences for the financial system. If households were able to convert commercial bank deposits into a CBDC at a rate of 1 to 1, they may prefer a risk-free CBDC rather than bank deposits. During a systemic banking crisis, this could trigger digital bank runs of unprecedented speed and scale, magnifying the effects of such a crisis.

So how could banks counter this? They might manage to make their deposits more attractive than central bank ones and, for instance, provide additional services, such as paying bills, or cross-selling financial insurance products. Otherwise – even without a crisis – a readily convertible CBDC could crowd out bank deposits, leading to the disintermediation of the banking sector, with far-reaching implications for the structure of the financial system and for the ability of central banks to perform their core tasks, Mersch warned.

With central bank retail deposits, it might also have to provide loans, with all the ensuing consequences. Deposit and lending facilities would also require the central bank to ensure regulatory

compliance in areas such as anti-money laundering, consumer protection and confidentiality. Some argue that this may reinforce monetary sovereignty, as disintermediation would make the financial system safer and reduce the moral hazard of banks by diminishing their role in money creation. But Mersch argued that disintermediation would be economically inefficient and legally untenable. The EU Treaty provides for the ECB to operate in an open market economy, with decentralised market decisions on the optimal allocation of resources. Historical cases of economy-wide resource allocation by central banks are hardly models of efficiency or good service. Furthermore, a retail CBDC would create a disproportionate concentration of power in the central bank.

These potentially highly adverse effects on the financial system would appear to outweigh the benefits envisaged by the introduction of a retail CBDC.

What, then, could be done to lessen the impact of a CBDC on the financial system?

One option could be to set interest on CBDC at below-market rates in order to create incentives for non-banks to rely more on market-based alternatives rather than on central bank deposits. The drawback would be that, in times of crisis, it may become necessary to apply highly negative rates, which could generate criticism from the public and substantially undermine public confidence in the central bank as well as in the basic values of saving which underlie our societies.

Another option is a tiered system of interests, where the first tier could serve as a means of payment. The central bank would need to avoid setting a lower or a negative interest rate in order to keep a CBDC attractive to the public as a means of payment. While the second tier could serve as a store of value, the central banks could discourage people from using it as such by setting unattractive interest rates. However, such schemes should draw from the experience of multiple exchange rate regimes. And the repercussions of the intentional use of such schemes need to be subjected to an additional comprehensive investigation.

In monitoring the evolution and uses of technology, the ECB respects technological neutrality. It will only introduce a digital currency if it becomes firmly convinced that it is both necessary and proportionate to fulfil its tasks in ensuring the stability of our currency, Mersch emphasized. CBDC design choices are not merely technical questions. They have policy and legal implications. This is why the ECB is devoting so much attention to every detail. ■

Banque de France ponders CBDC

While continuing the exploration phase with papers on the work of CBDC taskforces, the Bank de France is making the first practical steps. In April the BdF issued a call for applications to experiment with a central bank digital currency for interbank settlements. The deadline for digital applications is 15 May 2020, interviews with applicants submitting eligible applications will be held in June and applications will be selected on July 10, unfortunately past the publication date of Infosecura.

In planning real experiments with a central bank digital currency for interbank settlements, the Banque de France makes a definite distinction between retail and wholesale CBDC.

The four part report ([central-bank-digital-currency_cbdc_2020_02_03.pdf](#)) describes the work done by an internal Banque de France central bank digital currency (CBDC) taskforce led by Christian Pfister, who was a speaker at Intergraf's last conference in Copenhagen in 2019. The taskforce's objective was to document the benefits, costs, difficulties and risks associated with the potential implementation of a CBDC, whether on a wholesale basis, i.e. accessible to financial institutions or to designated financial institutions, or on a retail, i.e. universally accessible, basis. The group deliberately took a more operational perspective than that typically adopted in CBDC-related work, much of which has been driven by theoretical approaches. Part one of the report looks at the potential reasons for issuing a CBDC, part two considers technical and operational aspects, part three deals with the legal framework, while part four addresses the macroeconomic, monetary and financial consequences. Wherever appropriate, a distinction is drawn between the wholesale and retail versions of CBDC, since it is possible to dissociate issuance of one type from the other.

While employing the same definition of CBDC as the Bank of England, the report places this issue within the framework of the Eurosystem and emphasizes the differences between retail and wholesale CBDC. Within the framework of the Eurosystem, which has sole authorisation to issue a CBDC in the Euro area, a European solution would be capable of preserving the European Union's sovereignty in transactions while being independent of private or foreign participants. In the case of a wholesale CBDC, this solution could be employed to carry out end-to-end transactions, including final settlement, using assets that are tokenised on a blockchain. This would stimulate innovation and productivity in the financial sector. A retail CBDC would primarily make it possible to lower the social costs of retail payments while ensuring universal access to central bank money in a digital form that would act as a complement to fiat currency.

CBDC issuance would have to meet the strictest security objectives both technical and operational. To satisfy level playing field requirements, use of the CBDC would likely have to be priced. In the case of a wholesale CBDC, the only social benefit would come through use of the blockchain, since institutions already have digital assets through reserves. With a retail application, use of the blockchain could run up against users' technical capabilities or even their interest in acting as nodes in the system. A retail CBDC could therefore be merely an electronic currency issued by the central bank, but a blockchain would have to be used if the central bank wanted to integrate smart contracts.

