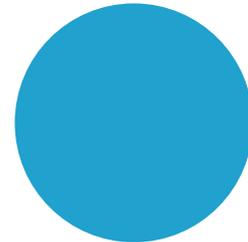
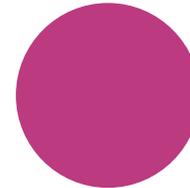


Systems Transformation and the key trends & disruptions that could shape 2020-30

October 2020





Julian Hill-Landolt
Project Director, Vision 2020 Refresh

Today's agenda

Systems Transformation and the key trends & disruptions that could shape 2020-30

1

About WBCSD & the Vision 2050 Refresh

2

Systems Transformation

3

Key trends & disruptions that could shape 2020-30

A bright sun is rising over a layer of white clouds, creating a lens flare effect. The sky is a clear, deep blue.

Business leadership for a sustainable future .

World Business Council for Sustainable Development (WBCSD)

200 global companies united around a common vision
creating a world in which over 9 billion people are all living well
and within planetary boundaries by 2050



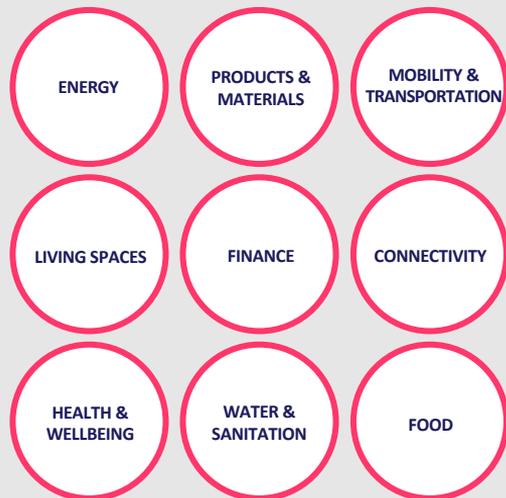
Vision 2050 Refresh





9+ billion people **living well**
within **planetary boundaries**,
in alignment with the
SDGs and the **Paris Agreement**

Realized through *transition pathways*
in *key areas* of business activity



Underpinned by a *reinvention*
of our *model of capitalism*

Making progress demands critical and complex SYSTEMS TRANSFORMATIONS

We must answer questions on

- **how they occur**
- **the key ones** required
- **the factors** that will influence how this decade unfolds

1 HOW DOES TRANSFORMATION HAPPEN?

2 WHAT ARE THE FUNDAMENTAL MINDSET SHIFTS THAT ARE REQUIRED AS PRECURSORS TO TRANSFORMATION?

3 WHAT ARE THE KEY TRANSFORMATIONS WE NEED TO SEE AND WHAT ACTIONS MUST BUSINESS TAKE TO DRIVE THEM?

4 HOW WILL COVID-19, MACROTRENDS, OTHER DISRUPTIONS AND INNOVATIONS AFFECT THESE TRANSFORMATIONS?

5 WHAT ARE THE MOST IMPORTANT AREAS TO FOCUS ON TO UNLOCK AND RAPIDLY DRIVE TRANSFORMATION?

Throughout 2020, WBCSD is releasing
a series of issue briefs on the road to the
final output in early 2021



Macrotrends and disruptions shaping 2020-2030
7 May 2020



The consequences of COVID-19 on the decade ahead
7 May 2020



Unlocking systems transformation
11 June 2020



Innovations that could shape the next decade
25 August 2020



Building long-term business resilience
7 September 2020



Reinventing capitalism – A business perspective
October 2020

FINAL VISION 2050 OUTPUT (early 2021)

Today's agenda

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Unlocking systems transformation

② What is a system?

A system is a configuration of interdependent parts connected by a web of relationships.

A system can be of any size or scale – from a tree to the food system. In a lake, the parts range from tiny amoebae to larger fish, amphibians and reptiles, as well as aquatic and nearby terrestrial plants. Human beings could also play a role, for example by extracting water for irrigation, fishing to feed their families, or dumping waste in the food system; the parts include companies all along the value chain, from farmers to retailers and restaurants, as well as input providers, tech companies, inventors, regulators and others. These diverse actors are connected by the specific purpose of putting food on people's plates.

