Central bankers of the future

Speech by Mr Agustín Carstens, General Manager of the BIS, at the Deutsche Bundesbank's internal discussion series on "Digitalisation and central banking – Is there a fundamental change under way?"

Basel, 14 December 2020

Lieber Jens, liebe Kollegen von der Bundesbank, Es ist mir eine Freude heute vor Ihnen zu sprechen, wenn auch nur virtuell aus Basel und der Bank für Internationalen Zahlungsausgleich.

Now, if I may revert to English. I hope you are all safe and still in good spirits despite this latest surge in Covid-19. This has been the strangest year in my memory, but rather than dwell on that, I thought I would look to the bright future on the other side of this pandemic. Specifically, I want to talk about central bankers of the future. And that means yourselves – our bright future. I hope my reflections resonate and I very much look forward to your feedback and questions afterwards.

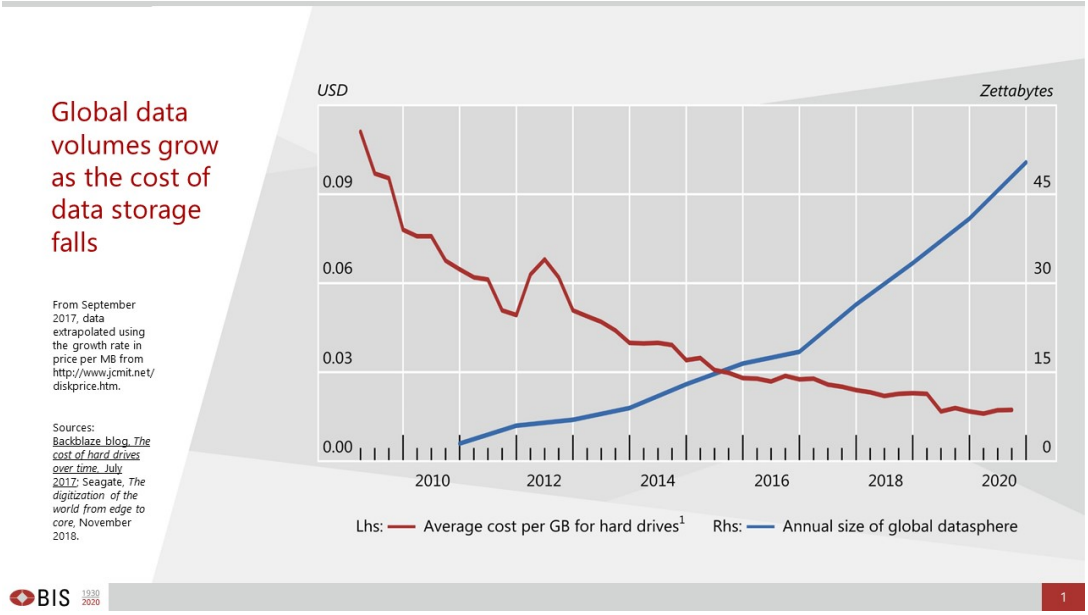
We are all central bankers here today but our profession is not the only thing we have in common. First, we have the same boss. Jens is your President and my Chairman of the Board. Second, we all appreciate the Bundesbank's unwavering commitment to price stability. For me this is personal – as a child, I lived through high inflation in Mexico. When I was eight, I remember my father giving me a wad of cash for the bus home from school. At the end of the school day, when I tried to take the bus home, I was kicked off because my money fell short of the bus fare. Fares had gone up during the day, and I ended up walking. This experience brought home to me the dangers of financial instability and its impact on people's lives. To this day, I probably carry a bit more cash than I really need. Third, we know that Bundesbank staff are among the best and brightest. Again, I know this personally. Not just from my many visits to Frankfurt but also from your colleagues who have joined the BIS over the years.

At the Bank for International Settlements, we are celebrating our 90th birthday this year. The BIS is a bit like Bellamy's time traveller that Jens so fittingly referenced in a recent speech. We were founded in 1930, when many countries still adhered to the gold standard. But now we find ourselves about to enter the age of digital money. Only our purpose remains unchanged – as a forum where central bankers can meet to coordinate and promote global monetary and financial stability.

