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Fleur de Beaufort and Patrick van Schie interpret the results of the Dutch elections and 'populism'

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Trade wars

The political reaction to COVID-19 has plunged the West into an ever-greater debt burden, which will have to be paid back. Fortunately, interest rates are currently at a very low level. However, these high debt levels are also coinciding in a perfect storm situation with the low-growth environmental, social and corporate governance-friendly policies that the US and Europe in particular are in love with.

When Reagan and Thatcher wanted to cut back the size of the state, it changed the world. Now the United States, European Union and the United Kingdom are united in the opposite mission: to bring back big government. This is encapsulated in a commitment to what is known as stakeholder capitalism, which focuses on serving the needs of the society, the environment, the community, the people who work within the business, the customers of the business, not just the shareholders of the business.

Government-directed industrial sectors are invariably poor-performing and low growth. There is a risk that Europe, which has been on this road longer than the United States, will end up like the Eastern Bloc of the seventies, poor and years behind the capitalist West (or in this case, China and the Asian economies). This will be the result of the Fortress Europe protectionist Europe that is coalescing in front of our eyes.

Trade protectionism has long roots and is still alive and kicking. Import-substituting industrialisation behind a wall of tariff and non-tariff barriers led to failed economic development in post-colonial Asia, Africa and Latin America, as their industries seldom grew up to compete in world markets. They instead became conduits for crony capitalism, corruption and loss-making public investments.

Governments favouring important domestic political constituencies at the expense of international trade is common enough in the OECD countries as well. Trade protectionism arises from a fear and failure to compete. Trade relationships are increasingly being driven by the ESG agenda – the Environment, Social, Governance agenda – and by doing good for society and good for the planet by behaving responsibly as a government. Non-tariff barriers, whether they are about worker rights, carbon taxes or diversity, are an impediment to growth.

In the green agenda, for example, as governments start to translate a net-zero 2050 target into a set of shorter term and more specific targets, we need to explore the impact these will have on jobs, total output and incomes and public spending. The cost of the transition to net-zero has not been disclosed. A government-driven project is certain to cost a multiple of any figure, and delivery is sure to be overdue. And for what?

It is an irony that the greatest wealth-creating, poverty-reducing period in history, when economies worldwide were opened up, is now ending as economies are increasingly becoming more protectionist. Will the technological transformation be enough to counteract the influence of the liberal elite? That is the question. ■

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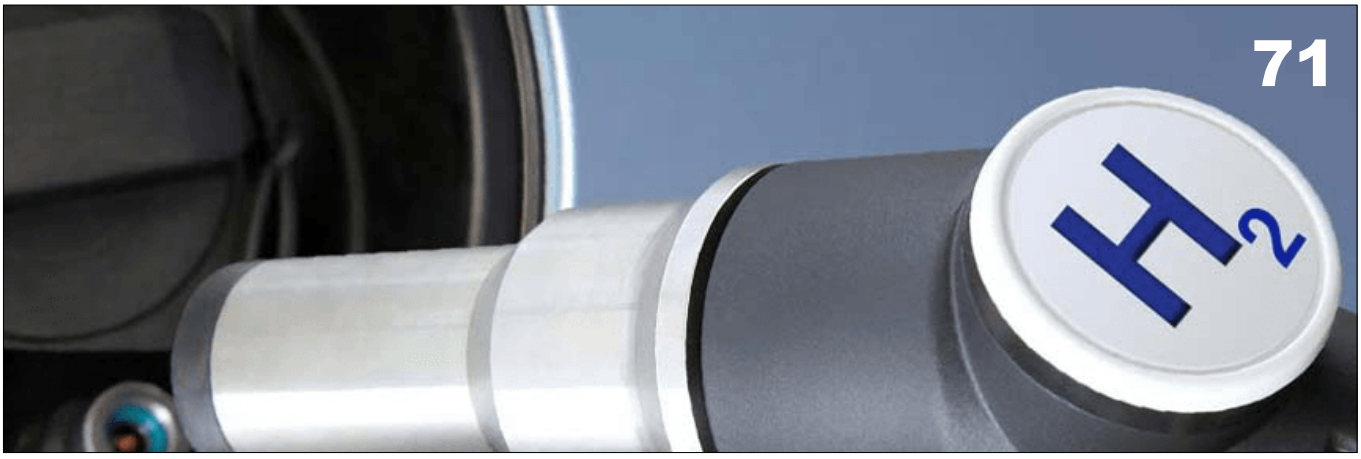

China and the WTO

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China's ascension to the WTO followed years of negotiations with the incumbent members and was hailed at the time as a victory for the liberal paradigm – part of the 'end of history'. But today frictions remain.

China was one of the original contracting parties to the General Agreement on Tariffs and Trade (GATT) in 1947, but its status was deactivated in 1950 after the formation of the People's Republic.

For the next three decades, China had practically no contact with the agreement. But the situation changed in the late 1970s and early 1980s, following Deng Xiaoping's economic reforms.

China formally sought the resumption of its status as a contracting party to the GATT in 1986, with accession negotiations starting the following year. Despite 20 rounds of negotiations, China and the incumbent GATT members failed to reach an agreement by 1995, when the WTO succeeded GATT. It then took another 18 rounds of negotiations for the two parties to agree on China's 'Protocol of Accession' to the WTO.

The exceptionally long accession negotiation reflected the challenge of having a country with a socialist economic system and the largest population in the world join an organisation conceived and operated on essentially liberal economic principles.

Despite some apprehension, China's accession to the WTO in 2001 was hailed as a magnificent achievement that would stay in history as the indelible etching on the wall commemorating the definitive victory of the liberal paradigm.

But 20 years later, the mood has changed radically. Today, newspapers headlines concerning China – in the Western world at least – are consistently negative. Increasingly, there is a feeling that perhaps China and the WTO are mutually incompatible.

What has changed during the past 20 years? China or the WTO? How can a seemingly happy marriage turn so sour so quickly? The answer is multi-faceted. China did not change. The problem is largely one of false expectations. The answer can also be seen as being a case of 'sub-optimal contracting'.

We begin with a caveat: in this column, inspired by our recent book (Mavroidis and Sapir 2021), we discuss China in the WTO, not China in the world economy or China in the realm of international relations. We do not deny that there is an osmosis between the general and the specific.

Allison (2017) offered a perspective in this context, when claiming that we are probably traversing yet another Thucydides' trap. Nevertheless, while we take on board all these analyses, in what follows we concentrate on China and the WTO.

The GATT liberal understanding

Economists and historians alike have described 'GATT-think', both its explicit and its implicit dimension. In Baldwin's (1970) classic account, the GATT is a tariff bargain, the value of which is insured through legal disciplines like national treatment, and non-violation complaints. Tumlir (1984), and Zeiler (1999) focus on the pre-requisites for the agreed GATT-think to function: a liberal economy.

This should not come as surprise at all: Irwin *et al.* (2008) have shown that a conscious decision was taken to restrict the number of seats around the GATT negotiating table to a homogenous nucleus of liberal market economies.

This choice was consistent with the idea that GATT, besides being a trade agreement, was part of the arsenal of the West during the Cold War. Trade policy, after all, broadly defined, is national security policy – since it allows trading nations to have access to goods that could be critical in advancing national security concerns (Schelling 1971).

No one gate-crashed the party, but the club is not what it used to be

The GATT entered the world of international relations as an interim organisation that was meant to be eventually incorporated into the International Trade Organisation (ITO).

The ITO was supposed to become a multilateral organisation. The GATT followed suit even though the ITO never saw the light of day. In part hoping to persuade them to change

course, and in part in order to place a dent on the coherence of the Soviet bloc, the GATT gradually opened its doors to Poland and Yugoslavia (in the 1960s), then Hungary and Romania (in the 1970s).

The incumbents did not find it necessary to translate the liberal understanding implicit the GATT into explicit legal disciplines, since all four countries were very small shares in terms of international trade.

The GATT was not amended when Japan joined GATT in the 1950s either, although the state played an important role in the Japanese economy, and many GATT incumbents were reluctant to accept Japan in their midst for this reason. Japan was, of course, a large economy, and its export-led growth model was viewed as a threat.

In fact, some of the reactions to China's attempt to access the GATT and then the WTO were very reminiscent of the reactions to Japan's own efforts to enter the GATT-world.

Yet, there were also striking differences between the West's reaction to Japan and China. These had to do with economics but also, and primarily, with geopolitics. Given the military occupation of Japan by the US at the time it joined the GATT, there was never any doubt that it would eventually espouse the Western economic model.

Its membership of the OECD, with its various 'codes of conduct' (in line with the principles of economic liberalism), a decade after joining the GATT, was the clearest sign that Japan had joined the Western 'club'.

This time is different

The GATT/WTO liberal understanding was still implicit when China knocked on its door. WTO incumbents assumed that with Deng's reforms China had entered a one-way street, with market economy being the end destination.

Buoyed by Fukuyama's (1992) pronouncement of 'the end of history', they seemed to espouse the view that the definitive victory of liberalism had arrived, and the fall of the Berlin wall was only the beginning.

As we note in our book, some US statesmen went so far as to state publicly that China would become not only a liberal market, but also a liberal democracy.

Of course, there were sceptics too, especially in the US. But even they bought into a simplistic narrative: the US keeps its tariffs at the same level after China's accession; China greatly reduces and caps its tariffs (from 25 to 9% for industrial products, and from 31 to 14% for farm products); and as a result, the US was bound to gain more than China, obtaining bilateral trade surpluses.

Even those who did not buy into the 'China changes' story could see the huge potential economic benefits of accessing the world's fastest growing market with the biggest population (soon to become the world's biggest market). For many, China was the biggest prize of the 21st century.

"What can be done to further open up the Chinese market under the existing WTO regime? 'Not much' is the simple answer"

The economic dream has become reality, but so have the frictions with China. Even if China had, like Japan, become a Western-style economy by becoming an OECD member, frictions have occurred, as they did with Japan. It is not possible to incorporate into the trading system a very large and very fast-growing economy without frictions.

But what is different with China is that has retained substantial state involvement in the working of its economy, which is in direct contradiction with the WTO's implicit liberal understanding.

China describes its economic system as 'socialist market economy'. It is a mix of private initiative and state planning, where, unlike in Western economies, the state's (or the Communist Party's) role is paramount. Dominated by state-owned enterprises (SOEs), and omnipresent industrial policies, the Chinese economy leaves some room for the private sector.

But according to official Chinese statistics the public sector made up 63% of total employment in 2019. While some opening of the economy has occurred over the years, and it is now possible to have 'wholly-owned foreign enterprises' (known as 'Wofers'), privatisation has been slow (or at least slower than expected by China's trade partners).

No doubt, lots of assets have been corporatised, but corporatisation does not mean privatisation, as China's trade partners have come to realise after the country's accession to the WTO.

An uneasy relationship

On 11 December 2001, China officially joined the WTO. Its achievements since then have been truly remarkable. In 2001, China was the sixth largest exporter of goods in the world (fourth, if the European Union is counted as one unit). Since 2009, it has been the world's largest goods exporter, surpassing even the EU bloc from 2014 onwards.

Fast export (and import) growth has boosted GDP growth and income levels. According to the IMF's April 2021 WEO database, China's GDP amounted to barely 13% of the US GDP in 2001. Twenty years later, this ratio is likely to reach 73%. During the same period, China's per capita income (measured at purchasing power parities) rose from the level of Sudan in 2001 to nearly the level of Mexico today.

But China's integration in the world economy has created frictions, especially with the US, which has long had massive trade deficits with China. In 2019, US goods and services trade with China totalled an estimated $635 billion. Exports were

$163 billion; imports were $472 billion. The US goods and services trade deficit with China was $309 billion[1] – a far cry from the forecast when China joined the WTO.

Economists rightly argue that bilateral trade balances reflect many factors other than trade policies and that the WTO is about establishing competitive opportunities for nations to exploit their comparative advantage, not about having bilateral balanced trade. But the politics of trade in different, especially in the US.

Critics of China's trade policy, not only in the US but also in the EU and elsewhere, often argue that China has done well by not respecting its WTO obligations. But has this been the case?

China's WTO obligations

When China joined the WTO, it negotiated three distinct layers of obligations:

- The multilateral framework that applies to all WTO members and consists of the General Agreement on Tariffs and Trade(GATT), the General Agreement on Trade in Services (GATS), the agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPs), and the Dispute Settlement Understanding (DSU);

- A plurilateral framework that applies to only a subset of WTO members wishing to join the Government Procurement Agreement (GPA) and/or the Agreement on Trade in Civil Aircraft;

- China's own Protocol of Accession. China promised to join the GPA but has not done so up to now, nor does it belong to Civil Aircraft agreement.

Consequently, the legal benchmark to judge whether China has respected its WTO commitments is the sum of the WTO multilateral framework and China's Protocol of Accession.

The multilateral framework was negotiated during the Uruguay Round, without China in mind. The most glaring evidence to this effect is the fact that the term 'SOE' (state-owned enterprise) – a key feature of China's economic system, though also present in many other countries, including EU member states – is totally missing in the WTO Agreements.

A few years later, President Obama adopted the opposite strategy. He negotiated the Trans-Pacific Partnership (TPP) with China in mind, without implicating China in negotiation.

If China ever wished to accede to TPP, it would have to adjust to a very demanding discipline regarding SOEs, as Vietnam had to do to join the Comprehensive and Progressive TPP (CPTPP), the trade agreement among the remaining TPP signatories after President Trump decided to bow out of the TPP.

The Protocol of Accession: hope, and the legitimate limits of hope

The Protocol of Accession reflects the Zeitgeist at the time when China was negotiating its accession: exuberance, probably irrational exuberance. Incumbents even set a date, 2015, when they expected China to have become a market economy. And this provision probably explains the spirit permeating all remaining provisions as well.

The Protocol contains many best-endeavours clauses, which reflect the spirit of the negotiated contract but do not translate into legally enforceable obligations. So, while we observe various best-endeavours clauses on privatisation or pricing policies, there is precious little in the Protocol in terms of binding commitments in these areas.

And, of course, the Protocol of Accession could have never been a perfect substitute for deficient legislative foresight. Both the statutory language as well as practice – discussed in exemplary manner by Williams (2008) – confirm this point.

The extensive margin of obligations included in the multilateral agreements (and the plurilateral agreements, assuming the acceding country agrees to adhere to one or more of them) circumscribe the sum of obligations that a Protocol of Accession can include. The intensive margin (eg. the level of tariffs) is of course a matter of negotiation, and very much an item for inclusion in any Protocol of Accession.

The Doha Round mandate

China joined the WTO when the Doha Round was initiated. The Doha Round mandate included renegotiation of various WTO Agreements, including the Agreement on Subsidies and Countervailing Measures (SCM), which could have been used to 'complete' the deficient SCM Agreement and add important details to explicitly acknowledge, for example, that SOEs are 'public bodies' in the SCM sense of the term.

Abandoning the 'Trade and Competition' and 'Trade and Investment' initiatives at the WTO Ministerial Meeting in Cancun (in 2003) did not help either. Various investment-related practices have continued to plague market access for foreigners in China.

The EU recently tried to remedy this situation (but only for EU investors) with the bilateral EU-China Comprehensive Agreement on Investment (CAI), which has been assessed by Dadush and Sapir (2021). Similarly, enforcement of competition law by the Chinese authorities continues to pass the trading community by stealth.

Now, the Doha Round is all but gone and we are back to square one.

Can litigation do what negotiation did not do?

Dissatisfaction with China on the part of the US, the EU, and other Western countries has centred mainly around two issues: the manner in which SOEs have been operating, and the (lack of) enforcement of intellectual property rights (typified by the de jure or de facto obligation for foreign investors in China to enter into joint venture agreements with Chinese companies and transfer them their technology).

Two WTO complaints have been raised so far implicating Chinese SOEs, and both have been raised by …China. This is

telling, in and of itself. If the membership complains about the involvement of SOEs in the Chinese economy, then why not litigate more?

There is a general claim that there has been under-enforcement against China by its trading partners, and there is probably some merit to this claim. If we use a country's share of global trade as a predictor for the number of disputes it faces at the WTO as respondent, then China is definitely under-represented.

It is plausible that various foreign investors prefer to 'bite the bullet' and stay in the Chinese market rather than provoke the wrath of the Chinese authorities by litigating their rights. There is some evidence to this effect.

But when litigation has occurred, the outcome has not been exhilarating for complainants. The WTO Appellate Body has eviscerated the legal discipline imposed by GATT Article XVI on state-trading enterprises (STEs) – a sub-set of SOEs – by narrowing the obligation imposed to non-discriminatory behaviour, making the obligation to act in accordance with commercial considerations essentially redundant.

In a similar vein, the Appellate Body has held that SOEs 100% owned by the Chinese state are not even presumptively 'public bodies'. Its eventual finding in a subsequent case that even private companies could be considered 'public bodies' – a complete U-turn over the prior case law – was too little too late.

By that time, the Trump Administration had pulled the rug under the Appellate Body, condemning it (provisionally at least) into abeyance. Legislators could have provided clearer legislative guidance, but WTO adjudicators failed in this context as well.

What about the vexed issue of forced technology transfer that foreign companies wanting to invest in China routinely complain about? There has only been one litigation against China, by the EU, in a WTO case that is still pending. Why nothing more? For one simple reason: the WTO does not punish the behaviour by private agents.

Unless the obligation to transfer technology to a Chinese partner in a joint venture can be attributed to the Chinese state, which is rarely or never the case, foreign investors will not prevail in a WTO litigation.

Have complainants been pursuing the wrong legal strategy? Certainly, Charlene Barshefsky, a former US Trade Representative, thinks this way. In a recent (2019) speech at the US-China Business Council in Shanghai, she deplored the under-use of commitments made by China in its Protocol of Accession to litigate at the WTO.

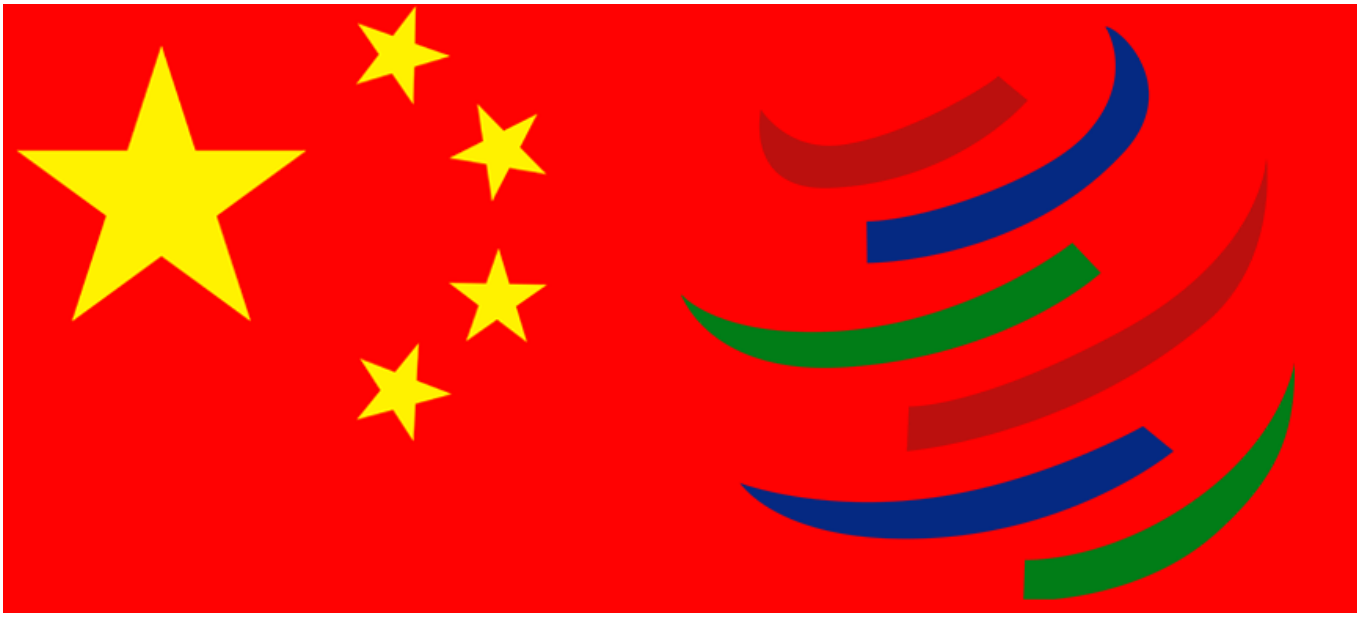
But apart from the anti-surge clause (which protects against 'excessive' Chinese exports), she did not point to any provision that would have obliged China to open its closed market.

This is the main problem faced by China's trading partners and is certainly a far bigger priority than slowing down the alarming pace of Chinese exports to their markets.

What can be done to further open up the Chinese market under the existing WTO regime? 'Not much' is the simple answer. There is a lot in terms of 'spirit' but no binding language in the Protocol of Accession. A former member of the Appellate Body, Jennifer Hillman (2018) has claimed that non-violation complaints could provide an adequate means to channel disputes against China.

In Mavroidis and Sapir (2021), we disagree. For starters, this instrument can be of almost no help when it comes to litigating Chinese measures (and there are many) preceding China's negotiation of tariff bindings. This is because of the allocation of burden of proof under WTO law.

But more to the point, prevailing in this context does not entail an obligation for China to amend its regime. It will



simply have to part with a very small, infinitesimal portion of its huge surplus.

The conclusion is that WTO adjudication is no substitute for deficient WTO legislation. Those who negotiated the terms of accession seem to have spent more time thinking 'how can we block Chinese exports?' than asking 'how do we guarantee that China will open up?'

Is there a silver lining?

We have, so far, painted a rather bleak picture. Is there light at the end of the tunnel? Maybe, but to get there the world trading community, China included, will have to behave like 'responsible stakeholders', as Zoellick (2020) has recently asked them to do.

How can China and the WTO work together better?

The ability of the WTO to shape the way China conducts its trade policy has been severely limited, and most attempts to leverage multilateral pressure have so far failed.

This is a clear case of cognitive dissonance. China never committed to becoming a 'market economy' when it joined the WTO. It only promised to become a 'socialist market economy'. The Western countries and the WTO membership in general only paid attention to the words 'market economy'. But for the Chinese, the word 'socialist' was equally important.

China's constitution is very clear about this. Article 6 states that:

> *"The foundation of the socialist economic system of the People's Republic of China is socialist public ownership of the means of production, that is, ownership by the whole people… and collective ownership by the working people… In the primary stage of socialism, the state shall uphold a fundamental economic system under which public ownership is the mainstay and diverse forms of ownership develop together."*

It was not really a surprise, therefore, that President Xi has moved towards re-invigorating the role of the state, rather than retracting it. And he had, and still has, little incentive to do otherwise.

China, as is, has been outperforming other big advanced and emerging economies for some time. And not only that. China weathered the 2007-2008 Global Crisis much better than others. The same holds for the COVID-19 crisis.

According to the IMF's April 2021 WEO database, China's GDP will reach 117% of its 2019 level in 2022, while the US will only reach 106% and the EU 102% of their 2019 levels. China emerged from the Global Crisis as good as (and probably even better than) anyone else. So, why change?

Not that a serious regime change was ever on the cards. Chairman Deng excoriated Gorbachev's decision to dissolve the party, since he always thought that its role was crucial in directing state affairs. And the reduction of state was more a question of corporatisation of (former) state assets, rather than privatisation – especially as understood in the Western world.

As a result, the world trading community is now stuck with a legal framework that is hardly appropriate to take care of the concerns that emerge. Yet, as we argue in Mavroidis and Sapir (2021), this does not necessarily mean that no progress is possible in trying to bridge the gap between the Chinese and the WTO systems.

The parameters

The word trading community should be under no illusions as to what can be achieved. China will not change its economic regime and overall approach by legislative fiat or through an edict decided in Geneva.

What the multilateral regime can do is 'tweak' a few key institutions, which will facilitate access to China's market and increase the relevance of the WTO framework in Beijing.

In doing this, the trading community should not repeat the mistakes of the past. There is no reason to believe, if there ever was one, that a relational contract full of gaps will function as expected. The WTO membership's heterogeneity would argue against similar expectations. This is the time of explicit contracting.

Wu (2016) correctly underscores the capacity of China to evade its disciplines. It is equally true though that the biggest victories against China were scored in the areas where contractual expression had been quite clear. It is the time of action. Contrary to Rodrik's (2018) suggestion, the world trading community cannot stay idle.

This 'do-nothing' approach implies that problems perpetuate. It is also a-historical. The GATT/WTO was not designed to accommodate each and every state on earth, irrespective of its regime choice. The liberal understanding permeated the agreed text.

Indeed, its key institutions cannot function properly, absent acknowledgement of the liberal understanding. At the same time, it is true that neither the GATT nor the WTO agreements ever made explicit their implicit liberal understanding.

Contrary to the EU (which added accession criteria – the Copenhagen criteria – to prepare for the accession of the former socialist countries of central and eastern Europe), the GATT/WTO agreements contain no such criteria.

The world trading community would be well-advised to avoid repeating unilateral reactions as seen during the Trump Administration. We now know, thanks to the work of Amiti *et al.* (2019) and Bown (2021), that not only China did barely flinch, but that it is the US economy that had to suffer the bulk of the cost of the unilateral increase in tariffs.

And of course, the Phase One US-China agreement did not solve the 'China problem', nor did it reduce the US trade deficit with China. The agreement also risks being outlawed by a WTO panel.

So, what can be done?

The world trading community needs to come together and 'complete' the contract. Bilateral solutions like the US-China deal or the EU-China Comprehensive Agreement on Investment (CAI) may help a bit but will not solve the problem because of the nature of what is at stake: subsidies, especially, require a multilateral approach.

In doing this, the world trading community would be well-advised to mimic existing successful examples. Both the Comprehensive and Progressive Trans-Pacific Partnership (CPTPP, the successor to the TPP signed under Obama but rejected by Trump) as well as the US-Mexico-Canada Agreement (USMCA, the successor to the North America Free Trade Agreement, NAFTA) contain detailed chapters regarding the disciplining of state-owned enterprises (SOEs) and forced technology transfers – the two biggest irritants to trade and investment relations with China (see part two of this series).

For 'Realpolitik' reasons as well, this is a commendable approach: why attempt to re-invent the wheel, when solutions that meet the approval of a substantial percentage of the WTO membership already exist? The good news is that China has already agreed on some of this discipline in its bilateral investment agreement (the CAI) with the EU, as Dadush and Sapir (2021) explain.

With this in mind, we would like to advance two proposals for WTO reforms. The first concerns SOEs, of which only a small subset (state-trading enterprises (STEs)) are covered by the WTO Agreement.

The new text should make it clear that all SOEs (including, but not exclusively, STEs) are presumptively 'public bodies' (reversing the burden of proof in subsidies disputes) and must act in accordance with 'commercial considerations'.

Second, for foreign direct investment involving joint ventures, WTO signatories (China included) should be constrained not to enforce contracts between domestic and foreign firms that oblige the foreign investor to transfer technology to its domestic partner against its wishes.

If these propositions were agreed at the multilateral level, a substantial part of today's complaints against China would subside.

But every silver lining has a touch of grey

For all this to happen of course, all the main WTO players (China included) must agree to participate in WTO negotiations. The question is how to bring this about politically. The January 2020 Joint Statement of the Trilateral (Japan, the US, and the EU) showed that trade distorting policies and practices by China pose challenges to many nations, and that cooperation is possible.

As argued by Baldwin *et al*. (2020), calls for a structured dialogue with China will be required down the road. China has profited enormously from its participation in the WTO. The cost of non-WTO – as may happen if the 'China problem' continues to poison the atmosphere at the WTO – would be felt in Beijing probably even more than elsewhere.

China should have an incentive, therefore, to act as a 'responsible stakeholder' – a concept already put forward the then US Deputy Secretary of State Robert Zoellick in 2005 (Zoellick (2005). Crises usually go in tandem with opportunities. And this current crisis is no exception. ■

Endnotes

1. See https://ustr.gov/countries-regions/china-mongolia-taiwan/peoples-republic-china

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Africa's latent assets

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Social science research has painted a dismal picture of Africa's potential for sustained economic growth. But growth, such as that which happened in China after 1978, can be surprising and can tap into 'latent assets' in a society that might have not been previously evident. This column identifies three latent assets in Africa which the authors argue are highly propitious for its long run trajectory.

How will Africa adjust to the COVID pandemic (Arezki *et al.* 2021)? Can it overcome the deep negative legacies of the slave trade (Nunn 2008) and colonialism (Heldring and Robinson 2013, Michalopoulos and Papaioannou 2017, Roessler *et al.* 2020) or deal with the mounting challenges of climate change (Rohner 2021)? Are there reasons to be optimistic about Africa's development futures, and if so what are they?

In our research, we identify three latent assets which we argue suggest that there may be very different and much better economic times ahead for Africa (Henn and Robinson 2021). To see why this is plausible, note that while Africa might have had a very bad 400 years, prior to 1978 China had had at least a very bad 200 years.

By the second half of the 18th century, the Qing state was collapsing fiscally and wracked by corruption. The granary system of social insurance withered away, the Grand Canal silted up, and China was convulsed by civil wars such as the Taiping rebellion. The Imperial state collapsed, there was rampant warlordism, a Communist revolution, the Great Leap Forward, and then the Cultural Revolution.

But despite all these calamities, it turned out that China has large latent advantages, or assets, on which economic prosperity could be built. A central one was a social norm that, as Confucius put it, one should *"promote those who are worthy and talented"* (2003: 138). The norm of meritocracy turned out to be a powerful sociological principal on which to build an inclusive market economy.

Africa has latent assets too, indeed the first we identify – that African societies are based on achieved status – is closely related to Chinese meritocracy. The achievement basis of African society is also deep-seated.

In historic Africa, even slaves who had the capacities got to the top. We illustrate this fact with ethnographic and historical evidence and also several sources of statistical information. For example, survey data on perceived and expected social mobility shows Africa to be the most socially mobile part of the world. Africans are also the most optimistic about future mobility.

Figure 1 uses a variety of comparable surveys to plot a person's stated income on the vertical axis and their parent's income

Figure 1. Perceived mobility by region

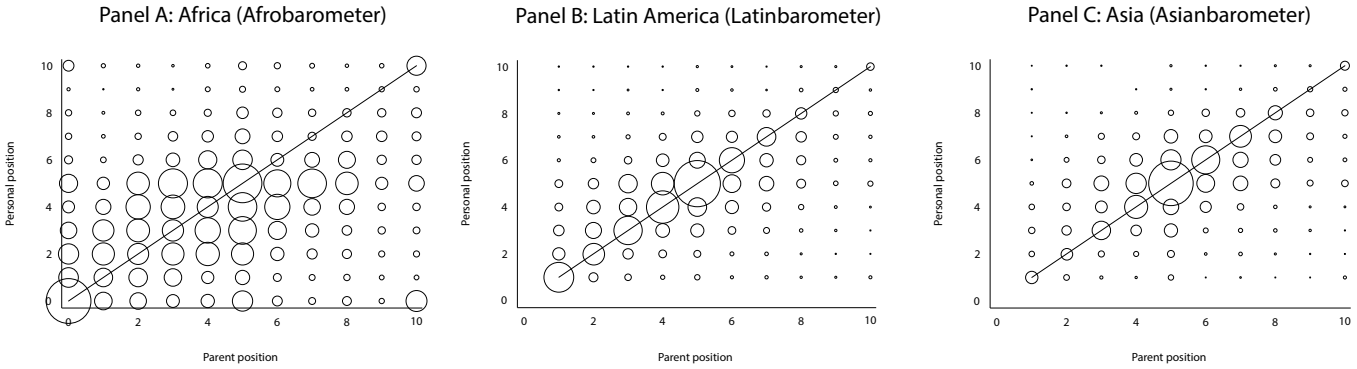
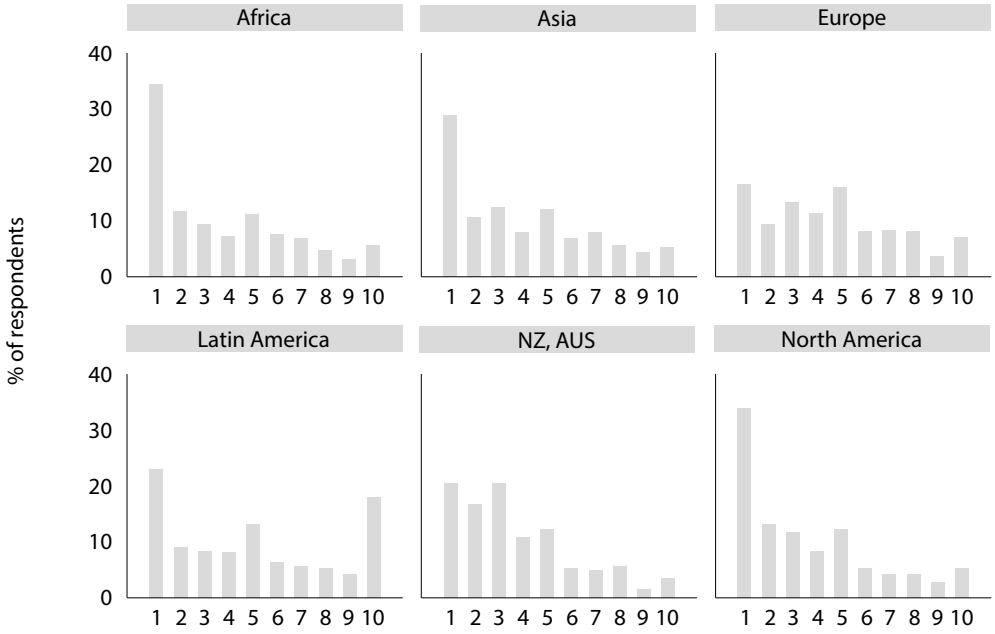


Figure 2. Importance of hard work versus luck and connections, by region (*World Value Survey*)



1 = hard work brings a better life; 10 = hard work doesn't matter, it's about luck and connections

on the horizontal axis. In places with little social mobility, such as in Latin America in Panel B, the data are clustered on the 45° line.

But, as Panel A shows, for Africa the data are spread everywhere. This shows that a person's income is not predicted by their parent's income – a situation with high social mobility. In fact, social mobility is higher in Africa than in Asia (Panel C) and even than in the US.

Anticipated social mobility of children is even higher than the data in Figure 1 suggests. This has important consequences. For example, despite the cliché that Africa is a continent of corruption where connections and social networks are critical to people's opportunities, in fact, as Figure 2 shows, in the *World Value Survey*, Africans are more likely to say that the way to get ahead economically is via hard work and this is much more important than 'luck and connections'.

Their opinions about this are similar to those of people in the US. We also show that these beliefs manifest themselves in the types of attitudes they transmit to their children.

The second latent asset we call 'scepticism of authority'. Unlike many societies in East Asia, Africa is much more like Western liberal democracies in its anticipation that political power will be abused.

African oral history and political theory is full of the anticipation of miss-rule, often in the form of a 'drunken king' (de Heusch 1982), and it generally lacks the notion of a 'redeemer' (Krauze 2011) or charismatic personal rule so central to the emergence of populism in Latin America and elsewhere.

This scepticism has of course not stopped power being abused in post-colonial Africa, but we argue that, just as in the US at the time of the Constitution, this scepticism can provide the basis for building inclusive and effective political institutions.

We illuminate this by presenting data on attitudes in Africa towards one-man rule and we show how these are related to the history of political development in Africa.

The final asset we identify is 'cosmopolitanism'. Because of the heterogeneous and small-scale nature of historical African society, Africans endlessly had to deal with differences – different languages, different cultures, different histories. This is reflected in African languages where the word for 'stranger' is typically the same word as for 'guest'.

We argue that this makes Africans the most able culturally to cope with a modern globalised world; people who can deal with difference and adapt will succeed. Though much social science attempts to portray this diversity as a burden, which may be true in some specific contexts, we argue that it is in fact an asset.

One way we illustrate this asset is by showing that Africa is the most multi-lingual continent in the world. Though it may not be specifically advantageous to speak Lingala or Kikongo in New York, London or Paris, the ability and willingness of Africans to master so many languages is indicative of the great

"African societies are based on achieved status [...] closely related to Chinese meritocracy. The achievement basis of African society is also deep-seated"

suppleness of cosmopolitan African society and in line with a recent literature in social psychology, it helps Africans to take and appreciate the perspectives of others (Kinzler 2020).

Thus far these assets are latent and we do not underestimate the challenges to building better institutions in Africa in the difficult context that colonial powers bequeathed (Acemoglu and Robinson, 2012).

Moreover, the analogy to China is made complicated by the fact that unlike Africa, China has a long history of consolidated state authority with a common system of writing and something approximating a common culture. These features almost certainly helped Deng Xiaoping move the country onto a path of reform.

Yet, these features also helped implement the Great Leap Forward and the Cultural Revolution. It is not obvious that the type of challenges that Deng overcame are larger than those that face African leaders.