As any given one of the diverse parts in a system are acting and interacting according to their

incentives, capabilities, and power dynamics. In most modern social and economic systems, the parts, or actors, have at least a degree of autonomy, but the opportunities available to them, and the choices they make, are determined in relation to what others are doing. For example, corporate decision-making reflects government policy choices, the way that capital markets are structured, the strategies and tactics their competitors are using, and the way, for instance, media, civil society and organized religion are shaping consumer aspirations and values. The actors are always influencing one another, and some actors have a measure of outright authority over others – but no actor has sufficient authority or capacity to control the entire system.

The outcomes of these interdependent actors' actions and interactions can be positive and negative, intended and unintended. Usually it is a combination.

The food system, for example, feeds billions of people around the world, in many places putting a dazzling array of choices at their fingertips. At the same time, malnutrition, including obesity, affects one in three people worldwide and costs an estimated US\$ 12.5 trillion a year¹⁰ and agriculture uses up to 70% of all freshwater abstracted¹¹ – contributing to a gap in supply and demand for water that is expected to reach 40% by 2030.¹²

Boundaries can be drawn around systems at many levels. At the same time, systems are often nested and intertwined. The national food system in the United States, for example, is an inextricable part of the global food system; the global food system, for its part, reflects the influence of investors and the decisions they make within the global financial system. It is important for companies and other actors intent on driving transformation to be clear about their objectives and which system, or systems, they are focused on as a result.



Unlocking systems transformation, Vision 2050 issue brief⁷

While the theory may be simple enough, the reality is complex, messy and unpredictable: systems transformation is dynamic and non-linear.

Because systems are made up of so many diverse, yet interconnected and interdependent actors, the process of systems transformation is distributed and adaptive. This means it is the

product of many different actors experimenting, learning, and adapting with parameters that are always changing as a result of one another's efforts. Over time, they develop new products, technologies, services, business models, public service delivery models, policy and regulatory innovations, voluntary standards, and cultural norms and behaviors that together deliver new results. This process is

organic and non-linear.¹³ Systems transformation often results in advance planning and can be very hard even to predict. As Forum for the Future describes it, systems transformation "confounds our expectations with shifts that can be very fast, even abrupt."¹⁴ We can envision the future we want and work to bring it into being, but we also have to expect surprises and be prepared to learn from them.

Figure 1: Megatrends, innovations and enablers combine to bring about transformation of systems



Source: Based on the widely cited multi-level perspective developed in Kemp and Pap, 1998. Enablers adapted from systems of change literature and expert interviews.

10 Unlocking systems transformation, Vision 2050 issue brief

wbcsd

Unlocking systems transformation:

An issue brief in support of Vision 2050

Unlocking systems transformation

SUMMARY OF KEY COMPONENTS

1 Recognize the frequent use of terms “transformation” and “systems transformation” but **note that we are not always specific about what transformation means** or how it happens

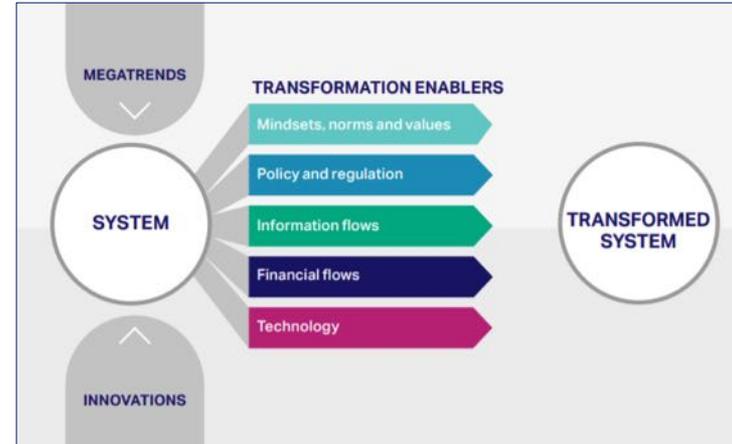
2 State that WBCSD understands transformation to be **profound change that generates dramatically different outcomes and impacts.**

3 Emphasize the **distinction between transformational change and more incremental change.**

4 Identify **three common factors that influence the transformation of systems:** Macrotrends, Innovations, and Enablers.

