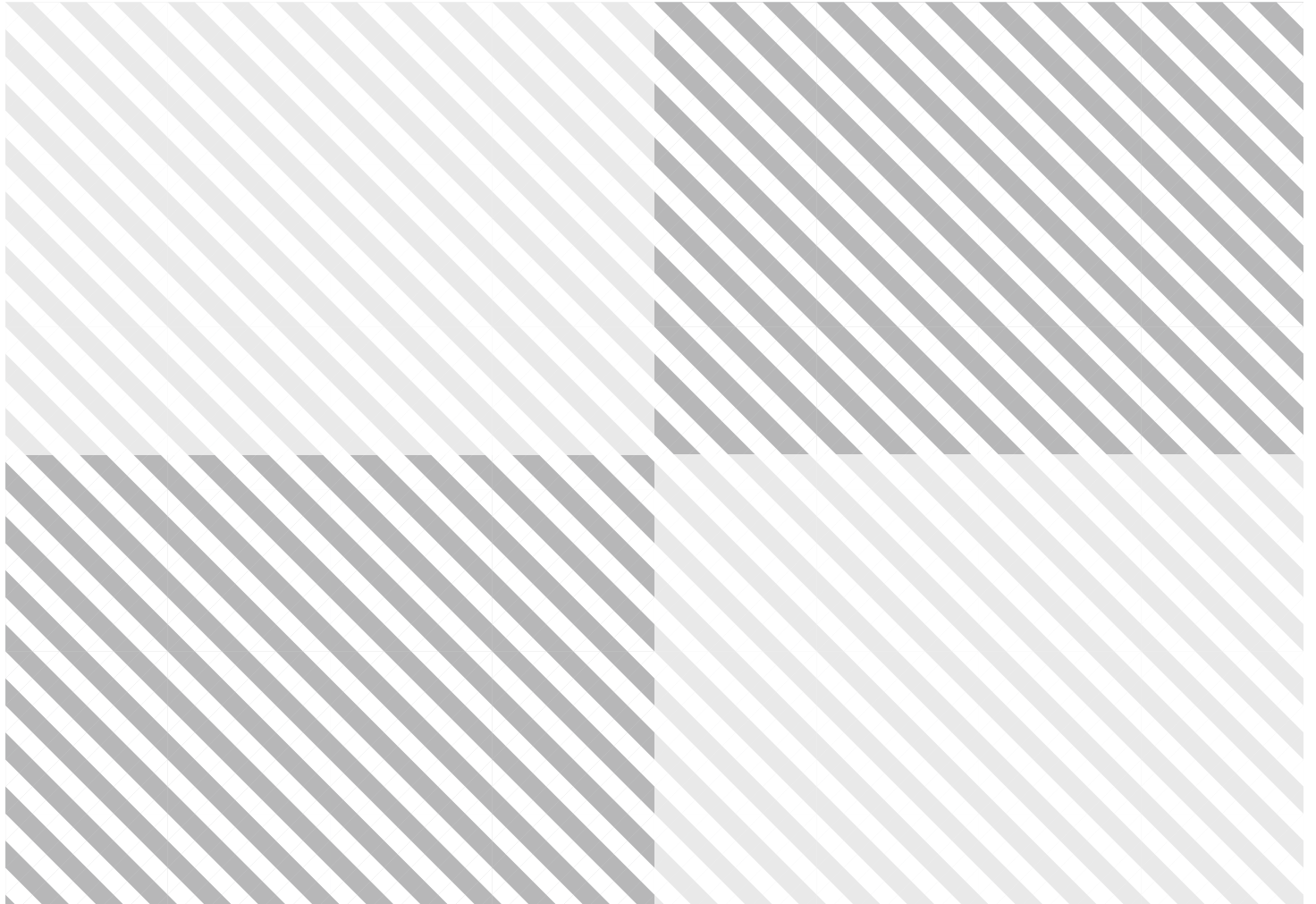


White Paper

# Future Preparedness

## A Conceptual Framework for Measuring Country Performance

January 2017



# Contents

3	Executive Summary
4	Introduction
7	Existing Work Related to Future Preparedness
11	The Future Preparedness Framework
11	Methodology
11	Dimensions and categories
16	Data collection and indicators
17	Conclusions
18	Appendix: Potential Indicators
31	Acknowledgements
32	Endnotes

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# Executive Summary

Everyone wants their children's generation to enjoy a better quality of life than their own. However, leaders are often too focused on short-term planning horizons to take seriously the long-term issues that will determine what kind of world future generations will inherit. The increasingly rapid pace of change makes it especially difficult to address challenges and opportunities that will play out over several decades.

One way to encourage decision-makers towards longer-term thinking would be to enable them to benchmark how well prepared their societies currently are for the uncertainties of the future. Until now, no such tool has existed. This white paper proposes the development of a Future Preparedness Framework to fill the gap. It is intended as a base for discussion on further input into the development of this framework.

Building on existing work as well as quantitative and qualitative data at the country level, the proposed framework will enable policy-makers and the public to compare their own future preparedness with that of peer countries across four dimensions comprising nine categories (see Figure 1):

## 1. Fourth Industrial Revolution readiness

The rapid development and convergence of emerging technologies will create unprecedented challenges and opportunities in the coming years. The Future Preparedness Framework will include two categories: a country's **digital readiness** and its capacity to stimulate **innovation**.

## 2. Economic readiness

Countries at all levels of development can lay the foundations for improved economic performance in the future by investing smartly in two categories: **infrastructure** and **human capital**, including education and health. A third category in this dimension is **economic agility**, which will measure whether the business environment is forward-looking and responsive.

## 3. Security

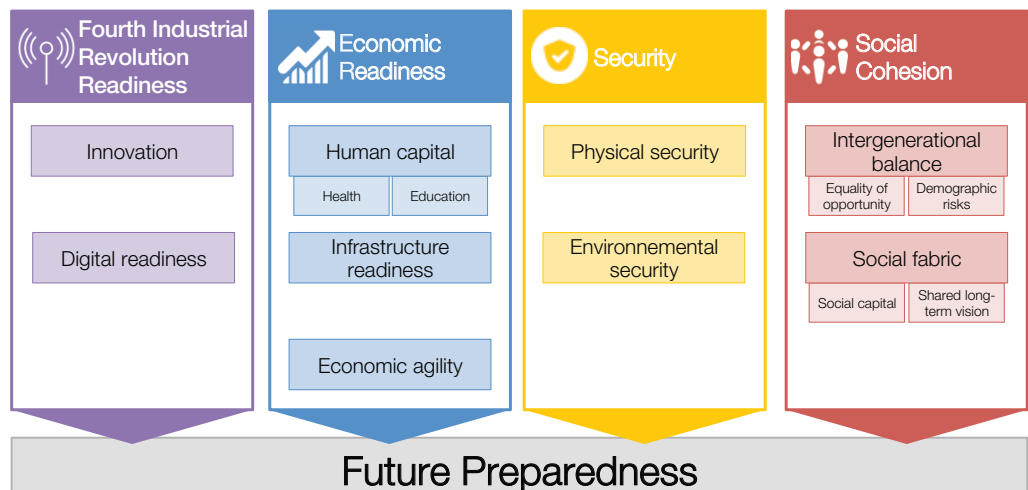
The two categories here are **physical security**, as countries which minimize wars, conflict and interpersonal violence are better prepared to prosper in the future; and **environmental security**, measuring whether countries are using their natural resources sustainably, maintaining their natural environment and putting in place measures to cope with the expected impacts of climate change.

## 4. Social cohesion

Most countries are facing some form of demographic risk which they need to address to ensure equality of opportunity for the younger generation – topics considered under the heading of **intergenerational balance**. The second category, **social fabric**, covers *social capital* – which influences resilience to shocks – and whether there is a *shared long-term vision* to facilitate political decision-making.

By allowing countries to benchmark themselves on these dimensions and categories, the Future Preparedness Framework is designed to help them better prepare for the future disruptions that will be created by long-term challenges, and to seize the opportunities presented by long-term trends.

Figure 1. The nine categories of the Future Preparedness Framework



# Introduction

Older generations in all societies strive to bequeath a better quality of life to younger and future generations. However, many important risks to and opportunities for intergenerational progress remain outside the typical planning horizon of governmental and other leaders, who often find their time consumed by more immediate imperatives.

In today's world, which is characterized by rising complexity and uncertainty, countries and companies need to adapt to a fast-evolving environment in order to be prepared for future disruptions and to identify opportunities, in particular in the context of the Fourth Industrial Revolution (see Box 1). Yet oftentimes, vested interests, the challenges related to collective action, lack of intergenerational oversight or absence of vision<sup>1</sup> combine to endanger the well-being of younger and future generations.

Although the concept of “future preparedness” – which captures countries' ability to prepare for and invest in the future (see Box 2) – is not yet on the policy radar of most nations, some governments are increasingly focusing on longer-term issues, including preparing for the changes that will be brought about by the Fourth Industrial Revolution. Examples of such initiatives include the United Arab Emirates' Ministry of the Future, Denmark's efforts to develop a long-term strategy for the country's international positioning, Chile's National Prospective Council or Singapore's Strategic Economic Plan (see Box 3 for the example of Singapore).

## Box 1: The Fourth Industrial Revolution

We are at the beginning of a global transformation that is characterized by the convergence of digital, physical, and biological technologies in ways that are changing both the world around us and our very idea of what it means to be human. The changes are historic in terms of their size, speed and scope. This transformation – the Fourth Industrial Revolution – is not defined by any particular set of emerging technologies themselves, but rather by the transition to new systems that are being built on the infrastructure of the digital revolution. As these individual technologies become ubiquitous, they will fundamentally alter the way we produce, consume, communicate, move, generate energy and interact with one another. And given the new powers in genetic engineering and neurotechnologies, they may directly impact who we are and how we think and behave. The fundamental and global nature of this revolution also poses new threats related to the disruptions it may cause, affecting labour markets and the future of work, income inequality and geopolitical security, as well as social value systems and ethical frameworks.

*Source: Adapted from Klaus Schwab, *The Fourth Industrial Revolution*, 2016.*

Despite growing country-level efforts, no tool exists to assess how well countries are set up to address long-term challenges and opportunities. The proposed Future Preparedness Framework aims to provide a benchmarking tool to help policy-makers think about how to prepare for long-term trends, and prod them towards policies, investments and other measures that go beyond the usual political cycle. It focuses on the critical long-term drivers of societal success in the 21st century – the key risks and transformational changes that are likely to play out over the next few decades and could undermine the prosperity and security of future generations if not properly anticipated and addressed.

## Box 2: What does the Future Preparedness Framework measure?

The Future Preparedness Framework benchmarks a country's preparation for and investment in the well-being of younger and future generations. In particular, it examines the relative strength of efforts to proactively manage long-term risks and leverage opportunities inherent in long-term trends.

This white paper presents the concept of future preparedness and an initial approach to benchmark countries based on four dimensions: Fourth Industrial Revolution readiness; economic readiness; security; and social cohesion. The next section of this paper reviews existing work on long-term trends, risks and resilience and their measurement, and lays out the methodology adopted, including the details of the proposed framework and the types of data to be considered. An appendix shares a preliminary list of indicators to be included in the framework. The paper is presenting work in progress as a base for discussion and to stimulate further input into the development of this framework.

### **Box 3: Future-Ready Singapore**

*Contributed by Tan Chorh-Chuan, President, National University of Singapore, Singapore*

As a small island-nation with no natural resources, staying relevant and adaptable is an existential necessity for Singapore. Thinking long-term about the challenges and opportunities of the future is therefore an integral part of the Singapore DNA. It is harder than ever before, though, to discern the main currents and eddies of the future given the rapid and unpredictable changes brought about by technology, globalization and major geopolitical shifts. Nevertheless, Singapore has embarked on key broad-based strategies that should help make it more future-ready.

#### **SkillsFuture: A comprehensive framework to enable the culture and practice of lifelong learning**

Singapore has always kept a singular focus on talent and invested heavily in education with considerable success, as reflected by the top PISA score placements achieved by its schools, and the high global standing of its universities. Building on traditional strengths in math and science, in recent years, there has been enhanced emphasis on new areas such as computational thinking, as well as creativity and holistic personal development.

However, the most important of the new thrusts is the national SkillsFuture initiative, which aims to help Singaporeans develop the mastery of skills required across the lifetime of their careers, and to acquire enhanced and/or new abilities needed in the rapidly changing workplace of the future. At an aggregate level, it will help Singapore's workforce become more responsive to more rapid and unpredictable economic and job cycles in the years ahead.

#### **"Smart Nation" – Harnessing digital technologies to create and enable new opportunities**

The Smart Nation vision was launched by Prime Minister Lee Hsien Loong in 2014 to harness digital technologies to improve lives, create new jobs and promote a more cohesive society. One key thrust will be to build further on Singapore's world-class infrastructure and making it even more secure – today, 9 in 10 households have broadband, mobile phone penetration is nearly 150% and cybersecurity is a high national priority.

However, as noted by the Vivian Balakrishnan, Minister for the Smart Nation initiative, Singapore needs to get ahead of the curve. "We need to be the masters of the new technologies, rather than trying in vain to compete for the lower-value parts of the chain that are being transformed."

Smart Nation provides an enabling platform for government, businesses and the public to co-develop novel programmes and exploit new opportunities. This would require, and in turn foster, innovation and new skills and mindsets.

#### **Research Innovation and Enterprise (RIE) 2020**

Talent, research capabilities and innovation sit at the heart of Singapore's continued heavy investments in R&D. The key thrusts are targeted not just at growing research strengths, but also in making Singapore one of the world's entrepreneurial hubs. These ongoing efforts are achieving promising results. For example, the Economist magazine in 2014 described Singapore's Block 71 start-up incubator complex, as "the world's most tightly packed entrepreneurial ecosystem". Singapore has also been rated the best performing Asian country in Asia Pacific in the Global Innovation Index (GII) 2015, co-published by Cornell University, INSEAD and the World Intellectual Property Organization (WIPO).

### **Promoting a cohesive multi-racial society**

In tandem, as societies around the world are exposed to greater polarizing forces, Singapore has actively redoubled its long-standing efforts to promote the deep relationships of trust between different groups, which underpin its harmonious multi-religious, multi-racial society. These also contribute to the social and psychological aspects of preparedness for, and prevention of, new security threats such as terrorism.

