

Markets of Tomorrow: Pathways to a New Economy

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1

Executive summary

Recovery from the economic downturn attributed to the COVID-19 pandemic calls for an inclusive and sustainable economic transformation capable of economic growth that is conducive to the broader societal and environmental objectives to be achieved over the coming decade. The impact of the pandemic has exacerbated the social crises prevalent in many parts of the world before its onset and created new ones to the extent that the risk today is not only to see decades of progress in fighting poverty around the world obliterated, but also public and private leadership retracting on commitments and actions taken to protect the environment at a time when the very opposite is needed: economic transformation that can provide economic growth while meeting the needs of society and the environment.

Building the “markets of tomorrow” to achieve such economic transformation requires a creative combination of breakthrough technological and socio-institutional innovation. Economic value is produced by means of the technological capabilities available and organized and distributed through the formal and informal institutions that have been developed to structure behaviour: from public policies and procedures to habits and norms, shared beliefs and perceptions. Each market of tomorrow is a subset of the broader technological and socio-institutional systems most closely linked to the exchange of a specific good, service or asset. Conceptually, a new market builds on and replaces previous ones and can become a piece of a new paradigm, driving economic transformation. The goal of such innovation would be to produce not only more or better, but to transform economies by establishing new technological and institutional systems to resolve the most pressing societal issues.

Twenty markets of tomorrow are considered promising in that they could support inclusive and sustainable revival of growth. The establishment of some will rely on advances in breakthrough technological innovation (e.g. broad-spectrum antivirals, space flights), others will require radically new social and institutional structures (e.g. skills capital, water rights and quality credits), others still a combination of both (e.g. data, genes and DNA sequences). Each of these markets could offer potential benefits across multiple dimensions, for example, by helping to increase well-being and empower people (e.g. precision medicines and

orphan drugs, EdTech and reskilling services), advance human knowledge and understanding (e.g. artificial intelligence, satellite services) and protect the environment (e.g. electric vehicles, hydrogen). Some of them have a global (e.g. greenhouse gas allowances) and others might have a stronger national (e.g. skills capital) or local component (e.g. water rights and quality credits).

Each of the markets of tomorrow requires seven key conditions to develop to maturity:

- A new product must be invented that can be sustainably produced (invention)
- A set of companies is able and willing to produce and market it (production)
- Product demand is sufficient to sustain a commercially viable market (demand)
- A set of market standards for the new product has emerged among actors in the ecosystem (standards)
- Society is aligned on how to value the new product (value)
- The legal frameworks allow to identify, hold and exchange the new product (codification)
- The necessary infrastructure (physical, digital, intangible) to exchange, distribute and store the new product needs to be in place (infrastructure).

The markets of tomorrow may be supported by government incentives, private investment and public-private collaboration. Coalitions at the country and global levels can together pursue the establishment of these conditions. The creation of new markets can occur only when sufficient public and private stakeholders join forces, together with civil society and research institutions. The existing landscape influences the possibility for these actors to succeed. It includes all the elements that are structural or the result of long-term processes and cannot be easily influenced by the actors that pursue the creation of a new market. These elements can suddenly or slowly change over time, and this can play a key role in allowing new niches to emerge and replace established paradigms.

The COVID-19 disruption represents a unique opportunity to pilot breakthrough technological and socio-institutional innovations that have the potential to grow into entire new markets. Countries in which actors will be able to mobilize and coordinate, and where market concentration in industries adjacent to the new markets is not too high – those that can either participate or otherwise be affected by them – are likely to benefit the most.

For optimal societal outcomes, the markets of tomorrow should be designed around fair and sustainable ways of producing and distributing value, for example through tighter collaboration between the public and private sectors and innovative models of financing research and development, managing intellectual property and designing the public sector's risk-taking into the new ventures. Especially at the country-level, public institutions have a key role to play in catalysing public-private collaboration and creating the systemic conditions for selected markets to emerge.

Preliminary mapping of country readiness reveals that countries with advanced technological capabilities, strong social capital and public institutions that shape future-oriented visions are likely to be better placed to successfully create a broader range of markets for economic transformation. However, global coordination and cross-industry collaboration may be needed to realize the markets of tomorrow.

Global coordination – where the business community is increasingly asked to play a more proactive role thanks to the nature of their activities and value chains – should reinforce country-level action and remains indispensable for the successful creation of many of the markets of tomorrow, particularly those with a global scope. Cross-industry coalitions can pool the know-how of multiple innovation chains and focus on creating specific conditions for some of the markets of tomorrow.

Pathways to a new global economy

The COVID-19 pandemic has triggered one of the deepest systemic economic shocks of the past 150 years. Economic activity plummeted in the first and second quarters of 2020 as the virus spread globally, causing wide-scale business closures and layoffs, only partially offset by generous rescue packages provided by governments. The global economy fragmented as global trade and the movement of people across borders were heavily restricted, accelerating the restructuring of global value chains in light of national strategic considerations governing the production of goods and services of fundamental importance to economies and societies. Financial markets have been hit with the deepest turmoil since the Great Depression, requiring monetary interventions on a scale that has dwarfed those in the 2008-2009 financial crisis.

During the crisis, governments enacted stringent measures to contain the spread of the virus, prioritizing public health over business and economic activities. To protect people and livelihoods, governments that could afford it extended safety nets and other means of direct intervention in the economy to safeguard jobs, businesses and segments of strategic or systemic importance.

Recovery presents a multitude of pressing challenges and the outlook for economic revival is uncertain. Concerns have arisen about the sustainability of rising government debt levels and

their distributional implications in the long term. Uncertainties remain about potential new waves of virus contagion and the availability of a treatment or vaccine in the near future. While some consumption patterns have quickly reset, others may have changed for the longer term, with a permanent shift towards e-commerce and digital services. Production and business activities are being reorganized and global companies are looking closely at the costs and benefits of parallel supply chains to strengthen their resilience.

As calls for a more inclusive and sustainable economic revival grow, policy-makers are exploring how to proactively incentivize a new global economy that respects planetary boundaries, generates less inequality, empowers people, and advances access and progress of knowledge. What would it take to shape the quality and direction of future growth, and lay the foundations of a new economy?

The functioning of economies is the result of the technologies at work in societies and their established “social code”,¹ the formal and informal institutions that determine the way people behave, interact and organize in a community. Economic transformation requires a transition from one set of technologies and institutions to another.² Such transition is driven by the creation of new markets that combine technological and socio-institutional innovation to generate new sources of value adapted to societal objectives.

3

Identifying the markets of tomorrow

In their simplest formulation, markets are “situations in which some good or service is sold to customers for a price that is paid in money”.³ A growing number of scholars, many of whom work outside the sphere of economics or at the intersection with other social sciences, emphasize the phenomenon of market creation. Creating a new market involves a mix of technological and socio-institutional innovation that affect socio-economic systems.

This briefing paper builds on some of the literature on socio-technical systems⁴ and looks at market creation as a source of transition or evolution from one economic system to another. The markets of tomorrow represent niches of technological and socio-institutional innovation within the current economic systems that enable

the creation and exchange of new products and assets. Such markets are not yet mature but are considered to have the potential to significantly reshape the established paradigms of economies and societies and contribute to economic growth and transformation towards more sustainability and inclusion.

Based on a mapping of the current and emerging efforts and experiments taking place around the world, this briefing paper aims to identify these new markets on the basis of their potential, not only to trigger growth but also to contribute to a broader economic transformation – from the current technological and socio-institutional system to one that can provide economic growth and is directed towards clear societal and environmental objectives.

3.1 The new markets that can drive tomorrow’s economic transformation

This paper proposes an initial list of 20 key markets of tomorrow, which fall into three main categories:

1. Safeguarding planetary boundaries
2. Empowering and protecting people
3. Advancing knowledge

At the core of each market is one specific product (good or service) or asset that, to be more effectively exchanged, would require a radically new set of technological and institutional innovations. The importance of these products and assets is considered to be such that, once a new market is established for them, they are likely to trigger a paradigm shift for economies and societies.

FIGURE 1 Twenty new markets with the potential to transform our economies



Safeguarding planetary boundaries

- Electric vehicles
- Greenhouse gas allowances
- Hydrogen
- Plastics recycling
- Reforestation services
- Water rights and quality credits



Empowering and protecting people

- Broad-spectrum antivirals
- Care
- Data
- Digital financial services
- EdTech and reskilling services
- Hyperloop-based transport services
- New antibiotics
- Precision medicine and orphan drugs
- Skills capital
- Unemployment insurance



Advancing knowledge

- Artificial intelligence
- Genes & DNA sequences
- Satellite services
- Space flights

It is important to note that the concept of “market” includes a wide variety of notions when it comes to, for example, the weight that public or private actors can have in that market or the extent to which transactions, prices and products are influenced by rules and regulations. This is part of the institutional innovation that will characterize each market. “Market” here does not mean “free market” nor does it necessarily entail a “laissez-faire” approach. In most cases, innovative solutions will have to go beyond the traditional public-private dichotomy.

Artificial intelligence. Artificial intelligence (AI) has been identified as the next “general purpose technology”, the fourth since the beginning of the industrial revolution after the steam engine, electricity and semiconductors. As such, its applications in economy and society will impact not only how value is generated but also the capacity to do research and advance knowledge. AI is already being embedded in a number of goods and services that are exchanged on their respective markets. While the “application markets” are growing rapidly, the markets for AI itself – the source codes and the algorithms – are far from being defined or mature.

