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INTERGRAF CURRENCY+ IDENTITY

24-26/03/2021

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Being visible online



The main subject of this issue is the forthcoming Intergraf Currency+Identity online conference in March. Many of us, who have been regular delegates to physical conferences, over the course of last year almost got used to this strange form of communication. It actually works and it is a true form of 'communication' as it makes something, in this case knowledge or opinions' 'common' (from Latin *communicare* to share, from *communis* common) for the whole of the audience. This also implies that it is not a one-way activity. After each presentation there is a five-minute question and answer period and as delegates probably sit at their desk at home or at the office, it is easy to type in the chat box any question that comes up while the speech goes on. The same applies to the exhibition and the various round tables. It is easy and very effective to ask and comment online in writing. It may be a little unfamiliar but by the end of the day most of us will be familiar with the workings of the conference and exhibition. One of the main advantages is the fact that all presentations will be available online for four weeks after the event. And as all good contributions and presentations have a knock-on effect within the company, the final information transfer could be considerably larger than the number of people looking at the screen at the time. One of the speakers of the first day, Leonie Bruckert of secunet Security Networks AG, Germany, sums it up nicely, when she said that "I really appreciate the increased number of online events, since it allows more people to participate without the need for travelling. However, as a speaker I miss the feedback of the audience during the talk." We can give at least some feedback to speakers and exhibitors by using the interactive features of the platform.

The conference may be the main subject of this issue but it is certainly not the only one. We are also talking about 'cash in the time of Covid', along with many other things. Hitherto taken for granted, the pandemic will show how much the public is attached to cash. Having had this idea that physical banknotes could transmit the virus – an idea mostly debunked relatively early in the pandemic – somewhere at the back of their minds for now over a year, it will be interesting to see if the experience will have been very habit forming for the general public. And then there is technology: the dark net on the one hand and Artificial Intelligence (AI) on the other.

The former can only be a menace, while the latter can be either very beneficial or an absolute disaster. We will see in the near future which one it will be, it may possibly be both. We also have the contribution of one company that has supported Intergraf for a long time: OVD Kinegram which delivered an article about the design of ID documents that have to be read by humans and machines.

The Editor


INTERGRAF
 CURRENCY+IDENTITY

24-26/03/2021

The where, when and what

of Intergraf Currency+Identity online

Although it is still a little time to the official opening of Intergraf Currency+Identity we can already welcome you to the conference. In December 2020 you received an email containing your username and password under the subject line 'Intergraf Currency+Identity Online 2021 - Registration Info'. This username and password are linked to your personal profile in our database. They are what you need to register on www.intergrafconference.com, and cannot be shared or transferred (if forgotten, you can have them resent via our registration area - or just contact us at intergrafconference@intergraf.eu).

When registering, please update your details if needed, including your job title, and upload a recent photograph if it is missing. The data you provide here will be used to create your profile on the event's virtual platform. You will receive a confirmation email within two days after registering. Please check the attached invoice carefully to verify its accuracy. If you are missing that confirmation email, please take a look at your spam folder. And if you still have questions, do not hesitate to contact us at intergrafconference@intergraf.eu!

FIRST-TIME PARTICIPANTS

If you have not participated in an Intergraf Currency+Identity conference before – even if that was under one of the previous names of the event, such as Intergraf Security Printers Conference – you need to go to the website www.intergrafconference.com and complete our New Contact Form to register your interest.

The event is open exclusively to security printers, suppliers to security printers, central banks, government authorities, law enforcement, industry-specific digital solution providers.

All companies and individuals wanting to attend for the first time, are subject to strict screening by Intergraf's Committee of Experts. We will get in touch to request the information needed to assess your eligibility. Intergraf reserves the right to refuse participation if its attendance criteria are not met. Please note that due to the delay involved in assessing your eligibility, Intergraf will no longer be able to consider new companies or individuals for attendance after 10 March 2021.

(right) Daniel Hulme, who will deliver the keynote speech on Artificial Intelligence

ACCESSING THE EVENT'S VIRTUAL PLATFORM

Once your registration has been confirmed, you will receive another email, an invitation email from the event's virtual platform Swapcard - on or around March 10th. By clicking on the link on that email, you will be automatically logged in the platform and invited to define a password (within 48 hours). The email will come from noreply@swapcard.com, so make sure to add this address to your whitelist. And again, if you are missing that email, do check your spam folder: it may have been landed there instead of your inbox.

Once logged in the virtual platform, you can edit your profile and, if you want to, add a biography and social media handles. And now you can start navigating the platform.

If you have registered but you can no longer attend, another representative from your company can take your place provided that you notify us in writing at intergrafconference@intergraf.eu, at the very latest two weeks before the start of the event.

TO PROFIT FULLY FROM THE EVENT

As Intergraf Currency+Identity is a truly international event and as – unlike at all previous conferences – you will participate by staying at home, the conference has two starting times: on Wednesday, March 24th, for Europe and points East we will begin at 09.00 (Central European Standard Time) with the welcome by Beatrice Klose, Intergraf's Secretary General, and Dieter Sauter, the Chairman of Intergraf's Committee of Experts, followed by the Keynote speech on *AI and the future of business* by Daniel Hulme. At 35 minutes, followed by 10 minutes 'Questions and Answers', this will be the longest presentation you will follow at the conference, all other presentations are 15 minutes followed by a 5 minute question and answer period.



You will find a complete agenda on the conference website intergrafconference.com. Our friends from the western hemisphere – USA, Canada, the Caribbean and Latin America – will join us at 15.00 (CEST) and they will be greeted just like their European colleagues and they will hear the same Keynote speech.

Already in the morning, after the Keynote and the speeches of Doug Witschi of Interpol and Bernd Kümmerle of Giesecke& Devrient, the conference will divide into a banknote and an identity part, but



"I am eager to participate in the next edition of the Intergraf Conference, because it is the right place to discuss and share views on different topics with my peers. Moreover, even virtual, it will be the first opportunity since a while to gather the «Banknote community» and to discover the latest innovations of our industry."

Pierre-Yves Biossinot, General Manager Printing Works, Banque de France



unlike at the previous physical conferences, participants can listen at will to one or the other or to both, as all presentations are available online for four weeks after the event. Delegates from the Americas will also be able to hear the two plenary presentations of the morning whenever they want.

"The world forces us to adapt to new challenges such as this year's virtual Intergraf conference. Another challenge is that we must adapt our products and processes to improve the environmental sustainability of the world we live in. I will be pleased to present the work of the ECB in this respect on cash"

Bernadette O'Brian, Senior Banknote Production Expert, European Central Bank

At any time before the conference you can select the sessions you want to follow and create your own personalized agenda. You will receive reminders for

"I really appreciate the increased number of online events, since it allows more people to participate without the need for travelling. However, as a speaker I miss the feedback of the audience during the talk."

Leonie Bruckert, Consultant, secunet Security Networks AG



"We are pleased to be exhibiting at Intergraf Currency+Identity Online. Please feel free to visit us at our virtual Intergraf Certification booth. We also invite our ISO 14298 & CWA 15374 certified companies to participate in our Certification workshops on 04.03.2021 and 01.04.2021."

Marc Been, Director and Auditor, VPGI

the sessions you have pre-selected. You can also book meeting slots with speakers to receive further details of their presentations.

THE EXHIBITION

An online exhibition seems a strange affair, but in fact it enables any delegate who wishes to do so to take a much closer look at what exhibitors have to offer. Instead of facing a crowded exhibition hall and having to wait until a representative at the stand is available, you can preselect the companies you want to visit by scrolling down the list of exhibitors to see who offers which products or services. You can then book a meeting slot with an exhibitor to discuss the offers or simply look at the visual material available at the stand and decide afterwards whether you want to take a closer look or not. You may also want to visit the Exhibitor Innovation Tracks which will showcase specific products.

If you want to know what is new in a specific product area and you want to hear not only the words of the presenting company, but also see the reaction of your colleagues and perhaps even that of competitors, participate in any of the exhibitor roundtables, where exhibitors chose a topic and arrange for a discussion with interested participants.

