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# FUTURE POSSIBILITIES REPORT 2020

FUTURE
POSSIBILITIES
REPORT 2020

# Contents

# Foreword

by **H.E. Mohammad Al Gergawi**

*UAE Minister of Cabinet Affairs*

Human ingenuity is the single most vital resource in the world, and in the age of global interdependence the need for solutions that drive economic growth while contributing to human prosperity and wellbeing have never been as pressing. As we look to the future, we as humanity have a unique opportunity to reset the way we produce, consume, socialize and interact. The Future Possibilities Report aims to contribute to this debate by shining a light on how countries can leverage global trends for truly sustainable development, and harness the potential of the Fourth Industrial Revolution.

The UAE Government has greatly benefited from the vision and wisdom of our leadership to prioritize, invest in and focus on the future. We are honoured to be listed among the strongest countries in COVID response, and are focusing our efforts on the path to the next normal as that foresight and future orientation is all the more important now. The Future Possibilities Report provides a positive, opportunity-focussed approach for achieving systemic change, with a view to providing tools for all nations to shift their focus to the future. By focussing on opportunities that achieve the twin objective of financial returns while contributing to human and sustainable development, it suggests a pragmatic approach for countries for the next normal, and for the much needed Great Reset.

It is our privilege to launch this report as a contribution to the global debate about the future we want in the context of the commemoration of the 75th Anniversary of the United Nations, and the efforts of the Secretary-General Antonio Guterres to lay the groundwork for the UN we all need at the time of its centennial in 2045. We welcome all countries to join us on this important endeavour and hope that it will provide a valuable resource for stakeholders as they seek to redesign models, approaches and systems on which our societies are based for the next normal.

# Foreword

by **H.E. Fabrizio Hochschild**

*Under-Secretary-General and Special Adviser to the Secretary-General for the Commemoration of the United Nations' 75th Anniversary*

After the devastation of World War II in the preamble of the UN Charter world leaders stated that the use of "international machinery for the promotion of economic and social advancement of all peoples" was an essential means of securing peace, upholding human rights and ensuring social progress. They demonstrated exemplary foresight and thanks to their commitment to solidarity succeeding generations grew up in periods of unprecedented peace.

Employing our international machinery for the promotion of economic and social advancement of all peoples is now more urgent than ever in order to overcome the devastating effect of COVID19. While the vision of the Charter is still relevant, our "international machinery" and the commitment to it, are imperiled and in need of serious attention. The machinery of multilateralism has come under assault from old foes such as unchecked nationalism and big-power politics. It also faces new challenges for which yesterday's design no longer works so well. The grave dangers of climate change, demographic shifts, growing inequality and the digital revolution can only be managed by states working effectively together and yet too often we see a diminished will to compromise and cooperate and a retraction from our multilateral system.

COVID19 has laid bare the fault lines and has exacerbated many negative megatrends, widening the divide between rich and poor, between haves and have-nots, between those who have access to work, healthcare, education or digital technologies and those who have not. Now more than ever, we need a functioning and effective international machinery that produces innovative solutions to these global trends and ensures we build back better and secure a viable future for those who come after us.

Against the backdrop of growing international challenges and diminishing global solidarity the Secretary General of the United Nations decided to mark the 75th anniversary nota as a celebration but as a moment of forward looking

reflection around the three critical questions of our time: What is the future we want for the world ? What do we see as the biggest threats to that future and how can the world come together better to address these threats and deliver on our aspirations? The global dialogue around these questions brings together peoples across the world from all walks of life. It is facilitated by the energy and resolve of many Member States of the United Nations such as the United Arab Emirates.

This Future Possibilities Report lays out a powerful and important set of policy initiatives for building back better after COVID19. It contributes to the debate by exploring how countries can actually leverage these global trends for economic growth as well as human and sustainable development. In doing so it adds a welcome voice to the global dialogue and provides for urgent oiling of the international machinery.

I thank the government of the UAE for its support for UN75 and for the valuable contribution that the Future Possibilities Report provides to us all.

# Executive Summary

What are the possibilities of tomorrow, and how can countries leverage them to reset their economies in the post-COVID world? The Future Possibilities 2020 Report sets out to answer that question by identifying six transformational trends that are creating possibilities, and the factors that explain a country's capacity to take advantage of those possibilities for the benefit of society.

The COVID crisis of 2020 has made it palpable that it is no longer enough for government policies to aim to boost the productivity of the economy as a whole. The link between productivity and economic growth is weakening and, in many countries, growth is becoming less of a priority relative to issues such as climate change and income inequality. More importantly, the COVID pandemic has highlighted that efficiency can stand in the way of resilience needed for human security. Countries instead need to identify a goal—whether improved health or food security, better connectivity, or greater use of renewable energy sources—and define transformational public policies that create conditions for businesses to innovate and lead globally in finding solutions.

History shows that it is possible for countries and cities to shape their future development by leveraging global trends: examples include Denmark establishing world-leading expertise in wind power and the UAE capitalising on global trade patterns to become a logistics hub. While some global trends do present risks that must be mitigated, psychological research suggests that a more positive outlook makes people more resilient in times of change.

As countries start thinking about the post-COVID world, we hope that the Future Possibilities Report will encourage governments, businesses and societal stakeholders to think differently about development. By providing a practical approach, the report can help them to identify the trends to prioritise, and to work together to create ecosystems that will support the development of new business models, products and services. It will also support the process of rebuilding in engaging with a positive, possibilities-focused future perspective.

**Future Possibilities: Total expected value by 2025**

| Transformational Trends | Value (USD) |
|---|---|
| Exabyte Economy | > 8 trillion |
| Wellbeing Economy | > 7 trillion |
| Net Zero Economy | > 2.3 trillion |
| Circular Economy | > 4.5 trillion |
| BioGrowth Economy | > 1 trillion |
| Experience Economy | > 6.5 trillion |

## Transformational trends: drivers of possibilities

The Report analyses how countries can leverage possibilities emerging from six transformational trends for their future economic growth and societal wellbeing. The trends were selected because of their systemic and global nature and because they are expected to generate significant possibilities in a wide range of sectors over the next 5-10 years (see table).

The six transformational trends presented in the Future Possibilities Report emerge from a combination of new business models, technologies and changes in attitudes and behaviours. They are based on a set of cross-cutting structural trends: ageing populations, the reengineering of urban life, rising global mobility, the influence of younger generations, changing global trade patterns, diversifying investment flows, the expanding middle class in emerging economies, and growing interest in measures of progress other than GDP growth.

### The Exabyte Economy: Hyperconnected devices, data and people

As computing power and storage become cheaper and more efficient, and 5G technology is rolled out, future rises in connectivity will be driven more by devices than people. The resulting flow of data will further improve the capacity of AI-based systems to optimise processes and services and disrupt business models across a range of sectors. The Exabyte Economy could deliver possibilities with an estimated total economic value of up to USD 8 trillion by 2025.

### The Wellbeing Economy: Redefining health

Interest in physical and mental wellbeing is already huge and is set to grow considerably as new approaches to wellbeing are embedded at individual, organisational and community level. There will be multiple opportunities in this sector, particularly in high-income but also middle- and lower-income countries. The combined value of Wellbeing possibilities, including preventative health, self-improvement coaching, organisational and educational programmes, fitness, diet, health and beauty, travel and real estate, could reach USD 7 trillion within a few years.

### The Net Zero Economy: Scalable low-carbon solutions

Emerging markets and data processing are increasing demand for energy, while countries are setting targets to reduce carbon emissions in greater numbers. Innovation in technologies, investment models and markets can be expected from battery technologies, electric vehicles, energy-efficient buildings and hydrogen-powered fuel cells. Growing demand for renewable energy

could yield over USD 2.3 trillion of possibilities by the mid-2020s.

### The Circular Economy: Waste not, want not

Growing public awareness of the need to reduce environmental impact will continue to open up new possibilities across value chains based on optimising the use of resources and reducing waste. The circular economy, recycling and upcycling will become more mainstream as new technological solutions become available. By some estimates, leveraging the Circular Economy could open market possibilities totalling up to USD 4.5 trillion.

### The BioGrowth Economy: New agriculture and biomaterials

Arguably the lowest-profile of the six transformational trends, the BioGrowth Economy is still set to open new market possibilities in some of the biggest global sectors. Rapid progress in biomaterials, plant science and synthetic biology will lead to breakthroughs in areas such as biodegradable materials, resilient crops, fuel refining from agricultural waste and animal protein substitutes. BioGrowth-related possibilities could be worth USD 1 trillion by 2025.

### The Experience Economy: From ownership to usership

The desire to "experience", rather than to consume, is trickling down from high-end markets to mass markets. Chatbots will increasingly enable service personalisation, and 3D printing will expand opportunities to customise products. "Experience tourism" accounts for a growing share of the global travel market, and virtual reality is becoming more sophisticated and affordable. Together these trends could build an Experience Economy worth up to USD 6.5 trillion by 2025.

## Transformational policies to drive change

How can countries make these possibilities happen? They need to put into place transformational policies in each of the above future economies and across a range of cross cutting policy areas, which we call core capacities. The core capacities are:

- **Government vision** to develop and implement a long-term strategy providing strong directionality to align the efforts of diverse stakeholders.
- **Advanced technology** to enable new ideas to be developed and adapted, particularly solid ICT infrastructure and widespread digital skills.
- **Innovation** which includes both R&D and entrepreneurship reflecting investment in basic and applied science, research institutions and a culture

of creativity.

- **Talent** to enable labour market transitions to be navigated, including attractiveness to outside talent and education that develops soft skills.
- **Business friendliness** in the shape of rule of law, absence of corruption, minimal red tape, access to finance, trust and social capital.
- **Market dynamics** that drive investment, with market size creating scope for economies of scale, improving efficiency and deploying new solutions.

## How can stakeholders use the Report?

Governments can use the Report to help them define a vision that commands wide societal support, select which trends to focus on, and develop and implement action plans. Businesses can use the Report to inform investment decisions, identify other stakeholders to work with, engage with governments and advocate for transformational public policies.

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# 1. Future Possibilities: A New Approach to Development

The COVID 19 crisis has laid bare many shortcomings of our current economic models that are focussed on efficiency and financial returns. It gave rise to a plethora of calls for systemic change to ensure better outcomes for society and human wellbeing. However, models that spell out practically how such systemic change can be achieved at the country level are scarce. The Future Possibilities Report offers a practical approach for countries to achieve growth and systemic change by leveraging possibilities offered by transformational trends.

In the same way that businesses leverage market trends, countries' long-term success depends on their capacity to strategically leverage transformational global trends. Those megatrends—such as the advancing technologies, transition to low carbon economy, focus on sustainability or smarter use of resources—are transforming industries, economies and societies and give rise to countless possibilities for improved growth and societal wellbeing. By leveraging these trends, countries can improve their economic as well as societal outcomes.

There are many examples of countries and cities that have leveraged global transformations to alter their development path. China's 1980s reforms enabled it to ride the wave of globalisation. Liberalisation of financial markets made London a global hub. India and the US, in particular, seized the opportunities created by the emergence of the Internet.

Realising possibilities associated with global trends could accelerate progress at scale, but only if the right conditions are in place. Government policymakers and business leaders can build capacity to leverage trends by recognising them, investing in them, and putting in place transformation

policies that enable all actors in their societies to take advantage of the possibilities they present.

By highlighting the potential to capitalise on new growth possibilities, the Report aims to improve understanding of what elements of transformational policies countries need to put in place and how to create the necessary capacity to leverage trends. It aims to shift the global conversation from a risk-based view of transformational trends towards a positive, possibility-focused perspective that recognises global megatrends as an engine for advancing socioeconomic development. This perspective is particularly important when we think about the post-COVID world.

In Part 1, we explain why countries have been moving away from traditional economic policies that target GDP growth and assume trickle-down effects, to focus on a wider range of social and environmental objectives. In Part 2, we discuss how transformational trends drive possibilities. In Part 3, we analyse how governments and businesses can use the framework to drive change.

## Why future possibilities matter for development

Traditionally, policies aimed at enhancing economic productivity as a whole, such as providing the right business environment, improving governance, liberalising trade, supporting innovation, ensuring equitable access to education and building infrastructure. All these goals remain important, but productivity is no longer seen as sufficient to compete in the increasingly fast-paced global race.[1] By finding ways to leverage transformational trends, countries can depart from this logic and leapfrog to higher, inclusive and sustainable growth.

*The Future Possibilities 2020 Report sets out to answer the question: What are the possibilities in the post-COVID world and how can countries leverage them?*

Recent successes offer some pointers. For example, in the last few decades, the United Arab Emirates has leveraged its geographic position to become a logistics hub, building the infrastructure and creating the enabling environment to benefit from globalisation and Asia's growing role in trade.

Denmark, meanwhile, has established itself as a frontrunner in renewable energies. In particular, it has invested in research and development to harness power from wind—an abundant resource, given its expanse of coastline. As concern about climate change increased global interest in renewables, Denmark was well-placed to take advantage—the wind power industry now makes up 6.7% of Danish exports, and employs over 30,000 people.[2]

Similarly, economic growth alone cannot deliver the desired societal outcomes. The Washington Consensus assumed that liberalisation would boost economies in general, and societal benefits would follow. Today, citizens

## Box 1: From glass half-empty to glass half-full – A positive approach towards the future

Research in psychology and neuroscience suggests that optimism—as a state of mind, rather than a character trait—makes people more ready to act in times of change. Positive expectations have been linked to greater investment in tasks expected to yield future rewards.[1] Innovators and entrepreneurs are more optimistic than average. Research suggests that optimism among an organisation's employees is a good indicator of positive organisational outcomes. This way of thinking is also finding way into economic policy, as identified by Paul Romer, who said, "What the theory of endogenous technological progress supports is conditional optimism, not complacent optimism. Instead of suggesting that we can relax because policy choices don't matter, it suggests to the contrary that policy choices are even more important than traditional theory suggests."

Governments need to identify and communicate how trends will create future growth possibilities to engage stakeholders in envisioning and creating the transformational policies that support new business models, products and services. A positive narrative—with messages about objectives and outcomes that speak to the needs of organisations and individuals—is more likely than a risk-based outlook to engage and build support for leveraging trend-related possibilities.

Being able to leverage change—not being left behind by global transformations, but turning them into an advantage—requires a complex system of institutions, measures and actions. Hence, it is worthwhile examining commonalities among successful countries.

1 Kappes & Sharot, 2015

expect socio-economic policies to directly and explicitly address societal goals, be it in terms of food security, health, climate change, decent jobs or income inequality. Each of these challenges is complex, requiring changes not only in policies and regulations but also in behaviours and systems.

Last but not least, the recession context which we are currently experiencing, makes systemic change more difficult. The financial pressures companies, individuals and governments experience limit risk taking, which is inherent in systemic change and put pressure on short term results. As a result a positive, opportunity-focussed approach is more likely to gather support of different stakeholders. Moreover, new research suggests that a more positive approach is likely to result in better outcomes, as discussed in Box 1.

## Systemic change requires transformational policies

Through case studies on selected countries (see boxes 2, 3 and 4), workshops, expert contributions and in-depth, structured interviews, our research identified a set of characteristics common to countries that have demonstrated successful growth and increased wellbeing. In this context, successful growth means growth that improves living standards and societal wellbeing and cohesion. To achieve this type of growth, countries need to attract investment in sectors of opportunity, generate employment and offer an entrepreneurial environment, among other factors.

In the past, many countries have implemented industrial policies that aimed to identify and nurture national champions or key industries through

PHOTO BY SUNGHUN KIM ON UNSPLASH

## Box 2: Republic of Korea's long-term strategy for "Green Growth"

In 2008, Republic of Korea's President Lee Myung-bak identified low-carbon green growth as a new long-term national vision, in recognition of the fact that the country's economic growth was slowing as the global financial crisis took hold. As climate change was already having an impact on the Korean peninsula, air pollution, depletion of natural resources and fossil fuel dependency were among the challenges Korea needed to address.

In 2009, the government launched the Green New Deal and set up an inter-ministerial body, the Presidential Committee on Green Growth, to develop a multi-sector approach. It created the National Strategy for Green Growth (2009-2050), a comprehensive policy framework with three main objectives: (1) to promote eco-friendly new growth engines, (2) to enhance people's quality of life, and (3) to contribute to international efforts to fight climate change. As part of these efforts the Green Growth Institute with offices in Soul, Abu Dhabi and Jakarta was also created.

Korea's latest Five-Year Plan, covering 2019-2023, continues to implement the strategy through specific budget indications and detailed tasks for ministries and related entities. Around 2% of country's GDP is devoted to the strategy, largely drawn from the central government budget. Tax incentives, subsidies and exemptions, loan programmes and green private equity funding all promote the greening of industry. The development of green technology is expected to increase productivity and strengthen the country's role as a world leader in climate change mitigation technology.

Specific green growth initiatives include the Four Major Rivers Restoration Project, which aims to increase water security, control flooding and protect ecosystems by restoring the Han, Nakdong, Geum and Yeongsan rivers. New constructions have already proved to be effective against recent typhoons. It is estimated that this long-term project could create 340,000 jobs and generate 40 trillion KRW of economic benefits.

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## Box 3: Foresight in the European Union

EU policymakers use foresight exercises to anticipate how future developments and emerging technologies could give rise to new demands from societies, raise the risk of disruptive events and create potential opportunities. Foresight helps to evaluate existing and potential new policies, analyse how policy decisions could interact with anticipated future developments, and connect policy-making across a range of sectors.

The EU distinguishes three types of foresight activities. Strategic foresight is used in developing proposals for research and innovation. Horizon scanning—aimed at identifying early signs of important changes in society, science and technology—helps to inform policy proposals from the European Commission. Foresight-based policy involves input from expert groups and evidence yielded by studies exploring future policy options, along with developing lessons and recommendations.