Moreover, many doubt that the hegemony of authoritarianism is consistent with sustaining the prosperity that China has generated in the past 40 years. Here Africa may have systematic advantages over China. ■

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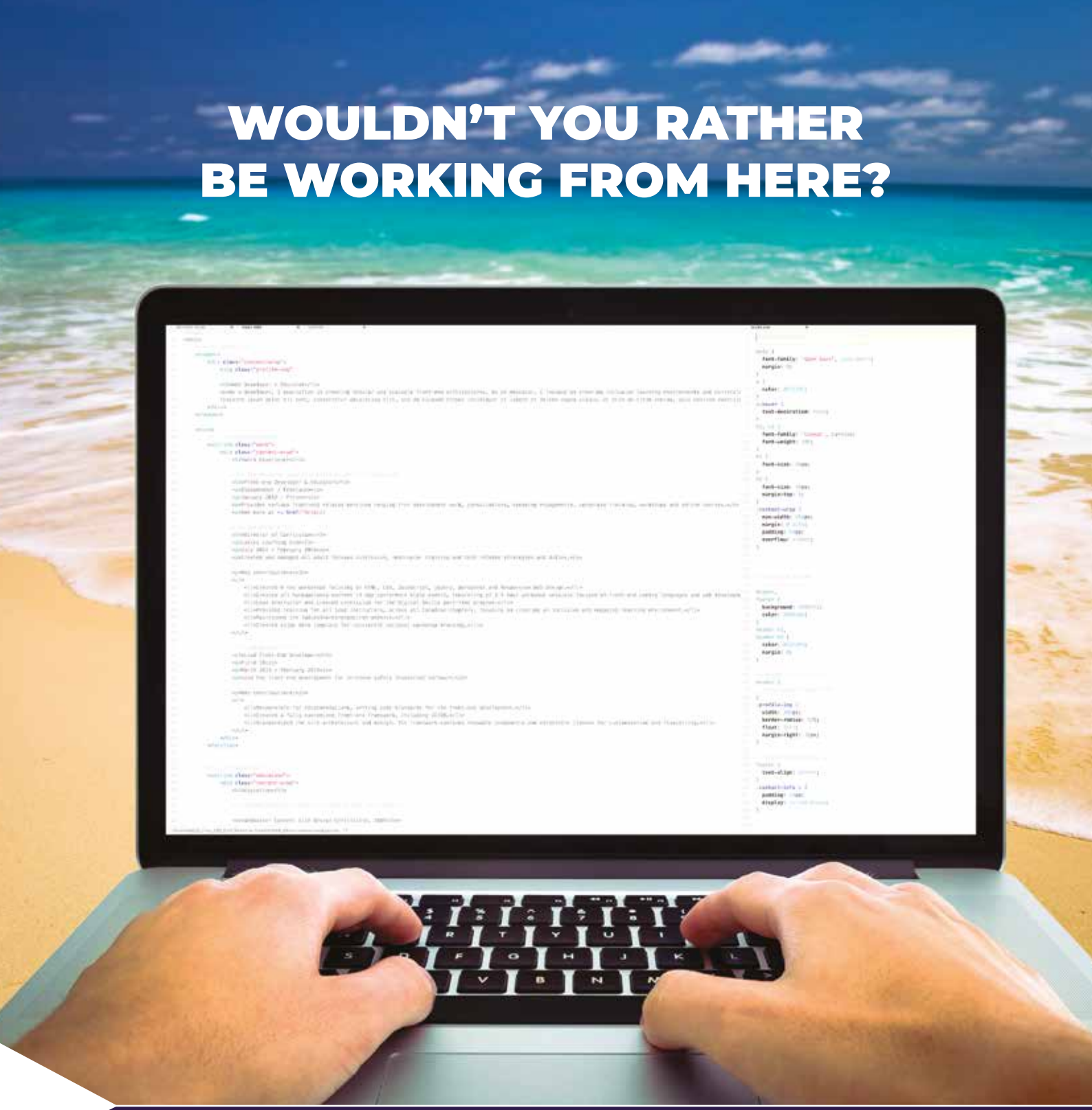

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Quo vadis, Swiss-European Union relations?

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Switzerland and the European Union have a close and unique relationship, but it is a relationship that hangs in the balance after the Swiss government decided on 26 May to abandon negotiations on a so-called institutional framework agreement (InstA) with the EU. What is the agreement, why did the Swiss reject it, and where do relations go from here?

What is the institutional framework agreement?

In 1992, Swiss voters rejected European Economic Area membership. Subsequently, Switzerland and the EU created a tight web of over 120 bilateral treaties that allow for close cooperation on issues as diverse as market access, research cooperation and free movement.

While close, Swiss-EU bilateral relations are therefore complicated, not least because the multiple treaties need to be updated continuously as EU law evolves. To put the relationship on a more institutionalised footing, Switzerland and the EU in 2014 started negotiations on a broader institutional framework agreement.

The institutional framework agreement's goals were in particular to allow for easier updating of the bilateral market-access agreements and to provide a dispute settlement mechanism for any conflicts over the application and interpretation of the bilateral agreements.

The objective of the institutional framework agreement was thus to consolidate and further develop the bilateral path taken by Swiss-EU relations.

Why did the Swiss side abandon the agreement?

The InstA has been contested in Swiss politics since the start of negotiations but became more politicised in 2019, when the Swiss government launched a domestic consultation on the text of the framework agreement negotiated with the EU (and which the EU at that time considered a finalised agreement).

In those consultations, three issues of contention emerged: guaranteed protection for Switzerland's traditionally high wages, state aid rules which created problems for the Swiss cantons, and the question of whether to accept the EU citizens' rights directive (2004/38/EC) and give EU immigrants access to Swiss welfare.

After further negotiations to try and resolve these issues, the Swiss government decided at the end of May that these they could not be resolved and abandoned negotiations altogether.

Critics of this decision have pointed out that these three issues weren't insurmountable. But what made them politically problematic was that they split up the traditional pro-EU alliance in Switzerland. While the left has traditionally supported closer relations with the EU, the wage protection issue alienated trade unions who adamantly opposed the framework agreement.

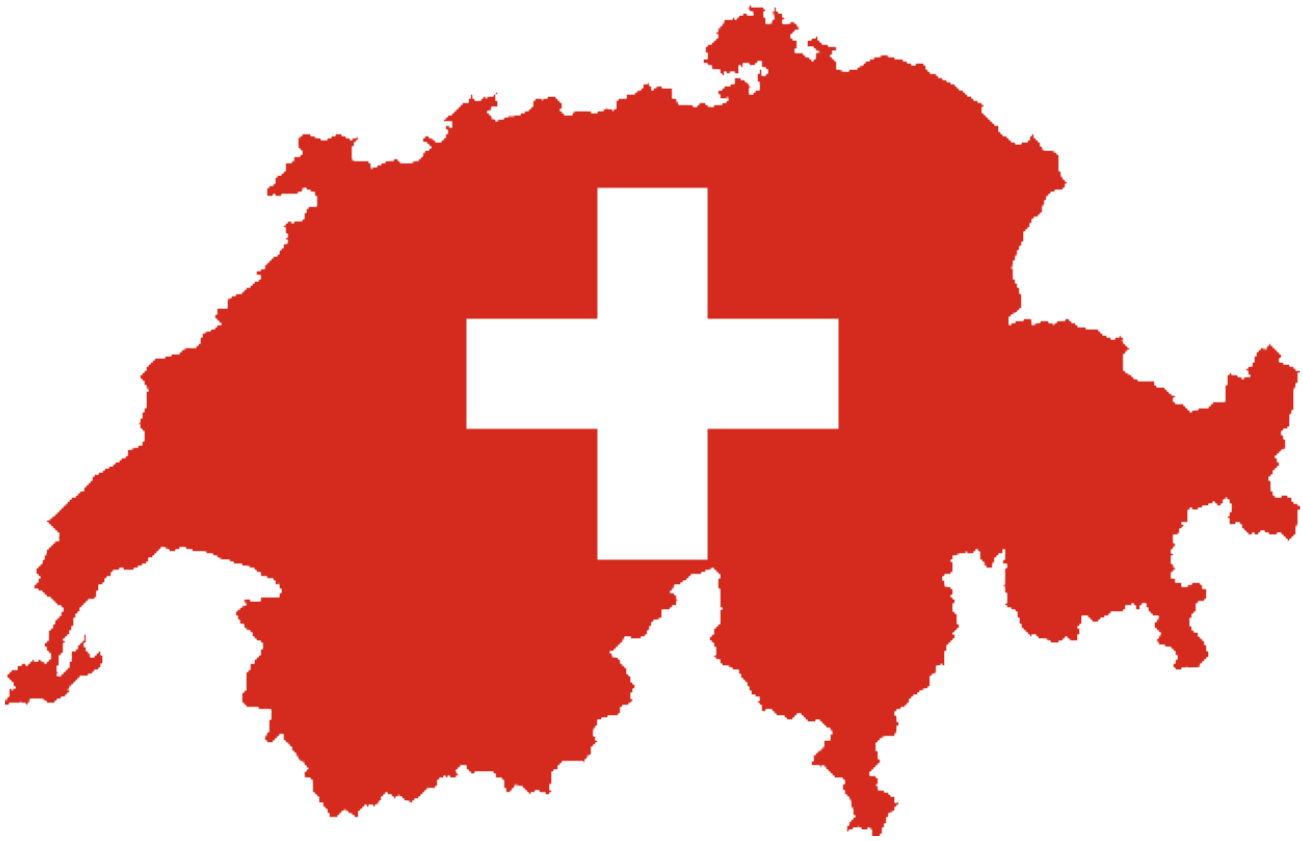
This new opposition emerged next to the staunch, longstanding resistance from the right who fundamentally opposed the InstA from the start (especially any role for the ECJ in the dispute settlement mechanism) as well as growing criticism from business, who have traditionally supported bilateral cooperation with the EU.

Although public opinion polls have repeatedly shown a majority of voters support the InstA, the widespread criticism from both left and right made it increasingly difficult for the government to win a referendum on the framework agreement.

However, the fundamental reasons for the failure of the InstA negotiations go deeper. They are rooted in a strong Swiss unease about giving up sovereignty in a direct democracy in which voters are used to being given the final decision on issues as diverse as tax reform and the dehorning of cows, as much as on international treaties.

They are also rooted in a strong preference for bilateral relations to remain as they are today. Support for the bilateral treaties is exceptionally strong in Switzerland.

In a survey[1] from February 2021, two thirds of respondents said that the bilateral treaties were very or somewhat positive, compared with only 16% who viewed them somewhat or very



negatively. For many Swiss, the status quo is the ideal scenario for Swiss-EU relations.

Where are Swiss-EU relations headed?

Against this backdrop, it is not surprising that the Swiss government wants to consolidate and expand existing relations on a bilateral, case-by-case basis.

The government's immediate strategy consists of three elements: first, it will try to convince the Swiss parliament to approve the payment of the 'cohesion billion', money intended for cohesion measures in central Europe that was put on hold in 2019 when the EU declined to grant the stock market equivalence.

Second, it will go over all areas covered by the bilateral treaties to unilaterally update and align domestic legislation with EU standards where no domestic opposition exists. Third, it plans to 'engage in a political dialogue with the EU'.

Whether these measures will safeguard the status quo is uncertain. The EU has said that it is unwilling to update any existing agreements or conclude new ones until a framework agreement is in place. For Switzerland this is problematic because the status quo can only be maintained if both parties pursue this path.

If the EU follows through on its threat of refusing to update existing agreements, then the status quo of bilateral relations will slowly erode. In the short to medium term this means new certification hurdles for the medtech and machinery industries, reduced electricity security and a relegation of Swiss researchers to third-country status in Horizon Europe. In the long run, Swiss-EU cooperation could fall far below current levels.

While proponents of the InstA in Switzerland warn against this scenario, the dominant view among Eurosceptics, and it seems the government, is that this is an empty threat[2]. President Guy Parmelin argued in a newspaper interview[3] that *"the EU would damage itself by torpedoing trade relations with one of its most important trading partners."*

Many believe that the EU is bluffing because it benefits equally from close relations with Switzerland. Commenting on the government's decision, Daniel Lampart, chief economist of the Swiss trade union federation claimed 'the EU Commission would be stupid' to put good and regulated economic relations with Switzerland at risk.

InstA sceptics also point to the 1992 experience, where despite concerns of a deterioration of Swiss-EU relations, the rejection of EEA membership ultimately resulted in a favourable and tailor-made agreement with Switzerland. Thus, there is a widespread expectation Switzerland will be able to continue on its bilateral path with the EU.

Meanwhile, the government's decision has led to considerable domestic debate. Swiss-EU relations has turned into a cross-cutting cleavage with several key parties, most notably the liberal democrats and the social democrats, torn between a Europhile and a Eurosceptic camp.

Unsurprisingly, reactions have varied widely: views are divided on whether Switzerland should pay into EU Cohesion Funds, on the extent to which a substantial updating of domestic

"It will take a few months for the dust to settle and for the contours of the new Swiss-EU politics to emerge"

legislation is possible and on the merits of a new political dialogue.

More generally, there has been a range of proposals of where to go from here[4]. Some argue that the decision to abandon negotiations was not the governments but parliament's prerogative[5].

Indeed, a motion is pending in parliament urging the government to continue negotiations (the government acted before the motion could be voted on). But it is unclear whether the government's decision could and would be overturned by parliament. Others have proposed collecting signatures for a popular initiative[6] that would force the government to reengage with the EU.

Some have gone further, arguing that Switzerland now needs a fundamental discussion about its relationship with the EU, including EU accession (an option that is deeply unpopular among Swiss voters) or EEA membership. On the conservative side of the political spectrum, there is a push for domestic reforms and more deregulation to offset the loss of EU market access with a more competitive Swiss business environment.

What future Swiss-EU relations will look like will depend both on the EU's response and on domestic developments. A non-accommodating EU response may highlight the risks associated with an erosion of the bilateral treaties, but it may also harden feelings towards an EU that is already seen much more negatively in Switzerland than in EU countries.

Domestically, new alliances may form, and the two main parties that are not represented in Switzerland's consensus government, the Greens and the pro-EU Green Liberals, may benefit politically. But the move could also strengthen Eurosceptics, most notably the Swiss People's Party. It will take a few months for the dust to settle and for the contours of the new Swiss-EU politics to emerge. ■

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Guy Parmelin, on the left, and Ursula von der Leyen

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A connectivity game changer

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An overview of the BBIN sub-region

The BBIN sub-region, comprising Bangladesh, Bhutan, India, and Nepal, is home to nearly 1.6 billion people with a combined gross domestic product (GDP) of US$3.5 trillion. India and Bangladesh are the two largest economies, while Bhutan and Nepal are land-locked and are mostly dependent on India's road, rail and waterways for their third country exports and imports.

Additionally, India enjoys a trade surplus with the rest of the countries in the BBIN sub-region, including Bangladesh. These countries are dependent on India for supply of food grains and various essential agricultural products, among others.

Intra-regional trade in the BBIN sub-region

It is argued that the volume of intra-regional trade among countries in South Asia is less than its potential owing to a number of infrastructural and trade facilitation challenges.

Total goods trade within South Asia could be worth $67 billion rather than the actual trade of only $23 billion[1]. The BBIN sub-region, which a part of South Asia, is no exception. Presently, the intra-regional trade among countries in the BBIN sub-region stands at merely four percent (Table 1).

A comparative analysis of countries in the BBIN sub-region in terms of their Logistics Performance Indicators (Figure 1) and their Ease of Doing Business Rankings (Figure 2) underlines significant inter-country differences. Figure 1 reveals that other than India, countries in the BBIN sub-region are below the global average.

Similarly, Figure 2 highlights the need for harmonising procedures for trading across borders so as to reduce the time and cost of doing trade, especially for Bangladesh. These are the reasons why it is often argued that it is about 15-20 percent less expensive for a company in India to trade with a company in Brazil or Germany than with a company in Bangladesh[2].

Efforts to facilitate seamless cargo movement: the BBIN MVA

Trade in the BBIN sub-region is heavily skewed toward roadways[3]. Such a skewed modal mix could be attributed to several factors[4]. Some of them are as follows:

- roadways provide seamless first and last mile connectivity
- greater predictability in the delivery of consignments
- artificially low trucking price

Table 1. Intra-regional trade among countries in the BBIN sub-region (values in million US$)

Countries	Bangladesh	Bhutan	India	Nepal	Export RoW	Total Exports
Bangladesh		83.97	1,264.74	45.17	45,531.41	46,925.29
Bhutan	8.61		324.74	9.54	576.00	918.89
India	8,200.75	777.70		6,276.11	313,361.04	328,615.59
Nepal	11.64	1.93	633.90		922.28	1,569.75
Import RoW	57,566.22	952.00	474,709.28	10,215.08		378,029.52
Total Imports	**65,787.23**	**1,815.59**	**476,932.66**	**16,545.90**		**561,081.38**

Notes: 1) Rows represent Exports and Columns represent Imports. 2) Data on Exports and Imports taken from trade data published by Governments of Nepal, Bhutan and India. 3) Methodology adopted from UNESCAP (https://artnet.unescap.org/APTIAD/Trade%20Share.pdf). 4) RoW = Rest of the World
Source: CUTS's calculations

To facilitate seamless cargo movement and avoid transhipment at the borders, countries in the BBIN sub-region came together and signed a Motor Vehicles Agreement (a Framework Agreement) in June 15, 2015. While owing to domestic reasons, Bhutan decided to remain an observer to the BBIN MVA, the other three countries have decided to go ahead and implement it.

Meanwhile, commendable progress is happening on the Inland Waterways and Railways front. There is an increased momentum in the BBIN sub-region to establish multimodal connectivity through various transportation and digital connectivity initiatives.

Multilateral development organisations such as the Asian Development Bank (ADB), the World Bank, United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), and bilateral agencies such as Japan International Cooperation Agency (JICA) are assisting these countries by providing broader frameworks in developing multi-modal connectivity.

Prospects of multi-modal connectivity in the BBIN sub-region

A study by the Organisation for Economic Cooperation and Development (OECD) has found that a 10 percent improvement in transport and trade-related infrastructure quality can increase agricultural exports of developing countries by 30 percent[5].

Therefore, efficient transport and logistics networks would be critical for promoting trade globally and among countries in the BBIN sub-region. This is even more important for geographically challenged landlocked countries like Bhutan and Nepal which are dependent on India for their third country exports/imports.

Given the excessive dependence on roadways for doing cross border and its various challenges like congestion, multi-modal connectivity is an imperative to reduce the pressure on roadways and promoting other modes of transportation

Trial run under BBIN MVA in 2016

"With the coordinated efforts from governments, private players and civil society organisations [...], an efficient multi-modal transport connectivity network could be created in the BBIIN sub-region"

to facilitate increased freight movement and a reduction in freight cost, either through reduction in travel time and/or through reduction in cost per tonnage, or both.

Reduced cost of transporting and transit time would make the products from the sub-region competitive in the global market. It would also help in attracting global investment to the sub-region for creation of more economical and business friendly logistics system.

Adoption of multi-modal connectivity in the sub-region supported by digitisation and automation will upgrade the logistics performance of the sub-region.

Setting up multi-modal transport networks would also play a catalytic role in industrial development in the BBIN sub-region by better integrating the industrial clusters in the BBIN sub-region[6].

Enhanced connectivity would be beneficial for sectors like fast moving consumer goods, textiles and clothing. Local farmers and women entrepreneurs in the small and medium category would be directly and indirectly benefitted from the seamless connectivity by getting access to distant markets.

Multi-modal transport connectivity would also help in decarbonising the supply chain by efficiently integrating environment friendly transport modes like inland waterways in the chain. For example, better integration of the river systems in India and Bangladesh could facilitate a modal shift of select bulk and break bulk cargo from roadways to waterways.

On-going initiatives and projects in the pipeline

Realising the potential of multi-modal connectivity, countries in the BBIN sub-region are now focusing on initiatives such as building multi-modal terminals, logistics parks, enhancing bilateral railway and water connectivity, building dedicated freight corridors, digitisation of trade initiatives, and adopting real-time electronic cargo tracking system.

Following are some major initiatives to promote multi-modal connectivity in the BBIN sub-region:

Roadways

- Construction of a bridge on river Padma in Bangladesh
- Construction of a dry ports at Pasakha and Phuentsholing,

Multi-modal terminal under construction in Haldia, India

Figure 1. Comparative analysis of countries in the BBIN sub-region vis-à-vis global average based on their logistics performance indicator

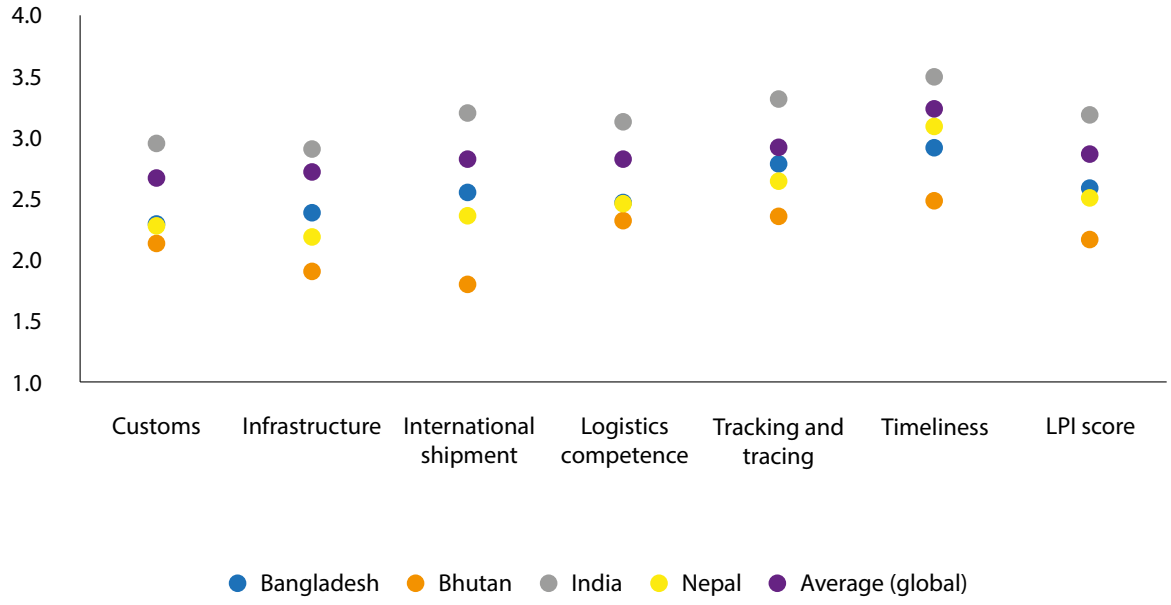
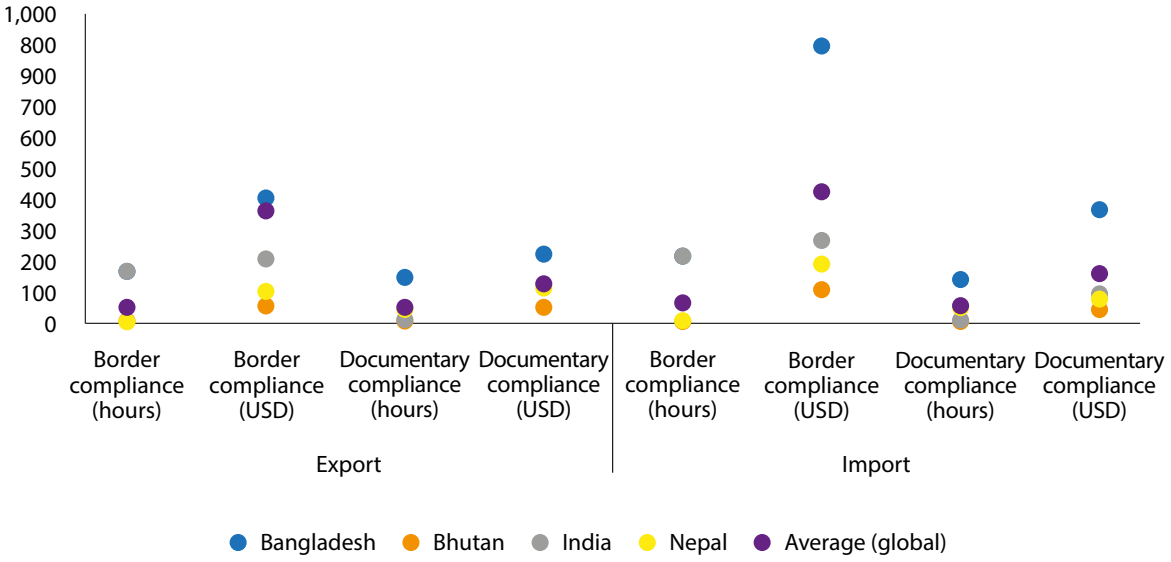


Figure 2. Comparative analysis of countries in the BBIN sub-region vis-à-vis global average based on Ease of Doing Business rankings - trading across borders



Bhutan
- Upgrading of four important trade routes between India and Nepal to six-lane highways

Railways
- Augmenting of the Jamuna Setu in Bangladesh with a dual gauge, double track railway line
- Bhutan and India are fast-tracking a railway link between Mujnai in West Bengal and Nyoenpaling in Bhutan[7]
- Construction of railway line connecting Haldibari (India) – Chilahati (Bangladesh)and Akhaura (Bangladeshy) – Agartala (India)
- Construction of the Mongla – Khulna Rail Project in Bangladesh
- Construction of railway line connecting Raxaul, India with Kathmandu, Nepal[8]

Inland waterways
- Renewal of the PIWTT between India and Bangladesh and inclusion of five new Port of Call
- Construction of Multi-Modal Logistics Park at Jogighopa, Varanasi, and Sahibganj in India
- Facilitating water transportation in the Karnali, Narayani, Kaligandaki and Koshi Rivers to improve Nepal's connectivity via inland waterways

Coastal shipping
- Construction of a deep-sea port at Matabari, Bangladesh
- Discussion on including additional Port of Call in the Coastal Shipping Agreement between India and Bangladesh

Challenges and how to address them

The establishment of seamless connectivity comes with a set of practical challenges as well. Addressing challenges with the right solutions are important for establishing seamless multi-modal connectivity in the sub-region.

Skewed modal mix which suits the requirement of small exporters/importers and problem of cargo aggregation

Transporting cargo via modes like inland waterways and railways becomes economically feasible only if the size of the cargo is substantial. For example, it is cheaper to transport 2,000 tons of a cargo via inland waterways vis-à-vis roadways, but it is cheaper to transport 50 tons of the same cargo via roadways vis-à-vis inland waterways.

Majority of the exporters/importers who avail roadways are small exporters/importers usually trading in 100-150 tons. To encourage them to avail alternative modes would require aggregators of the cargo.

While the logistics service providers and/or the freight forwarding agents could very well play this role, however, it is essential to make necessary amendments in the customs procedures to allow sending multiple consignments in a single voyage.

Predictability in delivery of consignments

Other than time and cost of cargo transportation, Predictability is a major factor influencing an exporter/importer's choice of mode. For example, in a survey undertaken by CUTS, majority of the exporters/importers opined that even though trucks face a detention of 10-18 days at the Petrapole-Benapole border, between India and Bangladesh, the exporters/imports are confident that the cargo will be delivered to the exporter's/importer's warehouse within 25 days.

In the case of inland waterways such predictability is missing. This is because the barges that ply between India and Bangladesh depend on tidal forces. On top of it, there are issues with night navigation, and availability of depth in select stretches. Together these factors make transportation by inland waterways unpredictable.

In the case of railways, factors like availability of rakes, availability of line clearance etc. has been considered to be a major challenge which motivates traders to stick to roadways, even though railways and inland waterways offer cheaper modes of transportation.

Therefore, there is a need to identify and address the factors affecting predictability in cargo transportation to encourage more and more players to avail railways and inland waterways as their preferred transportation.

To this end, there is a need for the respective national governments to undertake more pilot movements and gradually start scheduled services to make cargo movement among countries in the BBIN sub-region more predictable.

Promoting off-border clearance and operationalising the use of Electronic Cargo System

Cross border trade among countries in the BBIN sub-region requires a number of at-the-border procedures like physical checking of the consignments by customs officials and national security agencies, checking whether all duty payments etc. has been done for the consignment etc.

This leads to congestion at the border crossings. For example, while on an average, 2,000 trucks arrive at the Petrapole border in India, not more than 400 trucks could enter the Bangladesh side.

Such delays could be avoided by facilitating off-border clearance at the Inland Container Depots, where all necessary customs and security checks could be undertaken and the trucks are allowed to move to the border points.

Additionally, use of smart technologies like Electronic Cargo Tracking System and RFID seals could be used to address the concerns of national governments and customs officials pertaining to trucks going off track or violating cross-border movement rights.

It is important to note here that majority of the trucks plying within countries in the BBIN sub-region are open body trucks and use of ETS and RFID seal could be challenging.

In this regard, it is an imperative that each of the national governments undertake coordinated steps to convert open trucks to closed trucks by introducing appropriate fiscal

incentives for the truck owners, transporters, and logistics service providers.

Coordination among multiple stakeholders

In a multi-modal transport system, a shipment is handled by more than one stakeholder/company, that too across multiple countries in case of cross border trade.

In such a scenario, it is imperative that all the agencies work in tandem to ensure timely delivery of a consignment. Furthermore, it needs to be determined who would be liable for damage or any delay in delivering cargo.

Therefore, it is essential that countries in the BBIN sub-region come together and put in place a regional multi-modal logistics policy. This policy should aim at uniformity in freight rates, standardization of procedures to avoid delays at the border, and gradual replacement of transhipment with transit arrangements in alignment with the provisions of the BBIN MVA.

Livelihood concerns

It has been argued earlier that facilitating greater multi-modal connectivity would entail re-balancing the existing modal mix. While such re-balancing would create new livelihood opportunities, it would also make some of the earlier jobs redundant.

Addressing all the stakeholder concerns and providing alternative livelihood options for people who lose their livelihood is an imperative for creating a political economy consensus to facilitate multi-modal connectivity.

Therefore, there is the need for an in-depth study to better understand the kind of adjustments likely to happen in the logistics sector and the type of jobs that are likely to be created for a comprehensive understanding of job-specific skill requirements and strategies to address the skill gaps. Such interventions should consider options for imparting training to the people displaced by redistribution of modal shares.

Conclusions

While transporting cargo via roadways have its advantages, however, poor road conditions and traffic congestion, cause delays in freight transportation attribute to much of the delays in Cross Border Trade within the BBIN sub-region[9].

Additionally, there are issues pertaining to exchange of transit rights, which leads to transhipment at the borders (barring trade between India and Nepal) mandatory thereby causing additional delays.

Since progress with regard to operationalisation of the BBIN MVA is turning out to be a slow-going process, multi-modal connectivity could be one of the more viable solutions that could facilitate seamless cargo movement within the BBIN sub-region.

However, facilitating multi-modal connectivity among countries in the BBIN sub-region requires addressing a number of infrastructural, procedural, and socio-economic challenges. Addressing these challenges would require undertaking co-ordinated and well targeted interventions.

With the coordinated efforts from governments, private players and civil society organisations, taking into account concerns of all the stakeholders involved, an efficient multi-modal transport connectivity network could be created in the BBIIN sub-region. There is no doubt that this will be a game changer in the sub-region's achievement of sustainable growth and prosperity. ■

Endnotes

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4. https://niti.gov.in/writereaddata/files/document_publication/Freight_report.pdf

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6. Industrial corridors such as the Amritsar-Delhi-Kolkata Industrial Corridor, and the Eastern Dedicated Freight Corridor in India; industrial estate in Pasakha, Bhutan; the fast-developing regions in North and North West Bangladesh; and industrial parks in Nepal; would be benefitted from the multi-modal transport network.

7. Feasibility studies for up to five rail links between Bhutan and India are being conducted. This includes a 57km line from Kokhrajhar (Assam) to Gelephu (Bhutan), a 51.15km line from Pathsala (Assam) to Nanglam (Bhutan), a 48km line from Rangiya (Assam) to Samdrupjongkjar (Bhutan), a 23km line between West Bengal's Banarhat to Samtse in Bhutan, and a 17.52km line between Hasimara in West Bengal to Phuentsholing in Bhutan.

8. Pathalaiya–Birgunj (Nepal)–Raxaul (India) Road; Dharan–Biratnagar (Nepal)–Jogbani (India) Road; Belhiya (Nepal)–Sunauli (India) to Bhairahawa–Butawal Road; and Suryabinayak–Dhulikhel Road.

9. https://cuts-citee.org/pdf/Report-Connecting_Corridors_beyond_Borders.pdf

The Dutch elections and 'populism'

Dr Fleur de Beaufort is Researcher and Dr Patrick van Schie is Director of the Dutch liberal think tank TeldersFoundation.

The background to the elections in the Netherlands

In March 2021 the scheduled elections were held for the Second Chamber, which is the more important of the two chambers comprising the Dutch parliament. As many as 37 parties sought a seat in the new Second Chamber. The elections were remarkable for various reasons and the run-up to them proceeded more messily than ever before.

On the left, where three political parties – the Partij van de Arbeid [Labour Party] (PvdA), GroenLinks [Green-Left Party], and the Socialistische Partij [Socialist Party] have been talking in vain about combining their forces for many years now, they again beat about the bush as is customary in relation to the contentious issue of 'greater cooperation'. On the right, conflicts ensued in the weeks preceding the elections, which resulted in splits and the birth of new competitors.

In the meantime, the existing government coalition of four centre-right and centre-left parties (the third cabinet of Prime Minister Mark Rutte) fell on 15 January in the wake of a social allowance affair which saw the Tax and Customs Administration office wrongly accuse and prosecute the recipients of childcare allowances as frauds over a lengthy period of time.

The fall of the Rutte III government was accompanied by the demise of the odd key political player and the social democrats were urgently compelled to seek a new leading candidate (because their current one had been responsible in his capacity as a minister in the previous government), while others explicitly secured the ongoing support of their rank and file, and remained.

Even the Christian democrats changed their leading candidate during the contest due to circumstances. At the outset the media sought to elicit statements from the leading candidates as to their potential coalition partners – and apparently more interestingly – their exclusion of specific parties.

In particular, this had already been the fate of the explicit right-wing flank on more than one occasion, while extreme left-wing viewpoints invariably went unchallenged.

At a more practical level, the elections also proceeded differently from what was customary. As a result of the coronavirus crisis, it had been decided to stagger the elections over three days to ensure that the polling stations would not be excessively busy.

In addition, those voters who were older than 70 years of age had the option of casting a postal vote. Nevertheless, many failed to observe the procedure properly, with the result that even then their vote was declared invalid.

It was reported that some 65,000 votes (of the total of 10,462,677 ballots cast) were not counted for the purposes of the final outcome. In spite of what were extraordinary circumstances, the turnout of 78.7% could be termed 'average' by Dutch standards.

The results interpreted

What is of course more interesting is to examine a number of striking aspects of the election results. First of all, 17 parties managed to obtain a sufficient number of votes to secure a seat in the Second Chamber, which comprises a total of 150 seats.

This meant that a post-war record was achieved in terms of the number of parties represented. This large number is partly due to the fact that the Netherlands has one of the purest systems of proportional representation in the world with merely one seat in the Lower House (representing 0.67% of the votes cast) serving as an electoral threshold[1]. As such, it is relatively simple for a new party to gain access to the Second Chamber.

Partly as a result of this, the trend toward so-called single-issue parties gaining access to parliament is persisting. In 2006 the Netherlands was the first European country in which a political party focusing on animal welfare managed to secure a seat in parliament (Partij voor de Dieren).

Since then parties which specifically focus on the elderly (50PLUS)[2], rural interests (BoerBurgerBeweging), the promotion of a federal Europe (VOLT), and anti-discrimination (BIJ1) have come to be represented in the Second Chamber. In a number of cases newcomers are actually breakaways from existing parties, such as JA21, whose founders turned their backs on their existing party, Forum voor Democratie [Forum for Democracy], following internal division.