A time-travelling central banker

Jens's speech got me wondering. What if a time-travelling central banker from yesteryear woke up today in a BIS meeting of central bankers? And – after somebody had explained to her why everyone was wearing a mask – what would she think of the topics being discussed? Especially, how amazed would she be at the way tech is driving big changes in finance and central banking? My guess is that she would pick out four or five major themes. Perhaps along these lines.

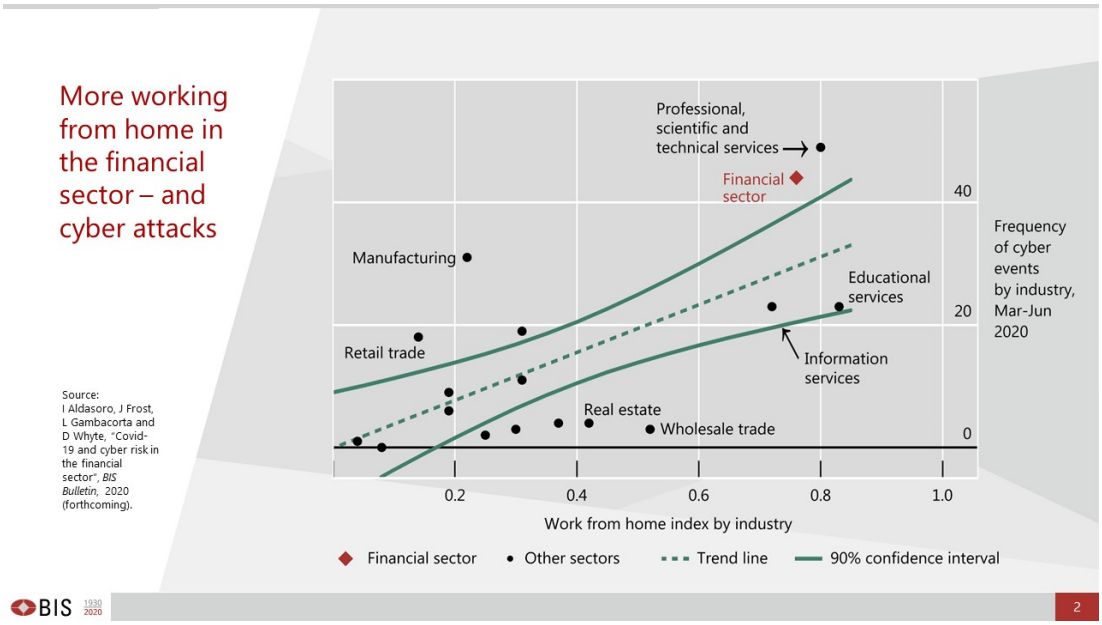
First, everyone wants to get hold of as much information as possible. And the more data you have, the better. In our modern market economy, the data are distributed around the world. As the costs of data storage have fallen, the global volume of data has surged (see slide 1). Trade-offs are everywhere. Consumers give out their data for a better or a free service, for example. But do they understand what they are giving up? Do we need to sacrifice privacy if we want more efficiency and innovation? Can we ensure privacy while making sure that policymakers get the information they need to ensure the integrity of the system?



Second, money can be – and is being – turned into pure information. Payments are being integrated with digital communications, and private companies are asking, "If it is so easy to send a TikTok video around the world, why isn't it just as easy to send money?" This is bringing new challenges to how we think of money, and to the role of central banks.

Third, while private companies offer a dizzying array of payment options and financial services, issues of competition loom large. Regulators want banks and other companies to play fair, in other words keep a "level playing field". But in a complex and globalised world with national regulators and regulatory structures built for traditional business models, how do we ensure this in practice?

And fourth, as we have become more dependent on digital technologies, we are also more vulnerable to their failure ("cyber risk"). While crime – and warfare – have bedevilled all ages, they have now moved to the digital realm. And the financial sector, which central banks supervise, is a particularly common target. Especially in 2020 as we are all working from home (see slide 2).



How the BIS is adapting to these changes

These are just some of the challenges that face central banks. And, given those challenges, what will be our role, our work and what kind of people will we need? I will discuss all of these questions, in turn, but let me start on how the BIS is adapting to these changes, in particular through setting up the BIS Innovation Hub (see slide 3).

Given the changes under way in the financial system, an innovation hub was a natural step forward for us. Central banks today need a deep understanding of new technologies, as well as forums in which to share and pool that knowledge. And we need to work together to develop public goods for our communities.