EU foresight projects are funded by Horizon 2020, a seven-year research and innovation programme; the Joint Research Centre, employing scientists to provide independent advice; and the European Political Strategy Centre, the European Commission's in-house think tank. The use of foresight is coordinated by a network of correspondents across all relevant departments.

**Source**
European Commission, 2019

PHOTO BY JAAKKO KEMPPAINEN ON UNSPLASH

## Box 4: Renewing innovation policies – Finland and the SUUNTA strategy

Finland's main innovation policy agencies (Academy of Finland, Tekes, Sitra, Finnvera, and Finpro) decided in 2013 to develop a new joint strategy. The SUUNTA strategy set out to shift the focus of RDI (Research, Development and Innovation) support beyond individual projects, companies and sectors towards broader business ecosystems in key areas identified by foresight work on opportunities being created by megatrends.

SUUNTA, which means direction in Finnish, identified natural resources and resource efficiency, digitalisation, wellbeing and health as areas with potential for new business ecosystems to emerge, connect to global hubs and attract investment to Finland. The SUUNTA group worked to boost these emerging ecosystems by improving coordination among innovation policy agencies by, for example, appointing ecosystem orchestrators, creating physical or virtual platforms, identifying and addressing barriers, securing political support and developing policy instruments.

At Tekes, the Finnish Funding Agency for Innovation, the SUUNTA strategy is being implemented in programs including Bits of Health, on digital healthcare solutions; 5th Gear, on next-generation telecommunications standards; IoT, on the Internet of Things; and Business with Impact (BEAM), co-funded by the Ministry of Foreign Affairs, on inclusive innovation in collaboration with developing countries. Work is ongoing to improve sense-making and real-time monitoring through new types of ex ante impact assessment approaches.

**Source**
Palmberg & Schwaag Serger, 2017

**Table 1.1: Industrial policies vs transformational policies**

| Traditional industrial policy | Transformational public policies |
|---|---|
| • Subsidies/protection for selected champions and sectors aimed at giving industries time to mature | • Dynamic co-investment between public and private players |
| • Supports the business sector to increase efficiency | • Takes the entire value chain into account |
| • Benefits mainly one sector | • Supports collaboration across disciplines and stakeholders |
| • Selection of sectors based on their commercial potential | • Seeks solutions that benefit society more broadly |
| • Builds on current strengths of country | • Fosters experimentation and risk-taking |
| • Focussed on promoting economic growth and job creation | • Cross-disciplinary, cross-sectoral and cross-actor |
| | • Flexible, multiple bottom-up paths and solutions |
| | • Clear direction, timebound and measurable |
| | • Based on broad societal support |

government support. As the growing complexity of markets made this strategy increasingly difficult, it has been replaced in recent decades by horizontal policies—those that will support the development of all sectors.

*"What drives private investment is the perception of future growth opportunities. Missions help define those opportunities in ambitious ways."*

Mariana Mazzucato[3], Professor of Economics of Innovation and Public Value, University College London

The transformative trends discussed in this report are systemic: they transform entire systems, such as the food system, which involves people from farmers to consumers, sectors from transport to health, government regulations, educational institutions, and many other players. Leveraging business possibilities from systemic change requires what we call transformational public policies.

Transformational policies differ from traditional industrial policies in several important ways (see Table 1.1). Most importantly, they require a broad and

deep understanding of sociology, politics, economics and technology to direct investment towards the key challenges[4], and they aim for outcomes that are not only economic but have a positive effect on society as a whole.

Transformational change requires stakeholders to be orchestrated and aligned. Governments need to proactively and deliberately support areas where they see growth objectives that align with other societal goals. Countries must identify specific areas where they can hope to lead in the ongoing global transformations and turn these into possibilities for their own growth and societal wellbeing.

In the following sections, we explore each of the six transformational trends through the prism of their related market possibilities, and we examine what the Future Possibilities Survey results reveal about how business executives view the possibilities associated with each of the trends.

As the COVID 19 crisis advances it is crucial for countries to start thinking about the systems we want to build for the future. The measures countries put in place during the crisis will significantly influence our economies beyond the crisis – they can slow down or accelerate systemic change. True systemic change is difficult during the best of times and can be brought to a standstill when financial pressures dominate decision making during a crisis. One way to achieve systemic change is to focus on the possibilities for growth in business, jobs and impact it creates.




# 2. Six Global Transformations

Many global transformations are simultaneously under way and transformational policies could focus on any of these. For the sake of this report we have identified six transformational trends that emerge from a combination of new business models, technologies and changes in attitudes and behaviours. Our criteria for selecting trends as transformational included their systemic nature, global relevance and likelihood of impact over the coming 5-10 years (the methodology in the appendix describes the selection process in detail). None of these trends influence markets in isolation, they rather interact on a regular basis (see Box 5). And yet, each of the six trends presents distinct types of openings for governments, the business sector and society to improve both lives and livelihoods.

The six trends we identified are as follows:

1. **The Exabyte Economy:** As computing power and storage become cheaper and more efficient, and 5G technology is rolled out, future rises in connectivity will be driven more by devices than people. The resulting flow of data will further improve the capacity of AI-based systems to optimise processes and services and disrupt business models across a range of sectors.
2. **The Wellbeing Economy:** : Interest in physical and mental wellbeing is already huge and is set to grow considerably as new approaches to wellbeing are embedded at individual, organisational and community level. There will be multiple opportunities in this sector, particularly in high-income but also middle- and lower-income countries.
3. **The Net Zero Economy:** Emerging markets and data processing are increasing demand for energy, while countries are setting targets to reduce carbon emissions in greater numbers. Innovation in technologies, investment models and markets can be expected from battery technologies, electric vehicles, energy-efficient buildings and hydrogen-powered fuel cells.
4. **The Circular Economy:** Growing public awareness of the need to reduce environmental impact will continue to open up new possibilities across

## Box 5: Science-based targets for smarter resource use

By **Randall Krantz**, *The Value Web*, Geneva, Switzerland

Although the Circular Economy is a transformational trend on its own, the need for smarter use of resources cuts across all the transformational trends. It makes sense to look for co-benefits, where the trends interact, and consider the paradigms that underlie these trends as well as the potential pressure points to change them.

Consider the "fast fashion" industry: consumers bought 60% more clothes in 2014 than in 2000, and threw them away twice as quickly.[1] What could be done to shift this behaviour? One solution lies at the intersection of the Resourceful Economy and the Experience Economy: personalised clothing. It is likely to cost more, but deepening customers' involvement in their purchase decisions could make them more attached to the product and less likely to throw it away quickly.

At the intersection of Wellbeing and Net Zero, there are potential co-benefits in reducing use of fossil fuels—reducing not only impacts on the climate, but also on human health through air pollution. In India and China, reducing greenhouse gas emissions to comply with the 1.5C Paris Agreement could generate a net benefit of USD 3.6 trillion in lower mortality and morbidity.[2]

The search for potential co-benefits requires a systems-thinking approach of the kind described by Donella Meadows, a pioneering environmental scientist and systems thinker. She showed how many of the approaches we usually adopt to address a problem—such as taxes and subsidies, incentives or feedback loops—are far from optimal. The most profound opportunities come from thinking about the paradigms that underlie systems.

A holistic view of the six transformational trends and the need to reduce our resource use reveals that we need to fundamentally rewire how many sectors and markets work.

Meadows emphasised the importance of looking for pressure points to change systems. One promising example is the rise of the B Corp: even within the constraints of the current system, companies are thriving through ethical business practices attracting loyal customers and workers. Eventually, we can expect the practices of front-running companies in a range of areas to form the basis for future reforms to laws and regulations.

Another example of potential pressure points is the Science Based Targets initiative on climate change—an alliance between the CDP, UN Global Compact, WRI and WWF.[3] It looks at required changes globally and breaks them down into specific implications for industries. For example, if an industry's size is projected to double by 2030, but its emissions need to halve in absolute terms to meet Paris Agreement targets, all industry members need to target a 75% reduction in their emissions over that time.

The Science Based Targets Network is now applying this approach to areas beyond climate. Although in its early stages, it could become a powerful pressure point to leverage the transformational trends towards achieving smarter use of resources.

1 Reichart & Drew, 2019
2 Markandya, et al., 2018
3 https://sciencebasedtargets.org/

value chains based on optimising the use of resources and reducing waste. The circular economy, recycling and upcycling will become more mainstream as new technological solutions become available.

5. **The BioGrowth Economy:** Rapid progress in biomaterials, plant science and synthetic biology will lead to breakthroughs in areas such as biodegradable materials, resilient crops, fuel refining from agricultural waste and animal protein substitutes.
6. **The Experience Economy:** The desire to "experience", rather than to consume, is trickling down from high-end markets to mass markets. Chatbots will increasingly enable service personalisation, and 3D printing will expand opportunities to customise products. "Experience tourism" accounts for a growing share of the global travel market, and virtual reality is becoming more sophisticated and affordable.

Global trends do not influence markets in isolation. Nonetheless, each presents distinct types of openings for governments, business and society

**What we mean by "transformational trend"**

We define transformational trends as trajectories and patterns arising from sustained socioeconomic, environmental or technological changes and likely to transform economic possibilities over the coming 5-10 years.

**Figure 2.1: "The money shot"—transformational trends and related possibilities in 2025**

| Exabyte Economy | |
|---|---|
| Health X data X devices | > USD 1.1 tn |
| Autonomous vehicles | > USD 500 bn |
| Big data market | > USD 90 bn |
| Cognitive computing | > USD 49 bn |
| **Total expected value** | **> USD 8 trillion** |

| Wellbeing Economy | |
|---|---|
| Wellness care and products | > USD 4.7 tn |
| Wellness tourism | > USD 1 tn |
| Health trackers | > USD 60 bn |
| Corporate wellness | > USD 58 bn |
| **Total expected value** | **> USD 7 trillion** |

| Net Zero Economy | |
|---|---|
| Renewables for electricity | > USD 1.5 tn |
| Electric vehicles | > USD 567 bn |
| Energy efficient buildings | > USD 623 bn |
| Lithium ion batteries | > USD 93 bn |
| **Total expected value** | **> USD 2.3 trillion** |

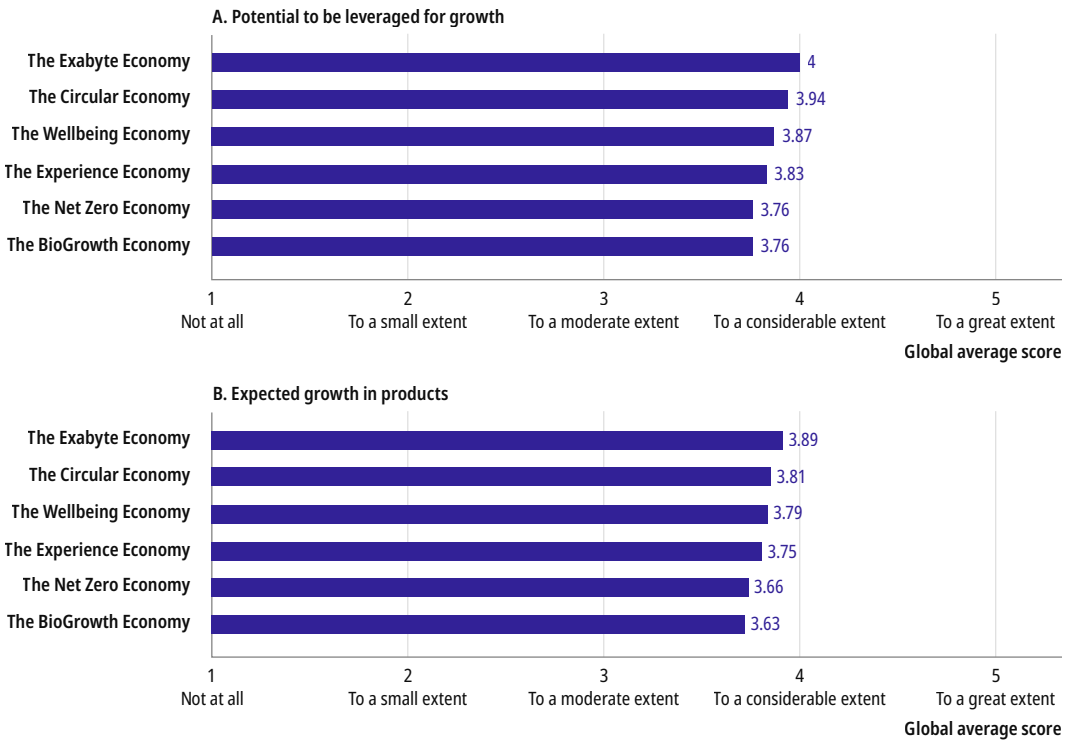
| Circular Economy | |
|---|---|
| Circular economy, EU only | > Euro 1.8 tn |
| Global recycling metals | > USD 590 bn |
| Smart water networks | > USD 7.25 bn |
| Sustainable fashion | > USD 150 bn |
| **Total expected value** | **> USD 4.5 trillion** |

| BioGrowth Economy | |
|---|---|
| New generation biorefining | > USD 550 bn |
| Agri-biotech | > USD 51 bn |
| Bioplastics | > USD 42.6 bn |
| Synthetic biology | > USD 13.6 bn |
| **Total expected value** | **> USD 1 trillion** |

| Experience Economy | |
|---|---|
| Leisure travel & tourism | > USD 5 tn |
| Sharing platforms/goods & services | > USD 336 bn |
| Global digital content | > USD 237 bn |
| 3D printing & customisation | > USD 28 bn |
| **Total expected value** | **> USD 6.5 trillion** |

Source: Author's calculations.

**Figure 2.2: Global business perceptions of transformational trends potential**




Source: The Future Possibilities Survey: A. "How likely is your country to leverage these trends for growth possibilities?" The global average is calculated as the arithmetic mean of individual country scores.

**Figure 2.3: Business expectations of impact of transformational trends on jobs – by sector**

| Sectors | Exabyte | Wellbeing | Net Zero | Circular | BioGrowth | Experience |
|---|---|---|---|---|---|---|
| Advanced Materials & Biotechnology | = | ↑ | ↑ | ↑ | = | ↑ |
| Automotive, Aerospace & Aviation | = | ↑ | = | ↑ | = | = |
| Chemicals/ Petrochemicals | ↓ | = | = | ↓ | = | ↓ |
| Consumer Goods | ↑ | = | ↑ | ↑ | ↑ | ↑ |
| Energy, Oil & Gas | ↑ | = | = | = | ↑ | = |
| Financial Services & Investors | = | ↑ | ↑ | = | ↑ | = |
| Health & Healthcare | ↑ | = | ↑ | ↑ | ↑ | ↑ |
| Information & Comm. Technologies | ↑ | ↑ | ↑ | ↑ | ↑ | ↑ |
| Infrastructure & Construction | ↑ | ↑ | ↑ | ↑ | ↑ | ↑ |
| Insurance & Re-insurance | = | ↑ | = | = | = | = |
| Logistics, Shipping & Freight | ↑ | = | ↑ | ↑ | ↑ | ↑ |
| Media & Entertainment | ↑ | = | = | = | = | ↑ |
| Mining & Metals | = | = | ↓ | ↓ | ↓ | = |
| Professional Services | ↑ | ↑ | ↑ | ↑ | ↑ | ↑ |
| Travel & Tourism | ↑ | ↑ | ↑ | ↑ | ↑ | ↑ |
| Utilities | = | = | = | ↑ | = | = |

**Expected change:** ↑ Increase ↓ Decrease = No change

Source: Future Possibilities Survey 2019

to improve not only livelihoods but also lives, by improving access to services (the Exabyte Economy and Experience Economy), reducing waste (the Circular Economy) and enhancing health (the Wellbeing Economy), among other initiatives. This part of the report concludes with a brief outline of how each of the trends relate to the UN Sustainable Development Goals, pointing towards how future possibilities can generate both growth and wellbeing when the vision, policies and strategies of all stakeholders align.

## There are sizeable market possibilities ahead

As a part of our analysis of the six transformational trends, we reviewed reports produced by leading international organisations, consulting and research firms, governments and international industry associations to estimate the expected value of the related markets by 2025. Figure 2.1 offers a snapshot of some of the possibilities that would emerge from transformational trends by 2025. It is based on a conservative approach and provides an indication of the relative size of the markets driven by each trend.[5]

Business executives also view the trends as having a considerable potential

to be leveraged for growth and societal wellbeing. As can be seen from Figure 2.2, survey respondents prioritised the transformational trends in the same order when asked to rate their impact on growth opportunities.

### Possibilities for both market *and* jobs growth

The business executives that took part in the Future Possibilities Survey expect transformational trends to translate into a mainly positive outlook for employment. While job losses are forecast for some sectors, expected growth in other areas should more than compensate for them (see Figure 2.3). The crucial factor, as will be discussed in Part 3 of this report, will be governments' policy responses in key areas, such as education and skills.

**Exabyte in brief**

One of the most interconnected of the six transformational trends, ranking first in the survey for growth potential, Exabyte is driven in large part by the rollout of 5G technology. Markets expected to benefit across all economies include healthcare, finance, consumer goods, logistics and mobility.

## The Exabyte Economy: Hyperconnected devices, data and people

Computing power, storage and connectivity continue to become cheaper and more efficient. Two-thirds of the world's population own a mobile phone, and more than half have Internet access. More people will gradually continue to come online—7% is the most recent annual growth estimate—but future rises in connectivity and data flows will be driven more by devices than by people.

**The Internet of Things (IoT)**—driven by smart grids, white goods, wearables, vehicles and medical devices—will expand rapidly (see Figure 2.4). There will be an estimated 3.5 billion IoT connections by 2023, up from 1 billion in 2018. Currently, there are twice as many connected devices as people; by 2035, it will be almost 20 times as many. The 5G rollout will enable even greater data flows.