One way to broaden access to AI for all is to create more efficient and inclusive markets for AI. Two market models seem to have emerged so far: platforms for collaboration and exchange of bits, morsels and parts of codes – often open-source; and commercial platforms of AI-as-a-service, where AI is sold according to the specific tasks it can perform or, in some cases, in the form of fully-fledged machine-learning frameworks and services, thus blurring into “application markets”.

Broad-spectrum antivirals. Whereas antibiotics developed in the past were and are effective against a broad spectrum of bacteria, the antivirals currently available were developed and tested with one specific virus in mind. Since the outbreak of the COVID-19 pandemic, a number of antivirals, initially developed to fight previous viruses, have been tested to block SARS-CoV-2. Some have shown a certain degree of success but effective treatment for COVID-19 or a drug that could be relied upon in case of future viral pandemics are still lacking, underscoring the importance of the ongoing efforts to develop broad-spectrum antivirals.

Some experts caution about the potential unintended consequences of such treatments, which in the case of broad-spectrum antibiotics became evident only after a few decades. Those working on the development of broad-spectrum antivirals recognize that targeted vaccines remain the preferred option in the long-term, but stress the value of having broad antivirals available as additional methods to fight new viruses when a vaccine is not yet available.

Care. A broad set of care services caters to various family needs: for children, the elderly, the sick, for pets, housework etc. How these markets

are organized varies, depending on the extent to which such services are provided by formal market activities (i.e. sold in exchange for money) or informally by relatives or friends. Creating a fair market for these services is a challenge to all societies and meeting it could have significant positive implications in terms of economic growth, and equality and inclusion, particularly for the benefit of women, who carry the primary burden of all forms of care work.

Most countries have tried to address this challenge by developing and making services provided by formal providers more accessible, professional and efficient. Some have tried to formally recognize and reward the value of care when it continues to be given within the family, paving the way to its full establishment as a separate market and source of value creation in the economy.

Data. Data is often hailed as the “new oil”, but the mechanisms through which it is currently being exchanged are leaving large volumes of generated data unused while exacerbating market concentration and inequality, as well as creating new concerns about privacy and confidentiality.

It is now urgent to establish an exchange mechanism for data that would align three objectives: enhance economic efficiency, fairly distribute value and guarantee privacy. To build this into a mature market, inroads are needed to define and take into account the legal rights of the institutions that extract value from data and the relationship between them and those who produce the data, notably in the case of personal data. Challenges include accurately quantifying the value of the data being extracted and exchanged, and the infrastructure needed to manage data in a decentralized manner while ensuring quality, aggregability and interoperability through an appropriate set of standards.

Digital financial services. Digital financial services refer to a broad range of financial services accessed, delivered and used through digital channels, mostly through mobile phones, including payments, credit, savings, remittances and insurance. A study from the McKinsey Global Institute finds that a mature digital financial services market that would promote widespread adoption and use of digital financial services could increase the GDP of all emerging economies by \$3.7 trillion by 2025.⁵

Digital financial services bring new regulatory challenges that remain unresolved in many countries, regarding who can provide financial services, new actors in the market such as agents, new institutional arrangements not yet clear, how to implement risk-based approaches, and how to build interoperable payment systems, among others. Once these obstacles are removed, however, it could have the potential to transform the financial system into a more inclusive one, contributing to economic growth, greater social cohesion and well-

being by providing access to the billions of people who lack formal financial services.

EdTech and reskilling services. The world of work is at the core of several transitions, many of them accelerated by the outbreak of the COVID-19 pandemic: digitalization of the workplace, shifting to a greener economy, the reorganization of societies to ensure social distancing, to name but a few. Transforming the global economy will require people to take on new jobs and learn new skills. Yet the effectiveness of reskilling services (most recently supported by a number of technological tools) has remained limited and mostly in favour of already highly skilled workers. Creating a sound market for EdTech and reskilling services will contribute to greater inclusivity, empowering people and ultimately improving their well-being.

In many countries, service providers have not yet grown into structured businesses and the sector remains often fragmented and underinvested. In light of uncertainty about the demand for such services, it is proving hard to motivate workers and nudge employers into creating the type of conditions conducive to successful reskilling. Most markets also suffer from a severe lack of standards, including accepted skills taxonomies and reliable micro-credentials and certification schemes. Part of the solution might come from new and more innovative ways of providing reskilling servicing, blending different tools and approaches, including EdTech.

Electric vehicles. Electric vehicles (EVs) have been around for almost two centuries⁶ but, throughout most of the 1900s, internal combustion engines dominated the car industry. This is now slowly changing. Increasing awareness of climate change priorities have induced a growing number of companies, consumers and governments to support the transition to EVs. These include three different sets of technologies that today coexist in the market: full battery EVs, hybrid EVs and plug-in hybrid EVs. Most industry players are betting on one of the above categories, while a handful are carrying forward research across more than one.

The transition to EVs might be inevitable if we want to achieve the targets of carbon emissions reduction, yet certain factors could slow it down and even affect the final outcome of the impact of this transition. The lack of complementary infrastructure for recharging remains one of the key areas of investment. Market establishment is also stalling because of the uncertainty around the technological standards that will prevail in the future, as research has progressed significantly over recent years across different technology families. Buyers are therefore waiting, and demand largely relies on generous public subsidies.

Genes and DNA sequences. Genes and DNA technologies are considered by many to be the next frontier of knowledge that could find widespread application in daily life,⁷ from computing and data

storage to new materials, medicines and health technologies, among others. At the core of this new frontier of possibilities lies the capacity to map, decrypt and re-use the code of life, the foundational building blocks of every living organism on Earth. Many have drawn the parallel between genes and DNA sequences and the operating systems that power our digital world, resorting to the notion of *wetware*. The sensitivities around the code of life are, however, even greater than those concerning artificial intelligence.

In light of these sensitivities, and learning from the experience of semiconductor and software development, a number of synthetic biology research institutions have set up frameworks to create an “open market” for genes and DNA sequences in the form of open registries and standards for interchangeability. At the same time, genetic resources are being codified as proprietary assets through patents, trade secrets and copyright. Ultimately, whether societies will decide to attribute an economic value to genes and DNA sequences will largely determine what type of markets will be created to exchange them.

Greenhouse gas allowances. Most of the hopes to significantly and systemically reduce greenhouse gas emissions and thwart climate change rely on a single “new financial product”: greenhouse gas allowances consisting of permits (or allowances) for companies to emit a certain amount of pollutants. Emission trading schemes have been introduced around the globe at regional, national or subnational levels to trade these allowances (most notably in the European Union, California and a number of north-eastern states of the United States, the Republic of Korea and, soon, in China). In addition to these mandatory schemes (known as “compliance markets”) a number of “project-based markets” have also been established, where exchanges are bilateral and consist of one-off transactions.

These markets are still far from becoming an integral part of the global economy. What is needed to unlock them? First, a global, liquid and effective market needs to emerge, bringing together multiple project-based standards (there are currently six main ones,⁸ with global reach) and compliance markets (31 in operation today, national or subnational⁹). The value of these allowances needs to be aligned with environmental needs (at \$50-\$100 per ton of CO₂, according to the World Bank¹⁰) and made more stable and uniform across compliance-based and project-based markets. Finally, while emission allowances have been officially codified as financial instruments in the EU Emissions Trading System (ETS), in most compliance markets there is no clarity about their exact legal nature, creating uncertainty and discouraging investment, innovation and further market development.

Hydrogen. The promise of widespread adoption of hydrogen – particularly for transportation, heating and power generation – has remained

largely unfulfilled. To date, hydrogen has been produced mainly for a limited number of industrial and aerospace applications, and usually through production processes that result in high levels of carbon emissions and a relatively high cost per unit (so-called “grey hydrogen”). Unlocking the full potential of hydrogen will require creating a market for clean hydrogen, so-called “blue” and “green” hydrogen, produced with the adoption of carbon-capture technologies and renewable energy.

A number of bottlenecks are slowing down the establishment of this market. Reduced renewable energy costs have made mass production of clean hydrogen a more realistic option. Large-scale investments are now needed to trigger the economies of scale and industrialization of new processes that could lower production costs. Most operators avoid these investments in light of uncertainties around demand and market prices. But demand also remains low until production costs are high and uncertain. The first international price index for hydrogen was launched in December 2019 by S&P Global Platts, with assessments at various production locations for grey, blue and green hydrogen. Similarly to other commodities, these valuations will help the establishment of a mature market.

Hyperloop-based transport services. Initially presented as a concept note in 2013 by a team of researchers at Tesla and SpaceX, the application of Hyperloop technologies to passenger and freight transport promises to significantly reduce travel times across large distances while maintaining higher levels of energy efficiency than trains and aircraft. Currently, several projects are in scoping or development around the world. There are hopes, particularly in the US Midwest, that such a fast and cheap mode of transport will help narrow some of the growing divides between rural and urban areas.

Conceived by its founder, Elon Musk, as an open-source project, Hyperloop has quickly become a global, collaborative endeavour involving a number of companies and researchers that are further developing the technology. The open-source nature of the technology has accelerated progress, fostered the development of a competitive productive sector and started a standardization process to ensure full safety and future interoperability across producers. Several countries have expressed interest and demand is expected to increase once the first commercial services will be launched – currently slated for 2029 in India.