Essentially, the Hub is a catalyst for the tech work central banks are already doing. Bringing this work onto a global platform, it applies new technologies to solve real-world problems in the financial system.

Some might think that central banking and innovation are a contradiction in terms. And certainly few people see us as a hotbed of innovation. Rather, we are seen as a bastion of conservatism.

This is no bad thing! Being seen as conservative is a price well worth paying for the public's trust. But central banks do, in fact, innovate all the time. The modern electronic pan-European payment systems such as TARGET2 and TIPS are living evidence of the collaborative innovation between the Bundesbank, the European Central Bank and other Eurosystem central banks. It is a central bank's mandate to foster stability. That requires action when the events around us are anything but stable.

But just responding to events is not enough. To be conservative is to dislike surprises. And to avoid surprises, you need to know what the future will hold. That is exactly the purpose of the Innovation Hub.

We owe Jens a great deal for making all this happen. It's fair to say that without his drive, support and enthusiasm as our Board Chairman, there would be no Hub today. So I have come to the right address to talk about innovation!

It is still early days. Yet, like any start-up worthy of the name, the Hub is expanding by leaps and bounds (see slide 4). In addition to Hong Kong SAR, Singapore and Switzerland, we are opening new centres in Toronto, London, Stockholm and a Eurosystem centre spanning both Frankfurt and Paris. And when the Frankfurt location opens, I look forward to welcoming more of you to the BIS.

There is a lot to do. Our project themes will be familiar, especially as the Bundesbank has its own pedigree in many of these areas. We are looking at new technologies to support market monitoring by supervisors and regulators. Through proofs-of-concept, we are exploring how the next generation of FMIs might be structured and integrated into broader systems. Our work on central bank digital currencies spans wholesale and retail, with a focus on interoperability and cross-border use. And last but far from least, we are working hard on cyber security.

As the new centres launch, our project list will obviously increase. The Hub's staff are working in new ways too. Novel project management methodologies, design thinking and development tools let teams work together across central banks, disciplines and time zones. In the history of the BIS, there has never been anything like it.

So what will the future look like for you: the central bankers at the heart of a revolution in technology? As a conservative at heart, I will pick out just four areas, with some examples of projects and prototypes that are under way right now in the Innovation Hub. This is what I see in your future:

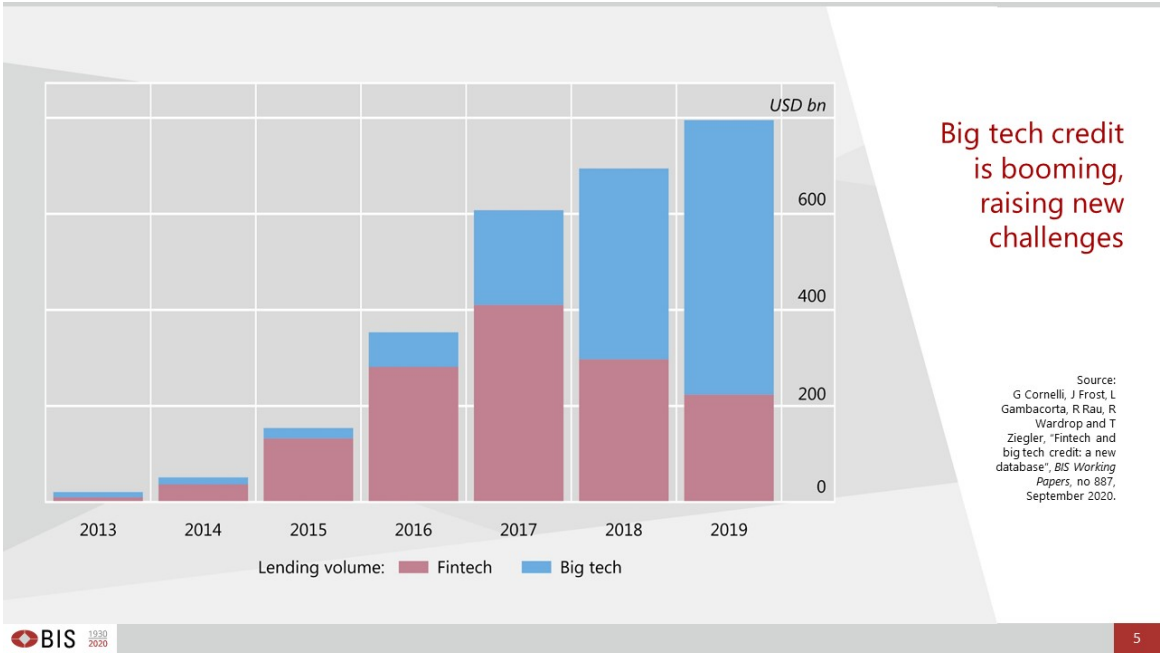
- First, your perspectives will broaden beyond financial and credit markets;
- Second, you will work with innovative new tools and you will need to listen and observe trends
- Third, you will work more closely with a much more diverse range of multi-disciplinary colleagues; and
- Finally, you will work in a central bank that adapts constantly – I believe the word is "agile" – to meet a changing world.