In turn, more data will enable **improved machine learning, advancing AI-based systems and software** (see Figure 2.5). These technologies have the potential to optimise processes and services across multiple sectors, from personalised healthcare and finance, to mobility and energy efficiency. New business models will emerge, using purpose-built platforms with real-time

**Figure 2.4: Potential of Internet of Things**

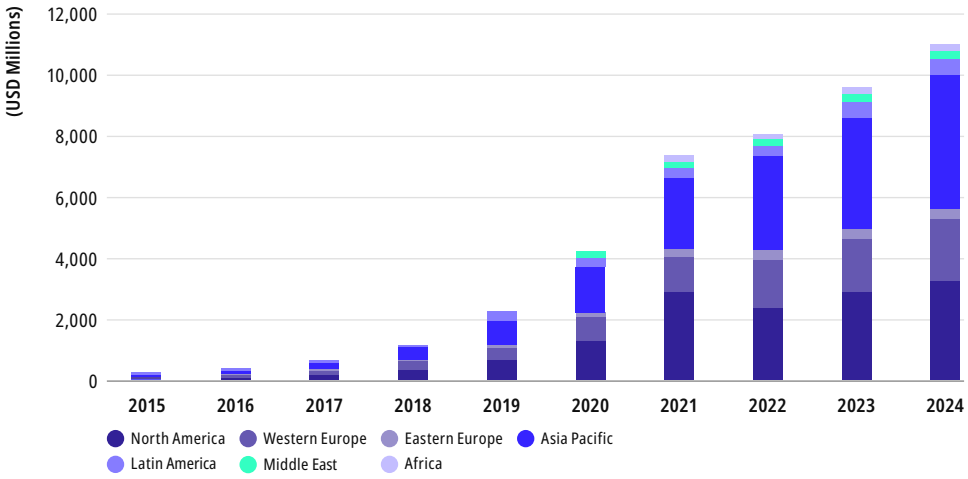
| Nine settings where value may accrue | | Size in 2025, USD trillion[1] |
|---|---|---|
| Factories | eg. operations mamagement, predictive maintenance | 1.2-3.7 |
| Cities | eg. public safety and health, traffic control, resource management | 0.9-1.7 |
| Human | eg. monitoring and managing illness, improving wellness | 0.2-1.6 |
| Retail | eg self-checkout. layout optimization, smart customer-relationship management | 0.4-1.2 |
| Outside | eg. logistics routing, autonomous (self-driving) vehicles, navigation | 0.6-0.9 |
| Work Sites | eg. operations management, equipment maintence, health and safety | 0.2-0.9 |
| Vehicles | eg. condition-based maintenance, reduced insurance | 0.2-0.7 |
| Homes | eg. energy management, safety and security,chore automation | 0.2-0.3 |
| Offices | eg. organizational redesign and worker monitoring, augmented reality for training | 0.1-0.2 |




[1]Adjusted to 2015 dollars; for sized applications only; includes consumer surplus. Number do not sum to total, because of rounding.

Source: McKinsey Global Institute

**Figure 2.5: AI revenue is expected to reach USD 12 billion globally by 2024**




Source: Tractica Research

data to alter how goods and services are produced, consumed, owned, shared and paid for. **While sharing economy platforms have so far focused on consumers, future innovation is expected in business-to-business models,** with solutions already emerging in sectors such as transport and logistics.

The COVID 19 pandemic is likely to accelerate the adoption of advanced digital technologies for a number of reasons. Firstly, the need for digital interaction due to social distancing measures helped overcome many behavioural barriers to adoption and helped users recognize the advantages technological solutions. These may break down adoption barriers more broadly. The crisis has also highlighted vulnerabilities in supply chains of essential sectors which may lead to re-shoring of production activity. Due to increasing cost pressures this will most likely lead to higher levels of automation in these sectors.

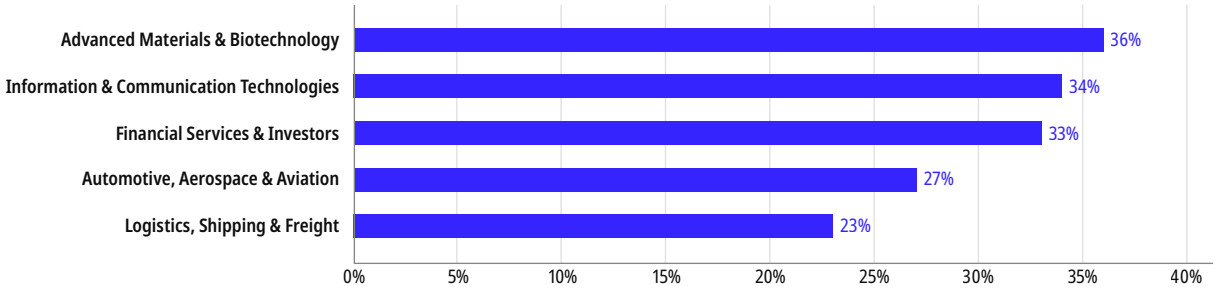
### Sectors that will benefit most from the Exabyte Economy

Business leaders expect the Exabyte Economy to drive opportunities in advanced materials and biotechnology but also in informational and communication technologies, financial services and automotive sectors (see Figure 2.6). Box 6 describes how AI can drive progress in the health sector, which could be instrumental to resolving future health challenges such as the COVID 19 pandemic.

### Exabyte possibilities by numbers [6]

- The **cognitive computing market,** including machine learning and AI systems, is expected to be worth **USD 49.3 billion by 2025.**

**Figure 2.6: The business leaders' perspective on which sectors will benefit most from the Exabyte Economy**



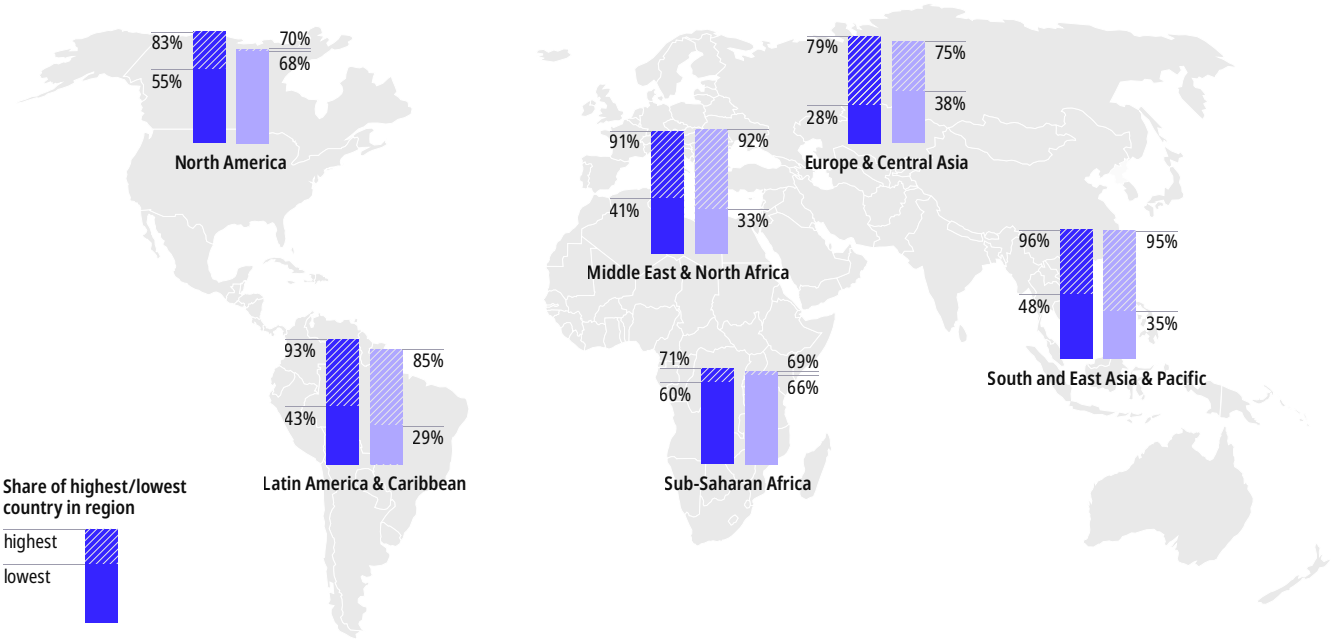

Source: Future Possibilities Survey item: "Which sectors do you think are best placed to leverage these trends?" Top six sectors based on the average per region of the percentage of respondents who selected the sector for their country.

- **Big data revenue** is set to exceed **USD 90 billion by 2025**, double the figures reported for 2018.
- **The estimated economic impact of the IoT is estimated at USD 11.1 trillion** per year in 2025, equivalent to 11% of global GDP, nearly 40% of which could be generated in emerging economies.
- Estimates put **5G as contributing up to USD 12.3 trillion** to global economic output over the next decade
- The **global autonomous vehicle market** is projected to grow to USD 556.67 billion by 2026, with an expected CAGR of 39.47% from 2019 to 2026.
- The value of **improved health** of individuals living with chronic diseases through the adoption of **connected devices for remote monitoring could reach USD 1.1 trillion per year by 2025**.

### Realising Exabyte Economy possibilities – The regional view

The Exabyte Economy was perceived by the Future Possibilities Survey respondents from all regions as one of the two trends most likely to be leveraged for growth, and was expected to generate the greatest demand for new goods and services (see Figure 2.7). Most potential is to be found in North America and Asia.

**Figure: 2.7: The Wellbeing Economy growth and demand**




Source: The Future Possibilities Survey items: "How likely is your country to leverage these trends for growth possibilities?" and "To what extent do you see potential demand for new products and services related to these trends?"

## Box 6: Artificial intelligence and healthcare

By **Jackie Hunter**, *Benevolent.AI*, London, UK

The application of artificial intelligence (AI) in healthcare is still in its early stages in some areas, such as drug development. In other areas, such as digital pathology and radiology, clear and concrete examples of impact have already emerged. There is no doubt that this technology is already transforming healthcare, and it will be essential in the future to allow a truly personalised approach to medicine.

AI ranges from simple machine learning to much more complex approaches such as convolutional neural networks. Large companies such as GE, Siemens and Phillips are delivering digital pathology and radiology hardware and software informed by AI. The development of analytics that will work across multiple platforms will create additional value and will probably lead to new business models.

Smaller companies are also capitalising on AI. Start-ups such as Owkin are using it to develop detailed and accurate prognostic models across a range of diseases to enable more targeted treatments. This benefits not only patients but also healthcare providers.

The most advanced examples of AI applications are in diagnostics and monitoring. An example is a mobile colposcope that uses AI analytics to enhance image quality for screening and diagnosing cervical cancer, reducing the need for expensive hardware. It also reduces mortality rates, which can be especially significant in developing countries such as India, by facilitating patient follow-up.

Indeed, AI may initially have the greatest impact on healthcare in countries that have historically not had great infrastructure, notably those in Sub-Saharan Africa. MobileODT's colposcope can be used in the field to reach women who would otherwise not have access to healthcare.

Of course, AI will also benefit countries with healthcare systems based on electronic records which facilitate data mining and analytics. However, more widespread AI adoption in healthcare will require addressing not only technical and regulatory barriers, but also social barriers stemming from reluctance to share data as well as concerns related to job displacement.


OLYMPUS
4x 10x
40x

**Wellbeing in brief**

Interest in physical and mental wellbeing is already huge and is set to grow considerably with increasing awareness of its importance among governments and individuals. This is likely to be accelerated by the COVID pandemic. New approaches to wellbeing are being embedded at individual, organisational and community level. There will be multiple opportunities in this sector, particularly in high-income but also middle- and lower-income countries.

## The Wellbeing Economy: Redefining health

COVID19 has given additional impetus to the growing importance of proactive approaches to wellness and wellbeing that are driving rapid change in consumer behaviour. The expanding global wellness market encompasses diverse sectors including fitness, diet, beauty, travel and real estate, as well as educational and organisational practices, but also mental wellbeing (see Figure 2.9).

The 'quantified self' trend is driving demand for health wearables and encouraging more proactive approaches to wellness (see Figure 2.10). Potential advances in nutrigenetics could offer more personalised diets to optimise health and wellbeing. Wellbeing and fitness apps experienced a boost during the COVID pandemic limiting the health impact of social distancing and isolation.

Wellness tourism is growing at a rapid pace as more people travel to boost their health through physical, psychological or spiritual activities. More recently, augmented and virtual reality is growing and opening doors to innovative physical and mental wellbeing approaches.

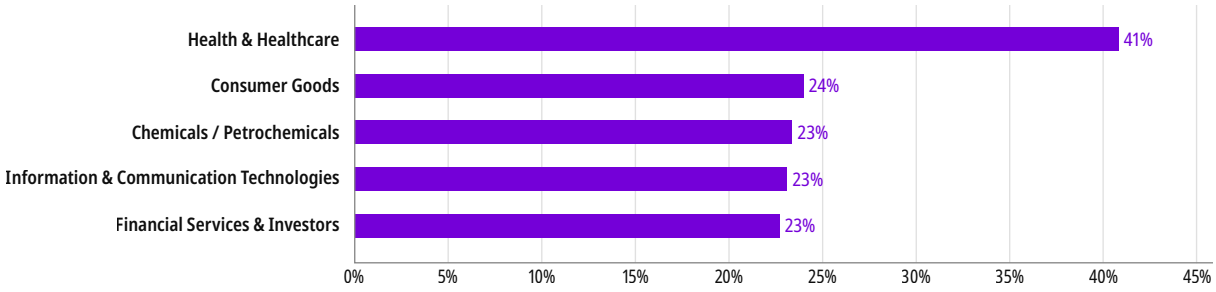
### Sectors that will benefit most from the Wellbeing Economy

Business leaders expect the Wellbeing Economy to drive opportunities in health and healthcare, consumer goods, chemicals/petrochemicals, but also in information and communication technologies (See Figure 2.8).

### Wellbeing possibilities by numbers [7]

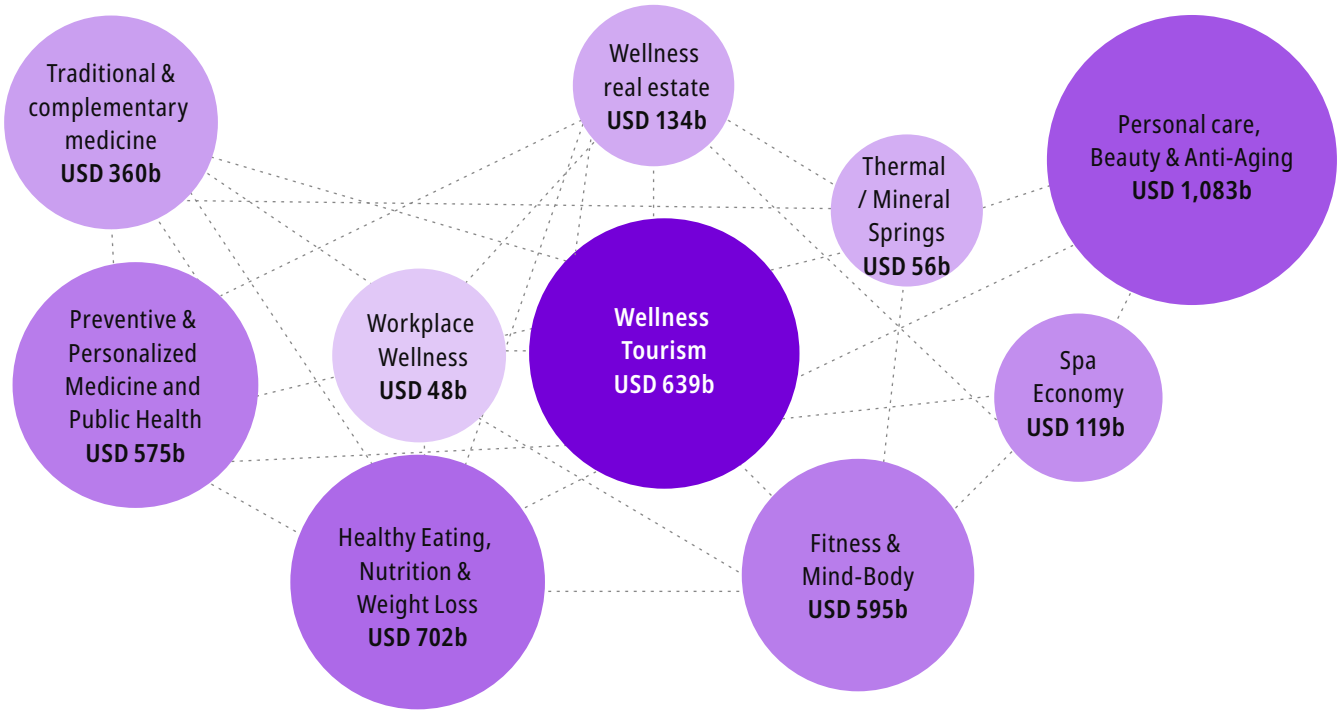
- The market for **"wellcare"**, incorporating preventive health, nutrition, fitness and beauty, was worth **USD 810 billion in 2018**.