Use of a retail CBDC would have to comply with data privacy as well as AML/CFT requirements. More flexible than a token-based approach, in which the CBDC is linked to a physical medium proving ownership, an account-based model would offer better results for a retail CBDC. However, it might also lead to greater competition with banks than a token-based model, which would be closer to the concept of a retail CBDC that is merely a digital complement to banknotes. Whichever circulation approach is used, a retail CBDC could be distributed via intermediaries, as is done already with banknotes, making it possible to tap into the experience of these intermediaries in Know Your Customer (KYC) and AML/CFT aspects.

In the case of a wholesale CBDC, transactions in the currency would be approved by participants, potentially in the absence of the central bank, which would however have full traceability of all transactions. A wholesale CBDC would have to be interest paying to safeguard the unity of the monetary base, while a retail CBDC could be exempt, as fiat currency is. Conversely, a retail CBDC would have to be accessible to non-residents, as legal tender already is in the form of fiat currency or bank money. This would increase the technical and operational challenges involved in setting up a retail CBDC while meeting security requirements and complying with regulations.

From a legal standpoint, the European treaties do not provide expressly for the ECB to issue CBDC. Unless it is considered simply as a technical procedure used to carry out the ECB's standard tasks, CBDC issuance would need to be integrated in existing treaty provisions to avoid having to amend the legal texts. Then there is the question of whether the CBDC should be legal tender. As the law stands, only banknotes issued by the Eurosystem and coins are considered to have legal tender status in the euro area. If a retail CBDC that is considered to be equivalent to a digital form of banknote is introduced, it would therefore be legal tender.

A FIRST PRACTICAL STEP

Banque de France, has completed what it is calling the first successful test of a digital euro, as part of its ongoing experiments with central bank digital currency. On May 20, Finextra reported that the Banque de France and investment bank Société Générale have tested the use of a blockchain platform to settle a transaction with a central bank digital currency. Earlier this month, Société Générale issued € 40 million of covered bonds as security tokens directly registered on a public blockchain. The bonds were fully subscribed by SocGen which simultaneously paid the issuer in a digital form of euros issued by France's central bank through a blockchain platform.

The Banque de France says the SocGen experiment is just the first of several it will carry out over the next few weeks with other financial services players as it seeks to test the use of a central bank digital Euro. In April, Banque de France issued a call for applications to experiment with a central bank digital currency for interbank settlements. ■

ECB: TO BALANCE ANONYMITY AND AML/CFT

One of the most important characteristics of cash is its anonymity. While greatly appreciated by the cash-using public, it is often assumed, rightly or wrongly, that anonymous cash is used to launder the gains of criminal activities and to finance terrorism. This assumption, which has to a large extent been debunked, is also behind the decision of the European Central Bank to discontinue printing the € 500 note.

In a new paper or proof of concept - available as *Exploring anonymity in central bank digital currencies*, published December 2019 on www.ecb.europa.eu, the ECB writes that the ongoing digitalisation of the economy represents a major challenge for the payments ecosystem, as a balance needs to be struck between allowing a certain degree of privacy in electronic payments and ensuring compliance with regulations aimed at tackling money laundering and the financing of terrorism (AML/CFT regulations). Under the coordination of the ECB, the European System of Central Banks (ESCB) has established a proof of concept for anonymity in digital cash.

That proof of concept is part of the ESCB's continuing technical research on CBDC and it is not geared towards practical implementation and does not imply any decision to proceed with CBDC. The ECB will continue to analyse CBDC to explore the benefits of new technologies for European citizens

and in order to be ready to act should the need arise in future. The prospect of central bank initiatives, however, should neither discourage nor crowd out private market-led solutions for fast and efficient retail payments in the euro area.

The proof of concept drawn up by the ESCB demonstrates that it is possible to construct a simplified CBDC payment system that allows users some degree of anonymity for lower-value transactions, while still ensuring that higher-value transactions are subject to mandatory AML/CFT checks.

That proof of concept boasts several novel features developed by the ESCB's EUROchain research network using distributed ledger technology (DLT). It provides a digitalisation solution for AML/CFT compliance procedures whereby a user's identity and transaction history cannot be seen by the central bank or intermediaries other than that chosen by the user. The enforcement of limits on anonymous electronic transactions is automated, and additional checks are delegated to an AML authority. This is achieved using "anonymity vouchers", which allow users to anonymously transfer a limited amount of CBDC over a defined period of time.

The proof of concept will be instrumental in any assessment of how CBDC could work in practice and how the specific technical features of such an initiative will affect its potential implications for the economy, the ECB writes. ■

TAKING AN IDEA TO THE PEOPLE

The Bank of England takes its role as intermediary between the money-using public and the financial world seriously. In March the BoE published a discussion paper linked to a webinar about central bank digital currency. The bank stresses that it has not yet made a decision on whether to introduce CBDC, and intends to involve all interested parties, including the public in the discussion on the benefits, risks and practicalities of doing so. In a summary on its website, the BoE explains what CBDC is, how it can be implemented and it asks the public to participate in the discussion.

The discussion paper "Central Bank Digital Currency: opportunities, challenges and design" (<https://www.bankofengland.co.uk>) describes a CBDC that would be an electronic form of central bank money that could be used by households and businesses to make payments. It would be an innovation in both the form of money provided to the public, and the infrastructure on which payments can be made. It would be denominated in pounds

sterling, just like banknotes. And it would be introduced alongside – rather than replacing – cash and bank deposits. A CBDC would not be a cryptoasset or cryptocurrency, nor necessarily based on the technology that powers them (Distributed Ledger Technology).