5 We underline that In order to realize transformation business must:

- **Understand the macrotrends** shaping the context for our work.
- **Support innovations** that further our goals and withhold support for those that could make things worse.
- **Use influence** at its disposal to ensure the necessary enablers create conditions for transformation.



Today's agenda

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Key trends & disruptions that could shape 2020-30

Macrotrends and disruptions shaping 2020 - 2030

Macrotrends & Disruptions

This issue brief outlines the macrotrends and disruptions that could shape the environment business operates in over the next 10 years. It is best read alongside our Issue Brief on the specific impacts of COVID-19 on the decade ahead.

MACROTRENDS

We outline 12 macrotrends set to shape the 2020s. These represent major shifts in the demographic, environmental, economic, technological, political and cultural landscapes that can be foreseen with a relatively high degree of certainty, though their implications are often more uncertain or ambiguous. We then focus in on a subset of the macrotrends to explore the ambiguity and

suggest how the global business community might seek to influence the way these trends play out in order to accelerate progress on Vision 2050. Crucially, too, all the macrotrends are interconnected. How they interact with one another is central to how the next decade will play out. We explore some of these interconnections briefly in the introduction to each landscape.

Macrotrends emerging over the next decade



4. Macrotrends and Disruptions shaping 2020-2030 Vision 2050 issue brief

DISRUPTIONS

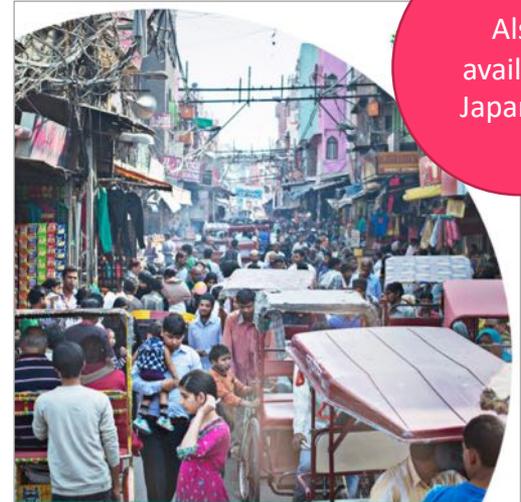
We propose 10 "wild card" disruptions that could plausibly materialize during the 2020s, resulting in significant impact. Indeed some of them already have, with impacts still unfolding. However, the wild cards are not all negative – they simply have the potential to significantly disrupt the landscape that business operates in.

The macrotrends and disruptions are deliberately not presented as risks and opportunities. Every risk contains the seed of an opportunity within it – and every opportunity the seed of a new risk. What matters is how we respond to and influence the dynamics of the world around us.

Potential "wild card" Disruptions



5. Macrotrends and Disruptions shaping 2020-2030 Vision 2050 issue brief



Also available Japanese

Macrotrends and Disruptions shaping 2020-2030.

Vision 2050 issue brief

The consequences of COVID-19 for the decade ahead

Also available in Spanish, Portuguese and Japanese

① What COVID-19 has exposed

At the time of writing, COVID-19 continues to have a devastating impact on lives and livelihoods around the world. It has revealed some hard truths about the scale of the systemic risks we face and the lack of resilience built into our current operating models. We outline five factors that have all contributed to making both the health crisis and the resulting economic crisis worse.

1. OUR DEPENDENCE ON ECONOMIC GROWTH



The pandemic – and governments' response to it – has triggered a dramatic and sustained drop both in global demand and production. Around the world, millions of businesses and billions of people's livelihoods are suffering or at risk as a result. Governments are scrambling to provide temporary support to the many businesses and households that have no financial buffer. But, as UC Berkeley economist Parag Mehta-Courchesne notes, flattening the infection curve inevitably steepens the macroeconomic recession curve.¹ This trade-off was, without doubt, a key factor in many policymakers' initial reluctance to embrace containment measures – a reluctance that may have worsened both the health and economic crises in the long run.