**Figure: 2.8 The business leaders' perspective on which sectors will benefit most from the Wellbeing Economy**



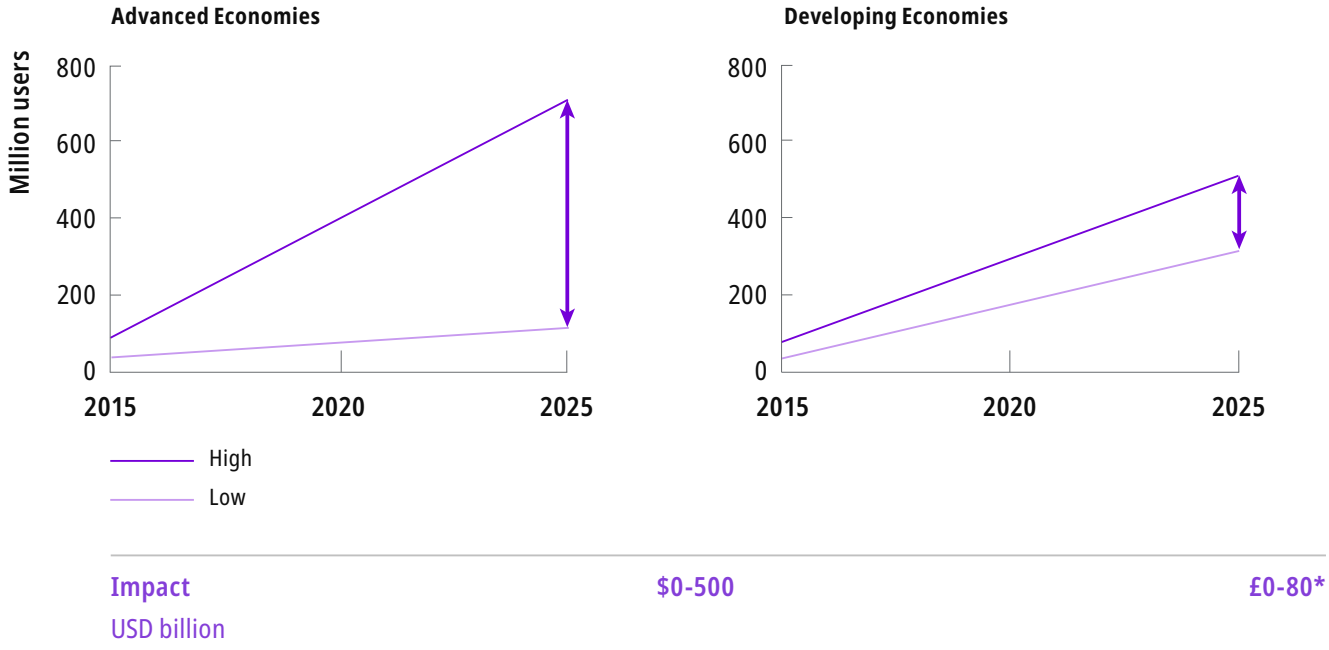

Source: Future Possibilities Survey item: "Which sectors do you think are best placed to leverage these trends?" Top six sectors based on the average per region of the percentage of respondents who selected the sector for their country.

**Figure: 2.9 The Global Wellness Economy**




Source: Global Wellness Institute. Global Wellness Economy Monitor, October 2018

**Figure: 2.10: Estimated adoption of wearable devices**



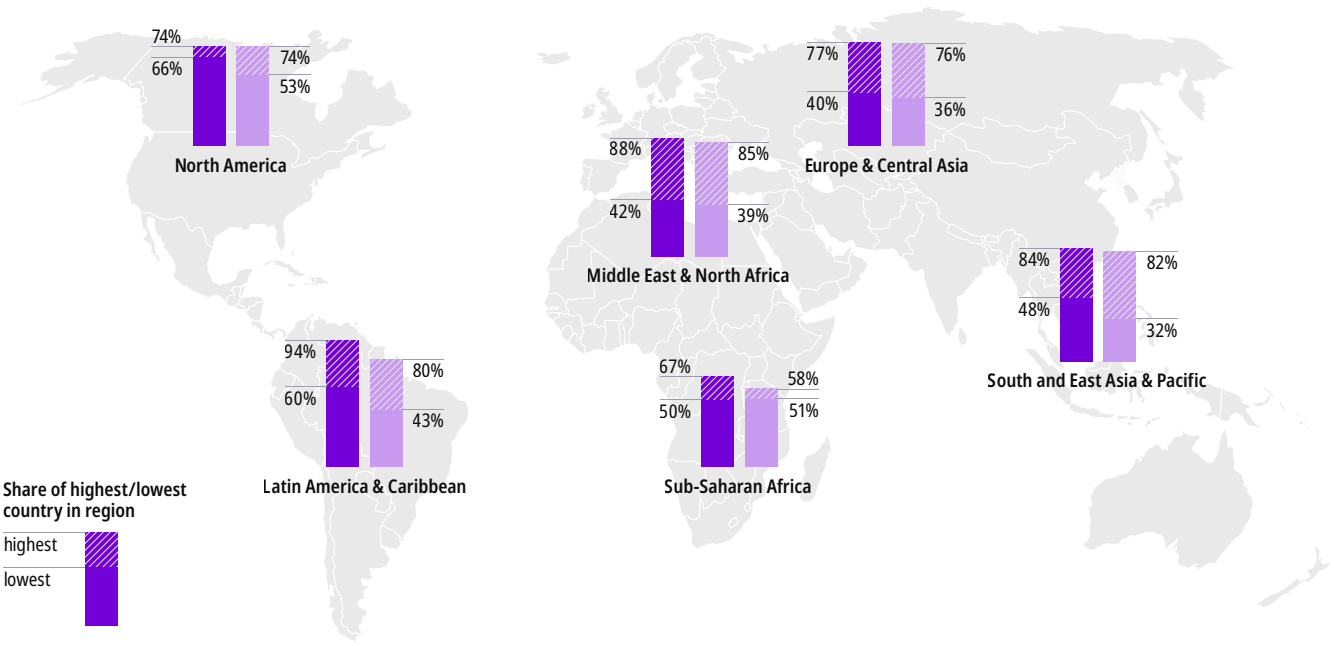

Source: eMarketers: HIS, Euromonitor, WSJ, McKinsey Global Institute analysis.

- The **self-improvement coaching market** was worth **USD 9.9 million in 2016 in the US alone**, and is forecast to reach USD 13.2 billion by 2022.
- The **preventative and personalised medicine market was USD 574.8 billion in 2017** with an average growth rage of 3.7%.
- The **healthcare wearables market**, including health trackers and remote monitoring devices, is set to reach **USD 60 billion by 2023**.
- The global **genomics market** is projected to reach USD 35.7 billion by 2024 from USD 18.9 billion in 2019, at a CAGR of 13.5%.
- Wellness tourism is growing strongly at the intersection between two industries: **the USD 2.6 trillion tourism industry and the USD 4.2 trillion wellness market**.

### Realising Wellbeing Economy possibilities – The regional view

The Wellbeing Economy is rated third for growth potential. It has the highest potential in countries in Latin America & Caribbean and Middle East & North Africa, where Survey respondents expect that demand will be high and that countries are able to leverage this opportunity. The opportunities are perceived as less present in some countries in South Asia & Pacific and Europe & Central Asia (see Figure 2.11).

**Figure: 2.11: The Wellbeing Economy growth and demand**




Source: The Future Possibilities Survey items: "How likely is your country to leverage these trends for growth possibilities?" and "To what extent do you see potential demand for new products and services related to these trends?"

**Net Zero in brief**

Renewable energy still accounts for a small percentage of total energy consumption globally. Nonetheless, new-generation renewables, product innovation and energy efficiency solutions are driving demand for net zero possibilities.

## The Net Zero Economy: Scalable low carbon solutions

Innovation in technologies, investment models and markets will continue to speed up the world's transition towards net zero carbon emissions. A growing number of countries are introducing new policies and setting long-term targets (see Figure 2.12). Globally, the renewable energy market share is still low, but Net Zero opportunities are growing.

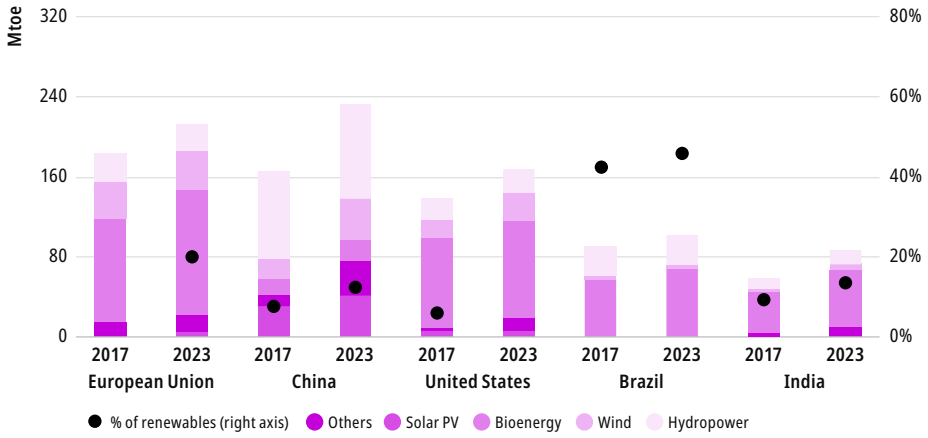
**About a sixth of global energy investment went into renewables** in 2017.[8] The world is becoming hungrier for energy, as demand grows in emerging markets and more electricity is consumed by data processing and devices.

Improvements in **battery technologies are addressing the problem of storing renewable energy** at scale and offering off-grid solutions to remote areas. They will contribute to the spread of electric vehicles as more car-makers enter the market and charging infrastructure becomes more developed (see Figure 2.13). Lighter materials and more efficient engines will further reduce emissions from burning conventional fuels. There is growing interest in **energy-efficient buildings**.

Zero-emission hydrogen-powered fuel cells (see Box 7) could become more feasible for shipping and heavy vehicles, and link renewables to the energy and steel sectors.

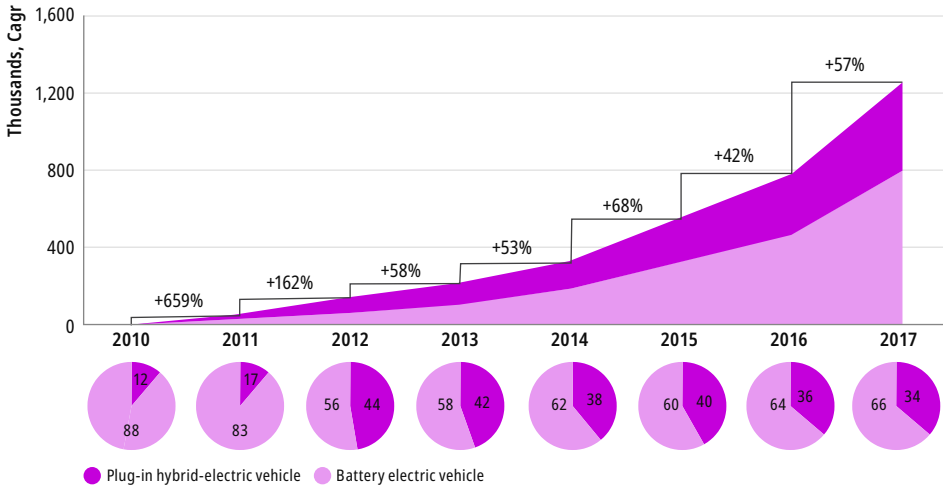
As this report is finalized, there is debate on whether the COVID pandemic and the ensuing recession will accelerate or slow down the transition to the low carbon economy. While the judgement is still out, some governments made public support conditional on improved sustainability (e.g. France's support

**Figure: 2.12: Renewable energy consumption in major markets, 2017 and 2023**



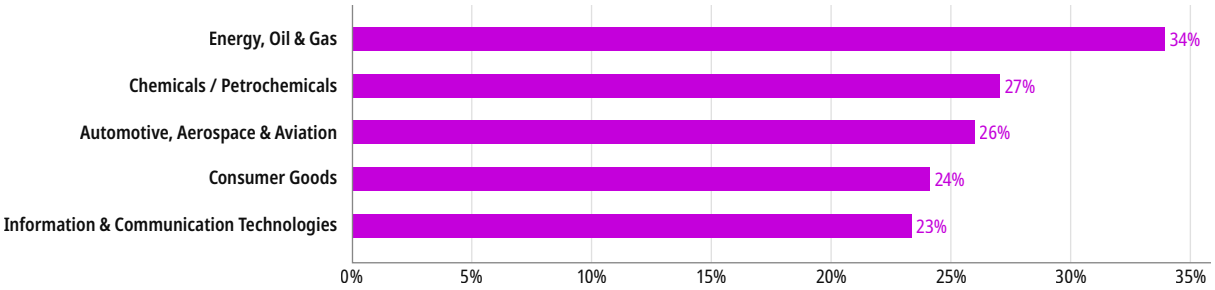

Source: The share of renewables in total final energy consumption in the European Union is calculated using the methodology outlined in IBRD, World Bank and IEA (2015), Global Tracking Framework (GTF) 2015. The exact calculation and inclusion of specific energy flows may differ from that outlined in EU Directive 2009/28.EC.ded

**Figure: 2.13: Global electric-vehicle sales, 2010-17.**




Source: McKinsey Global Institute, 2018

**Figure: 2.14: The business leaders' perspective on which sectors will benefit most from the Net Zero Economy**




Source: Future Possibilities Survey item: "Which sectors do you think are best placed to leverage these trends?" Top six sectors based on the average per region of the percentage of respondents who selected the sector for their country.

for the aviation industry or Germany's subsidy scheme for electric vehicles), suggesting that there is an opportunity to drive change in this space as well. In this context, an opportunity focussed approach remains very important.

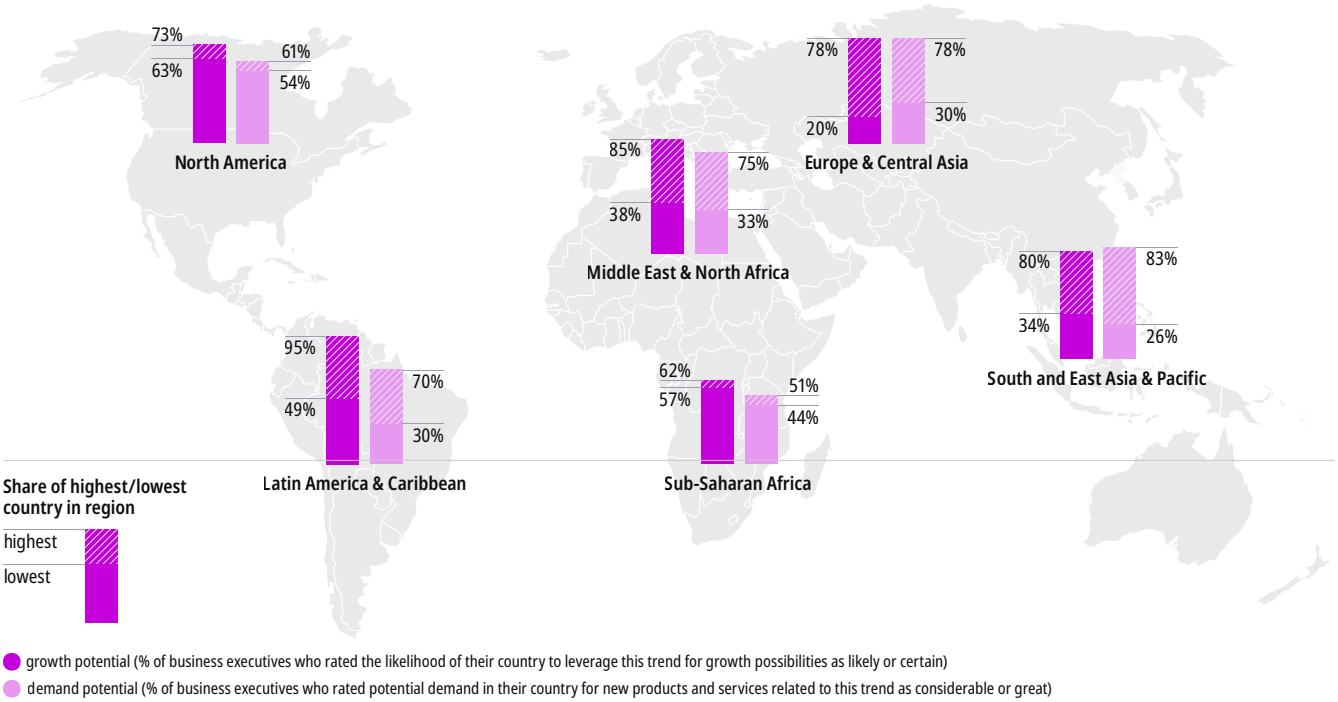
### Sectors that will benefit most from the Net Zero Economy

Business leaders expect the Net Zero Economy to drive opportunities in energy, oil and gas, chemicals, automotive, and consumer goods. (See Figure 2.14).

### Net Zero possibilities by numbers [9]

- The **global renewable energy market is expected to exceed USD 1.5 trillion by 2025**, up from USD 928 billion in 2017.
- The **global electric vehicle market is projected to reach USD 567**

**Figure: 2.15: The Net Zero Economy map.**




Source: The Future Possibilities Survey items: "How likely is your country to leverage these trends for growth possibilities?" and "To what extent do you see potential demand for new products and services related to these trends?"

**billion by 2025**, growing at a CAGR of 22.3% from USD 119 billion in 2017.

- **Lithium ion battery** market will be **worth USD 93 billion by 2025**.
- The **hydrogen generation market is expected to reach USD 199 billion by 2023**, growing at a CAGR of 8% from USD 135.5 billion in 2018.
- The transition to Net Zero could create 42 million jobs in renewables by 2050 and give rise to cumulative savings of USD 62 trillion or more.

## Realising Net Zero Economy Possibilities – The regional view

It may be surprising that the Net Zero Economy rated relatively low in most regions (see Figure 2.15). This sentiment could reflect business executives' recognition of the need for systemic change led by visionary government policies and market regulation.