The Bank of England is interested in CBDC because the use of banknotes – the Bank's most accessible form of money – is declining, and use of privately issued money continues to increase, with technological changes driving innovation. These developments provide the public with new ways to pay for goods and services, which support and enable the digital economy, but also present new risks. They raise an important question for the Bank: As the issuer of the safest and most trusted form of money in the economy, should the Bank provide the public with electronic money – a Central Bank Digital Currency – as a complement to physical banknotes?

OPPORTUNITIES FOR THE BANK'S OBJECTIVES

CBDC could present a number of opportunities for the way the BoE achieves its objectives of maintaining monetary and financial stability.

- By supporting a more resilient payments landscape.
- By building on the BoE's ambitious renewal of the Real Time Gross Settlement (RTGS) service alongside private sector initiatives.
- By providing safer and more trustworthy payment services than new forms of privately issued money-like instruments. This may be especially important in the future as cash use declines; and
- By providing a building block for better cross-border payments in the future.

CBDC would also introduce risks that need to be carefully managed. If significant deposits moved from banks to CBDC, there could be implications for the balance sheets of both the Bank of England and commercial banks. This could affect the amount of credit provided by banks to the wider economy, and in turn, how the Bank implements monetary policy and supports financial stability.

DESIGNING A CBDC

The discussion paper outlines an illustrative model of CBDC designed to store value and enable UK payments by households and businesses.

The *platform model* is not a blueprint for CBDC, but rather a basis for further exploration of the opportunities and challenges that CBDC could pose for payments, the Bank's objectives and the wider economy. In this 'platform' model of CBDC, the central bank would build a fast, highly secure and resilient technology platform which would sit alongside our Real Time Gross Settlement (RTGS)

service to provide the minimum necessary functionality for CBDC payments. This could serve as the platform to which private sector 'Payment Interface Providers' would connect in order to provide customer-facing CBDC payment services.

The platform model involves a central bank core ledger, a fast and highly secure and resilient platform that provides relatively simple payments functionality.

API access, which allows private sector Payment Interface Providers to connect to the core ledger. Blocks unauthorised access - only regulated entities can connect.

Payment Interface Providers, authorised and regulated firms providing user-friendly interfaces between ledger and user. May also provide additional services not built into the core ledger as overlay services.

Users register with Payment Interface Providers to access CBDC.

WHAT TECHNOLOGY COULD CBDC USE?

Choices around the technology used for CBDC are important as they would have a significant impact on the extent to which CBDC meets the bank's overall objectives.

The technology used to power CBDC should be chosen on the basis of BoE's design principles. There are trade-offs between different design principles, so the right balance would have to be struck in order to achieve the Bank's policy objectives. It is not presumed that any CBDC must be built using Distributed Ledger Technology (DLT), and there is no inherent reason it could not be built using more conventional centralised technology. However, DLT does include some potentially useful innovations, which should be analysed when considering the design of CBDC. Distribution and decentralisation may enhance resilience and availability, but could have a negative impact on aspects such as performance, privacy and security. CBDC may be able to provide 'programmable money' through smart contracts. There would be a range of options for how this might be delivered.

FUTURE ENGAGEMENT

The BoE welcomes the views of the public, technology providers, the payments industry, financial institutions, academics and other central banks and public authorities, but unfortunately the deadline for comments expired before publication of this issue.

Given the wide ranging implications of CBDC for the Bank's objectives and the wider economy, any decision to introduce a CBDC would involve the UK Government, Parliament and regulatory authorities, and engagement with society more generally. ■

BANQUE DE FRANCE REOPENS PAPER AND BANKNOTE PRODUCTION - AND SO DO OTHERS

In April, the value of euro banknotes in circulation increased by the largest amount since the 2008 financial crisis, which indicates that many people in Europe have responded to the coronavirus pandemic by hoarding cash. It was not a good time to halt banknote production, even temporarily, but the health of employees came first and now the Euro is as widely available as ever.

It had not been widely reported, but an article in the French regional daily *La République du Centre* on March 24, revealed that on March 16, the Banque de France had temporarily halted the production of banknote paper at its EuropaFi paper mill in Vic-le-Comte and that of Euro banknotes at its printing works in Chamalières, both in the department of Puy-de Dôme in central France. The management of the Banque de France took the decision to stop production in both factories until further notice out of concern for the health of the 700 employees at Chamalières and 300 employees at Vic-le-Comte, the paper wrote. The immediate question was, “will a shut-down of several weeks, depending on the development of the situation, threaten the supply of banknotes to ATMs in France?” And not only in France, as both production sites are important for the Euro System, with the Banque de France producing about 20 per cent of the Euro banknotes in circulation in the Euro zone.

“Absolutely not,” reassured Vincent Bonnier, director of banknote manufacturing at the Banque de France, himself confined to working remotely from his Parisian home. “The Banque de France has sufficient banknote stocks to meet the demand of our fellow citizens for many weeks. There is really nothing to worry about. With the exception of two, all of our cash centres remain open to cash couriers for cash withdrawals and deposits. All of this works normally.” He was of course right and in the end the temporary stoppage lasted eight weeks, as on May 11th, both factories started to work again. There was never a serious threat to the availability of Euro banknotes as the Banque de France is part of the Euro System of central banks where there is an additional safeguard regulating the circulation of banknotes in the Euro area: strategic stocks distributed in the various central banks of the zone, which would be mobilized if necessary.