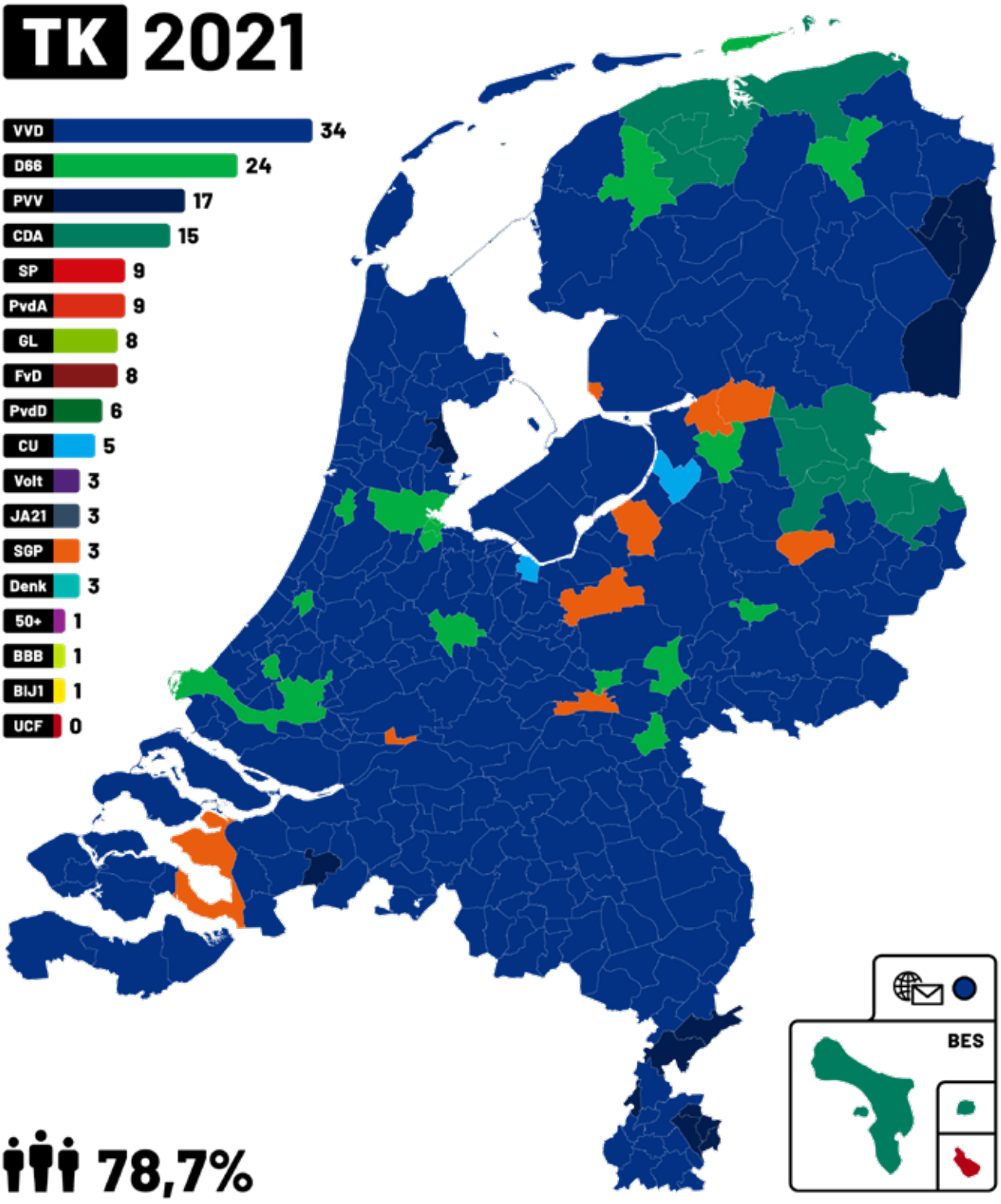
The 'traditional' major currents of social and Christian democracy have been exhibiting a decline in their number of seats for years now, a trend which is also occurring at the international level[3]. Between 1956 and 1998 the social

democrats (PvdA) usually won in excess of 40 seats, with peaks of more than 50 and the odd decline to 37 seats.

In the last two elections they have failed to win more than nine seats. In the case of the Christian democrats (the CDA [Christian Democratic Party]), which always achieved an absolute majority between 1922 and 1967, the decline initially began somewhat earlier with a provisional trough of 29 seats in 1998.

A brief revival featuring scores in excess of 40 seats was followed by a drop to a low point of 13 seats in 2012, and the party failed to advance further than 15 seats in 2021. A survey of voters has also revealed that these traditional parties have to contend with supporters who are ageing the most[4].

What is also remarkable is that the left has also failed to emerge as the largest presence in any single Dutch municipality. Even the last left-wing bastions, such as north-east Groningen (in



the extreme north-east of the Netherlands) changed their colour to dark blue (VVD) [People's Party for Freedom and Democracy] or light green (D66 [Democrats 66] in 2021.

The Christian democrats, which were still in the majority in most municipalities in 2002, managed to retain their relative majority in several rural municipalities, especially in north-east Friesland and the Twente region (in the north and east of the country respectively), although they were forced to acknowledge the VVD as their superior in other municipalities. The original social and Christian democrat predominance in the large cities and the north and the Catholic south respectively has dissipated in its entirety.

This is because the parties designated liberal (the VVD and D66) together obtained more than 58 seats, although the question remains as to whether this may really be celebrated as a genuine victory of liberalism. The victory of the right-wing liberal VVD is predominantly due to the persistent popularity of Prime Minister Mark Rutte as a crisis manager.

As such, the party largely centred its campaign on the person of Rutte in the absence of any explicit liberal message. In addition, Rutte headed a government which has pursued a policy that was hardly liberal in that it imposed strict restrictions on liberty during the coronavirus pandemic.

Moreover, the fall of the government in January this year seems to have failed to yield any grounds for a reduction of Rutte's popularity. While it is true that D66 is usually viewed as liberal in international terms, and profiles itself using the vague adjective, 'progressive', it has adopted few liberal positions.

For instance, this party took the initiative to introduce legislation on organ donation which conflicts with the constitutional right to the inviolability of the individual's own body, and it opts for more state intervention with persistent frequency.

In addition, during the last elections most voters turned their backs on the traditional left in favour of D66 as a 'left-wing alternative'. This too occasions doubt about the concept of a 'liberal victory'.

More to the left the traditional left-wing parties together failed to advance further than 26 seats. If one adds the minor, left-wing, single-issue parties of PvdD, VOLT and BIJ1, the left has failed to advance further than 36 seats.

As such, the left wing in the Dutch parliament is smaller than ever, not even managing a quarter of all of the seats. This outcome is even more striking in view of the allegedly 'neo-liberal' yoke that is frequently cited and under which the country is said to be suffering.

It is precisely on the right that a collection of parties is growing – the Partij voor de Vrijheid [Freedom Party] (PVV), Forum voor Democratie (FvD)[5], JA21, Staatkundig Gereformeerde Partij [Reformed Political Party] (SGP) – which is good for 31 seats and, as such, is larger than the traditional left.

"... there is a good chance that a Rutte IV government will emerge, because it is impossible to form a stable government without the VVD"

Most of these parties are tagged as 'populist', a description which is then eagerly applied in the foreign media. However, this is misleading in many respects.

'Populism' on the explicit right?

In order to ascertain whether there is any question of 'populism' amongst these parties, one first needs to determine what it entails. This is not the place to proceed with a discussion of the matter, although the aspects which are attributed to it and are frequently cited are (a) playing up to dissatisfied voters, (b) presenting matters as though such dissatisfied voters comprise the real people whom the 'elite' no longer serves but cheats, (c) a strong leader (or this is how the party leader is at any rate presented) who would do everything differently if they were to seize power, and (d) an appeal to and/or ties with a body of thought sourced from a 'brown' or 'black' past.

The first three aspects are mainly sourced from the relevant academic literature[6], while the fourth aspect is frequently cited in left-wing circles in order to align them with a questionable tendency. In this respect we would merely like to note that the first two aspects almost always apply in the case of new political movements or parties.

All of the established parties or their predecessors once started out from dissatisfaction (whether justified or not) with matters which the dominant political regime neglected or mismanaged in the eyes of the newcomers.

In this sense the social and Christian democrats, the parties which are now on the wane, were the 'populists' of their time more than a century ago, even though they developed an ideology based on their dissatisfaction.

If we examine the above-mentioned parties on the right in the Netherlands in the light of these criteria, one must immediately treat the SGP as an exception. Established in 1918, the SGP is now the oldest political party in the Netherlands. While it is true that the three traditional tendencies of liberalism, and Christian and social democracy are older, the parties that currently espouse them are younger.

The SGP is a typically Dutch party: extremely orthodox Calvinistic, anti-papal for many decades, and formerly more inclined to testify as preachers from the pulpit than as politicians operating in the political arena. Its support base is one of the most stable in the Netherlands, consistently amounting to more than 2% of the voters.

It also espouses a highly distinctive ideology sourced from a strict, Calvinistic interpretation of the bible coupled with a


Mark Rutte

distrust of state intervention in the socio-economic field. In parliament the SGP has started to operate 'more politically', albeit constructively.

The party is probably the only one that has never been represented in a government but which does not in itself serve as opposition and is disposed to accommodating governments, albeit critically.

Still always representing more than 10% of the electorate, Geert Wilders' PVV is the largest party on the explicit right and the one which is always categorised as 'populistic and right-wing' in the foreign media. This party has been quite simply set up around a single leader.

More importantly, voters cannot become a member of the party, as Wilders is its sole member[7]. More so than in any other party, Wilders also personally helps to select all of his fellow parliamentary members. This desire for control has its origins in the fear of the conflicts with which new parties are almost always afflicted.

Wilders is relatively flexible in relation to various issues and his party appears to listen to a potential support base comprising socially and economically disadvantaged or neglected voters. Yet Wilders is uncompromising when it comes to his primary concern.

He views Islam as an ideology that is hostile to Dutch values and would therefore like to reduce the number of highly religious Muslims. It is this essential aspect of his beliefs which causes many of his opponents to brand him as discriminatory or even 'racist'.

The question as to whether this description is justified is closely associated with one's own assessment of Islam and the presence of large groups of Muslims in Western European countries. Wilders is vehement and explicit, something which Muslims sometimes perceive to be provocative and insulting.

His links to extreme right-wing parties and his admiration for 'strong leaders', such as Orban and Putin, cause one to consider the fourth of the above-mentioned criteria.

However, Wilders definitely distinguishes himself from traditionally extreme right-wing parties in two respects. Firstly, he is not anti-Semitic and is even explicitly pro-Israel. Secondly, his argument contends that Islam constitutes a threat to traditional Dutch freedom, in respect of which he explicitly refers to the rights of women and homosexuals. Traditionally, the extreme right, has little sympathy for these two groups.

For approximately five years there has been a newcomer on the right-wing flank, namely, Forum voor Democratie (FvD) and its leader, Thierry Baudet. Its original agenda was twofold. The other parties were characterised as 'cartel democracy' and the remedy was supposed to be more direct democracy.

This component of its agenda is very similar to what D66, a party that is viewed as an eminent example of anti-populist sentiment, brought with it when it entered the Dutch political arena 55 years ago. The second component of its agenda lies in FvD's view that European integration has gone too far, with the result that the nation state has come to be under threat.

In this case too direct democracy is the remedy that is offered. The voters must be able to express their views on EU matters through referendums, including the question as to whether the Netherlands should remain a member of the EU.

A third issue which FvD has used to profile itself emerged at a later stage: opposition to climate targets and, closely associated with this, to sensitive matters, such as the erection of increasingly more wind turbines in the countryside and policy to reduce those farming activities which are deemed to be polluting.

Whatever conclusions one wishes to draw in this respect, they are legitimate positions and in them the party is expressing concerns which are clearly shared within the Dutch electorate.

The fact that there was a breeding ground for a party which expressed such concerns is also an indication that the 'established parties' devoted insufficient attention to them in the eyes of part of the electorate at any rate and that the Netherlands' open system of democracy – featuring pure proportional representation – offers scope for the representation of voters who are 'not heard'.

However, FvD is frequently portrayed unfavourably in the news because of three factors and the party has already had to contend with a major breakaway on three occasions in its brief history. The person of its leader, Thierry Baudet, is the first factor.

He does not tolerate opposition, which nevertheless occurs more often in politics, and he does not have the wherewithal to secure the loyalty of fellow party members who do not admire him uncritically. The situation is more difficult, because Baudet is somewhat capricious.

Related to this – the second factor – is that racist statements regularly occur within the party and Baudet does not distance himself from them. More to the point, on more than one occasion he has also made statements which suggest a belief in a superior white race, provided that its conduct is deemed to be 'masculine'.

A third factor lies in his undisguised admiration for Putin and his tendency to deny or condone aggressive Russian behaviour. The most distressing within the Dutch context is that Baudet constantly raises doubts as to whether Flight MH-17, an aircraft with mainly Dutch passengers which was shot down above eastern Ukraine in the summer of 2014 was indeed brought down by pro-Russian rebels.

Baudet is sympathetic to Russian propaganda which ascribes this crime to Ukraine. According to leaked internal electronic messages, this position is (also?) linked to Russian funding of FvD. For a party that claims to support the national interests, it is remarkable that it is so casual in its dealings with the interests of the survivors of the almost 200 deceased Dutch citizens who were on board Flight MH-17.

Aversion to the first two of the above-mentioned factors led to a breakaway from FvD to establish JA21 several months before the Lower House elections in March 2021. This party claims that it wishes to highlight FvD's original agenda without making any wild statements and to do so in a way in which it hopes to exert influence on its policy.

This newcomer relies on a 'conservative, liberal' body of thought. It explicitly claims that it wishes to provide a home for those voters who are of the opinion that the liberal right-wing VVD and the Christian democratic CDA are inclined too much to the left.

It awaits to be seen to what extent this party, many of whose members were also a member of FvD until recently, is able to live up to this claim. Nevertheless, within a brief period of time it has managed to convince enough voters, most of whom have come from the VVD and CDA rather than FvD and the PVV, to enter the Lower House with three seats.

According to some polls, it already commanded double the number of seats two months after the elections. It says a great deal that other parties have not precluded this party at the outset. As such and in so far as it is already possible to say this now, JA21 is a potentially non-populist outlet for dissatisfied voters on the right. Time will tell whether this party will be able to live up to this.

Towards a new government

Three months after the elections a new government is still a far-off prospect. This is not unusual in the Netherlands. The formation of a new government can take a long time, because increasingly more parties are required for this purpose.

Since the Second World War the formation of a new government has taken more than three months on average. The formation of the Rutte III government took a record number of 225 days.

What is unusual is that the first two months elapsed before the formation involved any substantive matters and – up until know – without there being any clarity as to which parties would constitute part of the new coalition.

An unfortunate leaked statement made by Prime Minister Rutte occasioned extensive debates in the Lower House, where parties that are rival to the VVD sought to settle scores with Rutte, who won the elections.

Nevertheless, there is a good chance that a Rutte IV government will emerge, because it is impossible to form a stable government without the VVD, while polls reveal that new elections, which some losers in March may be seeking, will again result in Rutte's VVD trumping its competitors by a large margin.

Voters are beginning to tire of politicians who have been preoccupied with holding each other to account instead of addressing the major issues facing the country, as in the case of other Western nations. ■

Endnotes

1. By way of comparison, most of the European countries which have a system of proportional representation have an electoral threshold varying from 2% (Denmark) to 5% (Germany, Belgium, Poland, most others).

2. It is no longer formally represented in the Lower House, albeit still locally and in the Senate, after the departure of its leading candidate, Liane den Haan, on 6 May 2021 following a conflict.

3. As it happens, the membership of all of the political parties amounted to more than 780,000 members when taken together, whereas that figure had shrunk to 310,000 in 2021. The minor (new) movements are performing relatively better than the traditional parties.

4. 'TK2021 naar demografische en andere kenmerken' [The 2021 Lower House based on demographic and other characteristics], which was consulted at https://maurice.nl/peilingen/2021/04/11/tk2021-naar-demografische-en-andere-kenmerken/

5. On 13 May 2021 FvD again had to contend with a breakaway, as a result of which three of the five seats will continue as the Haga Group and the FvD leader, Thierry Baudet saw his party shrink to five seats in the Lower House.

6. See numerous publications, eg. Cas Mudde and Rovira Kalwasser, Populism: A Very Short Introduction (Oxford, 2017) and Jan-Werner Müller, What is populism? (Philadelphia, 2016).

7. In formal terms there are two 'members: the individual, Geert Wilders, and also a foundation whose executive board consists of ... Wilders.

The BVI fintech transformation

Simon Gray is Head of Business Development and Marketing at BVI Finance

The British Virgin Islands (BVI) is emerging as a global hub of fintech innovation and investment, evidenced by the arrival of several exciting fintech start-ups and providers over the last few years.

Increasingly, businesses in the sector are recognising the advantages of the BVI, attracted by fit-for-purpose regulations, ease of doing business and a growing talent pool across the fintech and digital space.

Regulatory innovation

One of the BVI's most significant regulatory innovations to date is the BVI Fintech Regulatory Sandbox. This initiative was conceived to support fintech innovation while ensuring that digital products and services comply with regulatory standards.

The sandbox was developed in anticipation of the needs of financial services providers and innovators striving to succeed

in an increasingly digitised global commercial environment. This regulatory framework facilitates the testing of 'innovative fintech,' which refers to technology that creates, enhances, or promotes financial products or services.

The sandbox tests the operational efficiency of new financial products, detecting problems, and envisioning improvements.

But in tandem with efficiency testing, the sandbox enables the BVI Financial Services Commission (FSC) to assess the product for essential compliance with legal and regulatory requirements. Companies undergoing sandbox testing are afforded 18 months to conduct business in the BVI without a licence.

The regulatory sandbox is currently accessible to BVI financial services providers and start-up businesses. The facility is also intended for a varied and expanding range of financial services and banking applications, as digital banking and credit sector applications are expected to feature strongly in response to calls for more advanced virtual banking and credit services in the wake of the COVID-19 crisis.

The sandbox represents another future-focused strand of the BVI's innovative regulatory framework. It puts ongoing digitisation of banking and wider financial services at the centre of the jurisdiction's offering.

The support of fintech through the sandbox regulations initiative has contributed to the BVI's reputation as a progressive hub for digital asset centred opportunities. This standing is set to continue through the BVI's culture of evolving regulatory provision by benchmarking with the best.

Evolving fintech

Examples of future fintech developments extend to the promotion of smart contracts such as the Limited Liability Autonomous Organizations (LAO). A LAO is a digitally organised business – a Decentralized Autonomous Organization (DAO) within a corporate structure – with legal standing invariably structured as a limited liability company.

DAO activities are defined by rules that decide on the actions the organisation will take. The decision making within a DAO is made electronically by a computer code or through the votes of its members.

"The position of the British Virgin Island financial services centre as a global hub for financial technology development is only set to grow"

A key problem with first generation DAOs was rooted in their lack of clear legal basis, which resulted in issues including vulnerability to fraudulent attacks that in turn threw up difficult questions regarding liability for the loss of funds.

To address such problems, the DAO concept has progressed into a next generation form, the Limited Liability Autonomous Organization (LAO), which is essentially a DAO within a corporate wrapper. LAOs represent a model for the next generation of digital disruption in business registration.

Digital assets

The BVI is also focussed on the delivery of quality service provision to the rapidly growing digital assets market. Working hard to position itself as a fintech hub, the BVI became the jurisdiction of choice for token generation.

Tokens are issued through Initial Coin Offerings (ICOs) or Initial Token Offerings (ITOs). The token issuer will raise funds by issuing the coin or tokens on a blockchain network in return for investment in the form of conventional fiat currency or even cryptocurrencies.

The BVI subsequently expanded its offering from token generation into related areas such as token exchanges and investment funds focussed on cryptocurrency and other blockchain-based digital assets.

The BVI has striven to become a force in the new capital raising wave, which has led to increased interest in BVI companies as ICO issuer vehicles. The advantages offered by BVI company registration has seen the jurisdiction become an ICO hub of choice over other financial centres.

The BVI's range of legislative advantages and territorial benefits mean that BVI companies benefit from the corporate flexibility and efficiency enshrined in the modern and commercially minded BVI Business Companies Act (BCA).

In addition, a range of other jurisdictional company laws, the BVI's tax neutrality, the absence of capital control and maintenance rules, low incorporation and annual company maintenance costs, and efficient company maintenance, are among a range of additional benefits.

The BVI instinct for services innovation is demonstrated by the approach taken by the BVI Financial Services Commission (FSC) to the regulation of cryptocurrencies, tokens, and other digital assets. The BVI FSC has chosen a progressive approach as outlined in its Guidance on the Regulation of Virtual Assets in the British Virgin Islands 2020.

Unlike some other jurisdictions where specific regulations in relation to digital assets and related activities have been introduced, the BVI guidance for virtual assets examines each major piece of BVI financial services legislation on a case-by-case basis to assess how it should be applied in relation to tokens, cryptocurrencies, and other digital assets. The FSC will be regulating VASPs soon.

Innovation and support

The BVI's innovative approach to regulation has seen the territory become one of the largest cryptocurrency markets in the world, featuring in the top five geographical markets by US dollar denominated trade volume.

According to figures from PwC, the BVI is now home to one in six of the crypto hedge funds currently in place globally. In 2015, the BVI launched its Incubator and Approved Funds regimes. The BVI Incubator Funds regime proved to be ideal for light-touch, short term crypto vehicles – many of which are also hedge funds.

The regime has become known as the '20-20-20 fund' due to its structure, which takes a maximum of 20 investors, a minimum initial investment of US$20,000, and net assets of up to US$20 million.

This product appeals to the increasing number of pioneer managers who are looking to gain a track record before converting the Incubator Fund to a more sophisticated fund product. It works well for the growing fintech and crypto-asset fund type.

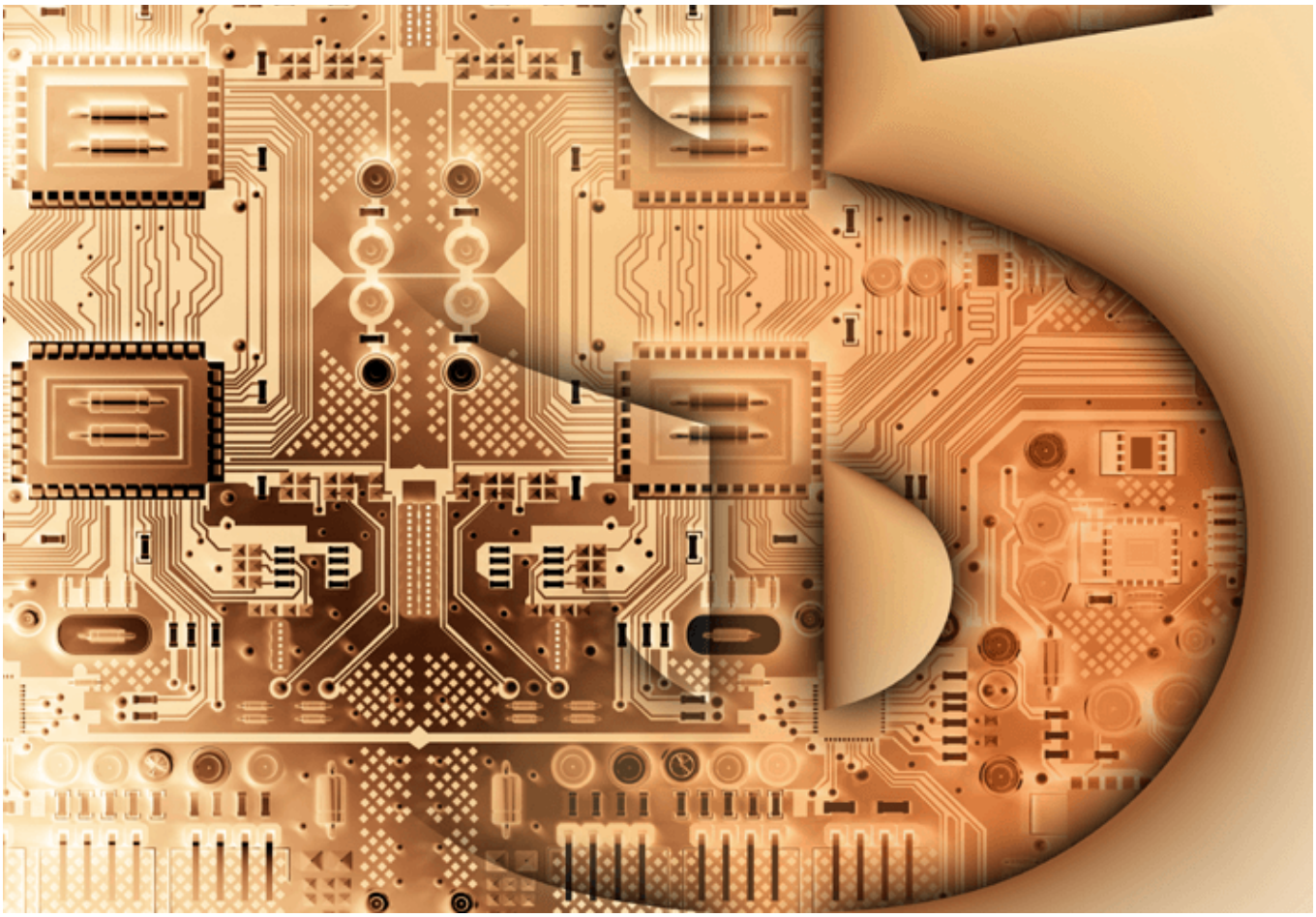
Crypto hedge fund managers are often attracted to this structure as offshore funds are typically subject to significant administration costs and high levels of supervision, whereas the BVI incubator fund minimises initial requirements so as to enable start-up crypto managers to come to market faster and more seamlessly.

The BVI Approved Funds framework facilitates a maximum of 20 investors, an aggregate maximum investment not exceeding US$100 million, requires no minimum subscription, and has an evergreen duration. An approved fund is very flexible and may operate without appointing a custodian, investment manager, or auditor, but unlike an incubator fund will need an administrator.

In 2020, the BVI launched its Private Investment Funds regime, which brought a new regulatory framework for closed-ended funds, including private equity and venture capital funds.

A private investment fund (PIF) is a company, limited partnership, unit trust, or any other body that collects and pools investor funds and issues proportionate interest calculated on the net asset value of the fund. A PIF must be recognised by the BVI Financial Services Commission (FSC) prior to carrying on business.

The popularity of the BVI's innovative funding regimes has helped to secure the jurisdictions position as one of the top global hubs for crypto hedge funds provision.



Adapting to market needs

The BVI financial services centre has nurtured success through diligent attention to the needs of its companies. This focus brought about the establishment of the Bank of Asia in the BVI in 2014, which was launched as a fully digital institution signifying the importance of the Asian market to the jurisdiction.

The bank represents one of the jurisdiction's most direct contributions to the digitisation of global banking, offering essential support to corporate service providers through a cost-effective banking solution for their customers.

Safeguarding growth

The BVI believes that at a time of unprecedented digital proliferation, industry change and opportunity, it is essential to safeguard growth through adherence to international standards.

To this end, the BVI Financial Services Commission follows the regulatory principles of the Basel Committee (Banking), the IAIS (Insurance), IOSCO (Securities, Investments, and Funds), the OECD (Corporate Governance), as well as adhering to recommendations by the Financial Action Task Force (FATF), to combat money laundering and terrorist financing.

This adherence to standards safeguards investment in innovation, BVI companies, the territory, and wider business markets.

To further demonstrate its commitment to operational transparency and accountability, the BVI created the BVI Beneficial Ownership Secure Search System Act (BOSSs) in 2017.

The Act requires registered agents and financial service firms in the BVI to create a database of beneficial ownership information relating to in-scope entities they represent.

The BOSS system acts as a highly secure depository for essential business data. The BOSS is indicative of the BVI's commitment to legislative and services innovation at a time of exponential digital and fintech growth.

The acceleration in global digitization resulting from the COVID-19 pandemic will make the role of the BVI in global finance as a facilitator for innovation and investment ever more relevant.

Just as important is the BVI's example to other jurisdictions on the essential role of regulation and meeting international standards in safeguarding innovation and growth. Rather than stifle enterprise with unnecessary bureaucracy, smart regulation acts to safeguard success.

The example of the BVI Sandbox underpins this point. The position of the British Virgin Island financial services centre as a global hub for financial technology development is only set to grow. ■

The future of cryptocurrencies

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From their inception in the early 2010s, until their meteoric rise to fame in 2017 on the back of Bitcoin's astronomical bull market, digital (crypto) currencies were relatively obscure and only for speculators.

Cryptocurrencies such as Bitcoin have foreshadowed a potential digital future for money, though they exist outside the traditional global financial system and aren't legal tender like cash issued by governments.

Despite this, the blockchain technology behind them has robustly demonstrated its potential for use in financial services. As a cryptographically secured decentralized ledger system, it is ideally suited to the transparent and incorruptible recording and facilitation of global financial transactions quickly, cheaply and securely.

In fact, cryptocurrencies and networks such as Ripple[1] and RippleNet[2] have been used as alternative settlement mechanisms for international trade transactions for some time now.

However, rarely have the vagaries, person attitudes, whims and comments of so few radically influenced the fluctuation, value and trust in crypto for so many.

After a few tumultuous weeks, there has been a fundamental shift in perception, value, security and sustainability of crypto currencies.

From the lofty heights of Bitcoin valued recently at nearly $60,000 crashing to $31,000 in a matter of days, it appears that the opinions of a few individuals can spook markets such that any thoughts of crypto being a viable long term stable alternative to fiat currency are clearly suspect.

And one quote captured the sentiment:

> *"Unless and until Bitcoin can be used to buy a sandwich, or be accepted by your friends when you pay them back for a restaurant meal, then it is likely to remain just a playground for geeks and gamblers."*

Just as in the 1990's when George Soros famously influenced market dynamics by shorting sterling, moving the UK government to withdraw from the exchange rate mechanism and requiring the Bank of England to prop up the Pound, so the recent tweets of Elon Musk have had a profound effect.

But problems are still apparent, namely a lack of sound legal frameworks with no way to enforce debts and, cryptocurrencies remain very volatile with huge price fluctuations even within a single day; an important component of a reliable currency is a relatively stable value.

Overcoming these two hurdles will put digital currencies firmly on the road to mainstream, and with over 4,000 different cryptocurrencies and tokens in operation, crypto payments are fast, cheap, secure, with easy set-up, enabling global funds transfers in minutes, not days.

Little wonder traditional financial organisations and governments need to take stock.

Why are banks and financial firms embracing crypto?

Since cryptocurrency is a virtual currency accessible via the internet, it is regulated not by a national regulator but by cryptography, giving it complete security and anonymity. It operates outside the analogue preserve of traditional banks, and without active moves to create an operating environment inside a tight regulatory framework, banks will not be competitive versus more agile alternative financial providers in future.

To avoid missing out on potential revenue streams, banks need to be involved, but also need to exercise caution.

The biggest exchanges in the world are in the USA, Japan (and China, before the government banned them), leaving the UK behind with overbearing legislation and basis lack of education on the impact of crypto. Even Ukraine and Malta have a greater understanding and operating infrastructure to compete with and supply crypto services.

The UK needs to up its game to re-establish itself as the crypto financial capital, with the first issue to develop policies to regulate the technology.

As stated by the London Stock Exchange *"the UK government needs to understand cryptocurrencies in order to place City of London and the nation at the centre of a 'reputable and safe' financial market."*

It is all down to control of assets, and banks need to take a pro-active approach to ensuring underlying technology, accessibility and choice are available for all types of investors and clients.

These organisations rely on management and control of fiat currency within a given jurisdiction, with the aim of profit and a charge for additional services, such as cross border transfers.

Key points that will enable banks to participate include assistance with immediate, simple, transparent exchange from crypto to fiat currency stored on a memory card or wallet, using mobile technology, making it easier to exchange into and out of accounts seamlessly.

Secondly, building on a legacy of security, where banks can offer the benefits of cryptography in protecting the asset in a public key infrastructure prohibiting fraud, copy or misappropriation. Also, as transfer does not require correspondent complex international banking arrangements, with the cost and time implications of such services, all transfers are fast, easy and inexpensive.

Positioning is everything, and whilst the role of financial and technology companies becomes increasingly blurred, Bank of America reportedly holds more blockchain-related patents than any other company, even beating tech giant IBM.

Currently payments are expensive, take days and may require multiple hops to achieve delivery.

Ultimately transfers between wallets and much quicker more cost-effective for cross-border transactions, and with banks losing customer loyalty, without immediate action may find their clients looking for alternative applications and cheap payment mechanisms.

What about governments?

The greatest fear for any government is uncontrolled speculation affecting a home currency.

Cryptocurrencies, such as stable coins, pegged to other assets such as the US dollar, can now act as a safer and more trustworthy way of safeguarding people's assets.

Ultimately, governments wish to control money supply and where cash is moving. This is especially the case where high rates of cryptocurrency adoption have also been recorded in developing countries, like Vietnam, Turkey and South Africa. And with these different cultures, acceptance, handling, and regulation of crypto across the globe are quite different.

A primary method to regain control is the power of taxation, always a major weapon in a governments' armoury of revenue-generating measures. By exerting regulation in this area authorities can prevent loss of monetary control and revenue, taxing any fiat money used when buying, selling, or exchanging virtual tokens.

Whilst traders use cryptocurrencies as medium of exchange for basic goods and services in the natural course of commerce,

"As cash ceases its grip on day-to-day transactions in favour of plastic, we will see more crypto currencies becoming commonplace"

cases are already emerging of the IRS chasing investors over non-reported trades and profits, making it subject to either income or a capital gains tax.

Rather than merely accept the thousands of coins, tokens, and assets in circulation, many of which have no value, governments are looking to introduce their own digital assets. These are totally under their control, backed and pegged to the fiat currency, using underlying blockchain technology, with immediate value, trust, and portability, without the speculative risks.

In China, the digital Yuen backed by deposits held by China's central bank has been tested in shops and used to pay bills and is essentially the first digital currency accepted as legal tender.

Importantly, China has also mandated those exchanges will need to be registered and regulated as ownership of crypto is still permitted, but any non-Yuen cryptocurrency payments are banned along with mining and trading, but possession is not yet affected.

In the authoritarian state of China, digitized programmable money, could easily identify criminal activity, source and destination of funds, spending patterns and facilitate instant fine deductions.

In other countries, take up of crypto is far greater than immediately thought, particularly in jurisdictions not normally associated with speculative assets.

In Nigeria, cryptocurrency use is on the rise in Nigeria, with 33% of Nigerians either using or owning cryptocurrency, primarily using it as a cheaper solution to send expensive FX across borders.

Nigeria has banned banks and financial institutions from providing exchange services and threatens to close bank accounts found using cryptocurrency exchanges. In the Philippines where remittance and transfers companies are common with a large expat community, the Central Bank has approved several crypto exchanges.

However, by imposing draconian measures against the population with the risk of major fines, imprisonment and sanctions, countries can prohibit mining coins they cannot control. And, in some countries, fear of the effects and implications of crypto has led to outright bans on buying, owning, and trading altogether including Algeria, Bolivia, Morocco, Nepal, Pakistan, and Vietnam.

Examples of other country bans include the central bank of Turkey, banning cryptocurrency payments with far tighter restrictions on the cryptocurrency exchanges due to lack of regulation and a central authority for the coins.

The view was taken a) that it is in the public interest to prevent opportunities to fund illegal activities, and b) protecting investors especially where wild fluctuations would affect investors who can't recover any losses and have no legal redress.

In Saudi Arabia, to control foreign exchange, financial institutions have been warned from using Bitcoin although penalties are not yet clear.

With the anticipated introduction by the Indian central bank of the digital rupee, just how far India is prepared to legislate is illustrated by the terms of a proposed bill, which criminalises possession, issuance, mining, trading and transferring crypto assets.

In the UK the FCA banned the offering of crypto derivatives products to retail users due to a number of inherent risks that the regulatory body believes could negatively affect retail customers. Other regulation will come.

Recent events have indicated just how fragile, volatile and erratic the markets can be, with regular rises and falls which would years ago have been classified on exchanges as 'significant' market events.

As a result we expect many more countries to look at introduction of own taxable digital currency assets, and review and place firm restrictions on exchanges, activities, mining and unregulated use of crypto currencies such as Bitcoin.

Are currencies such as Bitcoin a good or bad thing?

Whilst we have seen wild speculation, adverse risk and price fluctuation, the technology is sound and has proved itself; it is convenient, cheap, fast and extremely reliable.

If banks can embrace the technology and provide standardisation, rationalisation and reusability with the same or similar cost schedule and client experience that payments infrastructures should offer, this will be a positive.

The one area where Bitcoin and other cryptocurrencies will always differentiate themselves in the anonymity it provides to the holder. And security is an additional issue and personal responsibility is key.

You may have read about a UK investor who mistakenly threw away a hard drive containing the crypto key enabling access and spending of 7,500 Bitcoins, equating to more than $280 million. He sought permission to search a council refuse facility, offering a 25% donation if he was able to recover the data. Permission was refused and the potential monies lost. Other cases cite lost or forgotten passwords effectively leaving the unfortunate owners with zero value.

Just remember if the firm or exchange you've used has gone out of business and can't pay your claim, there is no equivalent of a financial services compensation scheme to cover losses, no helpdesk, no legal precedent or legal remedy.

The power game

Much has been written about the amount of energy required

to run crypto mining operations. As the primary method of earning coins, miners run powerful arrays of computers that verify blocks of transactions made with cryptocurrencies, all competing in a global, decentralised computer network. This needs considerable resources, with estimates of required power equivalent to the total consumption of Denmark.

And countries which heavily subsidize electricity costs (such as Iran) are hosting facilities for China and other jurisdictions. This is earning large sums for the miners but having a significant impact on pollution and global warming on Iran, with little additional economic benefit for the state.

According to the BBC[3] Bitcoin uses more energy than Argentina, and if Bitcoin was a country, it would be in the top 30 energy users worldwide. Perhaps a carbon tax on CO2 emission is the next step to controlling or at least monetizing the immense power requirements of mining operations globally.

Conclusion

Love them or loathe them, cryptocurrencies, coins and tokens, valued in billions of US Dollars, will play an increasing role in complementing and competing with monetary systems globally. Designed to work autonomously and independently of central banks, regulators and governments, they provide an anonymous, secure, low cost, globally accessible, borderless mechanism for payment, underpinned by riskless DLT technology.

We can expect to see increased uptake of crypto in international trade, with the use of barter tokens, promoting financial inclusion with lower points of entry and easier payment exchange, especially in countries with rampant inflation and unstable banking systems.

As cash ceases its grip on day-to-day transactions in favour of plastic, we will see more cryptocurrencies becoming commonplace.

However, whilst the number of coin offerings, price, value and faith in them will rise and wain, governments and banks will embrace controlled regulated digital assets, the biggest impact on the finance industry and economies as a whole will be through the active technological advancement in global use of what one may classify as a by-product, namely blockchain. ■

Endnotes
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Private money and central bank money as payments go digital

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Technology is driving dramatic change in the US payments system, which is a vital infrastructure that touches everyone[1]. The pandemic accelerated the migration to contactless transactions and highlighted the importance of access to safe, timely, and low-cost payments for all.