New antibiotics. It has been 40 years since the last new class of antibiotics was developed and brought to market. Since then, it has not been possible to keep up with the growing threat of antimicrobial resistance, which has been estimated to cause at least 700,000 deaths per year globally.¹¹

The pipeline of new antibiotics in clinical development is shrinking owing to the challenge of establishing a mature market for any new class

of antibiotics and the extremely high investment required to discover such substances and bring them to market through clinical trial and development. These are not easy to sustain, given the uncertain results and, significantly, in light of the limited use that any new antibiotic substance has, as public authorities rightfully restrict its application to preserve its effectiveness. A number of global initiatives¹² have been set up over the past years to address these issues, but progress is still slow.

Plastics recycling. It has been estimated that the world has recycled only 9% of the 6.3 billion metric tons of plastics used and sent to waste since production started in the 20th century.¹³ Still today, only approximately 20% of plastic waste is sent to be recycled, but in many cases recycling does not actually take place.¹⁴ The market for plastics recycling remains limited: recycling plastics through traditional techniques is still not commercially sustainable and consequently does not take place in sufficient volume, particularly in advanced economies. Plastic waste collected in these countries has been traditionally sent to emerging economies (China banned the import of low-quality plastic waste in 2018), for recycling to the extent possible, with large amounts still ending up in landfills, rivers, oceans.

A sound market for plastics recycling will require the invention of new techniques, the standardization of processes and plastic waste, and the support of demand for recycled plastics. Research is ongoing to develop and refine more efficient processes (most notably, chemical recycling) to recycle low-quality plastic waste, usually discarded by recycling facilities in most countries. Quality standardization of the sorted plastic and recycling process will also help to create a market for plastics recycling services, allowing actors to leverage economies of scale. Demand for recycled plastics could increase in parallel to the number of applications and through support mechanisms that compensate for the higher costs vis-à-vis virgin plastic.

Precision medicine and orphan drugs. An estimated 300 million people in the world are affected by a rare disease for which so-called “orphan drugs”¹⁵ are unlikely to be developed in the private sector because demand would be too small to make successful research profitable. A number of countries have legislated to create a market for such drugs, subsidizing their development. Such policies have generally demonstrated success in increasing the development and commercialization of orphan drugs.

More recently, precision medicine has emerged as a new market that could offer potential for orphan drugs on a number of levels. Precision medicine is a medical model that proposes customized healthcare, tailored to individual patient needs and developed for a single or small set of individuals based on the characteristics of their genes, environment and lifestyle. Similarly to orphan drugs, drug development costs for a limited number of

users will be high, potentially raising issues of access for those who would benefit from them. Some precision medicine development costs could decrease through the analysis of large health datasets being developed, also through dedicated public support in certain countries. The two markets are meshing whenever precision diagnostics (most often through genomics) make it possible to identify specific subsets of patients with a non-rare disease that respond significantly better to personalized treatment (so-called “orphan subsets”).

Challenges in terms of development costs and access remain in both cases. The advances of precision medicine might require a redefinition of the notion of orphan drugs, or the need for innovative mechanisms to ensure that as many people as possible receive the best treatment that medical science can offer.

Reforestation services. Reforestation as an economic activity relates to land restoration and consists of planting trees in deforested areas.¹⁶ Types of reforestation services vary, some catering to large reforestation projects promoted by governments and others to companies or individual citizens, some relying heavily on technology and others on more traditional processes. The benefits of planting trees are multiple, ranging from the absorption of greenhouse gas emissions, support to biodiversity and, when close to or within urban areas, improved quality of life for urban dwellers.

Service providers are still rather small and fragmented, and the industry has not yet formalized and professionalized. This is in spite of growing demands from companies and particularly governments aiming to fulfil ambitious commitments as part of their compensation and mitigation strategies or restoration efforts.

Satellite services. Satellites provide a broad range of services ranging from Earth observation imagery, position, navigation and timing support, communication and broadcasting services. These are in turn used to develop downstream applications and additional services for an equally broad range of users including governments, businesses and consumers. Satellite services play a key role in advancing our knowledge of the phenomena taking place on Earth and in the universe, enhancing human capacity to tackle climate change, prevent natural disasters or simply understand the world we live in. The creation of these markets has historically depended on strong public support throughout the innovation chain and among industrial players. Over the past decade, as part of public-agency efforts to outsource the provision of some of these services and create a space industry, private companies are increasingly engaged in the set-up of satellite infrastructure and provision of upstream and downstream services.

The maturity of this market is advancing thanks to the compound effect of three main forces: First, advances in technologies and additional public

programmes are making infrastructure (satellites, ground stations etc.) cheaper and more easily available; second, governments are stimulating the creation of additional services and applications that can cater to a variety of business and consumer needs, focusing in some cases on the ones that can better address current societal and environmental challenges; and third, demand is on the rise but mass adoption of satellite services remains limited to a few applications, particularly within the positioning, tracking and communication services.

Skills capital. The rapid and profound transformation in the global economy has made skills development one of the most valuable assets to ensure that people can thrive in a constantly changing work environment. People with skills that do not match the needs of the workplace are confronted with income deterioration and job insecurity. Economists introduced the concept of “human capital” more than 50 years ago,¹⁷ but it has not yet been possible to create a system that elevates skills acquisition to the same level of tangible or other intangible asset acquisition. In other words, it is still easier to get funding to buy a car than it is to pay for education and training. Similarly, accounting standards and fiscal regulations reward companies for investing in machinery and real estate rather than in the skills of their workforce.

Some initiatives are moving in the right direction. The Adecco Group has put forward a proposal to restructure accounting frameworks to allow companies to capitalize as assets the investment they make in retraining their employees.¹⁸ The French government is working with the national accounting authority to pilot a reform that would allow companies to amortize, under specific conditions, part of their training expenses.¹⁹ The World Economic Forum and Willis Tower Watson have developed a model that proposes to change how companies measure human capital.²⁰ While questions remain about how to value skills justifiably and to what type of legal rights individuals and companies should be entitled, the overarching goal is to empower people and increase their possibility of investing in their skills capital.

Space flights. The provision of space launch services (for cargo and crew/passengers) has long been exclusively reserved for space missions run by public agencies and research programmes. Space exploration has represented a crucial frontier for advancing human knowledge. Some public agencies, particularly NASA in the USA, are counting on creating a broader market for space launch services. Such market would comprise private-sector providers on one hand and (smaller) public agencies as well as private users on the other. The efficiency gains that a competitive market is expected to bring should encourage growth of smaller actors, and additional applications and business models to make use of space launches (e.g. space tourism).

The plan is ambitious and progress has been made. A handful of service providers are developing or have successfully provided launch services for crew or cargo. Demand remains limited to a growing number of publicly-funded space programmes, as more countries have been setting up dedicated agencies without the need to fully develop internal technological capabilities. It will be more challenging for private demand to materialize: only a few individuals have so far travelled to space for tourism and – without significant improvements to space-launching technologies that drive down costs – it will be difficult to expand business applications. Space-launching services are strategic to unlocking a number of additional space-related markets: from private-sector research services to space-based solar power and space mining.

Unemployment insurance. In national economies that provide unemployment insurance, provision has been struggling to keep up with the growing complexity and fragmentation of labour markets, and the emerging needs and challenges that their transformation is generating.²¹ In most countries providing insurance, unemployment schemes were introduced and calibrated in times of greater stability professionally, with considerably less mobility across sectors, functions or geographies and fewer unemployment episodes. While other forms of social safety nets (such as pensions and health insurance) have grown in sophistication, introducing new forms of public-private collaboration, unemployment benefits have yet to grow into a thriving market with a diversified offering.

Creating such a market requires, first and foremost, accurately evaluating the needs of workers and experimenting with the type of socio-institutional innovation to create services that can address them effectively. Forms of public-private collaboration can be piloted, for example in specific niches, or to complement broader schemes.

Water rights and quality credits. Some policy-makers and experts have been advocating the management of water resources in a similar

approach to the one adopted for air pollutants or other natural resources, thereby establishing a clear system of rights or credits tied to the use of water, which can be traded in a dedicated market.²² Where they have been implemented (see Box 2 for examples), these rights and credits have been designed differently but can be broadly grouped into three categories: water ownership rights, water use rights, water quality credits. Ownership and use rights translate into the possibility of exploiting a certain amount of water for productive activities, the difference being in the nature of the legal right reserved to the company and the possibility to introduce a cap-and-trade scheme for use rights. Water-quality credits consist of allowances to introduce pollutants in wastewater, which can be capped and traded.

These initiatives still face challenges. The localized nature of water ecosystems as well as infrastructural constraints impose a segmentation of the market, making it less commercially viable. This is so both from a demand perspective (some water basins are too small) and in terms of standards (each basin has its own specificities and environmental needs that might have to be reflected in the water rights and quality credits). Important questions remain on whether a monetary value could be assigned to water rights, and whether this should be independent from the actual use of these rights (as in the case of commodities). Alignment on a value is even more difficult in the case of water quality credits. Finally, legal codes around water rights and quality credits remain complex and are in many cases at infancy stage. They can vary significantly (also with time) and are usually restrictive in terms of how these rights can be used commercially.

The establishment of these new markets could have a transformative impact on economies. They might displace companies in one sector and create opportunities in others. Even within an industry, some companies might be more adaptable than others, as new markets can open the way to complementary innovations in terms of new business models, processes or products.

