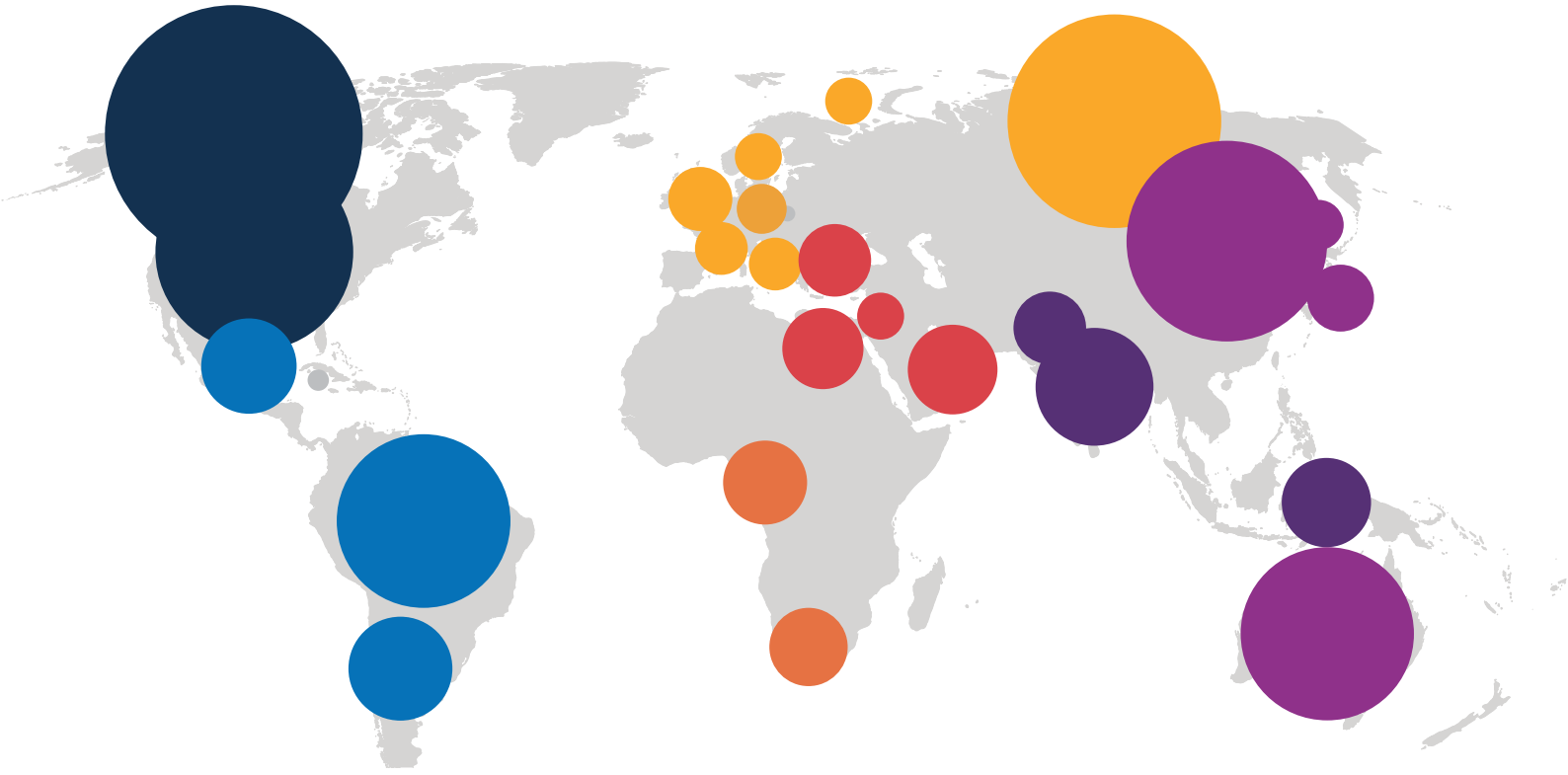
MISK GLOBAL FORUM
منتدى مسك العالمي

The Global Youth Index 2018

An assessment of youth development



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About this report

This report summarizes the results of the Global Youth Index (GYI) and the related research program. The GYI evaluates the drivers of youth development and access to opportunity across a range of factors for young people's success in the future economy.

The GYI was developed by the Economist Intelligence Unit (EIU) with the support of the Misk Foundation. The EIU created the measurement framework for the GYI and carried out the research and analytic summary, drawing upon its global team of economists, public policy experts and technical specialists.

The data visualization of the Global Youth Index and related materials can be found at: gyi.miskglobalforum.com

About the MiSK Foundation

The Prince Mohammed bin Salman bin Abdulaziz Foundation (the MiSK Foundation) is a non-profit philanthropic foundation established by H.R.H. Crown Prince Mohammed bin Salman to discover, develop and empower Saudi youth to become active participants in the knowledge economy. MiSK specifically focuses on four key areas: education, creative and digital media, technology, and culture and the arts. MiSK pursues this agenda both through its own programs and through partnerships with local and global organizations.

About the EIU

The Economist Intelligence Unit (EIU) is the research arm of The Economist Group, publisher of *The Economist*. As the world's leading provider of country intelligence, we help governments, institutions and businesses by providing timely, reliable and impartial analysis of economic and development strategies. Through our public policy practice, we provide evidence-based research for policymakers and stakeholders seeking measurable outcomes in fields ranging from finance and gender to energy and technology. We conduct research through interviews, regulatory analysis, quantitative modelling and forecasting, and display the results via interactive data visualization tools. Through a global network of more than 650 analysts and contributors, we continuously assess and forecast economic and business conditions in more than 200 countries. For more information, visit www.eiu.com.

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I. Introduction: Why a Global Youth Index?

A tool for understanding challenges and opportunities for youth in the future economy

Half of the world's population is under the age of 30, and one-quarter is under 15.[1] Most of these young people live in low- and middle-income countries. Everywhere, youth are growing up in a period of intensive technological and economic transformation. Despite the diversity of youth experiences around the world, there are multiple challenges that are now being shared by youth globally. These range from the threat of climate change to the young generation to the complexity of adapting to the future economy, with jobs being constantly reshaped by technological innovations.

Understanding youth's challenges, and responding to them, will be of vital importance for the transition to the future economy, as well as society. If youth can access promising work, start their own ventures, and become increasingly globally connected, the potential is enormous. By contrast, the failure to prepare youth adequately for the future could be a huge missed opportunity. There is a path to understanding how to prepare youth for the future, and the Global Youth Index provides a roadmap. The index assesses youth preparedness across 25 countries, and highlights examples of best practices, innovative policies and scalable models and the experience of young people in terms of access and engagement.

Preparedness is critical New technologies offer the potential for the younger generation to enjoy vast increases in productivity, innovation and prosperity. There are also, however, fears that if youth are not adequately prepared, technological change will undermine their job prospects and render their skills obsolete. The exact nature of jobs in the future is unknown, and it is likely that the majority of jobs will be radically altered by new technologies. Yet, equipping these youth with skills and jobs is critical for the future.

1 https://esa.un.org/unpd/wpp/Publications/Files/WPP2017_KeyFindings.pdf

Adaptability and ongoing change management To prepare for this, youth will increasingly have to be adaptable, flexible, adept at managing change, and open to lifelong learning. They will also need to be entrepreneurial. In a globally interconnected economy they will need to develop their sense of global citizenship, including local and global participation and openness to cross-cultural collaboration. Moreover, their preparedness will be affected by the success of their broader societies in ensuring that the economy grows and creates jobs, and that youth are not only able to be educated but also to find jobs where they can utilize—and continue to develop—these skills. Thus, the role of governments, the private sector and civil society will be of paramount importance, as will be the role of youth themselves.

II. Index overview

Objectives of the index

The Global Youth Index (GYI) measures youth's preparedness for the knowledge-based economy they will face in the future. This assessment is made in a set of 25 countries through five domains populated by a set of quantitative, qualitative and survey indicators. The overarching objectives of the index are to:

- **develop a tool for the assessment** of global youth development for a range of stakeholders and strengthen the evidence base;
- **identify global challenges** through the lens of the key focus areas: future skills, employment, entrepreneurship, and global citizenship;
- **support and accelerate the transition** toward a true knowledge-based economy while empowering youth to participate in and contribute to the transition;
- **promote dialogue and debate** around youth development to foster change and policy reform;
- **examine the best practices and policies** that have driven change in country environments and their role in youth development;
- **provide unique and actionable insights** and to catalyze policy reforms.

The Global Youth Index design

The Global Youth Index is a measurement of **the conditions needed for youth development**. The measurement framework design facilitates a nuanced understanding of the complexities of youth development challenges in the 25 countries. This, in turn, offers insight into how to improve conditions for youth, and provides them with the tools and information needed to prepare for the future. This sets this project apart from studies that seek to understand youth development based on outcomes rather than an understanding of enabling factors.