MEETING OLD FRIENDS AND NEW ONES

Attending online does not have to be a solitary affair. The participants list is there to show you who of your friends and acquaintances is also taking part. You can connect with other participants and organize one-to-one chats (in writing) or personal meetings by booking a meeting slot or choosing the instant video meeting option. In addition to the one-to-one chat and video chat between participants we have interactive rooms that will facilitate networking between participants.■

CASH IN THE TIME OF COVID

Central Banks the world over have been looking at how the Covid pandemic has influenced the demand for their cash and tried to work out how cash will do in the post-Covid world. The Bank of England in its Quarterly Bulletin 2020 Q 4 provided a thorough analysis of the ups and downs of the pound sterling and an estimate of the situation after a return to normality.

Cash remains an important part of the UK economy, with ca. 9.3 billion cash payments in 2019. Only 2.1 million people mainly use cash for day-to-day purchases – out of a population of 68 million. Cash as a medium of exchange has fallen dramatically in recent years. Only 23 per cent of all payments in 2019 were made using cash, down from close to 60 per cent a decade earlier.

While the transactional use of cash has declined, the value of notes in circulation (NIC) has increased; it doubled between 2005 and 2017. This trend started in the early 1990s creating, what has been called the ‘paradox of banknotes’, which can be explained by an increasing role for cash as a store of value. Historically low interest rates and low inflation since the early 1990s have reduced the opportunity cost of holding banknotes as a non interest bearing asset. Relative exchange rates also matter. Demand for banknotes increased, e.g. for £ 50 in 2016, when sterling fell sharply. But people also hold more cash when there are concerns about banks or the economy. During the Covid-19 pandemic, the way people use cash has changed, with even less being used for transactions and more as a store of value. One reason is, that consumer spending as a whole has fallen, another may be concerns about the risk of banknotes transmitting the virus. The latter concern has been examined by BoE research, which found that the risk of transmission via banknotes is low.

WHAT HAS BEEN THE INFLUENCE OF COVID?

There has been a significant fall in cash withdrawn from ATMs, both by volume and value, by about 60 per cent in late March 2020 compared to the same period in 2019. In subsequent weeks ATM withdrawals increased slowly but remained well below previous levels. By the second week of October ATM volumes and values were still about 40 per cent and 30 per cent lower respectively than the previous year, especially in tourist hotspots and large cities. London and Glasgow saw the biggest year-on-year falls in ATM cash withdrawals in the first six months of the pandemic, with 81 per cent and 71 per cent respectively. Tourist areas, such as the Lake District and the Yorkshire Dales, also saw large declines in cash withdrawals. In contrast, some of the most deprived areas of the country saw the smallest falls year-on year as people continued to use cash during lockdown. Cash withdrawals in

Liverpool Walton fell by just 23 per cent during the first six months of the pandemic. People acquire about 90 per cent of their cash from ATMs, with most of the rest coming from bank branches, Post Office branches, cashback and wages.

GROWTH IN DEMAND FOR BANKNOTES

The mentioned banknote paradox showed no signs of disappearing during the Covid crisis; in fact, the gap between cash usage and banknote demand appears to have widened, with the value of banknotes in circulation increasing sharply in 2020.

Growth in demand for banknotes increased slightly in late March around the time of the first lockdown measures likely because people withdrawing some extra cash as a precautionary response to heightened uncertainty. The level of banknotes in circulation then remained broadly flat until the start of May, following which there was very strong growth in the value of notes in circulation, around the same time that economic activity began to recover. Increasing cash demand continued when non-essential shops, and pubs and restaurants began to gradually reopen.

The number of banknotes in circulation can increase either because more banknotes are being issued from cash centres to meet customer demand (entering circulation), or because fewer are being returned from customers (removed from circulation). Before Covid, the value of banknotes flowing into and out of circulation was broadly balanced.

The sharp decline in cash use in late March was reflected in both significantly lower inflows and outflows. Between April and August, the flow of notes into circulation recovered faster than the flow of notes out of circulation, which explains the increase in notes in circulation over that period: although fewer banknotes were being withdrawn from ATMs than normal, even fewer were being returned via banks and retailers. That pushed up the total amount of banknotes in circulation. Since September, inflows and outflows have returned to being broadly balanced, and as a result the number of notes in circulation has remained relatively steady since then.

The UK is not alone in experiencing a sharp increase in the value of cash in circulation during the Covid pandemic. In both the US and the Euro area, total currency in circulation in September was more than 10 per cent higher than a year earlier, with a similar pattern in Canada and many other countries.

WHY DID CASH USE CHANGE?

The first reason was the big fall in consumption at the start of the pandemic. The temporary closure of shops and restaurants, and social

distancing during the Covid pandemic, led to significant declines in household spending in cash and even in debit and credit card use: total household expenditure fell by almost 30 per cent in April, according to Visa, while the value and volume of contactless card transactions also fell in April, by 40 per cent and 44 per cent respectively.

Between March and April ATM withdrawals fell and began to recover similar to consumer electronic payments. However, from June onwards, consumer electronic payments have continued to recover while ATM withdrawals have levelled off. This suggests that Covid may ultimately have longer-lasting effects on cash than on electronic payments.

The Covid pandemic has changed the way that people shop. More people are shopping online, meaning fewer cash payments. Online shopping accounted for 28 per cent of UK retail spending in September 2020, compared with 19 per cent a year earlier, having peaked at 33 per cent in June. At least some of this increase can be attributed to the Covid crisis. For example, in March and April, 21 per cent of UK survey respondents said they are shopping online for the first time. Even how people pay for things in shops has been affected by Covid.

The Government had advised retailers to minimise contacts around transactions. Many retailers encouraged consumers to use contactless payments, while still accepting cash. But other retailers announced that they would no longer accept cash payments at all. Forty-two per cent of people had visited a store in the previous six months that did not accept cash, representing a significant increase on the January figure of 15 per cent.

Paying with contactless cards may be habit forming. 56 per cent of respondents to a BoE survey said they are happier to use a contactless card now than they were a year ago and another survey in July found that 71 per cent were using less cash compared with before the pandemic. 44 per cent said they could go for more than a month without using cash, up from 32 per cent pre-pandemic. The main reasons cited by respondents for using less cash were retailers not accepting cash (44 per cent) and concerns about handling cash (35 per cent), such as that the virus could be transmitted via banknotes.

WHY DID CASH DEMAND INCREASE?

As already stated, the use of cash for transactional purposes fell, but the demand for banknotes increased. An analysis of how changes in behaviour caused by Covid has affected each stage

of the cash distribution cycle might provide an answer to this.

Once banknotes have been printed, they are sold by the BoE to the Note Circulation Scheme (NCS). NCS members then supply banknotes to (and collect banknotes from) their major customers, primarily banks, ATM operators and merchants. These notes are acquired by the public and either spent or saved as a store of value. Retailers and banks will return excess notes to the NCS, at which point they are sorted to ensure they are genuine and in good condition, and recirculated. The constant flow of banknotes around the system means that banknotes are used many times without causing an overall increase in the number in circulation. Therefore, the recent increase in demand suggests there has been a change in behaviour at one or more points in the system and that banknotes are being held somewhere — among retailers, financial institutions, ATMs, or the public — and not returned to the NCS as usual.

Why? Firstly, people could be holding more cash than before the Covid crisis began. A survey in April found that 14 per cent of respondents were keeping more cash at home in case of emergencies or because there was less opportunity to spend it. In July that figure was 8 per cent.

Secondly, it is also possible that cash use - particularly non-retail, including for household services such as window cleaning and gardening - recovered as lockdown eased and economic activity picked up, but cash took longer to be deposited. Slow deposits would explain why inflows of banknotes to NCS cash centres were weaker between April and August.

Together, these two factors are probably the primary drivers of the increase in demand for banknotes. Other factors have also contributed but have likely played a less significant role. For example, retailers may also be running with higher floats than usual. It is also possible that banks, post offices and ATM operators are holding more cash than usual at present. Banks typically prepare for an incident such as a pandemic by ensuring that branches, cash centres and ATMs are fully stocked with banknotes. As such, higher cash holdings among these institutions is likely to be a contributing factor to the increase in cash demand, although it cannot explain the full extent of the change.