While great strides are being made in R&D, scaling up solutions remains a major challenge (see for example Box 8). Hence, it may take a few years for the growing public pressure and changes in consumer behaviour to reach a critical mass.

# Box 7: The future of hydrogen fuels— Opportunities and trends

By **Wolfgang Lehmacher**, *Senior Supply Chain Executive*, Hong Kong SAR

Energy stored in hydrogen can be released by combustion, which produces three times as much energy as the same amount of gasoline; or by fuel cells, which turn it into electricity. In both cases, only water is emitted. Hydrogen fuels are potentially important in the transition to a low-carbon economy.

However, producing hydrogen without greenhouse gas emissions is expensive. "Green" hydrogen, using renewables to power electrolysis, accounts for only four percent of global production. The rest comes from natural gas (48%), oil (30%) and coal (18%)—collectively known as "blue" hydrogen if the CO2 emitted is captured and stored, and "grey" hydrogen if it is not.[1]

Today, hydrogen is primarily used in refining oil and producing ammonia, methanol and steel. Future opportunities include heating for buildings—hydrogen could be blended into natural gas networks, or used directly in boilers or fuel cells—and fuel for transport.[2]

Hydrogen-powered vehicles have long aroused interest and controversy. Hydrogen needs more storage space than gasoline, even when highly compressed, and its flammability also poses safety issues. Its efficiency is relatively low: according to a 2016 German government study, hydrogen trucks achieve 29 % efficiency, compared to 62 % for battery-powered electric trucks. Still, operating costs of hydrogen trucks are 30-40 % lower than those of diesel trucks, though capital costs are higher.

Several carmakers have experimented with hydrogen internal combustion engines, which work similarly to gasoline-powered engines. More common are hydrogen fuel cell vehicles (FCVs), such as the Honda Clarity and Toyota Mirai. Like battery-powered electric vehicles, they use electricity to drive the wheels.

As with battery-powered electric vehicles, hydrogen FCVs face a chicken-and-egg problem: consumers hesitate to buy them until there is a wide network of filling stations, which cost over a million dollars to install, and will not be built unless there is sufficient consumer demand.[3] California, Germany and Japan have offered subsidies and loans to spur their development, but the progress remains slow. A joint venture involving Shell, Total, OMV, Daimler and industrial gas manufacturers Air Liquide and Linde is aiming to develop 400 hydrogen refuelling stations across Germany by 2023.[4]

Hydrogen FCVs and battery-powered electric vehicles are often portrayed as competing technologies, but they have different strengths. While electric vehicles are ideal for urban mobility, FCVs are more suited for use in buses, commercial vehicles, delivery fleets and trucks. These applications do not need a dispersed network of refuelling points, as vehicles can fill up for the day at headquarters or a job site.

Hydrogen fuel cell buses are being adopted from Europe[5] to the US[6] to Korea.[7] Amazon runs forklifts on fuel cells.[8] Logistics companies in Germany, Belgium and the Netherlands are testing 27-tonne hydrogen trucks through the H2-Share project funded by the European Regional Development Fund.[9] In May 2019, DHL ordered 100 hydrogen-powered StreetScooters, weighing 4.25 tonnes and with a 500 km range.

The world's first hydrogen-powered, energy self-sufficient ship launched in 2017 and has since travelled over 17,000 nautical miles. However, as hydrogen-powered ships are significantly more expensive than diesel vessels, the investment is hard to justify.[10] The world's first hydrogen train is, however, already in commercial service on a route in northern Germany.[11]

The new EU Commission could develop a specific strategy on hydrogen.[12] But a more powerful driving force may be China, which has already publicised its ambitions—a recent Chinese government whitepaper sets out expectations that hydrogen will account for 10% of the country's energy system by 2050, in sectors ranging from transport to industrial production.[13]

1 IRENA, 2018
2 International Energy Agency, 2018
3 Stecher, 2019
4 Shell, 2017
5 Hart, 2019
6 US Department of Transportation, 2018
7 The Korea Bizwire, 2019
8 Casey, 2017
9 Deutsche Post DHL Group, 2019
10 CNN Business, 2019
11 The Guardian, 2018
12 Van Renssen, 2019
13 Yuanyuan, 2019

## Box 8: Scaling up technologies to achieve a Net Zero Economy

By **Jodie Roussell**, *Planair SA*, Geneva, Switzerland

PHOTO BY ANDREAS GÜCKLHORN ON UNSPLASH

At the September 2019 UN Climate Action Summit, 66 countries committed to becoming carbon neutral by 2050. The challenge is to translate that political will into better-aligned incentives.

We already have the technology to achieve that ambition. While continuing to invest in innovation that would yield even better solutions, we must align incentives to get the best current solutions deployed at scale. In areas such as solar power, renewable technologies that are significantly more efficient at reducing emissions than those now being mass produced already exist, but these technologies will not be able to compete economically until they achieve scale.

Understandably, investors will not pay a premium unless there is a clear business case as well as an environmental case, and manufacturers with low margins are hesitant to overhaul their existing product lines. So how do we get the most efficient technologies into key markets at higher volumes? As national governments have a key role in this ambitious initiative, they should set clear targets and tariff levels for renewables, far enough in advance to enable businesses to plan, which incentivises long-term investments.

China's five-year planning system has been used to effectively structure and address the expansion of clean energy systems and power grid regulations while addressing pollution-related public health concerns. Ambitious plans have quickly turned the country into the world's biggest producer and user of solar, wind and hydropower technologies.

Governments should also publish detailed maps of energy transmission infrastructure and capacity, to enable entrepreneurs and communities to identify projects most likely to be feasible. The best solutions depend on local contexts. We can think of cities as virtual islands, and focus on available resources: perhaps rooftop space for solar installations, volcanic activity for geothermal power generation, or a coastal location for offshore wind schemes.

Depending on the types of agricultural activities nearby, there may be opportunities to combine, for example, farming with solar panels several metres above the crops, or ranching and wind power. Agricultural waste can often be harnessed too—pork or dairy farming is particularly suitable for methane digesters.

District heating schemes, burning waste generated locally and capturing the emissions, are increasingly becoming viable. With the growing popularity of electric cars, new possibilities are emerging to integrate transport networks with energy storage. Vehicles plugged into the grid can recharge their batteries when electricity is plentiful, and give power back at times of peak demand.

To make best use of available technologies, we need to find innovative ways to align the financial incentives of public entities and private businesses with the SDGs and the aim of a carbon-neutral global economy. There is significant scope for sustainability metrics to achieve a transformation similar to the International Financial Reporting Standards in accounting.

*There is a significant scope for sustainability metrics to achieve a transformation similar to the International Financial Reporting Standards in accounting.*

Various initiatives currently exist, including the Global Reporting Initiative, EcoVadis and B Corps. Ideally, we should aim for the sustainability performance of each company to be reducible to a single score. Customers could exert pressure by taking these scores into account when selecting suppliers and service providers. Governments could use them as the basis for incentives such as tax breaks or eligibility for tenders.

Initiating such a system would require a group of countries—or a trading bloc, such as the EU or Mercosur—to define the metrics and set out a timetable: for example, this could start by encouraging voluntary reporting for five years, followed by mandatory reporting, and gradual introduction of benefits. The system could spread by emulation or incorporation in free trade agreements. Because sustainability scores would reflect cross-border operations and supply chains, such a system would eliminate opportunities for carbon arbitrage—the practice of companies moving to countries with lax regulations, which disincentivises governments unilaterally making their own rules stricter.

**Circular in brief**

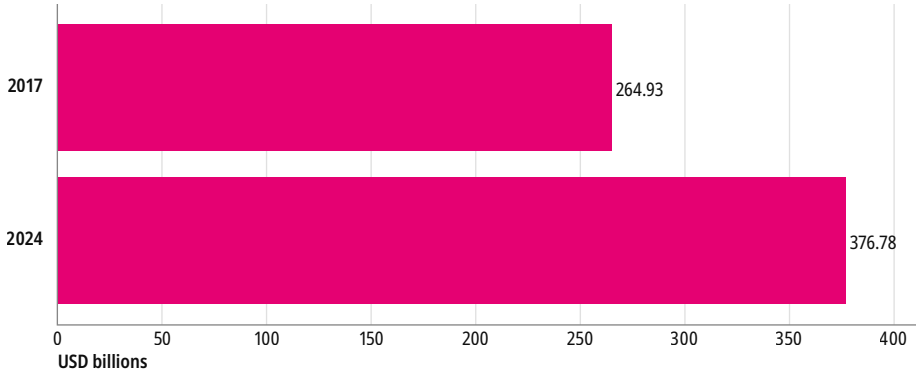
Greater awareness of the need to optimise resources and reduce waste and environmental impact is transforming value chains in multiple sectors, from fashion to steel to water. New business models include circular supply chains, sharing platforms and product life extension.

## The Circular Economy: Waste not, want not

Efforts to reduce waste and optimise the use of resources are opening up new possibilities throughout value chains. From manufacturing processes to sales and distribution models, the circular economy is becoming a reality. Driven by both governments and corporations, these efforts respond to the growing global population, rising resource costs and increased public awareness about the needs of future generations (see Box 9).

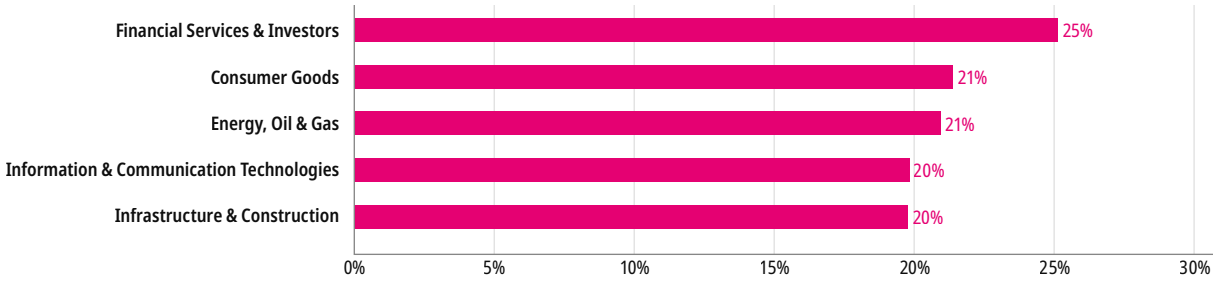
Recycling and upcycling will become more mainstream (see Figure 2.16). Cities will introduce new systems to reduce their environmental footprint by reducing waste, recycling resources and generating energy more cleanly. There are opportunities to reduce food waste in particular: around 30% of food is currently wasted between field and fork.

**Figure: 2.16: Size of the waste recycling services market worldwide.**



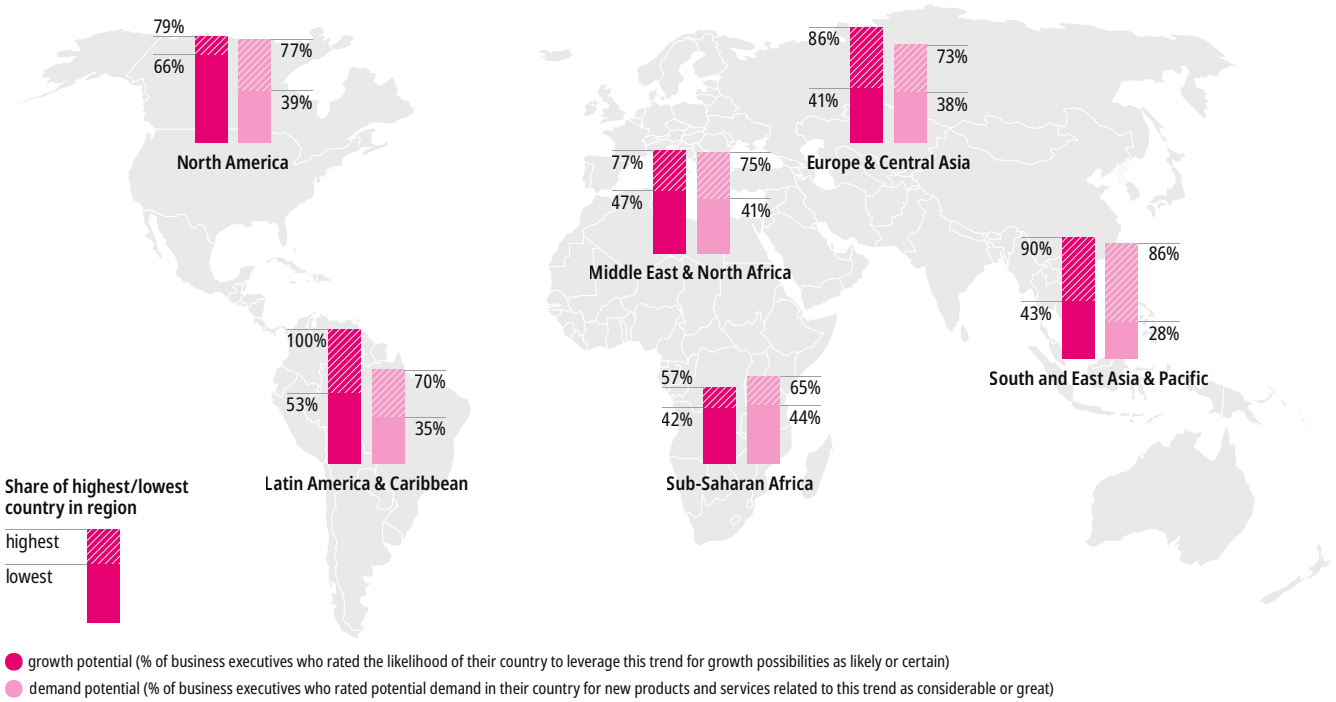

Source: Statista, 2019

**Figure: 2.17: The business leades' perspective on which sectors will benefit most from the Circular Economy.**




Source: Future Possibilities Survey item: "Which sectors do you think are best placed to leverage these trends?" Top six sectors based on the average per region of the percentage of respondents who selected the sector for their country.

**Figure: 2.18: The Circular Economy growth and demand**




Source: The Future Possibilities Survey items: "How likely is your country to leverage these trends for growth possibilities?" and "To what extent do you see potential demand for new products and services related to these trends?"

Technological solutions will also improve in areas such as sustainable replacements for plastics—a global market worth over USD 522 billion in 2017—and water supply, with atmospheric water generation and desalination becoming more affordable. Overall, estimates put the value of possibilities due to a more resourceful, circular economy at USD 4.5 trillion.[10]

### Sectors that will benefit most from the Circular Economy

Business leaders expect the Circular Economy to drive opportunities in financial services, notably in terms of low carbon investments, consumer goods, energy, oil and gas and information and communication technologies (See Figure 2.17).

### Circular possibilities by numbers [11]

- The **global fashion industry could unlock USD 150 billion of net new revenue** through tackling waste and encouraging resale of used products at scale.
- 40% of steel production is made from scrap and the size of the metals recycling market is projected to grow from USD 277 billion in 2015 to **USD 406 billion by 2020**, at an estimated CAGR of 8%.
- In Europe alone, the **net benefit of applying circular-economy**

*Successfully leveraging the Circular Economy could open market possibilities totally up to USD 4.5 trillion by some estimates.*

**principles could be as much as EUR 1.8 trillion annually by 2030**, reducing the cost of goods, leaving consumers with more disposable income and generating jobs in areas as diverse as product design, engineering and waste management.

- Global revenue from **smart water networks** is projected to grow from USD 2.6 billion in 2016 to **USD 7.2 billion in 2025**.
- The European Commission is planning to invest EUR 1 trillion into sustainability related projects under the European Green Deal by 2030.

### Realising Circular Economy possibilities – The regional view

As the trend rated second most likely to be leveraged for growth possibilities, the Circular Economy is slowly gaining traction. The regional view reveals a somewhat lower potential. Business executives in some countries in South East Asia & Pacific seem more alert to the potential opportunities for innovation in products and business models, with evident effects across a range of industries. At the same time, the circular Economy is perceived as less of an opportunity in Sub-Saharan Africa (see Figure 2.18).

## Box 9: Representing the interests of future generations

By **Sándor Fülöp**, Formerly *Government of Hungary*, Budapest, Hungary

If future generations are to grow up in liveable circumstances, we must hope to achieve a "sustainability turning point" through a cumulative, systematic effect of small changes in the same direction across diverse areas: environmental impact assessments, state planning, development of indicators to monitor the use and status of natural resources, regulations, taxation, public procurement, facilitating local initiatives, educating the public, and many others.

In theory, it could be a powerful idea to create organisations tasked with protecting the interests of future generations. In practice, however, the institutions created directly for this task in New Jersey and Hungary did not survive for long. Even if these were probably the most advanced attempts to put the idea of intergenerational justice into practice they could not deliver on their potential, demonstrating how difficult it is to change systems.

For now, court activism may be a more effective strategy—even if laws are inherently imperfect, environmental laws in particular. Greta Thunberg is right to say: "We will not be able to save our environment by obeying the laws, because our laws are wrong." But why are the laws wrong, and what can we do about it?

Environmental laws are not written by environmentalists, or even by neutral bureaucrats. They are written primarily by lobbyists representing those who are most economically affected by rules and regulations. Faults in environmental legislation can be rectified by courts by applying environmental legal principles. A growing body of literature and court practice—international, regional (mostly the European Court of Justice) and national—points to the importance of five such principles:

- Integration principle – environmental impacts must be integrated into decision-making processes in all relevant sectors.
- Sustainable development principle – economic, social and environmental interests shall be harmonised, while the rights of the future generations must be honoured.
- Polluter pays principle – companies must not be allowed to treat the commons, including land, forests, biodiversity, clean air and water, as their own property.
- Precautionary principle – the burden of proof must be on those who wish to take risks to demonstrate that those risks are acceptable.
- Public participation principle – the people and communities affected by decisions must partake in decision making.