The GYI study adds value to the current knowledge on youth development and is intended to be comprehensive and actionable. The evaluative framework's domains and indicators were selected on the basis of expert opinion and literature reviews, with the aim of offering a comprehensive view of drivers of youth development and each country's enabling environment. The study relies on a range of metrics, both qualitative and quantitative that supports a detailed understanding of the dynamics

of youth development. An assessment of condition of youth development cannot be complete without a look into youth's attitudes, motivations and expectations. A survey of youth opinion greatly enriches this study by ensuring that it reflects the concerns and voices of youth. Almost 40% of the indicators are drawn from a survey of 25,000 youth across 25 countries that investigates attitudes and experiences among 18-30-year-olds

The Global Youth Index analytic framework design is based on five categories (domains) that the analysis has determined to be critical for youth preparedness for the future. The first is **education** at all levels. The second is **employment** (including education-to-work transition and youth perceptions of training and skills matching as an indicator of the quality of jobs). The third is **entrepreneurship**, as youth's ability to start their own ventures will be a key factor in their adaptability to a changing economy. The fourth is **global citizenship**, as youth are likely to live in a world that is increasingly internationally interconnected. Fifthly, the index assesses the overall **economic environment for a future economy** which will be more knowledge-based than today. A more detailed discussion of each domain is included later in this paper, and in the Methodology appendix accompanying the study. The domains are detailed in the schematic below:

The Global Youth Index framework

1. Education and skills	**2. Employment**	**3. Entrepreneurship**	**4. Global citizenship**	**5. Knowledge economy ecosystem**
Compulsory education *5 indicators*	Opportunities *5 indicators*	Entreprenuerial skills *3 indicators*	Youth strategies and participation *3 indicators*	Innovation *3 indicators*
Higher education *5 indicators*	Education to work transition *3 indicators*	Entrepreneurial ecosystem *6 indicators*	Attitudes towards the future *3 indicators*	Economic growth *3 indicators*
Digital skills *4 indicators*	Job quality *3 indicators*	Supporting policies and institutions *3 indicators*	Exposure to international experiences *4 indicators*	Infrastructure and connectivity *4 indicators*

The index draws on an analysis of three perspectives, and types of indicators: the latest **quantitative data** on youth development and the factors affecting it, and some outcomes; **qualitative scores** on factors in the environment such as government strategy for youth entrepreneurship and policy design; and new **survey data** on the attitudes of youth toward their future.

The scores for the 57 qualitative and quantitative indicators (based on 105 underlying sub-indicators) are then used to produce ratings and rankings by country, by domain and by indicator. These results provide an evidence-based perspective on best practices, policies, areas of strength and areas for improvement for global youth development.

The index looks beyond quantitative output measures to a a multi-dimensional assessment of the dynamics of youth development – the role of systems, policies juxtaposed with youth While a number of studies examine data on the outcomes of youth development, this study looks at the drivers of youth development through several perspectives – preparedness for employment and entrepreneurship, opportunities for development as global citizens, access to digital skills and training, and the role of to gain through 5 dimensions that seek to capture the dynamics

The GYI development process The GYI framework design process relied on conceptual coherence, informed by expert advice. The goal was to include indicators and focus areas worked out through an iterative approach to ensure a comprehensive view on youth.

- We designed the framework through consultation with experts in each of the areas we intended to study. We designed shared definitions for the key concepts and used expert inputs to identify elements of youth development that are inherently desirable, such as global citizenship, rather than those that provide statistically similar results.
- Through the consultation with experts and an internal audit we explored existing variables on the basis of their relevance, availability and cross-country comparability.
- For areas that lacked appropriate indicators we designed, in consultation with topic experts, survey and policy measures to capture the desired phenomena. For existing series, we developed methodology for imputation on individual basis (Please see details of the project methodology and indicator framework in the Methodology note).

What did we learn overall?

Youth are generally optimistic about the future, the research finds, but meeting these positive expectations will be a serious challenge. The Global Youth Index is intended to help assess how the optimism and enthusiasm of youth can be guided into actions and activities. One of the strongest themes that emerged from the survey research is that around the world youth express positive attitudes to the future, to emerging challenges and to entrepreneurship. In all 25 countries covered, though to different degrees, a large majority of those surveyed said they were optimistic about their economic

prospects, positive about their ability to cope with different challenges, and confident in their own political knowledge being developed and valued. This presents an opportunity not to be squandered.

Yet, at present, youth are not receiving enough support for such optimistic aspirations to be realized. In all the countries studied, youth report that their education makes only limited provision for 21st-century skills as well as entrepreneurial skills.[2] They also report that they have received very little on-the-job training in digital skills to do their jobs. Across the board, youth are increasingly digitally connected, but typically engage in few practices that support online safety. In terms of entrepreneurship, on average, almost a half (45%) of those interested in starting their own venture have not done so because they do not have the necessary support. Youth also face very unequal opportunities to develop their sense of global citizenship through international travel and experiences. In terms of the enabling environment for the knowledge economy, there are particularly significant disparities between countries. All this increases the risk that some will be unable to make the transition to the changing demands of the new economy.

Youth's unmet needs

- **In addition to future needs, youth around the world have a number of unmet needs today**. Young people aged between 15 and 24 are nearly three times more likely to be unemployed than those aged between 25 and 55.[3] In the two regions of the world that have the youngest populations, the Middle East and Africa, youth unemployment is close to 30%, more than twice the global rate.
- **Disparities between the countries covered are especially pronounced when it comes to the economic environment and after that, education and skills**. While youth across the world are far more likely to be unemployed than adults, the opportunities available to a young person in Germany, where only 6% of youth are unemployed, are staggeringly different from those in South Africa, where unemployment among youth stands at 57%.
- **There is also a growing gap between countries when it comes to the gender gap**. Globally, there has been great progress in reducing women's economic and educational inequality. Many countries have eliminated what used to be a significant gender gap in educational enrolment, and in several there is no gender gap in broadband access. Many more have made progress toward reducing the gender gap in entrepreneurship and in science, technology, engineering and mathematics (STEM) education, but more needs to be done. However, others still have a serious deficit in women's participation in all these areas, representing a significant opportunity cost for societies and economies. Millions of young women are at risk of being left behind.

2 The Economist Intelligence Unit commissioned a survey of 25,000 youth across the 25 countries (1,000 per country) in June-August 2018. Details are included in the methodology note that accompanies this study.

3 The International Labor Organization estimates that 13.4% of the world's 15-24-year-old labor force is unemployed, which is far higher than unemployment among the broader labor force, at 5.5%.

For youth to contribute to and thrive during this transition, they must be actively engaged and involved in their local and global communities, both through employment or entrepreneurship and through civic participation. This, in turn, requires a future-focused education, an active youth community, supportive policies that target youth, and the provision—and awareness—of economic opportunity for all.

In general, the best performers are countries that combine targeted support to youth with an environment of economic and educational opportunity. The top five countries in the index all have well-developed national institutions for youth. Sweden, which comes top of the index, has been a particularly successful example of a holistic approach to youth development, while most of the other top performers also have well-structured youth policies. The top five performers also map closely with the top-ranked countries for education and skills (the top five overall performers are in the top six for education and skills, along with South Korea). They tend to be advanced economies, with China the only developing country to make it into the top five – helped by its rapid economic growth and development.

Youth is a formative stage of life. The ability to develop long-lasting skills and become active citizens will shape the longer-term role that today's youth will play in future decades. The shift to a much more knowledge-intensive economy is also at a formative stage, and the human impact of this anticipated technological change will depend crucially on youth's ability to adapt to these changes. This, in turn, will be affected by policy decisions that are made now.

The overall rankings and scores are summarized in the results table. The rankings and scores for each of the domains is included in Appendix A.

Global Youth Index 2018: Overall results

Overall country rankings and scores (100 = best score)

OVERALL SCORE

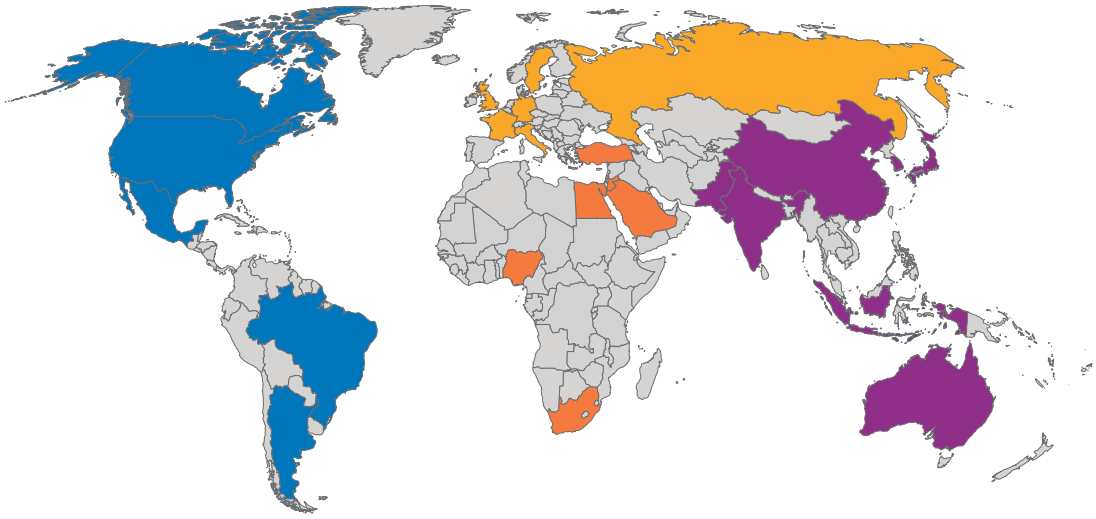
Rank	*Country*	*Score*
1	Sweden	64.2
2	Australia	62.9
3	UK	62.2
4	China	60.6
5	Canada	60.1
6	South Korea	59.9
7	US	59.8
8	Germany	59.2
9	Denmark	58.4
10	France	55.7
11	Japan	54.3
12	Italy	52.1
=13	Russia	49.0
=13	South Africa	49.0
15	Turkey	48.8
16	India	48.5
17	Mexico	47.2
18	Argentina	46.5
19	Brazil	46.2
20	Saudi Arabia	45.8
21	Indonesia	45.7
22	Nigeria	38.4
23	Egypt	38.3
24	Jordan	37.6
25	Pakistan	34.8