### **Bringing it all together**

These broad-based strategies serve as critical horizontal platforms which help enable exciting new sectoral initiatives for the future.

For example, in 2015, the Monetary Authority of Singapore set out its vision for a Smart Financial Centre where innovation is pervasive and technology is widely but safely used. MAS has launched several initiatives, working closely with industry and academia. These include critical infrastructure for innovation such as a national KYC infrastructure (to know the identity of a customer), and a blockchain infrastructure for cross-border inter-bank payments. In addition, programmes to stimulate the growth of a vibrant FinTech innovation ecosystem are ongoing, alongside regulation that is conducive to innovation.

It is often said that the best way to predict the future is to try to create it. This is certainly our hope in Singapore, that we should not just be preparing for a future created elsewhere, but be an active player in helping to shape that future for the benefit of all.

# Existing Work Related to Future Preparedness

The cornerstone of any future preparedness exercise is to identify long-term trends and risks and, more importantly, anticipate their effects on society. While well-being of future generations is the ultimate goal of the framework, it builds on related concepts of sustainability, intergenerational justice and resilience. Much work on better understanding long-term challenges more generally, as well as the related concepts and their measurement, has been undertaken by different stakeholders over the past years. The framework therefore builds on existing work, of which some is reviewed below.

Within the World Economic Forum, the Global Risks Report is the most directly relevant workstream analysing **long-term challenges**. It assesses 30 future risks, 13 trends and the interactions between them, and discusses measures to increase resilience. It aims to help create a shared understanding among policy-makers, academia and the private sector of the most pressing issues over a 10-year time horizon.<sup>2</sup> More recently, the Forum has embarked on addressing the future of 14 systems through its System Initiatives (see Box 4) and related Global Future Councils.<sup>3</sup>

An important contribution highlighting the need to think long term was The Oxford Martin Commission's report "Now for the Long Term".<sup>4</sup> The publication was intended as a wake-up call for policy-makers to look beyond short-termism in politics and decision-making, and has laid important ground work for the Future Preparedness Framework as it included the creation of an index of preparedness for the long term among its recommendations.

A related body of work are exercises based on horizon scanning and other trend-identification techniques conducted by various government bodies to identify long-term trends that could create new challenges and opportunities for their countries; for example, the National Intelligence Council's Global Trends report – published every four years – identifies key trends for the next 15-20 years and seeks to stimulate reflection on long-term issues and planning.<sup>5</sup>

## Box 4: World Economic Forum Systems Initiatives

Many challenges facing today's leaders cannot be addressed by a single government, industry, company or other institution alone. The issues are often too complex, interrelated and rapidly evolving. A broader, interdisciplinary mobilization of expertise and resources is required, and a wider network of relevant actors and initiatives must be activated and aligned behind shared priorities.

The world requires a new kind of cooperative platform in the 21st century – one that facilitates a more systemic approach to resolving problems and capturing opportunities that lie at the intersection of multiple industries, stakeholders and intellectual disciplines. As the International Organization for Public-Private Cooperation, the World Economic Forum is applying its organizational capacity to this purpose – its unique, leader-level multistakeholder communities, convening and facilitation capabilities, knowledge resources and interaction technology. Each of its 14 System Initiatives provides a platform on a particular topic that enables deeper communication and practical cooperation across a multistakeholder ecosystem involving many of the world's most relevant actors and experts.

Each System Initiative is guided by a Stewardship Board which consists of ministers, chief executives and leading experts, who assume an informal, collective sense of stewardship for the public-private dimension of international cooperation and progress on their issue. Their work programmes consist of a portfolio of insight, policy or action-oriented projects that the community chooses to engage in, whether managed by the Forum or directly by consortia of institutions within the community. Each is supported by a dedicated Global Futures Council of thought leaders as well as the Forum's suite of digital interaction and knowledge integration tools.

The aim is to provide a more efficient "operating system" for the wider and better-focused multistakeholder cooperation required to innovate new approaches or scale the impact of existing ones. Systems leadership seeks to cultivate a shared vision for change and sense of community, encourage distributed innovation and action aligned with that vision, and enable mutual learning and accountability across the community ecosystem.

The following Systems Initiatives are in place:

1. Shaping the Future of Consumption
2. Shaping the Future of Digital Economy and Society
3. Shaping the Future of Economic Growth and Social Inclusion
4. Shaping the Future of Education, Gender and Work
5. Shaping the Future of Energy
6. Shaping the Future of Environment and Natural Resource Security
7. Shaping the Future of Financial and Monetary Systems
8. Shaping the Future of Food Security and Agriculture
9. Shaping the Future of Health and Healthcare
10. Shaping the Future of Information and Entertainment
11. Shaping the Future of International Trade and Investment
12. Shaping the Future of Long-Term Investing, Infrastructure and Development
13. Shaping the Future of Mobility
14. Shaping the Future of Production

Inherent to the concept of well-being is **sustainability**, which was defined by the Brundtland Commission in 1987 (see Box 5). As young and still-to-be-born generations cannot express their preferences or influence decisions, there is a tendency to ignore their interests and bias decisions towards short-term outcomes. This creates a moral responsibility for today's generation to put in place infrastructure, investment and incentives to prepare societies to take up opportunities and build resilience capabilities for future risks.

#### Box 5: Definition of sustainability

One of the most-used definitions of sustainability was proposed by the Brundtland Commission in 1987:

*Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts:*

- *The concept of “needs”, in particular the essential needs of the world's poor, to which overriding priority should be given; and*
- *The idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs.*

Source: UN World Commission on Environment and Development, *Report of the World Commission on Environment and Development: Our Common Future*, 1987.

A body of work also exists **on equality of opportunities for younger and future generations**. The most relevant is the United Nations report entitled “Intergenerational solidarity and the needs of future generations”, which defined fairness between generations as the cornerstone of **sustainable development**.<sup>6</sup> More recently, UNICEF and the London School of Economics published a systematic review of the factors and mechanisms that drive intergenerational poverty,<sup>7</sup> including transmission of health outcomes, education and income. They conclude that policies targeting early child development are critical as “disadvantages experienced at early stages in childhood play a much larger role than those experienced later in life”.

Box 6 shares examples of countries that have put future generations at the heart of their policies.

#### Box 6: Prioritizing younger and future generations

*Contributed by Catherine Pearce, Director, Future Justice, World Future Council, United Kingdom*

While most countries have a national youth policy, a small number offer dedicated strategies to cultivate youth engagement in decision-making, working to ensure that the needs of younger generations are prioritized in policy:

- The Danish government has integrated its youth policy throughout government and across relevant national, regional and local authorities, creating the basis for young people's participation in society.
- Finland's Youth Act of 2006 seeks to support young people's growth and independence in order to promote young people's active citizenship and empowerment and to improve young people's growth and living conditions.
- Costa Rica's General Youth Law of 2002 aimed to ensure access to services and resources and allow young people opportunities to fully exercise their civic participation and formulate and implement national policy. The National Council of Young Persons works with civil society organizations and government to promote youth policies and services through inter-agency support, cooperation and access to information.
- The Well-Being of Future Generations Act 2015 (Wales) sets seven national well-being goals for Wales, with indicators of progress and operating principles, and imposes a duty on public bodies to meet the goals. The legislation was developed through a process of national conversation which allowed opportunities for people to share concerns and identify the future they wanted. A Commissioner for Future Generations has been introduced as a guardian for future generations, with statutory duties and powers to help implement the Act.
- The Canadian Commissioner of the Environment and Sustainable Development, a position established in 1995, is located within the Office of the Auditor General and responsible for assessing whether departments of the federal government are meeting their sustainable development objectives. The commissioner may also process citizens' petitions concerning sustainable development. The Auditor General Act – which, alongside the Federal Sustainable Development Act, governs the role of the commissioner – recognizes “the needs of future generations” as part of the commissioner's considerations.
- Hungary established the position of Parliamentary Commissioner for Future Generations in 2008, tasked with protecting the constitutional right to a healthy environment. The commissioner investigated citizens' complaints on environmental issues and advocated sustainable policy that considers the needs of future generations, through preparing reports on the environment, sustainability and policy development. In 2012, all parliamentary commissioners were replaced



by the Office of the Commissioner for Fundamental Rights, which continues to examine policy and legislative proposals to ensure that they do not threaten the environment or the interests of future generations.

- The German Parliamentary Advisory Council on Sustainable Development, established by parliament in 2009, is intended to advocate long-term responsibility in the political process. The council provides support in the parliamentary process with regard to the federal government's National Sustainable Development Strategy and may also present recommendations on medium and long-term planning. It evaluates the sustainability impact assessment mandated for all legislation and statutory orders. This assessment, based on the National Sustainable Development Strategy, encompasses four areas: fairness between generations; social cohesion; quality of life; and international responsibility.

Some 20 national constitutions also refer to future generations, with Bolivia, Ecuador, Germany, Kenya, Norway and South Africa among countries with constitutions that enshrine future generations' rights.

The debate around sustainability led in 2015 to the United Nations adopting 17 Sustainable Development Goals (SDGs) and 169 related target to be reached by 2030 (see Box 7). The Future Preparedness Framework will incorporate various aspects of the SDGs, which are explicitly meant to be implemented "for the full benefit of all, for today's generation and for future generations".<sup>8</sup>

Other initiatives that attempt to measure different aspects of **well-being** include the:

- Stiglitz Commission on the Measurement of Economic Performance and Social Progress<sup>9</sup> and the European Commission initiative Beyond GDP<sup>10</sup> were the first large-scale effort that called for alternative metrics for measuring socio-economic progress that target well-being.
- EU Sustainable Development Strategy, which looks at sustainable development in the European Union through 10 different themes.<sup>11</sup>
- United Nations Development Programme's Human Development Index, which combines measures on health, education and standard of living (Gross National Income).<sup>12</sup>
- World Economic Forum's *Inclusive Growth and Development Report*, which presents a dashboard of indicators measuring inclusive growth.<sup>13</sup>
- OECD's Better Life Index, which measures individual well-being using two broad concepts – material conditions (income and wealth, jobs and earnings, housing) and quality of life (health status, work-life balance, education and skills, social connections, civic engagement and governance, environmental quality, personal security, and subjective well-being) – and looks at sustainability through measures of natural capital, economic capital, human capital and social capital.<sup>14</sup>

- Inclusive Wealth Index, which aims to assess countries' capabilities to "improve their citizens' well-being, and do so sustainably for the benefit of present and future generations".<sup>15</sup>
- Social Progress Index, which ranks countries on a framework with three dimensions (basic human needs, foundations of well-being and opportunities) and 12 components.<sup>16</sup>
- Sustainable Economic Development Assessment from The Boston Consulting Group which analyses how countries transform wealth to well-being through a framework of three elements (economics, investments and sustainability) that comprise 10 dimensions.<sup>17</sup>

A last concept relevant to future preparedness, which has been discussed abundantly, is **resilience**. Resilience is defined by the United Nations Office for Disaster Risk Reduction as "the ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions."<sup>18</sup>

There is a large body of work on resilience, ranging from natural disasters to cyber risks, and many core capabilities have been identified and many metrics developed to inform policy-makers and businesses about how to strengthen resilience at city or country level – for instance, the Rockefeller Foundation City Resilience Index.<sup>19</sup> The Overseas Development Institute published an overview of 17 resilience measurement frameworks in 2015.<sup>20</sup> Among their findings was that "resilience cannot be measured only through indicators of improved livelihoods and well-being, but that it also cannot be measured without such information". The Future Preparedness Framework therefore intends to look at resilience in the context of countries' capabilities not only to meet challenges to future well-being, but also enlarges the concept by considering how to take advantage of the benefits that long-term trends can bring to younger and future generations.

The **private sector** is very interested in future preparedness and some institutions have developed benchmarking studies and scenario exercises. Notably, the Future Readiness Index developed by Dell and IHS assesses businesses and cities, and intends also to cover countries in the future. It defines a future-ready city as having "attributes that enable its people and organizations to access new tools and new ideas that deliver better connections, better outcomes and a better world".<sup>21</sup> Other examples include KPMG's Change Readiness Index,<sup>22</sup> looking at countries' ability to change, The Boston Consulting Group's Globalization Readiness Index,<sup>23</sup> looking at companies' ability to compete in emerging markets, or Shell Scenarios which explores plausible alternative stories of the long-term future.<sup>24</sup>

The Future Preparedness Framework builds on this broad body of existing work and goes beyond it by explicitly focussing on how countries can deal with long-term challenges, including the ability to adapt to and take advantage of the Fourth Industrial Revolution.

### Box 7: Sustainable Development Goals

Adopted by the 193 Member states of the United Nations in September 2015 and officially applicable since January 2016, the 17 Sustainable Development Goals (SDGs) and 169 associated targets form the UN's new global agenda for the next 15 years. The SDGs build on the Millennium Development Goals (MDGs), which had aimed to halve extreme poverty and disease by 2015. The MDGs were often criticized for being too narrow while the SDGs tackle a broader range of issues. The resolution adopting the SDGs includes principles such as to "end poverty and hunger everywhere; to combat inequalities within and among countries; to build peaceful, just and inclusive societies; to protect human rights and promote gender equality and the empowerment of women and girls; and to ensure the lasting protection of the planet and its natural resources", and says Member States "will endeavour to reach the furthest behind first".

#### The 17 Sustainable Development Goals:

- Goal 1. End poverty in all its forms everywhere
- Goal 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture
- Goal 3. Ensure healthy lives and promote well-being for all at all ages
- Goal 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
- Goal 5. Achieve gender equality and empower all women and girls
- Goal 6. Ensure availability and sustainable management of water and sanitation for all
- Goal 7. Ensure access to affordable, reliable, sustainable and modern energy for all
- Goal 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
- Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
- Goal 10. Reduce inequality within and among countries
- Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable
- Goal 12. Ensure sustainable consumption and production patterns
- Goal 13. Take urgent action to combat climate change and its impacts<sup>25</sup>
- Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development
- Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

- Goal 16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
- Goal 17. Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development

In March 2016, the United Nations Statistical Commission agreed on 230 individual indicators to monitor progress on the SDGs and related targets. These metrics were proposed by the United Nations Statistical Commission's Interagency and Expert Group on SDG Indicators (IAEG-SDG).<sup>26</sup>

Source: United Nations General Assembly Resolution 70/1, *Transforming our world: The 2030 Agenda for Sustainable Development*, 21 October 2015, [http://www.un.org/ga/search/view\\_doc.asp?symbol=A/RES/70/1&Lang=E](http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E).