How our world is changing

Now let's take a look at how our world is changing:

Broadening perspectives

Advances in technology affect the functioning of the real economy and the way financial services are provided. For instance, big tech and fintech credit are booming (see slide 5). This comes with new business models and risks. It may require new regulatory frameworks and new ways of monitoring.



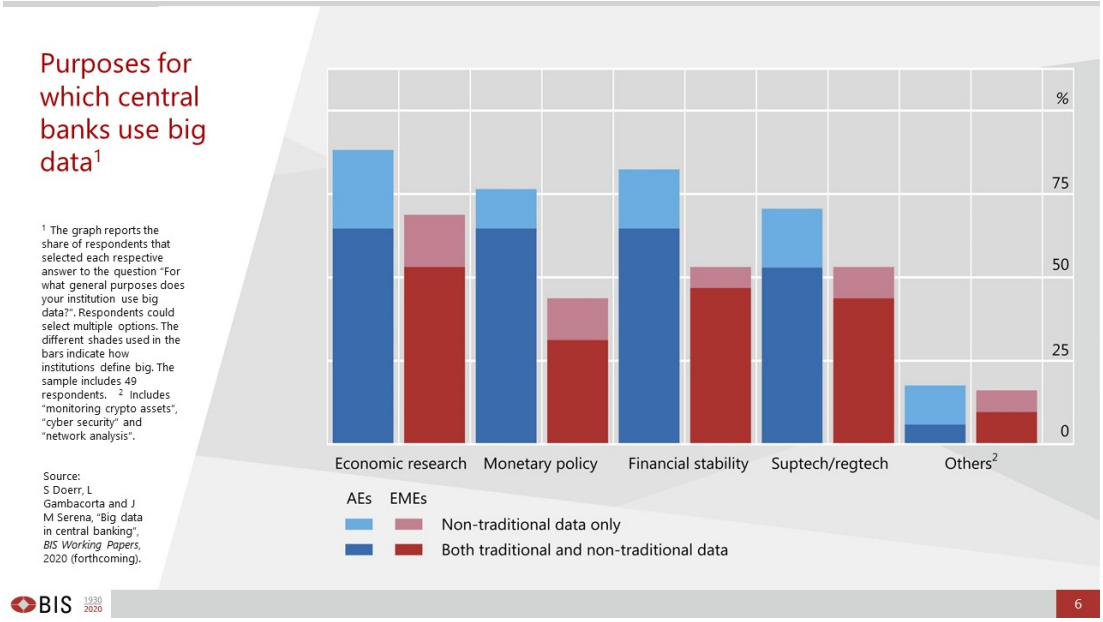
Most of all, it requires central banks to broaden the fields they cover, and the technologies they use to cover them.

In particular, when it comes to big tech, the lack of a regulatory framework – even at a domestic level – raises big questions about who stands to gain from using consumer data. The lack of a global framework allows big tech to have the cake and eat it, too.

Central banks need to adjust, along with their research, their data policy tools and the way they collaborate with other agencies – especially competition and data protection authorities.