With technology platforms introducing digital private money into the US payments system, and foreign authorities exploring the potential for central bank digital currencies (CBDCs) in cross-border payments, the Federal Reserve is stepping up its research and public engagement on CBDCs.

As Chair Powell discussed recently, an important early step on public engagement is a plan to publish a discussion paper this summer to lay out the Federal Reserve Board's current thinking on digital payments, with a particular focus on the benefits and risks associated with CBDC in the US context[2].

Sharpening the focus on CBDCs

Four developments—the growing role of digital private money, the migration to digital payments, plans for the use of foreign CBDCs in cross-border payments, and concerns about financial exclusion—are sharpening the focus on CBDCs.

First, some technology platforms are developing stablecoins for use in payments networks[3]. A stablecoin is a type of digital asset whose value is tied in some way to traditional stores of value, such as government-issued, or fiat, currencies or gold.

Stablecoins vary widely in the assets they are linked to, the ability of users to redeem the stablecoin claims for the reference assets, whether they allow unhosted wallets, and the extent to which a central issuer is liable for making good on redemption rights. Unlike central bank fiat currencies, stablecoins do not have legal tender status.

Depending on underlying arrangements, some may expose consumers and businesses to risk. If widely adopted, stablecoins could serve as the basis of an alternative payments system oriented around new private forms of money.

Given the network externalities associated with achieving scale in payments, there is a risk that the widespread use of private monies for consumer payments could fragment parts of the US payment system in ways that impose burdens and raise costs for households and businesses.

A predominance of private monies may introduce consumer protection and financial stability risks because of their potential volatility and the risk of run-like behaviour.

Indeed, the period in the nineteenth century when there was active competition among issuers of private paper banknotes in the United States is now notorious for inefficiency, fraud, and instability in the payments system[4]. It led to the need for a uniform form of money backed by the national government.

Second, the pandemic accelerated the migration to digital payments. Even before the pandemic, some countries, like Sweden, were seeing a pronounced migration from cash to digital payments[5]. To the extent that digital payments crowd out the use of cash, this raises questions about how to ensure that consumers retain access to a form of safe central bank money.

In the United States, the pandemic led to an acceleration of the migration to digital payments as well as increased demand for cash. While the use of cash spiked at certain times, there was a pronounced shift by consumers and businesses to contactless transactions facilitated by electronic payments[6].

The Federal Reserve remains committed to ensuring that the public has access to safe, reliable, and secure means of payment, including cash. As part of this commitment, we must explore—and try to anticipate—the extent to which households' and businesses' needs and preferences may migrate further to digital payments over time.

Third, some foreign countries have chosen to develop and, in some cases, deploy their own CBDC. Although each country will decide whether to issue a CBDC based on its unique domestic conditions, the issuance of a CBDC in one jurisdiction, along with its prominent use in cross-border payments, could have significant effects across the globe.

Given the potential for CBDCs to gain prominence in cross-border payments and the reserve currency role of the dollar, it is vital for the United States to be at the table in the development of cross-border standards.

Finally, the pandemic underscored the importance of access to timely, safe, efficient, and affordable payments for all Americans and the high cost associated with being unbanked and underbanked.

While the large majority of pandemic relief payments moved quickly via direct deposits to bank accounts, it took weeks to distribute relief payments in the form of prepaid debit cards and checks to households who did not have up-to-date bank account information with the Internal Revenue Service.

The challenges of getting relief payments to these households highlighted the benefits of delivering payments more quickly, cheaply, and seamlessly through digital means.

Policy considerations

In any assessment of a CBDC, it is important to be clear about what benefits a CBDC would offer over and above current and emerging payments options, what costs and risks a CBDC might entail, and how it might affect broader policy objectives. I will briefly discuss several of the most prominent considerations.

Preserve general access to safe central bank money

Central bank money is important for payment systems because it represents a safe settlement asset, allowing users to exchange central bank liabilities without concern about liquidity and credit risk. Consumers and businesses don't generally consider whether the money they are using is a liability of the central bank, as with cash, or of a commercial bank, as with bank deposits.

This is largely because the two are seamlessly interchangeable for most purposes owing to the provision of federal deposit insurance and banking supervision, which provide protection for consumers and businesses alike. It is not obvious that new forms of private money that reference fiat currency, like stablecoins, can carry the same level of protection as bank deposits or fiat currency.

Although various federal and state laws establish protections for users, nonbank issuers of private money are not regulated to the same extent as banks, the value stored in these systems is not insured directly by the Federal Deposit Insurance Corporation, and consumers may be at risk that the issuer will not be able to honour its liabilities.

New forms of private money may introduce counterparty risk into the payments system in new ways that could lead to consumer protection threats or, at large scale, broader financial stability risks.

In contrast, a digital dollar would be a new type of central bank money issued in digital form for use by the general public. By introducing safe central bank money that is accessible to households and businesses in digital payments systems, a CBDC would reduce counterparty risk and the associated consumer protection and financial stability risks.

Improve efficiency

One expected benefit is that a CBDC would reduce or even eliminate operational and financial inefficiencies, or other frictions, in payments, clearing, and settlement. Today, the speed by which consumers and businesses can access the funds following a payment can vary significantly, up to a few days when relying on certain instruments, such as a cheque, to a few seconds in a real-time payments system.

"In light of the growing role of digital private money in the broader migration to digital payments ... the Federal Reserve is stepping up its research and public engagement on a digital version of the US dollar"

Advances in technology, including the use of distributed ledgers and smart contracts, may have the potential to fundamentally change the way in which payment activities are conducted and the roles of financial intermediaries and infrastructures. The introduction of a CBDC may provide an important foundation for beneficial innovation and competition in retail payments in the United States.

Most immediately, we are taking a critical step to build a strong foundation with the introduction of the FedNow℠ Service, a new instant payments infrastructure that is scheduled to go into production in two years. The FedNow Service will enable banks of every size and in every community across America to provide safe and efficient instant payment services around the clock, every day of the year.

Through the banks using the service, consumers and businesses will be able to send and receive payments conveniently, such as on a mobile device, and recipients will have full access to funds immediately.

Promote competition and diversity and lower transactions costs

Today, the costs of certain retail payments transactions are high and not always transparent to end users[7]. Competition among a diversity of payment providers and payment types has the potential to increase the choices available to businesses and consumers, reduce transactions costs, and foster innovation in end-user services, although it could also contribute to fragmentation of the current payments system. By providing access to a digital form of safe central bank money, a CBDC could provide an important foundation on which private-sector competition could flourish.

Reduce cross-border frictions

Cross-border payments, such as remittances, represent one of the most compelling use cases for digital currencies. The intermediation chains for cross-border payments are notoriously long, complex, costly, and opaque.

Digitalisation, along with a reduction in the number of intermediaries, holds considerable promise to reduce the

cost, opacity, and time required for cross-border payments. While the introduction of CBDCs may be part of the solution, international collaboration on standard setting and protections against illicit activity will be required in order to achieve material improvements in cost, timeliness, and transparency[8].

We are collaborating with international colleagues through the Bank for International Settlements, Committee on Payments and Market Infrastructures, and the G7 to ensure the US stays abreast of developments related to CBDC abroad.

We are engaging in several international efforts to improve the transparency, timeliness, and cost-effectiveness of cross-border payments. It will be important to be engaged at the outset on the development of any international standards that may apply to CBDCs, given the dollar's important role as a reserve currency.

Complement currency and bank deposits

A guiding principle for any payments innovation is that it should improve upon the existing payments system.

Consumers have access to reliable money in the forms of private bank accounts and central bank issued currency, which form the underpinnings of the current retail payments system. The design of any CBDC should complement and not replace currency and bank accounts.

Preserve financial stability and monetary policy transmission

The introduction of a CBDC has the potential to have wide-reaching effects, and there are open questions about how CBDC could affect financial stability and monetary policy transmission.

Some research indicates that the introduction of a CBDC might raise the risk of a flight out of deposits at weak banks in favour of CBDC holdings at moments of financial stress[9].

Other research indicates that the increase in competition could result in more attractive terms on transactions accounts and an overall increase in banking system deposits[10].

Banks play a critical role in credit intermediation and monetary policy transmission, as well as in payments. Thus, the design of any CBDC would need to include safeguards to protect against disintermediation of banks and to preserve monetary policy transmission more broadly.

While it is critical to consider the ways in which a CBDC could introduce risks relative to the current payments system, it may increase resilience relative to a payments system where private money is prominent.

Protect privacy and safeguard financial integrity

The design of any CBDC would need to both safeguard the privacy of households' payments transactions and prevent and trace illicit activity to maintain the integrity of the financial system, which will require the digital verification of identities.

There are a variety of approaches to safeguarding the privacy of payments transactions while also identifying and preventing illicit activity and verifying digital identities.

Addressing these critical objectives will require working across government agencies to assign roles and responsibilities for preventing illicit transactions and clearly establishing how consumer financial data would be protected.

Increase financial inclusion

Today 5.4 percent of American households lack access to bank accounts and the associated payment options they offer, and a further 18.7 percent were underbanked as of 2017[11]. The lack of access to bank accounts imposes high burdens on these households, whose financial resilience is often fragile.

At the height of the pandemic, the challenges associated with getting relief payments to hard-to-reach households highlighted that it is important for all households to have transactions accounts.

The Federal Reserve's proposals for strengthening the Community Reinvestment Act emphasize the value of banks providing cost-free, low-balance accounts and other banking services targeted to underbanked and unbanked communities[12]. And a core goal of FedNow is to provide ubiquitous access to an instant payments system via depository institutions.

CBDC may be one part of a broader solution to the challenge of achieving ubiquitous account access[13]. Depending on the design, CBDC may have the ability to lower transaction costs and increase access to digital payments. In emergencies, CBDC may offer a mechanism for the swift and direct transfer of funds, providing rapid relief to those most in need.

A broader solution to financial inclusion would also need to address any perceived barriers to maintaining a transaction account, along with the need to maintain up-to-date records on active accounts to reach a large segment of the population[14].To explore these broader issues, the Federal Reserve is undertaking research on financial inclusion.

The Federal Reserve Bank of Atlanta is launching a public–private sector collaboration as a Special Committee on Payments Inclusion to ensure that cash-based and vulnerable populations can safely access and benefit from digital payments[15].

This work is complemented by a new Federal Reserve Bank of Cleveland initiative to explore the prospects for CBDC to increase financial inclusion. The initiative will identify CBDC design features and delivery approaches focused on expanding access to individuals who do not currently use traditional financial services.

Technology considerations

Multidisciplinary teams at the Federal Reserve are investigating the technological and policy issues associated with digital innovations in payments, clearing, and settlement, including the benefits and risks associated with a potential US CBDC.

For example, the TechLab group at the Federal Reserve Board is performing hands-on research and experimentation on potential future states of money, payments, and digital currencies.

A second group, the Digital Innovations Policy program, is considering a broad range of policy issues associated with the rise of digital payments, including the potential benefits and risks associated with CBDC.

To deepen our research on the technological design of a CBDC, the Federal Reserve Bank of Boston is partnering with Massachusetts Institute of Technology's (MIT) Digital Currency Initiative on Project Hamilton to build and test a hypothetical digital currency platform using leading edge technology design options[16].

This work aims to research the feasibility of the core processing of a CBDC, while remaining agnostic about a range of policy decisions. MIT and the Boston Fed plan to release a white paper next quarter that will document the ability to meet goals on throughput of geographically dispersed transactions with core processing and create an open-source license for the code.

Subsequent work will explore how addressing additional requirements, including resiliency, privacy, and anti-money-laundering features, will impact core processing performance and design.

Banking activities

Research and experimentation are also occurring at supervised banking institutions to explore new technology to enhance their own operations and in response to demands from their clients for services such as custody of digital assets.

While distributed ledger technology may have the potential to improve efficiencies, increase competition, and lower costs, digital assets pose heightened risks such as those related to

Bank Secrecy Act/anti-money laundering, cybersecurity, price volatility, privacy, and consumer compliance.

The Federal Reserve is actively monitoring developments in this area, engaging with the industry and other regulators, and working to identify any regulatory, supervisory, and oversight framework gaps.

Given that decisions at one banking agency can have implications for the other agencies, it is important that regulators work together to develop common approaches to ensure that banks are appropriately identifying, monitoring, and managing risks associated with digital assets.

Public engagement

In light of the growing role of digital private money in the broader migration to digital payments, the potential use of foreign CBDCs in cross-border payments, and the importance of financial inclusion, the Federal Reserve is stepping up its research and public engagement on a digital version of the US dollar. Members of Congress and executive agencies are similarly exploring this important issue.

As noted above, to help inform these efforts, the Federal Reserve plans to issue a discussion paper to solicit public comment on a range of questions related to payments, financial inclusion, data privacy, and information security, with regard to a CBDC in the US context[17].

The Federal Reserve remains committed to ensuring a safe, inclusive, efficient, and innovative payments system that works for all Americans. ■

Endnotes

1. I am grateful to Alexandra Fernandez, Sonja Danburg, David Mills, and David Pope of the Federal Reserve Board for their assistance in preparing this text. These are my own views and do not necessarily reflect those of the Federal Reserve Board or the Federal Open Market Committee.

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Stablecoins: what's old is new again

Christina Segal-Knowles is Executive Director for Financial Markets Infrastructure at the Bank of England

I'm going to focus on what is sometimes billed as the next big thing in digital payments - stablecoins - digital tokens issued by the private sector which aim to maintain a stable value at all times, primarily in relation to existing national currencies.

And to be clear from the start, I will touch only on those stablecoins that aim to be used widely as means of payments.

Stablecoins and other new forms of innovation in payments potentially offer benefits. They could reduce cost and offer new convenience and functionality. They could increase the resilience of payments – by offering alternative new ways to pay. And there could be potential long term financial stability gains from new forms of digital money. But these opportunities can only be realised if new forms of digital money are safe.

So I am not going to focus on what's new about stablecoins. Instead, I am going to focus on why – even if the technology they are using is new - the basic elements of a stablecoin are very old. In fact, as old as money itself.

This means that as financial regulators, stablecoins are not launching us off into some brave new world. We know what is required to ensure private money[1] is safe for wide-scale use. The key here is to ensure that just because something is packaged in shiny technology we don't somehow treat the risks it poses differently.

Private money: the basics

Before I turn to stablecoins I want to spend a minute on one of the reasons why the idea of private money feels innovative and flashy. Even though most money we use every day is already private money, the vast majority of us don't think about it. Luckily, regulation means we don't have to.

Popular culture often simplifies our ideas around what form our money takes and can reinforce the idea that banks are simply storing our sterling issued by the central bank for us, and that when we pay electronically, what is being moved is central bank-issued money. For example, remember those iconic scenes from *Mary Poppins* and *It's a Wonderful Life* which feature people demanding that banks give them back their money.

But in reality, when you tap your debit card in a shop or pay your friend back via a bank transfer, the money you are paying with isn't sterling issued by the Bank of England with a promise to pay the bearer – it's a bank deposit. Those are just a record of how much a private company – here, the commercial bank - owes its customers. Think of it as an IOU from the bank.

When we say that we are *"withdrawing our money"* from an ATM - what we are actually doing is converting our IOUs from our bank, ie. commercial bank money, into banknotes issued by the Bank of England.

So even though we don't think about it, we're already using private money all the time. Ninety-five percent of the funds households and businesses hold that are typically used to make payments are now held as commercial bank deposits rather than cash[2]. The pandemic has prompted a further decrease in cash usage, accelerating a longer-term decline that is likely to continue[3].

Private money: why do we care?

Today in the United Kingdom we don't generally pay attention to whether we are using private or public money. We can assume that the value of the money we use will be more or less stable. Shops don't need to scrutinize which bank holds your deposit before you pay – and they are generally as willing to receive private money in the form of card or smartphone wallet payments as they are cash.

The fact that commonly used private money is interchangeable with cash anchors it to national currencies and, as a result, promotes financial stability. The fact that bank deposits can be exchanged for cash on demand guarantees uniformity – ensuring that bank deposits from one bank can be used interchangeably with cash and with bank deposits from another bank.

While banks do fail, regulation and liquidity backstops makes that relatively rare. And deposit protection schemes ensure that transactional balances up to £85,000 remain interchangeable with cash even if that happens. This model is relatively recent. It was not ever thus.

And as we think about new forms of digital payments, it is important that we do not take this for granted.

A large number of financial crises of the last century have featured a loss of confidence in the reliability and safety of the money people rely on for transactions.

Money that is usually considered safe. Money that people normally do not think about very much.

In the emerging market financial crises of the 1990s and early 2000s, people and businesses lost faith in the state's ability to maintain the value of their local currency against the dollar[4].

"... these opportunities can only be realised if new forms of digital money are safe – which means recognising and properly regulating the elements that are age-old"

Other crises have had at their heart a loss of confidence in the ability of private issuers – commercial banks – to fulfil their IOUs with depositors and lenders and maintain the interchangeability and reliability of the money they issued.

Think of the Great Depression-era bank run depicted in *It's a Wonderful Life*. Think of the Northern Rock example – where worries about the Northern Rock's funding led to a crisis of confidence; first from wholesale lenders and then from retail depositors – who suddenly worried that their deposits would no longer be interchangeable with cash or other bank deposits.

Remember the queues outside of branches in 2007, as depositors rushed to exchange their deposits before – they believed – it might be too late[5]. Confidence in the credibility and stability of private money are fundamental components of financial stability.

Innovation

But let us go back to stablecoins and innovation in payments. Stablecoins are digital tokens that aim to maintain a stable value vis-a-vis existing forms of money[6]. Their origin stories generally trace back to the crypto world. Most forms of crypto-assets, like Bitcoin, are too volatile to be attractive as a widespread means of payment.

We have seen time and time again that if money is not reliably stable most people will not want to use or accept it as payment. There is no reason to think this time is different[7].

To solve this, stablecoins have turned to the age-old solution of anchoring their value to national currencies, often with a promise to ensure that the value remains 1 for 1 at all times. Stablecoins therefore could potentially serve as a substitute for a commercial bank deposit.

Both stablecoins and banks are offering a representation of what a private company owes its customers – an IOU - which can be transferred as a means to pay for things. Both are promising (or at least aspiring to) stability against and interchangeability with money issued by central banks.

It is possible in this context that stablecoins could scale up and grow rapidly, and become widely used as a trusted form of sterling-based retail payments. To be clear - I don't know if this will happen. Stablecoins and other new forms of private non-bank money might be the next big thing. Or they might be a flash in the pan.

I don't have a bet here - I am a central banker not a venture capitalist. My job, as a central banker and regulator - in all of this – is to ensure that financial innovations, including new forms of digital money, do not impair the Bank of England's ability to maintain monetary and financial stability.

This shouldn't be confused with preserving the status quo. Financial stability isn't about protecting incumbent banks or other existing firms from competition. Instead financial stability seeks to ensure that people and businesses can rely on essential financial services – like the ability to make a payment or the ability to get a loan - in bad times as well as good.

A regulatory framework

Earlier this week, the Bank of England published a Discussion Paper that examines the implications of stablecoins for its financial and monetary stability mandate. In it we present an illustrative scenario to examine the implications of the emergence of stablecoins and other new forms of digital money.

The discussion paper models what would happen if a large number of households and businesses moved their deposits from banks and into a stablecoin or Central Bank Digital Currency (CBDC). Contrary to some press headlines, even such a dramatic shift does not inherently constitute a financial stability risk as long as it happens in an orderly manner.

In fact findings show that the implications of this in the long term for the ability of households and businesses to get a loan are relatively modest – although there is considerable uncertainty around this result.

As such, while other risks may arise during a transitionary phase, the most significant risk arises from the potential for stablecoins in particular to undermine confidence in money and payments, and hence in the wider financial system.

As we discussed, the risk of a loss of confidence in the credibility and stability of private money is not theoretical. Loss of confidence in private money can be a major threat to financial stability.

But it is equally true that private money can be made acceptable as a widespread means of payment – indeed, as I covered earlier, the vast majority of money held for transactions in the United Kingdom is already private. So, with the right regulation, a stablecoin could potentially be made safe for wide-scale use.

Our existing regulatory framework seeks to ensure that the public is able to trust the reliability and stability of the money it uses every day. Banks are subject to extensive rules and requirements to ensure that consumers can use privately-issued money with confidence and interchangeably with cash.

These core rules and requirements were developed over time – in many cases via trial and error, with new rules introduced following financial crises.

Financial market infrastructure firms are also regulated to ensure that the assets they use for settlement – the underpinnings of our financial transactions, whether we're buying milk or clearing a derivative – are public money issued by a central bank wherever possible. Where that's not possible they are permitted to settle in money deemed to be a close substitute – commercial bank money.

If stablecoins seek to be acceptable widespread substitutes for commercial bank deposits as a means of payment, it stands to reason that stablecoins will need to meet the core elements of our existing regulatory framework for private money which underpins confidence that it is interchangeable with cash[8].

These are:

- A legal claim – to allow for prompt redemption at all times, for the amount initially deposited, and at no cost to the depositor; In other words – the little boy's right in *Mary Poppins* to demand that the bank 'give him back his money.
- Capital requirements – to lower the risk of insolvency, these are calculated based on the nature of the risks issuers undertake (credit, operational, market risks); they act as a cushion to absorb losses, reducing the chances that a firm fails.
- Liquidity requirements – to ensure redemptions can be met in most circumstances – supported by eligibility for central bank facilities where relevant, to meet firms' liquidity needs in extremis. This ensures that temporary liquidity issues arising from difficulties selling assets backing the value of stablecoins don't result in firm failure; and
- A backstop to compensate depositors – or in this case coinholders – such as the Financial Services Compensation

Scheme (FSCS) (or in other countries deposit insurance), in case of failure. This ensures that, even if a firm fails, transactional deposits up to a certain amount remain exchangeable for central bank money. Notably – one of the key responses to the Northern Rock episode was to increase FSCS coverage in the United Kingdom.

This is not to say the regulatory model for stablecoins needs to be identical to banks. It could include different applications of the above features. For example, if stablecoin operators are restricted to backing themselves in high quality liquid assets they won't need regulation to cover credit risk.

If they only back themselves in central bank reserves, which are inherently liquid, they don't need liquidity facilities. Ultimately, the specific requirements may well be different from those applicable to banks, but the outcome will be the same – that systemic stablecoins used as money will offer the same protection to coin holders as commercial bank money.

Conclusion

The title of this article is a cliché: everything that is old is new again. But I am going to end on a different cliché: the definition of insanity (widely – and inaccurately – attributed to Albert Einstein) is doing the same thing over and over again but expecting different results.

As I mentioned earlier, stablecoins may be innovative in the technology they use, but the fundamental questions they pose are not new. We as central bankers and regulators need to look at them as what they propose to be – a new form of private money.

This means that we will hold them to standards similar to those applicable to existing private money. It doesn't matter what type of technology you're using or the legal form of the firm. If a firm is offering private money on a systemic scale then it should be regulated as such.

Our core rules and requirements came through trial and error, often following financial crises. Our work on a regulatory regime for stablecoins builds on this learning process - rather than starting at square one and expecting different results.

I recognise that the themes here sound curmudgeonly. But this is not an anti-innovation message: quite the opposite. Establishing a secure regulatory environment for new forms of digital money to operate within the UK will lay a foundation for sustainable innovation.

As I said at the outset, if new forms of digital money can be made safe, they could potentially contribute to faster, cheaper and more efficient payments with greater functionality. They could increase the resilience of payments. And they could even have long-term benefits for financial stability.

But these opportunities can only be realised if new forms of digital money are safe – which means recognising and properly regulating the elements that are age-old. ■

Endnotes

1. Private money mainly takes the form of deposits held in bank accounts. The only form of public money accessible to the general public is cash, in the form of coins and notes.

2. This is based on the amount of cash held by the public as a share of total cash and sight deposits. See Part V of 'A millennium of macroeconomic data' [https://www.bankofengland.co.uk/statistics/research-datasets], Research dataset, Bank of England.

3. See LINK News and media contact, 'Coronavirus Crisis means cash use down but UK still withdrawing £1 billion from ATMs each week' [http://www.link.co.uk/about/news/coronavirus-cash-usage-data/]; See 'Statistics and trends' [http://www.link.co.uk/about/statistics-and-trends/]; See chart A in 'New forms of Digital money' [https://www.bankofengland.co.uk/paper/2021/new-forms-of-digital-money#Chart_A_FnA] DP, June 2021. Moreover, in practice, the UK authorities remain committed to ensuring access to cash to those that need it. The Bank, HMT, FCA and the PSR have been working together on the Joint Authorities Cash Strategy group to monitor the use of cash, ATM availability, and ensure cash remains available despite the impacts of Covid.

4. See the example of the Corralito in Argentina. (BBC, 02/12/2002: "Argentina lifts cash restrictions" [http://news.bbc.co.uk/1/hi/business/2535539.stm]).

5. See: "The financial crisis – 10 years on" [https://www.bankofengland.co.uk/news/2018/september/the-financial-crisis-ten-years-on] (Bank of England, 2018)

6. Stablecoins are different from CBDC. While stablecoins are a privately issued form of digital money, CBDCs are a form of digital money issued by the central bank. The Bank of England is exploring the case for a CBDC but has not made a decision yet.

7. In March 2018, the FPC noted [https://www.bankofengland.co.uk/-/media/boe/files/statement/fpc/2018/financial-policy-committee-statement-march-2018.pdf]: "[Crypto-assets] should be considered as assets rather than currencies. However, as assets, they establish no claim on any future income streams or collateral. They have no intrinsic value beyond their currently limited potential to be adopted as money in the future, and hence could prove worthless."

8. In December 2019, the FPC noted [https://www.bankofengland.co.uk/financial-stability-report/2019/december-2019] that: "Where stablecoins are used in systemic payment chains as money-like instruments they should meet standards equivalent to those expected of commercial bank money in relation to stability of value, robustness of legal claim and the ability to redeem at par in fiat."

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Do we need 'public money'?

Sir Jon Cunliffe is Deputy Governor of the Bank of England for Financial Stability

I want to talk about whether we need 'public money'. I should make clear that I am not talking here about public spending but rather about the form of money itself: by 'public money' I mean money issued by the state to its citizens for everyday use. This may seem a rather odd question.

In the UK, the Bank of England – a public institution[1] – has been issuing money to the public for over 300 years. Its banknotes, carrying the famous *"I promise to pay the bearer"* pledge are carried in millions of wallets and purses and used millions of times every day by the public to make transactions[2].

These notes and coins are denominated in Pounds Sterling, the currency of the UK. It is the Bank of England, on behalf of the state, that is charged with ensuring the stable value of the currency by keeping inflation at its 2% target.

Public money for general use in the UK is only available in the form of physical cash. It is highly visible, trusted and, indeed, is probably the image that many people in this country have in their mind when they picture money.

However, the majority of the money held and used by people in the UK today is not physical 'public money', issued by the state, but digital[3] 'private money' issued by commercial banks.

Around 95% of the funds people hold that can be used to make payments are now held as bank deposits rather than cash. In everyday use, only 23% of payments pre pandemic were made using public money in the form of cash, down from close to 60% a decade earlier[4].

This private money is not a claim on the state or backed with the resources of the state. It is not covered by that familiar Bank of England promise to 'pay the bearer'. It is not clear to me to what extent the general public understand this distinction between public and private money – or even that for most of the time they are using private money. I am not aware of any surveys or research that address this question.

I have, over the years sometimes asked the question of those I have met. Such an approach is statistically reprehensible of course and one certainly shouldn't base policy on it. But for what it is worth, the answers suggest that people are generally unaware of the distinction between private and public money.

And, outside periods of crisis, the type of money they use, what and who stands behind it, is not something that particularly interests them.

The fact that, unlike in some periods of history, we do not at present think much about these things and that people in the UK have a general confidence in the money they use regardless of its form and issuer is, I think, a good thing.

It is not an accident. It is due to the credibility of the institutional framework governing money in the UK that tethers private money to the public money issued by the state.

This framework has a number of important elements. An independent central bank ensures the stability of the value of the currency/unit of account. Commercial banks that issue money are regulated to ensure they are robust.

They hold accounts at the Bank of England, settle transactions electronically between themselves in Bank of England public money and are able to borrow from the Bank to meet liquidity shortfalls including in times of stress. And a deposit guarantee scheme gives holders of commercial bank money the protection of a backstop should the bank fail.

And, crucially, this tethering is also due to the fact that people have the right to exchange their private money, claims on banks, into public money, claims on the state, whenever they wish - as they do every time they go the ATM or pay cash in a bank account, without restriction or loss of value.

We do not have to look that far into the past to see episodes when this confidence in the money used in the UK – public or private – has been shaken. The monetary stability framework is less than 25 years old and followed a period in which the value of all monies, public and private, denominated in sterling was unstable[5].

The current regulatory framework for banks and deposit guarantee scheme originate in an even more recent experience. In the financial crisis only 10 years ago, the government was forced to bailout the banking system at enormous cost to avoid the millions of citizens losing the money they held in the form of claims on commercial banks – and the general loss of confidence in private money that would have ensued.

To be clear, I think the reforms we have made over the last 10 years have led to a much more robust and resilient commercial banking sector. The experience of the last 12 months has demonstrated the resilience of the banking system to an extreme economic shock.

But these not so distant episodes underline that threats to confidence in money or particular forms of money, is not just something in the history books. Money is in the end a social convention that can be very fragile under stress.

Future trends

Money is not only a social convention, it is a very dynamic one. The forms it can take and the uses to which it can be put have varied materially through history and between societies.

Change has often been driven by the interaction of technological innovation that has improved the functionality of money – for example, by making it more secure or more convenient to use. We have been living through a period of such change for the last few decades.

On the supply side, commercial bank, digital money has become more available to the general public, cheaper and more widely used, especially for lower value transactions.

On the demand side, convenience, especially with regard to e-commerce, has fuelled the public appetite for digital money. As a result the use of public money in the form of physical cash has been declining.

These changes have been very marked in the UK where they have mainly taken the form of the issuance of credit and debit payment cards to the general public[6], the development of a Faster Payments System and the emergence of e-money, a derivative of commercial bank money[7].

Digital forms of payment overtook cash in 2015 and now make up three quarters of all payments, with debit cards alone accounting for 42% of payments.

As the only digital money available to the public is private, commercial bank money, the shift from physical cash to digital payment over recent decades has meant a shift from public to private money. The pandemic and consequent huge forced experiment in remote living, working and transacting has, at least temporarily, accelerated these trends.

A recent Bank of England survey, for example, found that 70% of respondents were using less cash than prior to the pandemic. There has for obvious reasons been greater use of contactless payment[8] and internet transactions[9]. We do not, of course, know how persistent these changes will be when we emerge from the pandemic. I think, however, that it is a relatively safe bet that the experience of the last 12 months will lead to further acceleration of the move from physical to electronic/digital money and with it a shift from public to private money.

Over recent years, the technological innovations that have made digital private money cheaper and more convenient for both e commerce and face to face transactions have been the result of technologies that if not quite 'old hat' are certainly now quite familiar[10].

"... even without the new, technology enabled forms of money that are on the near horizon we are seeing accelerating changes in the way we live and transact that will greatly reduce and perhaps eventually eliminate the role that public money plays in the economy today"

There are, however, on the near horizon newer technologies and innovations, such as tokenisation and distributed ledger, which may further transform the money we use.

'Stablecoins', a form of crypto-assets are probably the best known of these. Their proponents claim that these have the potential radically to reduce the costs of digital money and to increase its 'functionality', the 'things it can do', embedding money much more deeply into the digital world in ways we can only now imagine[11].

The proponents of these newer forms of money are typically not banks but technology companies including the so called 'Big Tech' internet platforms. Their business models are very different to banks: many have no interest in providing credit but rather seek to integrate new forms of money into their other, data driven services.

This has attracted enormous attention, including from public authorities, like the Bank of England, who are now wrestling with the thorny question of what regulatory framework should apply to non-bank issuers of private money. (I do not propose to wrestle with that question today - the Bank of England will shortly be issuing a discussion paper on the public policy implications of non-commercial bank digital money[12])

Such developments would lead to a further shift away from cash and public money. They may never happen of course. However, having watched the digital transformation of other parts of the economy one would not bet against the next wave of technology leading to further major transformation: we could now, in payments, be in a 'Blackberry' world about to see the introduction of the 'iPhone'.

The Bank of England is committed to making physical cash, banknotes, available as long as there is demand for it and is working with other authorities to support continued access to cash. I do not think that demand for cash will entirely disappear any time soon. Many still rely on it for a number of reasons[13].

But cash, and by extension public money, is becoming an ever smaller fraction of the money we use in the UK and increasingly unusable in a digital world.

We may not be there yet. But it looks probable in the UK that if we want to retain public money capable of general use and available to citizens, the state will need to issue public digital money that can meet the needs of modern day life.

Does it matter?

The question – and it is not just a question for central banks – is: does it matter if the public cannot access public money they can use in their everyday lives?

The current mix of public and private money in the UK is the result of history rather than some informed policy decision and some might argue, generally available public money is becoming an anachronism.

Given we have the credible public authority framework for private money I described earlier, why should the state need to be involved in the issue of money to the public in competition with the private sector? The state does not directly provide electricity or water to the public in the UK anymore? Why should it provide money?

These are important questions that should not be brushed aside. Any decision that the state should issue a new form of digital money to its citizens cannot rest simply on the fact that the role in society of public money is declining.

It must rest on an assessment of the benefits of ensuring available and useable public money and the costs and risks of letting it disappear.

Such an assessment has not yet been done in the UK and no decision has been taken to introduce a public digital money – or to use its technical name, a Central Bank Digital Currency or CBDC.

Introduction of a CBDC would be a very major public project which would have material implications for the financial sector, many parts of the economy and for society more broadly.

The Bank of England, like many other central banks, has been exploring these issues in recent years. We published a discussion paper last year with an illustrative model of a general purpose public digital currency. We will shortly publish another discussion paper on some of the public policy issues generated by new forms of digital money.

At this year's UK Fintech Week, the Chancellor announced the establishment of a Task Force, led by the Treasury and the Bank of England to ensure a strategic approach is adopted between the UK authorities, as we collectively explore the issues posed by CBDC[14].

I do not want to anticipate the outcome of this work. But on the basis of the work the Bank has done so far, I can perhaps set out some preliminary views on where some of the benefits might lie and where, conversely, there might be risks in allowing publicly available state money to disappear.

In doing so, I will look to the future as well as to the present and to the possible entrance of non-bank issuers of private money such as the 'Big Tech' platforms.

Given the speed of technological development in payments and of the changes we are seeing in the way we transact, any assessment that is not forward looking is very likely to be overtaken by events.

Financial stability

First and foremost are the financial stability implications of the absence of public money for use by the general public. Ensuring confidence in money as a means of payment and store of value is fundamental to financial stability. Does the presence of public money in the hands of citizens play any part in this? The answers here, I think, lie in two related areas. First, the role that generally available public money plays in ensuring both the perception of uniformity of money in the UK and the reality of the substitutability, of all of the monies used in the economy.

The fact that holders of any private money issued by a commercial bank have the right to convert it into public money –ie. cash - on demand is in my view one key element in the framework that guarantees to users that one form of money in the UK, say claims issued by Bank A can be exchanged for claims on the state or claims on Bank B without any change in value[15]. From the user's point of view, it is all just the same 'money', pounds sterling.

The requirement on banks to be able to exchange, on demand, the money they issue through deposit accounts for Bank of England money also anchors the regulatory framework for banks.

The second area is the role that access to public money may play during times of stress when confidence in the issuers of private money comes under threat.

This is a complex issue. On the one hand during such episodes, easy access to safer, public money may stimulate runs out of private money amplifying the stress.

On the other hand, the knowledge that under stress depositors have the option to switch into state money may be important in preventing a more general loss of confidence in money.

Absent access to public money the general public is effectively locked into private money. Deposit protection, in such a world, only enables depositors to exchange the claims on one bank for claims on another.

In a systemic stress, when the robustness of the banking system as a whole is under threat, the perception that there is no route out of private money, that there is no access to safe liquid assets backed by the state, could undermine confidence.

This perhaps hints at something more elusive and yet more fundamental about the role of public money in citizens' perception of money itself: that whatever its form or issuer, confidence in the concept money in society needs anchored by the perception of a liquid safe asset that will always be accepted.

In previous centuries gold has played that role and its symbolism remains powerful to this day. In modern times, in the UK, I suspect the state, in the form of the Bank of England and its 'promise to pay' provides that anchor[16]. It is not at all certain whether the Bank of England could continue to provide that anchor, particularly in times of stress, if the public did not have access to the money it issues.

In thinking about these possible roles of generally available public money it is important to think beyond the status quo in which private money is issued only by tightly regulated commercial banks.

As I set out earlier, there is now the very real prospect of non-banks, including the large technology platforms or 'Big Techs', issuing new forms of digital money, such as 'stablecoins'[17] for general payment purposes. These are likely to have greater functionality and lower transaction costs than the current commercial bank digital money offering and could quickly attract a large number of users.

The role of generally available public money in anchoring both uniformity and confidence is likely to be more important in a world in which there is greater diversity in the issuers and the forms of the money circulating in the economy.

One cannot of course prove that generally available public money plays the role in financial stability that I have sketched out above. I know of only one, relatively small, example of a modern economy in which the general public does not have access to state money[18] and I am not aware of many in the historical record.