We live today at the border of two world orders. The varied ways of describing them—such as the age of industry versus the age of information, or modern versus postmodern—show how difficult we find it to understand what is happening, and how the past relates to the future. This has always been true at such turning points in history: people lose sight of the values that anchor them.

These five legal principles can help to enshrine the genuine, long-term interests of our societies and economies. But we need judges and institutions to be brave and creative enough to put them into action, and to be strong enough to assert their independence even in the face of the most populist of governments.

**BioGrowth in brief**

Though of lower profile than some other trends, BioGrowth has the potential to open new market possibilities in some of the biggest global sectors, from energy to construction and engineering, aviation, chemicals, agriculture, food and health.

## The BioGrowth Economy: New agriculture and biomaterials

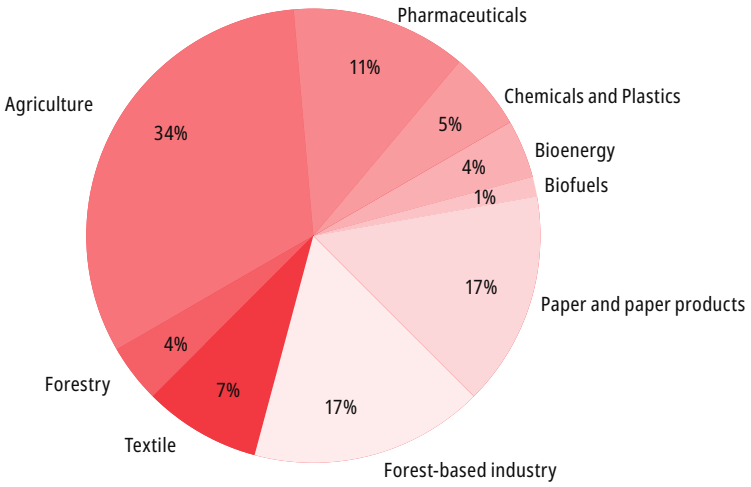
Rapid progress is being made in the fields of biomaterials, plant science and synthetic biology. Biodegradable materials, for example, are likely to become practicable in a wider range of applications. It will also become easier to refine agricultural waste into fuel on an industrial scale.

New solutions are likely to emerge in agriculture, such as crops that offer superior nutritional qualities or are more disease and drought resistant. This will reduce the risks associated with monoculture dependency as well as boost the **global seed industry**, a market expected to grow especially strongly in developing countries where rising demand for food is outstripping agricultural production.

Strides have been made in animal-protein substitutes. Innovative types of agricultural production, such as hydroponics and vertical farming, are becoming more widespread. Turnover in the EU28 bioeconomy (excluding food and beverage and tobacco products) already exceeded 1.14 trillion euros in 2016 (see Figure 2.19).

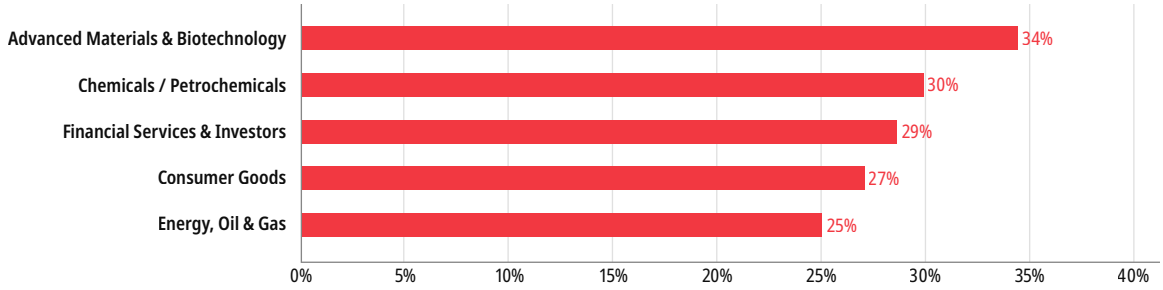
Based on the experience during the COVID pandemic, countries are likely to rethink food security policies highlighting the need for stronger local and regional production. As food production is re-shored, this is likely to accelerate the adoption of new technologies and the development of new products.

**Figure 2.19: Turnover in the EU28 bioeconomy by sector, in 2016**




Source: Nova Institute, 2016

**Figure: 2.20: The business leaders' perspective on which sectors will benefit most from the BioGrowth Economy**




Source: Future Possibilities Survey item: "Which sectors do you think are best placed to leverage these trends?" Top six sectors based on the average per region of the percentage of respondents who selected the sector for their country.

## Sectors that will benefit the most from the BioGrowth Economy

The BioGrowth Economy will likely drive possibilities in a number of sectors, notably in the advanced materials and biotechnology sector, but also in chemicals, automotive and consumer goods (see Figure 2.20).

## BioGrowth possibilities by numbers [12]

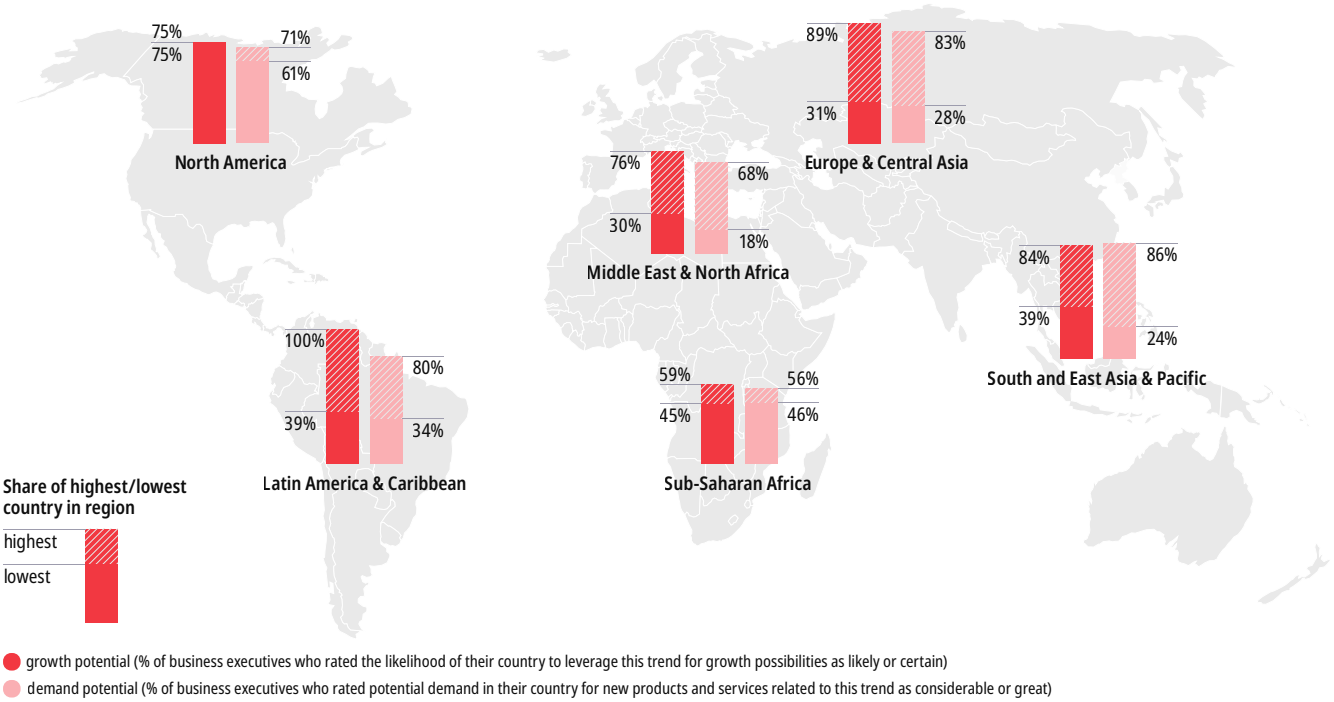
- The global **biorefining market is set to reach GBP 550 billion** by 2021.
- The market for **animal-protein substitutes** is projected to grow from USD 4.63 to USD 6.43 billion by 2023.
- The global market for **agricultural biotechnology** is set to grow from GBP 22 billion in 2016 to GBP 40 billion by 2022.
- The global **bioplastics** market is set to be worth **over GBP 33 billion by 2022**, up from GBP 13 billion in 2017.
- The **industrial biotechnology sector** has the largest share of the thermochemical biorefining market and is **expected to reach USD 447.3 billion by 2020**, up from USD 224.8 billion in 2014.
- The emerging global market for synthetic biology was worth over **USD 11 billion in 2018** and is projected to **grow by 24% by 2025.**

## Realising BioGrowth Economy Possibilities – The regional view

The survey respondents' perception that BioGrowth is less likely than other trends to be leveraged for growth or to generate demand may in part be due to the composition of the survey sample, as only 138 respondents worked in advanced materials and biotechnology sectors, compared to far higher numbers in ICT and consumer goods.

As a relatively nascent area, the potential for capitalising on BioGrowth in any given country depends heavily on the strength of government vision, incumbent biorefining and/or biotechnology industries and access to biomass.

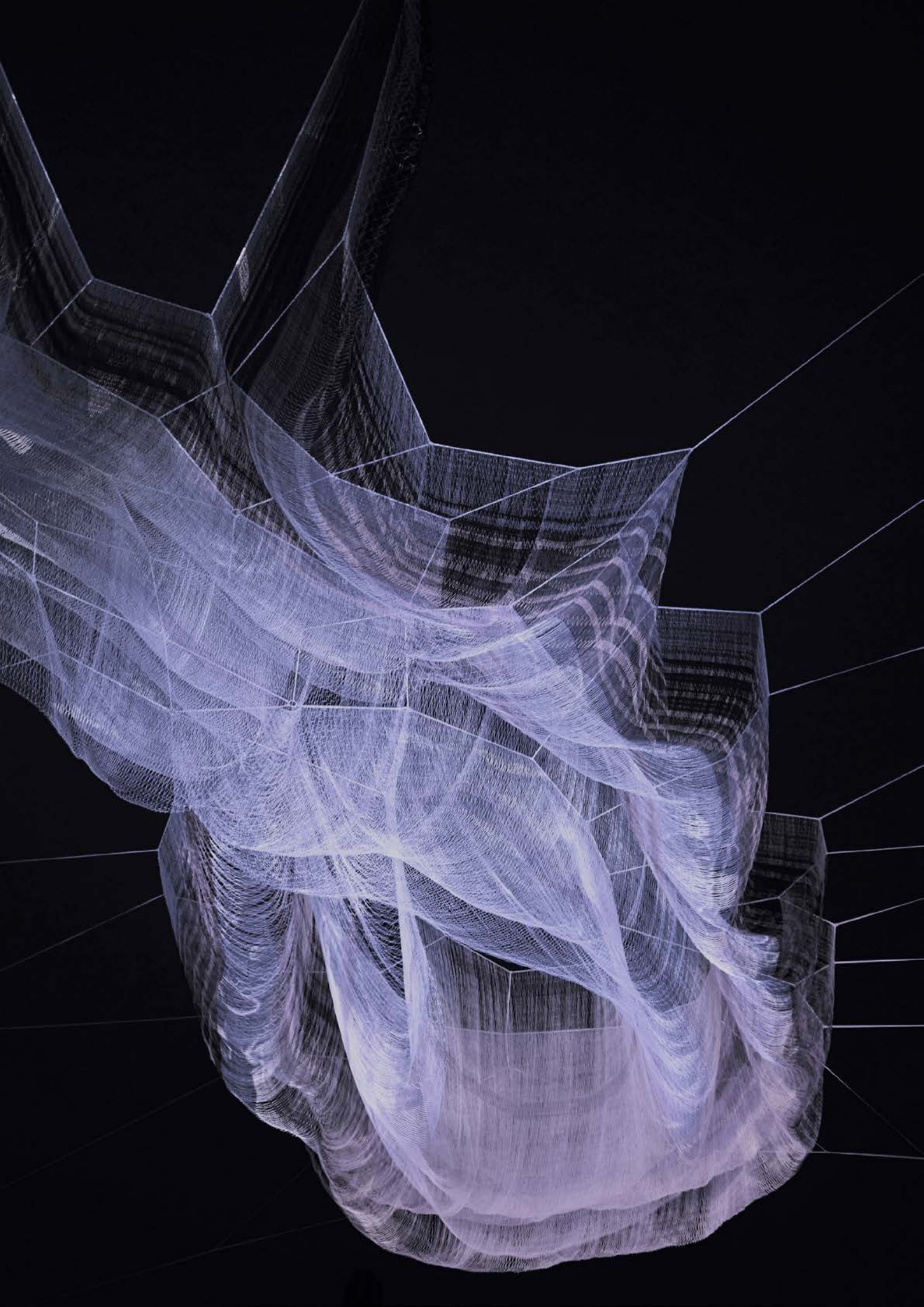
**Figure: 2.21: The BioGrowth Economy growth and demand**




Source: The Future Possibilities Survey items: "How likely is your country to leverage these trends for growth possibilities?" and "To what extent do you see potential demand for new products and services related to these trends?"

Respondents from Europe and Latin America, which have strong agri- and biotechnology sectors, provided higher scores than others. Brazil, for example, is an established leader in biofuels while the UK has supportive government policies and a small but growing biorefining sector (see Figure 2.21).

BioGrowth has strong potential in Sub-Saharan Africa, where several countries (including Kenya, Nigeria and South Africa) have considerable agri-inputs and a strong demand for cleaner energy.



**Experience in brief**

The convergence of a shift in attitudes towards material consumption, greater mobility and technologies that enable personalisation is driving the emergence of the Experience Economy. This trend affects sectors as diverse as tourism, consumer goods, media, health and finance.

## The Experience Economy: From ownership to usership

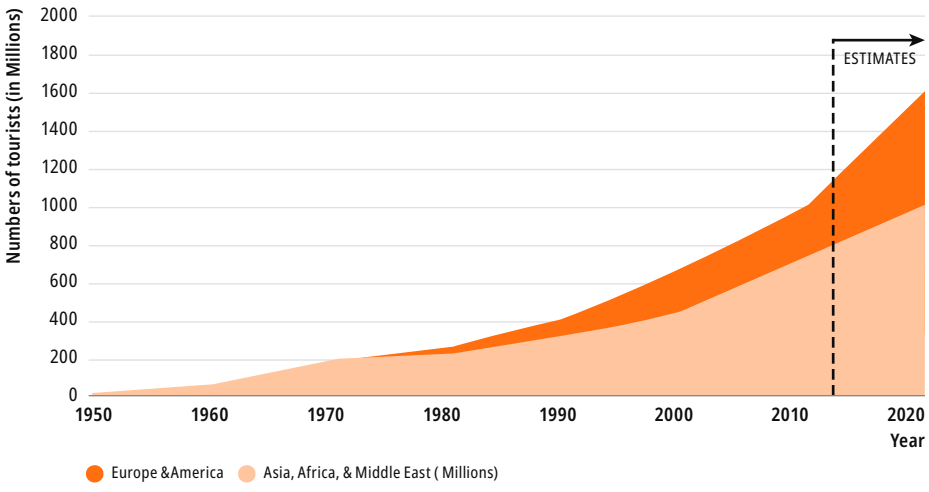
High-end markets have long been characterised by customers' desire to "experience" rather than to consume. This sentiment is trickling down to mass markets in a wide range of sectors, from health to travel to banking, as technology enables lower-cost customisation and personalisation of products and services.

Sophisticated software algorithms and highly customisable products are enabling consumers to experience a blend of the virtual and material. More widespread use of **3D printing** will enable consumers to engage directly in designing affordable, one-off items.

Attitudes to consumption and material goods are shifting as people look for ways to create more meaningful changes in their lives and the world. **Sharing platforms and services** have boomed, from AirBnB to furniture and clothes rentals.[13] More people are seeking experiences as the primary goal of service and product use. "Experience tourism"—including travel to remote places, participating in extreme sports, attending sporting events, and culinary or cultural experiences—represents a growing percentage of the global travel market.[14]

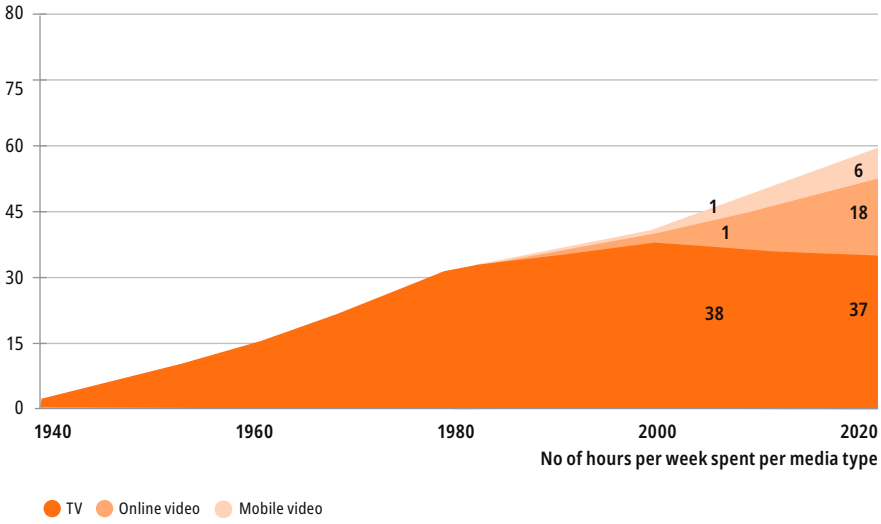
**Virtual reality and haptics** are becoming more sophisticated and affordable, enabling expansion of the already lucrative market for virtual "experiences" allowing gamers or armchair travellers to immerse themselves in places or situations. Retailers as different as IKEA and Ralph Lauren are using technology to rethink customer experience—from virtual reality headsets for kitchen planning to interactive changing room mirrors and augmented

**Figure: 2.22: Global tourist arrivals over time**




Source: Coolgeography.co.uk

**Figure: 2.23: Global consumption of mobile and online video**



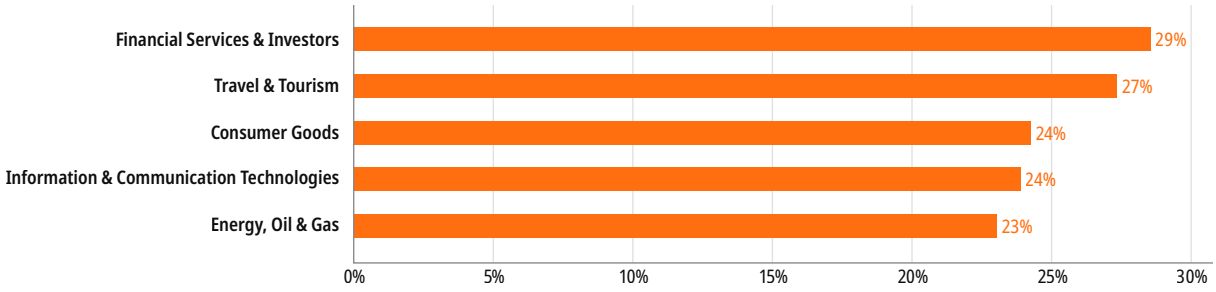

Source: Source to be added

reality, allowing customers to see how they look in an outfit from a range of angles and under different lighting conditions. The COVID pandemic is likely to durably accelerate the adoption of technology-driven experiences, as experiences move to the digital space to avoid in-person interaction and as people are unable to consume physical experiences due to mobility restrictions and quarantine policies.