Geographical scope

For this first year of the Global Youth Index, a set of 25 countries were selected for assessment. These countries are detailed in the table below, and collectively they represent 80 % of global GDP and 70 % of global youth population. Some guiding principles behind the country selection are:

- We sought to include the largest economies of the world (G20), comprising a majority of high-income countries (ten), upper-middle-income countries (seven), and two lower-middle-income countries (India and Indonesia). The focus was on large and advanced economies because they are more exposed to the changes brought about by technological disruptions and the transition to a knowledge economy, and because they are more likely to be developing innovative policies and best practices.
- Policy leaders Two Nordic countries, Sweden and Denmark, were selected as countries with successful regulatory and policy environments for youth education, skills development and labor market integration.
- Growing youth demographic Another key consideration was to include countries with a growing youth demographic. Countries with large and growing populations of young people face particularly strong pressures to ensure they are ready to actively participate in the technological and economic transformation. To capture this element, Egypt, Jordan, Nigeria and Pakistan were selected as representative countries with a high and growing share of young people and to ensure a more diverse global representation of regions.

Geographic scope



Global Youth Index 2018
Geographical scope and country classifications by region and income level

Country	Region	Income level
Argentina	Latin America	High-income
Australia	East Asia & Pacific	High-income
Brazil	Latin America	Upper-middle income
Canada	North America	High-income
China	East Asia & Pacific	Upper-middle income
Denmark	Europe	High-income
Egypt	Middle East & North Africa	Lower-middle income
France	Europe	High-income
Germany	Europe	High-income
India	South Asia	Lower-middle income
Indonesia	South Asia*	Lower-middle income
Italy	Europe	High-income
Japan	East Asia & Pacific	High-income
Jordan	Middle East & North Africa	Upper-middle income
Mexico	Latin America	Upper-middle income
Nigeria	Sub-Saharan Africa	Lower-middle income
Pakistan	South Asia	Lower middle income
Russia	Europe	Upper-middle income
Saudi Arabia	Middle East & North Africa	High-income
South Africa	Sub-Saharan Africa	Upper-middle income
South Korea	East Asia & Pacific	High-income
Sweden	Europe	High-income
Turkey	Middle East & North Africa*	Upper-middle income
United Kingdom	Europe	High-income
United States	North America	High-income

III. Key findings

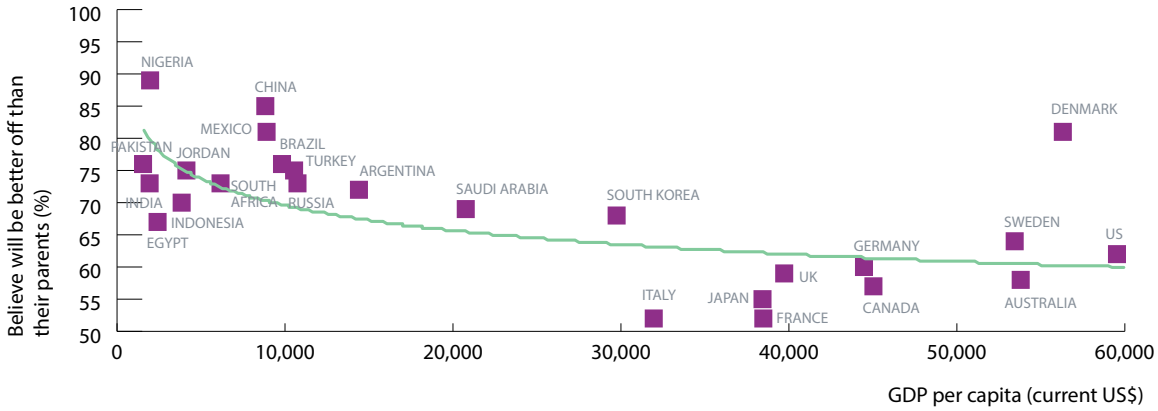
Overall key findings

- **Sweden, Australia, the UK, China, and Canada are the top five countries in the study for youth preparedness and youth's outlook for the future.**
- **The bottom five performers in the index are Indonesia, Nigeria, Egypt, Jordan and Pakistan.**

Youth survey respondents are broadly optimistic about education and their economic future. They generally express confidence in their ability to have an impact both on their own situation and on the problems of the world. They are also notably more optimistic in emerging markets than in advanced economies. In all countries, a majority of youth demonstrated a positive attitude toward their future economic prospects, based on their views of whether the economy would improve and whether they would be better off than their parents. More than two-thirds of youth surveyed said they thought that new technologies, such as automation and artificial intelligence (AI), presented more of an opportunity than a threat to their society. In almost all countries, more than three-quarters in every country expressed positive attitudes to lifelong learning and viewed education as essential for success. Overall, across the 25 countries covered, 82% were positive about lifelong education, and 79% said education is necessary for success. Attitudes to learning were most positive in Brazil, China and Nigeria.

Youth perceptions of economic opportunity are more positive in emerging markets than in advanced economies. The five most optimistic youth populations were in Nigeria, India, China, Pakistan and Mexico, based on questions about the individuals themselves, their country as a whole, and whether they would be better off than their parents. Denmark is the only Western country to make it into the top ten. This is likely to reflect the fact that the youth in countries that industrialized and developed earlier are less likely to envisage themselves as having a much better standard of living than their parents, in contrast to their counterparts in high-growth emerging markets. Japanese, French, Italian, Russian and British youth were in the bottom five in terms of youth economic optimism, even though Japan has the lowest unemployment and NEET (not in education, employment or training) rates. But this is all relative—the combined scores range from 68.5in Japan to 87 in Nigeria (with 100 being the most positive).

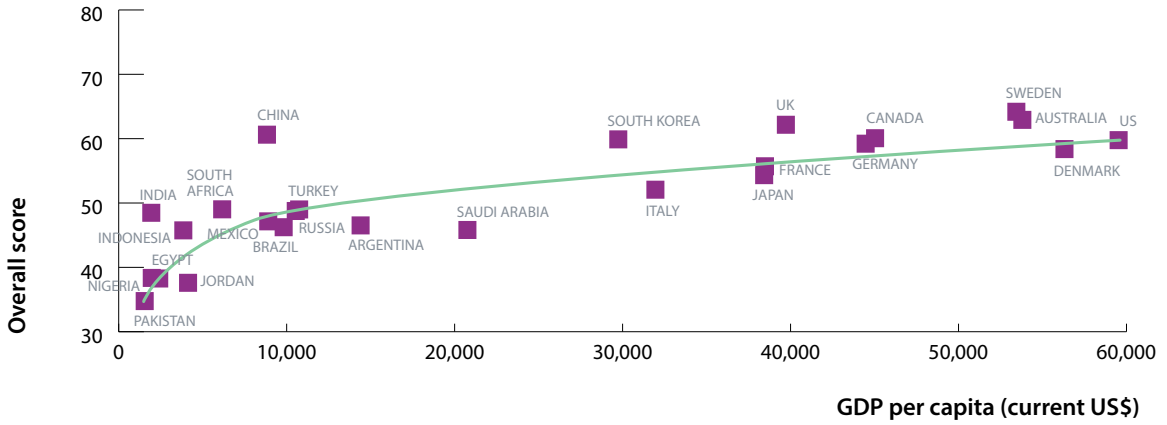
Youth perceptions of economic opportunities in the future are more positive in emerging markets than in advanced economies



Yet despite this general optimism, the index highlights significant challenges, especially for emerging markets. Measures such as unemployment, infrastructure, economic growth and gender inequality still reveal a large gap between the wealthy and less wealthy countries. This has significant implications for inequality of opportunity among youth from different countries around the world—although youth may have some control over their attitudes and education, they cannot choose their country's economic environment. There are also significant differences in the quality and duration of education. Australian youth can expect to spend 20 years in education, compared with just eight years in Pakistan.