It is certainly arguable that that some combination of regulation and backstopping of private money in its current and future forms will be sufficient to provide the necessary anchors both in normal times and in stress.

But there are clearly risks here to confidence in one of the fundamental underpinnings of the economy and society. And unlike other fundamentals such as electricity and water, money is a social convention that depends on confidence.

These risks will need to be very carefully evaluated in any assessment of whether we should be prepared to let generally available, useable public money wither as the digital age progresses or whether the state should issue its own digital currency.

Other public policy objectives

There are other areas in which there may be risks in allowing publicly available state money to disappear and benefits from a CBDC. These concern the wider benefits from a well-functioning money and payments ecosystem for economic activity.

This is an area in which the Bank has a particular interest but where responsibility is shared across a range of public authorities that will be involved in the work of the Task Force. Specifically I am thinking about promoting competition, innovation, inclusion and privacy. Ensuring competition in the provision of payments services is important for the wider economy.

Today, businesses pay substantial fees in order to accept payment from their customers whether directly to private companies[19] or indirectly through the costs of sorting, transporting and securely storing cash. Small business are particularly impacted in both cases. Customers do not see these fees of course, but like other merchant costs, all else equal, they increase the prices that customers pay.

Payments systems are however, by definition, susceptible to network effects. Consumers and retailers prefer to use a payment method when it is already widely used, and so customers gravitate towards large payment platforms.

This dynamic makes it very difficult for new payments firms to enter the market, which can in turn insulate incumbents from competitive pressure.

Looking forward, the challenge of delivering competitive outcomes is likely to grow more complex. As the payments business becomes increasingly integrated into the digital economy, the use of data has the potential to deepen the network effects in payments.

For example, if, big tech platforms have a very different, data driven business model to banks. If they are able to better extract value from user data, they may be able to more heavily cross-subsidise their payments business.

Interoperability is key for fostering competition in payments systems. By interoperability I mean the ability of consumers to move funds across systems or providers with little friction and at no substantial cost.

New money and payment innovators, with powerful data advantages could have strong commercial incentives to set themselves up as so called 'walled gardens' – systems that are not interoperable with others and therefore lock in consumers.

Competition acts a spur to innovation. As I observed earlier, we may still be in the 'Blackberry' phase of innovation in payments. The new technology and growth of digital payments is increasingly allowing for specialisation[20] and innovations that are giving new options to consumers over how they pay. Ensuring competition will be key to the conditions in which such innovation can flourish.

Competition and cost control can be ensured by regulation, by access to infrastructure and by common standards. Payment card fees, for example, are capped in the UK and the Payment System Regulator acts as the economic regulator of the main UK payment systems.

Other regulation prescribes common standards for non-banks to access bank-based deposit account information. The Bank of England has widened access to its central payments infrastructure to include non-bank payment firms.

However, public digital money could also have an important role in this respect. The option of paying in cash has in the past served to anchor the cost of face-to-face transactions. Looking ahead, as payment options proliferate, the option of using digital public money as an alternative to private money could play an important role in anchoring costs.

Equally important, digital public money and the infrastructure necessary to support it would help ensure the necessary interoperability and common standards between all major payment systems in the future economy. The extent to which digital public money in the form of a central bank digital currency could play these roles would depend on its design - most particularly on its interaction with the private sector.

In its discussion Paper last year, the Bank of England set out as an example a platform model of a central bank digital currency. This illustrated the role private firms might play in delivering interoperability, innovation and competitive outcomes as part of a future payments landscape.

In the model, digital public money would operate alongside private money - as cash does now. The central infrastructure in the model would be operated by the Bank of England. All customer facing services, however, would be provided by private sector firms, banks and non-banks alike, who would be able to plug into the Bank of England infrastructure and integrate digital public money into the services they offered.

There are also some wider social questions about the type of money we use that fall broadly into the category of 'values'. I will briefly highlight a few of these.

The first is inclusion. It is important for social as well as economic reasons that all have access to money in the form they need to make transactions. Physical cash provides a backstop. It requires very little of users - neither identification, nor ownership of a smart phone nor any particular understanding of technology. But it is increasingly a backstop rather than a fully functioning alternative.

Today, there are currently 1.2 million unbanked people in the UK, who by and large rely on cash and cannot access digital payments or can access them only at disproportionate cost.

The experience of the last 12 months has highlighted the risks of digital exclusion generally. As the economy become increasingly digitised, the social consequences of exclusion from digital money will become more severe. This is not simply due to the growing importance of internet transactions. We already see a small but growing number of examples in which cash is not accepted for face-to-face transactions.

As we have seen over many years with the banking system, future private money and payments providers may not have the commercial incentives to provide useable services for the unbanked and other parts of the population. Digital public money, appropriately designed, may therefore have an important role to play in ensuring inclusion.

A second area in this values category is privacy. This is a complex area. There is clearly a trade-off between the need for effective law enforcement to combat illicit activities on the one hand and citizens' right to privacy on the other. The balance will I am sure need to be struck in the same place for digital private and public money alike. It may, however, be considerably easier to implement for public digital money.

There is, however, another important privacy concern – the use of data on individuals' transactions for commercial rather than law enforcement purposes. This is, and will I am sure, continue to be covered by regulation.

But as most of us have probably experienced when being asked to give permission to use our data, there is often not an alternative option offering greater privacy available for the service we need. Given the network effects around money and payments, it is not clear that absent public digital money such an alternative would exist.

And finally, and perhaps most simply, should citizens have the right to holding and using the safest form of money, public money, in their usual, everyday lives and in times of uncertainty? It is perhaps no coincidence that the demand for Bank of England money, cash, has gone up during the current pandemic even as the use of it in daily transactions has gone down[21].

Conclusion

When seeking to deliver public goods, such as inclusion and privacy, and similarly for competition, one might look to regulation to achieve desired public policy objectives. And indeed, the same may be true for the public policy objective of financial stability.

But regulation alone is not always the silver bullet for complex, multidimensional public policy objectives. It can

be expensive, slow to react and difficult to police. It can also create barriers to competition.

It may be that a consistent regulatory framework across a range of policy areas could mean that it would not matter much if the population at large lost access to useable public money. But it might also be that a well-designed and effective public money alternative in combination with regulation where necessary would provide a more efficient and a more robust answer.

These issues and their implications for the design of any digital public money England will be at the centre of the work of the Treasury/Bank of England task force. We will explore them also in the broader engagement group that has been established.

There are other important questions that I have not covered about the public policy implications of any shift away from commercial bank money into any new forms of non-bank digital money whether public, like CBDC or private, like stablecoins. These will be explored in a Bank of England discussion paper we hope to release in the next few months.

My message, however, is that even without the new, technology enabled forms of money that are on the near horizon we are seeing accelerating changes in the way we live and transact that will greatly reduce and perhaps eventually eliminate the role that public money plays in the economy today.

New technologies and the entrance of new players are likely to reinforce these trends. We should not let this happen by accident.

Whatever the outcome, it should be based on a careful and thorough assessment of the implications of such a change and of the alternatives that may be available to us. ■

Endnotes

1. For much of the Bank's history we have been a quasi-public institution, under private ownership but tasked with the discharge of official functions.
2. The Bank of England is responsible for issuing Banknotes in the UK. Coins are produced by the Royal Mint, by agreement with HM Treasury.
3. This is sometimes also refer to as electronic money, but I will use the term digital money here – which avoids confusion with the narrow development of 'e-money' institutions.
4. UK Finance – UK Payment Market Summary (2020)
5. The UK's experience of high and volatile inflation is well documented. In the ten years before the introduction of the current monetary stability framework, inflation was on average twice as large and twice as volatile as in the following period.
6. Nearly all adults in the UK (97%, some 53 million people) now hold at least one debit card. The proportion of adults with at least one credit or charge card has increased slightly over the past few years with 68% of adults having at least one credit or charge card in 2019.
7. E-money firms are authorised or registered to issue e-money and undertake payment services. They offer electronic money, with client funds held at a commercial bank (and therefore backed at the central bank). However, e-money firms are not subject to many of the same safeguards as retail deposits, most notably deposit insurance.
8. In 2020 just under ninety percent of UK payments in the UK were contactless (Barclays Insights – 'Covid and the rise of the contactless consumer').
9. Online shopping accounted for 28% of UK retail spending in September 2020, compared with 19% a year earlier (Bank of England)
10. For example developments such as the use of 3-D secure protocols, delivered through Access Control Servers (ACS), have enabled the rapid growth of safe online payments and the integration of Near Field Communications (NFR) has enabled contactless card payments and greater adoption of mobile payments.
11. In the Bank of England's 2020 Discussion Paper on CBDC we highlighted emerging functionalities such as programmable money, smart contracts, device to device payments and micropayments. Amazon's 'Just Walk Out' stores give a sense of what is already possible. Advances in payments technology appear likely to accelerate these developments and provide for greater sophistication in the type and complexity of transactions that can be conducted seamlessly.
12. In the December FSR the Bank of England committed to publishing in due course a discussion paper on the potential effects from stablecoins and/or CBDCs on financial stability.
13. These are set out in detail in the 2019 'Access to Cash Review', which draws on a survey of 2,000 consumers.
14. Bank of England statement on Central Bank Digital Currency. The announcement also highlighted the formation of an engagement group for ensuring voices from across business and civil society are able to engage policy makers on these policy debates.
15. Today financial institutions are required, by regulation, to ensure redemption at par in fiat, which has the effect of also anchoring their redemption against other similarly regulated private monies, given the common reference point.
16. The promise to pay is, like all promises, intimately tied to credibility. Users must trust in the ability and integrity of the issuing authority, such that they can have confidence in support for the value of the means of payment. Physical symbolism in establishing this commitment may be significant, that is to say users of money place value on role of possession of a physical object establishing the right to a claim.
17. The Bank of England's Financial Policy Committee has set a clear expectation that where stablecoins are used in systemic payment chains in place of money, they must offer the equivalent protections to stable and reliable money currently used in traditional systemic payment chains, whether central bank money or private commercial bank money.
18. In Hong Kong, banknotes are issued by three commercial banks (under license from the HKMA). A similar arrangement exists in Scotland and Northern Ireland.
19. The Payment System Regulator has estimated the weighted average merchant service charge (the largest, but not only, fee item when accepting digital payments) across UK card transactions to be around 0.6%. This varies by size of business and is higher for smaller firms. For SMEs with lower turnover, the average MSC is three times larger, at around 1.9%.
20. We usually refer to making a payment as one, single, uniform activity – but there are a wide range of types of payments which may lead to distinct technological solutions. Payments vary based on who is making them (eg. business to business, person to person, government to person), their size (buying a house or chocolate bar), complexity (refunds, conditionality, bundling with other services eg. buy now pay later).
21. Despite the decline in the transactional use of cash throughout the pandemic, the value of notes in circulation (NIC) has shown strong growth, as is today nearly 20% higher than immediately before the pandemic. For context, the average growth rate of NIC over the preceding five years was 0.5%. For more detail, see Cash in the time of Covid

The views expressed here are not necessarily those of the Bank of England, the Monetary Policy Committee or the Financial Policy Committee. I would like to thank Shiv Chowla, David Copple, Ben Dovey, Julian Schelle, George Barton, Ridheema Manek, Miranda Hewkin-Smith and Cormac Sullivan for their help in preparing the text. I would like to thank Andrew Bailey, Nicholas Butt, Victoria Cleland, Lee Foulger, Andrew Hauser, Tom Mutton and Christina Segal-Knowles for their comments.

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A new template for the European fiscal framework

The European fiscal rules have been temporarily suspended since March 2020 to enable member states to take emergency measures against the COVID crisis. Martin *et al* argue this should be taken as an opportunity for an ambitious reform of a now clearly outdated fiscal framework

This column, part of the Vox debate on euro area reform, argues that the reactivation of the rules, now foreseen in 2023, should be made contingent on a political agreement on reforming the fiscal framework, and proposes a comprehensive reform in which the new European fiscal framework would prioritise externalities arising from debt sustainability risks and demand spillovers.

Fiscal targets should be differentiated depending on country vulnerabilities and implemented in a more decentralised way. We propose a comprehensive reform in which the new European fiscal framework would prioritise externalities arising from debt sustainability risks and demand spillovers.

Fiscal targets should be differentiated depending on country vulnerabilities and implemented in a more decentralised way. We provide a detailed economic and institutional roadmap for this reform.

We are no longer in the world of Maastricht

Since the Maastricht Treaty, the European fiscal rules have been constantly revised (without significant Treaty changes) but overall, the underlying framework has remained the same. Even before the COVID-19 crisis, many economists and officials were calling for its reform (eg. Bénassy-Quéré *et al*. 2018, Darvas *et al*. 2018, Feld *et al*. 2018, Thygesen *et al*. 2018).

The post-COVID context results in a disconnect between these rules and four new facts: higher public debts, very low or even negative interest rates, limited effectiveness of monetary policy in the vicinity of the effective lower bound, and common debt issuance with the adoption of the European recovery plan in 2020.

In this context, the role of fiscal policy in reducing both temporary and persistent demand deficits must be reassessed. This has strong implications for the euro area, where this role has been codified on a premise that now appears to be obsolete. Echoing Mario Draghi's 2014 call for a *"greater role"* for fiscal policy alongside monetary policy (Draghi 2014),

ECB Executive Board member Isabel Schnabel recently advocated rethinking the relationship between monetary and fiscal policy when interest rates can no longer be reduced, saying that *"effective macroeconomic stabilisation in the vicinity of the lower bound requires both unconventional monetary and fiscal policies"* (Schnabel 2021).

The case for a comprehensive overhaul of the fiscal rules

In a recent French Council of Economic Analysis paper (Martin *et al*. 2021), we argue that to be effective, an overhaul of the rules should address two main fiscal externalities.

The first, which was at the heart of the euro area crisis, is the risk to the area's financial and monetary stability posed by sovereign insolvency and, even more so, by the possible exit that could follow.

The rules should tackle the insolvency risk resulting from excessive debt, not the threats resulting from self-fulfilling

expectations, which are and should remained addressed by the ECB (Farhi and Martin 2018).

The second externality, which was largely neglected in the design of the EMU, pertains to aggregate demand. As long as fiscal support to aggregate demand is called for and no central budget exists to take on this role, the impact of national fiscal policies on partner countries must be considered.

This externality was long considered secondary because of opposite spillover effects through the goods and capital markets, yet it is significant when the central bank's policy rate can no longer be reduced due to the effective lower bound.

While the need for reform is increasingly recognised, its nature remains fiercely debated. Blanchard *et al.* (2021) call for replacing budgetary rules by qualitative standards.

They propose to get rid of all numerical criteria, to replace them with the sole principle that member states *"ensure that their public debts remain sustainable with a high probability"* and (in the most streamlined version of their proposal) to replace the mechanism of gradual sanctions by the standard EU procedure of action by the Commission before the Court of Justice.

We agree on the focus on sustainability and on removing the multiple numerical criteria that have accumulated in the European fiscal framework. However, we consider a complete break with the Pact as unrealistic.

Country-specific debt targets

We do not propose to rewrite the central provisions of the Treaty on the Functioning of the European Union (TFEU). This applies first of all to Article 126 (*"Member states shall avoid excessive government deficits"*), including the gradual pressure its procedures entail and the possibility – never used – of financial penalties.

We regard a gradual peer pressure mechanism as appropriate in a context where excessive public debt may have adverse effects on partner countries.

Similarly, we do not propose to eliminate the central provision of Article 121 (*"Member states shall regard their economic policies as a matter of common concern and shall coordinate them within the Council"*) on which the preventive arm of the Stability Pact was built. Neither the spirit nor the letter of this article prejudges the nature of externalities or the desirable direction of national policies.

However, we believe it is essential to at least de facto (and in time de jure) remove the uniform numerical thresholds for the debt (60% of GDP) and the deficit (3% of GDP) indicated in the Protocol 12 annexed to the TFEU. The debt threshold sets a target that is too far removed from reality and lacks analytical foundations.

Uniform numerical criteria are misplaced because debt sustainability depends fundamentally on the differential between the interest rate and the growth rate and on a state's capacity to maintain a sufficient primary surplus. These determinants of debt sustainability are all very much country-specific.

We therefore propose that each government sets a medium-term debt target, the appropriateness of which would be first assessed by the domestic independent fiscal institution (IFI) on the basis of a common methodology, monitored by the EFB, and second endorsed (or rejected) by the EU.

This target should be explicitly based on estimates of the maximum primary balance and the risks to the interest rate–growth rate differential.

Once debt targets have been set, they should serve as anchors for expenditure rules. The path for primary nominal expenditure net of new discretionary tax measures (and excluding automatic stabilisers on the expenditure side) would be determined accordingly.

Our proposal would change the hierarchy of objectives. So far, the deficit criterion has in most cases been given priority over the debt criterion. We would instead give priority to a country-specific debt target and de-emphasise the primacy of the deficit criterion.

Legally speaking, the reference value for public debt mentioned in Article 126 would need to be interpreted as country-specific rather than uniform. Ultimately, this would require amending Protocol 12, which can be done by unanimous agreement.

"We believe that the European economic policy system must learn all the lessons of the new economic and financial environment"

We do not favour introducing a golden rule that would treat investment expenditures differently from other public expenditures, as the distinction between investment expenditures and other growth-enhancing expenditures would raise endless discussions.

Nevertheless, it will be the role of the IFIs and of the EU to take into account the impact on potential output of public investment in a broad sense. The assessment of public finance sustainability should also consider the time profile of climate investments in order to ensure they are not postponed.

Space for discretionary policy

Because discretionary fiscal policy has an important role to play in a regime of low interest rates and as long as the sustainability objective is not at risk, the fiscal framework should leave room for active demand management.

A possibility would be to apply a common flexibility factor to national expenditure rules. However, this would not prevent member states from running excessively tight fiscal policies in a slump.

The Recovery and Resilience Facility (RRF), introduced in 2021 to respond to the pandemic shock, could serve as a template for a new European fiscal instrument. It would not be a budget, and the stabilisation of business cycles would continue to rely on monetary policy and on the member states' fiscal policies.

Nevertheless, the experience with the RRF could serve as a basis for taking joint fiscal initiatives in response to crises leading to prolonged demand shortfalls or to a structural lack in public investment. This could take the form of a European instrument to finance specific public investment programmes by means of mutualised debt.

A new institutional framework

We propose a redefinition of responsibilities of both the IFIs and of the European Fiscal Board (EFB). We recommend strengthening the resources, independence and surveillance capacities of the national IFIs, in order to further anchor the culture of fiscal responsibility in domestic institutions. We propose that:

- the EFB defines a common methodology to assess national fiscal sustainability, and controls its implementation by the IFIs;
- each government sets a debt target and expenditure rule over a five-year horizon;
- the IFI assesses whether the government's debt target is compatible with the EU sustainability standards, and its detailed assessment is made public;
- the Commission recommends to the Council whether or not to endorse the national debt target and expenditure rule;
- the Council (in euro format) endorses or rejects the member state's fiscal targets; and
- the Commission monitors the implementation of the country-specific fiscal rule.

A detailed map of the institutional geography is given in Figure 1.

Enforcement

To remain effective, a more adaptable oversight system must rely on credible sanctions for violation of the sustainability requirement. On top of the approval of the debt target and the expenditure rule by the Council, we propose the excessive deficit procedure be triggered by a manifest violation of the country-specific expenditure rule.

Moreover, if the Commission assesses that the budget for the following year risks materially violating the expenditure rule, it should refer it to the Eurogroup, which would make its opinion public.

Finally, an adjustment account should be introduced that would keep the memory of past spending slippages (or past under-spending) and contain or permit future spending overruns.

On top of being legally powerful, analyses and pronouncements by the IFIs, the Commission and the Council will carry weight because these informed judgements on potential risks to debt sustainability would have financial consequences through impacting borrowing costs.

For the management of demand externalities, we propose that the Commission make a recommendation to the Council on the overall fiscal stance of the euro area, both at a one-year and five-year horizon, and that it recommend the reorientation of a fiscal policy (be it too restrictive or too expansionary) of a member state that would aggravate current account imbalances within the zone.

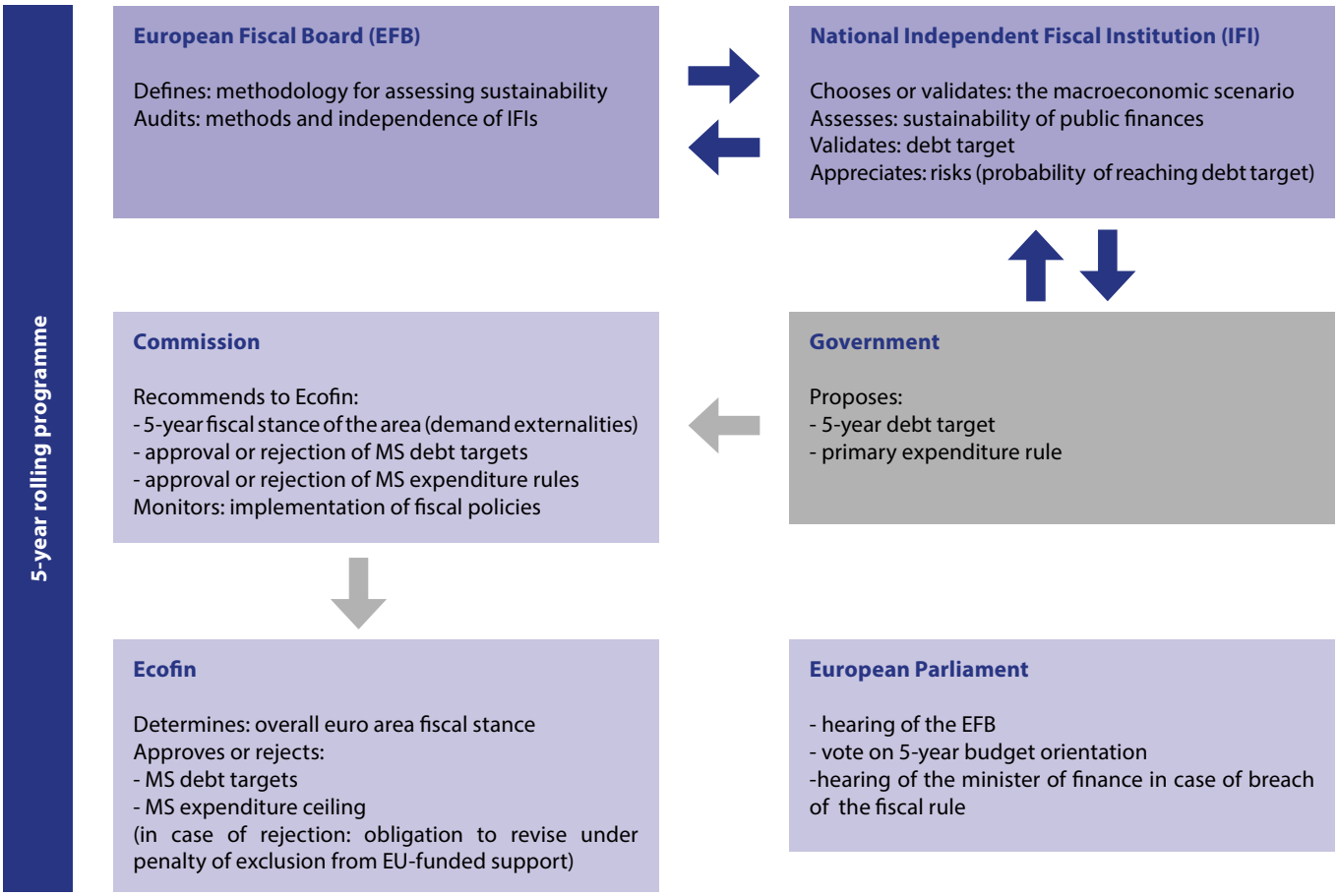
The Commission should also be entrusted with the responsibility of proposing the activation of exceptional support through the to-be-constructed common fiscal instrument.

Conclusion

The reforms we propose are substantial but compatible with the essential provisions of the European treaties. They aim to avoid policies that would endanger the stability of the euro area, whether through excessive debt or lack of fiscal support.

We believe that the European economic policy system must learn all the lessons of the new economic and financial environment. The reforms of the fiscal framework that we are proposing aim to make states both more autonomous in their fiscal choices, and more responsible. ■

Figure 1



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Towards a green capital markets union

Christine Lagarde is President of the European Central Bank

When technology and finance unite around a common purpose, the consequences for monetary unions can be far-reaching. Let me borrow an example from US history. The economic and financial integration of the United States in the late 19th century owed a great deal to the new technology of railroads.

With a fragmented local banking system, the huge amount of financing needed for this project could only be mobilised via capital markets, notably in the form of railroad bonds.

This, in turn, laid the foundations for the development of the US-wide financial system[1]. The railroads ended up linking not only the far-flung corners of the union, but also its capital markets.

If you allow me the analogy, I see some parallels between this period of US history and the EU's transition today towards a sustainable economy, backed by the growth of sustainable finance.

The shift to net zero emissions, together with an adequate digital backbone, will require major investments across Europe in technology, infrastructure and networks. Fragmentation between national financial markets might constrain our ability to finance future investments. But if green finance continues to emerge to fund this transition, the consequences for Europe's financial system could be sweeping.

In fact, I believe that the green transition offers us a unique opportunity to build a truly European capital market that transcends national borders – or what I would call green capital markets union (CMU).

And, like the railroads in the past, this could have ramifications for our monetary union that reverberate more widely. Integrating green capital markets could play a part in addressing two of the wider challenges we face today.

First, we face the challenge of making our monetary union more resilient to cyclical shocks. To achieve this, we must do better at reducing risks, and also at sharing risks across countries.

And second, we need to transform our economies as structural changes speed up around us. We must redirect activity towards the green and digital sectors as quickly as possible, which will help raise Europe's growth potential[2].

Addressing these challenges is important for the ECB, as they affect the transmission of our monetary policy across the euro area. They require parallel efforts on many different fronts. But a common thread is the need to enhance the contribution of the financial sector, in particular by taking significant steps towards a capital markets union in Europe.

Integrated capital markets are at the heart of building resilience, because they encourage Europeans to invest in debt and equity irrespective of home country considerations. That, in turn, helps share the costs of local recessions, because financial losses in one part of the Union can be offset by gains in another. Scale and depth matter, as does a common regulatory framework.

At present, however, financial markets are less integrated in the euro area than in other large economies. Only around 20% of shocks in the euro area were mitigated through cross-border debt and equity holdings between 1999 and 2016, compared with at least 60% in the United States[3].

Capital markets are also vital to fund the transformation of our economies. We need to see investment of around €330 billion every year by 2030 to achieve Europe's climate and energy targets[4], and around €125 billion every year to carry out the digital transformation[5].

While banks can and should provide a good share of this funding, capital markets can provide innovative tools to close the investment gap. Capital markets are better suited to financing projects with a defined purpose, directly linking investors to the impact they intend to achieve. And they are also better at drawing retail investors towards supporting transformative activities[6].

Although we are making progress, thanks to the work of the Commission, completing a fully-fledged CMU will take time. Capital markets have developed nationally, so we first have to open them up and harmonise those markets in order to integrate them further.

This begs the question: how do we deepen capital markets faster? Are there market segments where fewer obstacles exist and where we can achieve high levels of integration

quickly, but that also encourage the funding of future-oriented projects?

Developing European green capital markets

To my mind, Europe's green capital markets meet all these criteria. Green capital markets are dynamic and growing in Europe, and they are already relatively well integrated. This means that as they deepen further, so will Europe's resilience.

Europe is established as the location of choice for green bond issuance, with around 60% of all green senior unsecured bonds issued globally in 2020 originating here. And the market is growing rapidly – the outstanding volume of green bonds issued in the EU has grown almost eight-fold since 2015.

Environmental, social and corporate governance (ESG) investment is also concentrated in Europe. The assets under management of investment funds with ESG mandates have almost tripled since 2015, and over half of bond funds are domiciled in the euro area[7].

In addition, the euro has taken the lead as the global currency of green finance. Last year, around half of the green bonds issued worldwide were in euro. There is immense potential for this role to grow once the green transition takes off worldwide and we see a generational transfer of wealth to millennials who are bound to be concerned about the future.

Crucially, the green bond market has already achieved greater pan-European scale. Holdings of green bonds within the EU have, on average, half the home bias of conventional bonds.

And this means deepening the market is a different type of challenge. We do not need to undo the past – we need to create a new framework that did not exist before. So we have a real opportunity to build a genuinely European capital market from the outset.

Green capital markets could also act as a catalyst for the overall structural transformation of Europe, ensuring that it happens both quickly and evenly across EU countries.

These capital markets would not just add debt into the green finance mix, they would also add equity, which – as ECB research demonstrates – typically leads to more green innovation and a faster reduction in carbon emissions[8].

And they could spark the take-up of digital technologies such as smart urban mobility, precision agriculture and sustainable supply chains, which are crucial to the green transition[9].

With their pan-European reach, green markets could also help all countries to access the capital they need to finance economic transformation – not only those with the most sophisticated financial markets. That would support convergence within Europe, enabling capital to flow to regions that are currently lagging behind in the transition to a more sustainable economy.

In order to build momentum, the 'public sector dimension' should be part of the picture. The issuance of green bonds

"Green CMU not only gives us a tremendous opportunity to craft something genuinely European and with immediate impact, but it also has the potential to transform the EU as a whole"

by governments will be key to funding major infrastructure projects, which in turn helps create a pipeline of projects for the private sector to invest in. As part of the Next Generation EU fund, the European Commission will shortly be placing €225 billion of green bonds, making it by far the world's largest issuer.

Towards Green CMU

I must stress, however, that the continued growth of green capital markets will not happen by itself. We will at some point hit the same limits that now restrict the integration of our broader capital markets – missing cross-border infrastructures and national constraints.

If the EU cannot provide the services that foreign investors and issuers are looking for, they will go elsewhere. In fact, we know from history that deep and liquid capital markets are key to a currency gaining global status. If others move faster than we do, the euro's advantage as the global green currency could fade and be lost. The euro would miss an opportunity to strengthen its international role.

So in my view we should reinforce the CMU agenda by supporting the development of Green CMU. Specific initiatives under the CMU action plan should be fast-tracked – even if they are applied only to sustainable finance for now.

A key element is indeed the Commission's proposal on corporate sustainability disclosures. I strongly welcome this proposal and believe it can finally address the main data gaps currently afflicting the EU's sustainable finance landscape.

It will also be a key pillar of the Commission's forthcoming proposal for a European single access point. By integrating sustainability disclosures with financial data, we would create a 'one-stop shop' for all critical information about a company, including its green credentials, which would be immensely useful for investors. But more fundamental reforms will also be necessary.

We need proper European supervision of green financial products with official EU seals such as the forthcoming EU Green Bond Standard[10]. This is key to ensuring compliance and to identifying systemic links and associated risks within the cross-border market.

We also need harmonised tax treatment of investments in sustainable finance products, so as to prevent fragmentation

of green investments along national lines. And we need further convergence in the efficiency of national insolvency frameworks, even carving out special procedures for green investments.

These initiatives can be seen as an engine for the CMU project generally, testing and putting in place some of the measures that are needed to advance wider capital market integration. If we succeed, there will be very positive knock-on effects for European capital markets.

In short, Green CMU not only gives us a tremendous opportunity to craft something genuinely European and with immediate impact, but it also has the potential to transform the EU as a whole.

It would allow us to make our economy more resilient to shocks and fit for the future, all while avoiding the worst scenarios for climate change. To my mind, that is too good an opportunity to pass up. ■

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6. Brière, M and Ramelli, S (2021), "Can responsible investing encourage retail investors to invest in equities?" [https://www.ceps.eu/ceps-publications/can-responsible-investing-encourage-retail-investors-to-invest-in-equities/?mc_cid=5730a7093b&mc_eid=51fbb87bc7], ECMI Commentary, No 73, European Capital Markets Institute, March.

7. According to EFAMA market insights, in December 2020 the net assets of European ESG funds amounted to EUR 1.2 trillion, with an annual growth rate of 37%.

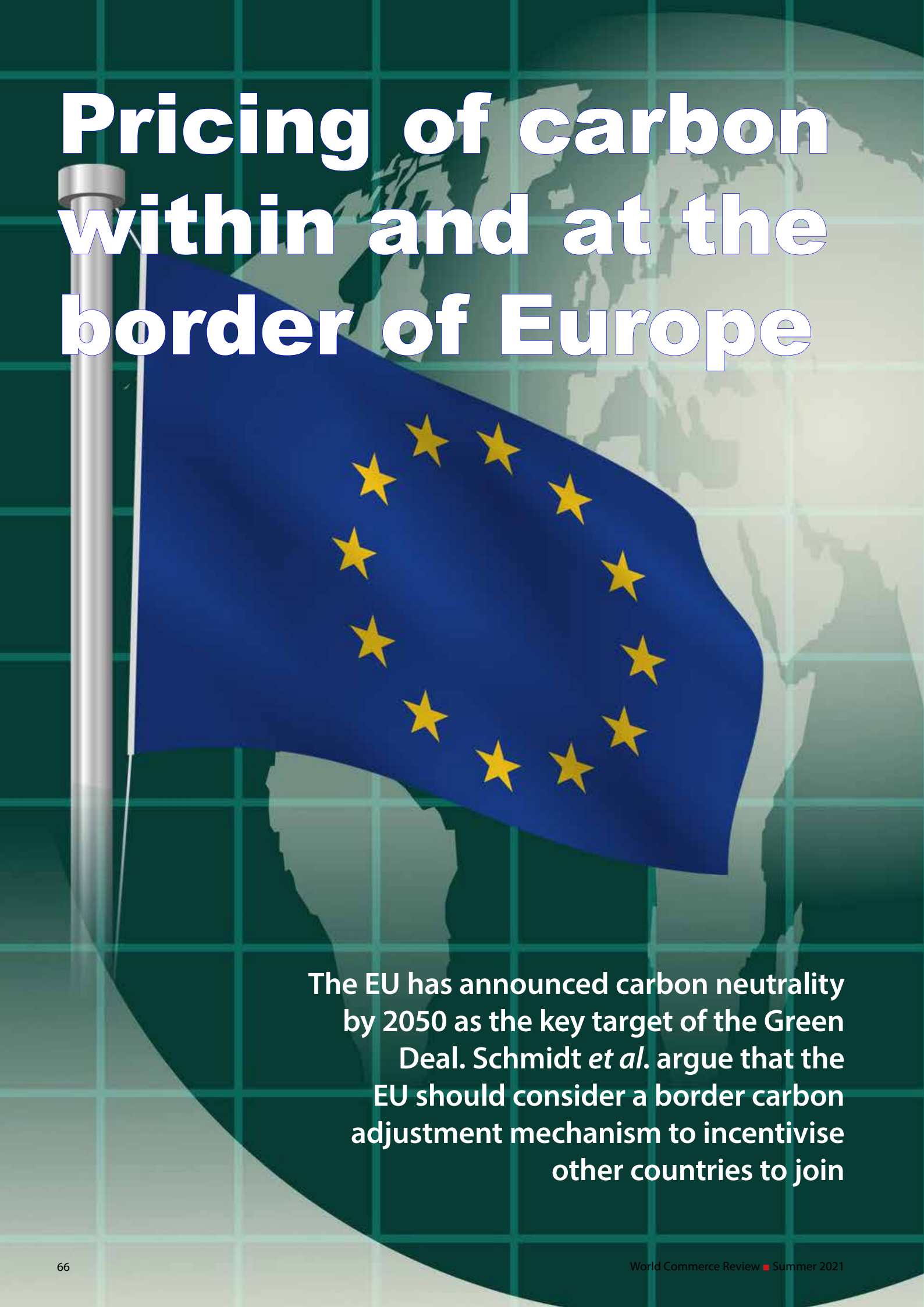
8. De Haas, R and Popov, A (2019), "Finance and carbon emissions" [https://www.ecb.europa.eu/pub/pdf/scpwps/ecb.wp2318~44719344e8.en.pdf], Working Paper Series, No 2318, ECB, September; Popov, A (2020), "Does financial structure affect the carbon footprint of the economy?" [https://www.ecb.europa.eu/pub/fie/html/ecb.fie202003~197074785e.en.html#toc8], Financial Integration and Structure in the Euro Area, ECB, March.

9. In 2017, Europe had 76% more patents in the digital-green domain than the United States and over four times more than China. European Investment Bank (2021), Investment Report 2020/2021: Building a smart and green Europe in the COVID-19 era [https://www.eib.org/en/publications/investment-report-2020].

10. See the European Commission's website [https://ec.europa.eu/info/business-economy-euro/banking-and-finance/sustainable-finance/eu-green-bond-standard_en].

This article is based on a speech [https://www.ecb.europa.eu/press/key/date/2021/html/ecb.sp210506~4ec98730ee.en.html] delivered at the European Commission's high-level conference on the proposal for a Corporate Sustainability Reporting Directive, Frankfurt am Main, 6 May 2021

Pricing of carbon within and at the border of Europe



The EU has announced carbon neutrality by 2050 as the key target of the Green Deal. Schmidt *et al*. argue that the EU should consider a border carbon adjustment mechanism to incentivise other countries to join

The EU has announced reaching carbon neutrality by 2050 as the key target of its Green Deal strategy. The best coordination signal in this endeavour would be a uniform and encompassing price on carbon. To ascertain that all goods consumed in the EU face the same carbon price, it would be sensible to credibly prepare the implementation of border carbon adjustments applied to imported goods.