There is no responsible way for governments to stimulate consumer demand – and thereby economic growth – until the health crisis passes. Yet the macroeconomic recession also has a severe human cost – especially in countries without strong safety nets for the millions of workers who suddenly find themselves unemployed. This puts governments in a double bind: The degree to which social stability and welfare in today's world is dependent on constant economic growth has become a source of vulnerability in the face of the COVID-19 pandemic.

¹ <https://www.econometricsociety.org/publications/econometrica/2020/08/01/2020-08-01-01>

5 The consequences of COVID-19 for the decade ahead | Vision 2050 issue brief

② How COVID-19 could shape the 2020s

The ripple effects from COVID-19 are likely to be felt for many years. In this section, we look at the ways in which the crisis is interacting with existing global trends and issues – particularly those identified in our [Vision 2050 issue brief on the Macrotrends and Disruptions shaping 2020-2030](#).

1. HOW COVID-19 INTERACTS WITH EXISTING SOCIO-ECONOMIC, POLITICAL AND CULTURAL DIVIDES

COVID-19 affects different groups differently: the old are more vulnerable than the young, men and obese people are more at risk than women and non-obese people, the rich are better protected than the poor. In some cases the pandemic will exacerbate tensions, but it also creates a context in which building solidarity between groups whose interests are normally opposed becomes possible. Key social factors that COVID-19 is interacting with in complex ways include:

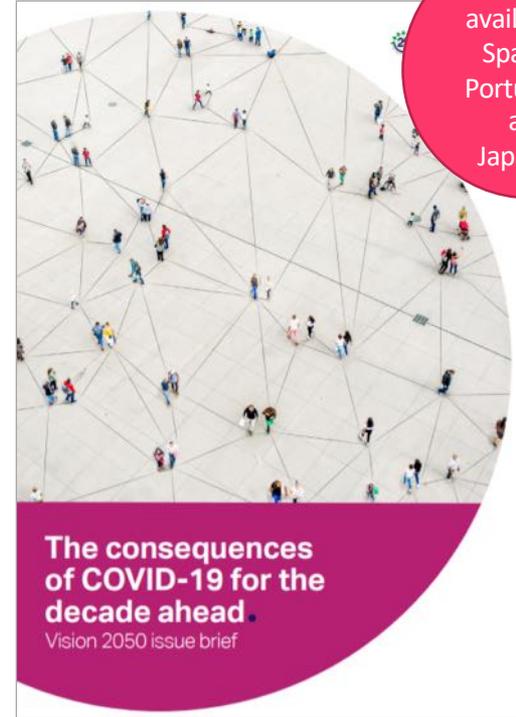


Income and wealth inequality: currently, those at the bottom of the wealth and income spectrum are being hit hardest by COVID-19. They are least likely to have access to adequate healthcare. Many cannot afford to stop going to work, putting themselves and others at risk. COVID-19 may, in the short run, reduce inequality by making the rich poorer, but this is likely to be a relatively short-lived effect. Longer term, COVID-19 is likely to increase the level of inequality within and between countries, though the post-crisis policy response (see section 3) will be critical to how this plays out.



Gender inequality: there is mounting evidence that the social and economic fallout from COVID-19 is disproportionately impacting women. Under lockdown, women and girls are taking on the majority of the caring burden – often at the expense of their own health, careers and education. Girls are more likely to be withdrawn from school to save money than boys. Professional women working from home are more likely to take on responsibility for home schooling and entertaining children than men. Sacrifices made (losing or not in the short term) are likely to have a long-term dampening effect on women's earnings. Tragically, too, domestic violence seems to be on the rise in households under lockdown.

6 The consequences of COVID-19 for the decade ahead | Vision 2050 issue brief



The consequences of COVID-19 for the decade ahead
Vision 2050 issue brief

Innovations that could shape and transform 2020 - 2030

3.2 BUSINESS MODEL SHIFTS



BUSINESS ECOSYSTEM

Description Business ecosystems are part of, or the architecture of, the center of a relation of complex firms, companies in the same business ecosystem strive to create an optimal value proposition for the ecosystem's customers, which exceeds the sum of the added value generated by each company individually.