3.2 Target conditions for establishing the markets of tomorrow

Creating the markets of tomorrow will involve experimenting with technology and institutions. Such experimenting would be continuous but only certain outcomes would demonstrate enough traction to shift the established way in which economies and societies work.

The maturity of a new market will depend on the maturity of the technological systems and the formal and informal institutions necessary

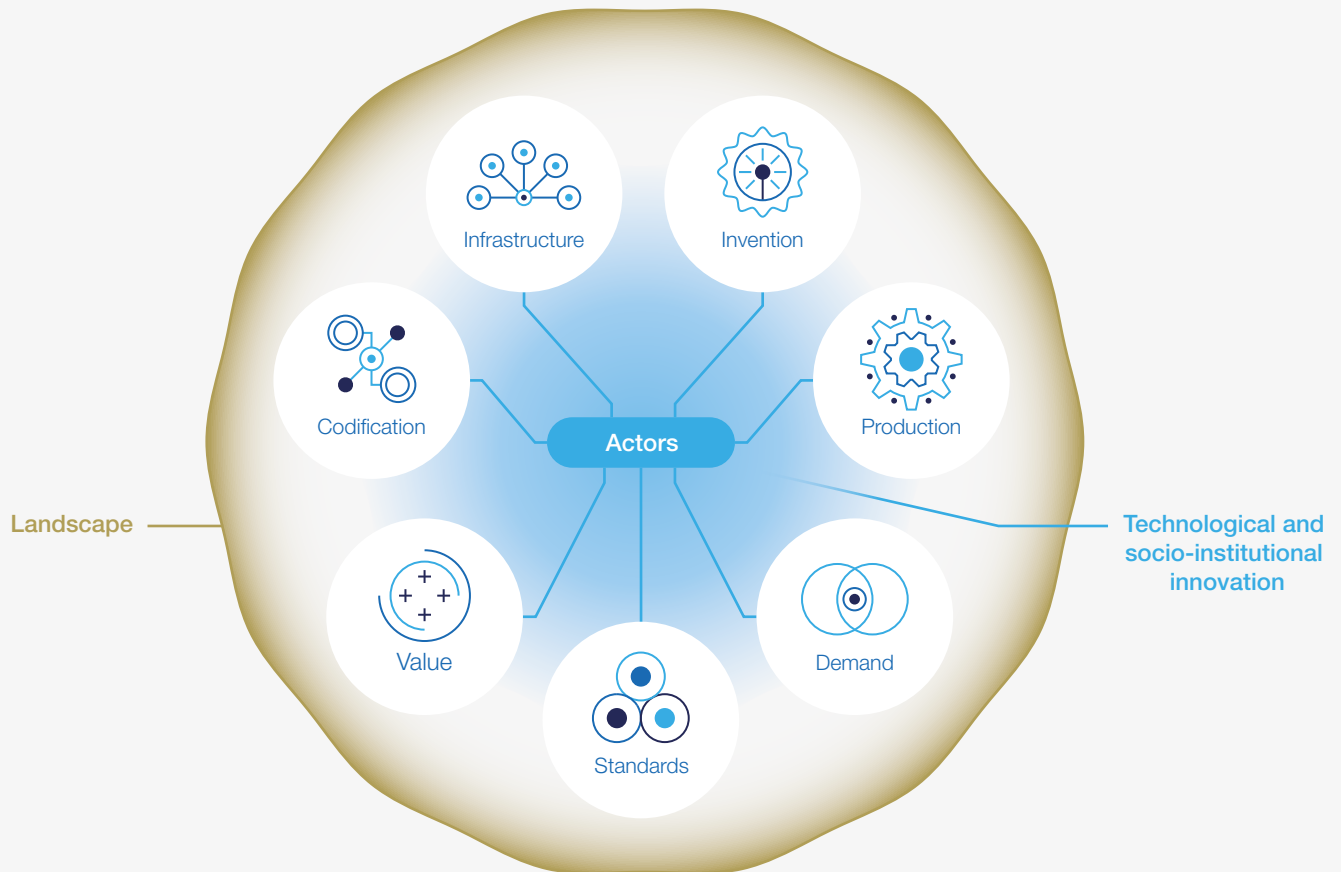
for that market to be stable and efficient. In terms of technology, this depends, for example, on whether the technical capacity exists to produce the new product, sustainably at scale, while also distributing it and storing it whenever necessary. Both formal and informal institutions include not only standards, but also the legal frameworks to identify and write commercial contracts and agreements related to the new products. They also include

the perception that people have of the new product, its attributes and value to society.

Seven target conditions have been identified to assess the maturity of a frontier market and the level of its establishment. These can be

interpreted as milestones that need to be achieved through technological and institutional innovations. They are elements of the broader economic system that need to be changed or created – new rules of the game that need to be established.

FIGURE 2 Landscape, target conditions and agents of change and innovation



Exogenous Landscape

Landscape: Exogenous conditions – static and dynamic – which affect the possibility of agents to establish the relevant target conditions for transition to Markets of Tomorrow

Target conditions for establishing the Markets of Tomorrow

Invention: Has a relevant product or asset that can be sustainably produced at scale been invented?

Production: Are any producers mature enough and ready to reliably provide the product or asset to the market?

Demand: Is the demand sufficient to sustain a commercially viable market?

Standards: Have clear market standards for the new products or asset emerged among the actors in the market ecosystem?

Value: Is there sufficient convergence and a common judgement of the value of the new product or asset?

Codification: Do clear legal frameworks codified for that specific product or asset exist that make the market economically and legally viable?

Infrastructure: Is the complementary infrastructure necessary for the market to exist already in place?

Agents of change and innovations they pursue

Actors: Individual actors, public and private organizations and other social groups

Technological innovation: Changes in science, technology and socio-technical systems

Socio-institutional innovation: Changes in rules and institutions (formal, normative or cognitive)

A series of criteria in the form of questions can serve public and private stakeholders in determining the level of maturity of each market, to map where they stand in their transformation from niche to new paradigm.

- 1. Invention: Has a relevant product or asset that can be sustainably produced at scale been invented?** Invention is at the core of every new product or service. Inventions are often considered to be innovations that only emerge in technology labs, but many products (especially intangible ones) do not rely on sophisticated new technologies. For example, technological invention is at the core of producing new medicines for rare diseases or sustainable hydrogen, while the creation of greenhouse gas allowances or skills capital mostly relies on an institutional invention.

The most radical inventions often require creativity that cuts across different types of sciences, beyond the traditional focus on science, technology, engineering and mathematics (STEM). Regarding the level of maturity of inventions, some may be available only as a prototype or proof of concept, or the production processes so far tested might not be sustainable for environmental, social or economic reasons. In other instances, the inventions might be fully mature and production at scale possible and sustainable. The focus here is exclusively on the know-how needed to produce that specific product or asset, and not on the maturity of the productive sector that will provide it to the market.

- 2. Production: Are any producers mature enough and ready to reliably provide the product or asset to the market?** Many good inventions lie unexploited in labs before companies turn their attention to them and start producing outputs that can be sold at market. These companies and the sector(s) they represent must embed the knowledge (human, codified or in other forms) needed for production and have the necessary networks and linkages with the other sources of technological expertise.

Industrial economists and some economic sociologists have emphasized the role of producers within markets in determining the final outcomes and the very existence of a specific market. For the former, the focus was on industries and market structure, management practices and performance within them;²³ while for the latter “markets are tangible cliques of producers observing each other. Pressure from the buyer side creates a mirror in which producers see themselves, not consumers.”²⁴

Most of the literature on system innovation has also focused on the importance of producers within the broader sectoral innovation system.²⁵ In some cases, the establishment of the production sector for a new market will rely

exclusively on brand new actors (most often start-ups) because all the existing ones might be locked out of the necessary know-how or entrenched in their own path-dependency. In other cases, some existing actors might be able to adjust and participate in the market, either producing the new product or complementary products. While in most cases production will be taken up by private actors, public institutions could also play a role – especially in the case of those markets that are likely to require a more stringent institutional set-up (e.g. water rights, greenhouse gas allowances).

- 3. Demand: Is the demand sufficient to sustain a commercially viable market?** Supply and demand influence each other and interact with the rest of the market ecosystem. A growing part of the literature has focused on the need to fully integrate usage into the analysis of the broader innovation ecosystem²⁶ and has highlighted the role of demand in establishing a brand new market.²⁷ This relationship passes through signals, market studies or simply expectations and a number of feedback loops that can lead to either virtuous or vicious cycles.

Governments, businesses and private consumers are all key pulls in the creation of demand within a new market ecosystem. The level of sophistication of their demand can influence expectations of potential producers and inhibit their ventures or determine the failure or success of their initiatives. Some products might require stable demand or a large set of consumers from the very beginning, especially if their use leverages network or scale effects. Government procurement has been identified in many cases as a key pull of new market ecosystems but, especially in the presence of large corporations, businesses can also play a strategic role through their supply chain decisions or by leveraging pools of customers.

- 4. Standards: Have clear market standards for the new products or asset emerged among the actors in the market ecosystem?** The importance of standards in shaping socio-technical systems and regimes has been largely established,²⁸ although there is still uncertainty about how to balance and best leverage tools such as standards, intellectual property rights and licensing.²⁹ Whenever a new invention is turned into a new commercial product, chances are that there will be a phase of experimentation where similar products will emerge with improvements or variations of the initial one.