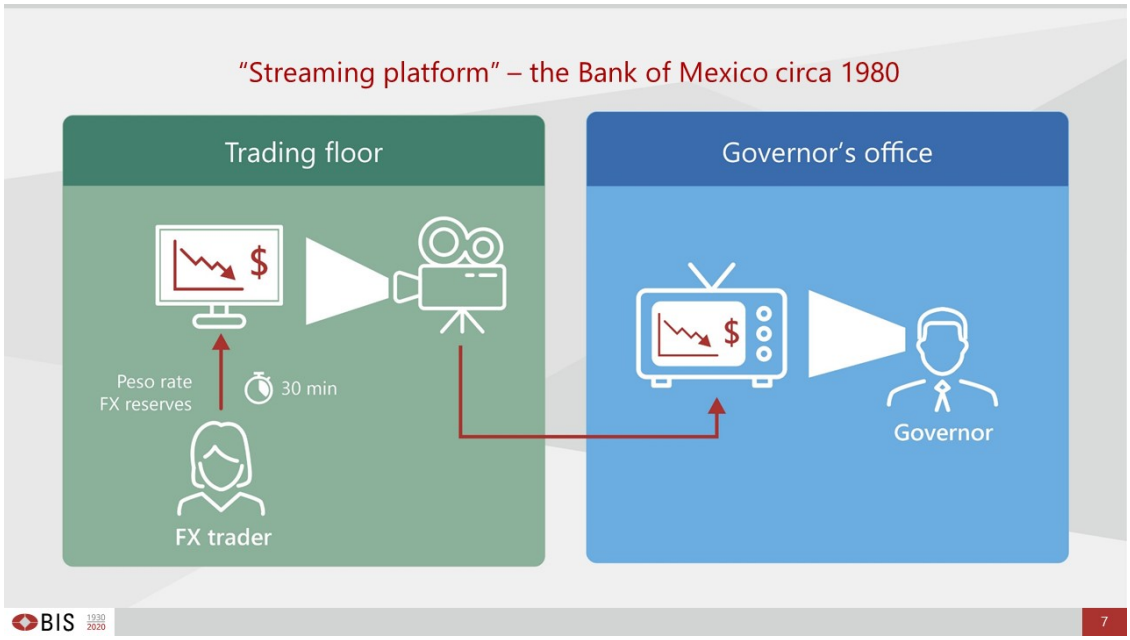
Another aspect is infrastructure. If data are the new oil, then we must invest in pipelines and refineries. Some of these facilities may have the nature of public utilities. Others, if privately offered – as in the case of cloud services – will require the right kind of public oversight.

All this has implications for IT, data storage and data lakes at central banks. They are already using big data to support economic research, monetary policy, financial stability, regulation and supervision, among other tasks (see slide 6). As they do so, one issue is data quality, especially for the unstructured data that are produced from social or business activity. This will require the expertise of those who understand statistics and data collection, perhaps with skills in the use of new technologies.



Working with innovative tools

Technology can help central banks broaden their perspective and develop deeper and faster analysis. The question today is how innovative technologies can be best harnessed – there is huge potential across a central bank's data, research, payments, supervision and market operations. Let me give you one example (see slide 7).