A GRADUAL RECOVERY

During the standstill, the priority for the management

of the Banque de France was ‘employee health’ and it remains so after the restart, which made the return to ‘normality’ a very gradual process. The other central banks of the Euro zone had similar problems, although not every member of the Euro System prints its own Euros. The printing works of the National Bank of Belgium had printed their last batch of Euro notes well before the COVID-19 crisis struck, as the bank had decided to stop printing Euro banknotes in 2019 and is in the process of closing the factory. Belgium’s Euro quota is now printed by Austria’s OeBS and Portugal’s Valora. Most of the other banknote printing works in the Euro zone, both national central bank and privately owned, had reduced production or temporarily shut down with the latter reopening around April 20 and May 11 respectively.

Among the 19 members of the Euro System, having their Euro quota printed by their own printing works is becoming a rarity. After Belgium, the Irish Central Bank stopped printing Euros in 2019 and a number of other central banks in the Euro system purchase their allotments of Euros from other printers, either those linked to central banks or private banknote printers. Only Austria (OeBS), France, Greece, Italy, Portugal (Valora) and Spain (Imbisa) print their own Euro quotas. All other Euro System member countries are part of the JET (Joint Euro Tender) system, lead by the Dutch Central Bank and recently joined by Ireland. There is an exception for Lithuania and Latvia, which joined the German Bundesbank’s separate tender. Apart from the mentioned central bank owned printers, three private printers usually participate in these two tenders, Giesecke & Devrient, Oberthur Fiduciaire and Bundesdruckerei. The latter is a government-owned company that operates according to private-sector principles.

A SURGE IN DEMAND FOR EURO NOTES

While the supply of Euro notes seems to be secure for some time to come, perhaps the denominations to be printed may have to be adjusted according to demand. The Financial Times wrote (April 15) that the value of euro banknotes in circulation has increased by the largest amount since the 2008 financial crisis, according to new data, which indicates many people in Europe have responded to the coronavirus pandemic by hoarding cash, much of it in € 100 and € 200 notes.

In the four weeks to April 10 the value of Euro banknotes distributed to individuals and businesses rose by €41.2bn to €1.33tn. That is the biggest jump in the amount of cash in circulation in the Eurozone since it rose by €41.4bn in the four weeks to October 24 2008 — shortly after Lehman Brothers went bankrupt, causing the global financial system to freeze. ■

ADVANCING SELF-SUFFICIENCY

India has made great strides towards self-sufficiency in banknote printing and in producing banknote paper. Now it is aiming to produce security features as well.

India has tried for quite some time to be self-sufficient in its banknote production. While in the printing itself, it has been there for some time. In producing the adequate amount of banknote paper and printing ink as well as security features it still may have some way to go. But in the area of security ink, both for bank notes as well as for passports, it might just have taken a further step towards its goal.

Several papers in India, including the trade journal 'The Print', reported that scientists from the CSIR-National Physical Laboratory have developed a bi-luminescent security ink which glows in red and green colours when illuminated by two different excitation sources at 254 nano meters (nm) and 365 nm, respectively.

The two colours are red and green — red at 611 nanometre (nm) is due to fluorescence, and the green at 532 nm is from the phosphorescence effect.

"The advanced security feature of the ink comes from its change of pigment colour. Currently, the currency notes display only a single colour with the emission of wavelength," said Dr Bipin Kumar Gupta, senior scientist at the NPL, who led the team of researchers.

"In the ambient light, the ink shows white colour. When exposed to UV (ultraviolet) light at 254 nm, it changes the colour to red and when the UV source is switched off, it turns green," he added. The colors can be seen through naked eyes.

Dual emissive luminescent security ink
The main task of the team was to select compounds, which do not obstruct the formation of the colours on the excitation of the wavelength.

For the production of luminescent pigment, two chemical compounds — sodium yttrium fluoride, europium-doped and strontium aluminate with europium-dysprosium — were synthesised to emit red and green colours, respectively.

The fluorescence property is through sodium yttrium fluoride, while the phosphorescence is by compound strontium aluminate.

The NPL researchers used the hydrothermal

synthesis method to get the red colour. In hydrothermal synthesis, a compound is crystallised from an aqueous solution at a high temperature.

To get the desired features of the ink, the two pigments were admixed at a weight ratio of 3:1. The mixture was then sintered for three hours at a temperature of 400°C. The heating process is also known as annealing. This resulted in the development of fine white powder for the single excitable dual emissive luminescent pigment. In addition, the heating process was done to ensure that the pigments stick to each other when the ink is produced.

"If we directly perform the mixing of both the phosphors (pigments) without annealing, then the individual pigments separate during ink formation and the required property of the ink to emit dual-colour is not developed," Amit Kumar Gangwar, one of the authors of the study, told ThePrint.

In the last step, the powder was mixed with the polyvinyl chloride (PVC) medium to procure luminescent security ink.

"For the feasibility test of the ink, an image was printed on a non-fluorescent white bond paper using a standard screen printing technique. The results showd the emission of red and green colours under the 254 nm UV excitation when the source was turned on and off," said Dr Gupta.

PROPERTIES AND APPLICATIONS

To analyse the stability of the ink, the researchers conducted chemical tests with various bleaching agents like soap solution, ethyl alcohol and acetone. "We studied the durability of the ink for about six months under rigorous atmospheric conditions like humid, hot and cold. Under all conditions, it remained stable, with no changes in print quality," said Girja Shankar, another author of the study, who monitored the ink properties.

In addition, the viscosity of ink was tested for better printing quality. It was done on both screen and offset printing to ensure the pigment properties.