Depending on the nature of the product and on how great these differences will be, this phase of differentiation might determine a trade-off: it will either trigger healthy research for the best invention to become the market standard or it will slow down, perhaps even impede the emergence of a market large enough to generate positive cash-flow that will accelerate research

and development of that very same product. Once again, this is a situation in which either a virtuous or a vicious circle could emerge.

Uncertainty about the “dominant” market standard might stall decisions of consumers and producers as well as providers of products and services upstream and downstream the value chain, thus making it less appealing for all actors to bet on the new market. This is one of the issues with the market for electric vehicles (EVs), where the coexistence of different technology families (full-battery EVs, hybrid EVs and plug-in hybrid EVs) is slowing down adoption among consumers and actors in the value chain, while also allowing for further experimentation in terms of new inventions.

5. Value: Is there sufficient convergence and a common judgement of the value of the new product or asset? Actors within a market ecosystem might not be able to align on a quantifiable value for the product or asset to be exchanged for at least two reasons.³⁰ On the one hand, different social and cultural patterns might influence the value judgement around an entire category of products (i.e. an entire market).

These patterns might mutate across society and time and impede the functioning of the market. This is, for example, relevant in the case of informal care, skills capital, genes and DNA sequences or water rights: are societies ready to assign a monetary value to these kinds of products and assets? On the other hand, reference points or a clear reference framework could be lacking to assign a value to specific characteristics of each product of the same category (i.e. within the same market). This is a core issue in the case of data or artificial intelligence: while everyone agrees that these intangibles have (and can have) a monetary value, it is extremely difficult to create a reference system to assess their value. What is the value of a git shared on one of the specialized platforms for collaborative coding? What is the value of a certain number of datapoints? Is the number of datapoints the right unit on which to base value?

6. Codification: Do clear legal frameworks codified for that specific product or asset exist that make the market economically and legally viable? In current economic systems, a legal framework wraps every product or asset being traded and gives legal substance

to a market exchange. Property rights are the cornerstone of these legal frameworks and are governed by a set of laws and regulations that allow to identify a specific product, pass ownership from one legal subject to another and enforce this right. A product does not exist in the economy until it can be identified within the prevailing legal system.

Legal frameworks also draw a distinction between products and assets, as any product can be converted into an asset once it is given by the law the attributes of priority, durability, convertibility and universality.³¹ For example, what type of codification should be developed for artificial intelligence or skills capital? Are they assets or services? Or maybe a new category? And what about genes and DNA sequences? Will the (intangible) information behind them or the (tangible) chains of the nucleotides be codified?

7. Infrastructure: Is the complementary infrastructure necessary for the market to exist already in place? Some products might require specific infrastructure (physical, digital or of another nature) to be exchanged or to be used effectively by users. Whenever the cost of such infrastructure and the timeframe for development are particularly large, this could discourage research, production and demand of the new product. For example, the establishment of a market for digital financial services is stalled in many countries by the absence of a secure digital payment infrastructure where the transactions can take place.

These conditions can be seen as a list of to-dos or assessment tools to determine the level of maturity of a new market, but they are deeply linked to one another and not mutually exclusive. For example, production and demand obviously depend on each other and market standards and codification can both contribute to the convergence around a specific value for the new product. They are conditions of the broader technological and institutional systems that need to be in place and each one of them often requires a combination of technological and socio-institutional innovation. For example, the codification of data as a distinct asset and the assessment of its value will require technological innovation in terms of the infrastructure (protocols) for a secure decentralization of data holdings, as well as institutional innovation to codify the type of legal rights to grant to data holders, especially in the case of personal data.

3.3 How transformation occurs

Previous literature³² helps us recognize the importance of the **landscape** in the framework, defined as the set of all elements that are largely beyond the control of the actors involved in establishing a new market, or that can only be influenced over a rather long-term horizon. It consists of both institutional elements and parts of the technological systems, including hard infrastructure and the physical environment (built and natural).

The landscape influences, either positively or negatively, the possibility of **actors** to implement their strategies and transform the economy. The landscape might change and with it the influence that it exerts. This can occur slowly, rapidly or in the form of a sudden shock.

The physical environment of a country might slow down or accelerate the establishment of a new market for a specific type of transport service (e.g. Hyperloop-based transport services). Gas pipelines are another example of physical infrastructure that, in many cases, might be recycled for hydrogen transport and could therefore exert a positive influence on the growth of a market. Climate change is a long-term process (slow but accelerating according to most indicators) that is likely to change the existing landscape. COVID-19 has been a shock that is still unfolding its effects on the landscape and has so far affected even deep structural elements of systems and regimes.

Changes in landscape play a key role in the ability of new niches to emerge and substitute established structures. Without falling into deterministic approaches and denying the importance of agency, it is important to recognize that most changes in landscape do create a window of opportunity for economic transformations that otherwise might be almost impossible or occur over a much longer time horizon.³³

The level of competition in current markets is a key element of the landscape that influences the capacity of new niches to grow into established paradigms. No market is ever created in a vacuum; instead, it builds on and possibly replaces elements of current ones. High levels of market concentrations in adjacent industries might slow down the creation of a productive sector for the new product or services, or incumbents could actively try to prevent a new invention from turning into a new market. Tipping points can arise – triggered, for example, by the emergence of a new player or the introduction of a new regulation – in which incumbents are forced to quickly change strategy and reorient part or all of their production around the new invention.

Progress on the seven target conditions usually proceeds asymmetrically, with invention often leading the way. Some are slow to change while others are more adaptable; some mature gradually over time while others advance in step changes. In most cases, the establishment of a target condition is not binary but should be assessed on a maturity spectrum.

Finally, it is useful to mention the scale at which market creation should take place and the actors that should engage and join forces. This will not necessarily fall within the geographical boundaries of one country. In some cases, the analysis of a new market and the actions required to develop it might be best approached at a regional or global level (i.e. in the case of greenhouse gas allowances); in others, it might make more sense to focus on a subnational dimension (as in the case of water rights and quality credits). The possibility of countries to significantly move towards the establishment of the markets of tomorrow when acting exclusively at a national level will depend both on the type of target conditions that need to be created and on the specific market.

4

Building the markets of tomorrow

What is needed to realize the markets of tomorrow? Various actors will have to work together to pilot and develop the technological and socio-institutional innovations required to create markets that can drive growth while transforming our economies and making them more inclusive and sustainable.

The scale of the challenge calls for coordinated efforts by the public and private sectors. Virtually each one of the seven conditions necessary for the establishment of these new markets cannot be fulfilled without some level of consultation, contribution or co-creation between public authorities and the business sector, as well as academia and civil society. Yet, it is important to recognize the distinct roles that the various actors play within a market system and make sure that their relationship truly is symbiotic.³⁴

The coordination and co-creation can take place at different levels (globally, regionally, nationally but

also subnationally and at the level of communities), but in most cases are likely to bear more fruit at a country-level than at a global, cross-industry level. As countries remain the key organizational unit of our societies – the one that holds much of the decision-making power and capacity to coordinate and organize economic and societal change – country-level decision-making is likely to be indispensable to move the needle on many of the conditions necessary to create the markets of tomorrow. Yet, global coordination nurtured through integrated innovation chains that span across industries and countries can significantly accelerate any country-based efforts. The business sector is likely to be the driving force of this type of coordination.

This section explores how multistakeholder action can be structured at the country and global levels, providing some concrete examples as well as steps and guidelines that actors can follow to focus their efforts.

4.1 Country-level public-private action: A foresight approach

Countries devote significant time and resources to planning their future. While industrial and innovation policy experts have often been divided on the best approaches to shaping long-term economic policy, there is consensus on the benefits of long-term thinking and decision-making by both the public and private sectors. Many countries have built their foresight capacity, often through dedicated agencies and embedding a foresight function across all ministries and key centres of public decision-making. The success of these efforts greatly depends on the capacity to leverage insight from and mobilize a wide range of stakeholders, including businesses.

Country-level foresight efforts can look for the most relevant markets and use the framework presented above to catalyse public-private collaboration to create new markets that can transform their economies while generating growth.

This section presents tools and examples that countries can build on to identify potential markets and assess their potential and level of maturity across the seven target conditions. It also outlines the key elements required to assess the nature of the landscape and the actors who are or should be driving the creation of new markets.

4.2 Selecting the markets of tomorrow

New markets are meant to address the key challenges that societies face today. Advocates of mission-driven innovation have defined the notions of “grand challenges” and the specific “missions” that actors across sectors must tackle to solve

them.³⁵ These challenges reflect the performance of the country on a broad set of economic and non-economic policy targets, which a few countries have started to track in addition to economic growth to orient their decision-making.³⁶

Once the challenges have been identified (either through political leadership or through stakeholder consultations), multiple markets could be created through technological and socio-institutional innovation to provide sustainable solutions. The potential markets presented in this briefing paper are likely to be relevant for many countries in the decades ahead, but still other markets could have a transformational impact in a specific country.

Clear use cases will help move from the identification of a broad challenge to specific problems that new markets are trying to solve. These use cases will inspire the research and

development required to invent the new products that could be used in the situations described. Such products might have been invented already and could be ready to be produced, and yet a market might not exist yet. Invention is only one of the seven conditions of the framework presented.