Finance Ecosystem solutions can improve cost performance through a mutually agreed distribution of processes. In the financial services sector, banks and other financial providers can form an ecosystem allowing users to conveniently transfer money among each other in very few steps and through one shared medium, such as a smartphone app.

Mobility Companies in ecosystems can achieve higher customer value by combining access to a range of different services. Ecosystems in the mobility sector can give customers simple access and settlement to various mobility services, offered by independent providers within the ecosystem.

- Opportunities & Risks**
- Business ecosystems increase convenience for customers through one-stop solutions.
 - Cross-industrial business ecosystems can create new added value thanks to synergy effects.
 - Systematic coordination and cooperation among members of the same industry increases the risk of monopolies or oligopolies.
 - Effective coordination can become very complex and therefore costly to manage for members of the ecosystem.



CIRCULAR & REGENERATIVE MODEL

Description Circular and regenerative businesses drive towards the resource-use in the creation of a product or service as well as embedding and closing products' life cycle. Regenerative goods and/or services are those that not only benefit the individual customer but also provide a benefit to the whole of society.

Challenges & Features One strategy for companies pursuing a circular business model is the setup of a "closed" production. A circular model for clothing companies, for example, would involve not only selling clothes but also taking them back once customers want to change them. After cleaning and if needed repairing clothes, they are ready to be sold again to new customers. In other models, materials are re-used to create new clothes. In any case, the customer's possession becomes temporary.

Health & Food Another approach for companies to position themselves in a circular economic system is to generate biogas, methane or compost waste to generate and offer a variety of services. Technologies to recover nutrients and water from waste create value adding products and achievable energy, organic fertilizers or protein-rich materials.

- Opportunities & Risks**
- Reduced input of virgin material and energy, less waste and emissions, reduced costs and environmental impacts in theory.
 - Increased sense of community and cooperation through the more circular model of consumption, such as the "sharing economy".
 - Increased societal legitimacy of economic system due to added value provided to society by regenerative businesses.
 - Over-focusing on ecological factors could lead to diminished growth and economic prosperity.

Innovations that could shape and transform 2020-2030 Vision 2050 issue brief 16

3.3 TECHNOLOGICAL INNOVATIONS / EMERGING TECHNOLOGIES



ARTIFICIAL INTELLIGENCE

Description Artificial intelligence (AI) is the application of fast data processing, machine learning, predictive analysis and automation to imitate intelligent behavior and problem-solving capabilities with machines and software.

Healthcare AI has the potential to radically improve the process of medical diagnosis. For instance, by analyzing a patient's heart structure, it could indicate their risk of cardiovascular disease. It could be used to detect abnormalities in common medical tests, such as chest X-rays, leading to earlier risk detection and better treatment plans.

Skills interface Driven by advances in computational AI, voice assistants are becoming increasingly popular. Some methods, for example in conversational electronics in the context of smart home voice assistants can replace human employees in jobs that are relatively short- and standardized conversations with clients, meaning that they could begin to do much more than they currently do, leading efficiencies in a broad range of societal services, from government to education to therapy.

- Artificial intelligent systems can help make humans to make decisions more efficiently and effectively, improving human-being's welfare abilities.
- AI's potential for automation of repetitive and standardized tasks can free up human resources for more complex and social tasks.
- AI systems have the potential to accelerate the technology-induced job-losing of the production sector, as well as to create new jobs.

Opportunities & Risks

- Replacement of human beings through intelligent machines could potentially lead to long-term unemployment and lost products on welfare states.
- The combination of greater amounts of data and increasing computing power leads to increasingly massive custom and/or automation to AI systems.
- AI systems can be hacked or lead to discriminatory outcomes as a result of the adoption of human biases embedded in the code or integrated data.



CONNECTED INFRASTRUCTURE

Description Connected infrastructure refers to a system of interconnected computer devices, mechanical and digital machines as well as other objects, which has the ability to automatically exchange data over a network, autonomously and without human intervention.

Healthcare Virtual care can be used in the medical sector to boost staff functions of general practices. This measure uses functions through various means, like a dry electrode placed under the skin that measures glucose levels and relay the information to a monitoring device, alerting their users and/or medical professionals. It also allows a car to track fitness.