This column argues, however, that the EU should refrain from exempting exports from carbon pricing, and should consider a border carbon adjustment mechanism only after having established a credible uniform carbon-pricing mechanism within its jurisdiction. This could provide incentives to other countries to join a far-reaching international alliance for carbon pricing.

The EU can become the world leader in the energy transition. It should be the explicit aim of this effort to provide the path towards an effective global approach to climate policy. To tap into a fruitful division of labour, research and investment projects entailing high European value added and policy instruments for setting incentives for the greening of the European economy should be coordinated at the European level.

Previous work by the French Council of Economic Analysis (CAE) and the German Council of Economic Experts (GCEE) (GCEE 2019, CAE and GCEE 2019), as well as the interdisciplinary work of the German national academies of science (acatech *et al*. 2020), advocated the pricing of carbon as the leading instrument of European climate policy.

Uniform carbon pricing: a cornerstone of European climate policy

As explained, for example, by Schlögl and Schmidt (2020), in the diverse and decentralised economic system that characterises the EU, the best coordination signal corresponding to this principle would be a uniform price on carbon that encompasses all actors, sectors, regions, and technologies. Separate pricing systems for different sectors or for different countries can only be interim solutions.

Correspondingly, while separate target values for sectors and member states can serve as important gauges of actual developments, it is not advisable to interpret them as binding restrictions. Voluntary participation by all member states in the uniform pricing mechanism might require financial transfers to member states whose energy systems still rely more heavily on fossil resources.

In principle, several pricing mechanisms could be employed to implement a uniform European carbon price – both price (taxes or surcharges) or quantity (emission certificates) schemes. As this already provides a functional and effective system, the best strategy would be widening the scope of the European Emissions Trading System (EU-ETS).

Currently, the EU-ETS only covers the industry and energy sectors, and it is pursuing a joint European reduction target for these sectors. For other sectors, the burden-sharing agreement instead stipulates a set of national target values

for 2030. With this compartmentalised approach, the EU is foregoing any possibility to enact the principle of division of labour in emissions reduction.

It might be sensible to fortify the EU-ETS with a minimum price floor over an extended time horizon, and also to engage in an extensive reform of national energy taxes and surcharges to support the uniform carbon pricing.

In practice, it will take time to integrate EU-ETS and non-EU-ETS sectors; the aim should be to form an integrated EU-ETS well before 2030 and, in parallel with this, to dismantle the multiple national climate policies. The longer the implementation of a uniform coordination signal by a fully integrated EU-ETS takes, leaving the coordination of transformation efforts in the non-EU-ETS sectors to separate (national) pricing schemes, the higher the overall cost of transition.

As long as carbon prices remain too low and limited in scope[1] the EU should regularly estimate and make public the shadow price of carbon that supports its climate ambition[2].

It should be used in the cost-benefit analyses that need to be conducted on its portfolio of existing non-price climate policies, such as bans, norms, standards, and subsidies. By providing additional public revenue, moving to carbon pricing will also help alleviate the regressivity inherent in climate policy.

This is a national responsibility of the member states (CAE and GCEE 2019), and this revenue would enable member states to fund redistribution schemes[3], energy price reforms and infrastructure investments, according to their individual preferences and institutions.

Arguably, Europe will only be able to contribute to the objective of reaching global climate neutrality if it manages to design its own transition path in a way that combines climate neutrality with unimpeded prosperity growth.

Taking action unilaterally is endangering the international competitiveness of energy-intensive European firms, which are facing serious competition from outside the realm of European climate policy ('carbon leakage').

So far, the EU-ETS has not led to serious carbon leakage problems, but the carbon prices emitters hitherto had to pay were moderate (aus dem Moore *et al*. 2019). It seems likely that this innocuous result will change at the higher carbon prices that will correspond to the ambitions of the Green Deal.

Climate neutrality and the European Green Deal: great ambitions

In December 2019, the European Commission proclaimed the European Green Deal as its principal growth strategy, announcing as its key target reaching carbon neutrality for the EU by 2050 (European Commission 2019).

This ambitious long-term objective has important repercussions for the EU's climate target for 2030; Europe is set to pledge to cut emissions by some 55% compared with their 1990 levels, a substantial accentuation of the previous target of 40%.

The Green Deal comprises a wide range of measures to cut emissions in areas such as energy systems, mobility, heating, and agriculture. Most importantly, the Commission is considering the implementation of an encompassing carbon-pricing mechanism covering all relevant sectors.

To implement uniform carbon pricing, the Commission announced its intention to widen the scope of the EU-ETS by 2021 to beyond the industry and energy sectors (European Commission 2020a).

The ensuing uniform carbon price would serve as the desperately needed principal coordination signal for the massive public investment and, to an even larger extent, private investment needed to meet the more ambitious European climate targets by 2030.

Arguably, carbon prices will have to rise steeply over time in order to meet these targets (Gollier 2021). Moreover, their effect in incentivising investments today already stands and falls with the credibility of their installation as an unalterable coordinating signal.

Until a fully integrated EU-ETS is implemented, reducing emissions in the non-EU-ETS sectors will remain a national affair. France and Germany, in particular, have so far not pursued a joint strategy for the non-EU-ETS sectors.

In previous years, with less ambitious transition objectives, the losses in terms of prosperity from disregarding possible efficiency gains were limited. With the announcement of the European Green Deal, however, the setting has changed dramatically: member states will have to increase their efforts to reduce emissions in the non-EU-ETS sectors.

To avoid these efforts being prohibitively costly, it is highly advisable to speed up the process of integrating national pricing schemes into the EU-ETS.

Steeply increasing (shadow) prices of carbon will endanger the competitiveness of European companies vis-à-vis their competitors that do not fall under the realm of the EU's ambitious climate policy. As the costs of those emissions-intensive domestic producers who are trading on global markets increase ever further, they might relocate increasing shares of their production to sites outside of Europe.

This carbon leakage would be harmful to European jobs and economic prosperity, and it would also hurt the overall cause of climate change mitigation, countervailing the EU's ambitions. The issue of how to incentivise other countries to adopt ambitious carbon emissions reduction targets through carbon pricing is therefore of utmost importance.

Under the EU-ETS, the international competitiveness of domestic producers has so far been protected quite successfully by the free allocation of certificates to emissions-intensive firms facing international competition in, for

example, the steel, cement and chemical industries, based on a benchmarking system.

Yet, with increasing carbon prices this might change. Outsourcing decisions motivated by rising cost differentials would be difficult to reverse ex post, due to the long investment cycles in the industry sector. Thus, the aim should be to avoid these decisions ex ante. A promising alternative to the cost-free allocation of certificates may be the installation of a border carbon adjustment (BCA) mechanism.

"The EU can become the world leader in the energy transition. It should be the explicit aim of this effort to provide the path towards an effective global approach to climate policy"

New challenges: towards reducing carbon emissions from imports

The principal idea behind the BCA mechanism would be to levy a charge on imported goods equivalent to the carbon payment of the same domestically produced good.

Ideally, all goods consumed in the EU would face the same carbon price, irrespective of globally diverging climate policies. As it seems far too complicated to impose the BCA on all imported goods, the system could instead be restricted to very energy-intensive and very tradable goods.

Limiting the BCA to applying only to imports would, however, not address the distortion caused by less stringent climate policies outside the EU to the competitiveness of EU companies in external markets and, accordingly, would induce the risk of carbon leakage.

Alternatively, the EU might opt to implement a full-fledged symmetric variant of the BCA, in which exporters would receive a corresponding remuneration. Consequently, goods consumed abroad would face the carbon price determined by the country where they are consumed. The system would then be reminiscent of a value-added tax, where imports are taxed and exports are exempt.

This is not the route to take: by implementing a symmetric BCA, the EU would contradict its own communication and forfeit control over the extent of carbon emissions generated in the region, since EU carbon pricing would only curb emissions caused by the production of goods and services actually consumed in Europe.

To preserve the EU's self-conception of taking responsibility for the global climate, it will be necessary to present the BCA not as a trade, competition or industrial policy, but as an environmental policy. Its proclaimed ultimate objective should therefore be reducing global carbon emissions, not increasing the competitiveness of European industry.

Thus, it should be restricted to applying only to imported goods. This fundamental dilemma between climate protection and preserving competitiveness would be less prevalent if the international alliance for carbon pricing were to grow, obviating the need to impose a BCA on products being imported from (and exported to) other members of this 'carbon club'.

Following the initiative of the French and German governments, the European Council has not only emphasised a BCA mechanism as an instrument to prevent carbon leakage, in contrast to our appraisal, but also announced in the conclusions of its meeting in July 2020 that starting from 2023, a BCA could be used as a source of revenue for the EU budget.

The explicit objective of the BCA should, however, be to induce a reduction of carbon emissions, not to serve as an instrument to raise public revenues. Contrary to a popular view, such a tax on imports would not be paid by foreign producers; due to a high pass-through of import taxes, it is European consumers who would bear the majority of the burden.

While the principal idea of a BCA is reminiscent of the well-established concept of value-added taxes, a sizeable number of technical, regulatory, and legal challenges would have to be overcome (Mehling *et al.* 2019). Accurately measuring the carbon content of individual goods is far from easy (Droege and Fischer 2020), since one would have to capture all of the carbon emissions caused throughout the good's entire value chain.

This is costly, since for the same good there are many possible production processes with varying carbon intensities. Simply applying the benchmarks employed for the cost-free allocation of EU-ETS emission certificates is precluded, since those only measure the direct carbon emissions caused during the production process.

A related issue concerns the question of possible exceptions. Which exporting countries will be subject to the BCA – all countries outside the regulated area, or just countries with no 'equivalent' climate policy? If the EU opted to take the latter approach, it would have to make up its mind on how to define an equivalent climate policy.

While, in principle, this could be a policy inducing at least a shadow carbon price of similar magnitude as in the EU, in a real-world application it is very difficult to estimate the underlying carbon value of the wide range of implemented regulatory measures. It will therefore be difficult to prevent countries subject to the tax considering it as a political choice, and therefore contesting it.

Furthermore, if the EU would not only be levying charges on imported goods but also offering rebates to exporters, this might also endanger conformity with GATT rules and lead to protracted trade disputes. This risk would be all the more grave the more openly the EU views the BCA scheme as a

device to ascertain economic competitiveness, instead of for global climate protection (Droege *et al*. 2018)[4].

Irrespective of the sophistication with which any legal obstacle might be circumnavigated, EU trading partners might interpret any unilaterally introduced BCA as a protectionist measure anyway (GCEE 2020).

Nevertheless, it could be possible to implement a BCA mechanism that is compatible with the existing body of law (European Commission (2020b). The chances of avoiding a severe trade conflict would likely rise substantially if the EU, instead of introducing the BCA unilaterally, were to take this action in a joint effort with other trading partners, especially the US.

However, the EU should consider a BCA mechanism only after having established a clear and credible uniform carbon pricing mechanism within its jurisdiction. This credibility is key to provide incentives to other countries, the US and China in particular, to join a far-reaching international alliance for carbon pricing (Nordhaus 2015).

Most specifically, trade partners could be invited to join the EU-ETS mechanism. The chances of a successful courtship will increase as the number of countries pricing carbon grows. ■

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Endnotes

1. This may be due to social acceptability issues in Europe, as shown by Oswald and Nowakowski (2020).
2. A shadow price associated to a collective constraint is defined as the price signal necessary to satisfy the constraint. It would have to be estimated by employing an integrated assessment model.
3. See, for example, the proposals by Dominique Bureau, Fanny Henriet and Katheline Schubert in CAE (2019).
4. Jakob et al. (2014) argue, however, that the climate impact of a BCA mechanism is itself rather uncertain, as it depends on its difficult-to-assess effects on global production and consumption patterns.

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Navigating through hydrogen

Ben McWilliams is a Research Analyst, and Georg Zachmann a Senior Fellow, at Bruegel

Hydrogen is seen as a means to decarbonise sectors with greenhouse gas emissions that are hard to reduce, as a medium for energy storage, and as a fallback in case halted fossil-fuel imports lead to energy shortages. Hydrogen is likely to play at least some role in the European Union's achievement by 2050 of a net-zero greenhouse gas emissions target.

However, production of hydrogen in the EU is currently emissions intensive. Hydrogen supply could be decarbonised if produced via electrolysis based on electricity from renewable sources, or produced from natural gas with carbon, capture, and storage. The theoretical production potential of low-carbon hydrogen is virtually unlimited and production volumes will thus depend only on demand and supply cost.

Estimates of final hydrogen demand in 2050 range from levels similar to today's in a low-demand scenario, to ten times today's level in a high-demand scenario. Hydrogen is used as either a chemical feedstock or an energy source. A base level of 2050 demand can be derived from looking at sectors that already consume hydrogen and others that are likely to adopt hydrogen. The use of hydrogen in many sectors has been demonstrated.

Whether use will increase depends on the complex interplay between competing energy supplies, public policy, technological and systems innovation, and consumer preferences. Policymakers must address the need to displace carbon-intensive hydrogen with low-carbon hydrogen, and incentivise the uptake of hydrogen as a means to decarbonise sectors with hard-to-reduce emissions.

Certain key principles can be followed without regret: driving down supply costs of low-carbon hydrogen production; accelerating initial deployment with public support to test the economic viability and enable learning; and continued strengthening of climate policies such as the EU emissions trading system to stimulate the growth of hydrogen-based solutions in the areas for which hydrogen is most suitable.

1 Introduction

In the European Union's decarbonisation drive, hydrogen is seen as a solution for sectors with greenhouse gas emissions that are hard to reduce, as a means of energy storage, and as a fallback in case halted fossil-fuel imports lead to energy shortages.

The attractiveness of hydrogen comes from the fact that no carbon dioxide is emitted when it is burned or used in a fuel cell to produce electricity. In sectors where it could be applied, hydrogen could displace fossil-fuel consumption and the associated carbon emissions.

Hydrogen is not a new fuel. Its ability to provide useful energy has been understood for well over 100 years. As recently as the early 2000s, a wave of public interest focused on its potential for powering automobiles (Lizza, 2003).

Interest in hydrogen is now resurging in the EU, linked to the bloc's much more ambitious decarbonisation targets. On the demand side, hydrogen could be a solution for particularly hard-to-abate sectors, such as steel, providing a valuable argument that full decarbonisation is technically feasible.

On the supply side, the potential for large imports of low-carbon hydrogen is attractive when considered against the argument that the EU's clean energy potential might be too limited. Moreover, hydrogen offers one solution to the seasonal storage issue that while renewable electricity generation peaks in summer, demand peaks in winter.

Notwithstanding this technical promise, hydrogen remains prohibitively expensive. Its use today in the European Union is thus far removed from the role optimists see it playing in a net-zero EU in 2050. It is currently used almost exclusively as a chemical feedstock for the production of ammonia and methanol and for crude oil refining.

Furthermore, the dominant production route for hydrogen – involving separation of hydrogen from methane – is highly carbon-intensive. But hydrogen can also be produced from electricity via electrolysis. The rapidly falling cost of electricity from renewables is creating excitement about low-cost, low-carbon hydrogen production.

The future role hydrogen will play in the sectors where it could be deployed depends upon the extent to which the necessary technologies reach commercial maturity. This will be driven by the complex interplay of capital costs, consumer preferences, policy decisions, and the relative performance of competing clean energy sources.

Because of these uncertainties, we estimate that in 2050, hydrogen could meet 20 percent of EU final energy demand


H2

– but it may meet only 3 percent (Figure 1). This is in line with more sophisticated modelling studies.

This Policy Contribution examines the gap between 3 percent and 20 percent. Our analysis supports the idea that decarbonisation will be driven mainly by electrification, while hydrogen will emerge to fill the niche for applications where electricity is either too expensive or complex.

We first explore the potential for hydrogen to evolve from today's highly polluting chemical feedstock to a key clean energy source in a decarbonised EU in 2050. The first fundamental step is the ability to produce significant volumes of clean hydrogen (section 2).

We then examine the main sectors in which hydrogen is currently being consumed or is considered an important pathway for future decarbonisation. To illustrate the uncertainty around future hydrogen demand we assess what 2050 hydrogen demand might be in ten significant sectors (section 3).

The difficulty for policymakers today lies in knowing exactly where the hydrogen niche lies. It could cover whole sectors, such as aviation, or might cover sub-sectors, such as hydrogen fuel cells for heavy vehicles travelling long distances. Or hydrogen might find a temporary niche, for example in heating of buildings.

"European policymakers should think about designing a framework for the international trade in clean hydrogen"

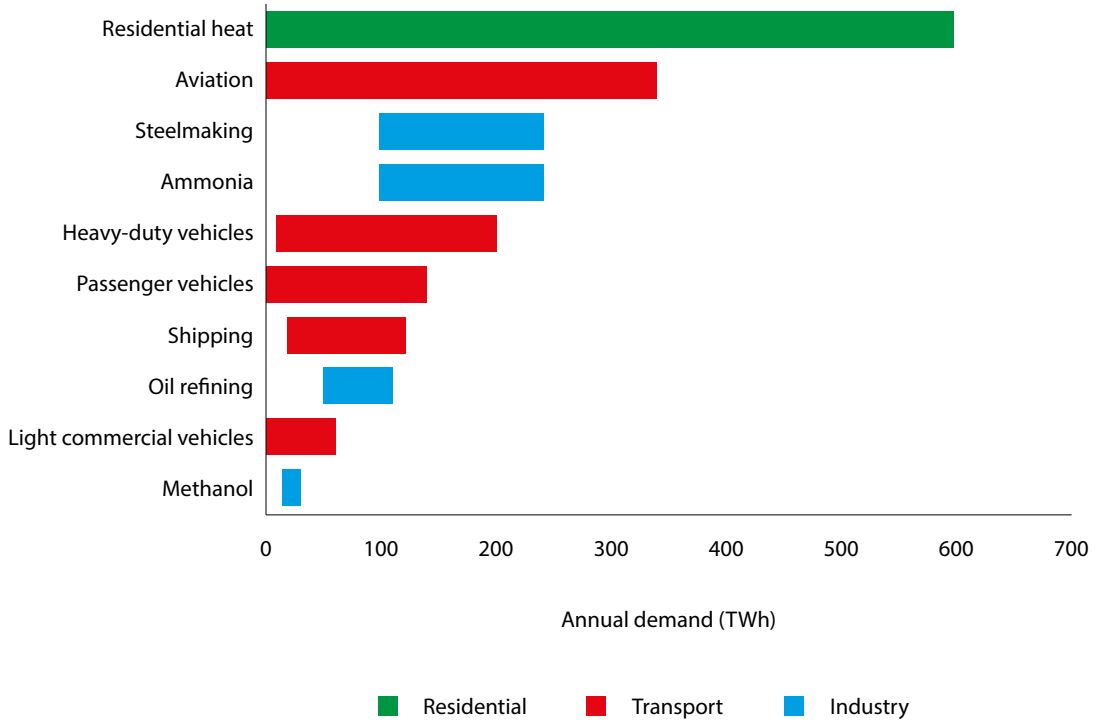
Despite the uncertainty, hydrogen's current use as a chemical feedstock and highly likely adoption in the steel sector mean that at least some clean hydrogen will be required by 2050. Public policy, which we cover in section 4, should therefore focus on stimulating cost reductions for the production of clean hydrogen.

2 Hydrogen supply

Large-scale production of hydrogen can be done using six very different inputs: natural gas, electricity, biomass/waste, solar radiation, coal and oil. At least 16 different production methods generate hydrogen from at least one of these inputs. Production methods differ significantly in their associated greenhouse-gas emissions.

For example, for production via electrolysis (electricity is used to split water molecules into hydrogen and oxygen atoms), the origin of the input electricity determines whether the hydrogen is carbon-neutral (eg. when produced from

Figure 1. Estimated variation in hydrogen demand in 2050



Note: Horizontal bars represent the range of annual hydrogen demand between our highest and lowest assumptions (see section 3). The European Commission (2018) estimated total final energy demand in 2050 of 10,000 TWh. Some of the uses for hydrogen shown in the figure are as a chemical feedstock, not energy consumption, but the 10,000 TWh figure still provides a sensible order of magnitude. Our higher estimate (2,080 TWh) would see total hydrogen demand of approximately 20 percent of final energy demand in 2050, with the lower estimate (295 TWh) at 3 percent.
Source: Bruegel.

Box 1. Carbon emissions associated with hydrogen from methane and electrolysis

For hydrogen from methane without CCS, the carbon intensity of production is around 270g CO_2/kWh. For an electrolyser connected to the European electricity grid, average emissions will be 430g CO_2/kWh, based on current average electricity-related emissions of 285g CO_2/ kWh.

Therefore, electrolytic hydrogen will only result in better emissions performance than SMR when the average emissions intensity of European electricity is reduced to significantly below 200g CO_2/kWh. Extrapolation of current decarbonisation trends would see this happening around 2025. Production from electrolysis will become even cleaner over time as electricity is further decarbonised.

Very low carbon intensities can already today be achieved in many hours of the year, such as on sunny and windy summer weekends, or in certain EU countries, such as France and Denmark. But making hydrogen production 'low-carbon' by producing it from green electricity has no economic justification because it would only imply that other consumers would consume non-green electricity.

To ensure that domestic hydrogen production does not result in increasing emissions, the cap of the EU emissions trading system (which covers hydrogen production from electricity and natural gas) should be tightened enough to meet the EU climate targets.

renewable or nuclear-generated electricity) or highly polluting (eg. electricity from lignite power plants). Figure 2 provides a schematic overview of the low-carbon production pathways for hydrogen.

The cost-competitiveness of different hydrogen production processes depend on the capital costs of the required installations, their technological efficiency in transforming input fuels into hydrogen, the input fuel and carbon prices.

Hydrogen supply capacity in the EU is currently estimated at 339 terawatt hours per year[1], approximately 3 percent of EU final energy demand (FCH JU, 2019). Of this, over 95 percent is hydrogen produced from fossil fuels, and less than 5 percent is produced via electrolysis (Cihlar *et al* 2020).

Production of fossil hydrogen in Europe is mainly done by separation of hydrogen from a stream of methane, a process that generates significant carbon dioxide emissions. Box 1 compares these emissions to those from electrolysis, which depend on the carbon intensity of electricity.

The EU hydrogen strategy, published in July 2020, aims to set out a vision for *"how the EU can turn clean hydrogen into a viable solution to decarbonise different sectors"* (European Commission, 2020). It is centred on scaling up electrolysis production with renewable electricity input.

An alternative option would be to apply carbon capture storage (CCS) technology in the production of hydrogen from methane, capturing up to 90 percent of the CO_2 emissions generated[2] (IEA, 2019a). The strategy sees a role for CCS in hydrogen production in the short and medium terms, but not as a long-term priority.

The competitiveness of hydrogen from methane compared to electrolysis depends on the price of the inputs (natural gas or electricity) and the carbon price (Figure 3). Our estimates for methane production use a price of €20/MWh, while the range of electricity prices likely available to industrial producers is the vertical shaded grey area, around €40-€50/MWh[3].

Figure 3 shows that at current natural gas, electricity and carbon prices[4], hydrogen production from methane without CCS is significantly cheaper than hydrogen production from electricity[5].

However, if electricity prices drop to about €20/MWh (for example because of cost reductions related to renewables), hydrogen produced from electricity would become cheaper than that produced from methane.

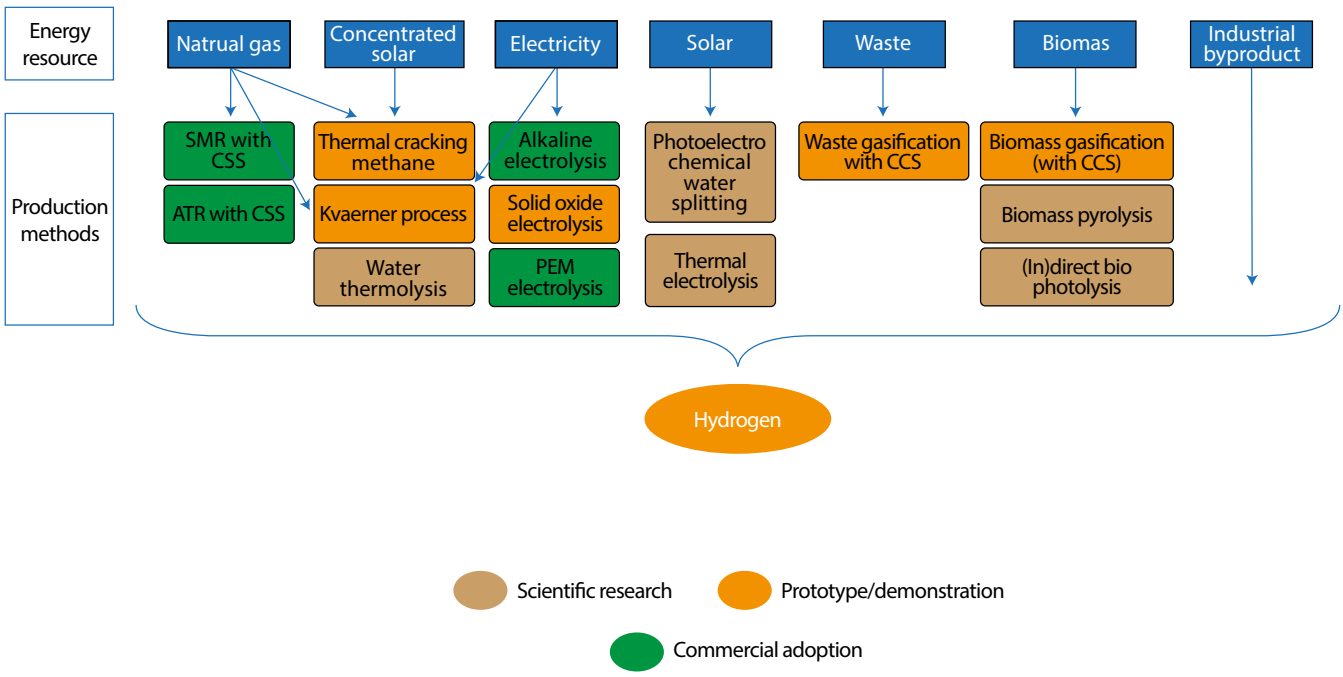
On the other hand, increases in the carbon price would also affect the cost. An increase in the carbon price to €200/tonne would mean that electricity at current prices would become competitive with natural gas.

Furthermore, the capital costs of electrolysers could fall significantly in the near term, meaning that electrolysis would be competitive even if electricity prices do not drop to €25/MWh. Wood Mackenzie (2020), for example, forecast electrolysis-produced hydrogen becoming cost-competitive with methane-produced hydrogen between 2030 and 2040, depending on the region, because of shifting cost dynamics.

Commitments in hydrogen strategies published so far by the EU, its member states and other countries to deploy electrolyser capacity are set to stimulate cost reductions.

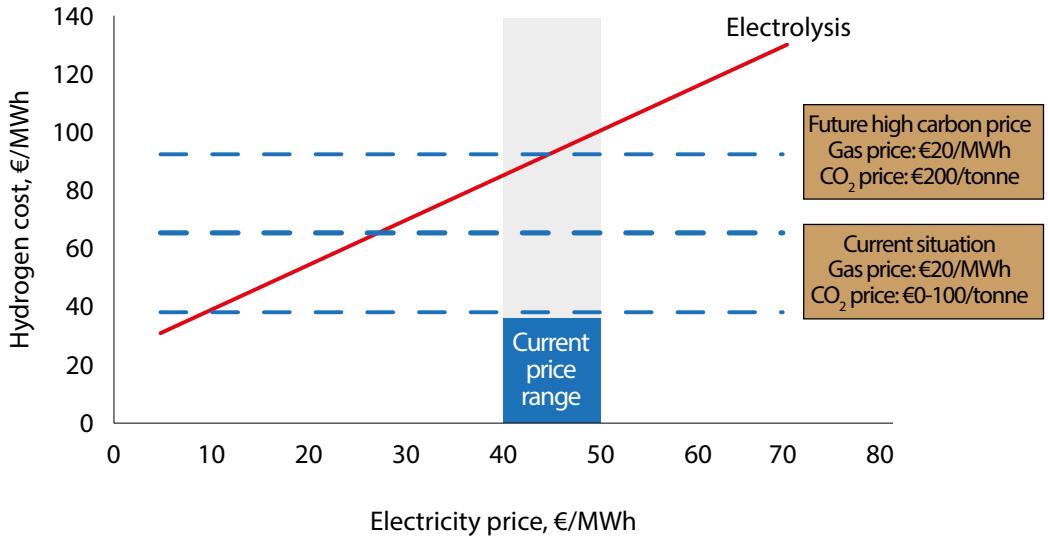
Moreover, our analysis is based on average EU values and cost assumptions. Differing tax rates, network costs and wholesale prices drive significant regional electricity price differences. The competitiveness of electricity versus gas will therefore vary between regions.

Figure 2. Low-carbon hydrogen production



Notes: SMR = steam methane reforming. CCS = carbon capture and storage. PEM = polymer electrolyte membrane. ATR= autothermal reforming.
Source: Bruegel based on Hanley et al (2017), Nikolaidis and Poullikkas (2017), Piebalgs et al (2020) and IEA (2020).

Figure 3. Hydrogen price for different electricity and carbon prices



Note: the graph shows the different hydrogen prices for different electricity prices using an electrolyser, where the cost of carbon is already internalised through the carbon price paid by electricity generators. For natural gas production, we assume a gas price of €30/MWh. The dashed lines represent different hydrogen costs for different carbon prices paid for a methane plant without CCS. Calculations based on IEA assumptions: for electrolysis, CAPEX - $900/kWe, efficiency – 64%, Annual OPEX – 1.5% of CAPEX. For natural gas reforming, CAPEX - $910/kW$H_2$, Efficiency – 76%, Annual OPEX = 4.7% of CAPEX, emissions = 8.9kgCO_2/kgH_2.
Source: Bruegel based on IEA.

And we base our analysis on an electrolysis plant behaving as a traditional baseload consumer of electricity, ie. demanding electricity with limited flexibility, which is the situation with electrolysers today.

However, developments in alternative electrolysis technology[6], the falling capital cost of electrolysers and the increasing variability of electricity prices (because of increasing shares of renewable energy generation) could increase demand for electrolysis as a source of flexible power demand.

Therefore, electrolysis could emerge as a significantly more competitive technology by: a) utilising close to zero (or occasionally even negative) electricity prices for a substantial number of hours, and b) providing flexibility services to the grid by consuming excess electricity at times of excess supply and helping to facilitate the over-deployment of renewable electricity sources (see section 3.4).

2.1 Alternative production pathways

Hydrogen production from natural gas and electricity are the most common methods, but there are others. Table 1 lists them, along with some rough cost estimates.

In sum, the global technical production potential of hydrogen exceeds demand by several orders of magnitude[7], meaning expansion of supply depends in principle only on the hydrogen production cost and demand at that cost level. National hydrogen production costs can differ depending on the differing availability and cost of inputs and capital, the availability of required infrastructure for transport, hydrogen storage and possibly carbon storage space.

2.2 Hydrogen imports

In optimistic scenarios, hydrogen could contribute a significant share of final energy demand within the EU by 2050. The EU hydrogen strategy works with a projection of 13 percent to 14 percent by 2050 (European Commission, 2020). If hydrogen demand is to reach such levels, imports of hydrogen might also develop.

The European Commission hydrogen strategy aims to develop 40 GW of hydrogen capacity in neighbourhood regions by 2030 – the same capacity the EU aims for within its borders. From countries with an abundance of renewable energy resources, green hydrogen could become an attractive export.

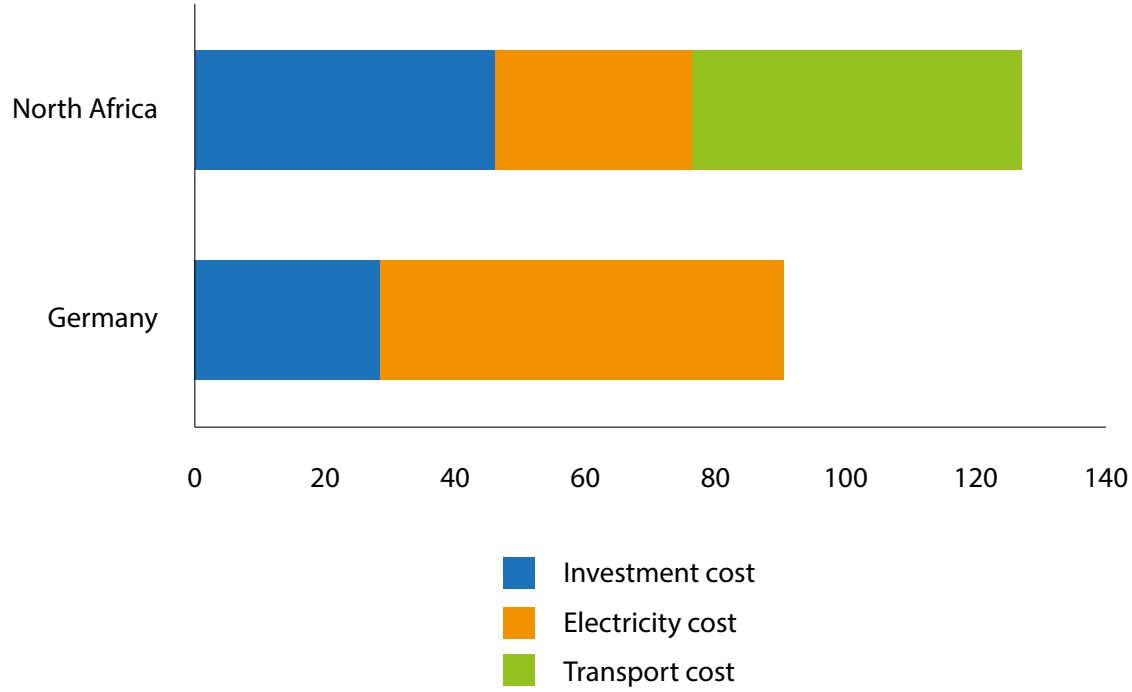
Installing renewables and electrolysers outside the EU and importing the hydrogen into the EU only makes economic sense when the renewables conditions in the exporting countries are significantly better, while capital costs are not substantially higher than in the EU.

Table 1. Additional low-carbon hydrogen production methods

Production method	Energy source	Feedstock	Hydrogen cost estimate (€/MWh)
Autothermal reforming with CCS	Fossil fuels	Natural gas	50
Methane pyrolysis/thermal cracking	Internally generated steam	Natural gas	54 - 57
Biomass pyrolysis	Internally generated steam	Biomass	42 - 74
Biomass gasification	Internally generated steam	Biomass	60 – 69
Direct bio-photolysis	Solar	Water and algae	72
Indirect bio-photolysis	Solar	Water and algae	48
Dark fermentation		Organic biomass	87
Photo-fermentation	Solar	Organic biomass	96
Solar thermal electrolysis	Solar	Water	172-354
PEC process (photo-electrolysis)	Solar	Water	350
Nuclear thermolysis (thermal cracking of water)	Nuclear	Water	73-89
Solar thermolysis (thermal cracking of water)	Solar	Water	269-284

Note: CCS = carbon capture and storage.
Source: Kayfeci et al (2019).

Figure 4. Import vs domestic hydrogen (€/MWh)



Note: Key assumptions: CAPEX electrolyser: $900/kW, electricity price in Germany: $47/MWh, electricity price in North Africa: $23/MWh, interest rate in Germany: 5%, interest rate in North Africa: 10%, transport distance: 3,000Km, pipeline transport cost of $2/Kg.
Source: IEA (2019a).

Furthermore, the cost advantage must exceed the costs of delivery of hydrogen as a gas via pipelines. Alternatively, hydrogen can be transformed into, for example, ammonia, which can be more easily stored in liquid form and transported by ship.

Based on IEA assumptions of current costs it seems hard to make a case for imports of hydrogen from solar energy from North Africa. If deployment of additional wind or solar units in Germany becomes difficult because suitable/acceptable land is already utilised, while investment costs in Africa decline, imports of hydrogen might become competitive.

However, consistent international rules would be needed to ensure that significant imports of hydrogen do not directly or indirectly increase net emissions in the producing country, for example through land-use change or replacement of renewable electricity for local populations by fossil fuels.

3 Hydrogen demand

The future evolution of demand for hydrogen in Europe is highly uncertain. Hydrogen has historically had a limited role in influential global energy modelling studies (for example, Quarton *et al* 2020). In this section, we discuss the most likely sectors for future hydrogen demand, with calculations for high, medium and low hydrogen demand scenarios.

We thus provide a broad overview of what hydrogen demand might look like in three scenarios: one in which hydrogen technology and deployment is aggressively pursued by policymakers and costs continue to fall, one in which the exact opposite occurs, and one in the middle. Our numbers are not intended to be forecasts, but rather serve to highlight the significant uncertainty surrounding future hydrogen demand[8].

The evolution of competing or complementary decarbonisation options, including energy efficiency, biomass, electrification and carbon capture, will be significant for determining the role or niche for hydrogen. Hydrogen therefore cannot be considered in isolation but rather in combination with the development of others fuels and energy carriers within complex energy systems (Hanley *et al* 2017).

Our assessment of hydrogen demand focuses on three broad sectors: transport (section 3.1), industrial applications (3.2) and residential heating (3.3). We also discuss the role hydrogen may play in the power sector (3.4). Table 2 provides an overview.