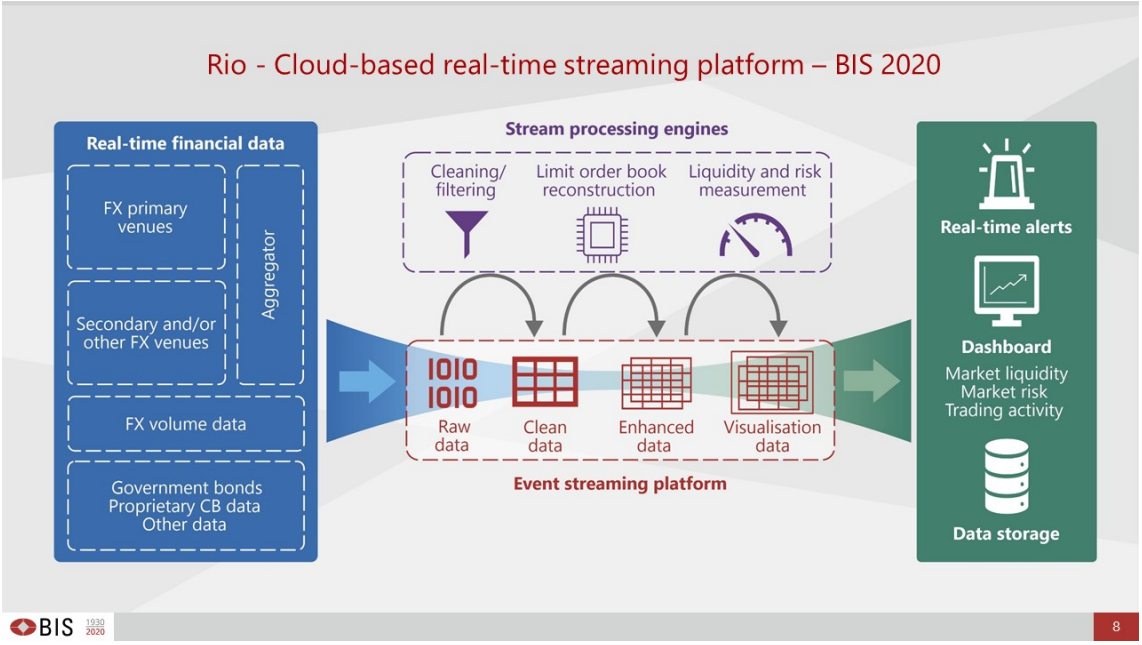


When I started at the Bank of Mexico in the 1980s, I was an FX trader. At that time, the peso was often under pressure and we had to carefully monitor the FX market and our reserves. Every half an hour, we'd update the exchange rate, the amounts traded with different banks and the remaining FX reserves on a big blackboard in our dealing room. To keep our governor in the loop, we rigged up a camera in

front of this blackboard and put a TV monitor in the governor's office, so that he could see what we were doing in real time – more or less.

How times have changed! But central banks still need to keep up with markets. Yet, strange to say, the choice of technologies for doing so is still quite limited.

What we need is a technology that can smoothly handle millions of messages and analyse these accurately in real time, but still be flexible and scalable enough to deal with diverse inputs and changes in the markets (see slide 8).



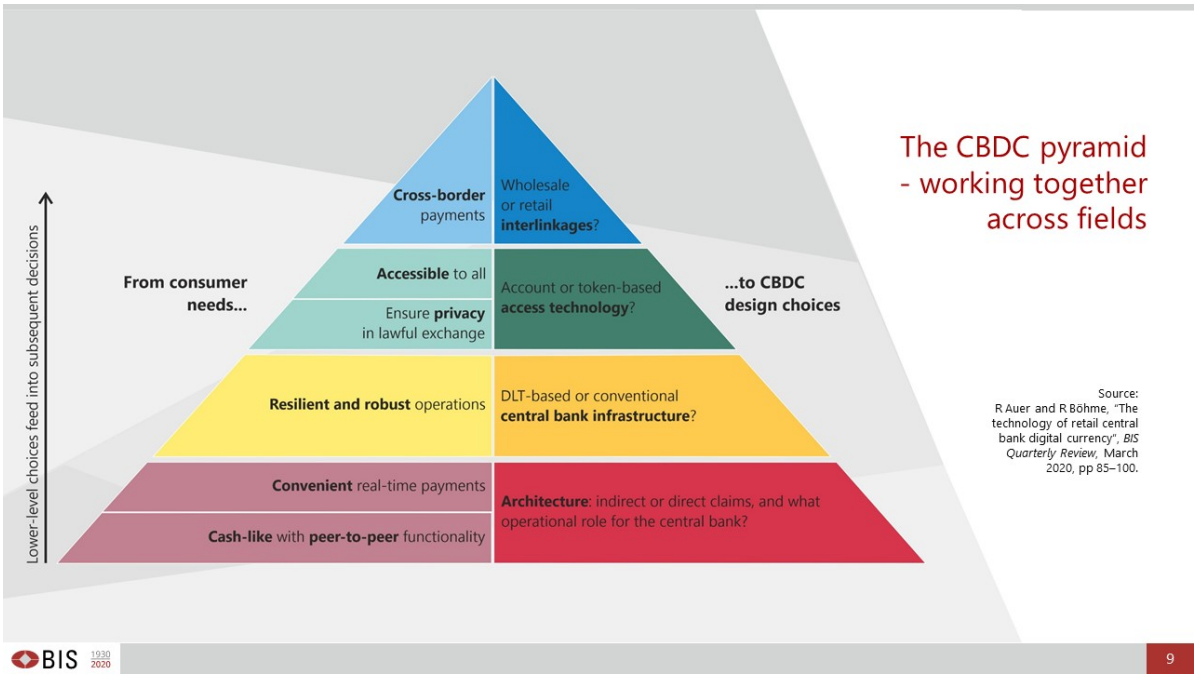
The Innovation Hub's response to this need is the "Rio" project – Spanish for "river", because it uses data-streaming technology – as originally developed by social media platforms to analyse and respond to user traffic. We are building on open-source code to develop a monitoring tool for central banks. A tool that will pull millions of messages from multiple trading venues but can also scale to higher speeds. We plan to test it in volatile markets requiring 7 million updates an hour – that is almost 2,000 every second. This is what it will take to alert central banks to market dislocations, liquidity issues and volatility in real time.