## Sectors that will benefit most from the Experience Economy

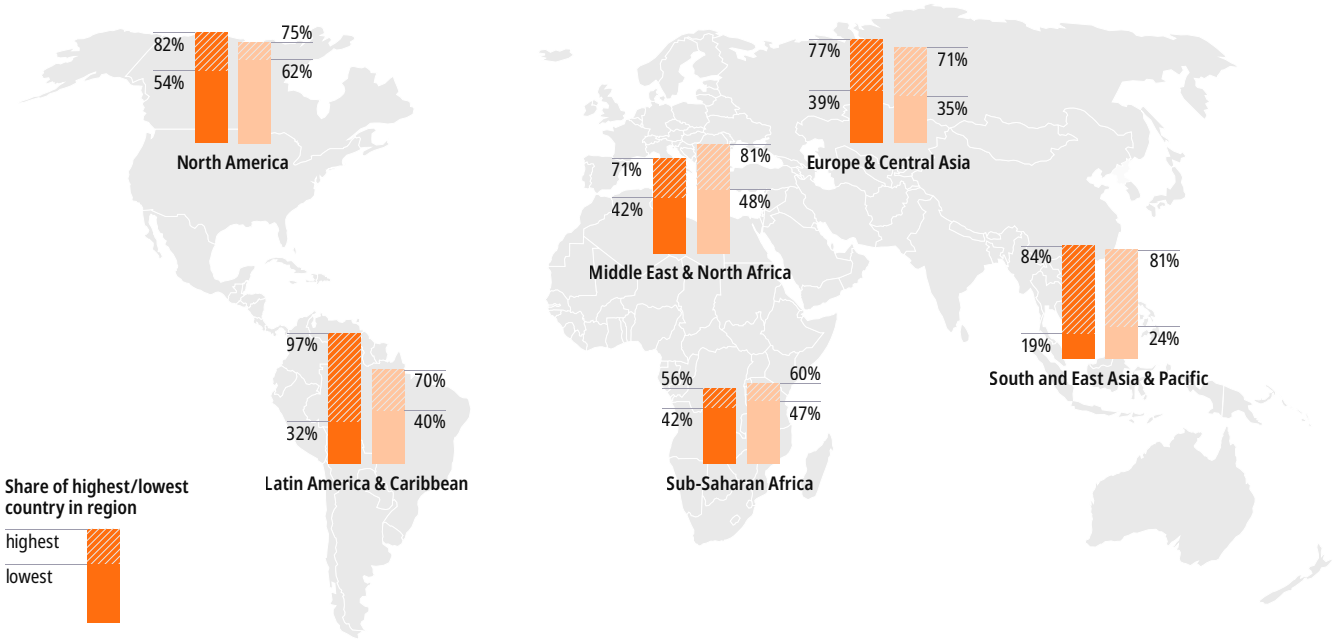
Business leaders expect the Experience Economy to drive opportunities in financial services, travel and tourism, consumer goods and information and communication technologies (see Figure 2.24).

**Figure: 2.24: The business leader's perspective on which sectors will benefit most of the Experience Economy**




Source: Future Possibilities Survey item: "Which sectors do you think are best placed to leverage these trends?" Top six sectors based on the average per region of the percentage of respondents who selected the sector for their country.

**Figure: 2.25: The Experience Economy growth and demand**




Source: The Future Possibilities Survey items: "How likely is your country to leverage these trends for growth possibilities?" and "To what extent do you see potential demand for new products and services related to these trends?"

## Experience possibilities by numbers [15]

- The **global digital content market** is expected to reach **USD 237.3 billion by 2024**, up from USD 143 billion in 2019 (Global Digital Content Market Report, Marketwatch 2019).
- The global **chatbot market for banking and financial Services** was valued at USD 357 million in 2017, and is **projected to reach USD 2.1 billion by 2024**, growing at a CAGR of 29.7% from 2018 to 2024 (Markets and Markets 2018).
- The **3D printing** sector is expected to be worth over **USD 28 billion by 2024**.
- **Customer experience** management solutions will reach **USD 14.5 billion in 2024** (Markets and Markets 2019).
- The global **sports tourism market is projected to reach USD 2.9 billion by 2028**, up from USD 1.4 billion in 2018.

## Realising Experience Economy possibilities – The regional view

The Experience Economy is not a new concept, but it is evolving and its effects are being felt in an increasing number of industries. Significantly, financial services rank first ahead of travel and tourism: as financial services become commoditised, providers compete more on client experience. The transition

from human to robot advisors is mirroring the replacement of bank tellers by ATMs.

Expectations for the Experience Economy are the highest in South East Asia & Pacific and Latin America & Caribbean (see Figure 2.25). In Asia in particular, demand is driven both by extra-regional tourists looking for new experiences and by the region's growing middle class. Like their counterparts in other parts of the world, they are eschewing beach resorts for more cultural, sporting or adventure-driven experiences.

Immersive technological experiences are a more nascent aspect of this trend, with growth expected in the area of entertainment in particular, ranging from 4D cinema to 3D gaming headsets. Wearables will be increasingly combined with experiential technologies, from augmented and virtual reality to sensors and haptics. These markets will reach more consumers across more regions over the next decade.

# Box 10: The intersection of transformational trends and the UN Sustainable Development Goals

**The UN's Sustainable Development Goals** (SDGs), launched in 2015, set detailed targets for 2030. The UN Global Compact, a platform for business leaders, has already engaged more than 9,500 companies in 160 countries to help achieve the SDGs in ways that intersect with their commercial, geographic and operational reach.


**How the transformational trends support the SDGs**

As well as creating growth and jobs, many of the possibilities emerging from the transformational trends can accelerate progress towards SDG targets. The transformational trends are largely in line with the "Entry Points for Transformation" identified in the UN Global Sustainable Development Report in 2019.[1] The suggestions below offer some pointers but are by no means exhaustive. By exploring the *Report*, governments can consider which trend-related possibilities they are best placed to leverage to engage stakeholders and develop ecosystems that can contribute to achieving the SDGs in their respective countries.

**The Exabyte Economy: Hyperconnected devices, data and people**

- Supporting small farmers through access to parametric insurance, real-time market prices and finance
- Connected sensors for animals and foods improve animal health and safety throughout the food chain
- Remote access to medical care and better diagnostics through affordable devices and data analysis
- Smart data and grid devices promote energy efficiency in homes and cities
- Networked devices deliver real-time data to optimise resource use and reduce waste in value chains

**The Circular Economy: Waste not, want not**

- Greater incentives for land stewardship and food waste reduction
- Improved management throughout the water cycle and value chains
- Reduced pressure on utilities/ infrastructure; less materials use and waste; greater use of biodegradables
- New building materials and approaches; retro-fitting existing buildings to new norms
- Circular economy solutions optimise resources and reducing or reusing waste

**The Net Zero Economy: Scalable low carbon solutions**

- Electric vehicles and cleaner fuel technologies improve urban and indoor air quality
- Smart data and grid devices promote energy efficiency in homes and cities
- Scaling of renewable technologies, e.g., solar, wind, tidal, hydrogen
- Access to off-grid energy enables more rural communities to access markets and enter supply chains
- Deploying new materials and techniques to produce zero-carbon buildings

**The Wellbeing Economy: Redefining health**

- Focus on wellbeing and prevention at individual and organisational level
- Advances in drug development and delivery
- Greater focus on mental health
- Increased demand for medical and wellness professionals

**The BioGrowth Economy: New agriculture and biomaterials**

- Enhanced crop productivity with less environmental impact
- Greater use of waste and non-food biomass for biofuels
- New farming solutions and new jobs in value-added agriproduct chains
- Ultra-local farming: hydroponic and vertical farms shorten supply chains for cities
- Agritech and advances in plant science drive efficiencies and reduce environmental impact
- More sustainable animal-protein substitutes

**The Experience Economy: From ownership to usership**

- Shift to experience and sharing models reduces material consumption
- Rise in sport and outdoor activities contributes to wellbeing
- Greater recognition of cultural experiences, including intangible "traditions", cuisine and ways of life
- Growth in lower-impact eco-tourism
- Job growth potential in new services and in sectors such as travel and tourism

1 United Nations, 2019



# 3. Leveraging Future Possibilities

Countries that wish to drive quality growth through the transformational trends outlined above, need to have the appropriate capacity across a number of areas that depend on each of the trends. For example, the Wellbeing Economy necessitates a strong capacity in research, development and innovation while the Exabyte Economy requires the availability of specific advanced digital skills as well as access to large markets. For a country to advance rapidly in the Net Zero Economy, it needs a scientific and technological capacity supported by national regulations that enable the roll out of low carbon technologies. Leveraging each of the transformational trends will require policies, institutions and investments that are specific to the trend. However, countries also need to have in place a set of core capacities that are important for all transformational trends.

## Core capacities

Based on case studies, expert consultations and desk research we identified six core capacities that cut across all trends and that reflect country ability to implement cross cutting transformational policies.  The elements of core capacity are as follows:

### 1. Government vision

Governments need to develop and implement a long-term strategy, based on a vision shared by societal and economic stakeholders, that gives a strong direction to actors to align their efforts and help them to collaborate on innovation to solve systemic problems. Directionality and a credible vision are critical to providing stability for investors.

The strategy must also incorporate flexibility to adapt. When countries face barriers to structural change because their public policies have for too long supported sectors that are struggling against market forces, they need to be able to redirect resources towards new, more promising sectors.

Foresight exercises can help governments to anticipate trends, and agile

regulation can support the ability of economic and social structures to adjust to change. Open data can help generate a shared understanding of the future path and enable individual stakeholders to identify opportunities.

Governments must decide which transformational trends to focus on through a process that is informed by research and reflects societal priorities.

### 2. Advanced technology

Advanced technology is an important driver of progress and future economic performance. For countries to be able to develop and adapt state-of-the-art technologies, they need widespread access to digital technologies, infrastructure that supports their use, and solid digital skills.

General-purpose information and communication technologies remain critical not only for accessing new ideas, but as platforms for developing solutions in areas such as artificial intelligence, the IoT and quantum computing. For example, 5G networks will open up new possibilities to harness much greater quantities of diverse data.

### 3. R&D, innovation and entrepreneurship

Countries need businesses to be able to innovate—in products, services, processes or business models. This requires a complex mix of elements to be in place, including:

- Sufficient investment in basic and applied science, whether public or private
- Protection of intellectual property
- Incentives for collaboration among businesses and other stakeholders, notably research institutions and universities
- Public procurement policies that reward innovation
- A culture of creativity and critical thinking
- An enabling environment for entrepreneurship, including access to finance, services and inputs

Policy innovation is also important, as countries that are able to innovate in policy making and public service delivery—identifying new solutions to social or environmental challenges that cannot be solved through market mechanisms—are more likely to be future-ready.

### 4. Talent

All countries will face labour market transitions as technologies, demographics and attitudes change. Some existing skills will become obsolete, while demand for some new skills will increase. Future-readiness demands that a country's population develops a solid base of skills required by the business sector. Not only digital skills but soft skills, such as critical thinking and creativity, are

frequently cited as important for future employment.

The skills base can be built by local education systems or by attracting talent from elsewhere. Given McKinsey's research findings indicating that the right talent can increase productivity by eightfold, businesses' ability to attract and manage talent is a key to any country's future wellbeing.

### 5. Business friendliness

Any business activity needs a degree of certainty provided by a stable and reliable environment. Rule of law, absence of corruption and minimal red tape help to reduce frictions and keep transaction costs low. Coupled with access to finance, they enable investments in high-return projects.

Trust and social capital—the networks of relationships among people who live and work in a particular society—are critical to the effective functioning of both societies and economies.

### 6. Market dynamics

Domestic market dynamics—market size, growth rate, trade and connectivity, which depends on infrastructure and related services—are important for driving investment. Market size creates scope for economies of scale, as well as for improving efficiency and speeding up the deployment of new technologies and solutions, especially in digital industries.

## National development strategies based on future possibilities

Governments that wish to leverage possibilities associated with the transformational trends for growth, jobs and impact need to embed the future possibilities approach into their strategic visions. While countries have different processes in place to develop and implement strategic visions, there are four important steps that need to be part of the process:

1. **Define a vision.** To ensure that it reflects societal priorities, the vision should be developed through wide-ranging consultations. In The Netherlands, for example, a visioning exercise was adopted to develop the science policy *2025 Vison for science, choices for the future*.[16] Such exercises should also take into account global market opportunities.
2. **Select focus trends.** The trends chosen as the focus of transformational initiatives need buy-in from the highest level of leadership and from individual entities that will be involved in implementation. The selection process should focus on obtaining buy in from the key stakeholders and in ensuring that these have the resources they need.

3. **Develop action plans.** Analyse the selected trends and the sectors that provide the most potential for leveraging possibilities related to each trend. This analysis should result in a map of possibilities, complemented by relevant stakeholders, as well as obstacles, enablers and systemic considerations. It should also yield detailed action plans to ensure that all stakeholders are aware of their roles in the process.

4. **Implementation.** This is likely to be an ongoing process that needs a high level of reflexivity, i.e., feedback loops built into processes and institutional structures to regularly check that the plan is on track, and discuss obstacles and new approaches. Given that projects will necessarily be to some extent experimental, a high degree of risk will need to be accepted.

The four steps summarised in Figure 3.1. An example of how Japan has developed its vision for a Society 5.0 is in Box 11 and how Flanders as a regional government is leveraging trends is described in Box 12.

Businesses can use the Future Possibilities Framework to inform investment decisions, in particular into promising new areas. They can use the data from the Future Possibilities Survey to identify those countries that are well positioned to leverage trends. For example, business leaders interested in solar energy can use the Survey data to identify countries with a strong potential market for renewables as a starting point for investment decisions.

In some countries, businesses are just beginning to engage with a wider set of stakeholders in their sector. The Framework can help them to identify the right stakeholders with whom to collaborate on improving the environmental and social impact of their business practices. Business leaders can also use the Framework to advocate for transformational public policies in their sector.

Business leaders and policymakers can jointly use the Framework as a tool to explore what is needed to create capacity to benefit from transformational trends, in areas such as skills, R&D investment and regulatory policy. It shows that while some core strengths are common to all trends, governments of different countries need to deploy levers specific to their socioeconomic and other conditions to successfully leverage each trend.

Regional industry bodies can use the Framework to engage with governments to compare and contrast approaches, helping to identify scope for those lagging behind common trends to emulate the approaches of regional leaders—and for leaders to identify new possibilities.

PHOTO BY PAWEL NOLBERT ON UNSPLASH

## Box 11: Society 5.0: Japan's strategic vision for the future

Japan's national strategy is called Society 5.0, as its aim is to build a super-smart society, tackling economic and societal challenges and transforming the national way of life by incorporating the innovations of the Fourth Industrial Revolution, such as big data analytics, AI, robotics and the Internet of Things.

Launched in 2017, Society 5.0 is now the centrepiece of the government's growth strategy—along with monetary easing and fiscal stimulus, part of a broader national concept called Three Arrows introduced by Prime Minister Abe in 2013 to revitalise the sluggish economy. Japan's budget for science and technology has been increased from USD 33 billion in 2017 to USD 38 billion in 2019 to help realise Society 5.0.

The Society 5.0 strategy ultimately emerged from an effort to revise the first growth strategy of 2013. A consultation and planning process led by the Council for Science, Technology and Innovation gathered opinions from business leaders, the Ministry of Education, Culture, Sports, Science and Technology, and the Ministry of Economy, Trade and Industry. The concept was first introduced as a part of a five-year national strategy for science and technology in 2016.

A Growth Strategy Council was set up to develop and execute the Society 5.0 strategy, comprising representatives of ministries, businesses and academia. The strategy addresses challenges such as the aging population, social polarisation, depopulation, and energy and environmental concerns. It targets four key areas:

1. **Healthcare** Sharing medical data for effective treatment and remote and in-home care;
2. **Mobility** Autonomous vehicles for public transportation in rural areas, and drone delivery to improve distribution and logistics efficiency;
3. **Infrastructure** ICT, sensors and robots for inspection and maintenance of roads, bridges, tunnels and dams;
4. **FinTech** Blockchain technology and open application programming interfaces for cashless payments.