# The Future Preparedness Framework

## Methodology

Building on existing work, the Future Preparedness Framework assesses countries' investments and policies that target the well-being of younger and future generations through their ability to embrace trends and take advantage of opportunities they present, as well as prepare for and rapidly bounce back from negative events. As the latter two components are deeply interlinked, the framework does not separate them but makes sure that each dimension of the framework contains aspects of adaptability, resilience and future well-being.

While developing the conceptual framework, three main tensions appeared which indicate the complexity and systemic nature of the exercise:

1. Due to data availability, the framework's unit of analysis is the country. But many challenges – environment, security, technology, and economic and social development – necessitate collaborative global or regional responses, so the framework aims to include indicators of countries' engagement at the international level, such as relationships with neighbouring countries. The framework also recognizes that within-country disparities such as rural and urban divides are also important, particularly in large countries, as future preparedness requires balanced development.
2. The framework is split into distinct categories; however, these are highly interconnected and should be seen and addressed as a whole. For example, a well-functioning economy requires innovative companies; infrastructure will be more efficient if latest technologies are available, and innovation cannot be undertaken without the right skills.
3. Most concepts have both a "flow" and a "stock" dimension. For future-looking indicators, it is important to focus not on where the country stands now, but also on what it is doing to prepare.

Based on these considerations, the following design principles are applied to: consider exclusively forward-looking indicators that assess the efforts of a country to prepare for the future, such as health risk factors, investment in infrastructure and future skills, education policies, focus on future generations or environmental protection; consider input measures, or the closest proxy possible; focus on countries as the benchmarking entity due to data availability; and apply, wherever possible, measures of the flow instead of the stock – in some cases, this is proxied by how a country's performance on an issue has evolved over recent years.

The distinctive contribution of the Future Preparedness Framework will be to provide a forward-looking benchmarking tool that allows countries to compare themselves to other countries on how well they do in terms of ensuring well-being of young and future generations. Given that desirable future may mean different things for each country, the approach is meant to be flexible. The framework will not be summed up to a single number, instead encouraging countries to benchmark themselves on each specific component.

The goal of the framework is therefore not to be prescriptive about what a country's future should be, but to provide clear and relevant indicators to inform each country's own

governance processes and identification of long-term goals. By providing a clear set of indicators and a new concept, the future preparedness framework's ambition is to help policy-makers think about the long term. The details of the framework are described below.

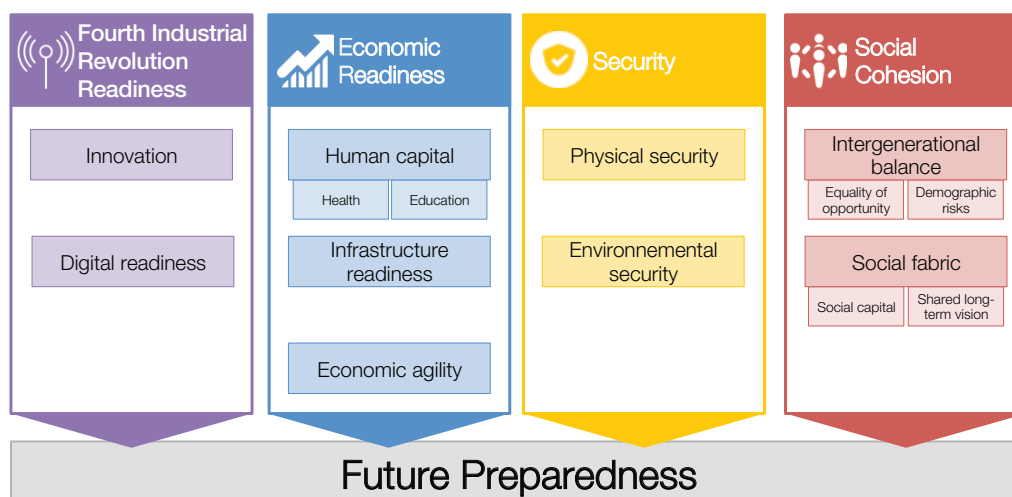
## Dimensions and categories

The Future Preparedness Framework is built around four main dimensions:

1. **Fourth Industrial Revolution readiness.** The accelerating pace of progress and systemic interactions among converging digital, physical and biological technologies raises fundamental, long-term challenges for economies at all levels of development. The measures put in place today to embrace this global transformation will determine the level of prosperity and well-being of every single country in the medium and long term. Countries that do not prepare will fall behind. The framework benchmarks the extent to which countries are preparing for this transformation in two categories: innovation and digital readiness.
2. **Economic readiness.** Capturing future economic opportunities requires continuous investment in infrastructure and human capital and necessitates an economy that can adapt to change and be resilient to economic shocks.
3. **Security.** Basic security, a prerequisite for human progress, requires deliberate cultivation and sustained stewardship that transcends the political cycle. The framework benchmarks conditions suggestive of future security in two categories: environmental security and physical security.
4. **Social cohesion.** Future welfare requires a society to balance the interests of generations and foster a common vision for progress based on civic participation, rule of law and trust. The framework includes two categories of societal cohesion: intergenerational balance and social fabric.

As illustrated in Figure 1, the four dimensions encompass nine categories. Each of them is discussed below.

**Figure 1. The nine categories of the Future Preparedness Framework**



## Fourth Industrial Revolution Readiness

Table 1 identifies 12 emerging technologies which are driving the Fourth Industrial Revolution. Their interactions will transform the world in many ways, creating both opportunities and risks, and impacting not only countries' economies but also the societal, political and geopolitical spheres. The extent to which countries can leverage the benefits while mitigating the risks of these technologies will depend on the rules, norms, standards, incentives, institutions and other mechanisms they put into place to shape the development and deployment of the

technologies, and the extent to which they foresee challenges to inclusivity and put in place strategies to deal with them.<sup>27</sup>

The Fourth Industrial Revolution will increasingly allow innovation in business models that use digital technologies to create, exchange and distribute value – so countries that embrace digital technologies are more likely to succeed, as are countries with strong ecosystems for innovating and bringing technologies to market. Innovation and digital readiness are therefore combined to form the Fourth Industrial Revolution readiness component of the framework.

**Table 1. 12 key emerging technologies**

Technology	Description
3D printing	Advances in additive manufacturing, using a widening range of materials and methods; innovations include 3D bioprinting of organic tissues.
Advanced materials and nanomaterials	Creation of new materials and nanostructures for the development of beneficial material properties, such as thermoelectric efficiency, shape retention and new functionality.
Artificial intelligence and robotics	Development of machines that can substitute for humans, increasingly in tasks associated with thinking, multitasking and fine motor skills.
Biotechnologies	Innovations in genetic engineering, sequencing and therapeutics, as well as biological-computational interfaces and synthetic biology.
Energy capture, storage and transmission	Breakthroughs in battery and fuel cell efficiency; renewable energy through solar, wind and tidal technologies; energy distribution through smart grid systems, wireless energy transfer and more.
Blockchain and distributed ledger	Distributed ledger technology based on cryptographic systems that manage, verify and publicly record transaction data; the basis of “cryptocurrencies” such as bitcoin.
Geoengineering	Technological intervention in planetary systems, typically to mitigate effects of climate change by removing carbon dioxide or managing solar radiation.
Ubiquitous linked sensors	Also known as the “Internet of Things”. The use of networked sensors to remotely connect, track and manage products, systems and grids.
Neurotechnologies	Innovations such as smart drugs, neuroimaging, and bioelectronic interfaces that allow for reading, communicating and influencing human brain activity.
New computing technologies	New architectures for computing hardware, such as quantum computing, biological computing or neural network processing, as well as innovative expansion of current computing technologies.
Space technologies	Developments allowing for greater access to and exploration of space, including microsatellites, advanced telescopes, reusable rockets and integrated rocket-jet engines.
Virtual and augmented realities	Next-step interfaces between humans and computers, involving immersive environments, holographic readouts and digitally produced overlays for mixed-reality experiences.

Source: *The 12 emerging technologies listed here are drawn from World Economic Forum Handbook on the Fourth Industrial Revolution (forthcoming, 2017).*

**Innovation** enables countries to increase efficiency and productivity and hence advance economic growth and development. But innovation is important beyond productivity considerations. It can be a key driver of inclusion, in particular when coupled with entrepreneurship, as the process of “creative disruption” regularly redistributes rents. It can potentially help to address climate change, demographic challenges, resource scarcity and other global challenges. Additional benefits accrue in societies that embrace innovation in a holistic manner, meaning that they not only rely on large-scale innovations to drive growth, but on a culture of continuous improvement and small-scale innovation.

The way economists and practitioners think about innovation has evolved in recent decades. In the past, the focus was on technological innovation enabling the production of new or more efficient products, services or processes. More recently, the view has expanded to include organizational innovation (e.g. new business models, work practices), social innovation (to meet the needs of society or solve social problems, e.g. charter schools) and public sector innovation. All matter for future preparedness in different ways, but all need a conducive innovation ecosystem to flourish.<sup>28</sup> Such an ecosystem rests on collaboration between different entities and stakeholders, access to information, opportunity to exchange ideas and concrete support systems such as access to finance.

To capture these aspects, the framework includes concepts beyond the conventional measures of R&D, such as the capacity to innovate, openness to new ideas, and enabling factors for fostering entrepreneurship and collaboration.

**Digital readiness** is fundamental to a country’s ability to leverage the Fourth Industrial Revolution – for the private sector, public sector and population in general. In terms of future preparedness, diffusion of technology is a key issue as it enables all sectors of society and the economy to benefit from the Fourth Industrial Revolution. Enabling all sectors of society and the economy to benefit from the Fourth Industrial Revolution implies ensuring that the entire population has the infrastructure to access digital technologies and the skills to leverage it.

Building on the World Economic Forum’s *Global Information Technology Report 2016*,<sup>29</sup> the digital readiness component measures the availability of information and communication technologies (ICTs) and how widely they are used by business, government and individuals. While general infrastructure and skills are part of the economic readiness dimension, elements are included that are specific to ICTs – for instance, public investment in ICTs and the number of secured services reflect ICTs infrastructure, while IT/programming training in schools can reflect skills needs for the Fourth Industrial Revolution.

## Economic Readiness

Future readiness depends on the performance of the economy, and how economic outcomes are distributed through wage and non-wage income. This determines the extent to which people can afford basic needs such as housing, nutrition and healthcare, and consume other goods and services that increase their well-being. In addition, higher income and wealth provide the possibility to accumulate capital to build resilience to future economic shocks and increase people’s freedom of choice over their lives.

Countries at all levels of development can improve long-term economic performance by investing in human capital and infrastructure. However, this will not be sufficient if the economy cannot easily adapt to new trends or is not resilient to risks. Hence, economic readiness takes into account not

only the degree to which an economy is pursuing a long-term strategy with respect to the development of human capital and infrastructure, but also measures of economic agility and resilience, such as openness, the solidity of financial systems and the strength of household wealth.

**Human capital** is a *sine qua non* of future preparedness. The well-being of young and future generations will depend on their capabilities to generate an income and maintain or improve their quality of life. Developing human capital necessitates investing in public health and education, including continuous professional development to equip people from all socio-economic backgrounds with the best skill set to perform well in an evolving economy. In many developing countries this includes unfinished business in terms of ensuring access to education for the whole population. The World Economic Forum *Human Capital Report* provides guidance to countries on their prioritization for developing their human capital.<sup>30</sup>

**Education** curricula need to anticipate and prepare students for future challenges. It is hard to anticipate precisely what skills will be needed, given the speed and complexity of change, but it is likely that cross-cutting skills such as critical thinking will be increasingly important, as well as specific skills for digital and technology-driven economies such as programming and STEM (Science, Technology, Engineering and Math). Many jobs are likely to be disrupted by the Fourth Industrial Revolution, with one study estimating that 47% of US jobs could be automated.<sup>31</sup> Future preparedness requires that education reaches beyond transmission of knowledge and skills to embrace a culture of sustainable development, leadership, global citizenship, resilience, tolerance and freedom.<sup>32</sup> These are important attitudes and values to build a cohesive society that can cope with challenges further discussed in the below section on social cohesion.

**Health** is particularly important in the first years of life, which are central to a person’s future health and learning ability. For instance, the effect of malnutrition and stunting affect cognitive and language development, increases morbidity and mortality and reduces work opportunities and earnings.<sup>33</sup> Broad-based access to healthcare and prevention measures likewise have a lasting positive impact on maternal and children’s health. The framework also assesses risk factors that influence the health of the future population, including those associated with non-communicable diseases – for instance, obesity, high blood pressure, tobacco and alcohol consumption – and communicable diseases, such as access to safe water.<sup>34</sup>

The extensiveness and efficiency of **infrastructure** are critical in determining where economic activity can locate and what kinds of activities or sectors can develop within a country. Well-developed infrastructure reduces the effect of distance between regions, integrating national markets and connecting them at low cost to markets in other countries and regions. It impacts not only economic growth, but also income inequalities.<sup>35</sup> Transport and communications infrastructure is a prerequisite for less-developed communities to access economic activities. Reliable energy infrastructure is key for participation in the Fourth Industrial Revolution.

Although the importance of infrastructure is widely recognized, the world is facing a shortfall in infrastructure investment of \$1 trillion annually.<sup>36</sup> Short political cycles, short-term investment horizons and a lack of viable financing structures and risk assessment frameworks lead to chronic underinvestment in infrastructure. This, in turn, reduces resilience to natural disasters and can create vulnerabilities to risks. Power outages in the United States and collapsing bridges in recent years are a case in point.

Underinvestment can also exacerbate inequality by limiting access to infrastructure – and hence economic opportunities – to only some parts of a country’s population. The framework therefore assesses the level of investment in infrastructure rather than its current state, although data availability is a challenge when studying, for example, the divide between rural and urban in terms of infrastructure.

The last component of the economic readiness dimension is **economic agility** and resilience. For a country to adapt to a changing reality without major frictions, it needs a forward-looking and responsive government able to constantly evolve regulations. Open, competitive markets require firms to adapt and innovate, in part by enabling new firms to enter the market. They ensure that goods and services are not over-priced due to distorted market competition, and that innovation can serve economic goals.