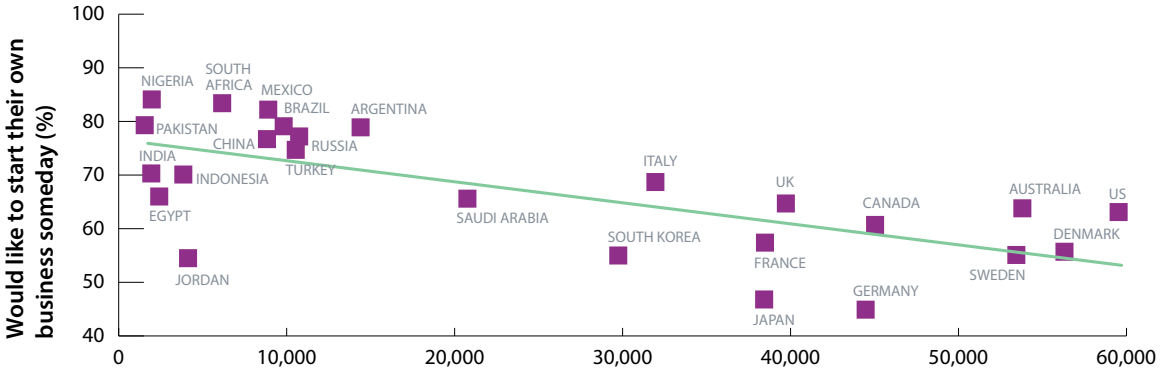
Advanced economies generally perform better in preparing youth for the future, but emerging markets perform well in certain areas, including entrepreneurship and global citizenship. The index shows that a strong performance between the overall ecosystem for the knowledge economy, where the rankings are entirely dominated by advanced economies, is not necessarily associated with a strong performance for entrepreneurship, where South Africa, Brazil, India and Mexico all come in the top ten. Looking at some specific indicators, Nigeria and Brazil have the highest levels of early-stage entrepreneurship among the population. Youth in Nigeria and South Africa were the most likely to express positive enabling attitudes toward entrepreneurship. Indonesia emerges as one of the top three countries in terms of social support for entrepreneurship, along with the US and Canada. This tallies with the survey finding that Indonesian students were far more likely than their counterparts in any other country to say that they had started their own venture (whether for-profit or not) while at university, with one in three saying they had done so. This compares with 16% of all survey respondents and just 6% in Denmark.

Advanced economies generally perform better in preparing youth for the future



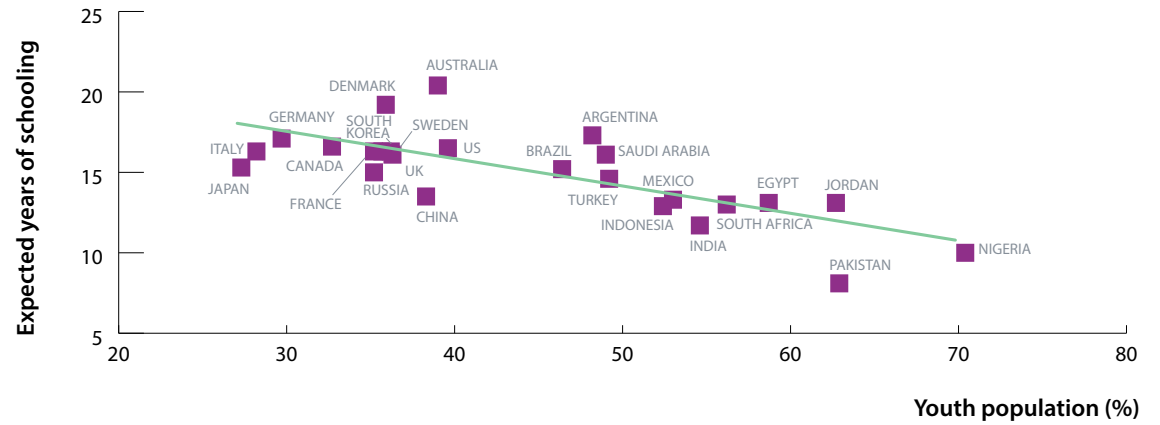
Several advanced economies are lagging behind in terms of entrepreneurship. France, Italy and Japan all rank highly in terms of the knowledge economy, yet slip to the bottom ten when it comes to entrepreneurship. This highlights the importance of fostering entrepreneurship among youth to ensure future economic dynamism. The scores are in part a reflection of limited social support for entrepreneurship in all three countries, calculated by the Global Entrepreneurship Monitor to reflect the degree to which social norms encourage new business methods or activities. Meanwhile, survey respondents in emerging markets in Latin America, Asia and Africa were more likely to say they had received entrepreneurship training than those in Europe, North America or the Middle East. Across the board, 65% or more of survey respondents expressed positive attitudes toward business risk-taking and said they would like to try a new venture, even if they failed. However, these positive attitudes are not always met by practical support, whether social, financial or regulatory. At least 60% of respondents in every country said they did not have the necessary support (broadly defined) to start their own venture.

Several advanced economies lag behind in promoting youth's entrepreneurial ambitions



Education systems are not yet making sufficient provision for 21st-century skills, according to the perceptions of survey respondents. Only half of respondents indicated they had worked with others on a group project in their secondary school or had given an oral presentation to their class, while only one-third said they had led others on a project or engaged in a discussion with people with whom they disagreed on a topic. The growing global debate about preparing youth for the future of work does not yet appear to have translated into the necessary changes in education, which will also require extensive training for teachers. Almost all the countries in the index have a digital skills strategy, but this is not necessarily being felt in practice. Nor is the private sector doing enough on the digital skills front: youth in all countries also report that only a minority receive on-the-job training, including workplace training in information and communications technology (ICT) skills.

However, countries with large youth population still face significant challenges in providing adequate education to them



STEM education trends

Preparing youth for the future is likely to require a mix of core basic skills (reading, writing, mathematics), digital skills, 21st-century skills, and investment in the quality and access of STEM (science, technology, engineering and mathematics) education. STEM education enrolment is strongest in Germany, China and India, in that order. Japan, in 15th place, is seeking to improve STEM education with a national strategy for STEM development through to 2020. Jordan comes in seventh place, with STEM enrolment of just over one-quarter. This is notable among the Middle Eastern countries and contrasts with 11% in Egypt, which ranks bottom of the list. A decade ago a World Bank study flagged the overreliance of many Arab countries on humanities degrees.[4] It pointed out that these were well suited to employment paths in the civil service but less suited to the needs of development strategies that aim to expand private-sector manufacturing and services businesses. Egypt has piloted a small number of elite STEM schools—it initially established one STEM school for each gender, then worked with international partners to expand this pilot to 11 model STEM schools—but has yet to take these to scale.[5]

There is a big divide when it comes to gender. The inclusion of women in education and entrepreneurship has improved dramatically at the global level in recent decades. Globally, female enrolment in tertiary education is now slightly higher than it is for males (at 39%, compared with 35% for males in 2016, according to UNESCO). But some countries buck these trends. India, Indonesia, Pakistan, South Africa and Nigeria all have female enrolment ratios that are significantly below the global level (from 29.5% in Indonesia to 8.3% in Nigeria).

Young women are more likely to be outside education, work or training in a majority of the countries surveyed, with Pakistan, India and Saudi Arabia recording the largest gaps. In 15 of the 25 countries covered, women and men have equal rates of broadband access. Pakistan, Nigeria and India emerge as the countries with the largest gender digital divide, measured in terms of the ratio of women who have broadband access compared with men. If unable to access the internet, young women face obstacles to informal learning, job searches and exposure to international ideas and experiences, among many other things.

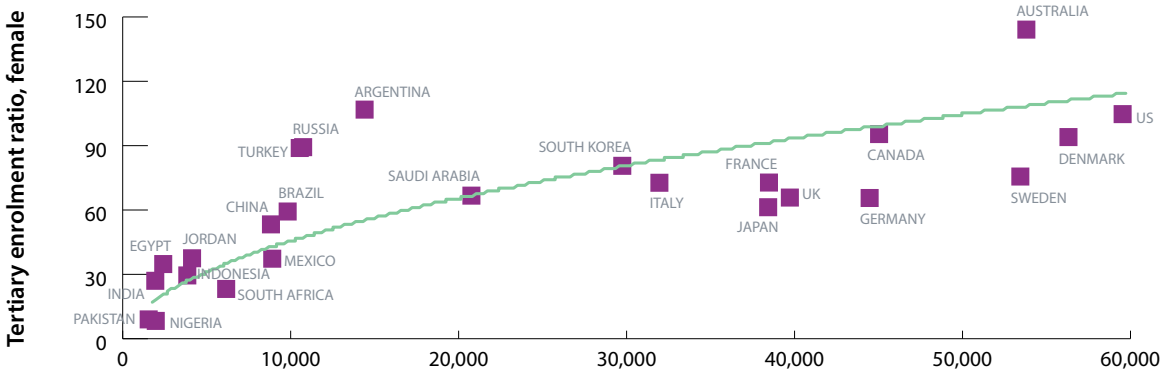
However, despite its gender digital divide, Nigeria, along with Brazil, emerges as one of the two countries with the lowest gender gap in early-stage entrepreneurship, reflecting a large proportion of women starting their own businesses. India also performs relatively well in terms of women starting their own businesses. These results suggest that the gender digital divide does not

4 http://siteresources.worldbank.org/INTMENA/Resources/EDU_Flagship_Full_ENG.pdf

5 https://www.worldlearning.org/program/egypt-stem-schools-project/

necessarily prevent women from starting their own businesses. However, it is likely to be a barrier to scaling up these early-stage enterprises into more sustainable, larger-scale businesses. Moreover, if left unaddressed, it could become more of an obstacle in the years to come as the digitization of the economy increases.