It should be noted that the BoE report covers the beginning of the pandemic until the improvement of the situation in summer and autumn. It does not cover the even more severe Covid phase two in winter. ■

WILL THE US DOLLAR STAY THE TOP RESERVE CURRENCY FOREVER?

A currency held as a reserve by other countries indicates the trust in which the economic and financial system of that country is held. As there are a number of advantages in being dominant in this area, the top position can be challenged by other economies or by technical developments. A paper by the IMF (International Monetary Fund) finds that, although changes in reserve currency positions are very slow, they can happen.

The subject of reserve currencies has come up several times in Infosecura, lastly in the article about a possible digital Renminbi in the last issue, where we said that should China be the first to issue a sovereign digital currency, it could give it an edge over other countries in this domain, potentially becoming a technological leader in the transition to a digital currency. China may hope to create its own international payment architecture, something comparable to SWIFT, but which would be more centered on digital currencies and dominated not by the US dollar, but by the Chinese digital yuan.

But before that, in an article entitled: 'CBDC: a sudden urgency' we cited a speech by the then departing Governor of the Bank of England, Marc Carney (IS 82, November 2019), in which he said that it would be wise to counter some of the effects of "dominant currency pricing, which is reducing the shock absorbing properties of flexible exchange rates. A new synthetic currency 'perhaps provided through a network of central bank digital currencies' rather than a private provider such as Facebook, could gradually replace the dominance of the US dollar in international transactions. At present the global financial cycle is basically a dollar cycle, as the dollar represents the currency of choice for at least half of international trade invoices, around five times greater than the US's share in world goods imports, and three times its share in world exports."

THE IMF LOOKS AT RESERVE CURRENCIES

The International Monetary Fund has published a 'staff paper' entitled "Reserve Currencies in an Evolving International Monetary System" which explains that over the past decades, the international monetary system has evolved in response to major structural shifts in the global economy such as trade and financial integration, technological developments, and geopolitical events. More recently, global output and trade became less concentrated on a few players and a more multi-polar global economy

emerged due to the sustained growth and rapid integration of emerging market and developing economies (EMDEs). Yet the US dollar remained the dominant reserve currency, as it has been for the past 60 years, with a share of 61 per cent of global reserves although new reserve currencies such as the Euro - which holds 21 per cent - and the Renminbi emerged over the past two decades. The dollar's reserve currency status has been supported and reinforced by its global use for trade invoicing and cross-border investment, among others, and as an exchange rate anchor.

As the IMF paper points out, changes in the preference for reserve currencies are extremely slow. However, a number of possible factors could lead to an eventual change in the status quo. For instance, the COVID-19 pandemic could yet alter the global economic landscape; rising geopolitical tensions could trigger strategic shifts in reserve holdings; or technological advances, in particular the emergence of digital currencies and advances in payment systems, could speed up the transition to alternative, and perhaps less stable, configurations of reserve currencies.

WHY RESERVE CURRENCIES?

Countries hold foreign exchange reserves to finance balance of payments needs, intervene in foreign exchange markets, provide foreign exchange liquidity to domestic economic agents, and for other related purposes, such as maintaining confidence in the domestic currency and facilitating foreign borrowing, the paper explains. As such, reserves are generally denominated in currencies widely used for international payments and widely traded in global foreign exchange markets.

As already stated, sustained economic growth and rapid trade integration of EMDEs - particularly China - gradually shifted the world's economic center of gravity. Financial integration also increased significantly, with global capital flows, measured as the sum of gross capital inflows across all countries relative to the global GDP, three times as large in recent years than in 1970s. But still, the US dollar remains the dominant reserve and international currency. Even COVID-19 contributed to its role as it caused a global flight to safe assets, and so to the dollar, supported by the US Federal Reserve's actions to provide liquidity. Although, if and when China overtakes the USA as the world's largest economy and the share of EMDEs in global GDP exceeds 50 per cent - expected by 2030, the high degree of inertia in the currency composition of global reserves suggests that the US dollar will remain the dominant reserve currency for the foreseeable future. But still, there are uncertainties in the future.

Countries could make their currencies more attractive as reserve currency if they can expand their use in cross-border banking and debt markets. In the debt area, new creditors - including China - have become increasingly important. Such shifts could accelerate in a post-pandemic world as EMDEs have great financing needs and their EMDEs' Renminbi-denominated debt could rise in future - as could the amount of Renminbi held as reserves.

Trade links have become a little less important in the configuration of reserve currencies. The pandemic has shown the fragility of global supply chains and countries' interest in ensuring the future security of critical supplies. Such factors could lead to more diversified supply chains and/or localized production to avoid overreliance on a single dominant supplier country in the future, with implications for the demand for reserves.

Geopolitics also play a large role. China has been actively promoting a wider use of the Renminbi for trade and investment, which was supported by the addition of the Renminbi to the SDR (Special Drawing Right) basket in 2016. Between 2010 and 2014, 37 central banks have reportedly added the Renminbi to their reserve portfolios, with the share of Renminbi in global reserves reaching 2 per cent in 2019. The next stage in the internationalization of the Renminbi may depend on China's economic and political ties that emerge after the COVID-19 crisis, the paper noted.

TECHNOLOGY DISRUPTORS

What could change the current position of reserve currency is financial innovation and related technological developments. Advances in financial and payments technologies can reduce switching costs and optimise information systems, and thus further reduce the strength of existing network effects and inertia. Technology also might make it possible to sidestep capital controls and sanctions, potentially making alternative currencies more attractive. The paper predicts that in the short term the two most potent channels in the area of reserve currencies are the emergence of digital currencies and changes in existing networks, including payment ecosystems.

Digital currencies come and will come in many different forms and the implications for reserve currencies will depend on which form will be dominant, especially if that form is CBDC. A recent BIS survey of central banks shows that about 80 per cent are working on CBDCs, and 40 per cent have progressed to experiments or proof of concept. In 2020, China became the first large country to put a CBDC into limited use. Such CBDCs could increase the demand for reserves denominated

in these currencies, whereas a CBDC issued by smaller countries with highly credible policy frameworks could make their currencies easier to use as reserves. And then there is the universal hegemonic CBDC, backed by a basket of CBDCs as suggested by Marc Carney, which could provide more efficient domestic and cross-border payment services, benefiting from the credibility of multiple central banks that support it. Such an architecture could change the demand for reserves denominated in currencies in the basket based on their relative weight. (The paper is available at [www.imf.org › Publications › Issues › 2020/11/17 › RCEIMSEA](http://www.imf.org/Publications/Issues/2020/11/17/RCEIMSEA))

A US VIEW ON RESERVE CURRENCY

The US Council on Foreign Relations' (CFR) Backgrounder entitled "The Dollar, the world's currency" (Anshu Siripurapu September 29, 2020) explains that the dollar's role as the primary reserve currency for the global economy allows the United States to borrow money more easily and impose painful financial sanctions.

The dollar's centrality to the system of global payments also increases the power of US financial sanctions. Almost all trade done in US dollars, even trade among other countries, can be subject to US sanctions, because they are handled by so-called correspondent banks with accounts at the Federal Reserve. By cutting off the ability to transact in dollars, the United States can make it difficult for those it blacklists to do business. "There's no doubt that if the dollar were not so widely used, the reach of sanctions would be reduced," one of the CFR's economists said. However, the aggressive use of sanctions could threaten dollar hegemony. After the Trump administration unilaterally reimposed sanctions on Iran in 2018, France, Germany, and the UK, began developing an alternate, dollar-free system to continue trading with Tehran. More recently, Russia and China have reduced the use of the dollar in their trade with each other.

The economic upheaval caused by the coronavirus pandemic has renewed concerns about the downfall of the dollar as the leading reserve currency. Some experts fear that the US government's massive stimulus spending, adding to a mountain of existing debt, combined with the country's failure to control the spread of the virus could lead to a crisis of confidence in the greenback.