Financial stability is key to the soundness of the entire economy. A healthy and stable financial system allows for long-term investment, makes countries less vulnerable to crises and enables them to bounce back more quickly. Households that are not overburdened with debt also help economies to be resilient to economic shocks.<sup>37</sup>

## Security

Physical safety and security are basic pre-conditions, not only for well-being but for future preparedness. They allow people, businesses and governments to go beyond survival mode and invest in building capabilities for the long term. Conversely, experiencing war, conflict, violence or insecurity not only affects current well-being, but also has long-term, detrimental impacts on the well-being of future generations. The same is true of natural or other environmental disasters.

Ensuring **physical security** is crucial to investing in physical assets and human capital. The OECD report on measuring well-being notes that “experiences of crime and violence can have a strong impact on victims’ physical and mental health in the short and long term”.<sup>38</sup> Violence, wars and conflicts – which are becoming increasingly complex – can impact future generations through various channels. They lead to trauma, displacement and homelessness, disrupt children’s education, weaken government institutions and lower economic growth.<sup>39</sup>

This can make conflict a self-reinforcing cycle: low socio-economic development and weak institutions, for example, are not only consequences of conflict, but also contribute to the conditions that give rise to it. Experiences of violence in early childhood can have lasting effects, while violence against pregnant women – including the effects of weapons such as radiation or mustard gas – can affect unborn children.<sup>40</sup> Research suggests interpersonal violence can significantly weaken a country’s economic future, with the impact of homicide alone in 2015 put at \$1.79 trillion.<sup>41</sup>

The Future Preparedness Framework therefore includes indicators such as the homicide rate, internally displaced people and tolerance toward minorities as determinants of future well-being. Sources of information include the OECD’s *How’s Life? 2015* – which includes indicators such as deaths due to assault, self-reported victimization and feeling safe when walking alone – and the Global Peace Index, which collects information on factors such as violence, militarization and the impact of terrorism, etc.<sup>42</sup>

The second component of the security dimension, **environmental security**, looks at the extent to which today’s generation is depleting natural resources, degrading of the environment, for example, water or air quality, and

contributing to climate change – all of which could impact the health and well-being of future populations. Climate change is the biggest environmental challenge, affecting for instance the future availability of food and fresh water; the frequency of natural disasters such as flood, droughts and heat waves and the intensity of hurricanes; and causing sea levels to rise, threatening coastal settlements.<sup>43</sup> Such natural hazards can create poverty, displace people and ultimately affect younger and future generations.

The extent to which adaptation and mitigation measures are in place – such as effective institutions and governance, innovation and investments in environmentally sound technologies and infrastructure, sustainable livelihoods and behavioural and lifestyle choices<sup>44</sup> – will influence the capacity of countries to bounce back from shocks to future quality of life. Disaster risk reduction includes “reducing exposure to hazards, lessening vulnerability of people and property, wise management of land and the environment, and improving preparedness and early warning for adverse events”.<sup>45</sup> A key data resource here is the *Global Assessment Report on Disaster Risk Reduction*, published by the United Nations Office for Disaster Risk Reduction (UNISDR).<sup>46</sup>

Environmental security includes efficient management of renewable resources, such as wood or fish, to avoid compromising their availability to future generations. The quality of a country’s natural environment in general affects its population’s health and quality of life, through pathways including illnesses caused by pollution and the effects of environmental degradation on agricultural productivity and food security.

Given that natural capital is not included in traditional measures of national accounts, alternative frameworks are needed to give a sense of the situation. One comes from the Global Footprint Network, which estimates that the world is currently consuming resources (such as fish, forests pastures, cropland and fresh water) at 1.6 times the rate that would be sustainable.<sup>47</sup> Another way of thinking about global sustainability comes from Rockström et al, who suggest nine “planetary boundaries”:<sup>48</sup> each defines “limits within which humanity can operate safely to avoid major human-induced environmental change on a global scale”, and three (climate change, rate of biodiversity loss and changes to the global nitrogen cycle) have already been exceeded.

Many institutions have developed frameworks to quantify environmental sustainability at a country level. These include the:

- Global Footprint Network’s National Footprint Accounts display the ecological footprint of 200 countries.<sup>49</sup>
- Environmental Performance Index (EPI) uses 20 indicators to rank countries on ecosystems vitality and environment health.<sup>50</sup>
- University of Notre Dame’s Global Adaptation Index uses 45 indicators to benchmark countries’ vulnerabilities to climate change and readiness to adapt.<sup>51</sup>

The indicators included in the Future Preparedness Framework will measure environmental protection, biodiversity and the degree to which the use of natural resource compromises the needs of future generations. This set of indicators will help long term planning toward environmental sustainability.

## Social Cohesion

People's well-being depends on the way they interact with others in society and the way society functions as a whole. The quality of an individual's personal relationships, formal and informal social networks and family ties are crucial to individual well-being. Well-functioning, cohesive societies can improve the quality of these relationships, increasing the non-material side of quality of life, while also facilitating smooth political decision making by reflecting a high degree of alignment behind a vision for society. Children that grow up in such societies carry forward this vision; a cohesive society therefore ensures social sustainability well into the future. The most future-prepared societies combine this strong social fabric with freedom of choice and tolerance towards different lifestyles and minority societal groups.

The **intergenerational balance** category captures the demographic challenges faced by most countries arising from changing population dynamics – in varying degrees, rising longevity, migration or the need to create opportunities for a bulging youth population.

**Demographic risk** is one of the two sub-categories. The world population was estimated at 7.3 billion in 2015 and is expected to reach 9.3 billion by 2050.<sup>52</sup> Life expectancy increased from 67 years in 2000-2005 to 70 years in 2010-2015, and is projected to rise to 77 years by 2045-2050. Despite these trends, 48 countries will experience their population shrinking between 2015 and 2050. Europe's population, for instance, is expected to reduce by 32 million by 2050. The number of persons aged 60 and above is expected to more than double by 2050, becoming equivalent to the number of children under the age of 15 and calling into question the sustainability of health and public pension systems. The International Monetary Fund (IMF) has computed that if life expectancy were to increase by three years more than expected (called "life expectancy risk"), the costs associated with ageing would increase by 50%.<sup>53</sup> Countries need to put measures in place to address these risks and anticipate further demographic shifts to avoid leaving the younger and future generations an unsustainable level of public debt and tax, which could negatively impact growth and their well-being.

As longevity increases, the interests of older generations need to be balanced with the interests of the young. In many democratic countries, short-termism prevails as rising older populations bias policies towards their interests. Ensuring **equality of opportunity for the young** is therefore the second sub-category of the intergenerational balance category. The Future Preparedness Framework sees intergenerational equality of opportunities as including breaking the vicious cycle of poverty and ensuring that younger and future populations have access to employment and housing, and are represented in political decision-making processes.

Opportunities for younger and future generations are particularly endangered by inequality – of gender, education, wealth, etc. For instance, children living in urban areas are up to 30% more likely to complete primary school than children in rural areas.<sup>54</sup> Restricting opportunities for the less well-off can also lead to social tensions and instability, affecting growth.<sup>55</sup> To account for the equality in terms of opportunities, the Future Preparedness Framework includes indicators such as Pisa social mobility, which measures the relationship between the socio-economic background of students and their test scores, youth unemployment and gender inequality.

Another dimension of intergenerational equality of opportunities is ensuring that the younger generation has a voice in the political decision-making process and their

interests are taken into account in the development of legislation. As discussed in Box 6 above, some countries have included future generations in their constitutions. The UNDP report *Humanity Divided: Confronting Inequality in Developing Countries* suggests other ways to strengthen political participation, such as a "regulatory and political environment that is conducive to the formation and effective functioning of civil society organizations and in which these are seen as legitimate participants".<sup>56</sup>

**Social fabric** is the second category of the social cohesion dimension. Its influence on future preparedness can be seen through multiple channels:

- The quality of social relationships, and being able to rely on someone in times of need, contributes to well-being, strengthens individual resilience and drive growth.<sup>57</sup>
- Strong social support helps build personal resilience and hence makes communities better prepared. For instance, studies have shown that social support can enhance resilience to stress.<sup>58</sup>
- Support for a common vision and a participative, decentralized process of decision-making are key to ensuring that resources are deployed efficiently towards a country's long-term goals.
- Trust in others and in public and private institutions improves how a community functions by reducing transaction costs, and increases overall well-being. Studies suggest that high levels of trust in a society can be passed on to rising generations and hence remain fairly stable over long periods.<sup>59</sup>

**Social capital** encompasses the quality of interpersonal relationships (including trust), strength of communities (social network support), and trust and cooperative norms (rule of law).<sup>60</sup> Social capital is important for future well-being in part because it leads to economic growth<sup>61</sup> – higher trust results in better-functioning economies and governments, more open markets and less corruption.<sup>62</sup> One recent study found that measures of social capital powerfully predict how measures of subjective well-being will evolve.<sup>63</sup> Another notes the link between social capital and measures of happiness. Switzerland and Scandinavian countries are among those scoring highly on measures of social capital and happiness, as well as affluence.<sup>64</sup>

The OECD defines social capital as "networks together with shared norms, values and understandings that facilitate cooperation within or among groups".<sup>65</sup> Other definitions stress the productive value of social connections in increasing well-being. The Future Preparedness Framework aims to capture the strength of a society to face challenges and its agility to grasp opportunities by looking at indicators such as the volunteering rate, youth suicide rate, and trust in others and in institutions.

Creating a **shared long-term vision** can increase the well-being of future generations by building a common sense of identity and belonging among a country's population and helping to avoid the polarization that may be caused by factors such as diverging incomes for different societal groups. It depends on civic participation and features of institutions that are conducive towards long-term decision-making, along with a multistakeholder process to secure buy-in. In Singapore, a shared long-term vision (see Box 3) has enabled the country to define goals and put resources behind them. Indicators intended to capture these concepts include the presence of a formalized long-term vision for the country, e-participation, budgeting horizons and stakeholders' engagement in regulatory decisions.

## Data collection and indicators

The Future Preparedness Framework examines the relative strength of efforts to proactively manage long-term risks and leverage opportunities inherent in long-term trends. It explicitly relies on forward-looking indicators that signal if countries are putting into place measures to ensure the well-being of younger and future generations. It will enable countries to benchmark themselves against their peers on selected dimensions, using an interactive tool. To accommodate a diversity of possible future outcomes and allow countries to benchmark the dimensions that matter to them most, it is not intended to prove an aggregate measure of future preparedness, but rather a flexible, interactive tool that aggregates data on each of the dimensions and allows the user to choose the weighting.

A preliminary list of indicators for each domain and category is provided in Appendix 1. Types of data used in the framework will include:

- Traditional statistical data collected by organizations such as the IMF, WHO, UNESCO and OECD.
- Qualitative data relying on surveys to capture the opinions of business executives (from the World Economic Forum's Executive Opinion Survey<sup>66</sup>) and populations (such as the World Value Survey). Qualitative data is necessary as traditional statistical data cannot capture subjective and qualitative elements of well-being.
- New types of data such as big data or satellite imagery.

On the latter, the framework intends to make explicit use of new data sources that are increasingly becoming available through the digitalization of human activities, such as internet searches, geospatial data, social network data and personalized health data. Table 2 shows a selection of the categorization of new forms of data by the OECD.<sup>67</sup> New technologies should open up more opportunities to collect better data, although they often require deep public-private collaboration. Many statistical data collection systems will need a fundamental overhaul to capture latest developments; a review of statistical systems with this objective in mind is underway in, for example, the UK.<sup>68</sup>

Despite advances in data collection, many concepts related to future preparedness are not yet measurable or country coverage is insufficient. This includes, for example, resilience to natural disasters as well as some concepts related to social cohesion and social capital. The high cost of data collection also prevents countries from collecting environmental data on a regular basis. Continued investment in better data and broader data coverage will therefore be necessary. As the goal of the exercise is to cover as many countries as possible, not all concepts will be measured for all countries.

**Table 2: New forms of data**

Category	Description	Sub-category	Examples
Internet usage	Internet data, deriving from search and social networking activities	Search terms	Google©; Bing©; Yahoo© search activity
		Website interactions	Visit statistics; user generated content
		Downloads	Music; films; TV
		Social networks	Facebook©; Twitter©; LinkedIn©
		Blogs; news sites	Reddit
Tracking data	Tracking data, monitoring the movement of individuals or physical objects subject to movement by humans	CCTV images	Security/safety camera recordings
		Traffic sensors	Vehicle tracking records; vehicle movement records
		Mobile phone locations	GPS data
Satellite and aerial imagery	Image data, particularly aerial and satellite images but including land-based	Visible light spectrum	Google Earth©
		Night-time visible radiation	Landsat
		Infrared; radar mapping	

Source: OECD, *New Data for Understanding the Human Condition*, 2013.



# Conclusions

Continuing to increase well-being for future generations requires long-term thinking that in recent years has given way to a relentless immediacy of pressures as change accelerates, information spreads faster and emotions dominate political debates. Short-termism, driven by a need for quick returns in terms of political support, has been on the rise and constraining the policy space for long-term measures.

The World Economic Forum seeks to contribute to this important debate about what makes countries equipped for the long term by presenting a conceptual framework to measure the future preparedness of countries understood as the well-being of young and future generations.

This white paper has introduced a first draft of the Future Preparedness Framework – a proposed framework to measure how well countries prepare for the future. It defines future preparedness as a country's capacity to increase the well-being of young and future generations by proactively managing long-term risks and leveraging opportunities inherent in long-term trends.

The framework builds on existing work and on the World Economic Forum's expertise in benchmarking, and was developed based on expert inputs. It comprises four dimensions, covering nine categories:

- **Fourth Industrial Revolution readiness** (innovation, digital readiness)
- **Economic readiness** (human capital, infrastructure readiness, economic agility)
- **Security** (physical, environmental)
- **Social cohesion** (intergenerational balance and social fabric)

This paper presents work in progress and is intended as a basis for discussion and inputs in order to further develop the framework to be presented in Fall 2017. The Forum welcomes feedback from all readers at [gcp@weforum.org](mailto:gcp@weforum.org).