Access to higher education for women is higher in advanced economies

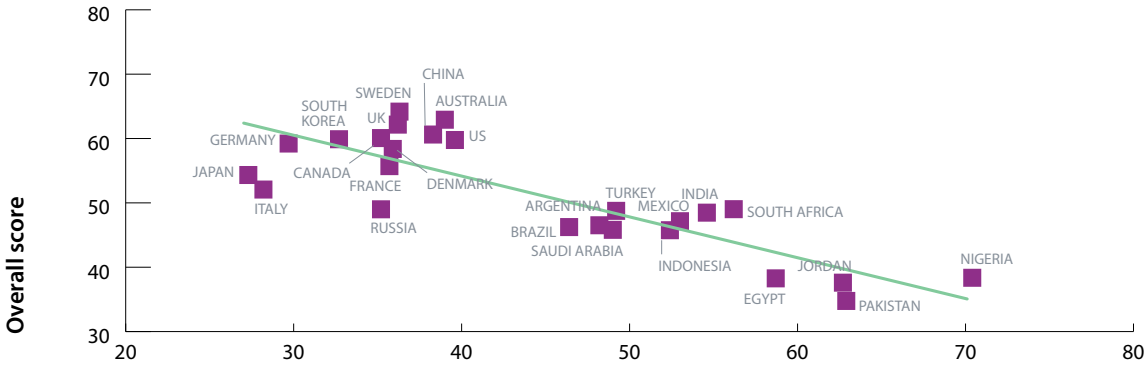


THE SWEDISH EXPERIENCE

Sweden tops the index overall, reflecting its high performance in three domains in particular: it has the best economic environment for youth and the third-best ranking for entrepreneurship and global citizenship. By comparison, on employment and on education and skills it is in the top ten, but not in the top five. Sweden's government is committed to an evidence-based youth policy, and since 2004 there has been an effort across government agencies and ministries to share data on youth living conditions to support a comprehensive youth policy. According to one review, the idea of youth as a specific policy area dates back to at least the 1940s.[6] A 1997 government report recommended three key objectives of youth policy: that young people needed to be prepared to live independent lives; that young people should be given the opportunity to participate in society and exercise real power; and that young people should be perceived as a resource, with their capacity for critical thinking seen as a positive for society. In an attempt to take a holistic approach toward youth, the government has promoted cross-sectoral co-operation, such as between police, schools and non-governmental organizations (NGOs) working with youth.

6 Torbjorn Forkby, "Youth policy and participation in Sweden: a historical perspective", 2014. https://pjp-eu.coe.int/documents/1017981/8437152/H4_Sweden.pdf/da8e27d8-8c5c-4b04-9550-20fa8c1ab33b

Developing countries with large youth populations face significant challenges in unlocking youth potential



Youth unemployment is a global problem, but there are great disparities between countries. Japan and Germany recorded the lowest level of youth unemployment, at 4.6% and 6.4%, respectively. Germany's low levels of youth unemployment have been attributed by many to an effective vocational education system, among other labor market factors.[7] The latter is known as the "dual training" or dual apprenticeship system, because it combines private-sector training within companies with publicly funded training in vocational schools. These training programs are certified by chambers of commerce or other relevant professional bodies and are regulated by employers' organizations and trade unions. The system thus incorporates input from the public sector, the private sector and civil society. On the other side of the spectrum, South Africa has the highest youth unemployment rate among the countries covered by the Index, standing at 57.4%. This is followed by Jordan (39.8%), Italy (36.9%), Egypt and Saudi Arabia.

China is one of the highest performers, reflecting enormous growth in its economy and in education in recent years, enabling it to catch up rapidly with economies that industrialized much earlier, despite having a lower GDP per capita. It is in the top five for every domain except global citizenship. Chinese youth were the least likely to say that their socioeconomic status had been a barrier to their education. They were also the most likely to say that they had been able to obtain an internship and that it had helped them find employment. The government has been actively steering youth toward STEM subjects (where it has the second-highest ratio of graduates after Germany) and toward a smooth education-to-work transition.

7 Pierre Cahuc et al, "Youth Unemployment in Old Europe: The Polar Cases of France and Germany", July 2013. http://ftp.iza.org/dp7490.pdf

Work-based learning programs: examples of best practice

Australia, South Korea, the UK and the US are leading the way in developing work-based learning programs. They have developed incentives for internships, such as tax breaks for companies that create internships or apprenticeships, and they have set up digital platforms that allow youth to find internship opportunities. By contrast, 13 of the 25 countries surveyed have no digital platforms for internships, 13 provide no government incentives for internships, and seven have no national work-based learning strategies.

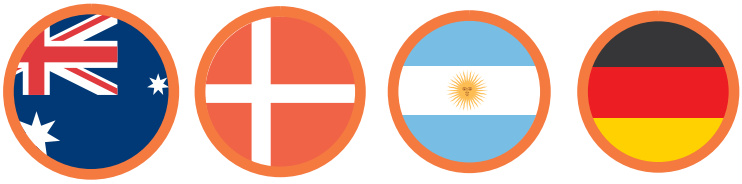
Gaining work experience while studying has a significant effect on future employability. Across many countries, there are controversies about whether unpaid internships are acceptable: while their ability to take on unpaid interns encourages employers to create more internships, it generally also limits them to people with an already higher socioeconomic status. France tries to balance this by waiving the minimum wage requirement for internships of less than two months, while Germany requires the minimum wage to be paid for internships unless they are a degree requirement. By contrast, **Denmark provides students with a guaranteed basic income throughout their studies, including periods where they undertake unpaid internships**, which typically account for around one semester during a degree course.

Youth reported receiving only limited on-the-job training, with less than half (48%) of those surveyed receiving basic introductory training, and only 22% receiving specific software or computer training. Respondents in India indicated the highest levels of training, particularly ICT-specific, while Jordan ranked at the bottom. On-the-job training appears to be one area in which all countries surveyed should try to improve their performance, but there are concerns that the growing trend of short-term or otherwise insecure employment could discourage companies from investing in training.

Key findings by domain

Domain 1. Education and skills

Expected years of schooling



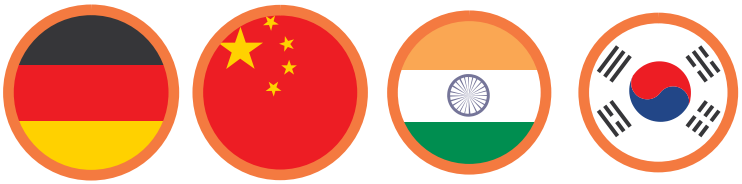
Australia **20.4** Denmark **19.2** Argentina **17.3** Germany **17.1**

Top three performers in PISA average scores in reading, mathematics, and science

1. Japan
2. Canada
3. South Korea
4 China*

*based on metropolitan regions

Share of higher education graduates in STEM fields
%



Germany **36.8** China **36.5** India **31.7** South Korea **29.9**

21st century skills: Only about **50%** of youth surveyed have worked on a group project, and just **34%** have led one in their secondary school

Sources: UNESCO, OECD, Global Youth Index Survey

The Education and skills domain is based on three key focus areas:
Participation and quality of compulsory education
• Upper-secondary enrolment ratio
• Expected years of schooling
• Reading, mathematics and science skills
• Perceived inclusion of 21st-century skills in compulsory education
• Attitudes toward learning
Participation, skills and quality in higher education
• Tertiary enrolment ratio
• Tertiary enrolment ratio, female
• Perceived obstacles to accessing higher education among youth
• STEM education enrolment
• Quality of universities
Promotion and adoption of digital skills
• National strategies for digital literacy for students and teachers (a subset of eight factors considered in the score)
• National strategies for e-inclusion of females
• Youth's use of ICTs
• Youth's use of online safety measures

The indicators in this domain assess each country's "supply" of the skills and the knowledge needed to allow youth to participate in the global transition toward the knowledge economy. The indicators evaluate young people's access to formal education, and the access to the development of skills required for jobs of the future. Most experts agree that youth education should include both traditional and technical skills along with a focus on 21st-century skills, such as problem-solving and critical thinking, digital skills for the future, adaptability, self-direction, and social and cross-cultural interaction. The full impact of technological advancements such as artificial intelligence (AI) and automation on employment remain unknown, with many applications yet to be invented. As a result, one of the vital skills will also be a commitment to lifelong learning and training, to adapt and remain up-to-date with technological change.