Apart from solving the problem of counterfeiting of currency notes, the novel ink can be used in printing documents, which have a high risk of security breach and duplication. For example, the passport cover when seen under the UV light shows the covert emblem of India in green colour. With the new ink, it will emit two colours, which is hard to copy. ■

(This article is based on information by Mrigakshi Dixit, a freelance science journalist based in Delhi.)

INDIA'S ID HEADACHES AND SUCCESSES

As any other country in the world, India has currently plenty of problems. Apart from the Coronavirus crisis, which at the time of writing has not yet hit India fully, there are several others, which are potentially dangerous and which are home-made.

One of the home-made problems is the change made by the Hindu-nationalist BJP party led government of Narendra Modi to the Citizenship Amendment Act (CAA) to create a legal loophole for unrecognized Hindu, Sikh, Buddhist, Jain, Parsi or Christian immigrants from neighbouring Moslem countries to be eligible for citizenship. On the face of it, this is a very benign change, supporting persecuted groups abroad, but the special political context of Hindu nationalism in India makes it divisive.

The CAA states that people from these communities, who entered India until 2014, "shall not be treated as illegal migrants", according to the amended law, which was designed to help religious minority groups who have come to India from Muslim-majority states such as Afghanistan, Bangladesh or Pakistan. By leaving out Moslem illegal migrants from these countries, it is the first time that India, which was founded as a secular state, has incorporated religious criteria into its naturalisation or refugee policies. What makes the law especially controversial is the possible (future) link to another government programme connected to identity and citizenship, the National Register of Citizens (NRC). This link has already been established in Assam.

There were no reports of any large-scale migration from neighbouring Moslem countries in the Indian press, so why was the law changed? The reason may well be that the North-Eastern state of Assam decided to update the NRC it published in 1951. Anyone listed in the 1951 NRC or their descendants or in Electoral Rolls of 1971 or in any other admissible documents issued in 1971, which would prove their presence in Assam or in any part of India on or before 24th March, 1971 (the day before Bangladesh became an independent country) is deemed a citizen of India. All other people, who's names are not found on these lists - and there were about two million of them - must provide documentary proof that they are citizens. Tribunals have been established in Assam to decide who is or is not a citizen. While among those who's claim has been rejected there have been both Moslems and Hindus, there have been claims in the press that the proportion of Moslems among those rejected has been disproportionately high. Anyone rejected is deemed to be an illegal immigrant, facing detention or deportation and, at a minimum, loss of important rights. While the new Citizenship Amendment Act (CAA) ensures

that Hindus, Jains, Buddhists, etc. declared illegal, will be recognized as Indian citizens, Moslems will not. Many of the latter were born in India or have lived there for decades and as the proportion of Moslems among the poor and illiterate is high, there have been many who were unable to provide proof of citizenship. Deportation to neighbouring Bangladesh is probably no option as Bangladesh is unwilling to take any "migrants", which will leave any "rejectees" stateless. The UN regards the right to a nationality as a fundamental human right. International human rights law provides that the right of states to decide who their nationals are is not absolute and, in particular, states must comply with their human rights obligations concerning the granting and loss of nationality.

So far the National Register of Citizens (NRC) has only been compiled and updated in Assam, but the Indian Home Minister Amit Shah proposed a nationwide register of citizens to ensure that "each and every infiltrator is identified and expelled from India" by 2024, the BBC reported.

The Citizenship Amendment Act (CAA) and the National Register of Citizens (NRC) are only two of the nationwide attempts by the Indian government to come to terms with the need to know the Indian population. The others are the National Population Register (NPR), the census and Aadhaar. The National Population Register was first done in 2010 and was updated in 2015 when it was linked with Aadhaar. But since it was announced that the NPR will be updated in 2020 - now delayed until after the Coronavirus crisis - right in the middle of a raging controversy on the National Register of Citizens (NRC), there is widespread confusion between the two. Many have also confused the National Population Register with Census, which is also due.

The NPR is a register of the usual residents of the country with information collected at the local, district, state and national level. A usual resident is someone who has resided in a local area for the past six months or more, or who intends to reside in that area for the next six months. The objective of the NPR is to create a comprehensive identity database of every usual resident in the country, which would contain demographic particulars such as name, etc. but not religion. Whatever information is provided by the respondent will be deemed correct and no documents or biometric would be required, Home Minister Amit Shah said to news agency ANI.

TO BE SUCCESSFUL, KEEP IT SIMPLE

Amid the controversy surrounding CAA and NCR, India's most daring approach to reach every person in the country and provide secure identities to all, has entered its tenth year of existence: Aadhaar. The challenge to provide every Indian resident with



a unique digital identity was huge and the need even greater: nearly five million births went unregistered in 2009, over 250 million people were illiterate, and between 16-41 per cent of food grain meant for the poor was diverted. Despite these conditions, India embarked on an ambitious mission to provide a unique digital identity to every resident. Ten years later, 1.2 billion Indians – including 95 per cent of adults – have an Aadhaar.

The Aadhaar number is a 12-digit random number issued by the UIDAI (Unique Identification Authority of India) to the residents of India after giving minimal demographic and biometric information during the enrolment process. The Aadhaar number is verifiable online, and is unique and robust enough to eliminate duplicates and fake identities and may be used as a basis/primary identifier to roll out several Government welfare schemes and programmes. This is the only program of its kind globally, wherein a state-of-the-art digital and online ID is being provided free of cost at such a large scale to people, and has the potential to change the way service delivery functions in the country. The Aadhaar number does not profile people based on caste, religion, income, health and geography. It is a proof of identity, however, it does not confer any right of citizenship or domicile to an Aadhaar number holder.