Many experts agree that the dollar will not be overtaken as the world's leading reserve currency anytime soon. More likely, they say, is a future in which it slowly comes to share influence with other currencies, though this trend could be accelerated by the aggressive use of US sanctions and the United States' waning global leadership. ■

ITALY: PAY BY CARD – GET MONEY BACK

The Covid pandemic seemed a good opportunity for the Italian Ministry of Finance to combat tax avoidance by increasing the traceability of payments by encouraging people to pay cashless, especially for small amounts. To reward card payments by a ‘money back’ scheme, seemed, however, excessive to the ECB.

The pandemic, raging for most of the year 2020, has changed the way people paid for day-to-day purchases, making signs of “No cash please” common in shops in many European countries. In 2021 Covid is still playing havoc with our lives and the year will again be one that sees cash being under attack, this time in Italy.

On December 8, 2020 the Italian government launched its “Italia Cashless” initiative that aims to ‘widen the tax base’ – in plain language, combat tax evasion, mainly in VAT - by encouraging the population to pay for purchases cashless, by (traceable) card or by smartphone app. Italy is at the top of the European charts in tax evasion - costing the public purse up to 100 billion euros per year according to official estimates. It is also high among countries using cash.

The first phase of the new initiative launched in December and set to continue in 2021 offers an automatic refund from the state to citizens making in-store purchases with a bank card or smartphone app, if they first register their payment methods on the government’s own IO app. Users will get back 10 per cent of each purchase up to a maximum of €300 per year, as long as they make at least 50 digital transactions in a six-month period. In a sign of the idea’s popularity, the systems behind IO were overwhelmed when 7.6 million people downloaded it by the day of the scheme’s launch in December.

The cashback programme “covers purchases made in shops as well as payments to craftsmen, plumbers, electricians, a lawyer or a doctor,” a finance ministry spokesman told AFP. The maximum cashback for every transaction is €15, even if the single payments are worth more than €150. In total, for every six months period even those who will have made purchases for more than €1,500, will still be refunded a maximum of €150. The objective is to incentivize card payments especially for small purchases, those where the use of cash is more common and therefore more likely not to be assigned a tax receipt. The programme excludes internet shopping, where users have no option but to pay by card.

On 1 January the Italia Cashless initiative launched ‘Super Cashback’, which enables “those who are among the first 100,000 citizens who have totalled the highest number of card and payment app transactions in a [six-month] semester” to receive a €1,500 reward.

In Italy, the percentage of cash transactions dropped from 68.4 per cent in 2016 to 58 per cent in 2019, according to a study by Italy’s central bank and the ECB - although even that figure leaves cash payments well above the eurozone average of 48 per cent. The government has earmarked 1.75 billion Euros for the scheme for 2021, and three billion for the following year. As part of its “Italia Cashless” plan, the government is also automatically enrolling those who pay by card or app in a lottery, with prizes for both shoppers and shopkeepers. In addition, the ceiling for cash payments is due to fall from 2,000 Euros to 1,000 Euros from January 2022.

THE EUROPEAN CENTRAL BANK OBJECTS

In December, Yves Mersch, Member of the Executive Board of the European Central Bank, wrote to Italy’s Minister of Economics and Finance Roberto Gualtieri, reminding him that the Ministry’s initiative must comply with Union law; “in particular, any, direct or indirect, limitation or disincentive to use cash payments must comply with the requirements regarding the legal tender status of Euro banknotes.”

“While the ECB acknowledges that lawful means for the settlement of monetary debts other than cash payments, are generally available in Italy, their availability across all parts of society, at comparable costs to cash payments, should be closely verified by the Italian authorities. Such verification is particularly important because these other means may have different characteristics, compared with cash payments, and as a result may not be fully equivalent alternatives.”

With reference to the Ministry’s aim of reducing tax evasion he wrote “there should be clear evidence that the cashback mechanism is, in fact, capable of achieving the stated public goal of combating tax evasion.”

He continued: “Against this background, the ECB considers that introducing a cashback program for electronic means of payment is disproportionate in the light of the potentially adverse impact on the cash payment system that such a mechanism could have and because it undermines the objective of having a neutral approach to the different means of payment available.” He ended by saying that the ECB would appreciate being consulted before such measures are taken. ■

A RIGHT TO BE HEARD AND TO BE SEEN

Some countries like their banknotes to reflect their history, others prefer to represent their people in all their diversity. After following the former throughout its history, the US, five years ago, decided for the latter and then, when the presidency changed, changed course again. Now, there is again a chance to represent gender equality on US banknotes. This course has already been followed successfully in an Arab country, that put the portrait of a woman on one of their banknotes, a first in the region.



The first design of the US\$10 note that never was - but now will be

In March 2016 we published an article about the wish of the US Treasury to put the portrait of women on one of the US Dollar notes. Remember,

it was the eighth year of Barack Obama's presidency and throughout US history, it was only dead, white males that were given a place on the US currency notes.

The time seemed about right to change that and now it was only a question, which dead white male was to be pushed off the pedestal to be replaced by which women, dead or alive. The idea was no coincident. There had been a grassroots campaign by well over half a million women to put a woman on the \$ 20 note. The US Treasury was quite happy to do that on the \$10 note, which had been due for redesign, but not necessarily on the \$20 note. The portrait on the \$10 note is that of the first Secretary of the Treasury, Alexander Hamilton, one of the most revered of the early American public figures, while that on the \$20 is that of Andrew Jackson, one of the most hated ones. The Treasury's resistance was more operational than ideological, so the discussion could continue.

In April 2016, it looked as if the "Woman on 20s" had won, when then US Treasury Secretary Jacob Lew used the words "We said we'd listen – and we did", announcing that black slave liberation fighter Harriet Tubman would be on the front of the \$20 note, relegating Andrew Jackson to the back. But this was the year the Democrats and the Republicans were choosing their presidential candidates. One of them, Donald Trump, said after the decision was announced, that "I would love to leave Andrew Jackson and see if we can maybe come up with another denomination". At the time, Trump mentioned the \$2 bill for Tubman, with the smallest volume of any bill, about seven times less than the \$20. "I think it would be more appropriate," he said.

After Trump was elected, the new US Treasury Secretary Steven Mnuchin declined to endorse the plan for a 2020 Harriet Tubman redesign of the \$20 bill, that was announced by the Obama administration. "People have been on the bills for a long period

of time," Mr. Mnuchin told CNBC. "This is something we'll consider. Right now, we've got a lot more important issues to focus on." Well, that administration is gone and in his first eight days in office President Joe Biden has revived the project, with White House Press Secretary Jen Psaki telling reporters the Treasury was "exploring ways to speed up" the process. The move would make Ms Tubman the first African American to appear on a US banknote, and the first woman for more than 100 years. "It's important that our notes, our money, reflect the history and diversity of our country, and Harriet Tubman's image gracing the new \$20 note would certainly reflect that," Ms Psaki said.

AN IMPORTANT VICTORY

Meanwhile there was an important victory for gender equality at an unexpected place, the Arab world. In Spring 2020, the Central Bank of Tunisia issued a new 10 dinar note, that prominently showed a portrait of Tawhida Ben Chaikh, Tunisia's first female physician. Born in 1909, Tawhida Ben Chaikh had many 'firsts' to her name. She was the first female student in Tunisia to receive a university degree, the first North African woman to receive a medical degree (in Paris in 1936) and she is thought to be the first female doctor not only in Tunisia, but in the Arab world.

Strictly speaking, Dr. Ben Chaikh is not the first female on a Tunisian dinar note, she follows Elissa or Dido, the legendary founder and queen of ancient Carthage, but in the context of gender equality on banknotes, a legendary queen probably does not count.

Central Bank governor Marouane El Abassi said about the banknote: "I thought clearly that we need someone from the contemporary area. After the revolution a decade ago, we wanted banknotes to be a mirror of the whole country."