Key findings for Education and skills

Australia is top-ranked for youth education and skills. Australia has developed a world-class education sector that attracts substantial numbers of international students. The large number of foreign students makes it the only country in the index where the number of people enrolled in a university is higher than the local population of university age. Australia also ranks third in terms of the perceived inclusion of 21st-century skills in secondary and post-secondary education, based on the youth survey. (These are skills that can be utilized in a variety of functions and focus on

teamwork, leadership, flexibility etc.) However, despite the overall positive statistics, access to education—measured by whether the respondents to this survey perceived their family background as a barrier—is still an issue. Indeed, local studies note significant educational inequality, with poorer educational performance in remote areas, including those with large indigenous populations.[8]

South Korea, in second place, benefits from high scores for overall tertiary education enrolment, STEM enrolment and access. Meanwhile, China comes in sixth place, ahead of France or the US. China scores particularly well when it comes to perceived obstacles to accessing higher education and the quality of its top universities. China also ranks highly for enrolment in STEM subjects at higher-education level, with only Germany recording a higher proportion.

The quality of the top universities is generally higher in more developed economies, with the US in first place. When it comes to perceived access to education, however, China is in the lead, followed by Jordan, with India and Saudi Arabia also making it into the top ten. Access for Chinese students is strengthened by the fact the country has the largest higher education system in the world, and also the largest state-run education system. Of all the young people surveyed, the Chinese were the least likely to say that their family finances or social standing had posed an obstacle to their education. By contrast, the US came tenth in the ranking for perceived obstacles to access, and South Africa came last.

Beyond the elite universities, the quality of basic education will be critical to ensuring that the youth population is able to develop a more knowledge-based skills set. In most countries, the vast majority of youth of upper-secondary age are enrolled in school. However, there are still big disparities between countries. For instance, a young person in Pakistan can typically expect to have eight years of schooling –half the time that their Saudi counterparts spend in education, and just 40% of the average period of schooling in Australia. Yet the generally strong performance on secondary enrolment reflects a wider global trend of rising secondary school enrolment over several decades: UNESCO data show that global secondary school enrolment rose from 41% of the global population in 1970 to 76% in 2016, by which time the enrolment rate had become slightly higher for females than for males.[9] However, the quality of education varies immensely from one country to the next. Reading, maths and science scores, measured by the average scores for 15-year-olds in the OECD's 2015 Program for International Student Assessment (PISA), were particularly strong in East Asian and Western countries. They were generally lowest in the poorest countries surveyed for the index.

In most countries, policy support for developing skills for the future is growing. Most countries have policies to drive the development of digital skills. In addition to this, in the survey the vast majority of youth expressed the view that learning is a lifelong process and is essential for success. However, the survey also suggests that youth still have only limited practical experience of 21st-century skills in their education system. In terms of these skills, across the 25 countries surveyed, only

8 Australia's 'staggering' education divide: How students in remote areas are far from a 'fair go', https://www.sbs.com.au/nitv/nitv-news/article/2017/06/28/australias-staggering-education-divide-how-students-remote-areas-are-far-fair-go

9 https://data.worldbank.org/indicator/se.sec.enrr

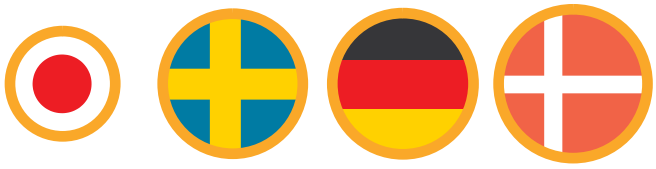
half of respondents indicated that they had worked with others on a group project in their secondary school (50%) or that they had given an oral presentation to their class (49%), while only around one-third had engaged in a discussion with people with whom they disagreed on a topic (37%), led others on a project (34%) or had helped to organize an event at school (30%). When it comes to the final component of digital skills, online safety, the results highlight serious limitations in all the countries surveyed. This indicator is based on reported user behavior when it comes to safety, privacy, and also the accuracy of online materials.

The scores for youth education and skills are highly correlated with overall performance in the index, with a correlation of 0.91. This reflects a particularly strong correlation with employment (0.79) and the knowledge-economy ecosystem (0.77), all of which are areas where advanced economies maintain a strong lead. High scores for youth education are less strongly associated with global citizenship (0.61) or entrepreneurship (0.56), where some advanced economies do not perform so well.

Domain 2. Employment

Lowest share of youth population not in education, employment, or training (NEET)

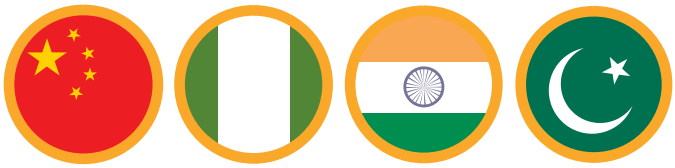
%, lower is better



Japan **3.5** Sweden **6.2** Germany **6.3** Denmark **7.0**

Share of youth surveyed that expect their economic situation to improve in the next five years

%



China **88** Nigeria **87** India **86** Pakistan **85**

Work-based learning

Less than 50% of the countries developed programmes to encourage work-based learning, such as internships.

Less than a half of the youth surveyed received basic introductory training, and just one in five a specific software/computer-related training in their job.

Sources: ILO, Global Youth Index Survey, EIU research

The Employment domain is based on three key focus areas:

Opportunities

- Youth employment rate
- Youth not in education, employment or training (NEETs)
- Ratio of female to male NEET rate
- Youth's perception of their economic opportunities
- Employment in high-skill occupations

Education-to-work transition

- Participation in internships
- National strategies for work-based learning programs (a subset of three factors considered in the score)
- Youth's job search strategies

Job quality

- Training in the workplace
- ICT and digital training in the workplace
- Skills-matching in the labor market

This domain measures the level of youth employment and the enabling environment that support young people's transition from education to work. This includes both direct enablers, such as career services and online job-search platforms, as well as indirect enablers, such as participation in internships and apprenticeships (these help build workplace skills). This domain addresses the "demand" for and the matching of the skills and the knowledge that are deemed to be necessary for youth to participate in the knowledge economy.

The main focus of the indicators in this domain measure job opportunities, education-to-work transition, and job quality. This reflects the fact that beyond the absolute unemployment numbers there are concerns about youth underemployment and the underutilization of skills in almost all economies, as well as about the rising trend of temporary, insecure and informal work. As informal work remains a reality in developing countries, there are new patterns of insecure work arising from freelancing and the small but rapidly growing "gig economy" in advanced economies. As well as affecting living conditions and quality of life, these labor-market trends pose risks to the availability of on-the-job training. This also raises the question of who will pay for the lifelong learning that will be needed to adapt to continuous technological changes in the workplace.

Key findings for Employment

Australia, the UK and the US top the rankings for youth employment; these 3 countries offer the best environments for education-to work transitions. Even though other countries have lower proportions of unemployed youth and better rankings for employment opportunities, these three countries benefit from their strong performance in education-to-work transition and youth perceptions of training and skills-matching (based on the survey). Looking at the three main categories that make up this domain, Denmark is the best performer in terms of employment opportunities. Australia, the best performer for education and skills, also ranks top for education-to-work transition. In terms of youth perceptions of job quality, by contrast, survey respondents were most positive in India, China and Pakistan when asked to assess their experience of how long they had to wait to find a job after education, and whether they had been offered on-the-job training, including digital training.

South Africa and Jordan registered exceptionally high youth unemployment rates, as well as high rates of youth not in education, employment or training (NEETs). The NEET rate is in some ways a better measure of youth economic exclusion because it includes the economically inactive, whereas the unemployment rate is calculated relative to the population that is actively seeking work. (Note that the ILO's definition it does include unpaid household or caregiving work performed mainly by women) Having a low NEET rate is also regarded as a sign of a healthy education-to-work transition. In the survey, Japan, Sweden and Germany record the lowest NEET rates, at just 3.5%, 6.2% and 6.3%, respectively.

In some countries, the young female population is particularly likely to be left out of the labor market, with the female NEET rate six times higher than the male rate in India, seven times higher in Pakistan. Women's participation in the labor force in Saudi Arabia is increasing as a result of investment in women's education, coupled with the gradual introduction of policies to encourage women to work. By contrast, the NEET gender gap is lowest in Denmark, which has a heavily subsidized early-years education sector, a culture of flexible working, and a NEET rate that is almost the same for young women as for young men. In Italy, Canada and France, meanwhile, the NEET rate is somewhat higher among men than among women.

Young people are still heavily reliant on traditional sources of information when looking for employment opportunities according to the survey results, with 57% saying their first source was friends and family, followed by 44% who cited online sources.

Survey results also indicate that Chinese youth respondents were the most likely to have had an internship that they found had prepared them well for their job. Most Chinese students are required to complete an internship as part of their degree, and major companies see them as a key element of successful graduate recruitment[10]. Brazil, France, India and Jordan are also ranked among the top five for this indicator. The Brazilian government's Scientific Mobility Program,[11] which funds scholarships to study STEM subjects in the US, also offers funding for two-month internships and has secured more than 50% of its participants from low-income families.