The prototype will be ready next year. We have spoken to 40 central banks, and they are excited about it. And despite all the varying use cases, currency markets and configurations, the new technologies are flexible enough to accommodate them. Powerful tools do not have to be "one-size-fit-all". The same technology could play multiple roles in central banks as well as incorporating additional data from other markets. As central banks collaborate, the best innovations will prosper.

Organising in innovative ways and using new skills

New tools require new skills to use and new teams to be formed. The team building the Rio prototype includes an FX quant, a research economist, a data scientist, a programmer and an analyst. Beyond this, BIS economists are working with lawyers, anthropologists, geographers and computer scientists in their research on digitalisation.

This cross-collaboration in multi-disciplinary teams will be the new normal for working in central banks. Economists – you will not lose your jobs! Big data can also make it harder to see the big picture and good economic analysis is still necessary to distil quantitative results. Just because a new technology can do something, that does not mean it should. New financial systems bring new challenges to understand incentives and risks. But working together, we can bring fresh insights.



By broadening our perspective through a multi-disciplinary team the effects of novel technologies can be better understood. For example, recent BIS research work on the technology of retail CBDC brings together experience in computer science, economics and central banking. In this case, the result was a framework for the design of fiat digital currency, the CBDC Pyramid (see slide 9). By understanding the import of different technologies, central bankers can start to assess the trade-offs involved in different design choices.

These collaborations will be even easier in the future as remote working allows more flexibility in how teams and workplaces can be structured. At the Innovation Hub, working together across borders is routine, using the new video technologies but also with collaboration platforms and cloud-based systems.

Innovation gives us a chance to make the financial system work better for everyone. But realising these benefits, and avoiding issues, will take international cooperation – of the kind that the BIS has been practising for 90 years.

There are risks too, particularly of the cyber kind. We are working on this too. Between them, the BIS Cyber Resilience Centre and the Innovation Hub ran a "Secure code competition" for central bank developers in November. The idea is to build a strong pool of talent in the central banking community and keep up the drive to constantly improve and adapt our skills.

Adapting to innovations in the financial system

To evolve is to adapt yourself to the world. And you central bankers of the future could see the financial system change in radical ways. New technologies could make the financial system less centralised, or at least realign the structures and systems of today.

A diverse and multidisciplinary team can help not only to run these experiments but to understand their broader impact. The BIS has been experimenting with new technology – just as the Bundesbank has. Why? To be better prepared to respond to the need for safe and trusted money in a changing system.

This will be the real test for central bankers of the future – not just the depth of their understanding, but the effectiveness of their response to a changing financial system and how they harness the new policy options available to them. And I will talk about one new option under intense scrutiny – central bank digital currencies.