# Appendix: Potential Indicators

## Fourth Industrial Revolution Readiness

### Innovation.....

<b>Name:</b>	<b>Globally ranked universities</b>
Description:	Ranking of over 900 universities based on assessment of over 3,800 universities. Top 400 universities receive individual rankings and the remainder are ranked in groups. Based on six indicators: academic reputation, employer reputation, citations per faculty, international faculty ratio and international student ratios.
Source:	QS World University Rankings 2016/2017 – Global Press Release. <a href="http://www.topuniversities.com/student-info/university-news/qs-world-university-rankings-20162017-global-press-release">http://www.topuniversities.com/student-info/university-news/qs-world-university-rankings-20162017-global-press-release</a>

<b>Name:</b>	<b>Number of scientific and technical articles</b>
Description:	Number the scientific articles per 1,000 population. This takes into account scientific and engineering articles published in physics, biology, chemistry, mathematics, clinical medicine, biomedical research, engineering and technology, and earth and space sciences.
Source:	World Bank, <i>World Development Indicators</i> (WDI)

<b>Name:</b>	<b>Research and development expenditure (% of GDP)</b>
Description:	Expenditures for research and development are current and capital expenditures (both public and private) on creative work undertaken systematically to increase knowledge, including knowledge of humanity, culture and society, and the use of knowledge for new applications. R&D covers basic research, applied research and experimental development.
Source:	United Nations Educational, Scientific and Cultural Organization (UNESCO) Institute for Statistics

<b>Name:</b>	<b>Capacity for business innovation</b>
Description:	Executive Opinion Survey: In your country, to what extent do companies have the capacity to innovate? [1 = not at all; 7 = to a great extent]
Source:	World Economic Forum

<b>Name:</b>	<b>Attitudes toward entrepreneurial risk</b>
Description:	Executive Opinion Survey: In your country, to what extent do people have an appetite for entrepreneurial risk? [1 = not at all; 7 = to a great extent]
Source:	World Economic Forum

<b>Name:</b>	<b>Government procurement of advanced technology products</b>
Description:	Executive Opinion Survey: In your country, to what extent do government purchasing decisions foster innovation? [1 = not at all; 7 = to a great extent]
Source:	World Economic Forum

<b>Name:</b>	<b>Business Incubators</b>
Description:	Availability and performance of incubators as a tool to support commercialization of new innovative business ideas
Source:	UBI Global

<b>Name:</b>	<b>Property rights</b>
Description:	Executive Opinion Survey: In your country, to what extent are property rights, including financial assets, protected? [1 = not at all; 7 = to a great extent]
Source:	World Economic Forum

<b>Name:</b>	<b>Public attitude towards science</b>
Description:	Questions: 1. Science and technology are healthier, easier, and more comfortable [1 = Completely disagree; 10 = Completely disagree]; 2. It is not important for me to know about science in my daily life [1 = completely disagree, 10 = completely agree]; 3. The world is better off, or worse off, because of science and technology [1 = a lot worse off; 10 = a lot better off]
Source:	World Values Survey

<b>Name:</b>	<b>Government success in ICT promotion</b>
Description:	Executive Opinion Survey: In your country, how successful is the government in promoting the use of ICTs? [1 = not successful at all; 7 = extremely successful]
Source:	World Economic Forum

<b>Name:</b>	<b>Growth of innovative companies</b>
Description:	Executive Opinion Survey: In your country, to what extent do new companies with innovative ideas grow rapidly? [1 = not at all; 7 = to a great extent]
Source:	World Economic Forum

<b>Name:</b>	<b>Collaboration between companies</b>
Description:	Executive Opinion Survey: In your country, to what extent do companies collaborate in sharing ideas and innovating? [1 = not at all; 7 = to a great extent]
Source:	World Economic Forum

#### Digital Readiness.....

<b>Name:</b>	<b>Availability of latest technologies</b>
Description:	Executive Opinion Survey: In your country, to what extent are the latest technologies available? [1 = not at all; 7 = to a great extent]
Source:	World Economic Forum

<b>Name:</b>	<b>ICT use for business-to-business transactions</b>
Description:	Executive Opinion Survey: In your country, to what extent do businesses use ICTs for transactions with other businesses? [1 = not at all; 7 = to a great extent]
Source:	World Economic Forum

<b>Name:</b>	<b>Internet use for business-to-consumer transactions</b>
Description:	Executive Opinion Survey: In your country, to what extent do businesses use the Internet for selling their goods and services to consumers? [1 = not at all; 7 = to a great extent]
Source:	World Economic Forum

<b>Name:</b>	<b>Evolution of mobile-cellular telephone subscriptions</b>
Description:	Number of mobile-cellular telephone subscriptions per 100 population. It includes post-paid subscriptions, active prepaid accounts (i.e. that have been active during the past three months), and all mobile-cellular subscriptions that offer voice communications. Percentage change over the past 5 years.
Source:	International Telecommunication Union (ITU), World Telecommunication/ICT Indicators Database 2016

<b>Name:</b>	<b>Mobilebroadband subscriptions</b>
Description:	Number of active mobile-broadband subscriptions per 100 population. It includes standard mobile broadband subscriptions and dedicated mobile broadband data subscriptions to the public internet.
Source:	International Telecommunication Union (ITU), World Telecommunication/ICT Indicators Database 2016

<b>Name:</b>	<b>Fibre internet subscriptions</b>
Description:	Number of internet subscriptions using fibre-to-the-home or fibre-to-the-building; at downstream speeds equal to or greater than 256 kbit/s per 100 population. It includes subscriptions where fibre goes directly to the subscriber's premises or fibre-to-the-building subscriptions that terminate no more than 2 meters from an external wall of the building. Fibre-to-the-cabinet and fibre-to-the-node are excluded.
Source:	International Telecommunication Union (ITU), World Telecommunication/ICT Indicators Database 2016

<b>Name:</b>	<b>Evolution of internet users</b>
Description:	Percentage of individuals who used the internet from any location and for any purpose, irrespective of the device and network used, in the last three months. Percentage change over the past 5 years.
Source:	International Telecommunication Union (ITU), World Telecommunication/ICT Indicators Database 2016

<b>Name:</b>	<b>Growth of IP addresses</b>
Description:	Number of IP addresses; percentage over the past year.
Source:	CIPB, <a href="https://www.countryipblocks.net/allocation-of-ip-addresses-by-country.php">https://www.countryipblocks.net/allocation-of-ip-addresses-by-country.php</a>

<b>Name:</b>	<b>Quality of math and science education</b>
Description:	Executive Opinion Survey: In your country, how do you assess the quality of math and science education? [1 = extremely poor – among the worst in the world; 7 = excellent – among the best in the world]
Source:	World Economic Forum

<b>Name:</b>	<b>Programming/IT skills in school</b>
Description:	Executive Opinion Survey: In your country, to what extent does the active population possess sufficient digital skills (e.g., computer skills, basic coding, digital reading)? [1 = not at all; 7 = to a great extent]
Source:	World Economic Forum

<b>Name:</b>	<b>Mobile network coverage rate</b>
Description:	Percentage of total population covered by a mobile network signal. This indicator measures the percentage of inhabitants who are within range of a mobile cellular signal, irrespective of whether or not they are subscribers. This is calculated by dividing the number of inhabitants within range of a mobile cellular signal by the total population. Note that this is not the same as the mobile subscription density or penetration.
Source:	International Telecommunication Union (ITU), ITU World Telecommunication/ICT Indicators Database 2015 (December 2015 edition), <a href="http://www.itu.int/en/ITU-D/Statistics/Pages/publications/wtid.aspx">http://www.itu.int/en/ITU-D/Statistics/Pages/publications/wtid.aspx</a>

<b>Name:</b>	<b>Secure internet servers per million population</b>
Description:	Secure internet servers are servers using encryption technology in internet transactions.
Source:	The World Bank, World Development Indicators

<b>Name:</b>	<b>Public investment in ICT infrastructure</b>
Description:	Total ICT expenditures as a share of central government expenditures
Source:	OECD. 2013. Government at a Glance 2013. Paris: OECD Publishing

## Economic Readiness

### Human Capital.....

#### Education

<b>Name:</b>	<b>Critical thinking in teaching</b>
Description:	Executive Opinion Survey: In your country, how do you assess the style of teaching? [1 = frontal, teacher based, and focused on memorizing; 7 = encourages creative and critical individual thinking]
Source:	World Economic Forum

<b>Name:</b>	<b>School life expectancy</b>
Description:	Total number of years of schooling (primary through tertiary) that a child can expect to receive, assuming that the probability of his or her being enrolled in school at any particular future age is equal to the current enrolment ratio at that age.
Source:	UNESCO Institute for Statistics, <a href="http://data.uis.unesco.org">http://data.uis.unesco.org</a>

<b>Name:</b>	<b>Quality of primary education</b>
Description:	Executive Opinion Survey: In your country, how do you assess the quality of primary schools? [1 = extremely poor - among the worst in the world; 7 = excellent - among the best in the world]
Source:	World Economic Forum

<b>Name:</b>	<b>Out-of-school children of primary school age, both sexes (number)</b>
Description:	Children in the official primary school age range who are not enrolled in either primary or secondary schools.
Source:	World Bank World Development Indicators and UNESCO Institute for Statistics

<b>Name:</b>	<b>Government expenditure per student, primary (% of GDP per capita)</b>
Description:	Government expenditure per student is the average general government expenditure (current, capital and transfers) per student in the given level of education, expressed as a percentage of GDP per capita.
Source:	World Bank World Development Indicators and UNESCO Institute for Statistics

<b>Name:</b>	<b>Lower secondary completion rate, total (% of relevant age group)</b>
Description:	Lower secondary education completion rate is measured as the gross intake ratio to the last grade of lower secondary education (general and pre-vocational). It is calculated as the number of new entrants in the last grade of lower secondary education, regardless of age, divided by the population at the entrance age for the last grade of lower secondary education.
Source:	World Bank World Development Indicators and UNESCO Institute for Statistics

<b>Name:</b>	<b>Lifelong learning</b>
Description:	Executive Opinion Survey: In your country, to what extent do companies invest in training and employee development? [1 = not at all; 7 = To a great extent]
Source:	World Economic Forum

<b>Name:</b>	<b>Youth literacy rate, population 15-24 years, both sexes (%)</b>
Description:	Number of people age 15 to 24 years who can both read and write with understanding a short simple statement on their everyday life, divided by the population in that age group. Generally, "literacy" also encompasses "numeracy", the ability to make simple arithmetic calculations. Divide the number of people aged 15 to 24 years who are literate by the total population in the same age group and multiply the result by 100.
Source:	World Bank World Development Indicators and UNESCO Institute for Statistics

<b>Name:</b>	<b>STEM education performance</b>
Description:	Student performance in science (mean score) and student performance in maths (mean score)
Source:	OECD, Programme for International Student Assessment (PISA) <a href="http://www.oecd.org/pisa/data">http://www.oecd.org/pisa/data</a>

<b>Name:</b>	<b>Active labour market policies</b>
Description:	Executive Opinion Survey: In your country, to what extent do labor market policies help unemployed people to reskill and find new employment (including skills matching, retraining, etc.)? [1 = not at all; 7 = to a great extent]
Source:	World Economic Forum

<b>Name:</b>	<b>Country capacity to attract talent</b>
Description:	Executive Opinion Survey: To what extent does your country retain talented people? [1 = not at all – the best and brightest leave to pursue opportunities abroad; 7 = to a great extent – the best and brightest stay and pursue opportunities in the country]
Source:	World Economic Forum

<b>Name:</b>	<b>Ease of hiring foreign labour</b>
Description:	Executive Opinion Survey: In your country, how restrictive are regulations related to the hiring of foreign labour? [1 = highly restrictive; 7 = not restrictive at all]
Source:	World Economic Forum

### Health

<b>Name:</b>	<b>Prevalence of stunting, height for age (% of children under 5)</b>
Description:	Prevalence of stunting is the percentage of children under age 5 whose height for age is more than two standard deviations below the median for the international reference population ages 0-59 months. For children up to two years old height is measured by recumbent length. For older children height is measured by stature while standing.
Source:	World Health Organization, Global Database on Child Growth and Malnutrition Country-level data are unadjusted data from national surveys, and thus may not be comparable across countries. Adjusted, comparable data are available at <a href="http://who.int/nutgrowthdb/en">who.int/nutgrowthdb/en</a> . Aggregation is based on UNICEF, WHO and the World Bank harmonized dataset (adjusted, comparable data) and methodology.

<b>Name:</b>	<b>Prevalence of underweight, weight for age (% of children under 5)</b>
Description:	Prevalence of underweight children is the percentage of children under age 5 whose weight for age is more than two standard deviations below the median for the international reference population ages 0-59 months.
Source:	World Health Organization, Global Database on Child Growth and Malnutrition. Country-level data are unadjusted data from national surveys, and thus may not be comparable across countries. Adjusted, comparable data are available at <a href="http://who.int/nutgrowthdb/en">who.int/nutgrowthdb/en</a> . Aggregation is based on UNICEF, WHO and the World Bank harmonized dataset (adjusted, comparable data) and methodology.