In the words of the Society 5.0 strategy: "The society of the future will be one in which new values and services are created continuously, making people's lives more conformable and sustainable. Japan will take the lead to realise this ahead of the rest of the world."

Sources
Government of Japan, 2019, UNESCO, 2015

**Table 3.5: How governments can use the Future Possibilities Framework**

| | Step 1: Visioning exercise | Step 2: Priority setting and selection of trends | Step 3: Implementation plan | Step 4: Implementation |
|---|---|---|---|---|
| **Tools** | • Foresight exercises to identify main global trends<br>• Research and analysis<br>• Societal consultations (e.g. townhall meetings) at different levels of government | • Consultations across main government entities<br>• Review of vision<br>• Analysis of market opportunities<br>• Analysis of global trends and how they affect the country<br>• Foresight exercises | • Analysis of selected trends and barriers and enables to levering associated future opportunities<br>• System maps and stakeholder mappings for each trend and the most relevant and affected sectors<br>• Discussions and consultation processes for each of the trends | • Implementation plans<br>• Feedback loops in institutions and processes<br>• Regular meetings with key stakeholders<br>• Impact metrics to measure progress |
| **Key success factors** | • Buy-in from main societal groups;<br>• Solid understanding of the main global trends and how they will affect the country<br>• Forward looking mindset within public service | • Buy-in from highest level of government<br>• Buy in from across the government | • Buy-in from main actors on each of the trends<br>• Solid knowledge of the countries strengths and weakness in each of the transformational trends | • Government capacity to change and introduce new public policies and process<br>• Public innovation capacity<br>• Ability to drive consensus around the main priorities<br>• Support from stakeholders under each trend |
| **Outcome** | **Vision with strong societal buy-in that provides a strong direction for the country as a whole.** | **Priority trends and sectors that lay the base for future development.** | **Development of action plans for each of the selected transformational trends.** | **An ongoing process that aims at building a society and economy focussed on future opportunities.** |

Source: Author's analysis

# Box 12: How regions can prepare for future possibilities: The case of Flanders

By **Alexey Prazdnichnykh**, *Eurasia Competitiveness Institute, Strategy Partners*

Flanders is one of the three regions of Belgium. Published in 2016, its innovative "Vision 2050: A long-term strategy for Flanders" strategy shows that not only countries and cities but also regions can create momentum for growth by using future visioning to strengthen their policy coherence.

In developing Vision 2050, Flanders could draw on a history of long-term policymaking. The Leuven-based research and development centre IMEC, a world-leading innovation hub in nanotech and digital technologies, dates back to the "third industrial revolution" (Derde Industriële Revolutie in Vlaanderen, DIRV) strategy of the very first regional government, elected in 1981.

Vision 2050 starts by analysing megatrends such as migration, technological disruptions, climate change and the eastward shift of global economic power. This is followed by outlining the vision for the future of Flanders that encompasses knowledge development, materials use, decarbonisation, water, food, mobility, living conditions, accessibility and quality of care, and agile government.

Based on stakeholder discussions and consultation sessions, Vision 2050 identifies seven "transition priorities" for current policy action—circular economy, industry 4.0, smart living, lifelong learning, healthcare and welfare, transport and mobility, and energy. The government has committed to work on these priorities using adaptive governance principles, such as focusing on systems innovation, taking a long-term perspective, involving stakeholders and learning from experiments.

For each priority, a "transition space" has been established. In each space, a "transition manager" from the public administration works with two designated ministers from the relevant departments and an external stakeholder representative to create online and offline platforms for partnerships, learning communities and experiments, exploring approaches such as foresight and scenario exercises, or exploring regulatory changes and alternative forms of financing.

Vision 2050 stipulates that the government provide each transition space its own operating budget, typically around 150,000 to 200,000 EUR per space per year, with additional subsidies considered for specific initiatives, such as demonstration projects and living labs. Flexibility is important, as innovative proposals that span across multiple objectives often do not meet traditional criteria for receiving subsidies.

In the 17 "living labs" in the Industry 4.0 transition space, for example, the Flemish government holds workshops for businesses interested in exploring how to deploy new technologies. These include 3D printing, cyber security, working with robots, harnessing data to improve production processes, sensors to monitor equipment and schedule maintenance, and drone application in a variety of tasks, from inspecting buildings to spraying crops.[1]

In the "circular economy" transition space, over 100 organisations from multiple sectors have committed to initiate at least two purchasing projects over the next two years based on circular economy principles. Activities in this transition space include:[2]

- PROFIT—researching ways to separate complex waste streams with the aim of making it economical to recycle plastic that is currently incinerated.
- Supermex—aiming to reduce $CO_2$ emissions from concrete production by using metal slag, waste residue from producing zinc and recycling scrap as a substitute for cement.
- CO2PERATE—aiming to develop catalytic technologies that can convert $CO_2$ into formic acid for use in biosynthetic production of chemicals.

A cross-thematic platform brings together the work of these transition spaces, enabling the managers to reflect on their experiences and share expertise. The work is coordinated by the department of Public Governance and the Chancellery (Kanselarij en Bestuur), which monitors and reports on progress with a committee of experts drawn from within and outside the government. Successful experiments from transition spaces should feed into policy recommendations.

1 Industrie Vlaanderen, 2019
2 Vlaanderen Circular, 2019



# 4. Conclusion: Building Back Better

As UN Secretary General Antonio Guterres said, the COVID 19 crisis is an opportunity to "build back better". Yet, resetting the economic system in a way that it is more attuned to the needs of people and planet will require a focus on opportunities. The Future Possibilities Report is based on extensive research into the factors that shape a country's capacity to seize the opportunities that emerge from transformational trends and provides a new conceptual framework for national development.

The Report elaborates a practical and positive approach for businesses and countries to leverage possibilities associated with ongoing global transformations, many of which will be accelerated by the COVID 19 crisis. By exploring the Report, governments and businesses can identify areas that offer potential, as well as issues on which they need to collaborate to build capacity.

This is just the start of the journey. In future editions, we plan to further support countries' efforts in this space by designing a tool to benchmark national performance. This tool will help countries to identify strengths and weaknesses and areas capacity can be strengthened or built. Over time, this tool will also enable countries and investors to monitor performance.

The ultimate proof of the usefulness of the framework will, however, come when decisions it informs translate into tangible improvements in economic progress and societal wellbeing. We hope the Report and associated research will help all stakeholders to take a positive, possibility-focused approach as countries seek to accelerate systemic change following the COVID 19 crisis.

# Endnotes

1 Mazzucato, 2018
2 Wind Denmark, 2018
3 Mazzucato, 2018
4 Mazzucato, 2018
5 Many of the studies reviewed considered the expected impact of individual elements of a trend—such as big data or the Internet of Things, both covered by the Exabyte Economy—across several industries or at country level. In these, estimated economic impact both direct and indirect is quantified, or market potential is forecast, often as a percentage of global GDP. For example, a cautious estimate puts the 2025 Wellbeing Economy at over 13% of global GDP (at USD 80 trillion in 2018).
6 Sources: Grandview Research, 2018; Statista, 2018; McKinsey Global Institute, 2015; IHS Economics and IHS Technology, 2017; Allied Market Research 2019
7 Sources: PWC, 2017; MarketResearch, 2018; Global Wellness Institute, 2018; Juniper Research, 2019; Markets and Markets, 2018
8 International Energy Agency, 2018
9 Sources: Allied Market Research; Research and Markets, 2018; Grandview Research, 2017; Markets and Markets, 2018.
10 Accenture, 2019
11 Sources: McKinsey & Company, 2015; Accenture and H&M Foundation, 2018; Markets and Markets, 2015; Navigant Research, 2016; European Commission, 2020
12 Sources: Research and Markets 2017a, Research and Markets 2017b, Research and Markets 2017c, Prescient & Strategic Market Research, 2015, Global Market Insights, 2019; IRENA, 2020
13 PwC, 2015
14 Statista, 2018
15 Sources: MarketWatch, 2019, Markets and Markets, 2019a. Markets and Markets, 2019b, Markets and Markets, 2019c, Markets and Markets, 2019.
16 Government of the Netherlands, 2014

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# Appendix: Methodology

### Transformational trends

In the first step we identified a set of global trends with the potential to shape growth possibilities internationally, regionally and across multiple industries.

For the FPI framework, a trend is defined as *a sustained change, movement or phenomenon in the socioeconomic, environmental or technological sphere, the emergence, influence, and physical or financial impact of which can be observed and measured as rising/intensifying over many years*.

The following criteria were applied to select the trends most likely to be relevant for growth and societal wellbeing:

- **Impact** The trend will have significant positive impact on possibilities available to countries and/or industries, in terms of business growth and job creation, and improved living standards and societal wellbeing.
  *N.B. Some trends could also have potential negative impact, but are included if mitigation and action can reduce risk and drive innovation.*
- **Likelihood** The trend is either current or emerging and highly likely to mature.
- **Scope** The trend will affect a large majority of countries and several industry sectors.
- **Time horizon** The impact of the trend is already measurable, or will be in the near-term, and is expected to continue to grow for at least 5 to 10 years.
- **Relevance** The trend is or will be particularly relevant to businesses and governments, and by extension society at large.
- **Exclusion** We excluded trends that might advantage individual countries but be harmful at the global level.

### Trend identification and analysis

The transformational and structural trends used as a base for the Future Possibilities Report were identified, reviewed and validated through:

1. Desk research: A review of over 100 publicly available reports and articles from business, scientific and mainstream media and international organisations.
2. Consultations with 40+ subject matter experts through:
   - A series of structured interviews with experts in various fields to refine and/or validate selected trends (so-called Delphi method)
   - Expert workshop: A one-day workshop held in London on 11 April 2019 to validate and review the initial trend set.
   - Consultation with the Advisory Board.
3. The Future Possibilities Survey provided insight into business executives' perceptions of the implications of the transformational trends for growth, demand and policies by region and by industry, and the capacity of countries to leverage those trends.

### Structural and transformational trends

Using this method, a long list of trends was narrowed down and segregated into two sets: structural and transformational trends.

**Structural trends**: Refers to longer-term (at least 10 years) socio-economic trends, such as shifts in demographics and urbanisation patterns. The full impact of structural trends on behaviours, innovation and possibilities is not always observable in the near- to mid-term future. Rather these trends drive more near term transformations that will have direct impact on business, society and governments. These are captured in the transformational trends.

**Transformational trends:** Refers to trends that are likely to have an obvious impact in the near- to mid-term period, i.e., over the next 5 to 10 years on businesses, society and governments. These trends often result in—or emerge from—structural change that leads to changes to business models, regulation, and attitudes and behaviours. Many, though not all, transformational trends are technology-centric, emerging from the convergence of technological or scientific advances. Transformational trends can also emerge from tipping point moments, due to new information, insight or events that spark widespread changes in attitudes or behaviours.

The following structural trends were taken into account:

### Reshaping Societies

**1. Silver societies**

The global population is ageing as fertility rates are declining and life expectancy is increasing. The global spending power of over-60s is expected to reach USD 15 trillion by 2020. By 2040, average life expectancy will be above 80 in 59 countries. By 2050, over-65s will number 1.5 billion—an almost three-fold increase on 2010.

As lifespan extends, individuals' life phases and choices will shift, with a growth in life-long learning and portfolio career patterns. Intergenerational wealth transfers will also become more important. Changing lifestyles and tastes among older consumers will give companies new opportunities to innovate and grow in order to meet the needs of this growing age segment. Many of these opportunities will be found in the Wellbeing Economy and the Experience Economy.

**2. Reengineering cities**

The rethinking and reengineering of urban life will be one of this century's biggest projects. Already just 50 cities account for over a fifth of global GDP. By 2050, two-thirds of the world's population will be urbanites, 90% of whom will reside in Asia and Africa.

Cities will be hotbeds of innovation in areas such as smart buildings, waste management, culture, access to services, and transportation, with a growing market for more integrated and "greener" solutions. "Superstar" cities will increasingly compete with one another to attract business, investment and talent. Their search for innovative solutions to problems related to overcrowding, pollution and sustainability of resources will create possibilities especially in the Net Zero Economy and the Resourceful Economy.

**3. A world on the move**

Global mobility is rising. The expected doubling of plane passenger numbers between 2016 and 2035, with a particularly strong growth in the Middle East and Asia-Pacific, is just one example.

Most migration is intra-regional, not inter-regional, but more people are migrating, either temporarily or permanently. This is particularly true for the highly skilled, who account for 70% of recent immigration to OECD countries. Greater ease of mobility and more ethnically mixed families and communities will create shifts in the way people interact with each other, both professionally and personally. New values and expectations that emerge from changing dynamics in workplaces, families and societies will give rise to Wellbeing and Experience opportunities in particular.

**4. Generational influences**

Young people from all economic and cultural backgrounds increasingly interact within the same online world, thus influencing and being influenced by opinions and events beyond the countries in which they live. They engage less with traditional politics and more with issues and causes, wielding influence as consumers, employees and activists. They quickly shift which services and information sources they trust, based on the influence of their peers.

Leaders will have to find new ways to reach younger voters. Businesses will need to cater to new consumers who grew up with ubiquitous marketing, making them more sophisticated than previous generations. Employers and governments will be shaped by the attitudes of educated and tech-savvy younger generations on issues such as digital identity and data privacy, as well as environmental and social causes. Young people's changing ambitions and expectations will feed into all the transformational trends in a variety of ways.

## Remapping economies

**1. Trading partners**

Global trade is being reshaped by new relationships and product and service types. Trade in information technology products has tripled in two decades, cross-border data flows have increased 50-fold in the last decade, and around an eighth of trade in consumer goods is now executed via e-commerce. Overall, global flows of goods and services are expected to grow by 30% in the next 15 years, with services accounting for a higher share.

The reconfiguration of supply chains will create new possibilities for growth. So will the rising purchasing power of emerging markets, particularly India and China. In the next decade, India is set to be the fastest-growing exporter of services, followed by Indonesia and China. The strong growth in digitally mediated trade will create possibilities especially in the Exabyte Economy.

**2. Emerging global middle class**

Though declining in advanced economies, the middle class is rising globally—estimated at 3.2 billion people in 2016, with a combined spending power of around USD 35 trillion. In emerging economies, the new middle class is driving growth for many businesses and is changing the fabric of economies and societies all around the world.

Businesses will increasingly need to respond to the demands of these consumers in markets such as India and China. Innovations in business models, products and services will generate competition with incumbent global brands. The emerging middle classes will become increasingly interested in Experience and Wellbeing purchases, and their engagement in sustainability will create possibilities in Circular and Net Zero.

**3. Investment flows**

Global investment flows are diversifying in terms of the type of investments, investor profiles, and the directions they take. For example, developing markets are fuelling growth in assets under management. Asia, and particularly China, is driving a rise in M&A deals. By 2050, the BRICS members will hold more than 40% of all external assets, a four-fold increase from the current 10%. Meanwhile the alternative investment industry, including socially responsible investments, is projected to grow by 59% by 2023.

Far-sighted policymakers and executives will be able to leverage the possibilities offered by new investment flows, whether generated by institutional investors moving more money into sectors such as real estate, or new and more diverse generations of investors seeking returns from socially responsible portfolios – with obvious possibilities in Circular and Net Zero.

**4. Re-evaluating value(s)**

GDP growth figures can paint a distorted picture of the global economy, as fragile developing economies post high growth rates, while advanced economies struggle with anaemic rates. Many are questioning whether GDP is the best measure of economic and social progress and what values to measure instead. Wellbeing is quickly becoming an important metric.

Technology is opening up new possibilities, such as using real-time sentiment analysis and anonymised health tracking data to assess national quality of life. Companies are gaining more ability to track their environmental, social and governance (ESG) performance. Already 80% of institutional investors apply ESG criteria to their portfolios. Insurers and lenders will increasingly demand information about ESG risks.

Companies and governments will move to find more efficient means to measure—and tax—the value generated by new digital and data-driven business models in the Exabyte Economy.

### The transformational trends

Our research gave rise to the six transformational trends that form the base of the Future Possibilities Framework:

1. The Exabyte Economy
2. The Wellbeing Economy
3. The Net Zero Economy
4. The Circular Economy
5. The BioGrowth Economy
6. The Experience Economy

### The Future Possibilities Survey

The Future Possibilities Survey is a central element of the Future Possibilities Report. It gauges business leaders' perceptions of their countries' readiness to leverage trends and preparedness for the future. The survey is critical to our evaluation of countries' capacity to leverage future possibilities, as it allows comparisons in areas for which hard data is lacking. We decided to address our survey towards business executives, as they are directly concerned by the policies and strategies implemented in their respective countries.

**Survey composition:** The Future Possibilities Survey comprised 23 questions, including information about the respondent. Most questions were broken down by transformational trend. Respondents were asked to evaluate the country in which they work using a five-point Likert-type scale requiring the respondent to select one of the following options 1 = "Not at all", 2 = "To a small extent", 3 = "To a moderate extent", 4 = "To a considerable extent", and 5 = "To a great extent".

**Survey score contribution to ranking:** The indicators derived from the Future Possibilities Survey principally cover governance aspects and account for approximately 20% of a country's score.

**Sample size:** The survey was completed by 4,735 business executives across 74 countries between July and September 2019. Following the data editing process described below, 3,639 responses were retained, reflecting feedback on 70 countries. The survey was distributed online in all countries except for India and was made available in 15 languages: Arabic, Bulgarian, Chinese, Czech, English, French, German, Hungarian, Italian, Japanese, Portuguese, Polish, Russian, Spanish and Turkish. Survey respondents who are equally familiar with two countries had the option to complete the survey for both and 651 did so.

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