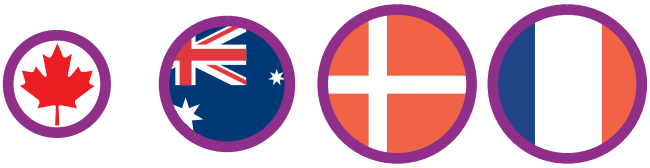
10 https://files.eric.ed.gov/fulltext/EJ1113761.pdf

11 https://www.ncbi.nlm.nih.gov/pubmed/28492731

Domain 3. Entrepreneurship

Shortest time to start business

Days, lower is better



Canada **1.5** Australia **2.5** Denmark **3.5** France **3.5**

Share of adults who have recently started a business or are in the process of starting one

%

Nigeria **39.9** Brazil **20.3** Canada **18.8** Turkey **16.1**

Youth entrepreneurship

89% of youth surveyed indicated they have started, or might have some interest in starting their own venture (for profit or not), but **only about a third** indicated that they have had training around entrepreneurship (37%) and **only about one in four** (27%) had finance/accounting courses as a part of their education.

Sources: World Bank, Global Entrepreneurship Monitor, Global Youth Index Survey

The Entrepreneurship domain is based on three key focus areas:
Entrepreneurial skills
• Youth's exposure to practical skills education
• Entrepreneurship training
• Enabling attitudes for entrepreneurship
Entrepreneurial ecosystem
• New business activity
• Early-stage entrepreneurial activity
• Inclusiveness of early-stage entrepreneurial activity
• Perceived financial obstacles to starting a business among youth
• Depth of capital market
• Time to start a business
Supporting strategies and institutions
• Youth entrepreneurship strategies (a subset of nine factors considered in the score)
• Youth entrepreneurship networks (a subset of three factors considered in the score)
• Supporting social norms and institutions for entrepreneurship

This domain measures the extent to which each country fosters youth entrepreneurship. In addition to being prepared for the jobs of the future, youth should be empowered to participate actively and innovate in the knowledge economy. This includes the existence of the necessary skills and attitudes, policy and civil society support, and the economy's overall ability to support entrepreneurial activity.

Key findings for Entrepreneurship

Canada tops the rankings for entrepreneurship, followed by Australia and Sweden. China emerges in fifth place, marginally below the US. China has adopted policies to encourage entrepreneurship in recent years, determined to move beyond its reliance on state-led industrial sectors and to create jobs for its growing number of university graduates. The authorities have cut taxes for small and medium-sized enterprises (SMEs), established funds to invest in them, promoted platforms for crowdfunding, and sought to shift cultural norms around entrepreneurship.

While attitudes toward entrepreneurship vary from country to country, most youth in our survey were positive in their outlook. Across all respondents, more than three-quarters agreed that taking risk for the right reasons is acceptable (78%), and more than two-thirds agreed that they would someday like to start their own business (68%). Support for risk-taking (for the right reasons), learning and trying new things were particularly high in South Africa, Nigeria and Mexico, and lowest in Jordan, Germany and Japan. On top of that, there seems to be a great deal of interest among respondents to start their own venture: just 11% indicated no interest, while over one-third said they had already embarked on their own venture (34%).

In terms of the ecosystem for entrepreneurship, Australia, the US and the UK rank highest. New business density is one of the areas in this study where countries show great differences. The UK tops the ranking with 100 new businesses per 1,000 people, but this proportion falls rapidly, with France, in tenth place, recording just 11 per 1,000 people, and half of the remaining countries recording five or per year or fewer.

Nigeria (lower-middle income) and Brazil (upper-middle income) score highest in terms of the rates of early entrepreneurial activity (individuals starting a business in the past 42 months). Both countries also show high levels of female early entrepreneurial activity. By comparison, in a number of developed countries the participation rate of women can be as low as half of that of men. France, Italy and Japan demonstrate particularly low levels of early entrepreneurial activity (Japan also ranks bottom for enabling attitudes), and in Jordan and Pakistan the rates are especially low among women.

The scores for entrepreneurship are fairly highly correlated with the overall score, at 0.73, but have a particularly low correlation with the scores for the knowledge-economy ecosystem. This reflects the fact that some emerging markets rank highly for entrepreneurship, whereas the best performers for the knowledge-economy ecosystem are all advanced economies.

Domain 4. Global citizenship

Global problems

The majority of youth surveyed indicated that they consider global issues as **quite or extremely important for the future**, with **access to education** (82%), **food** and/or **water scarcity** (80%), and **global health** (78%) rated as the most important global issues.

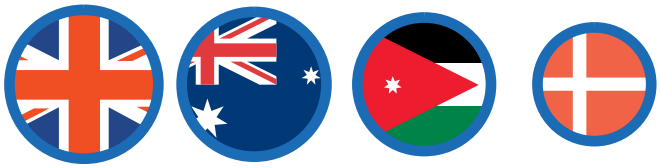
However, only about **one in four** (27%) participated in an event to raise awareness of a local, national, or global issue and **less than a third** donated their time (29%) or money (31%) to a local organisation.

Diversity

Around three-quarters of youth surveyed agreed that it **is important to learn about diverse people** (75%), and that studying/ living/working abroad is a valuable experience (73%), but only over a half (56%) **talked with people of different cultures**, religions, ethnicities, or opinions to inform their own understanding, and just **one in ten** (11%) had a chance to study abroad.

Share of tertiary students coming from abroad

%



UK **18.5** Australia **17.5** Jordan **14.9** Denmark **10.8**

Sources: Global Youth Index Survey, UNESCO

The global citizenship domain is based on three key focus areas:
Promotion and status of civic participation
• National youth policies (a subset of nine factors considered in the score)
• National youth institutions (a subset of three factors considered in the score)
• Level of youth civic participation
Attitudes toward the future among youth
• Attitudes toward global issues
• Attitudes toward civic engagement
• Attitudes toward emerging challenges
Youth's exposure to international experiences
• Openness to multiculturalism
• Share of tertiary education students from abroad
• Policies promoting study abroad (a subset of two factors considered in the score)
• Foreign language proficiency

This domain measures the extent to which the youth in each country see themselves as active citizens contributing to society, and the extent to which they embrace a global view of citizenship. Attitudes to global issues and openness to multiculturalism are often seen as being linked to the development of 21st-century skills and the ability to succeed in an increasingly global knowledge economy. Active citizenship and a desire to participate positively in society have also been linked to the idea of a "learning society", committed to lifelong learning, innovation and improvement.[12]

Key findings for Global citizenship

Youth engagement with global citizenship varies widely across the 25 countries in the study; largely based on exposure to international experiences and civic participation. These are mainly driven by differences in the level of civic participation and exposure to international experiences in their societies. By contrast, youth in the 25 countries surveyed show more similarities and convergence when it comes to the third component of this domain: attitude toward the future.

In terms of civic participation and government policy, most governments have set up national institutions for youth and policies toward youth. Out of the 25 countries surveyed, 19 have a national network for youth organizations, and of these 11 are members of international networks for youth organizations (such as those that exist across the EU). Among the Arab countries, Jordan is the only one to have a youth organization network, but it is not part of an international network. By contrast, all the countries in the index have national networks for youth entrepreneurs, even though ten of them have no government funding for such networks. In 18 out of the 25 countries, including the three Arab countries, these networks are members of larger international networks for youth entrepreneurs.

South African youth report the highest engagement with civic participation – they are the most likely to have participated in the various forms of civic participation queried in the study's survey. These activities are: donating money or time to a local organization; participating in an activity with a civic or political organization; taking part in community discussions; participating in an event to raise awareness of issues; or participating in discussions with people of different backgrounds and viewpoints to raise their own awareness. These types of civic participation were defined to include informal modalities of civic participation, with overlaps with 21st-century skills, and not to be limited to work with formally recognized non-governmental organizations (NGOs) or political groups. Chinese youth, along with Australian youth, were in the top three for reporting civic participation, while Japanese youth were the least likely to do so. Nonetheless, at least one in five youth in every country reported some form of civic participation.

All youth surveyed across the 25 countries report high engagement with major global challenges including climate change, global health, migration, food/water scarcity and income inequality. In almost every country, more than half of respondents said that each of the challenges was either "quite" or "extremely" important. Youth in Japan were the least likely to rate

12 http://infed.org/mobi/the-theory-and-rhetoric-of-the-learning-society/

the challenges as important—especially when it came to migration, poverty and inequality, and climate change. Thus, Japan ranks bottom for this indicator, while Brazil, Mexico and South Africa come in joint first place.