3.1 Transport

There are multiple options for hydrogen consumption in the road, rail, maritime and air transport. Pure hydrogen can be consumed directly through a fuel cell to produce electricity, or combusted. Alternatively, hydrogen can be transformed into ammonia before use in a fuel cell or by combustion. Finally, hydrogen can also be used as a building block for renewable synthetic fuels (e-fuels).

Table 2. Sector scorecard

Sector	Emissions (% of EU total)	Hydrogen potential	Note
Ammonia & methanol	14%*	★★★★★	Already using hydrogen produced from natural gas/industry by-product
Oil refining	2%	★★★★	Already using hydrogen produced from natural gas/industry by-product
Steelmaking	4%	★★★★★	High potential to replace coal
Passenger vehicles	12%	★	Electric vehicles hold first-mover advantage in low carbon market
Light commercial vehicles	2%	★★	Electric vehicles likely to be strong competitors
Heavy duty vehicles	5%	★★★	Hydrogen more suited to heavier vehicles
Shipping	7%	★★★★	Potential additional demand via use as ammonia
Aviation	4%	★★★	Synthetic fuels; fuel cells
Residential heating	12%	★★	Competing with electricity

*Note: *emissions include all chemical sector, not only ammonia and methanol.*
Source: Bruegel.

Transport: road

Passenger vehicles

- Hydrogen potential: ★
- Upper demand: 140 TWh. Medium demand: 50TWh. Lower demand: 0 TWh[9]
- 12 percent of EU greenhouse gas emissions

In road transport, hydrogen faces direct competition from electricity. Increasingly, the decarbonised future of passenger vehicles looks to be one of battery electric vehicles (BEVs). The price of batteries has rapidly dropped while range per charge is increasing.

As a result, the global stock of fuel cell (hydrogen) vehicles is just 11,200 compared to more than 5 million BEVs (IEA, 2019). BEVs now enjoy a first-mover advantage as the conventional low-carbon passenger vehicle. They attract significantly more government and private-sector funding, particularly for charging infrastructure.

Nonetheless, there may be some scope for hydrogen if limitations arise because of raw material shortages, technological limitations of batteries or excess strains on electricity grids arising from too many poorly managed BEVs. Moreover, certain companies (Hyundai, Honda) are still actively developing fuel-cell electric vehicles (FCEV), ie. hydrogen passenger vehicles.

As markets grow and prices decrease, it is possible that FCEVs will one day compete more seriously with BEVs. Large-scale deployment of hydrogen refuelling networks would be fundamental to this, but these currently still face the problem that while FCEV take-up is low, investment in refuelling networks is not attractive.

As other economic sectors begin to demand more hydrogen, the roll-out of hydrogen refuelling networks may become economically more attractive.

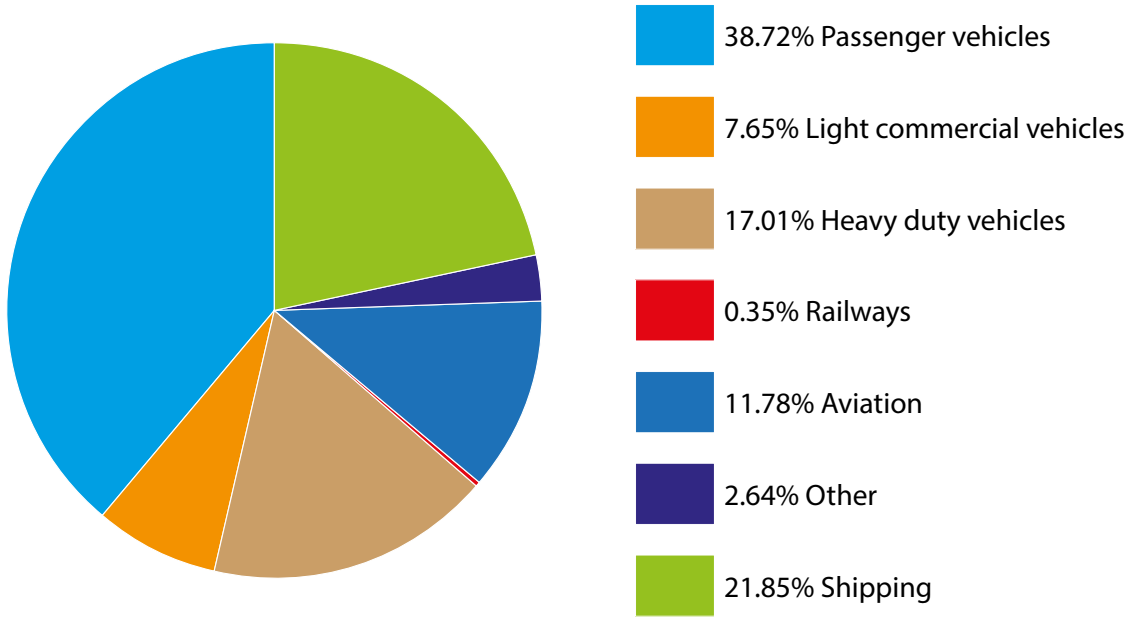
Hydrogen offers quicker refuelling than battery charging, making it potentially more suited to vehicles in constant use, such as taxis and buses.

Heavy-duty vehicles

- Hydrogen potential: ★★★
- Upper demand: 200 TWh. Medium demand: 120 TWh. Lower demand: 10 TWh[10]
- 5.2 percent of EU greenhouse gas emissions (including buses)

Hydrogen appears to have greater potential for the heavy-duty road transport sector because hydrogen is able to store more energy in a smaller space and at lower weight than a lithium-ion battery. A challenge for manufacturers of battery electric vehicles has been producing batteries which contain sufficient energy but are not too heavy.

Figure 5. GHG emissions share in transport sector



Source: Bruegel.

For example, to provide the same range as a 1,000 litre diesel truck, the battery of an electric truck would have to weigh about 14 tonnes. As the capacity and range of lithium batteries has expanded, this problem is gradually being overcome for small, passenger vehicles.

However, hydrogen fuel cells could be deployed in heavier vehicles for which greater range and higher power output are required.

In this market segment, hydrogen would compete against biofuels and the use of electrically-derived fuels (via hydrogen). The speed of battery improvements has been rapid so far, and it is still very possible that innovations will allow battery-driven electrification to dominate heavy-duty transport. Overhead transmission lines may also play a limited role.

The most optimistic EU 2050 scenarios see approximately a 15 percent share of hydrogen FCEVs in the heavy goods vehicle stock (European Commission, 2018). Least optimistic scenarios would see 0-3 percent FCEV deployment. Some additional indirect hydrogen demand might occur through electrically derived fuels.

Light-commercial vehicles

- Hydrogen potential: ★★
- Upper demand: 60 TWh. Medium: 15 TWh. Lower: 0 TWh[11]
- 2.3 percent of EU greenhouse gas emissions

Vans and light commercial vehicles occupy the middle ground between passenger vehicles and heavy-duty vehicles. They tend to be slightly larger than passenger vehicles, giving hydrogen an advantage because of its higher energy density, but not comparable to heavy-duty vehicles, meaning it is still very possible that this market will be dominated by BEVs.

Currently, over 90 percent of light commercial vehicles in the EU are diesels (European Commission, 2018). The deployment of hydrogen fuel cells in this sector may likely depend on the initial success of hydrogen fuel cell deployment elsewhere (particularly in heavy-duty vehicles). However, similarly to passenger vehicles, current market dynamics would still suggest that BEVs will dominate this market.

Transport: rail

- Hydrogen potential: ★
- Demand: likely to be very close to zero
- 0.11 percent of EU greenhouse gas emissions

The strongest decarbonisation opportunities are in electrifying rail tracks, shifting away from diesel consumption. Electrifying tracks implies significant upfront fixed costs. Tracks electrified so far are those which are the most heavily used in order to increase the ratio of returns to a fixed investment.

For less-used tracks, the returns are not large enough to justify the significant upfront capital costs of electrification. On these tracks, hydrogen fuel cells are an attractive option (IEA, 2019).

The potential scope is still relatively small as approximately 50 percent of European tracks have already been electrified (Donat, 2020).

Take up of hydrogen for trains on non-electrified tracks can be aided by falls in the costs of fuel cells, driven by deployment elsewhere. Battery electric trains are another option. Overall,

rail is not likely to be a leading candidate sector for large volumes of hydrogen consumption.

Transport: shipping

- Hydrogen potential: ★★★★
- Upper demand: 120 TWh. Middle demand: 70 TWh. Lower demand: 20 TWh[12]
- 6.6 percent of EU greenhouse gas emissions

The maritime-fuel mix in the EU and globally is dominated by heavy fuel oil. Policy restrictions on sulphur emissions and planned controls on greenhouse gas emissions mark an attempt to move beyond heavy fuel oil. The European Commission is considering including shipping in the EU emissions trading system.

Hydrogen fuel cells may work for short-distance light shipping, for which power requirements are not too large. This is likely to be in competition with battery electric ships. Liquefied hydrogen, synthetic fuels derived from hydrogen and ammonia (Middlehurst, 2020), have greater potential in terms of decarbonising longer distance shipping.

Like hydrogen, ammonia can be used to produce energy either by combustion within an internal combustion engine, or by producing electricity through a fuel cell. Biofuels are likely to be another competitor for hydrogen in the maritime sector.

A challenge will be to transform bunkering, or fuelling, facilities, which currently store heavy fuel oils, so they can store hydrogen or hydrogen-derived fuels. Here, a global coordination problem arises as ships must refuel in multiple locations, normally in different countries.

For this reason, it is quite likely that one or two fuels will become dominant. Hydrogen might be boosted by other uses in port operations. Forklift trucks are already a big adopter of hydrogen, with 25,000 deployed globally, for example. Port hydrogen storage and distribution infrastructure will become economically more efficient with multiple end-use cases.

Transport: aviation

- Hydrogen potential: ★★★
- Upper demand: 340 TWh. Middle demand: 180 TWh. Lower demand: 0 TWh[13]
- 3.60 percent of EU greenhouse gas emissions

For short-distance flights of less than 3,000 kilometres (encompassing most European flights; Madrid to Helsinki is about 2,950km, for example), electricity and pure hydrogen could make a significant contribution. This may be through battery or fuel cell (hydrogen) electric planes, or through direct combustion of hydrogen. Hybrid options, combining the two (electricity and hydrogen combustion) are also possible.

Airbus has released three concept designs for hydrogen planes which they state could enter service by 2035 (Airbus, 2020). The proposed planes are of a hybrid nature, combusting hydrogen in modified gas-turbines and producing electricity through fuel cells. Longer distance flights require fuels with higher energy densities. Advanced biofuels and synthetic fuels[14] derived from hydrogen are the most promising decarbonisation options.

Synthetic jet fuel can be a drop-in replacement for current jet fuel. However, options are today far too expensive[15]. Significant policy support and cost reductions would be required for synthetic fuels to be a realistic decarbonisation option.

For longer distance flights, the evolution of biofuels will be a key determinant for the potential of hydrogen fuels. Biofuel production is constrained by land availability[16] and any constraints on biofuel production will provide a stimulus for investment into hydrogen. A further influencing factor will be the extent to which biofuels are demanded by other economic sectors.

Therefore, there are two separate considerations for future hydrogen demand in aviation: directly through use in a fuel cell/combustion to power short-distance flights, or indirectly producing synthetic jet fuels which are then combusted during flight. We estimate an upper bound of 210 TWh of direct hydrogen use in aviation, and 130 TWh indirect hydrogen use for producing synthetic fuels.

However, aviation remains firmly in the hard-to-decarbonise box, with technologies at a very immature stage of development. It will take many years of research and development before the potential of hydrogen relative to alternatives is clarified.

Moreover, as one of the hardest sectors to decarbonise, aviation is a strong contender for residual emissions in a net-zero 2050 scenario that involves significant use of negative emissions technologies. Aviation may therefore to some extent carry on burning conventional fossil fuels and emitting greenhouse gases.

3.2 Industry

Currently, over 90 percent of hydrogen produced in Europe is used as a feedstock in oil refining, ammonia and methanol production (Cihlar *et al* 2020). The possibility of substituting hydrogen for fossil fuels used in steel production is one of the most commonly discussed future uses for hydrogen. These four sectors together account for up to 41 percent of the EU's industrial emissions[17].

Chemical sector: ammonia and methanol

- 3.2 percent of EU greenhouse gas emissions[18]

The ammonia and methanol sectors both require hydrogen as a feedstock. The most convenient and cost-effective source is fossil-fuel derived hydrogen.

Ammonia production

- Hydrogen potential: ★★★★★
- Upper demand: 240 TWh. Medium: 160 TWh. Lower: 100 TWh[19]
- 2015 demand: 129TWh

Over 80 percent of ammonia produced worldwide is for the manufacture of fertilisers (Bazzanella and Ausfelder, 2017). Other uses are for nitric acid, pharmaceuticals and cleaning products.

In Europe, natural gas is the most important feedstock. Hydrogen is extracted from natural gas (methane) before being combined with nitrogen from the air to produce ammonia, or NH_3.

Green hydrogen would therefore be able to directly reduce emissions from ammonia production by eliminating the need for production of hydrogen from methane[20]. Such green ammonia projects are already underway[21].

Europe currently produces 17 million tonnes of ammonia annually and the future evolution of demand is uncertain. As the global population increases, demand for ammonia-based fertilisers will increase; food production must become more efficient to feed an increasing number of mouths from the same amount of land.

However, public policy may drive out ammonia in favour of biological fertilisers or higher levels of organic production. The EU in 2019 updated fertiliser rules to promote fertilisers based on organic materials rather than chemicals[22].

Our analysis is based on traditional uses of ammonia, but ammonia demand could rise significantly if ammonia becomes a significant future energy carrier. Ammonia could be a preferable option for transporting the energy contained in a hydrogen atom (ammonia's physical properties make it easier to transport than hydrogen). Ammonia could help in transporting energy from areas of renewable energy abundance to areas of demand.

Moreover, non-traditional demands for ammonia may arise in shipping (section 3.1) and potentially even in the power sector[23]. Such a scenario would significantly increase hydrogen demand for ammonia production.

Methanol production

- Hydrogen potential: ★★★★★
- Upper demand: 30TWh. Medium demand: 25TWh. Lower demand: 15TWh[24]
- 2015 demand: 27 TWh

Similarly to ammonia, demand for hydrogen in methanol production is predominantly met by hydrogen from methane. The production of green hydrogen would reduce demand for hydrogen from natural gas and its significant carbon emissions.

Currently, EU methanol production (1.5Mt/annum) as a share of global production is much lower than for ammonia. Assuming similar trends, final demand for hydrogen in this sector is likely to be significantly lower than in the ammonia sector within the EU.

Oil refining

- Hydrogen potential: ★★★★
- Upper demand: 110TWh. Medium demand: 90TWh. Lower demand: 50TWh[25]
- 2015 demand: 153 TWh
- 2.4 percent of EU greenhouse gas emissions

A major use of hydrogen today is in oil refining: turning crude oil into commercially attractive end-use products. Hydrogen is used in hydrotreating and hydrocracking. Hydrotreating refers to the removal of sulphur impurities from crude oil, necessary because sulphur is an air pollutant. Hydrocracking is used to transform heavier residual oils into lighter and more commercially attractive fuels.

Future demand for hydrogen in this sector will be determined by future demand for crude oil products, which in Europe is set to decrease. Meanwhile, sulphur restrictions are progressively being tightened, increasing the hydrogen demand per barrel of crude oil[26].

Ironically, sulphur restrictions on crude oil products such as jet fuel have in recent years likely increased the sector's greenhouse emissions because of the current carbon intensity of hydrogen (Catalá *et al* 2013, Figure 4.5.5). In 2050, there will likely still be demand in the oil refining sector because of the use of hydrocarbons in certain chemical products.

Steelmaking

- Hydrogen potential: ★★★★★
- Upper range: 240TWh. Middle range: 150TWh. Lower range: 100TWh[27]
- 3.8 percent of EU greenhouse gas emissions

The EU produces 177 million tonnes of steel a year, 11 percent of global output[28]. Significant emissions are associated with the steel sector and hydrogen is widely regarded as fundamental to decarbonising the sector.

Most steelmaking greenhouse gas emissions are associated with the turning iron ore into iron prior to its processing into steel. Steel can be produced in blast oxygen furnaces (BOF) (60 percent of EU production; European Commission, 2018) and electric arc furnaces (EAF).

The BOF route produces steel using coal and has little future in a decarbonised world, though efforts are being made to reduce emissions by improving efficiency, replacing some coal with hydrogen and retrofitting plants with carbon capture technology.

However, unless carbon capture can be done at levels of emissions far above capabilities today, there will always be significant emissions associated with BOF. Decarbonisation of steel production therefore relies on switching to the EAF (currently 40 percent of EU production). Here, the primary energy input is electricity[29], making green steel possible if the electricity is decarbonised. Two different feedstocks can be used with EAF: scrap steel and direct reduced iron (DRI), or a combination.

Globally, scrap steel contributes to about 25 percent of steel production. Increasing the use of scrap steel would be a

welcome shift toward the circular economy[30], but is limited by availability of high-quality scrap[31]. Meanwhile, producing DRI for use in EAF involves reacting iron ore with a reducing agent, currently a mixture of hydrogen and carbon monoxide.

This is already a technologically proven route, with deployment particularly in the Middle East where industry has access to low-cost natural gas, which is used for producing the stream of hydrogen and carbon gases for reduction.

All major European steelmakers are currently building or testing hydrogen-based reduction for use in EAF[32]. The target is to use pure hydrogen rather than a hydrogen/carbon mixture for reduction of iron ore. Using both scrap steel and DRI produced using hydrogen in electric arc furnaces is considered the most viable decarbonisation option for the sector within the EU (Hoffmann *et al* 2020).

A related question is whether the move to DRI-EAF will affect the location of steel production from close to coal/iron resources to close to cheap green-energy resources.

One issue is the long lifespan of steel plants – approximately 35 years. The production of steel through DRI-EAF using hydrogen is not yet economically mature. However, the industry must be wary of locking in any further BOF capacity, with such facilities likely to become stranded assets by 2050.

Residential heating

- Hydrogen potential: ★★
- Upper demand: 600 TWh. Medium demand: 300 TWh. Lower demand: 0 TWh[33]
- 12.5 percent of EU greenhouse gas emissions

Natural gas is currently the most common primary fuel used for household heating in the EU, accounting for 44 percent of demand. Coal, oil, and biomass are the other significant contributors (Bertelsen and Vad Mathiesen, 2020).

Energy efficiency is the main tool for ensuring decarbonisation of the buildings sector. The EU's long-term roadmap sees energy demand for residential heat halving in a baseline scenario (European Commission, 2018, Figure 39). Demand reductions will be achieved through a combination of rules for new build and existing households.

From 2021, new buildings must comply with requirements in the Energy Performance of Buildings Directive 2010/31/EU: new buildings must be nearly zero energy consumption. Old buildings must be renovated, and heating demand reduced through better insulation. The EU's *2020 Renovation Wave* strategy is intended to address exactly this issue[34].

Domestic heating can also become more electrified. Electrically powered heat pumps, with an efficiency of 300 percent, are able to draw three times more heat energy from outside air than they consume in terms of electric energy.

Currently, the share of electricity in final residential heating demand is approximately 5 percent but European Commission scenarios forecast a growth in this share to between 22 percent and 44 percent by 2050 (European Commission, 2018, Figure 43).

Nonetheless, as a temporary solution, blending natural gas with hydrogen in gas grids is being discussed. Technically, this can be done up to a certain proportion (roughly 5 percent to 20 percent).

In the short run, the blending of hydrogen into gas grids allows for incremental reductions in emissions while creating an early demand market for green hydrogen.

To achieve concentrations of hydrogen in gas grids above 20 percent, pipes and grid appliances must be retrofitted. This is not an impossible task; grids in the United Kingdom were retrofitted in the 1960s to move away from town gas (a mixture with a high hydrogen concentration) to natural gas.

Switching a gas distribution grid to hydrogen would be organised top-down and would require less significant investments on the user side to decarbonise residential heating, while moving to electric heat pumps will in principle be more efficient and allow for gradual switching of users at their convenience.

But it will be more difficult to push individual users to make the necessary substantial investments – one might consider this in light of the difficulties faced with smart meter roll-outs across Europe[35]. Moreover, the required strengthening of electricity distribution grids would also have to be financed.

Under a scenario in which electrification is pursued as the primary residential heating technology, hydrogen may still play a complementary role. Decentralised provision of hydrogen (ie. gas bottles) could supplement residential heating on the coldest days to prevent excessive strain on local electricity distribution grids.

A final option involves keeping the natural gas network much as it is today but injecting biomethane[36] or synthetic methane produced by combining hydrogen with carbon dioxide. An obvious advantage is minimal disruption to the grid. However current levels of supply of biogas fall far short of demand, and synthetic methane is an inefficient source of energy and is very expensive.

3.4 Hydrogen as an enabler of renewable electricity deployment

In addition to deployment in end-use sectors, hydrogen could be used for energy storage, enabling the integration of increasing shares of variable renewable generation into electricity systems.

Historically, electricity grids have operated on the basis of volatile aggregate demand from end-users being met by a mix of inflexible baseload (nuclear, lignite, run-of-river) and peak-load power that is dispatched on demand (for example gas or hard coal), with relatively little storage.

Increased adoption of variable renewable electricity sources is changing this model. A challenge for grid operators is to

maximise the uptake of renewable electricity that is produced when the sun is shining and the wind blowing. A number of options, beyond the scope of this Policy Contribution, are under consideration, including the use of hydrogen produced from electrolysis.

Short-term flexible demand

Hydrogen production via electrolysis could be increased during times of excessive renewable power generation and reduced when supply is weak, allowing more efficient balancing of the electricity market. Kopp *et al* (2017) showed that already in 2016, a 6 MW electrolyser in Mainz, Germany was deployed with economic benefit to the German control reserve market.

Whether electrolysers can be competitive as providers of grid-balancing services will depend on technological and regulatory developments in the next few years.

In particular, battery storage systems that already feature much lower storage losses than hydrogen will likely see their capacity costs drop dramatically as more batteries are produced and deployed. They may therefore be better suited than electrolysis to managing intra-daily or even intra-weekly fluctuations on electricity grids.

Long-term seasonal storage

Hydrogen could be a more useful option for managing fluctuations in renewable electricity produced in different seasons. Hydrogen could be produced during months of excess renewable electricity production, stored geologically, and then converted back into electricity during months of lower renewable electricity supply.

Compared to batteries, hydrogen is a more plausible solution for seasonal storage because investment costs are almost independent of storage volume[37] and 'self-discharge' is low (Parra *et al* 2019). From an economically efficient perspective, whether hydrogen emerges as a seasonal storage mechanism will depend on the relationship between seasonal price differentials and the capital costs of deploying electrolysers along with storage.

German electricity price differentials show that currently only for 5 percent of the time does the price differential (arbitrage gain) exceed €50/MWh. The evolution of this potential for arbitrage gain will inter alia depend on the deployment of renewable electricity generation sources and on the deployment of flexible demand side resources.

4 Overview of market dynamics

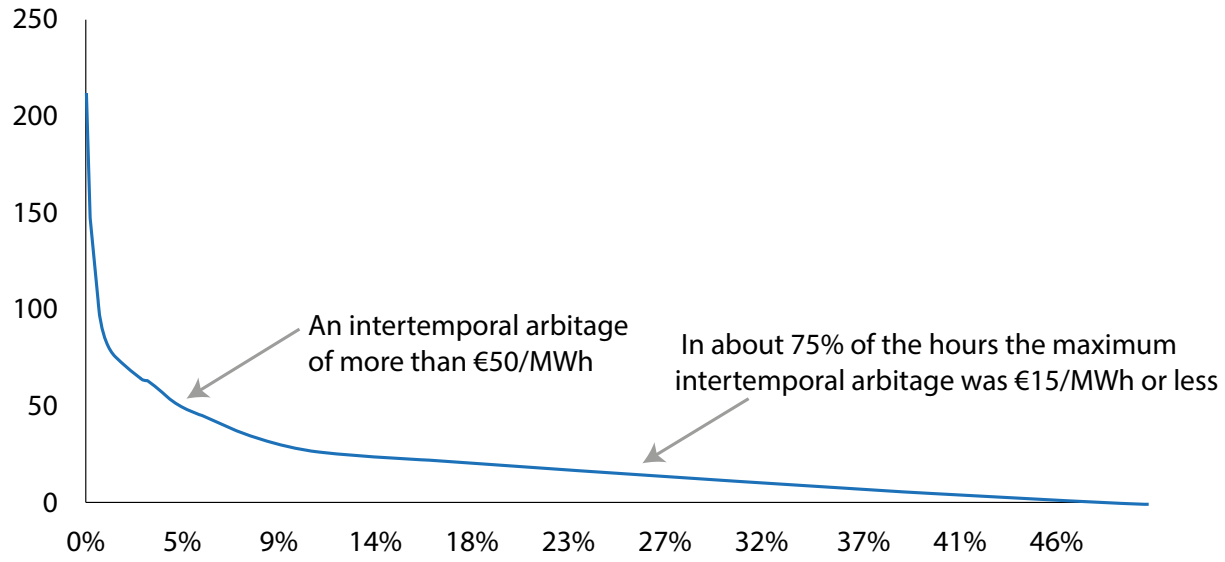
The current cost structure of hydrogen is based on its production from natural gas (methane). But, as we have discussed, this supply is expected to be considerably transformed.

The market consensus is that the price of low-carbon hydrogen will decrease over the coming years, largely driven by falling electrolyser costs (which can be reinforced by deployment policies that allow economies of scale and learning).

The extent of this cost decrease will determine the competitiveness of low-carbon hydrogen for each end-use sector (Figure 8). A further fundamental driver of supply costs will be the cost of fuel inputs – electricity in the case of electrolysis. Expectations are that, unless there are breakthroughs in terms of more flexible power demand/storage, there might be more hours with very high and very low prices (Bossmann *et al* 2018).

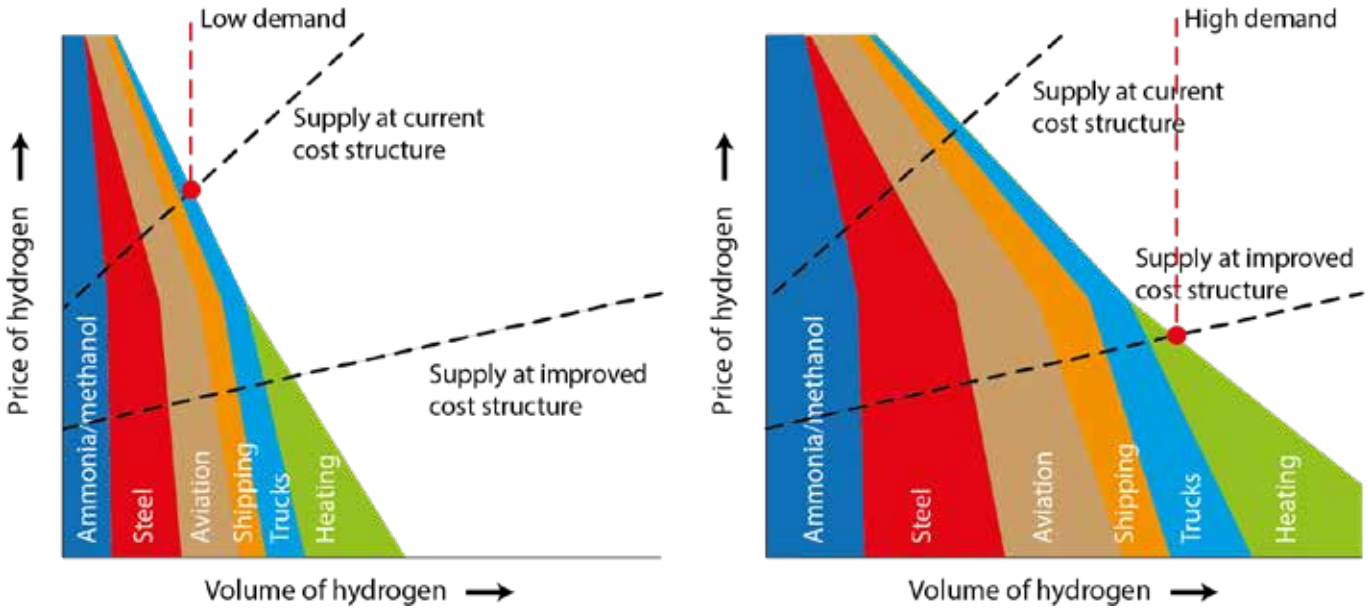
Thus, there is potential for hydrogen costs to be further lowered by running electrolysers only in hours when – thanks

Figure 7. Price differential, lowest vs highest hourly prices in Germany, 2019



Source: Bruegel based on SMARD.

Figure 8. Stylised hydrogen demand scenarios



Note: left panel shows a scenario with limited technological/commercial development on the demand side; right panel shows a scenario with significant breakthrough in all demand sectors.
Source: Bruegel.

to abundant power from renewables and/or low demand – electricity is particularly cheap.

However, while the investment cost of electrolysers remains high, they will have to run most of the year to justify their fixed costs.

Only when the fixed costs of electrolysers reduce enough will their use be economic in part-load. But then they will start to push up electricity prices during exactly those hours where it is economic to operate them. This will make additional renewables investments economically viable and an equilibrium could develop.

Electrolyser capacity in this equilibrium will be determined not only by the cost of renewables and electrolysers, but also by the cost of competing flexibility providers (eg. batteries, demand-response). Thus, if batteries continue their rapid pace of technological advancement, and/or innovation sees electricity demand become increasingly flexible, it is still possible that the capital costs of electrolysers will be too high to justify their part-load operation.

Non-EU countries are also investing in hydrogen production capacity. In some cases, this involves cooperation with Europe, such as between Germany and Morocco (BMZ, 2020).

In other cases there is no European cooperation and hydrogen will potentially be traded on international markets. The ability of third countries to produce hydrogen under more favourable conditions may exert downward pressure on European prices, although transport costs would have to be factored in, as discussed in section 2.

The evolution of hydrogen demand within Europe is highly uncertain (section 3). But whatever happens, a certain level of hydrogen demand is almost certain to remain, the extent of which will depend on the demand for the end products: ammonia, methanol, crude oil-derived products. In other sectors, demand for hydrogen will depend if hydrogen-utilising technologies reach commercial maturity.

5 Policy options

The future prospects of hydrogen are highly uncertain. Currently, it is a chemical feedstock but significant breakthroughs in production and end use could mean hydrogen might even contribute 20 percent of the EU's final energy demand in 2050.

The challenge for policymakers today is to assess the correct level and type of policy support in the context of this uncertainty. We conclude with a discussion of some of the policy measures that could support hydrogen deployment currently being debated.

Meaningful price on all greenhouse gas emissions

Tightening/extending the EU emissions trading system and re-thinking the design of energy taxation systems

Higher prices on the use of fossil fuels help the competitiveness of all low-carbon technologies relative to fossil-fuel alternatives. In 2021 the European Commission will propose to extend and tighten the EU emissions trading system (ETS) in line with tougher emission reduction targets.

Addressing the current taxation discrepancy between electricity and natural gas prices would be another no-regret option. From a carbon emissions standpoint, the

European taxation system currently biases consumption away from electricity and toward natural gas[38]. The European Commission can address such discrepancies by reforming the EU Energy Taxation Directive (2003/96/EC), which is also scheduled for 2021.

Supporting low-carbon hydrogen production

State support for the production of hydrogen with low carbon emissions

We classify this as a no-regret policy option. Decarbonising the production of current hydrogen demand would already avoid approximately 100 Mt of CO_2 emissions in the EU per year.

The wide range of sectors which could potentially use clean hydrogen suggests that the benefits of decarbonising hydrogen production are likely to exceed those from current demand only.

Moreover, until a low-carbon hydrogen source at scale is secured for Europe, there is limited value in stimulating a massive ramp up in additional hydrogen demand, which would be met by carbon-intensive production methods[39]. Supporting low-carbon hydrogen should therefore be a policy priority.

The deployment of a significant volume of electrolysers should be supported to reduce their cost. This could be done using tools that proved successful for wind and solar technology (auctioning of feed-in premia).

Policies to support the deployment of renewable electricity generation to fuel growing demand from electrolysers would also be a no-regret option. The deployment of other low-carbon hydrogen production should also be phased in when industry is willing to share some of the remaining technology risk.

From a geopolitical standpoint, developing commercial know-how in technologies used to produce clean hydrogen is likely to make Europe's exports more competitive in a decarbonising world.

Supporting green products

State support for the production of low-carbon products, particularly in markets currently dominated by emissions-intensive production

Focusing public support to the demand for low-carbon products and intermediate goods (such as low-carbon steel) has the advantage of being technologically neutral.

Markets would be allowed to decide the most cost-efficient manner for production. Public revenue would be spent only for products for which a clear carbon-emissions reduction has been achieved.

This would allow policymakers to adopt a neutral standpoint regarding the applicability of hydrogen technologies, and to avoid public money being spent on projects that eventually do not significantly reduce emissions. The EU already has a tool for defining low-carbon benchmarks in the ETS product benchmarks[40]. A challenge would be choosing which products to support, and how much to support each product.

One drawback to this solution may be that one or two technologies are over-supported, while other options are ignored. The question then arises of whether the state is able to predict accurately which products and technologies should be supported.

This is because an explicit focus on decarbonising one sector prioritises technologies that are suitable for that sector while not necessarily taking into account that support for a different technology may have wider benefits for the rest of the economy.

For example, a focus on decarbonising heavy transport today might boost the competitiveness of new fuel cells and hydrogen tanks that then could be used in light vehicles, trains and aircraft, while a focus on decarbonising light vehicles today might instead extend the head start batteries have to all other modes of transportation.

Supporting R&D

Support for hydrogen research and development

Europe invests too little into R&D in general (D'Andria *et al* 2017). Public support for low-carbon R&D is a no-regret option. However, prioritising support for different areas is more controversial.

Many potential hydrogen applications would benefit from R&D investment. On the supply side, a range of potential production pathways could be explored. Public support for increasing the number of potentially viable decarbonisation options would make the low-carbon transition more resilient (eg. if other technologies fail unexpectedly).

Increased technology competition is also important to exert pressure on dominant technologies (eg. electric vehicles) to invest in innovation based on specific criteria where alternative technologies still have a lead (eg. limited range).

There is a strong case for Europe to significantly scale up R&D for all decarbonisation options. But, in a scenario of limited R&D budgets the value of hydrogen R&D must be weighed against R&D in competing technologies or energy carriers.

A consistent and predictable support mechanism at the European level would be beneficial. It could periodically allocate R&D funding to areas that appear most attractive according to decarbonisation criteria and priorities. The mechanism would adapt to technological evolution in order to avoid institutional lock-in[41].

It could take the form of an independent public body, a European Energy Agency, which could provide policy advice to the European Commission and interested member states.

For example, future bottlenecks in the shift to a low-carbon economy could be identified as a basis for today's public R&D support. Such a mechanism would help identify which hydrogen technological applications justify public R&D.

Finally, in the context of the current economic crisis, a focus on creating jobs and high multipliers might lead to an under-appreciation of the merits of R&D for long-term economic development.

Retrofitting natural gas networks

Public infrastructure investment to adapt the natural gas grid to make it suitable for transporting hydrogen

The natural gas grid constitutes a significant infrastructure asset, capable of holding large volumes of energy. At reasonable cost it could be repurposed for a low-carbon economy.

The necessity of repurposing the gas grid depends upon the size and geographic dispersion of demand clusters. If households are to consume significant volumes of hydrogen, clearly repurposing is necessary and investment should slowly begin.

However, it is not clear if household-level hydrogen demand will ever materialise (section 3). Instead, our demand analysis points to the likelihood of relatively significant hydrogen demand emerging in a series of large industrial clusters ('hydrogen valleys') across Europe.

In each cluster, hydrogen-using industries (eg. ammonia, steel, carbon storage) would co-locate and share the costs of hydrogen production or transmission.

Therefore, a planning perspective would not place much importance on building out a hydrogen distribution grid to the scale of anything like that resembling the current natural gas infrastructure. Instead, a few transmission pipelines connecting large demand and supply sources would be the priority investment.

Therefore, while it is technologically possible that hydrogen could satisfy household energy demand, it is not a first-best solution. The challenge in the transition between two network-based systems (eg. gas-based heating to electricity-based heating) is, that at one stage in the transition, the incumbent network will lose so many subscribers that its remaining subscribers will bear too much of its fixed cost, leading them to unsubscribe at increasing speed.

Such a disorderly transition (which was seen for some central heating networks in eastern Europe) can be inefficient and might need to be publicly managed. In addition, policymakers should focus short-term planning (5-10 years) and regulatory activity on enabling industry to build the infrastructure necessary for a system of large industrial hydrogen clusters.

Decisions over whether to retrofit natural gas grids at a more granular level should be postponed until clearer evidence emerges of the capacity of electrical solutions to fully satisfy household energy demand. Current market dynamics do not yet suggest that retrofitting natural gas grids to carry hydrogen is a sensible public policy.

Roll-out of hydrogen vehicle charging stations

State support for the deployment of hydrogen vehicle charging stations

Hydrogen vehicle charging stations are an enabling infrastructure. Providing the means to refuel and operate hydrogen vehicles should stimulate private investment in the production and purchase of hydrogen vehicles. Some pilots have already been supported (fewer than 100 in Germany).

However, significant public support for hydrogen charging stations would likely not be sensible. As discussed in section 3, the case for a transition of most transport sectors to hydrogen appears weak when compared to the case for battery electric technology.