<b>Name:</b>	<b>Health prevention expenditure</b>
Description:	Health expenditure and financing for preventive care as share of GDP
Source:	OECD Health Statistics, <a href="http://stats.oecd.org/index.aspx?DataSetCode=HEALTH_STAT">http://stats.oecd.org/index.aspx?DataSetCode=HEALTH_STAT</a>

<b>Name:</b>	<b>Overweight – risk factor</b>
Description:	Prevalence (percentage) of adults (age 18+) with a body mass index greater than or equal to 25 kg/m <sup>2</sup> .
Source:	WHO, <a href="http://gamapserver.who.int/gho/interactive_charts/ncd/risk_factors/overweight/atlas.html">http://gamapserver.who.int/gho/interactive_charts/ncd/risk_factors/overweight/atlas.html</a>

<b>Name:</b>	<b>Tobacco use – risk factor</b>
Description:	Prevalence (percentage) of smoking of any tobacco product (cigarettes, cigars, pipes, or other smoked tobacco product) by people age 15+, based on analysis of full set of tobacco use surveys.
Source:	WHO, <a href="http://www.who.int/gho/tobacco/use/en">http://www.who.int/gho/tobacco/use/en</a>

<b>Name:</b>	<b>Alcohol use – risk factor</b>
Description:	Total per capita (15+ years) alcohol consumption measured in litres of pure alcohol (“APC”) in a calendar year, including both recorded and unrecorded APC.
Source:	WHO, <a href="http://apps.who.int/gho/indicatorregistry/App_Main/view_indicator.aspx?iid=465">http://apps.who.int/gho/indicatorregistry/App_Main/view_indicator.aspx?iid=465</a>

<b>Name:</b>	<b>Access to healthcare</b>
Description:	Executive Opinion Survey: In your country, how accessible is healthcare to all individuals? [1 = limited – only the privileged have access to health care; 7 = universal – all individuals have access to healthcare]
Source:	World Economic Forum

<b>Name:</b>	<b>Healthy life expectancy (HALE)</b>
Description:	Healthy life expectancy at birth is the average number of years that a person can expect to live in “full health” by taking into account years lived in less than full health due to disease and/or injury. Lost health years are estimated as years lost due to disability per capital, adjusted for independent comorbidity.
Source:	WHO, <a href="http://apps.who.int/gho/indicatorregistry/App_Main/view_indicator.aspx?iid=66">http://apps.who.int/gho/indicatorregistry/App_Main/view_indicator.aspx?iid=66</a>

### Infrastructure Readiness.....

<b>Name:</b>	<b>Infrastructure investment</b>
Description:	Sum of four data points: 1. Investment in water and sanitation with private participation (current US\$) 2. Investment in transport with private participation (current US\$) 3. Investment in telecoms with private participation (current US\$) 4. Investment in energy with private participation (current US\$)
Source:	World Bank, Private Participation in Infrastructure Project Database ( <a href="http://ppi.worldbank.org">http://ppi.worldbank.org</a> )

<b>Name:</b>	<b>Improved water source, rural (% of rural population with access)</b>
Description:	Access to an improved water source refers to the percentage of the population using an improved drinking water source. The improved drinking water source includes piped water on premises (piped household water connection located inside the user’s dwelling, plot or yard), and other improved drinking water sources (public taps or standpipes, tube wells or boreholes, protected dug wells, protected springs and rainwater collection).
Source:	World Bank, WHO/UNICEF Joint Monitoring Programme (JMP) for Water Supply and Sanitation ( <a href="http://wssinfo.org">wssinfo.org</a> )

### Economic Agility.....

<b>Name:</b>	<b>Openness to trade and investment</b>
Description:	Average of the Executive Opinion Survey questions: 1. To what extent do non-tariff barriers limit the ability of imported goods to compete in the domestic market? [1 = Strongly limit; 7 = Do not limit at all] 2. How prevalent is foreign ownership of companies? [1 = Extremely rare; 7 = Extremely prevalent] 3. How restrictive are rules and regulations on foreign direct investment? [1 = Extremely restrictive; 7 = Not restrictive at all]
Source:	World Economic Forum

<b>Name:</b>	<b>Level of concentration in the economy</b>
Description:	Concentration index, also named Herfindahl-Hirschmann Index (Product HHI), is a measure of the degree of product concentration. An index value closer to 1 indicates a country’s exports or imports are highly concentrated on a few products. On the contrary, values closer to 0 reflect exports or imports are more homogeneously distributed among a series of products.
Source:	UNCTAD, <a href="http://unctadstat.unctad.org/wds/TableView/tableView.aspx?ReportId=120">http://unctadstat.unctad.org/wds/TableView/tableView.aspx?ReportId=120</a>

<b>Name:</b>	<b>Extent of market dominance</b>
Description:	Executive Opinion Survey: In your country, how do you characterize corporate activity? [1 = dominated by a few business groups; 7 = spread among many firms]
Source:	World Economic Forum

<b>Name:</b>	<b>Intensity of local competition</b>
Description:	Executive Opinion Survey: In your country, how intense is competition in the local markets? [1 = not intense at all; 7 = extremely intense]
Source:	World Economic Forum

<b>Name:</b>	<b>Time required to start a business</b>
Description:	Number of days required to start a business
Source:	World Bank/International Finance Corporation, Doing Business 2016: Measuring Regulatory Quality and Efficiency

<b>Name:</b>	<b>Corruption Perception Index</b>
Description:	Average score across the five components of the following Executive Opinion Survey question: In your country, how common is it for firms to make undocumented extra payments or bribes connected with (a) imports and exports; (b) public utilities; (c) annual tax payments; (d) awarding of public contracts and licenses; (e) obtaining favourable judicial decisions? In each case, the answer ranges from 1 [very common] to 7 [never occurs]
Source:	World Economic Forum

<b>Name:</b>	<b>Regulatory agility</b>
Description:	Executive Opinion Survey: In your country, to what extent does the government respond effectively to change (e.g. technological changes, societal and demographic trends, security and economic challenges)? [1 = not at all; 7 = to a great extent]
Source:	World Economic Forum

<b>Name:</b>	<b>Gross capital formation (% of GDP)</b>
Description:	Gross capital formation (formerly gross domestic investment) consists of outlays on additions to the fixed assets of the economy plus net changes in the level of inventories. Fixed assets include land improvements (fences, ditches, drains, etc.); plant, machinery and equipment purchases; and the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings. Inventories are stocks of goods held by firms to meet temporary or unexpected fluctuations in production or sales, and "work in progress". According to the 1993 SNA, net acquisitions of valuables are also considered capital formation.
Source:	World Bank national accounts data OECD National Accounts data files

<b>Name:</b>	<b>Financial stability</b>
Description:	Average of the indicators:  1. Executive Opinion Survey: In your country, how do you assess the soundness of banks? [1 = extremely low – banks may require recapitalization; 7 = extremely high – banks are generally healthy with sound balance sheets] 2. Executive Opinion Survey: In your country, to what extent do regulators ensure the stability of the financial market? [1 = not at all; 7 = to a great extent] 3. Degree of legal protection of borrowers' and lenders' rights on a 0–12 (best) scale: This index measures the degree to which collateral and bankruptcy laws protect borrowers' and lenders' rights and thus facilitate lending. For more details about the methodology employed and the assumptions made to compute this indicator, visit <a href="http://www.doingbusiness.org/methodologysurveys">http://www.doingbusiness.org/methodologysurveys</a> .
Source:	World Economic Forum and World Bank/International Finance Corporation, Doing Business 2016: Measuring Regulatory Quality and Efficiency

<b>Name:</b>	<b>Efficacy of corporate boards</b>
Description:	Executive Opinion Survey: In your country, to what extent is management accountable to investors and boards of directors? [1 = not at all; 7 = to a great extent]
Source:	World Economic Forum

<b>Name:</b>	<b>Inflation</b>
Description:	Annual percent change in consumer price index (year average)
Source:	International Monetary Fund



## Security

### Physical Security.....

<b>Name:</b>	<b>Relationships with neighbouring countries</b>
Description:	Assessment made by Economist Intelligence Unit's country analysis team annually [1 = peaceful (no attacks since 1950), 2 = low (aggressiveness in speeches or protectionist measures), 3 = moderate (serious tensions, restrictions), 4 = aggressive (open conflict), 5 = very aggressive (frequent invasions)]
Source:	Global Peace Index 2016, <a href="http://static.visionofhumanity.org/sites/default/files/GPI%202016%20Report_2.pdf">http://static.visionofhumanity.org/sites/default/files/GPI%202016%20Report_2.pdf</a>

<b>Name:</b>	<b>Global Restrictions on Religion 2007-2014</b>
Description:	Includes government restrictions on religion and social hostilities involving religion. Government Restrictions Index includes laws, policies and government actions, comprised of 20 measures of restrictions; Social Hostilities Index measures actions of religious hostility by private individuals, organizations and/or groups, comprised of 13 measures of social hostilities.
Source:	Pew Research Center, <a href="http://www.pewforum.org/datasets/global-restrictions-on-religion-2007-2014">http://www.pewforum.org/datasets/global-restrictions-on-religion-2007-2014</a>

<b>Name:</b>	<b>Tolerance toward minorities</b>
Description:	Question: Who would you not like to have as neighbours: people of a different race/immigrants/people of a different religion? [mentioned/not mentioned]
Source:	World Values Survey, <a href="http://www.worldvaluessurvey.org/WVSONline.jsp">http://www.worldvaluessurvey.org/WVSONline.jsp</a>

<b>Name:</b>	<b>Discrimination and violence toward minorities</b>
Description:	Group grievance: includes discrimination, powerlessness, ethnic violence, communal violence, sectarian violence and religious violence.
Source:	Fund for Peace Fragile State Index <a href="http://fsi.fundforpeace.org/indicators">http://fsi.fundforpeace.org/indicators</a>

<b>Name:</b>	<b>Terrorism incidence</b>
Description:	Index (1–7 best) averaging the number of terrorism-related casualties (injuries plus fatalities) and the number of terrorist attacks, each normalized separately.
Source:	World Economic Forum's calculations, based on data from the National Consortium for the Study of Terrorism and Responses to Terrorism (START) (2015), Global Terrorism Database <a href="http://www.start.umd.edu/gtd">http://www.start.umd.edu/gtd</a>

<b>Name:</b>	<b>Intentional homicides (per 100,000 people)</b>
Description:	Intentional homicides are estimates of unlawful homicides purposely inflicted as a result of domestic disputes, interpersonal violence, violent conflicts over land resources, intergang violence over turf or control, and predatory violence and killing by armed groups. Intentional homicide does not include all intentional killing; the difference is usually in the organization of the killing. Individuals or small groups usually commit homicide, whereas killing in armed conflict is usually committed by fairly cohesive groups of up to several hundred members and is thus usually excluded.
Source:	UN Office on Drugs and Crime's International Homicide Statistics database

<b>Name:</b>	<b>Persons detained</b>
Description:	Persons held in prisons, penal institutions or correctional institutions means persons held in prisons, penal institutions or correctional institutions on a specified day and should exclude non-criminal prisoners held for administrative purposes, for example, persons held pending investigation into their immigration status or foreign citizens without a legal right to stay.
Source:	UNODC, <a href="https://data.unodc.org/#state:1">https://data.unodc.org/#state:1</a>

<b>Name:</b>	<b>Internally displaced persons</b>
Description:	Internally displaced persons (IDPs) are people or groups of individuals who have been forced to leave their homes or places of habitual residence, in particular as a result of, or in order to avoid the effects of armed conflict, situations of generalized violence, violations of human rights, or natural or human-made disasters, and who have not crossed an international border. For the purposes of UNHCR's statistics, this population only includes conflict-generated IDPs to whom the office extends protection and/or assistance. Since 2007, the IDP population also includes people in an IDP-like situation.
Source:	UNHCR, <a href="http://popstats.unhcr.org/en/overview">http://popstats.unhcr.org/en/overview</a>

<b>Name:</b>	<b>Insurance penetration – total gross premium</b>
Description:	US dollar, millions
Source:	OCED, <a href="https://stats.oecd.org/Index.aspx?DataSetCode=INSIND">https://stats.oecd.org/Index.aspx?DataSetCode=INSIND</a>

<b>Name:</b>	<b>Property rights</b>
Description:	Executive Opinion Survey: In your country, to what extent are property rights, including financial assets, protected? [1 = not at all; 7 = to a great extent]
Source:	World Economic Forum

<b>Name:</b>	<b>Natural disasters – Population affected</b>
Description:	
Source:	EM-DAT - International Disaster Database

<b>Name:</b>	<b>Natural disasters – Total events by type</b>
Description:	
Source:	EM-DAT - International Disaster Database

### Environmental Security.....

<b>Name:</b>	<b>Environment protection enforcement</b>
Description:	Executive Opinion Survey: How do you assess the stringency of your country's environmental regulations? [1 = very lax; 7 = among the world's most stringent/rigorous]  How do you assess the enforcement of environmental regulations? [1 = very lax; 7 = among the world's most stringent/rigorous]
Source:	World Economic Forum

<b>Name:</b>	<b>Annual freshwater withdrawals, total (% of internal resources)</b>
Description:	Annual freshwater withdrawals refer to total water withdrawals, not counting evaporation losses from storage basins. Withdrawals also include water from desalination plants in countries where they are a significant source. Withdrawals can exceed 100% of total renewable resources where extraction from non-renewable aquifers or desalination plants is considerable or where there is significant water reuse. Withdrawals for agriculture and industry are total withdrawals for irrigation and livestock production and for direct industrial use (including withdrawals for cooling thermoelectric plants). Withdrawals for domestic uses include drinking water, municipal use or supply, and use for public services, commercial establishments and homes.
Source:	Food and Agriculture Organization (FAO), AQUASTAT data

<b>Name:</b>	<b>Adjusted savings: energy depletion (% of GNI)</b>
Description:	Energy depletion is the ratio of the value of the stock of energy resources to the remaining reserve lifetime (capped at 25 years). It covers coal, crude oil and natural gas.
Source:	World Bank staff estimates based on sources and methods in World Bank's "The Changing Wealth of Nations: Measuring Sustainable Development in the New Millennium", 2011.

<b>Name:</b>	<b>Renewable electricity output (% of total electricity output)</b>
Description:	Renewable electricity is the share of electricity generated by renewable power plants in total electricity generated by all types of plants.
Source:	OECD/IEA and World Bank, based on IEA data in IEA World Energy Balances; OECD/IEA 2013 edition, subject to <a href="https://www.iea.org/t&amp;c/termsandconditions">https://www.iea.org/t&amp;c/termsandconditions</a>

<b>Name:</b>	<b>Species protection</b>
Description:	This indicator measures the total number of Critically Endangered, Endangered and Vulnerable species as a percentage of total known species for mammals, birds and amphibians.
Source:	International Union for Conservation of Nature (IUCN), Red List of Threatened Species

<b>Name:</b>	<b>Marine protected areas (% of territorial waters)</b>
Description:	Marine protected areas are areas of intertidal or subtidal terrain – and overlying water and associated flora and fauna and historical and cultural features – that have been reserved by law or other effective means to protect part or all of the enclosed environment.
Source	United Nations Environmental Programme (UNEP) and the World Conservation Monitoring Centre (WCMC), as compiled by the World Resources Institute, based on data from national authorities, national legislation and international agreements.

<b>Name:</b>	<b>Forest cover change</b>
Description:	Percentage of forest cover change between 2000 and 2012. This indicator measures the percentage change in forest cover between 2000 and 2012 in areas with greater than 50% tree cover. It factors in areas of deforestation (forest loss), reforestation (forest restoration or replanting) and afforestation (conversion of bare or cultivated land into forest). Hansen et al. (2013) used 650,000 Landsat 7 satellite images with a resolution of 30 metres to quantify the area of forest loss. As defined in Hansen et al. (2013), trees were defined as all vegetation taller than 5 metres. Forest loss was defined as a stand replacement disturbance or the complete removal of tree cover canopy at the Landsat pixel scale. Results were disaggregated by reference percent tree cover stratum (e.g. greater than 50% crown cover to approximately 0% crown cover) and by year.
Source	Yale Center for Environmental Law & Policy (YCELP) and the Center for International Earth Science Information Network (CIESIN) at Columbia University, Environmental Performance Index 2014

<b>Name:</b>	<b>Terrestrial protected areas (% of total land area)</b>
Description:	Terrestrial protected areas are totally or partially protected areas of at least 1,000 hectares that are designated by national authorities as scientific reserves with limited public access, national parks, natural monuments, nature reserves or wildlife sanctuaries, protected landscapes, and areas managed mainly for sustainable use. Marine areas, unclassified areas, littoral (intertidal) areas and sites protected under local or provincial law are excluded.
Source	United Nations Environmental Programme (UNEP) and the World Conservation Monitoring Centre (WCMC), as compiled by the World Resources Institute, based on data from national authorities, national legislation and international agreements.