While at the time it needed extraordinary strength and intelligence for a woman to succeed academically and professionally in colonial Tunisia, now, nearly a century later, female students account for over half of the student population. In 2018, Tunisia was designated the 'Capital of Arab Women 2018-2019' by the Arab League in recognition of efforts in the country to promote the status of women. ■



(right) The Tunisian 10 dinar note with the portrait of Tawhida Ben Chaikh

SHINING A LIGHT ON THE DARKNET



In a press release last year, Europol, the EU's police organization, confidently wrote that the golden age of dark web marketplaces is over. Police is now able to counter encryption and the anonymity of dark web marketplaces and no longer only takes down such illegal marketplaces, they also chase down the criminals buying and selling illegal goods through such sites. Recent successes also prove Europol's point that law enforcement is most effective when working together across national borders and all of the police's successes against the dark net were achieved by police forces from several countries, inside and outside the EU, acting together, often coordinated by Europol.

Earlier last year, two prolific dark web marketplaces were taken down in simultaneous global operations, the Wall Street Market and the Silkkitie (known as the Valhalla Marketplace). Arrests were made in Germany, and two of the highest-selling suppliers of narcotics were arrested in the USA. Finnish authorities also shut down Silkkitie. When the same traders moved their activities to another illegal trade site on the browser, Tor, German authorities closed then down too.

This was followed in September by a coordinated operation known as DisrupTor, which targeted vendors and buyers of illicit goods on the dark web. Led by the German Federal Criminal Police supported by the Dutch National Police, Europol, Eurojust and various US government agencies, this takedown gave investigators quantitative data and materials to identify suspects behind dark web accounts. As a result, 179 vendors who engaged in tens of thousands of sales of illicit goods were arrested across Europe and the United States. Over \$6.5 million were seized in both cash and virtual currencies, alongside some 500 kg of drugs, and 64 firearms. The arrests were made in the US (121), Germany (42), the Netherlands (8), UK (4), Austria (3), and Sweden (1). Some investigations are still ongoing to identify the individuals behind dark web accounts.

Operation DisrupTor consisted of a series of separate but complementary joint operations against dark web sales, coordinated by Europol and Eurojust.

This operation was the result of a collaborative effort between the law enforcement and judicial authorities of Austria, Cyprus, Germany, the Netherlands, Sweden, Australia, Canada, the UK and the US.

THE END OF THE DARKMARKET

In January this year, Europol announced that DarkMarket, the world's largest illegal marketplace on the dark web, had been taken offline in an international operation involving Germany, Australia, Denmark, Moldova, Ukraine, the UK, and the USA. Europol supported the takedown with specialist operational analysis and coordinated the cross-border collaborative effort of the countries involved.

A 34-year-old Australian national believed to be the DarkMarket operator was arrested near the German-Danish border, just as more than 20 servers it used in Moldova and Ukraine were seized. Before its closure, DarkMarket hosted close to 500,000 users and had facilitated over 320,000 transactions, according to Europol. It traded everything from drugs and counterfeit money to stolen credit card details and malware. Europol estimated that the traded volume was the equivalent of €140 million, in a mix of bitcoin and monero. European authorities plan to use the seized DarkMarket servers to investigate the buyers and sellers who used the site for criminal transactions. DarkMarket was uncovered as part of a larger investigation into the web-hosting company Cyberbunker. Cyberbunker (which is actually located in a former NATO bunker) housed servers for both The Pirate Bay and Wikileaks in the past.

Although Europol plays an overall coordinating role, the operational lead is usually taken by a member country. In the case of DarkMarket it was Germany, where the Central Criminal Investigation Department in Oldenburg arrested the alleged operator of DarkMarket near the German-Danish border and the investigation itself was led by the cybercrime unit of the Koblenz Public Prosecutor's Office.

THE ROLE OF EUROPOL

Europol has a special cybercrime centre, the European Cybercrime Centre (EC3), which established a dedicated Dark Web Team to work together with EU partners and law enforcement across the globe. The team aims to deliver a coordinated approach by sharing information, giving operational support and expertise in different crime areas, developing tools, tactics and techniques to conduct dark web investigations and by identifying threats and targets. Another task of the team is to enhance joint technical and investigative actions, organise training and capacity-building initiatives, and conduct prevention and awareness-raising campaigns. ■

BORDERS AND AI: WE KNOW WHEN YOU ARE LYING

From 2016 to 2019, the EU funded a research project to streamline border crossings at the EU's external borders.

Using AI, iBorderCtrl works like a very sophisticated lie-detector and if and when it becomes operative, its use will be voluntary, but there are ethical concerns.

In October 2018, an article appeared on the EU website ec.europa.eu entitled 'Smart lie-detector system to tighten EU's busy borders', which described the EU-funded project iBorderCtrl designed to speed up traffic at the EU's external borders and ramp up security using an automated 'intelligent control system', that will test travellers using lie-detecting avatars. iBorderCtrl's system is introducing advanced analytics and risk-based management at border controls and 'will collect data that will move beyond biometrics and on to biomarkers of deceit.'

HOW DOES IT WORK?

On their own laptops, travellers will use an online application to upload pictures of their passport, visa and proof of funds, then use a webcam to answer questions from a computer-animated border guard, personalised to the traveller's gender, ethnicity and language. Meanwhile a 'deception detection' program analyses the micro-gestures of travellers to find out if the interviewee is lying.

This pre-screening step is the first of two stages. Before arrival at the border, it also informs travellers of their rights and travel procedures, as well as providing advice and alerts to discourage illegal activity. The second stage takes place at the actual border. Travellers who have been flagged as low risk during the pre-screening stage will go through a short re-evaluation of their information for entry, while higher-risk passengers will undergo a more detailed check.

Border officials will use a hand-held device to automatically cross-check information, comparing the facial images captured during the pre-screening stage to passports and photos taken on previous border crossings. After the traveller's documents have been reassessed, and fingerprinting, palm vein scanning and face matching have been carried out, the potential risk posed by the traveller will be recalculated. Only then does a border guard take over from the automated system.

The development of the system under the EU's research and innovation programme Horizon 2020 – now renamed Horizon Europe – finished in August

2019 at a cost of € 4 501 877 and the system has been trialled in Hungary, Latvia and Greece.

EU officials say such innovation is crucial for dealing with crime, terrorism and natural disasters. The strategic goal is to bolster the EU's security companies to compete with the US, Israel and China. But there is unease about the aims, public oversight and the perceived influence of corporate interests over the security strand of Horizon. One Member of the European Parliament, Patrick Breyer of Germany's Pirate Party, feared that if such technology was available to those in charge of policing borders, then people of colour, women, elderly people, children and people with disabilities could be more likely than others to be falsely reported as liars. Using EU transparency laws, Breyer requested more information from the European commission on the ethics and legality of the project but he received a negative response in the name of protecting trade secrets. He is now suing the EU to get further information. A major concern among ethicists is that scrutiny and criticism appear to be sidelined in the quest to bring new technologies to market, even when the technologies raise clear privacy and civil liberties concerns.

SURVEILLANCE: THE COVID EFFECT

The UK online blog ai-lawhub.com last July wrote that Covid 19 has brought immediate changes to the rights of free movement in the European Union and identifying and tracking visitors as effectively as possible is now essential. Using iBorderCtrl is one possibility of achieving this and it could be used as part of the European Travel Information and Authorisation System (ETIAS) which aims to introduce a largely automated IT system to identified risks (ranging from security to epidemic risks) posed by visa-exempt visitors travelling to the Schengen States. As iBorderCtrl will use Artificial Intelligence (AI), Machine Learning (ML) and probably Automated Decision Making (ADM), the European Commission will have to decide whether and, if so how, AI should be further regulated.

Using AI lie-detectors raises concerns as to whether an algorithm can account for trauma, mental health conditions, disability, or cultural differences in communication. Certainly, there is plenty of evidence in relation to other AI systems that black people, women and the disabled can be disadvantaged where biometric data such as appearance and voice is assessed by a machine. The iBorderCtrl AI system has been found to have a 25 percent error rate. Perhaps this can be reduced but it seems likely that this system will have a significant error rate for the foreseeable future.

iBorderCtrl's lie detection system was developed in

England by researchers at Manchester Metropolitan University, who say that the technology can pick up on “micro gestures” a person makes while answering questions on their computer, analyzing their facial expressions, gaze, and posture. They believe that the system could represent the future of border security. In an academic paper published in June 2018, they stated that avatars like their virtual policeman “will be suitable for detecting deception in border crossing interviews, as they are effective extractors of information from humans.”