The seven conditions should help countries assess where they stand between the formulation of the use cases and the establishment of the relevant markets. The following table provides guiding questions for their self-assessment. The answers to these questions are not binary, but can be assessed qualitatively or through a Likert scale.³⁷

TABLE 1 **Guiding questions to assess the maturity of new markets at the country level**

Invention	Has a relevant product or asset that can be sustainably produced at scale been invented?
Guiding questions:	<p>Are there any ongoing experiments or research projects in the country that are looking at providing solutions for the relevant use case? At what phase of R&D are they?</p> <p>Is there a socio-technical base that can be built on to invent the relevant product or asset?</p> <p>Has this invention been developed somewhere else in the world? If so, can the know-how be accessed and used?</p>
Additional comments:	<p>“Relevant” here refers to the applicability of the product or asset to the use cases that have been shortlisted. The invention might be taking place outside of technology labs and be purely social or institutional. A mapping of the relevant “sources of invention” – including relevant science and technology fields – in the country will be instrumental in assessing the domestic level of maturity of this condition.</p>
Production	Are any producers mature enough and ready to reliably provide the product or asset to the market?
Guiding questions:	<p>What current sectors are likely to adapt or complement their current business model to produce the new product or asset?</p> <p>What is the attitude of the relevant incumbents towards the new product or asset? Can they be mobilized to participate in the creation of the new markets? Do they have the necessary knowledge base? Are there risks in terms of increased dominance of the incumbents?</p> <p>Is there a thriving start-up ecosystem in the country? Are start-ups likely to leverage the new markets to challenge the incumbents and establish themselves as key players?</p> <p>Should the production of the relevant product or asset be fully delegated to private actors, or should public institutions or other state-affiliated entities also play a role?</p> <p>Is there a mature set of producers abroad? Can these producers be attracted to set up production activities in the country? Can production of the relevant product or asset be sourced sustainably from abroad?</p>
Additional comments:	<p>Invention does not grant production and production does not grant the existence of a market. Close coordination and collaboration between research institutions and the productive sector are among the necessary but not sufficient determinants of success along this condition. The quality of technology transfer offices can provide a good indication of the likeliness to turn invention into production, but it is important to go beyond the focus on STEM that these offices usually have. Considerations in terms of market dominance and competition are fundamental when assessing the likelihood and rightness of incumbent involvement in the creation of new markets. Finally, the production of some products (e.g. greenhouse gas allowances) might have to be structured under a public monopoly or (as in the case of genes and DNA sequences) be provided under a regime of “open access”.</p>

Demand		Is the demand sufficient to sustain a commercially viable market?
Guiding questions:	<p>Are private consumers (B2B and B2C) likely to adopt the new product or asset?</p> <p>Are public authorities likely to adopt (through public procurement and other purchasing decisions) the new product or asset?</p> <p>Is the domestic market size (public and private) large enough to sustain a commercially viable market?</p> <p>Can foreign consumers (public and private) be easily accessible?</p>	
Additional comments:	<p>The level of sophistication of demand plays a key role in advancing new and innovative products. In the case of digital products, the level of digital use and literacy among the population might provide an indication of the likelihood of success. The possibility of leveraging foreign demand largely depends on the nature of the product and the use case.</p>	
Standards		Have clear market standards for the new products or asset emerged among the actors in the market ecosystem?
Guiding questions:	<p>Are there products that adopt multiple standards (technological or of other nature) for the same use case?</p> <p>Is the presence of multiple standards a sign of dynamism of the market or is it actually preventing the market from growing?</p> <p>What role are intellectual property rights and licensing playing in the divergence or convergence of multiple standards?</p> <p>What ongoing national or international standardization efforts are relevant to the product or market under discussion?</p>	
Additional comments:	<p>There is a natural tension between competition and standards, as well as a non-linear relationship between standards and intellectual property rights. Participation in international standardization efforts (convened by institutions such as ISO and ITU) should be part of the economic diplomacy strategy of every country. Information about ongoing discussions should be fed back into the innovation and technology ecosystem.</p>	
Value		Is there sufficient convergence and a common judgement of the value of the new product or asset?
Guiding questions:	<p>Does society agree on whether to assign any monetary value at all to this new product category? If so, are the value expectations sufficiently aligned within society?</p> <p>Are there enough reference points and information to assign a monetary value to the specific characteristics of the products within the new category?</p> <p>Are there examples that can be followed from abroad?</p>	
Additional comments:	<p>Societal norms and attitudes are often hard to measure quantitatively and might be best assessed through a qualitative survey of experts. Representatives of civil society and polling of citizens can be a valuable source of insight into this assessment. Stability and transparency of prices can provide information about the maturity of value reference points within the market.</p>	
Codification		Do clear legal frameworks codified for that specific product or asset exist that make the market economically and legally viable?
Guiding questions:	<p>Is it possible to define the new product or asset in a way that makes it possible to write and enforce commercial contracts about it?</p> <p>Have the legal rights of the seller and buyer over the new product been fully codified and accepted by all parts?</p> <p>Have the current legal frameworks codified the new good as a product or as an asset? How shall it be codified according to the use case?</p> <p>Are there examples that can be followed from abroad?</p>	
Additional comments:	<p>Property rights are a basic condition for most markets to exist. Yet, legal frameworks must provide for more. All actors in the market must have clarity over the (legally-binding) definition of the product or asset that they are exchanging, the legal rights they have over them and their possibility to enforce them.</p>	

Infrastructure **Is the complementary infrastructure necessary for the market to exist already in place?**

Guiding questions:

Does the exchange, use and storage of the relevant product or asset require a particular type of public and/or private infrastructure (physical, digital or of another nature)?

How costly and lengthy is it to develop the necessary infrastructure?

Additional comments:

The definition of complementary infrastructure is broad and, to the extent that it cannot be acted upon directly by the actors that are championing the creation of the new market, is similar to that of landscape, provided as part of the framework.

Across each of the seven conditions, countries can benefit from exchanging with each other and learning from the public- and private-sector trailblazers around the world. A mapping of all pioneering experiences shall be part of the foresight toolkit adopted at the country level.

Assessment against these conditions of current and potential actors capable of driving the establishment of new markets, and of changing the landscape in which they operate, is a prerequisite to move from analysis to the design of the interventions.

It is useful to map all the relevant actors from the public and private sectors as well as academia, research institutions and civil society. How do these actors contribute to or oppose the establishment of the target conditions? What type of relationships exist among them? What are the possible alliances and coalitions to nurture and build on? How can they be activated?

It is also important to look at the landscape conditions, both structural and those that the relevant actors cannot easily influence, including those outside of the country or geography of analysis. What elements of the landscape can facilitate or hinder the establishment of the target

conditions? How are these elements evolving? Has there been any relevant shock? What tipping points are being approached?

Considerations of antitrust and market dominance also cut through the seven conditions of the framework and should not be dismissed lightly. It is worth recalling the approach followed by competition lawyers and economists in identifying the *relevant product market*, which includes all the products that can be interchangeable or substituted based on their characteristics, price and intended use.³⁸ This definition can be useful both in defining the new market (how narrow or how wide it is, what specific products it comprises and how it is different from existing ones) and in assessing the target conditions and planning interventions.

Box 1 outlines Singapore's work to create data markets and pilot solutions to advance across some of the seven target conditions. Box 2 provides a comparative assessment of the seven conditions with a mapping of trailblazers for the markets presented in the previous section that have a closer link with environmental protection. This assessment is based on the "global frontier", i.e. the extent to which these conditions have been fulfilled somewhere in the world.

BOX 1 **How Singapore is creating data markets**

Singapore has been active in experimenting with the creation of data markets: a full ecosystem that would allow actors to seamlessly exchange and aggregate datasets available within the country.

The production and demand for data have been growing globally, but the establishment of functioning data markets is being held back everywhere by the lack of standards and a common framework to easily assess the value of data, the uncertainty and limitations to the legal rights of data holders and data subjects, and the absence of a secure digital infrastructure to decentralize and exchange data.