<b>Name:</b>	<b>Adjusted net savings, including particulate emission damage (% of GNI)</b>
Description:	Adjusted net savings are equal to net national savings plus education expenditure and minus energy depletion, mineral depletion, net forest depletion, and carbon dioxide and particulate emissions damage.
Source:	World Bank staff estimates based on sources and methods in World Bank's "The Changing Wealth of Nations: Measuring Sustainable Development in the New Millennium", 2011.

## Social Cohesion

### Intergenerational Balance.....

#### Demographic risk

<b>Name:</b>	<b>Age dependency ratio, old (% of working-age population)</b>
Description:	Age dependency ratio, old, is the ratio of older dependents – people older than 64 – to the working-age population – those ages 15-64. Data are shown as the proportion of dependents per 100 working-age population.
Source:	World Bank staff estimates from various sources including census reports, the United Nations Population Division's World Population Prospects, national statistical offices, household surveys conducted by national agencies and ICF International

<b>Name:</b>	<b>Pension sustainability</b>
Description:	The Pension Sustainability Index (PSI) systematically examines relevant elements of pension systems and the developments that influence them in order to evaluate the pressure governments are under to undertake and implement reforms.
Source:	Allianz, <a href="http://projectm-online.com/app/uploads/Allianz_2016_Pension_Sustainability_Index.pdf">http://projectm-online.com/app/uploads/Allianz_2016_Pension_Sustainability_Index.pdf</a>

<b>Name:</b>	<b>Debt coverage ratio</b>
Description:	General government gross debt as a percentage of general government revenue
Source:	World Economic Forum's calculations, based on International Monetary Fund (IMF), <i>World Economic Outlook</i> , <a href="http://www.imf.org/weo">http://www.imf.org/weo</a>

<b>Name:</b>	<b>Maternity leave</b>
Description:	This is the mandatory minimum number of calendar days of maternity leave that legally must be paid by the government, the employer or both. Maternity leave is defined as leave available only to the mother; it does not cover parental leave that is available to both parents.
Source:	World Bank: Women, Business and the Law 2016

<b>Name:</b>	<b>Pension gap level</b>
Description:	Gross replacement rate for an average earner from mandatory pension schemes and difference from OECD average replacement rate.
Source:	OECD pension models, OECD Earnings Distribution Database

### *Equality of opportunity*

<b>Name:</b>	<b>Inequality in education</b>
Description:	Inequality in distribution of years of schooling based on data from household surveys estimated using the Atkinson inequality index.
Source:	United Nations Development Programme, Human Development Reports

<b>Name:</b>	<b>Youth unemployment</b>
Description:	Unemployment, youth total (% of total labour force age 15-24)
Source:	World Bank (modelled ILO estimate), <a href="http://databank.worldbank.org/data/reports.aspx?source=2&amp;series=SL.UEM.1524.ZS&amp;country=">http://databank.worldbank.org/data/reports.aspx?source=2&amp;series=SL.UEM.1524.ZS&amp;country=</a>

<b>Name:</b>	<b>Youth not in employment, education or training (NEET)</b>
Description:	Share of young people who are not in employment, education or training (NEET), as a percentage of the total number of young people in the corresponding age group, by gender.
Source:	OECD, <a href="https://data.oecd.org/youthinac/youth-not-in-employment-education-or-training-neet.htm">https://data.oecd.org/youthinac/youth-not-in-employment-education-or-training-neet.htm</a>

<b>Name:</b>	<b>PISA social mobility</b>
Description:	Gap in PISA reading scores by quintile (q1/q5) and gap in PISA math scores by quintile (q1/q5). The ratio Q1/Q5 captures the difference in learning outcomes between the bottom (quintile 1) and the top (quintile 5). A value of 0 reflects perfect inequality and a value of 1 reflects perfect equality.
Source:	OECD, <a href="http://www.oecd.org/pisa/">http://www.oecd.org/pisa/</a>

<b>Name:</b>	<b>Child poverty</b>
Description:	Children (age 0-17) in poor homes: proportion of households with children living on less than 50% of the national median income.
Source:	OECD, <a href="http://stats.oecd.org/Index.aspx?DataSetCode=IDD">http://stats.oecd.org/Index.aspx?DataSetCode=IDD</a>

<b>Name:</b>	<b>Representation of youth in decision-making</b>
Description:	Global Shaper Survey: Do you agree with the following statements? As a young person, I can actively contribute to shaping decision making in my country. [1 = strongly disagree; 5 = strongly agree]
Source:	World Economic Forum

<b>Name:</b>	<b>Public spending on services for families with children</b>
Description:	Public spending on family benefits: child-related cash transfers to families with children, public spending on services for families with children and tax exemptions/allowances/tax credits for families with children; measured as a percentage of GDP.
Source:	OECD, <a href="https://data.oecd.org/socialexp/family-benefits-public-spending.htm">https://data.oecd.org/socialexp/family-benefits-public-spending.htm</a>

<b>Name:</b>	<b>Satisfaction with life choices</b>
Description:	Question: Satisfaction with your life [1 = completely dissatisfied; 10 = completely satisfied]
Source:	World values survey <a href="http://www.worldvaluessurvey.org/WVSONline.jsp">http://www.worldvaluessurvey.org/WVSONline.jsp</a>

<b>Name:</b>	<b>Importance of future generations in constitution</b>
Description:	Mechanisms that recognize future generations worldwide. These include constitutional references, various institutional models and efforts underway to enshrine future generations.
Source:	World Future Council, <a href="http://www.futurejustice.org/resources/global-view-of-mechanisms-recognising-future-generations">http://www.futurejustice.org/resources/global-view-of-mechanisms-recognising-future-generations</a>

<b>Name:</b>	<b>Early marriage of girls</b>
Description:	Percentage of women aged 20 to 24 years who were first married or in union before ages 15 and 18.
Source:	<a href="https://data.unicef.org/topic/child-protection/child-marriage">https://data.unicef.org/topic/child-protection/child-marriage</a>

<b>Name:</b>	<b>Wage persistence (intergenerational income elasticity)</b>
Description:	Intergenerational income elasticity
Source:	M. Corak, 2011, <i>Inequality from generation to generation: the United States in Comparison</i> , <a href="http://www.piketty.pse.ens.fr/files/Corak2011.pdf">http://www.piketty.pse.ens.fr/files/Corak2011.pdf</a>

<b>Name:</b>	<b>Percentage of women in the labour force</b>
Description:	Females a percentage of the total labour force
Source:	World Bank, <a href="http://data.worldbank.org/indicator/SL.TLF.TOTL.FE.ZS">http://data.worldbank.org/indicator/SL.TLF.TOTL.FE.ZS</a>

<b>Name:</b>	<b>Evolution of median income</b>
Description:	Median of daily per capita income/consumption expenditure in 2011 US\$ PPP. The data are drawn from nationally-representative household surveys, which are conducted by national statistical offices or by private agencies under the supervision of government or international agencies and obtained from government statistical offices and World Bank Group country departments. The per capita income/consumption used in PovcalNet is household income/consumption expenditure divided by the household size. Percentage change over the past 5 years.
Source:	World Bank, Povcal net

## Social Fabric.....

### Social capital

<b>Name:</b>	<b>GINI change over time</b>
Description:	Gini index measures the extent to which the distribution of income (or, in some cases, consumption expenditure) among individuals or households within an economy deviates from a perfectly equal distribution. A Lorenz curve plots the cumulative percentages of total income received against the cumulative number of recipients, starting with the poorest individual or household. The Gini index measures the area between the Lorenz curve and a hypothetical line of absolute equality, expressed as a percentage of the maximum area under the line. Thus a Gini index of 0 represents perfect equality, while an index of 100 implies perfect inequality. Percentage change over the past 5 years.
Source:	World Bank estimate GINI index, <a href="http://data.worldbank.org/indicator/SI.POV.GINI">http://data.worldbank.org/indicator/SI.POV.GINI</a>

<b>Name:</b>	<b>Trust in others</b>
Description:	Questions:  1. Most people can be trusted ["Most people can be trusted" or "need to be very careful"]; 2. How much do you trust: 1. Your family, 2. Your neighbourhood, 3. People you know personally, 4. People you meet for the first time, 5. People of another religion, 6. People of another nationality [1 = trust completely, 4 = do not trust at all]
Source:	World Values Survey, <a href="http://www.worldvaluessurvey.org/WVSONline.jsp">http://www.worldvaluessurvey.org/WVSONline.jsp</a>

<b>Name:</b>	<b>Ratio male/female at birth</b>
Description:	Number of males per 100 females, age 0-1.
Source:	Sex ratio by broad age groups, UN Department of Economic and Social Affairs Population Division, <a href="https://esa.un.org/unpd/wpp/Download/Standard/Population">https://esa.un.org/unpd/wpp/Download/Standard/Population</a>

<b>Name:</b>	<b>Quality of Support network (relying on others in times of need)</b>
Description:	The indicator is based on the question: "If you were in trouble, do you have relatives or friends you can count on to help you whenever you need them, or not?" and it considers the respondents who respond positively.
Source:	OECD How's Life? 2015, <a href="http://stats.oecd.org/Index.aspx?DataSetCode=BLI">http://stats.oecd.org/Index.aspx?DataSetCode=BLI</a>

<b>Name:</b>	<b>Volunteering rate</b>
Description:	Question: Have you volunteered your time to an organization in the past month?
Source:	Gallup World Pull Questions

<b>Name:</b>	<b>Perceived criminality</b>
Description:	Question: Do you feel safe walking at night in the city or area where you live?
Source:	Gallup World Poll Questions

<b>Name:</b>	<b>Youth Suicide Rate</b>
Description:	Self-harm leading to death for the 5-20 age group.
Source:	WHO, <a href="http://apps.who.int/gho/indicatorregistry/App_Main/view_indicator.aspx?iid=78">http://apps.who.int/gho/indicatorregistry/App_Main/view_indicator.aspx?iid=78</a>

### *Shared long-term vision*

<b>Name:</b>	<b>E-Participation Index</b>
Description:	The E-Participation Index assesses, on a 0-to-1 (best) scale, the quality, relevance, and usefulness of government websites in providing online information and participatory tools and services to their citizens. According to the United Nations, the E-Participation Index assesses the quality and usefulness of information and services provided by a country for the purpose of engaging its citizens in public policymaking through the use of e-government programs. Within the E-Participation Index, countries are benchmarked in three areas: e-information, e-consultation and e-decision-making. As such, the index indicates both the capacity and the willingness of the state in encouraging the citizen in promoting deliberative, participatory decision-making in public policy and of the reach of its own socially inclusive governance programme.
Source:	United Nations Department of Economic and Social Affairs (UNDESA), UN E-Government Development Database

<b>Name:</b>	<b>Stakeholder engagement in regulatory decisions</b>
Description:	This indicator describes the extent to which formal stakeholder engagement is built in the development of primary laws and subordinate regulations. The indicator is calculated as the simple average of two composite indicators (covering respectively primary laws and subordinate regulations) that measure four aspects of stakeholder engagement, namely: systematic adoption (of formal stakeholder engagement requirements); methodology of consultation and stakeholder engagements; transparency of public consultation processes and open government practices; and oversight and quality control that refers to existence of oversight bodies and publicly available information on the results of stakeholder engagement.
Source:	OECD How's Life? 2015, <a href="http://stats.oecd.org/Index.aspx?DataSetCode=BLI">http://stats.oecd.org/Index.aspx?DataSetCode=BLI</a>

<b>Name:</b>	<b>Presence of long-term vision</b>
Description:	Executive Opinion Survey: In your country, to what extent does the government have a long-term vision in place? [1=not at all; 7 = to a great extent]
Source:	World Economic Forum