Agriculture Connected devices with embedded devices not only make it easier to monitor the internal climate, but also allow autonomous smart systems to control the conditions inside. Sensors measure soil moisture, depending on the plant's requirements, the water is processed in the cloud and sent back to the greenhouse where appropriate action is applied.

- Opportunities & Risks**
- Actions and conditions in a connected system can be more precisely adjusted to pursue and achieve a certain goal and can therefore be more resource-efficient.
 - An interconnected environment allows for the autonomous, effortless personalization of the environment.
 - Loss of privacy in an increasingly connected environment.
 - Interconnectedness increases the vulnerability of the system and also of the individuals in the system as a consequence.

Innovations that could shape and transform 2020-2030 Vision 2050 issue brief 18



Innovations that could shape and transform 2020-2030.

Vision 2050 issue brief

How best to “vision” what kind of future could unfold?

Highly likely
macrotrends

Less likely,
but high
impact
disruptions

Impact on
pathways
to Vision
2050



Key macrotrends emerging over the next decade

DEMOGRAPHICS



- 1. GENERATIONAL HANDOVER**
Political, economic, cultural & innovation power is shifting.
- 2. POPULATION GROWTH IN ASIA & AFRICA**
Sustaining geopolitical shifts straining scarce resources.



ENVIRONMENT



- 3. WORSENING CLIMATE IMPACTS**
More frequent and more severe weather becomes harder to ignore.
- 4. LOCAL POLLUTION DEGRADATION & SCARCITY CREATE IMPETUS FOR INNOVATION**
Loss, suffering, instability, displacement, and costs.



ECONOMY



- 5. SHORT-TERM CRISIS, LONG-TERM SLOWDOWN**
Under-investment, low productivity, weak demand.
- 6. PEAK GLOBALIZATION & THE RISE OF ASIA**
Rival blocs form as economic and political power pivots.



TECHNOLOGY



- 7. AUTOMATION IMPACTS EVERY INDUSTRY & COUNTRY**
Automation changes lives, industries and economies.
- 8. DATAFICATION, FOR BETTER & WORSE**
Smarter, more efficient, more surveilled - massive efficiency and productivity gains come at a price.



POLITICS



- 9. POLARIZATION & RADICALISM ON THE RISE**
High levels of dissatisfaction create appetite for radical alternatives
- 10. GEOPOLITICAL INSTABILITY**
Weakened multilateralism and nations in decline as the incentives for stability slowly fade away.



CULTURE



- 11. ATTITUDES TO OWNERSHIP DIVERGE**
Changing aspirations are helping on demand service models to spread globally.
- 12. CULTURE WARS ESCALATE**
Cultural clashes (young-old, rural-urban, rich-poor) contribute to polarization and in turn feed off it.





Potential “Wild Card” Disruptions



1

FINANCIAL CRISIS

How much will this COVID-19 crisis cost, and how will we pay for the next crash?



2

GLOBAL PANDEMIC

No country is fully prepared to handle a pandemic, and neither are any economies.



3

MAJOR CONFLICT

Cyber attacks, e.g. on critical infrastructure will touch all ordinary citizens in a conflict.



4

AN ECONOMIC “SINGULARITY”

What happens when new jobs can't be created where jobs have been destroyed?



5

SOCIETAL AND REGULATORY “TECHLASH”

Society sours on the costs of free tech, treasuries tire of lost taxes and competition.



6

POPULAR REVOLTS LEAD TO REGIME CHANGE

Inequality will continue to rise making more frequent and severe protest certain.



7

A CLIMATE “MINSKY MOMENT”

Costs, mandatory disclosures, social pressures all reorient financial flows – but how fast?



8

ENERGY TRANSITION REACHES A TIPPING POINT

Market forces lead to fossil fuel demand peaking and the energy transition accelerates.



9

BIOTECH BOOM

Disruption comes to food, health and materials as biotech's potential emerges.



10

GLOBAL GREEN (NEW) DEAL

Citizens embrace the chance to improve jobs, lifestyles, communities, environments.