There is a risk that public support for hydrogen refuelling stations would be at the expense of public support for electric charging stations.

European policymakers should continue to increase the stringency of decarbonisation policies for the transport sector. As discussed, with higher carbon prices or tougher policies, hydrogen solutions may be viable for heavy vehicles.

In such a future scenario, private investment could cover the required charging stations (at either end of a trucking route, for example). If private consortia come forward with co-financing options for publicly available hydrogen charging stations, policymakers might consider offering small incentives, but this should not be a landmark policy. Hydrogen vehicle charging stations are not today a priority for public support.

Certification scheme for low-carbon hydrogen

Developing a system for robust classification of the carbon content for each MWh of hydrogen

Knowing the carbon emissions associated with the production of each MWh of hydrogen will be an issue for future hydrogen consumption. Within Europe, calculations should not be necessary because hydrogen production falls under the ETS, and so carbon emissions are already priced in. But certification may be necessary for certifying the 'greenness' of hydrogen imports.

Designing a robust classification system will be difficult. For electrolysis, this would involve certifying the electricity input. When electricity for electrolysis is taken from the public grid its carbon content is more a matter of definition/accounting, than an objective value[42].

But even certifications of dedicated supplies from renewable electricity often do not pass the additionality test: has new renewable electricity capacity been built exclusively for hydrogen purposes, or has existing or already planned renewable capacity simply been 'assigned' to hydrogen production?

While a difficult task, European policymakers should think about designing a framework for the international trade in clean hydrogen. The extent to which hydrogen will become an internationally traded commodity remains to be seen, but if such a scenario emerges, Europe is likely to be a significant net importer. It would be wise, therefore, to start the conversation about how Europe can be sure its hydrogen imports are low carbon.

Competition policy/regulation holidays

Providing breaks from the rules of competition policy or regulation to encourage targeted investment

Providing some temporary exemptions from strict competition/network regulation rules designed for mature markets can be a tool for encouraging private sector buy-in. Horizontal and vertical coordination are both crucial during the earlier stages of building a new network. For example, initial investments in the production, transmission and consumption of hydrogen need to be well synchronised.

Without the ability to ensure the provisioning of the complementary elements of the hydrogen value chain (through vertical integration or binding agreements), private investment may be discouraged in some areas.

There is a coordination problem, with investment into all elements needing to be synchronised because each individual investment (eg. an electrolyser) is only worthwhile if all other parts of the new value chain (eg. a hydrogen pipeline, storage or steel-plant) also work.

Additionally, regulatory breaks can help encourage breakthrough R&D and investment. This is particularly the case for testing new technologies, such as the correct protocols for using hydrogen in households.

In both cases, such exemptions must be temporary and well targeted so they encourage investment in areas with high benefits. ■

Endnotes

1. In this paper we transfer all energy units (electricity, hydrogen, natural gas, etc) into terawatt hour (TWh) for easier comparability. One TWh is about 0.03 million tonnes hydrogen or 92 million cubic meters of Russian natural gas.

2. 90% is a technical maximum. The range of carbon captured is likely to be in the range of 60-90%. Capturing carbon between 60 and 90% is relatively more expensive.

3. See https://www.eex.com/en/market-data/power/futures where futures at the Belgian energy exchange frequently settle at around €50, and https://www.powernext.com/futures-market-data where an index of European natural gas prices stays around €20.

4. In fact, we consider a carbon price of €50 a likely upper bound for the next three years.

5. Estimates using IEA data. This illustrative example assumes that the required installations for hydrogen production from methane and from electrolysis are available.

6. The EU is in particular supporting the development of proton electron membrane (PEM) electrolysers. For example, the REFHYNE project (https://refhyne.eu/) will install and operate the world's largest hydrogen PEM electrolyser with 10MW capacity. This is important because PEM electrolysers are able to more quickly adjust demand in response to fluctuating electricity supply compared to conventional electrolysers.

7. Solar potential of some 600,000 TWh/year from Korfiati et al (2016) alone would enable around 12,000 Mt of hydrogen production.

8. Our calculations are predominantly built on interpretations of the European Commission's 'Clean Planet for all' strategy (European Commission, 2018). Additional sources are used to complement our analysis in many cases. A footnote below each set of numbers briefly explains the underlying calculations.

9. Figures estimated using the growth rate in passenger vehicles assumed by European Commission (2018). Upper demand based on 15 percent of the vehicle stock in 2050 being hydrogen fuel cell, 5 percent for medium, and 0 percent for lower.

10. Figures estimated using the growth rate in heavy duty trucks to 2050 from European Commission (2018). Upper bound assumes 25 percent hydrogen fuel cell composition of 2050 heavy duty fleet, medium and lower bounds assume 15 percent and 1 percent respectively.

11. Figures estimated using the growth rates in light commercial figures to 2050 from European Commission (2018). Upper bound assumes 20 percent hydrogen fuel cell composition for 2050 light-duty fleet, medium and lower bounds assume 5 percent and 0 percent respectively.

12. Figures estimated on the basis of hydrogen-optimistic and hydrogen-pessimistic scenarios for final energy demand in the shipping sector from European Commission (2018). These figures exclude indirect demand for hydrogen that would arise if ammonia were used as a fuel.

13. Total energy demand for aviation sector in EU taken from European Commission (2018). Upper demand assumes 30 percent of demand met by direct hydrogen (ie. fuel cell + combustion). Of the remaining 70 percent, jet fuel or equivalent substitutes are used. Of this demand, 20 percent is assumed to be met by synthetic fuel production from hydrogen. Lower demand is zero in the case that hydrogen technology does not develop. Medium is midpoint.

14. Synthetic fuel broadly refers to the concept of a chemical fuel synthesis in which hydrogen is reacted with carbon from carbon dioxide in order to produce hydrocarbons with a significant commercial value (eg. methane). When hydrogen is produced from green electrolysis and carbon dioxide is captured from the air, this can theoretically be a zero-carbon emission fuel.

15. The implied mitigation cost of using power-to-liquid to produce synthetic jet fuel would be in the order of €800/tonne CO_2 (Pavlenko et al 2019).

16. Biofuels from seaweed could address this issue but are not yet commercially proven (Bellona Europa, 2020).

17. Up to 41 percent with chemical sector emissions used to represent methanol and ammonia.

18. For the whole chemical sector, not just ammonia and methanol.

19. Based on the assumption of a 178 kilogramme hydrogen requirement per tonne of ammonia. The variation arises from different final demands for ammonia in the EU in 2050.

20. Production of hydrogen from methane emits 1.83 tonnes of CO_2 per tonne of ammonia (Bazzanella and Ausfelder, 2017).

21. For example, a 100MW wind-powered renewable hydrogen production plant in the Netherlands developed by power company Ørsted and fertiliser company Yara (Durakovic, 2020).

22. See https://www.consilium.europa.eu/en/press/press-releases/2019/05/21/eu-adopts-new-rules-on-fertilisers/

23. Ammonia can be combusted to produce electricity. On a small scale, it is currently co-fired in coal plants to produce electricity with lower emissions.

24. Based on assumption of 189 kilogrammes hydrogen per tonne of methanol. Variation arises from differences in EU final methanol demand in 2050.

25. Our estimations first take IEA trends for a slight decrease in hydrogen requirements in oil refining from 2020 to 2030 while assuming constant demand for oil refining. The scenarios then differ depending on assumptions on the decrease in demand for oil refining.

26. See for example the International Maritime Organisation's IMO 2020 rule:
https://www.imo.org/en/MediaCentre/HotTopics/Pages/Sulphur-2020.aspx

27. Demand assumed constant at today's level. Upper assumes all demand met from electric arc furnaces (EAF) with 60 percent direct reduced iron (DRI)/40 percent scrap steel feedstock. Lower assumes 50 percent EAF, and feedstock 50 percent DRI/50 percent scrap steel. Medium assumes 75 percent EAF and feedstock of 50 percent DRI/50 percent scrap steel.

28. See https://ec.europa.eu/growth/sectors/raw-materials/industries/metals/steel_en

29. Electric arc furnaces can also be rapidly started and stopped. A shift in steel production towards electricity could therefore have positive spillover effects for demand response in electricity grids with lots of variable renewable power.

30. As well as removing the majority of emissions which are associated with the reduction of iron ore.

31. Recycled steel can be contaminated with other elements, most commonly copper. This reduces the quality of steel.

32. HYBRIT in Sweden is a well-known example. See
https://www.ssab.com/company/sustainability/sustainable-operations/hybrit

33. Based on modelling results from European Commission (2018). Upper demand is taken from the H_2 scenario – this scenario achieved an 80 percent reduction in emissions. We assumed a slightly increased hydrogen demand to reach a 100 percent reduction. Medium and lower linearly extrapolated to zero.

34. See https://ec.europa.eu/energy/topics/energy-efficiency/energy-efficient-buildings/renovation-wave_en

35. In 2014, it was estimated that the penetration of electricity smart meters in the EU in 2020 would be 72 percent. Most recent estimates suggest that the actual figure is about 43 percent. Lack of consumer acceptance, often for privacy reasons, has been a main reason for delay (Tounquet and Alaton, 2020). While heat pumps should not present privacy issues, the example clearly illustrates the challenges associated with a policy that requires the agreement of individual households.

36. Refined from biogas, which is produced through anaerobic digestion of waste or organic matter from a variety of sources.

37. Most of the investment cost is related to the capacity (ie. the MW) of the appliances that transform electricity into hydrogen and back – while the size of the storage tanks/aquifers (ie. the MWh) does not drive cost that much.

38. This DG ENER factsheet shows the discrepancies in taxation rates: https://ec.europa.eu/energy/sites/ener/files/qmv_factsheet_on_taxes.pdf

39. There is an argument that it is still worthwhile pursuing demand cases today and that clean hydrogen supply will eventually 'catch up'. There is clear reason to this argument, but we believe that a clearer route must first be established for the decarbonisation of hydrogen supply within Europe. Supplying the volume of clean hydrogen suggested by our highest demand case would currently be very difficult for Europe.

40. Product benchmarks have been calculated for a range of emission-intensive products under the ETS. This benchmark is based on the average greenhouse gas emissions associated with the best performing 10 percent of installations. They can therefore be thought of as the best-practice

emissions associated with production of a particular product.
41. See Zachmann et al (2012) p 99, for further discussion.
42. For electrolysis, it would require defining the carbon content of the used electricity and three very different values can be used for each hour in which the electrolyser was used: cleanest power plant; average power plant; dirtiest power plant or last (marginal) power plant required to meet the demand. In the short-term, the last option seems most plausible, but in the longer term, additional demand from electrolysis might be met be increasing supply, potentially from renewable sources.

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Virtual EBACE connected our industry

Ed Bolen is President and CEO the National Business Aviation Association (NBAA)

Even more than one year later, I remain amazed and humbled by the tremendous innovation and resilience our industry displayed in responding to the COVID-19 pandemic, including by how quickly the business aviation community adapted to new forms of communication.

At NBAA, we revamped our entire model for connecting with our members to utilize the virtual environment. With our world and our industry *"locked down"* around the globe, NBAA's News Hour webinars, our NBAA Insider Daily summary of the latest news in our industry and immersive virtual convention platforms all proved to be vital and highly-effective tools as we navigated the COVID environment.

As *World Commerce Review* readers know, the 2020 edition of the European Business Aviation Convention & Exhibition (EBACE) was one of the first major industry events to be cancelled last year as the full scope of the pandemic became known. However, I'm pleased to note we've recently wrapped a successful virtual edition of the event for 2021, EBACE Connect.

Held 18-20 May and presented by the European Business Aviation Association (EBAA) and NBAA, this online exhibition soared beyond expectations and demonstrated the global business aviation community's eagerness to embrace the future, focus on new opportunities and fire the imagination.

EBACE Connect served to bring the business aviation community together to share a common vision for the future and to plan for our post-pandemic world. The event made clear that business aviation is focused on much more than just returning to a *"new normal"*; our industry is evolving, coming back stronger, more adaptive and more innovative than ever.

More than 1,600 attendees participated in EBACE Connect, which featured keynote discussions with aviation leaders and visionaries. Famed pilot and philanthropist Erik Lindbergh opened the program by sharing personal insights on the next great era in aviation, while day two featured a Lightning Round session with the CEOs of all the major business aircraft OEMs highlighted their perspectives.

The future was in focus throughout EBACE Connect's roster of panel sessions and 'Thought Leadership' discussions, covering advanced air mobility, safety regulation for new technologies, growing beyond COVID, market trends and

sustainability. Major OEMs and leading service providers announced exciting new products and offerings to an audience that included nearly 100 international journalists registered to cover the event.

Joining together once again as an industry

While EBACE Connect was an unquestionable success, our industry eagerly anticipates meeting together once again, in person, and we certainly look forward to the return of an in-person 2022 EBACE to Geneva Airport and Palexpo in Switzerland, scheduled to take place 23-25 May.

"I believe NBAA and our entire industry are confident of much brighter days ahead, as business aviation stakeholders worldwide embrace a promising, innovative and sustainable future"

NBAA is also working to bring an exciting, in-person 2021 edition of our Business Aviation Convention & Exhibition (NBAA-BACE) to Las Vegas, NV from October 12-14. Interest in this event has been strong from exhibitors and attendees alike, and we're close to selling out the Exhibit Floor at the all-new, state-of-the-art West Hall of the Las Vegas Convention Center (LVCC).

Featuring 600,000 square feet of exhibit space and the equivalent of 80 new meeting rooms, the LVCC West Hall also features an expansive, 14,000 square foot outdoor terrace for receptions. NBAA-BACE attendees will further appreciate that all exhibitors will be hosted in a single area, unlike past years in Las Vegas that split the exhibit floor between the Central and North Halls.

In keeping with its unique importance this year in bringing our industry together again, NBAA-BACE will feature an unprecedented roster of impressive, dynamic and forward-looking keynote speakers and session presenters, as well as hundreds of prominent business aviation OEMs, industry stalwarts and first-time exhibitors alike.

Attendees will also experience several new features of NBAA-BACE, including a dedicated Maintenance Pavilion on the show floor highlighting the very latest resources available to the aviation maintenance technicians (AMTs) and airframe and powerplant (A&P) mechanics who have kept our industry flying safely throughout the pandemic.

Details of this and other new offerings will be available in the months ahead at nbaa.org/bace.

NBAA has also partnered with leading medical services consulting firm CrowdRX to ensure NBAA-BACE meets the highest standards for attendee safety, without losing the character and camaraderie for which the event is known. Additionally, the LVCC has earned Global Biorisk Advisory Council (GBAC) STAR facility accreditation by ISSA, the world's leading trade association for the cleaning industry.

In marked contrast to the uncertainty we all felt this time last year, I believe NBAA and our entire industry are confident of much brighter days ahead, as business aviation stakeholders worldwide embrace a promising, innovative and sustainable future. We look forward to welcoming you to a truly one-of-a-kind experience in Las Vegas. ■

Silver linings

Professor Michael Osbaldeston is Associate Director of Quality Services, EFMD, and Former Director of Cranfield School of Management, and Adriana Kudrnova Lovera is Manager, EQUIS, EFMD

The internationalisation of higher education has been on the agendas of national governments and university leaders around the world for decades, but the topic has achieved greater prominence in recent years due to the increasing realisation that universities have a responsibility to prepare students for leadership roles in a global world.

There are different reasons for this: the issues faced by employers are increasingly global; companies and NGOs are increasingly organised internationally with a global focus; and students have increasingly been taking an international perspective when choosing where to study, often deliberately choosing to go abroad.

Greater international awareness of issues such as climate change, geopolitics, poverty, inequality and radicalisation has enhanced the international debate within the academy and led us to re-examine the ways in which internationalisation is conceptualised, systematised and operationalised within the strategic development of most universities.

While the current coronavirus pandemic has been a profound shock to many of these strategies, traditional approaches to international education already faced challenges due to concerns about sustainability, environmental impact, elitism and other ethical considerations.

What is internationalisation?

Knight's 2003 definition of internationalisation as "the process of integrating an international, intercultural or global dimension into the purpose, functions and delivery of post-secondary education" has been widely applied.

More recently, Knight acknowledged that her original definition has the weakness that *"traditional values associated with internationalisation such as partnerships, collaboration, mutual benefit and exchange are not articulated – only assumed."*

The description was thus expanded, with the addition of *"in order to enhance the quality of education and research for all students and staff and to make a meaningful contribution to society"* (by De Wit).

There is an increasing focus on how internationalisation contributes to outreach, social responsibility and engagement, but a recent European report (TEFCE) notes that *"in the absence of prioritising engagement over research excellence …, some universities have failed to develop the appropriate infrastructures to translate the knowledge they produce into the range of contexts …"*

Assessments of internationalisation have generally focused on structural issues such as relevant research and publications, student and faculty diversity, international partners and networks, and international corporate connections. Yet there is an argument for rebalancing attention towards processes that are more outcome-related, with more focus on the development of international relevance and outreach.

Internationalisation of management education

Although there have been university-based business schools for over a century, it is only in the last fifty years that they have become one of the major success stories in higher education, both from an academic perspective – faculty, research and publications – and a business one – customers, revenue and profitability.

In recent decades, business schools have spread rapidly from North America through Europe to Asia and beyond, currently numbering over 15,000 worldwide with new additions being launched almost daily, particularly in emerging economies.

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Yet despite this success, there has also been increasing criticism in recent years, fuelled in part by the frustrations of the global economic recession. Business schools have been charged with being too analytical, insular and theoretical; insufficiently global, integrative and collaborative; and lacking in values, ethics and social responsibility.

It is hardly surprising, then, that many leading schools have increasingly turned their attention to internationalisation to expand their reach and demonstrate their worth. In addition

to the global issues that affect higher education generally, faculty and students in management education tend to be more mobile internationally, and while they accept higher costs they also expect higher benefits (for example, some MBAs are the highest-priced but also the most sought-after Master's degrees in the world).

As management education has become increasingly competitive, it has become crucial to use internationalisation to enhance the differentiation, with an array of different international strategies being employed. At the same time, management research disseminated through journal publications, books, case and learning materials, has become increasingly cross-cultural.

"... a 'silver lining' may emerge for business schools from the current challenges. The business education ecosystem may develop its own immune system, with more flexible, innovative and collaborative international strategies"

Internationalisation and accreditation

The accreditation of management education started over a century ago with a focus on North American schools, later followed by other programme accreditation systems limited to specific countries.

It was not until the 1990s that the growing demand for a European approach to accreditation led the European Foundation for Management Development (EFMD, originally founded in 1971) to seize the initiative and work towards the launch of the European Quality Improvement System (EQUIS)[1] in 1997.

EQUIS was designed to provide business schools in Europe – and later worldwide – with a rigorous tool to assess and improve quality in all aspects of their operations. Over a relatively short period of time, EQUIS has enabled an elite group of institutions (currently 191 schools in 45 countries) to state with confidence that they are part of the *"1% of leading business schools."*

It was not long before EFMD also launched the European Programme Accreditation System (EPAS) in 2005 – recently rebranded as EFMD Programme Accreditation[2] – with 120 programmes currently accredited at 89 institutions across 35 countries.

After more than twenty years of continuous development, the *Financial Times* stated that five-year accreditation from EQUIS is now regarded as *"the gold standard"* for international business school accreditation.

EQUIS aims to recognise quality and promote quality assessment in the world's best business schools – through the award of a quality label that is valued worldwide by students, faculty, employers and the media (having now become a prerequisite for entry into some prestigious rankings) – and also recognise improvement through the need to meet and continue to achieve internationally agreed quality standards.

From the start, EQUIS was conceived as an accreditation system rooted in respect for diversity of institutional and cultural contexts. It does not promote any 'one best model' of a business school, but rather embraces higher education at all levels without imposing standardisation of programme design, course content or delivery mode.

However, it is also firmly grounded on several transversal issues, one of which is looking for an international dimension throughout a school's activities.

Although EQUIS was originally designed within a European context, it has also recognised the dilemmas that result from applying universal standards in widely differing international contexts and the system has thus evolved to ensure that it can be applied in all regions of the world, especially in rapidly emerging economies.

The criterion of 'respect for diversity' is a particular case in point. While EQUIS is designed to promote diversity of all types, it also inevitably reflects the nature of diversity encountered within its originating geographical region.

Assessment of quality begins with an understanding of the particularities of the local context before progressing to assess international application across all dimensions and thus ensuring it is possible to recognise top-level business schools in Europe, Asia and the Americas.

However, this inherent flexibility does not imply any lowering of expectations regarding quality standards because of local constraints. Rather it is a feature of an assessment process capable of accepting wide differences in the organisation and delivery of management education across the world.

At the heart of EQUIS accreditation is an issue which has engendered continuous debate since its foundation: exactly what is meant by the term 'internationalisation' and how best do we assess it?

Internationalisation has often been perceived as being reflected in the mix of nationalities amongst students and faculty, together with advisory board members, partner schools and recruiting organisations.

While a school's cultural diversity, measured by nationality, is, of course, important, a much deeper understanding of internationalisation results from an assessment of how a school has adapted its education and research to an increasingly global managerial world (and, an issue which we will return to later, how a school responds to unexpected international shocks such as the current global pandemic).

Further, deeper evidence of the degree of internationalisation can be reflected, for instance, by research that explores international challenges, education that incorporates an international curriculum and is accessible across the world, and exposure that encourages international mobility and employment.

In the same broader context, other more recent developments such as the growth of joint programmes in business schools, the dissemination of online learning methodologies, the establishment of satellite campuses, increasing institutional collaboration and partnerships, and the emergence of mergers and other forms of restructuring (many of which have taken place across international boundaries) all need to be considered if we wish to understand and assess this complex and multi-faceted concept.

A broader interpretation of internationalisation

In order to assist academic leaders and accreditation reviewers alike in assessing the degree of internationalisation of a business school, EQUIS developed a model (first launched in 2018) which encourages us to think beyond nationality mix and incorporate a wider range of international measures, grouped into four broad categories:

- **Policy** issues influencing the whole school
- **Content** aspects of the learning and development process
- **Context** issues resulting from the experience of the various stakeholders, and
- Elements of the wider **network** to which the school belongs

Each category encompasses three further dimensions (all included within the EQUIS Quality Profile). When assessed on a simple low/medium/high scale, these produce an overall profile of the extent of a school's internationalisation, together with its relative strengths and areas for further improvement.

This model (which has become colloquially known as the 'Spider Diagram') also enables a school to demonstrate its international quality improvement journey over time with past vs present profiles, or to illustrate its future international strategic objectives with present vs planned future profiles.

Policy

1. **Strategy** – does the school have a well-defined strategy for internationalisation together with plans and resources for its implementation?

2. **Recognition/reputation** – what is the competitiveness, recognition and ranking of the school in international markets?

3. **Governance/advisory board** – is there an international dimension in the school's governance and advisory system?

Content

4. **Curriculum/learning resources** – what are the

international perspectives, content and resources of the school's qualification and executive education programmes and how is the learning made accessible/disseminated internationally?

5. **Research and development** – what are the international scope, dissemination and recognition of the school's R&D?

6. **Competencies** – are global-mindedness and cultural sensitivity developed, is language learning provided and is English widely used for learning materials, teaching and publication?

Context

7. **Faculty/visiting professors** – what is the intercultural and experience mix of core, adjunct and visiting faculty?

8. **Students/exchanges/alumni** – what is the intercultural mix of degree-seeking and exchange students and the international spread of alumni?

9. **Professional staff** – is there an international/partnerships/exchanges office with an intercultural mix of professional staff?

Network

10. **Executive education/clients/recruiters** – does the school have international corporate links with clients/employers, including international companies with domestic offices?

11. **Alliances/partners** – what is the quality of the school's international academic partners, strategic alliances and professional networks?

12. **Activities abroad** – what is the school's level and quality of internationalisation outside its home country, such as satellite campuses, joint programmes and franchised provisioning (where applicable)?

Although participating schools have generally welcomed this broader interpretation of internationalisation within the EQUIS (and EPAS) accreditation system, there continue to be ongoing pressures to redefine standards, introduce new areas of assessment and continuously evolve processes to reflect and even anticipate developments in management education; none more so than in the context of the current coronavirus pandemic.

As was announced at the EFMD 2020 Deans' Conference[3], the Quality Services team is currently using external sources and EQUIS data to further research and publicise the benefits and challenges of internationalisation.

These relate to schools becoming more international, the intersection of internationalisation and the ethics, responsibility and sustainability transversal standards, and the diverse strategies which schools adopt to increase their internationalisation in widely different national contexts and regions.

The research findings will be used to identify new opportunities and strengthen current dimensions of internationalisation, to raise awareness of the challenges and potential pitfalls of becoming more international, to highlight successful strategies to internationalise despite local limitations and to disseminate illustrative case studies drawn from schools around the world.

In addition, a Digitalisation Task Force has been established, with the support of an Internationalisation Working Party, to draw on the experiences of EQUIS Deans from across the world in relation to the benefits of digitalisation for international management research and education and the consequences of online learning for students and faculty.

This project may also lead to an evolution in the language of internationalisation towards 'participation and experience' and away from ideas of 'enrolment and exchange'. The current and rapid transition seen in many business schools from a classroom to a virtual learning environment necessitated by the pandemic will also have major consequences for how we understand internationalisation.

Internationalisation strategies

More than twenty years of accreditation experience drawn from across the world has clearly demonstrated that there is no 'one best model' for internationalising a business school. Rather there are a variety of successful strategies, depending upon the scope, size, resources and location of a school (as illustrated by the briefcase examples 'boxed' throughout this text).

However, some of these approaches may be more affected than others by the constraints imposed by the current pandemic, especially approaches that rely heavily on international recruitment and exchange of students and faculty across borders.

While it is too early to assess whether these will become permanent barriers, some schools are responding to the current context by re-evaluating the long-term viability of their internationalisation strategies and searching for new opportunities.

Some large graduate schools have focused on developing programmes in a single location where everything is designed from an international perspective – curriculum, faculty, students, research agenda, etc – such that the national base is largely irrelevant to their operations.

Some large graduate schools have focused on developing programmes in a single location where everything is designed from an international perspective – curriculum, faculty, students, research agenda, etc – such that the national base is largely irrelevant to their operations.

These schools have developed a truly international community where no single nationality predominates. Others, perhaps originally based in a single European location, chose a different path, establishing a subsequent 'sister' school in a different geographical region.

Here, students and faculty can be recruited initially to either site and then move seamlessly between the dual locations to experience the contrasting cultural settings. Another option is schools which have invested in supporting fledgeling institutions, often located in developing countries, with financial, human and managerial resources, then withdrawing at a later stage once the new school has gained sufficient strength and independence.

A variation on this latter model is an international joint venture where an established school or foundation in one region of the world initiates a joint project with one or more other partners, working together to build a new institution from scratch in another region in order to enhance management education provision globally.

A more complex multi-campus strategy involves establishing a global network of interlinked campuses, either on a stand-alone basis or in partnership with other schools in each region, where students can be globally mobile, transferring from one location to another to complete their studies on the basis of international credit accumulation.

Faculty may contribute to research and teaching in any or all of the locations or choose to develop their careers by periodically moving between locations.

A somewhat less complex model involves selected partnerships where an independent school chooses to work with a variety of international partners (often using their accreditation status for selection) to develop different activities such as research networks, joint programmes or student exchange facilities.

Some of these partnership programmes are now so well established that they are assessed as delivering a higher quality of education than any one of the partner schools could provide alone.

Yet another option is independent schools which may choose to be nationally based but internationally open, by encouraging an influx of international exchange students and visiting faculty and promoting overseas faculty secondments to build an ever-changing international community.

The demand from Chinese and Indian students, in particular, to study abroad, especially at postgraduate level, has encouraged many schools in Europe and Australasia to expand internationally on this basis.

Internationalisation: current and anticipated effects of the pandemic

The onset of the coronavirus pandemic raised new questions about current approaches to internationalisation. Efforts to contain the spread of infection, including domestic lockdowns, international travel restrictions and campus closures, have left many international students in limbo, while many institutions have adapted quickly to continue their activities online.

This rapid transition to virtual learning which can then be disseminated worldwide, accompanied by pedagogical

training for faculty to support the revision of their teaching methodologies, are to be applauded. Yet at the same time, many international and exchange students have sought greater safety and security by returning to their home countries.

In tandem, accreditation bodies, ranking agencies and business school associations have been sharing experience and best practices in response to this educational disruption in order to provide a 'collaborative platform of knowledge and solidarity'.

Beyond these short-term impacts, institutions are now grappling with the implications for some internationalisation strategies, in particular those which focus on the international mobility of students and faculty.

Prior to the pandemic, many universities, particularly those in Australia, the UK and the USA, were becoming increasingly dependent on income from international students, who in some cases pay higher fees than their local counterparts. Figures published in January 2020 show that in 2017-2018, Chinese student fees provided £1.7 billion GBP to UK higher education institutions, comprising around five percent of all income.

Institutions with a large percentage of international students risk a major loss of tuition fee income due to the pandemic, with a decrease in international student enrolment.

For example, the world-renowned London School of Economics, like many schools, has invested heavily in international recruitment, has a student body of more than two thirds international students and could stand to lose a substantial proportion of its fee income if enrolments were to drop significantly.

A March 2020 survey from Studyportals found that a majority of prospective students (73 percent) who had planned to enrol in courses abroad in the following six months were continuing with the same study plans; the remaining students (27 percent) were considering postponing their studies or enrolling in online courses. A more recent survey in October 2020 by *Times Higher Education* found that over 50 percent of prospective international students are considering changing their plans and now wish to postpone their studies or study in a different country. More than half of the students surveyed were not interested in studying online, and 53 percent still hoped to travel abroad for their studies in the near future.

Whether prospective international students will choose to study locally in the future remains uncertain. However, it is possible that the pandemic, together with other factors, may indeed change the flows of students to different countries.

In August 2020, a survey by IIE found that more than half of 520 US institutions have seen a decline in international student applications in 2020 compared to the previous year, and some experts are warning that higher education institutions in the US may see a minimum 30 percent decline in international student enrolment in the coming academic year.

In addition to the restrictions of movement across borders imposed by the pandemic, students intending to study abroad could be put off by ever tighter visa requirements, a backlog of visas to be processed, and 'unwelcoming' or even discriminatory experiences reported over recent months by foreign students in some countries.

Furthermore, the perception that some countries have better managed the pandemic may also sway student plans.

Countries such as New Zealand and Australia may increase their share of international students globally as a result of their relatively successful containment of the virus. Other anglophone countries such as Canada may also benefit from their more liberal immigration and post-study regulations.

Whatever the short-term problems, some commentators have suggested that a 'silver lining' may emerge for business schools from the current challenges. The business education ecosystem may develop its own immune system, with more flexible, innovative and collaborative international strategies.

Schools may become more resilient, more relevant and better prepared for future disruption, while students may be more open, more selective and increasingly flexible in how they plan their international management education. ■

Endnotes
1. https://www.efmdglobal.org/accreditations/business-schools/equis/
2. https://www.efmdglobal.org/accreditations/business-schools/efmd-accredited/efmd-accredited-programmes/
3. https://twitter.com/i/events/1229346840904163329?s=20

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Time to act like a start-up

Jonathan Sharp is a Director at Britannic Technologies

After a year of lockdown and life being turned upside down businesses will need to adopt a mindset like a start-up, being more open to change and doing things differently. One advantage to the pandemic even though it was enforced were the accelerated changes that occurred such as digital transformation, customer experience and people working from home.

These things were happening already to some extent but now businesses have finally realised that these alterations to the way we work and do business are required in the modern world and life after lockdown.

Start-ups leading the way

The pandemic has triggered record number of companies created, with an extra 84,758 businesses setting up in 2020 compared with 2019. This is equivalent to a 12.3 per cent increase year on year, which is the highest percentage growth since 2011 and the highest actual growth on record.

Traditional companies are often set in their ways with rigid hierarchies, boundaries and processes. After this year, businesses need to recognise that if they don't press the reset button and start to behave like a start-up then they will suffer as result.

Now is the time to be agile and adapt your strategy and culture accordingly so you can respond to the changing environment and market.

Back to the drawing board

A survey conducted by Futurum Research in North America

and Europe revealed that 57% said their entire business model needed to be reconsidered in the wake of COVID-19.

During the last year a lot has changed in how we work, how we do businesses, dealing with customers, partners and suppliers, and maybe even adapting the products and services we offer and internal and external processes. It is time to tack stock and evaluate what has and what hasn't worked over this period of time.

Disrupt and innovate

Start-ups disrupt the market with innovative products and services that consumers demand. However, today it is not just about the revolutionary idea it is about the execution which needs to be integrated into the business's operations and processes to deliver a seamless customer experience.

Over the last year businesses have been propelled into action by lockdown restrictions and have made the relevant changes including deploying unification communication solutions to enable employees to work from home and making changes to the customer processes.

Businesses have discovered that digital transformation solutions do not have to be a lengthy and cumbersome process and can be designed and implemented at speed.

It is vital to acknowledge they must be part of a digital transformation strategy rather than implemented in isolation to deliver greater benefits.

A Mckinsey & Company study reported that businesses have on average accelerated their digital offering with seven years of progress in a matter of months. They were reacting to the first lockdown, ensuring business continuity was in place and now companies need to focus on how to optimise their remote teams and develop leaner business models.

The last year has demonstrated that businesses have acted with agility because they had no choice in responding to the environment and the market. The takeaway here is that they must continue to be agile and flexible and not return to a fixed mindset of being stuck in their ways in order to not only survive the aftermath of lockdown but to thrive.

The hybrid challenge

It is expected that when lockdown ends employees will want to work from home and the office therefore adopting a hybrid working approach. CIPD and YouGov survey in March 2021 stated that some 40% of employers said they expect more than half their workforce to work regularly from home after the pandemic has ended.

According to data from the Office of National Statistics, prior to COVID-19 only around 5% of the workforce worked mainly from home before the pandemic, 65% of employers either did not offer regular working from home at all or offered it to 10% or less of their workforce.

After the pandemic, that 65% is expected to fall dramatically to 37%. This represents a significant shift in ways of working

"The COVID-19 pandemic has taught us to be agile and accept change and that we need to keep moving and not to stand still"

which businesses need to be prepared for. Businesses will be confronted with the challenges of implementing and managing hybrid working which will call for new management skills further to managing the remote workforce over the last year.

Communication will be key to its success and when not managed well it will result in poor information flow producing knowledge gaps, barriers to effective team working and isolating team members who are not present in the office. Within hybrid teams the communication will need to be scheduled and effective team communication should be everyone's responsibility.

The beating heart

Naturally, technology is crucial in the facility of hybrid working where employees need to work and communicate seamlessly between home and the office.

Technology is also essential to transform internal and external processes such as communication, operations and customer service.

In order to successfully deliver these businesses will require a robust and reliant infrastructure to withstand the capacity and capabilities required for hybrid working and other areas to ensure they have the desired connectivity and security.

IP all the way

The industry is set for a big digital shift in 2025 when businesses will transition from ISDN to IP. The transition has been accelerated due to the pandemic and companies that still have legacy PBX technology on-premise should look to migrating to IP sooner rather than later to be prepared and to reap the benefits to assist them with the new demands of lockdown recovery.

Hosted in the cloud

By moving to cloud-based telephony solution businesses will be able to scale up and down, facilitate the management of communications, save costs and provide the flexibility to add on new technology and applications when required.

Cloud solutions also deliver analytics on data usage which can be utilised for business decisions and understanding more about the employees and the customers to add value and intelligence.

Security is paramount

Security has been a hot topic during lockdown and even with cloud solutions it is vital for employees working from different locations that each employee is protected by a layer of security to suppress cyber attacks.

This could include firewalls, single sign-on or multi factor authentications on the user's device where the IT team are alerted if the security is compromised.

For employees working remotely we would advise a remote VPN to deliver a secure encrypted connection to the business network which provides an additional layer of security and enables them to access the corporate network from anywhere using a public internet connection.

Seamless unified communications

Businesses then need to look at deploying a unified communications solution so employees can communicate and collaborate wherever they are.

This is a step up from quickly implementing a remote working solution to moving to a comprehensive unified communication solution enabling employees to communicate and collaborate with each other ensuring that it is integrated to your front and back office, such as contact centre or CRM system to deliver improved communications, operational processes and customer experience.

Improve with automation

Customer experience is what is driving competition today not product or price, Gartner forecasts that 89% of businesses expect to compete on customer experience.

The pandemic has fast-tracked customers' expectations demands increasing the need for a personalised and seamless service as online shopping as increased dramatically and competition is tougher than ever.

Businesses need to get creative with AI and automation technology to improve the customer experience by optimising processes. Automation solutions can be designed to handle a multitude of digital interactions, self-service options via web chat or AI solutions can deal with customer enquires reducing the cost to serve from £4.00 a phone call to £0.20 using AI.

A solutions provider will work closely with you to identify your problems areas and what objectives you want to achieve to re-engineer your process enabling you to save costs, improve efficiencies and customer service.

A new world

We must remember as Bill Gates famously states, *"Success today requires the agility and drive to constantly rethink, reinvigorate, react and reinvent."*

We believe that when lockdown lifts businesses will embrace a new culture where creativity, innovation and shared ideas are welcome. Employers and employees will operate in a transparent environment where no one is scared to fail after all if we don't fail then how we will evolve.

The COVID-19 pandemic has taught us to be agile and accept change and that we need to keep moving and not to stand still. ■

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