Some academics are questioning the value of the system, which they say relies on pseudoscience to make its decisions about travelers’ honesty. Ray Bull, professor of criminal investigation at the UK University of Derby, has assisted British police and specializes in methods of detecting deception. He told *The Intercept* that the iBorderCtrl project was “not credible” because there is no evidence that monitoring microgestures on people’s faces is an accurate way to measure lying. “The technology is based on a fundamental misunderstanding of what humans do when being truthful or being deceptive.”

Strictly speaking iBorderCtrl is still only a project. If and when it becomes operational, iBorderCtrl must also comply with the EU’s GDPR (General Data Protection Regulation) provisions. This raises some important issues. The GDPR says that informed consent must be freely given by travellers before using iBorderCtrl to process their data. Although its use will be voluntary, will this really be the case if using this system becomes a precondition to entry?

Travellers have a right to rectification, and for that there will need to be a system of fair human reassessment at the border in the event of a “rejection” by iBorderCtrl. Perhaps the EU is itself not so sure whether the system will be used or not. “iBorderCtrl was a research project and did not envisage the piloting or deployment of an actually working system,” Ylva Johansson, EU Home Affairs Commissioner, said last year. “A research project can be used to explore the possible uses of new technologies, but a careful assessment of outputs will always be needed before operationalising any result and this will also be based on the acceptability and impact of the technology in and on society.” ■

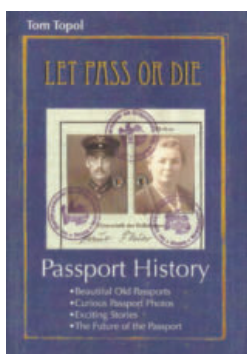
LET PASS OR DIE

Passports are usually considered to be benign documents. No policeman will stop you in the street to demand to see your passport, it’s your ID card he’ll be after. The bearer of the passport merely asks humbly to be allowed to pass through the gate. But there were instances where the person demanding entry issued the threat, rather than the one guarding the gate. According to the book by Tom Topol ‘*Let pass or die*’, in the reign of Genghis Khan and his grandson Kublai Khan, who ruled over a vast area in Asia and Eastern Europe in the 12th to the 13th century, emissaries were issued with an imperial passport, called «Paiza», a silver or bronze token that carried the inscription «By the power of eternal heaven, may the name of the Khan be revered. He who does not obey shall be killed and die». We do not know how effective the ‘Paiza’ was. It was not personalized, simply to carry that token guaranteed passage.

Personalisation seemed to have been a difficult subject then and for some time after. In 1835, Belgium demanded that the passport of British visitors included a description of the bearer. Lord Palmerston, the British Foreign Secretary at the time, objected. Belgium insisted and refused entry to a British aristocrat. Palmerston countered with the affirmation that ‘if they would damage their tourist trade by excluding all British subjects from Belgium, they were perfectly entitled to do so but no British passport would contain any particulars but the holder’s

name». His word was law until 1914. Although British passports later contained descriptive identification, they never had as thorough a description of the holder as some 19th century continental passports, who listed 14 different identifying features - height, hair colour, shape of nose, forehead, chin, etc. - as well as ‘other distinguishing marks’. These entries provided endless opportunities for subjective interpretation of the person in front of the issuing official. Was a forehead low or high, the face oval or, as one official wrote, ‘beautiful’? When in 1915 passport photos were introduced, linking the document to the person presenting it became more objective. However, early passport photos were nothing like the ones in present ones. The size of the picture could be as large as a postcard, the ‘sitter’ could be shown standing with his dog and a hunting gun, or showing the face of the bearer and that of her dog almost of equal size, or sitting and playing a guitar.

Mr Topol’s eclectic romp through the world of passports throws up many interesting facts from when passports were simple one-page documents with florid writing and affixed seals to the biometric, machine-readable passport documents of today. In his collection, most of the passports shown have a story attached and when they bear the name of a historic person, the historic background is given as well. Mr Topol is a passionate passport collector and he is obviously eager to make his hobby more widely known. He even gives advice on how to begin collecting passports. Further information at contact@passport-collector.com or www.passport-collector.com. ■



AN AGE OF COEXISTENCE

The Coronavirus pandemic increased the used of digital technology the world over enormously. The competition between physical and virtual money and ID documents is increasing but we can remain confident that there will be a place for both forms for a long time to come.

We can probably assume that everything that can possibly be digitized or virtualized eventually will be. For the producers of banknotes it looks as if this may be a threat to their existence. Dozens of central banks in Europe and Asia are working on digital currencies and there are now several private currencies, such as bitcoin or Monero, etc. However, if the future of currency is indeed to be non-material – still a big if – this will certainly be a very distant threat, as the volume and the value of banknotes in circulation is still rising. The unlikely saviours in this scenario are the tax systems of most countries. Money in the bank is visible and therefore taxable, banknotes under the mattress stay invisible and as long as interest rates stay at around zero, stashed cash will remain popular. So, for the foreseeable future, it will most likely be a coexistence rather than a victory of one over the other.

There appears to be a corresponding threat to physical ID documents such as ID cards and passports. Replacing physical documents with virtual ones seems to be further advanced than replacing physical currencies with the virtual kind. But looking at the technical development of countries not only in Europe and North America but over the whole world, it becomes clear that digital or physical identity documents will not be an either/or choice but a 'one as well as the other' proposition. Again, there will be coexistence. It can be expected that domestic ID documents will be digitized before passports, which by definition need to be read by other countries. A new study by the UK technology market research company Juniper Research mentioned that there were just over 1 billion digital identity apps in use in 2020. The company expects that that figure will sharply increase in the near future to 6.2 billion by 2025, driven by the increasing use of civic identity in emerging markets and the lasting impact of the pandemic. The research found that by then, civic identity apps, where government-issued identities are held in an app, will account for almost 90 per cent of digital identity apps installed globally.

UBIQUITOUS MOBILE PHONES

For the internal – non-international – use of digital identity, the prevalence of mobile phones and the relatively low cost of some mobile IDs compared to a card-based system can make this an attractive

option. In many countries, however, it would be difficult to use a mobile ID solution as the only identity credential, given that not everyone has a phone and network coverage may not be universal. Indeed, mobile-based systems are often used as optional or additional credentials to increase user convenience and choice. Thales/Gemalto, a supplier of ID solutions wrote.

As an example, the company cites the case of Moldova, one of Europe's less wealthy countries with 3,55 million people, which, ten years ago, started a programme to modernize the delivery of public services by using information and communications technologies (ICT). One of the goals was to offer e-service providers a simplified way to integrate strong authentication and signature functionality into their services. In order to accomplish this, the government adopted a Mobile eID (MeID) solution along with a suite of shared platforms, including MPass (for strong authentication and single sign-on functionality across government information systems and e-services) and MSign (used to electronically sign documents and records and validate electronic signatures).

The MeID solution was built on the existing PKI infrastructure and a strong ID system, including the State Register of Population (SRP), which covers virtually the entire population and assigns each citizen a 13-digit personal identification number at birth. The SRP is the core source for identification information and underpins numerous other registers and systems. In addition, the government issues physical ID cards (which as of 2014, includes the option of a smart "eID" card that also offers digital authentication and signature capability).

Austria also used its existing ID system as a base for its virtual Citizen Card (Bürgerkarte). The country operates a Central Register of Residents (Zentrales Melderegister) as a national information system that contains data about every resident of Austria (citizen and non-citizens). Austria mandates that all residents register their presence in the country, and the CRR contains the records of all these registrations. Each data record in the CRR has a 12-digit unique identifier, the resident's full name, sex, date of birth, citizenship, and full address. Records of foreigners also contain passport data.