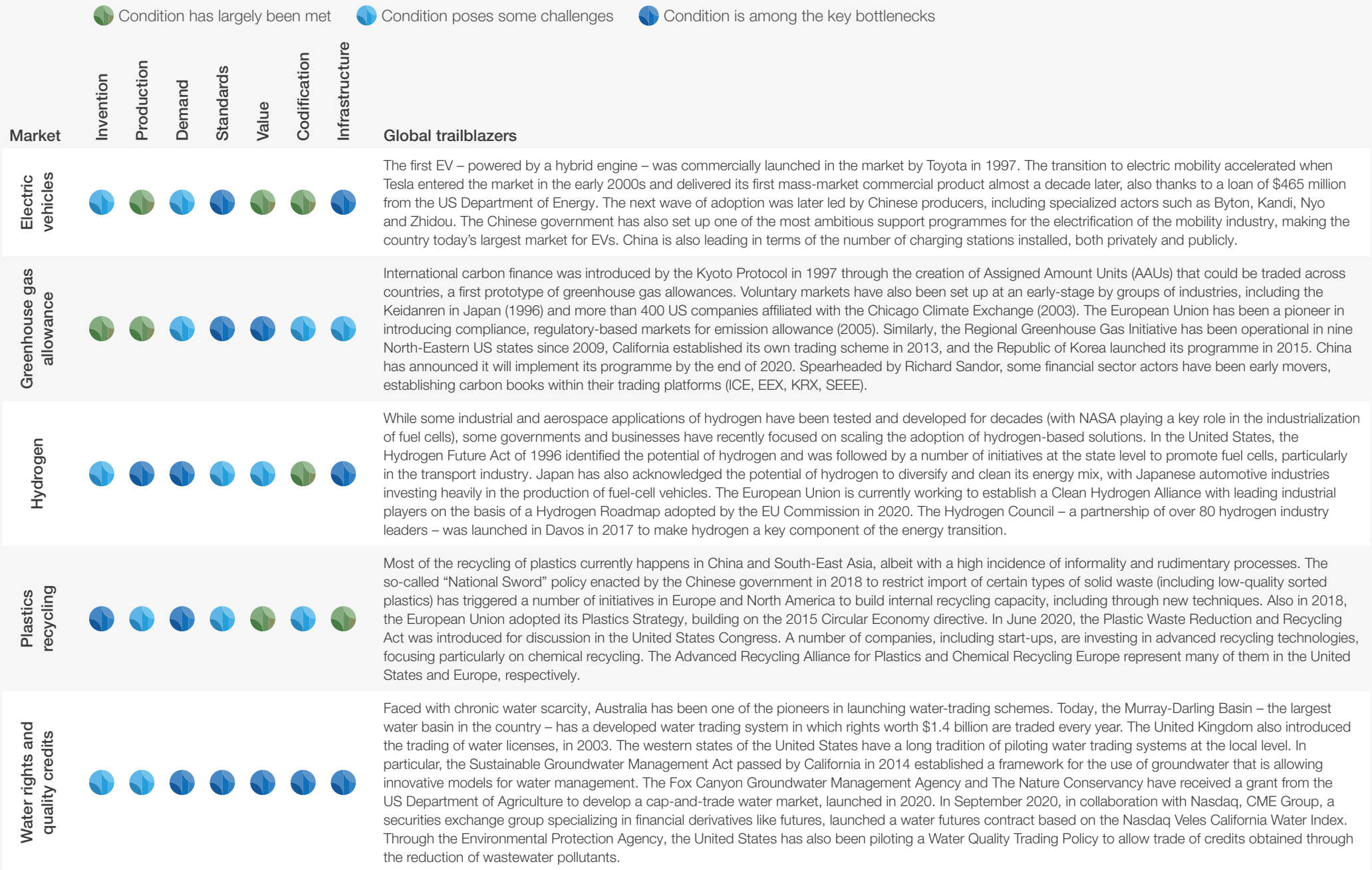
The Government of Singapore has launched certain initiatives to fulfil these conditions.

Through the [Data Collaboratives Programme](#), Infocomm Media Development Authority (IMDA) in conjunction with the Singapore Digital and the Personal Data Protection Commission have been providing [guidelines](#) to assess the monetary value of data held by companies and a [framework](#) to facilitate data sharing – including in exchange for money and through data service providers within data marketplaces – which lay out numerous foundations for standardization and codification for data exchange. The IMDA has also [partnered with DEX](#) to develop a blockchain-powered decentralized protocol to securely exchange datasets between data producers and data consumers.

Through these efforts, Singapore aims to grow a fully established data market, the first in the world.

Source: World Economic Forum

BOX 2 | Maturity of selected “green markets” around the world



Source: World Economic Forum

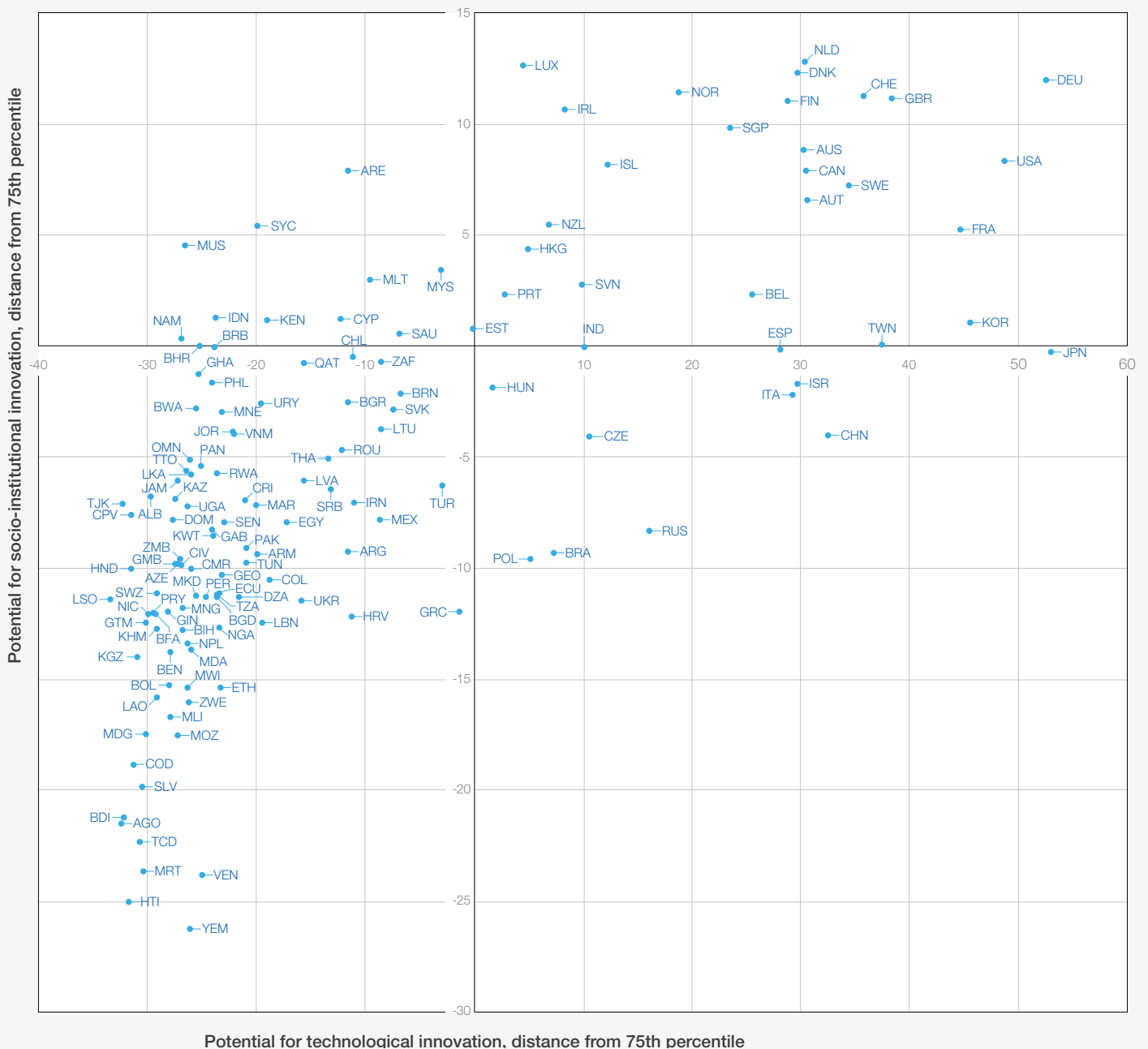
4.3 Leveraging available indicators

The assessment of the markets of tomorrow most relevant to each country will have to rely mostly on a consultative process and the qualitative assessment of stakeholders at the local level. Foresight methodologies such as Delphi surveys can be used to find convergence within the community and choose the directions to give to national industrial and innovation policies. The “embeddedness”³⁹ of public institutions within the broader technological and institutional ecosystem, the understanding of the knowledge and innovation capabilities

available, and the connections and linkages among the different actors will determine the success of experimentations around these markets.

The available data on technological development is limited, and is even rarer on socio-institutional innovation. A mapping of new markets against science and technology categories can help leverage available information on scientific publications, patents, researchers and R&D spending at the country-level. Yet, some of the

FIGURE 2 Countries’ potential for economic transformation



Source: World Economic Forum *Global Competitiveness Index 2019*

new markets will emerge from niches that might be difficult to isolate from available statistics. It will be even more difficult to gauge the potential for socio-institutional innovation, the capacity of society and its actors (individuals, companies, civil society organizations, public decision-makers) to create new formal and informal institutions, to change the “social code” – the formal, cognitive and normative elements that structure their behaviour.

The establishment of each new market requires different levels of technological and socio-institutional innovation, which are reflected in the level of maturity of the seven conditions. For example, the development of new antibiotics is mostly a scientific and technological challenge, while the establishment of a market for skills capital is mostly about changing institutions.

Similarly, some countries might be more prepared to experiment in the development of new technologies and others might have a higher potential for the creation of new socio-institutional arrangements. Selected indicators from the World Economic Forum’s *Global Competitiveness Index 2019* have been used to provide an initial assessment of country capacity to develop new markets across the two dimensions of technological and socio-institutional innovation, thereby transforming their economies.

The two dimensions are proxied respectively by their performance on research and development (patent applications, scientific publications, R&D expenditures and prominence of scientific institutions), and their level of social capital and future orientation of government (commitment to sustainability and capacity to provide a long-term vision for the country, adapt legislation to changes and new technologies, and provide policy stability).

The figures are centred on the 75th percentile of each dimension. As shown in Figure 2, countries with a potential for socio-institutional innovation above the 75th percentile of the distribution lie in the upper part of the plot; countries with potential for technological innovation above the 75th percentile appear on the right-hand side.