Now, ten years later, it is interesting to see how Indians experienced and perceived Aadhaar. An ambitious study covering 167,000 Indians by development consulting firm Dalberg sheds light on people's experiences and perceptions. The 'State of Aadhaar' report is based on the most extensive survey ever on Aadhaar. The survey can provide valuable lessons for other countries on improving public services for the vulnerable.

Aadhaar is modest, it collects only four pieces of personal information – name, age, gender and address – along with biometric data. For 65 to 70 millions Aadhaar holders, this was their first identity document, and they used the ID to open

bank accounts, access mobile phone services and access food rations. Inclusion isn't enough, however, India needed to ensure people had reliable access to welfare. 80 per cent of respondents felt that Aadhaar had improved the reliability of government-funded welfare services. India's welfare delivery has undergone dramatic digitisation in the past decade.

However, in a zeal to digitise, mandating people to use a particular document can cause anxiety; any such rule must, therefore, be selectively and judiciously used. Nearly 34 per cent of Indians worry about linking Aadhaar to too many services, and a comparable number fear losing access to a service because of it.

Despite government notifications not to deny benefits under Direct Benefit Transfer schemes for lack of Aadhaar or if authentication fails, change on the ground is slow. And banks incorrectly told over half of the survey respondents that the Aadhaar is mandatory to open bank accounts.

The most important thing that was learned from the survey is that in any ambitious, population-scale project, things get overlooked. India anticipated many challenges, but there will always be those that no team, no matter how diverse, could conceive.

While designing such systems, governments must keep the most vulnerable sections of society in mind. This is the segment that stands to benefit the most, but is also the most vulnerable to the possible failures of the system. Aadhaar has disproportionately benefited this segment – it is the first ID for nearly 15 per cent of India's homeless and nonbinary population.

Yet, the unfinished work of Aadhaar also lies with this very segment – a higher proportion here do not have an Aadhaar. Similarly, those with less education faced more substantial difficulties navigating the system. ■

WILL THE DAY AFTER BE DIGITAL ONLY?

Covid-19 and the associated threat of total surveillance seem to be a problems made for the digital age. So does an «immunity passport» if it would be possible to create one. The problem is not so much technological as medical. But also, any solution needing a 'gadget' would leave many people out, any one of them could reignite the pandemic.

Yuval Noah Harari, an Israeli author of thought-provoking books on philosophy, politics and economics wrote a lengthy article in the Financial Times, about what to expect after the COVID 19 crisis is over. During the crisis,

we face two particularly important choices, he wrote. The first is between totalitarian surveillance and citizen empowerment. The second is between nationalist isolation and global solidarity.

In order to stop the epidemic, entire populations need to comply with certain guidelines. To achieve this, government can monitor people and punish those who break the rules. Today, technology makes it possible to monitor everyone all the time.

In their battle against the coronavirus epidemic several governments have already used the new surveillance

tools. The most notable case is China. By closely monitoring people's smartphones, using millions of facial-recognition cameras, and obliging people to check and report their body temperature and medical condition, the Chinese authorities can not only quickly identify suspected coronavirus carriers, but also track their movements and identify anyone they came into contact with. A range of mobile apps even warn citizens about their proximity to infected patients.

Harari writes that many short-term emergency measures will become a fixture of life. That is the nature of emergencies. But endless, total surveillance is not necessarily the only solution. While still under lock-down, it is at least theoretically easier to control people. However, the problem gets serious as soon as the lock-down is relaxed and some people can prove that they have had the virus and recovered and may therefore be immune. The airline industry will need to know who has been cleared to travel, and companies will need to prevent further spread once employees start returning to the office, etc. Clearly, informal trust is not enough in such cases.

THE SEARCH FOR VERIFIABILITY

The COVID-19 Credentials Initiative (CCI), a collaboration of more than 60 organizations working to develop verifiable credentials to help stop the spread of COVID-19, has unveiled a plan to use "digital certificates to show who has recovered or been tested recently or, when we have a vaccine, who has received it." The blueprint for the technology is already there and became a global standard last November. It's called 'verifiable credentials'. This means that within a matter of weeks, healthcare facilities and COVID-19 testing services could start issuing digitally-signed credentials about a patient's COVID-19 status directly to their smartphones. With a quick touchless scan of a QR code, that individual can prove that he or she is currently virus-free or has been vaccinated (once that is available). This certificate does not need to contain any personally identifiable information - preserving privacy and confidentiality - while still providing strong cryptographic proof that the credential belongs to that person. And it can be issued in seconds—and revoked in seconds if that individual's COVID-19 status changes.

The COVID-19 Credentials Initiative aims to design and deploy such a solution at the speed and scale necessary, (COVID-19 Credentials Initiative • www.evernym.com/covid19) calling on the world's governments, healthcare organizations, tech companies, and innovators to collaborate on COVID-19 credentials. It is not the only one to do so.

IMMUNITY PASSPORTS - POSSIBLE OR NOT?

The United Kingdom is planning to roll out COVID-19 immunity passports, possibly within the

next 12 months. It is easy to see how useful such an immunity passport could be. Any technical problems could possibly be overcome but the medical ones are much more difficult. What about virus carriers without symptoms, or when will testing be available for all?

Currently, there are five companies that are suggesting how the system could work, a report in *Tech Times* of May 2 stated. NHSX, the innovation arm of the UK's health service, has published the first batch of preliminary proposals by private companies pitching their ideas to the UK's Science and Technology Committee. The companies who have proposed their ideas are Onfido, Yoti and OCL, IDnow, and iDenfy. The companies who offered their proposals are to combine a number of tracking and identification methods to make it work. Those include facial recognition, government documents, Q.R. codes, and individuals' access to certain places like shops and offices. The companies also all seem to agree about one thing when a person can get immune to the disease.