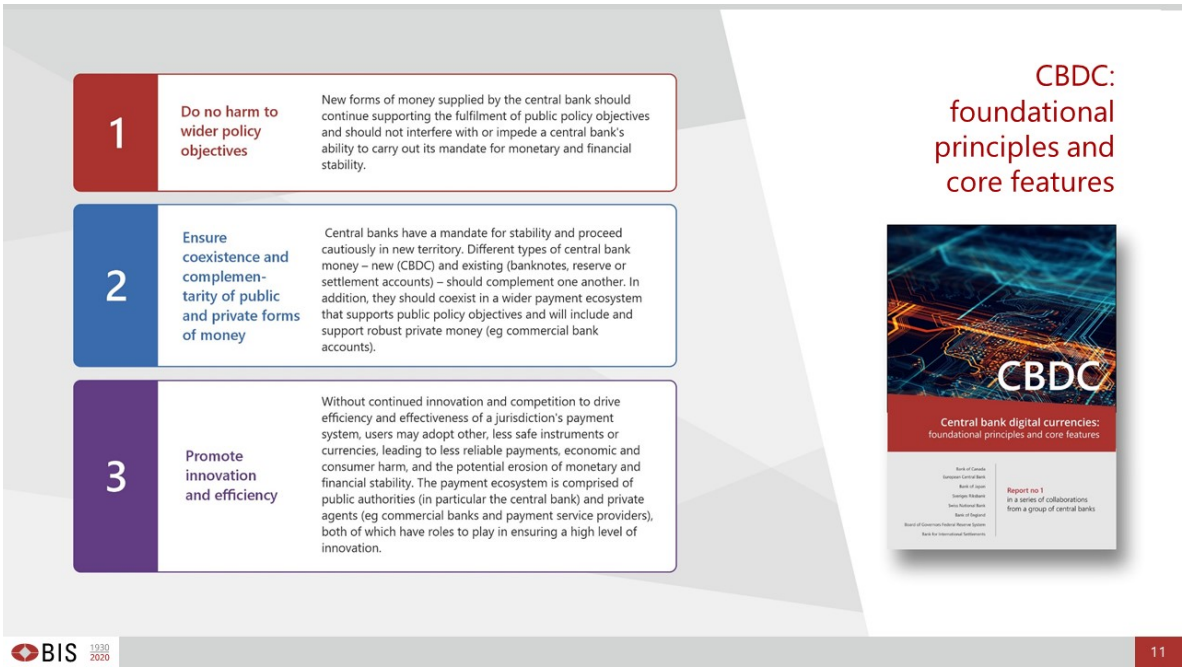
Again, an example from the Innovation Hub. The BIS reported on Project Helvetia earlier this month with colleagues from the Swiss National Bank (SNB) and SIX, the Swiss market infrastructure operator. This is a wholesale central bank digital currency proof-of-concept – a CBDC POC, if you like (see slide 10).

Another one? Yes. But with a difference. SIX plans to launch a trading and settlement platform using distributed ledger technology next year. So, this time, understanding how central bank money could be used is no mere academic exercise. It is a policy question.

Project Helvetia shows that central banks have options – issuing a CBDC within realistic systems is possible. So is linking the existing real-time gross settlement (RTGS) system. Side-by-side, a CBDC can offer more functionality than an RTGS link. But technical considerations are not the only ones for a central bank – the wider policy questions remain. The SNB and Innovation Hub will continue to work on these in 2021.

Why is the BIS involved? Because learning together is the best way to find the right answers.

The same is true when it comes to a retail, or general purpose, CBDC. The BIS is part of a group of central banks that is collaborating on practical policy research and applied technical experimentation. This group published a report in October this year, setting out the principles behind CBDC development (see slide 11).



Principle number one was what Benoît Cœuré, the head of the BIS Innovation Hub, described as a "monetary Hippocratic oath". Central banks are guardians of a currency – they will not issue a CBDC that could harm it.

A CBDC will co-exist with what we have now and innovations in the future. That includes cash. Full anonymity for digital payments is just not compatible with the law in most parts of the world. And it is a political question for parliaments on how much privacy their citizens are entitled to. All the central banks who contributed to that report remain committed to providing cash. CBDC or cash is not an "either/or" question. The answer may well be "both".

Co-existence means there will be a role for the private sector in a CBDC system. Designing a system in which the public and the private elements mesh seamlessly is no simple matter. Yet progress is being made here too, through multi-disciplinary collaboration between technologists, economists and payment system experts.

One thing to keep constantly in mind is this – safe and trusted money is not generated by algorithms. It is safeguarded by competent institutions. By law, the public look to central banks to safeguard their monetary system.

Conclusion

Technology changes but the essence of central banking does not. The Bundesbank today might appear radically different from the institution founded in 1957. But its aims are the same, now as then. Our tools will change. Our skills will become more diverse. And how we provide money to the public and financial system will move with the times.

In the 1980s, we used a video camera to monitor markets, but you will stream millions of data points every second. Earlier in my career, I worked with narrow teams of economists and lawyers, but you will have a rich diversity of backgrounds and experience. Times have changed – yet we serve the public in the same way.

Finally, in recent decades, we've seen financial markets and the world change fundamentally. You will see the same thing. At the BIS, our aim is to support you as you encounter these changes.

It is getting close to Christmas and so *Ich wünsche Ihnen allen frohe Weihnachten*! For central banks, 2021 will not bring business as usual. We may have to take on some brave new roles. Unfamiliar characters might enter the plot. Even for venerable institutions celebrating their 90th anniversaries, things change. We will change with them. And you – the central bankers of the future – will lead that change. I know you will do your very best.