While registration is mandatory, there is no equivalent requirement that every resident obtain a physical ID card. But physical ID cards do exist, however, they are voluntary. Instead, Austria has a virtual Citizen Card (CC) which can be installed on different devices, with smart cards and mobile

phones being the two most prevalent interfaces used. In order for a resident to use a smart-card-based CC, they need the Internet and special software (Citizen Card Environment- CCE) at the user end, and, a special software “MOA-ID” at the service provider end that helps with authentication.

A SHAPE-CHANGING SYSTEM

Aahaar, India's identification scheme is another example of the coexistence of physical and digital identity. Established over a decade ago, it was originally just a 12-digit unique identity number which can be requested voluntarily by residents and passport holders in India, based on their biometric and demographic data. It is the world's largest biometric ID system with about 1.9 billion holders. While there is no mandatory identity card in India, the Aadhaar card practically took the place of a multi-purpose national identity card, carrying 16 personal details and a unique identification number. It has been available to all residents since 2007. The card contains a photograph, full name, date of birth, and a unique, randomly generated 12-digit National Identification Number. However, the card itself is rarely required as proof, the number or a copy of the card being sufficient. The card has a SCOSTA QR code embedded on the card, through which all the details on the card are accessible. From being a number, albeit on a card, it meanwhile assumes different forms. The physical card is now available as a plastic card and also in digital form.

In 2018, Virtual ID was introduced which is a 16 digit number that is generated using the Aadhaar number. This Virtual ID can then be used instead of the Aadhaar number to carry out some Aadhaar related work. As the Aadhaar number is a permanent one, some people are reluctant to divulge it while VID a digital ID that Aadhaar holders can regenerate multiple times, which makes it safer than providing the actual Aadhaar number. VID is temporary and valid only until the user generated a new one.

Another mutation is mAadhaar, an official mobile application developed by Unique Identification Authority of India (UIDAI) to provide an interface to Aadhaar Number Holders to carry their demographic information viz. name, date of birth, gender and address along with photograph as linked with their Aadhaar Number in smart phones. mAadhaar was launched in 2017 and it allows users to carry their Aadhaar data on a smartphone, without the fear of losing the Aadhaar card. Furthermore, this app can be used to complete the identity check for several procedures, including ID check during traveling by flight or trains. This avoids carrying multiple ID and address proofs. As this app is password-protected, it also keeps user's information secure.

As these examples show, the ID environment is already a mixture of the physical and the virtual/digital. Which form dominates in which country or part of the world depends on a multitude of factors but both forms will coexist for a long time. ■

ESTONIA'S NEW PASSPORT

The Police and Border Guard Board (PPA) has begun issuing new redesigned Estonian passports. While all data included in the travel documents remains the same, there are many new security elements to go along with the designs inspired by Estonian nature. In addition, the material of the personal data page is now made from polycarbonate, which is also used for ID cards.



Some of the security elements are visible to the naked eye, some are tactile, but some of them are only visible in special lighting or when magnified.

“There are more elements than the eye catches at first. Many of them are actually visible, but you can just miss them. Some elements are also ones that you would not guess are security elements,” explained Eliisa Sau, chief expert of the PPA's identity and status bureau.

“For example, the background of all inside pages is of one tone, but if you look at it carefully, you will notice that there are larger elements braided into the background. They are very visible but you might not notice them at first,” Sau said. The new passports carry designs of Estonian nature and animals. Sau said that the desire to incorporate Estonian nature came right at the beginning of the design process.

“It is one of the tools to introduce Estonia as all these animals live in our forests,” Sau said. Older passports will still be valid until their expiration date. ■

DESIGNING FOR HUMAN AND MACHINE

In the past, physical security features in identity documents were designed mainly to facilitate inspection by humans. Today, and even more so in the future, physical security features need to be produced so that they can also be verified by machines, such as the document reader devices that we find at airports and border control points, as well as smart phone devices that are used by the everyday consumer.

This article was contributed by John Peters of OVD Kinegram, Switzerland



TRAVELLER CONVENIENCE VERSUS SECURITY

It is not unrealistic to expect that at some point in the not-too-distant future our airports will once again be over-crowded and the installation of additional automated passenger check-in kiosks and automated border control systems for both document inspection and traveller authentication will become more widespread. To enhance security without adding inconvenience to the traveller, the machine inspection of physical security features as part of this automated process will be extremely beneficial.

MOBILE SERVICES

Another major trend is our increasing need for on-line transactions. The technology available on the mobile platform continues to expand at an incredible rate. This creates ever increasing opportunities for every citizen who owns a smartphone device to remotely obtain services from their local governments, banks, or mobile network providers, without needing to be physically present.

Why go in-person to renew your driver's license or open a bank account or modify a telephone subscription if you can do this remotely using your mobile phone? Why not have your passport, ID, or driver's license on your mobile device? The current COVID-19 pandemic has accelerated the demand for such on-line transactions, including self-enrolment for mobile IDs. However, the big challenge that comes along with remote or on-line transactions is knowing who you are dealing with.

Numerous countries worldwide have introduced guidelines and legislation to regulate the identity-proofing process for digital transactions.

The Anti-Money Laundering Directive 5, issued recently by the EU commission, places an obligation on financial institutions to know who they are interacting with, but also requires them to report suspected criminal activities.

Mobile identity proofing and on-boarding is a service, usually in the form of an App, provided by governments or financial institutions that typically involves three steps. In step 1 the client is asked to present a government-issued identity document which may be a passport, driver's license, or ID card. Step 2 involves the verification that the document is genuine and valid, and has not been manipulated. Finally, step 3 - authentication - usually requires the client to take a "selfie" to provide biometric information; thus confirming that he or she, as the person presenting the ID document, is indeed the rightful owner of the document.

One of the most critical weak links in this process lies in step 2: a convenient and secure verification of the authenticity of the document which has been presented remotely as proof of identity. Authenticating a document requires a trained eye even when it is in the hands of an examiner. Most documents containing optically variable security devices, such as the KINEGRAM to protect the photo and/or personalized data. Thus, the verification of ID documents remotely is extremely challenging. It is insufficient to determine the authenticity of such security features based on a static photographic image, even if it is of high quality.

BIOMETRIC VERIFICATION USING CHIP-BASED DOCUMENTS

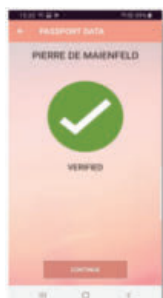
In addition to physical security features, the majority of passports and many ID cards also contain biometric data of the holder stored on a chip. However, depending on the assurance level required, most mobile on-boarding processes also accept non-biometric driver's licenses and ID cards as proof of identity. Furthermore, for those documents that do have a chip with biometric data, there is no guarantee that the data on the chip can be verified. For example, in the case of passports, of the 145 countries that are issuing biometric passports, approximately 90 countries are sharing their country signing certificates and fewer than 40 countries have provided Certificate Revocation Lists in the ICAO Public Key Directory.

In summary, many documents that are accepted for ID-proofing do not have a chip, and many of those that do have a chip store biometric data that cannot be digitally verified. Therefore, thorough machine-based inspection of the physical security features on a document is necessary to gain confidence in its authenticity.

Identification



Verification



Authentication



DESIGNING PHYSICAL SECURITY TO ENABLE BOTH HUMAN AND MACHINE VERIFICATION



In the case of state-of-the-art polycarbonate cards or passport data pages, it is always desirable to embed the security features to maximise the durability and inhibit manipulation. It is also important to protect as much of the personalised data as possible, without creating delamination of the card body. Today, thanks to new KINEGRAM technologies, it is possible to embed relatively large designs composed of discrete, individual elements which allow for full data protection without interfering with the machine readability of the data. Furthermore, these elements have synchronized optical effects which are not only difficult to reproduce or simulate, but also signal clearly to the human eye that they belong to one and the same design.

DOCUMENT READERS

Today, many of the KINEGRAM security features which are suitable for human verification, can also be designed to be inspected automatically using

machines. Below we see the same data page illuminated under white light, infra-red and ultra-violet on a standard document reader used at e-gates and e-kiosks.