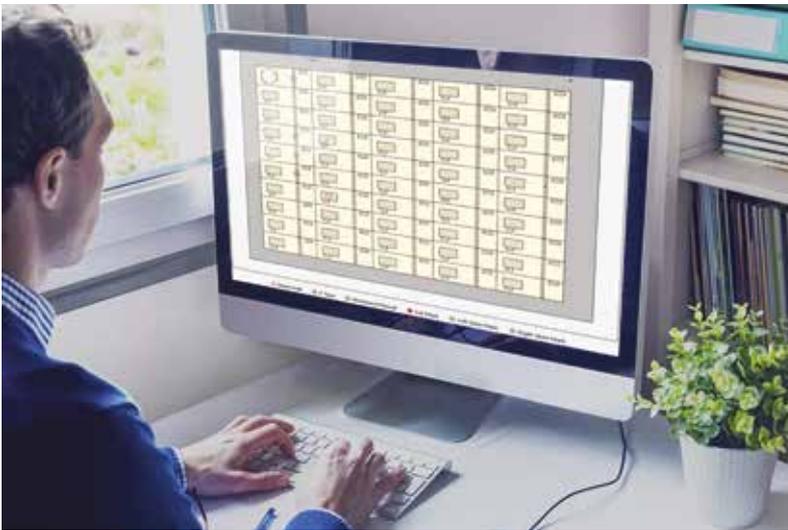
CEO Husayn Kassai of Onfido said: "Of course, we have yet to establish how long someone can be immune to the disease for," they would need more information about the coronavirus and immunity to establish results that would be effective for the immunity passport. Roger Tyrzyk, of IDnow's UK branch said: "I think it's realistic to say we might not see these rolled out for another year. So we will need to have good evidence of the general rate of reinfection before we can confidently describe someone as 'immune'," CEO Robin Tombs warned about the term "immunity,": "Scientists are still trying to figure out exactly how 'immune' a person is once they've recovered from the disease. Our discussions focused more on being able to tell when an individual had most recently been tested, for example, if you had negative results confirmed a day or two ago, rather than proving you're absolutely immune."

WHAT ABOUT THOSE LEFT-OUT?

We can assume that all proposals will be digital including the While Covid-19 Credentials Initiative. However, they all require the use of a smartphone. In many countries, especially in the developing world, many people, often poorer ones, do not have smartphones, Internet access, or even traditional forms of physical identity. But in time, they too will have to prove that they are not, or are no longer, active carriers of the Covid-19 virus. Is the identity document industry, with its deep knowledge of physical and digital identity, ready to employ its intellectual power to help solve this problem to beat the pandemic and get the economies of the affected countries back to work again and to avoid, what Harari calls 'totalitarian surveillance'? ■

Constant vigilance: New challenges in inline inspection of security substrates

Fast, flexible and equipped for the banknotes of tomorrow: the global market for security paper makes exceptionally high demands on paper manufacturers and printers. Companies who want to survive in this environment have to combine the most efficient processes and the highest quality. State-of-the-art inline inspection systems play a central role in this equation.



Overcapacity, new providers on the global market and a worldwide trend towards cashless payment are all increasing the pressure on security paper manufacturers. For instance, India imported 27,500 metric tons of banknote paper in 2017, one year after demonetization (during which 86 percent of banknotes were taken out of circulation); today, the country's annual requirement is estimated at no more than 25,000 metric tons. This is still a vast quantity, but the country now covers a large proportion of its needs through domestic production: India now manufactures 22,000 metric tons of paper for banknotes itself, and this figure is rising. In China, too, the demand for cash and thus also banknote paper is declining and it is assumed that the current COVID-19 pandemic will increase the use of electronic payment methods.

However, the end of cash, which has been repeated like a mantra for decades, is still a long way off and large quantities of top-quality security paper are still needed worldwide. This is the only way to replace the more than 150 billion banknotes that have come to the end of their life cycle and are taken out of circulation every year. In the Euro currency

alone, around 24 billion banknotes are currently in circulation. At the same time, however, the market is constantly being entered by new providers of security paper, which produce to quality standards comparable with those of long-established companies. These long-established companies do not have a significant competitive advantage: It is generally the providers that deliver the desired paper quality quickest and can offer the cheapest price that pick up the contract for the paper supply.

THREE TRENDS IN SECURITY PAPER MANUFACTURING

Inline inspection systems with the latest technologies help businesses succeed in this highly competitive market: They raise the productivity of systems, minimize waste and ensure that the most stringent quality standards are adhered to – both for today's currency series and those of the future. As such, they give paper manufacturers a decisive advantage. Three technological trends can be determined here: end-to-end inline inspection, the connection of all process steps through a material tracking system (MTS) and a modular design that can be flexibly adapted to new requirements. One recent example is the security paper manufacturing facility of the Istituto Poligrafico e Zecca dello Stato (IPZS) the Italian National Mint and Printing House in Foggia, southern Italy, which has been equipped with such a quality assurance infrastructure from ISRA VISION (inspection systems) and Inspectron (material tracking systems).

INSPECTION IN EVERY PROCESS STEP

It is no longer enough to just remove faulty sheets in the sheeter. In modern security paper manufacturing, the entire production chain is seamlessly monitored using inline inspection systems instead. This begins as early as in the wet section of the paper machine, where mainly the correct embedding of the security threads is monitored.