The consequences of COVID-19 for the decade ahead

Also available in Spanish, Portuguese and Japanese

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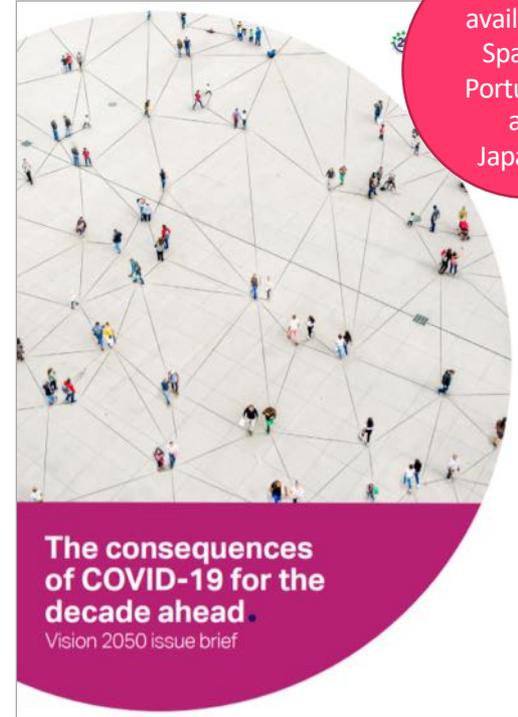
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The consequences of COVID-19 for the decade ahead
Vision 2050 issue brief

Systemic vulnerabilities being exposed by COVID-19



ECONOMIC GROWTH

Above all else, but at what cost?



HIGH LEVELS OF INEQUALITY

Within and between countries



WEAK NORMS & INSTITUTIONS

Coordination goes AWOL when it is needed most



UNDERINVESTMENT IN PUBLIC HEALTH

Nowhere near universal health coverage



EFFICIENCY AT ALL COSTS

Disruptions from capitalism's lack of slack (& planning)

How COVID-19 could shape the decade ahead

Interactions with existing socio-economic, political and cultural divides



INCOME & WEALTH INEQUALITY

The poor will take the
brunt (again) – rescue
responses will be critical



NATIONALISM & GLOBALISM

Knee-jerk nationalism
has been easy to turn to
and global tensions are
only increasing



INTERGENERATIONAL DYNAMICS

Adverse economic
circumstances will drive
an even bigger wedge
between generations



POLARIZATION & ATOMIZATION

Individualism loses its
lustre as awareness of
interdependence and
interconnection hits

How COVID-19 could shape the decade ahead

Accelerating existing trends



RESHORING

Peak supply chain fragmentation passes, as flexibility is out and resilience is back in



DIGITALIZATION

Massive expansion of IT services for the lucky few, and innovation in some fields get a boost



SURVEILLANCE

State intrusion is temporarily legitimized, but how many will give up their new power?



AUTOCRATIZATION

Public health is used to give autocracy a boost – but can democracy move online?

Innovations that could shape and transform 2020 - 2030

3.2 BUSINESS MODEL SHIFTS

BUSINESS ECOSYSTEM

Description
Business ecosystems are part of, or the architecture of, the center of a relation of complex firms, companies in the same business ecosystem strive to create an optimal value proposition for the ecosystem's customers, which exceeds the sum of the added value generated by each company individually.

Selected Applications
Finance: Ecosystem solutions can improve cost performance through a mutually agreed distribution of processes. In the financial services sector, banks and other financial providers can form an ecosystem allowing users to conveniently transfer money among each other in very few steps and through one shared medium, such as a smartphone app.
Mobility: Companies in ecosystems can achieve higher customer value by combining access to a range of different services. Ecosystems in the mobility sector can give customers simple access and settlement to various mobility services offered by independent providers within the ecosystem.

Opportunities & Risks

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Innovations that could shape and transform 2020-2030 Vision 2050 issue brief 16

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Work interfaces: Driven by advances in conversational AI, voice assistants are becoming increasingly popular across methods. For example, in commercial electronics, the context of smart home voice assistants can replace human employees in jobs that are relatively short- and standardized conversations with clients, meaning that they could begin to do much more than they currently do, leading efficiencies in a broad range of societal services. Non-government to education to therapy.