Countries in the upper-right quadrant present favourable conditions to develop and pilot both breakthrough technological and socio-institutional innovations. These countries are predominantly advanced economies. India, Spain and Japan are just below the bar in terms of socio-institutional innovation, while the economy of Taiwan, China, is just above.

The upper-left quadrant includes countries that can rely on high levels of social capital and future orientation of policy-makers but do not yet have a mature technological system. They are well positioned to transform their economies experimenting solutions based on socio-institutional innovation. They include many high-income economies from the Middle-East (Bahrain, Saudi Arabia, United Arab Emirates) and East Asia (Indonesia, Malaysia) as well as a number of small island states at various levels of development (Barbados, Cyprus, Malta, Mauritius, Seychelles) and emerging African countries (Kenya and Namibia).

A third group of countries present solid technological systems but not an equally solid social and institutional fabric. They appear in the bottom-right quadrant. In addition to India, Spain and Japan – already mentioned – a handful of advanced (Czech Republic, Israel, Italy) and emerging (Hungary, Poland) economies fall into this category, as well as the BRIC countries (Brazil, Russian Federation, India and China).

The plot also shows that technological and socio-institutional innovation tend to go hand-in-hand, which is not surprising in light of the interconnections and reinforcing mechanisms that have been analysed and suggested in the past between institutions (formal and informal) and technologies.

This mapping does not intend to be conclusive about the type of innovations on which each country should or should not focus. It can, however, help anticipate where niches of innovation are most likely to emerge within each country, and what the obstacles might be. Countries can also assess their position on the plot vis-à-vis their peers, which can inform the sharing of good practices and provide additional context as to whether the experience of one country is likely to be adaptable to another.

4.4 | Cross-industry action for the markets of tomorrow

Businesses have a strategic interest in co-creating markets of tomorrow and participating in the transformation of global and national economies. Companies should consider what role they could play in the use cases and the market ecosystems that are being created around them, how these will affect their current activities and business models, and what threats and opportunities might arise as the new niches grow into established markets.

Thinking about the new markets that can trigger an economic transformation should be part of the private-sector approach to foresighting and strategic investments. This framework could be used by industry associations and other private-sector research institutions to inform the decision-making of businesses. Some companies, such as Royal Dutch Shell and BASF, have been particularly successful in building internal capacities and dedicated units for foresight. These companies also show a track record of being able to carve out a leading role for themselves in new markets adjacent to their core business model.

A good overview of future markets also provides businesses with the opportunity of making strategic investments that branch out of their core sector. New markets require a cross-industry approach and will transform economies. Companies should think outside the lens of sectors and look for niches

of technological and socio-institutional innovation across the economy. Some of them are doing so, creating a free space for experimentation around a disparate set of technological challenges (e.g. Google X, EmbraerX, Leaps by Bayer). Others prefer to collaborate with, and potentially buy out, start-ups or to launch wholly separate companies to venture into new markets.

Some private-sector coalitions are trying to advance on one of the seven conditions for a specific market or across multiple markets. Country-level efforts, usually coordinated or led by governments, tend to be more effective when they take on a systemic approach, touching upon multiple conditions for the establishment of one specific new market.

On the contrary, global efforts, usually business-led, are more successful when they focus on advancing the status of one specific condition, usually catalysing actions of leading businesses around the world and across sectors. For example, Xprize, Breakthrough Energy Ventures, the AMR Action Fund and the AMR Industry Alliance all focus on the invention of new products that can respond to use cases that are useful for society. The focus of the Hydrogen Council and the European Clean Hydrogen Alliance is to accelerate investment in the production of clean hydrogen and, to some extent, to foster demand.

Conclusions and next steps

To transform economies in the post-COVID recovery, governments and businesses should increasingly combine breakthrough technological and socio-institutional innovation to create the new markets that can provide the goods and services needed to tackle the challenges ahead. Twenty markets of tomorrow have been identified as having promising potential to transform economies and establish new paradigms.

The disruptions brought by the COVID-19 pandemic to the ways of producing value and organizing societies present a unique opportunity for new and existing actors to pilot breakthrough technological and socio-institutional innovations that can develop into entire new markets. The capacity to leverage this opportunity will depend, at the country and global levels, on the capacity of a set of multistakeholder actors to proactively coordinate around the creation of the seven conditions presented in this briefing paper. Current market structures are not neutral: a high level of concentration and market power in industries adjacent to the new markets could slow down or even curb the establishment of the new markets presented.

Choosing the right challenges to solve is not enough for the final outcome to be inclusive and sustainable. It is important to design the right type of interventions to create the necessary conditions for these markets to emerge while ensuring that they will be based on a fairer and more sustainable way of producing and distributing value. Collaboration between public and private actors should be close but remain symbiotic. This will require, for example, innovative ways of financing investment in these new markets, managing relevant intellectual property and designing the public sector's risk-taking into the new ventures.

Public institutions have a key role to play. At the country-level, governments should catalyse public-private collaboration to create the systemic conditions for selected markets to emerge. Countries still represent the key organizational unit of societies, and most of the decision-making power and capacity to coordinate and organize economic and societal change remains in the hands of public and private actors as well as civil society organizations structured on a country basis. Their coordination is indispensable to move the needle on many of the conditions necessary to create the markets of tomorrow and governments will have to play a proactive role of catalysers.

Countries with advanced technological capabilities, strong social capital and future-oriented institutions are likely to be better placed to successfully create a broader range of the markets needed for economic transformation. Each new market will require a different level of technological and socio-institutional sophistication for public and private actors to establish all the necessary conditions. Some countries can build on more solid bases for piloting new solutions across both these dimensions.

Global coordination should reinforce country-level action and remains indispensable for the successful creation of many of the markets of tomorrow, particularly those with a global scope. Global cross-industry coalitions can leverage the expertise of multiple innovation chains and help create specific conditions for some of the markets of tomorrow. Businesses are well positioned to play a more proactive role in some of these coalitions and complement the efforts of other stakeholders.

A global agenda for the creation of the markets of tomorrow should focus on the following next objectives:

1. Map the most promising or successful interventions piloted around the world to create the necessary conditions for multiple or specific markets to emerge, and the champions that are driving them. It is not always possible to rely on the guidance of previous experience when working with frontier experimentations. Yet, it is useful to look at relevant experiences that are taking place or have taken place in the past. Such mapping could be initiated through a dedicated "call for champions" and organized both by the markets that are being created or by the conditions that such interventions are trying to establish.
2. Develop appropriate tools that can guide country-level action around the selection and creation of the most transformative markets of tomorrow. They will be presented in a playbook that will include guidelines and steps to select relevant markets and design country-level actions, as well as examples of the indicators necessary to assess the current situation, track progress and evaluate impact. A longer list of promising markets of tomorrow than the one presented in this briefing paper can also be developed.

3. Catalyse public-private interventions at the country level to select and work towards the creation of the markets of tomorrow. This agenda could be integrated into existing public-private collaboration platforms at the country level (e.g. at the World Economic Forum Closing the Innovation Gap Accelerators) or could be taken forward through new coalitions.
4. Catalyse global coalitions focused on specific interventions that can complement and support the efforts at the country level to create some of the markets of tomorrow. A number of such

coalitions exist already for specific markets and/or conditions. It is possible to build on their experience to develop a playbook for global action, and facilitate the creation of additional initiatives that can take action based on these learnings.

The World Economic Forum Platform for Shaping the Future of the New Economy and Society will provide an ongoing space for experts and practitioners to develop these areas of work. The future of economies, societies and the planet depend on developing these new, inclusive and sustainable markets.

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- 1 Cottam, Hilary, *Welfare 5.0: Why we need a social revolution and how to make it happen*, UCL Institute for Innovation and Public Purpose, Policy Report, 2020.
- 2 This approach follows, among others, Geels, Frank, “From sectoral systems of innovation to socio-technical systems: Insights about dynamics and change from sociology and institutional theory”, *Research Policy*, vol. 33, no. 6-7, 2004, pp. 897-920; and Geels, Frank and Johan Schot, “Typology of sociotechnical transition pathways”, *Research Policy*, vol. 36, no. 3, 2007, pp. 399-417. They define institutions (socio-technical regimes) as the set of formal and informal rules and beliefs shared within a broad community of citizens, policy-makers, scientists, businesses and social actors. This community of actors also shares the same socio-technical system – technology – which includes both the physical artefacts and the knowledge, capital, labour and cultural meaning that they embody and that are necessary to fulfil fundamental societal activities. Our notion of “technological systems and institutions” also echoes that of “techno-economic paradigms” put forward by Freeman, Christopher and Carlota Perez, “Structural crisis of adjustment, business cycles and investment behaviour” in *Technical Change and Economic Theory*, edited by Giovanni Dosi, Christopher Freeman, Richard Nelson, Gerald Silverberg and Luc Soete, 38-66, Pinter, 1988.
- 3 See Fligstein, Neil, “Markets as Politics: A Political-Cultural Approach to Market Institutions”, *American Sociological Review*, vol. 61, no. 4, 1996, pp. 656-673. But that exchange is only possible thanks to a complex system of technological, societal, economic and legal structures. Markets are therefore the subset of the broader technological and socio-institutional systems that are most closely linked to economic exchanges and activities or, more specifically, to the economic exchange of a specific good, service or asset.
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