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# Endnotes

- 1 Oxford Martin School, Oxford University, *Now for the Long Term: The Report of the Oxford Martin Commission for Future Generations*, 2013, [http://www.oxfordmartin.ox.ac.uk/downloads/commission/Oxford\\_Martin\\_Now\\_for\\_the\\_Long\\_Term.pdf](http://www.oxfordmartin.ox.ac.uk/downloads/commission/Oxford_Martin_Now_for_the_Long_Term.pdf).
- 2 World Economic Forum, *Global Risks Report 2017*.
- 3 For more information on the Global Future Councils, visit <https://www.weforum.org/communities/global-future-councils>.
- 4 Oxford Martin School, Oxford University, *Now for the Long Term: The Report of the Oxford Martin Commission for Future Generations*, 2013, [http://www.oxfordmartin.ox.ac.uk/downloads/commission/Oxford\\_Martin\\_Now\\_for\\_the\\_Long\\_Term.pdf](http://www.oxfordmartin.ox.ac.uk/downloads/commission/Oxford_Martin_Now_for_the_Long_Term.pdf).
- 5 For more information, visit <https://www.dni.gov/index.php/about/organization/national-intelligence-council-global-trends>.
- 6 United Nations General Assembly Resolution 68/322, *Report of the Secretary-General: Intergenerational solidarity and the needs of future generations*, 5 August 2013, <https://sustainabledevelopment.un.org/content/documents/2006future.pdf>.
- 7 Onuzo et al. *Intergenerational Equity - Understanding the linkages between parents and children: A Systematic Review*, UNICEF and the London School of Economics and Political Science, 2013, [https://www.unicef.org/socialpolicy/files/LSE\\_Capstone\\_Intergenerational\\_Equity.pdf](https://www.unicef.org/socialpolicy/files/LSE_Capstone_Intergenerational_Equity.pdf).
- 8 United Nations General Assembly Resolution 70/1, *Transforming our world: the 2030 Agenda for Sustainable Development*, 21 October 2015, [http://www.un.org/ga/search/view\\_doc.asp?symbol=A/RES/70/1&Lang=E](http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E).
- 9 Stiglitz, J., A. Sen and J.-P. Fitoussi, *Report of the Commission on the Measurement of Economic Performance and Social Progress*. Paris, 2009, [http://library.bsl.org.au/jspui/bitstream/1/1267/1/Measurement\\_of\\_economic\\_performance\\_and\\_social\\_progress.pdf](http://library.bsl.org.au/jspui/bitstream/1/1267/1/Measurement_of_economic_performance_and_social_progress.pdf).
- 10 For more information, visit [http://ec.europa.eu/environment/beyond\\_gdp/index\\_en.html](http://ec.europa.eu/environment/beyond_gdp/index_en.html).
- 11 EuroStat, *Sustainable development in the European Union; 2015 monitoring report of the EU Sustainable Development Strategy*, 2015, <http://ec.europa.eu/eurostat/documents/3217494/6975281/KS-GT-15-001-EN-N.pdf/5a20c781-e6e4-4695-b33d-9f502a30383f>.
- 12 For more information on the UNDP's Human Development Index, visit <http://hdr.undp.org/en/content/human-development-index-hdi>.
- 13 Samans, R., J. Blanke, G. Corrigan, M. Drzeniek, *The Inclusive Growth and Development Report 2017*, <http://wef.ch/igd17>
- 14 OECD, *How's Life? 2015: Measuring Well-being*, 2015, <http://www.oecd.org/statistics/how-s-life-23089679.htm>.
- 15 UNU-IHDP/UNEP, *Inclusive Wealth Report 2014: Measuring progress toward sustainability*, 2014, [http://www.ihdp.unu.edu/docs/Publications/Secretariat/Reports/SDMs/IWR\\_SDM\\_2014.pdf](http://www.ihdp.unu.edu/docs/Publications/Secretariat/Reports/SDMs/IWR_SDM_2014.pdf)
- 16 Porter, M., S. Stern, M. Green. 2016. *Social Progress Index 2016*, Social Progress Imperative, 2016, <http://www.socialprogressimperative.org/wp-content/uploads/2016/06/SPI-2016-Main-Report1.pdf>.
- 17 The Boston Consulting Group, *The Private-Sector Opportunity to Improve Well-Being*, 2016, <https://www.bcgperspectives.com/Images/BCG-The-Private-Sector-Opportunity-to-Improve-Well-Being-Jul-2016.pdf>.
- 18 For more information on UNISDR terminology, visit <https://www.unisdr.org/we/inform/terminology#letter-r>.
- 19 The Rockefeller Foundation and ARUP, *City Resilience Index*, 2015, <https://www.rockefellerfoundation.org/report/city-resilience-index>.
- 20 Schipper, L. and L. Langston, *A comparative overview of resilience measurement framework*, Overseas Development Institute, 2015, <https://www.odi.org/publications/9632-comparative-overview-resilience-measurement-frameworks-analysing-indicators-approaches>.
- 21 Dell. *Toronto Ranks #11 on Dell's Survey of 50 global Cities Enabling Innovation and Change Through Technology* [press release], 11 April 2016, <https://www.dell.com/learn/ca/en/cacorp1/press-releases/2016-04-11-toronto-ranks-11on-dells-survey-of-50-global-cities>.
- 22 KPMG, *2015 Change Readiness Index*, <https://home.kpmg.com/xx/en/home/insights/2015/06/2015-change-readiness-index.html>.
- 23 The Boston Consulting Group, *Globalization Readiness Index Lets Companies Know Whether they Are Ready to Win* [press release], 2 May 2012, <http://origin-www.bcg.be/media/PressReleaseDetails.aspx?id=tcm:103-104901>.
- 24 For more information on Shell scenarios, visit <http://www.shell.com/energy-and-innovation/the-energy-future/scenarios.html>.
- 25 The United Nations Framework Convention on Climate Change (UNFCCC) is the primary international, intergovernmental form for negotiating the global response to climate change.
- 26 For more information visit <http://unstats.un.org/sdgs>.
- 27 World Economic Forum, *The Global Information Technology Report 2016 Innovating in the Digital Economy*, 2016, [http://www3.weforum.org/docs/GITR2016/GITR\\_2016\\_full%20report\\_final.pdf](http://www3.weforum.org/docs/GITR2016/GITR_2016_full%20report_final.pdf).
- 28 OECD, *The Innovation Imperative: Contributing to Productivity, Growth and Well-Being*, 2015, <https://www.oecd.org/publications/the-innovation-imperative-9789264239814-en.htm>.
- 29 World Economic Forum, *The Global Information Technology Report 2016*, <https://www.weforum.org/reports/the-global-information-technology-report-2016>.
- 30 World Economic Forum, *The Human Capital Report 2016*, <https://www.weforum.org/reports/the-human-capital-report-2016>.
- 31 Frey, C. B. and M. A. Osborne. *The future of employment: How susceptible are jobs to computerisation?* Oxford Martin School, 2013, [http://www.oxfordmartin.ox.ac.uk/downloads/academic/The\\_Future\\_of\\_Employment.pdf](http://www.oxfordmartin.ox.ac.uk/downloads/academic/The_Future_of_Employment.pdf).
- 32 United Nations General Assembly Resolution 68/322, *Report of the Secretary-General: Intergenerational solidarity and the needs of future generations*, 5 August 2013, <https://sustainabledevelopment.un.org/content/documents/2006future.pdf>.
- 33 de Onis, M., and Branca, F., "Childhood stunting: a global perspective", *Maternal & Child Nutrition*, 12: 12–26, 2016.
- 34 For more information on World Health Organization risk factors, visit [http://www.who.int/topics/risk\\_factors/en](http://www.who.int/topics/risk_factors/en).



- 35 See Aschauer, D. A. 1989. "Is Public Expenditure Productive?" *Journal of Monetary Economics* 23 (2): 117–200.; Canning, D., M. Fay, and R. Perotti. 1994. "Infrastructure and Economic Growth." In M. Baldrassi, L. Paganetto, and E. Phelps, eds. *International Differences in Growth Rates*. New York: Palgrave Macmillan.; Gramlich, E. M. 1994. "Infrastructure Investment: A Review Essay." *Journal of Economic Literature* 32 (3): 1176–96.; and Easterly, W. 2002. *The Elusive Quest for Growth*. Cambridge, MA: MIT Press.
- 36 McKinsey Global Institute, *Bridging Global Infrastructure Gaps*, 2016, [https://www.mckinsey.de/files/mgi\\_bridging-global-infrastructure-gaps\\_june\\_2016.pdf](https://www.mckinsey.de/files/mgi_bridging-global-infrastructure-gaps_june_2016.pdf).
- 37 OECD, *How's Life? 2015: Measuring Well-being*, 2015, <http://www.oecd.org/statistics/how-s-life-23089679.htm>.
- 38 Ibid.
- 39 For a recent review on conflicts and poverty see Rohwerder, B., "The impact of conflict on poverty", *GSDRC Applied Knowledge Services*, <http://www.gsdr.org/docs/open/hdq1118.pdf>.
- 40 Devakumar et al., "The intergenerational effects of war on the health of children", *BMC Medicine*, 2014, 12:57, <http://www.biomedcentral.com/1741-7015/12/57>.
- 41 Institute for Economics and Peace, *Sustainable Development Goal 16 – From now to 2030: What is needed to measure Goal 16*, IEP Report 43, 2016, [http://economicsandpeace.org/wp-content/uploads/2016/09/Goal16\\_2016\\_webfile.pdf](http://economicsandpeace.org/wp-content/uploads/2016/09/Goal16_2016_webfile.pdf).
- 42 Institute for Economics and Peace, *The Global Peace Index 2016*, IEP Report 39, 2016, [http://static.visionofhumanity.org/sites/default/files/GPI%202016%20Report\\_2.pdf](http://static.visionofhumanity.org/sites/default/files/GPI%202016%20Report_2.pdf).
- 43 IPCC, *Climate Change 2014 Synthesis Report: Summary for Policymakers*, 2014, [https://www.ipcc.ch/pdf/assessment-report/ar5/syr/AR5\\_SYR\\_FINAL\\_SPM.pdf](https://www.ipcc.ch/pdf/assessment-report/ar5/syr/AR5_SYR_FINAL_SPM.pdf).
- 44 Ibid.
- 45 "What is Disaster Risk Reduction?" *UNISDR*, <https://www.unisdr.org/who-we-are/what-is-drr>.
- 46 UNISDR, *Making Development Sustainable: The Future of Disaster Risk Management. Global Assessment Report on Disaster Risk Reduction*, 2015, [http://www.preventionweb.net/english/hyogo/gar/2015/en/gar-pdf/GAR2015\\_EN.pdf](http://www.preventionweb.net/english/hyogo/gar/2015/en/gar-pdf/GAR2015_EN.pdf).
- 47 "World Footprint: Do we fit on the planet?" Global Footprint Network, 2015, [http://www.footprintnetwork.org/en/index.php/GFN/page/world\\_footprint](http://www.footprintnetwork.org/en/index.php/GFN/page/world_footprint).
- 48 Rockström, J. et al., "Planetary boundaries: Exploring the safe operating space for humanity", *Ecology and Society* 14(2): 32, 2009, <http://www.ecologyandsociety.org/vol14/iss2/art32>.
- 49 "Footprint Basics", Global Footprint Network, 2016, [http://www.footprintnetwork.org/en/index.php/GFN/page/footprint\\_basics\\_overview](http://www.footprintnetwork.org/en/index.php/GFN/page/footprint_basics_overview).
- 50 Yale Center for Environmental Law & Policy (YCELP) and Center for International Earth Science Information Network (CIESIN) at Columbia University, *Environmental Performance Index*, 2016, <http://epi.yale.edu/reports/2016-report>.
- 51 "About Us", ND Gain, part of the Climate Change Adaption Program, Environmental Change initiative (ND-ECI), University of Notre Dame, <http://index.gain.org/about>.
- 52 United Nations Department of Economic and Social Affairs (DESA), *World Population Prospects*, 2015, [https://esa.un.org/unpd/wpp/publications/files/key\\_findings\\_wpp\\_2015.pdf](https://esa.un.org/unpd/wpp/publications/files/key_findings_wpp_2015.pdf).
- 53 IMF, *Global Financial Stability Report*, 2012, <https://www.imf.org/External/Pubs/FT/GFSR/2012/01/pdf/press4.pdf>.
- 54 Example from UNDP, *Humanity Divided: Confronting Inequality in Developing Countries*, 2013, [http://www.undp.org/content/dam/undp/library/Poverty%20Reduction/Inclusive%20development/Humanity%20Divided/HumanityDivided\\_Full-Report.pdf](http://www.undp.org/content/dam/undp/library/Poverty%20Reduction/Inclusive%20development/Humanity%20Divided/HumanityDivided_Full-Report.pdf).
- 55 See for instance IMF reports: Ostry, J. D., A. Berg and C. G. Tsangarides, *Redistribution, Inequality, and Growth*, IMF Staff Discussion Note 14/02, 2014, <http://www.imf.org/external/pubs/ft/sdn/2014/sdn1402.pdf>; and Dabla-Norris, E. Kochhar, K., Suphaphiphat, N., Ricka, F., Tsounta, E, *Causes and Consequences of Income Inequality: A Global Perspective*, IMF Staff Discussion Note 15/13, 2015, <https://www.imf.org/external/pubs/ft/sdn/2015/sdn1513.pdf>.
- 56 UNDP, *Humanity Divided: Confronting Inequality in Developing Countries*, 2013, [http://www.undp.org/content/dam/undp/library/Poverty%20Reduction/Inclusive%20development/Humanity%20Divided/HumanityDivided\\_Full-Report.pdf](http://www.undp.org/content/dam/undp/library/Poverty%20Reduction/Inclusive%20development/Humanity%20Divided/HumanityDivided_Full-Report.pdf).
- 57 Easterly, W., J. Ritzen, and M. Woolcock, "Social Cohesion, Institutions, and Growth", *Economics and Politics*, 18 (2): 103–20, 2006.
- 58 Ozbay, F. et al., "Social Support and Resilience to Stress", *Neurobiology to Clinical Practice*, 4(5): 35-40, 2007, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2921311>.
- 59 Helliwell, J. F., & Wang, S., "Trust and wellbeing", *International Journal of Wellbeing*, 1(1), 2011, 42-78, doi:10.5502/ijw.v1i1.9.
- 60 Scrivens, K. and C. Smith, *Four Interpretations of Social Capital: An Agenda for Measurement*, OECD Statistics Working Papers, No. 2013/06, 2013.
- 61 Knack, S. and P. Keefer, "Does Social Capital Have an Economic Payoff? A Cross-Country Investigation", *Quarterly Journal of Economics*, 112(4): 1251-1288, 1997, <http://www.socialcapitalgateway.org/content/paper/knack-s-keefe-p-1997-does-social-capital-have-economic-payoff-cross-country-investiga>.
- 62 Uslander, E.M. 2002. "The Moral Foundations of Trust", *Department of Government and Politics, University of Maryland–College Park*, 2002, [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=824504](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=824504).
- 63 Bartolini S., F. Sarracino, "Happy for How Long? How Social Capital and GDP relate to Happiness over Time", *CEPS/INSTEAD*, Working Paper No. 2011-60, 2011, [https://www.liser.lu/publi\\_viewer.cfm?tmp=2732](https://www.liser.lu/publi_viewer.cfm?tmp=2732).
- 64 Bjornskov, C., "The Happy Dew: Cross-Country Evidence on Social Capital and Life Satisfaction", *Kyklos International Review for Social Sciences*, 56(1): 3-16, 2003, <http://onlinelibrary.wiley.com/doi/10.1111/1467-6435.00207/abstract>.
- 65 OECD, *The Well-being of Nations: The Role of Human and Social Capital*, 2001.
- 66 See Browne, C., A. Di Battista, T. Geiger, and S. Verin, "The Executive Opinion Survey: The Voice of the Business Community", *World Economic Forum Global Competitiveness Report 2016–2017*.
- 67 OECD, *New Data for Understanding the Human Condition; International Perspectives*, 2013, <http://www.oecd.org/sti/sci-tech/new-data-for-understanding-the-human-condition.pdf>.
- 68 C. Bean. *Independent Review of UK Economic Statistics*, 2016, [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/507081/2904936\\_Bean\\_Review\\_Web\\_Accessible.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/507081/2904936_Bean_Review_Web_Accessible.pdf).



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