Opportunities & Risks

- Artificially intelligent systems can help make humans to make decisions more efficiently and effectively, improving human-being's welfare abilities.
- AI's potential for automation of repetitive and standardized tasks can free up human resources for more complex and value-based.
- AI systems have the potential to accelerate the technology-induced job displacement of the production sector, as well as to complex tasks in technological systems become increasingly autonomous.
- Replacement of human beings through intelligent machines could potentially lead to long-term unemployment and job precarity on societal levels.
- The combination of greater amounts of data and increasing computing power leads to increasingly massive custom and/or automation to AI systems.
- AI systems can be hard to understand and/or outcomes as a result of the adoption of human biases embedded in the code or integrated data.

CONNECTED INFRASTRUCTURE

Description
Connected infrastructure refers to a system of interconnected computer devices, mechanical and digital machines as well as other objects, which has the ability to automatically exchange data over a network, autonomously and without human intervention.

Selected Applications
Healthcare: Virtual care can be used in the medical sector to boost staff functions of general practices. This measure uses functions through various means, e.g. by electronic patient under the care that increases practice needs and play the information to a monitoring device, alerting their users and/or medical professionals. It also helps a certain trend.
Agriculture: Connected devices with embedded devices not only make it easier to monitor the internal climate, but also allow autonomous smart systems to control the conditions inside. Sensors measure vehicle performance, depending on the driver's statements, the sensors assesses the climate and part back to the greenhouse where appropriate action is applied.

Opportunities & Risks

- Actions and conditions in a connected system can be more precisely adjusted to pursue and achieve a certain goal and can therefore be more resource-efficient.
- An interconnected environment allows for the autonomous, autonomous, effortless personalization of the environment.
- Loss of privacy in an increasingly connected environment.
- Interconnectedness increases the vulnerability of the system and also of the individuals in the system as a consequence.

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Innovations that could shape the next 10 years

	PILOT-PHASE	INTRODUCTION-PHASE	GROWTH-PHASE	MATURITY-PHASE
Business model shifts		<ul style="list-style-type: none"> • Circular / Regenerative (+++) • Outcome-based (++) 	<ul style="list-style-type: none"> • Business Ecosystems (+++) • Crowd-based (+++) • Omni-channel (++) 	<ul style="list-style-type: none"> • Platform (+++) • Subscription (++)
Technological innovations / emerging technologies	<ul style="list-style-type: none"> • Brain-Computer Interface (+++) • Nanomedicines (+++) • Programmable Matter (+++) • Quantum Computing (+++) 	<ul style="list-style-type: none"> • Digital Money (+++) • Distributed Ledger Technology (+++) • Edge Computing (+++) • Energy Harvesting (+++) • 3D Printing (+++) • Biosensors (++) • Small Modular Reactor (++) 	<ul style="list-style-type: none"> • Artificial Intelligence (+++) • Connected Infrastructure (+++) • Digital Twin (+++) • Electric Vehicles (+++) • Genetic Engineering (+++) • Next-Generation Robotics (+++) • Plant-based Meat (+++) • Healthy Architecture (++) • Unmanned Aerial Vehicle (++) 	
Social innovations	<ul style="list-style-type: none"> • Universal Basic Income (+++) • Universal Fund (++) • Time Banks (+++) 	<ul style="list-style-type: none"> • CrowdLaw (+++) • Participatory Budgeting (+++) • Self-sustaining Neighbourhoods (+++) • Local Currency (++) • Multi-generational Living (++) 	<ul style="list-style-type: none"> • Citizen Science (+++) • Digital Deliberative Democracy (+++) • Open Government Data (+++) 	<ul style="list-style-type: none"> • Open Source Software (+++) • Open Education (+++)



Introduction-Phase with potential impact level +++, or Growth-Phase with potential impact level +++ or Maturity-Phase with potential impact level ++ or +++. Below, you can see all the identified innovations and shifts allocated to a development phase and qualitatively assessed based on the expected impact potential. Those innovations and shifts that we shortlisted are highlighted in **bold**.



More information on Vision 2050:

www.wbcasd.org/Overview/About-us/Vision-2050-Refresh