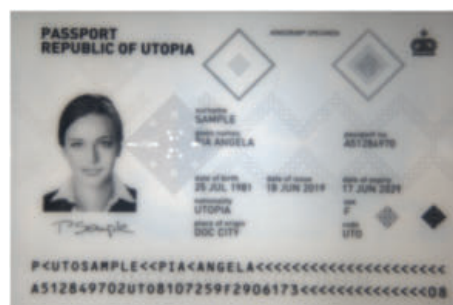
The white light image shown on the left allows for the automated detection and location of colour effects, while the IR image in the centre delineates the metallic structures. Finally, the UV image on the right confirms that the printed security inks are in perfect registration to the metallic structures. It is important to note that this optical machine authentication (OMA) process for the KINEGRAM can be readily integrated into the existing document reader software without any hardware changes.

As one example, check routines for the authentication of the KINEGRAM in the new Taiwan passport were developed by OVD Kinegram and integrated by Acuant, a document reader software provider. The software algorithms run in parallel with other check routines so there is no noticeable time delay and the results of the check are displayed immediately.

A more detailed look at the individual steps in the process, which in its entirety takes less than a second, reveals that the image on the left (below) was captured using white light to allow a quantitative analysis of the exact positions and locations of the colourful features in the KINEGRAM. The centre image was obtained using infra-red illumination where the dark structures and lines demarcate the exact positions of the metallic elements in the KINEGRAM. A quantitative comparison between



White light (VI)



Infra-red (IR)



Ultra-violet (UV)



White light (VI)



Infra-red (IR)

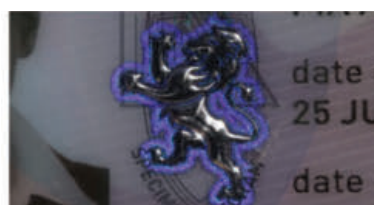
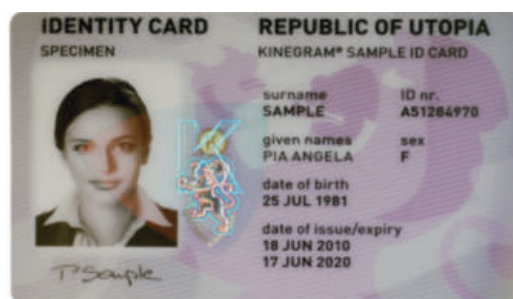


Ultra-violet (UV)

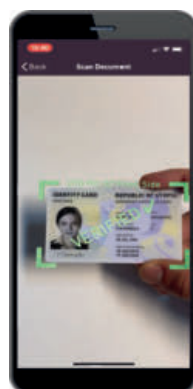
the different images allows for the assessment of authenticity. Finally, the process is repeated with a similar analysis of the UV image to further add to the level of confidence in the authenticity of the document.

MOBILE PHONES

The embedded KINEGRAM in the card shown below is designed and positioned to protect the photo. It exhibits a unique, customized display of synchronized movements of metallic fine lines, as well as virtual 3D images, all of which are very easy to recognize by the human eye and very difficult to simulate.



Using optical phone authentication (OPA), a recent innovation of OVD Kinegram, this same very complex design can now be inspected and verified using an ordinary smartphone device without any additional hardware attachments. Based on an understanding of the design elements and security features in the KINEGRAM, computer vision and machine-learning technology is used to recognize and verify the authenticity of the document.



The app instructs the user on how to position and tilt the document, using simple easy to understand guidance.

An additional feature in the OPA app uses Optical Character Recognition to capture the printed personalized data and compares this with the data in the machine-readable zone.

OUTLOOK

Automated ID-proofing for both in-person and mobile on-boarding processes will continue to gain in popularity and will become widespread. Digital identities derived from such automated ID proofing processes will be used for government services, traveller facilitation and commercial transactions. Furthermore, expectations are that automated border crossing processes using physical passports or digital passports on mobile platforms with minimal manual intervention will continue to be deployed at busy airports. Nevertheless, in all these cases, a secure and reliable identity-proofing process will continue to rely heavily on the authentication of government-issued physical identity documents as an anchor of trust. To this end, new methods and processes are needed for both manual and automated verification of both the physical security features and electronic data contained in the documents, regardless of whether they are presented physically (in-person) or remotely (on-line). OVD Kinegram is committed to advancing the security of identity documents by designing the KINEGRAM for easy and reliable human and machine verification. ■

INTERGRAF CERTIFICATION WORKSHOPS

The Intergraf certification workshops are for companies that are certified by Intergraf according to ISO 14298 and CWA 15374 and for those in the process of certification with positive screening results. The interactive online workshops will help to better understand the Intergraf Certification Requirements (ICR) and focus on the day-to-day challenges at the implementation of the standards. In these workshops, we will concentrate on two distinct and important chapters of the ICR: 1. Chapter B - Information related risks and 2. Chapter G - Disaster related risks.

Our team of experts will deliver the presentations with time afterwards to ask questions, exchange experiences and interactively develop new ideas within peer groups. Intergraf's next certification workshops will take place online on:

04/03/2021: Workshop 1 01/04/2021: Workshop 2
Further information and the registration form at <https://www.intergrafconference.com/index.php/intergraf-certification>. ■

DIAVY SRL: LANDQART'S CHOICE FOR FUTURE BUSINESS EXPANSION

The Swiss security paper maker Landqart is well known for the quality of its product – paper for banknotes and passports. It is equally well known for its innovation. Some years ago, the company developed a composite banknote substrate called Durasafe which consists of two layers of paper with one layer of polymer in the middle. The new series of Swiss banknotes, as well as currency of a number of other countries, is printed on this material. In a word, Landqart has a reputation to defend.

When the company decided to expand its business activities around its core competencies, among them Durasafe, which opens a range of new visual and technical capabilities, the company looked for a machine that could meet their very high requirements and that would also enable future expansion and innovation.

Landqart, at the end of evaluations with different suppliers, commissioned Diavy srl to construct this machine and the result has been the DMB 901.

A tailor-made multifunctional line that works in a reel-to-reel production process that allows extremely precise application of security features in register to each other. The machine with a state-of-the-art motion system was specifically designed to process very thin paper up to 35gsm, that is unique to Landqart's Durasafe composite substrate. Foils can be applied to the inside of the substrate, encapsulated by the polymer, like a security thread.



Delivering all the benefits associated with excellence in quality and performance, the DMB 901 offers ample choice of advanced technical features and customizations.

FIFTY YEARS OF EXPERIENCE

Diavy srl, founded in 1971 by the current management, originally specialised in metal sheet cold stamping, has become today a unique provider of all the technologies involved in the production of

optical and holographic materials, up to their application on multiple substrates like paper or polymer.

The current portfolio of state-of-the-art machines includes:

- Recombining machines
- Galvanic electroforming tanks
- Coating/embossing in-line machines
- Seamless embossing machines
- Soft embossing up to 2700mm
- Hard embossing machines for foils and polycarbonate
- Embossing and in-line register printing machines
- UV casting machines
- Printing and demetallization in-line machines
- Multiple in-line printing and coating machines
- Multi-functional lines for stripe application on banknote paper or polymer
- Special purpose machines

All of these technologies are completely tailor made to customer needs, and the vertical structure of the company allows following any project from the design stage until the engineering, manufacturing and assembly process. Some of the leading producers of banknotes, tax stamps and security documents are equipped with Diavy machines, but the company's offer includes also complete turnkey plants including know-how for customers who want to set up their own production facility.

In the area of foil-application machines, deep knowledge of application processes and excellent connections with customers have led to the development of the DMB machine series, a unique roll-to-roll multifunctional line for application of foil stripes combined with multiple processes. This multifunctional line, designed for single or double side foil stripe application in register in one pass, can also have added units for screen printing, special coatings, micro perforation or windows generation by laser or mechanical punching.

Today three DMB 900 are in well proven use at international banknote paper manufacturers mainly involved in the Euro second series production

Diavy srl. is exhibiting at Intergraf Currency+Identity online.■

The DMB 901 (left and right)



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SURYS