In the subsequent dry section, the sheet geometry of the finished papers is checked, the system verifies that the watermarks are undamaged and in the correct position and a general quality inspection is performed before they are forwarded to finishing.

Longer stretches of successive faulty sheets can be removed in a targeted manner at the rewinder using a corresponding rewinder software package; and no subsequent colour effects, foil elements, holograms etc. are applied to these sheets. Thus, fully finished sheets of insufficient quality arriving at the final quality control stage, only to be rejected, are a thing of the past – thereby raising efficiency and reducing production costs. After finishing, which is monitored by a particularly versatile inspection system due to the high number of variables, a fourth

inspection system then performs a final check of all security features and the overall quality of the sheets in the sheeter. The banknote paper is finally sorted here before it is sent to the printing factory.

INTELLIGENT NETWORKING AND PROCESS CONTROL

End-to-end quality and process control is a standard feature of modern security paper manufacturing. To enable centralized monitoring of all process steps, it is also necessary to network all of the usually standalone monitoring systems. This is where material tracking systems (MTS) are coming into play. They link the individual measured values and recognized anomalies with a unique sheet ID, which can then be tracked throughout the entire production process. If the data of the MTS and the inspection systems are monitored via a central platform, system operators also have complete control over the production process and access to both real-time data from the inspection systems and historic data. This traceability and the complete documentation of the manufacturing process is a requirement of the European Central Bank and is thus mandatory for the production of Euro banknotes.

Moreover, these data offer further benefits for paper manufacturers and printers and prepare the ground for the smart factory of the future, as the synopsis of all process-relevant factors highlights potential for optimizing production. In addition, correlations between fluctuations in quality and running time, speed, the time of day, product type, the materials/suppliers used and much more can be established and form the basis for smart production control and the introduction of predictive maintenance. This raises productivity, makes it possible to plan maintenance and reduces production restrictions caused by the unexpected failure of machines.

OPEN PLATFORMS AND MODULAR SYSTEMS

With every banknote series in a growing number of currencies and in ever shorter intervals, new substrates and innovative security features are being introduced to security paper manufacturing. Here, the focus is on keeping up with the fast pace of development.

Ideally, paper manufacturers should have already implemented quality control solutions adapted to the new products when the first contracts are awarded. This speed and flexibility is only possible in the long run when using expandable and modular quality control systems.

The latest inspection systems support a wide range of innovative functions, including statistical compilation of the density and distribution of security fibers in substrates, or solutions for inspecting half-windows in multi-layer security papers.

Leading manufacturers of inspection systems, such as the German company ISRA VISION, are already developing further functionalities for quality control of the highly secure and complex features of modern banknotes, such as for distinguishing between the colors of security threads or for the high-precision inspection of thread windows in any non-rectangular form.

ISRA VISION is the only provider in the world that consistently uses highly innovative line scan cameras and intelligent LED illumination modules developed and manufactured in-house. Thanks to these powerful optical components, functional enhancements often do not require any hardware modification. Instead, new functions are made available in the modular software platform quickly and easily without interrupting ongoing production. This allows customers to adapt their systems to meet new challenges quickly and guarantees a high degree of process reliability in the entire production process for security papers for banknotes, passports and other security-critical documents.

EQUIPPED FOR THE FUTURE

Security papers are still in demand on the world market – and this is not set to change. At the same time, the requirements placed upon paper manufacturers and printshops are growing with every new currency series, while new providers are shaking up the international market. Companies that wish to succeed in this sector in the future need to produce quickly and efficiently and must be able to react flexibly to the high quality control requirements for new currency series. Providers need to position themselves at the cutting edge of technological development. They can do this with inline inspection systems that enable end-to-end process and quality control of all production steps, link data and analyze centrally. Modular platforms ensure that even future security functions can be implemented quickly and flexibly; in doing so, they provide the basis for long-term process reliability, profitability and success in the competitive security paper manufacturing market. ■

(This article was provided by ISRA Vision AG)

Best quality control to meet the highest security standards.



ORELL FÜSSLI EXPANDS TO DIGITAL ID

Swissinfo.ch reports that Orell Füssli CEO Daniel Link has told Swiss media that he is convinced that digital identity will play an increasingly important role in society. In March, the firm acquired a stake in e-government solution provider Procivis.

Link told Swissinfo.ch that he was determined that his company will not experience a 'Kodak moment' of failing to recognise the potential of new technology until it is too late. Printing secure documents accounted for CHF101 million of the company's CHF237 million (\$245 million) revenues last year.

'Physical money and documentation will not disappear overnight, but they are also going digital,' he told swissinfo.ch. 'We have a three to five-year strategy to position ourselves for this development.' The size of the 'strategic investment' has not been revealed, but it comes with two seats on the Procivis board.

"Printing passports and IDs requires certification that your IT, printing and data storage systems are secure. We even have to show that we run the right background checks before employing new staff," said Link. "New players will have to go through a long process to obtain our levels of certification."

Procivis has the technical expertise while Orell Füssli brings the government stamp of approval – both in Switzerland and other countries in Africa, Asia and South America where it is entrusted with printing money and official documents.

The plan is to build an 'ecosystem' around the Orell Füssli/Procivis marriage that will provide a 'one-stop shop' of digital identity services for central banks, governments and companies within the next five years, the newspaper writes.

Links says this would combine technology, data and security expertise with the technical know-how of how to design and integrate eID into the likes of government services or payments systems. ■

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