Young people aged 18-30 find access to education to be the single most important global challenge, with 82% of all those surveyed saying it was extremely important. This aligns with the high proportion of youth (79%) who agreed that education was key to success. Survey respondents saw food and water scarcity as the next most important global challenge, followed by global health. The top three challenges seen by youth as being the most important - access to education, food/water security and global health – all relate to future economic provision. The importance youth place on health and education has significant implications for policymakers, since these services are widely seen as being primarily the responsibility of governments. By contrast, migration was regarded as the lowest priority, with just over half of respondents rating it as an important issue—just over 10 percentage points lower than the next-lowest priority, global governance.

Emerging market youth report a more positive attitude towards the coming challenges. Attitudes toward emerging challenges—including the impact of automation—again bore out the finding that youth in emerging markets are more optimistic than their counterparts in advanced economies. Youth were most positive in Nigeria, China and South Africa and least positive in Germany, Japan and France.

Attitudes to civic participation were positive among a majority of youth respondents in all countries. These questions assessed young people's perception of their own political knowledge, their perception that their opinion matters, and the degree to which they believe it is important to learn about people from diverse backgrounds. Mexico came top of the ranking, despite having only limited reporting of youth civic participation being put into practice. Saudi Arabian youth came 11th, although the country is ranked 21st for actual experience of civic engagement.

In terms of exposure to international experience, the wealthier countries strongly dominate the rankings. This is partly because opportunities to travel and study abroad are more easily available in the better-off countries. For instance, 12 of the countries offer government financial support for participation in multilateral student exchange programs. However, it also reflects attitudes and values: Japan is one of the wealthiest countries in the index but is placed 15th for exposure to international experiences. Although Japan funds studies abroad, it shows lower levels of foreign-language proficiency and openness to multiculturalism (according to the survey results).

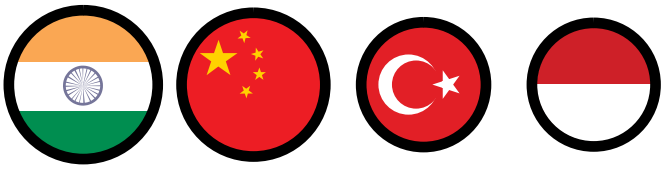
Youth in Latin American and African countries were the most likely to express openness to multiculturalism. By contrast, youth in Japan, South Korea and Indonesia were the least open to multiculturalism, but elsewhere in East Asia, Chinese youth were significantly more open.

Domain 5. Knowledge-economy ecosystem

R&D spending
% of GDP

South Korea **4.2** Japan **3.3** Sweden **3.3** Denmark **3.0** Germany **2.9** US **2.8**

Average annual GDP growth
2013-2017



India **7.4** China **6.9** Turkey **5.2** Indonesia **5.1**

Best performance in ICT access
Out of 10

South Korea **8.9** Denmark **8.7** UK **8.7** Germany **8.4** Japan **8.4** Sweden **8.4**

Sources: UNESCO, IMF, ITU

The Knowledge-economy ecosystem domain is based on three key focus areas:

Innovation

- Knowledge intensity of the economy
- Research and development (R&D) expenditure
- Receipts for the use of intellectual property

Economic growth and productivity

- GDP growth
- GDP per capita growth
- Labor force productivity growth

Infrastructure and connectivity

- ICT access index
- Gender digital divide
- Quality of a country's road, rail and air infrastructure
- Quality of trade and transportation-related infrastructure

This domain is structured to reflect the expectation that the knowledge economy will be a key area of future growth and competition. The measures assess the enabling factors required to support youth economic opportunity. This includes the health of the economy, the general business environment, and the quality and availability of information and communications technology (ICT) infrastructure and access. These are general requirements of economic development, including youth development. According to the World Bank,[13] the four vital pillars of a knowledge economy are a supportive economic and institutional regime, an educated and skilled population, a dynamic information infrastructure, and an efficient innovation system (comprising firms, universities and others).

Key findings for Knowledge-economy ecosystem

Advanced economies dominate this domain, which has a high correlation (0.88) with the overall ranking in the index. The top four performers are Sweden, China, South Korea and Japan, which are rated in terms of the development of their knowledge economy, their levels of infrastructure and connectivity, and their overall economic growth.

Emerging economies lead in terms of economic growth, and to a lesser extent growth in GDP per capita. Labor force productivity growth is highest in three rapidly growing Asian economies, China, India and Indonesia. This is an area where the adoption of technology can provide a significant boost. Labor force productivity growth is one of Egypt's relative strengths: it is in fourth place here, one of its highest rankings for any indicator.

However, the rankings for infrastructure and connectivity are dominated by advanced economies, with Sweden, France and the UK coming out on top. Road, air and rail infrastructure is most developed in Western countries, while South Africa, South Korea, Japan and China are in the top ten for trade-related infrastructure.

The high-skill manufacturing and technology economies - Japan, Germany and South Korea are global leaders in the knowledge-intensity of their economies, and form the top three in this assessment. Nigeria, Pakistan and Indonesia ranked the bottom three. South Korea benefits from having the world's highest R&D spending as a percentage of GDP, at 4.2% (nearly 1 percentage point above the second-highest spender, Japan). Here, China slips to ninth place, while the three other top performers for the overall economic environment remain at the top of the rankings for R&D. However, China's R&D spending has been on a strong upward trajectory in recent years. In 1991 it spent 0.73% of GDP on R&D; today it spends 2.1%, and the government is targeting 2.5% by 2020. According to Credit Suisse, the business sector is the main focus of the R&D increase, accounting for 77% of total spend.[14]

13 http://siteresources.worldbank.org/INTLL/Resources/Lifelong-Learning-in-the-Global-Knowledge-Economy/chapter1.pdf

14 https://www.credit-suisse.com/microsites/events/china-investment-conference/en/blog/from-adapator-to-innovator.html

Global R&D spending is heavily concentrated in the G20 (according to UNESCO, in 2016 the G20 accounted for 92%). Turkey and Saudi Arabia have the lowest R&D spending in the G20, while the non-G20 countries are all further down the ranking. There is a big gap between the countries in terms of earnings from intellectual property. While Sweden earns 1.5% of GDP from this, the bottom ten countries either earn nothing or a negligible amount (less than 0.1% of GDP).

The gender digital divide is another key area of differentiation among the countries in the study. In 15 of the countries surveyed, it is non-existent. Yet in Nigeria, women's internet usage is half that of men's and in India it is only 40%. This is another demonstration of the trend seen earlier, where women in many countries have caught up with men in terms of their economic and educational participation, while others are doubly left behind, not only in comparison with men in their own country, but also in comparison with women elsewhere.

South Korea's world-class ICT

South Korea is the top country for information and communications technology (ICT) access, as well as the top investor in research and development (R&D). This reflects dedicated government policy efforts. In 1960 South Korea's telephone penetration rate was around one-tenth of the world average. By the 2000s it had the world's highest broadband penetration rate. The government made extensive investments in ICT infrastructure in the late 1990s, following the Asian financial crisis, despite austerity in other areas. A 1996 national program for "informatization promotion" established free internet access points across the country, provided training in ICT and organized the distribution of second-hand computers. The country now has the world's fastest internet speeds, and the government has said it will commission two consortia to study how to make data speeds of 10 GB/second commercially viable. Policies have been designed to boost demand for, as well as supply of, ICT. For instance, the government has offered widespread ICT training and extensive e-government.

IV. Implications for stakeholders

"From a young person's perspective today, developing the ability to learn and to adapt is more important than learning any individual skill. It's about learning to learn."

ANN MEI CHANG, author of Lean Impact and former chief innovation officer at USAID

a. Youth

Youth need to be prepared for a future of rapid and unpredictable technological change, which will require them to be skilled at managing change and adapting to new realities.

Yet while governments and the private sector also have an interest in helping them to succeed, youth will not necessarily be able to rely on these other stakeholders to provide them with the skills and guidance they need. They will have to place a high value on their education. This requires both formal education in schools and universities and informal learning in the workplace, during leisure time and through peers. Youth should be alert to opportunities to learn in daily life and be proactive about asking for information, experience-sharing and on-the-job training whenever they can. Collaborative and civic initiatives can also present youth with valuable avenues to develop 21st-century skills as they prepare for the future. By participating in teamwork, social interaction, leadership activities and organizing their own events, they will be able to develop the soft skills that are likely to be valuable in the future economy.

"The index demonstrates the importance of youth policy and government institutions. Young people need structure, support and strong institutions. The challenge is to embed those for the countries at the bottom."

CLARE HOLDSWORTH , Professor of Social Geography, University of Keele

b. Policymakers

With 14% of the world's youth currently unemployed, a key challenge for policymakers is to find ways in which the new economy can provide these young people with opportunities, both now and in the future. This includes programs to develop skills, inside and outside the formal education system. In addition, providing the right ecosystem for the knowledge economy will depend on strengthening the broader economy, infrastructure and business climate, to ensure there is investment in future jobs for these youth.

Education systems will need to prioritize a combination of core subjects (such as mathematics and languages), digital skills, STEM education and 21st-century skills (such as problem-solving, adaptability and leadership), in an environment that fosters creativity and innovation. There is a need to adapt education policies to respond to cutting-edge research about the future of work.

Governments also need to work with the private sector to incentivize and promote work-based learning and on-the-job training. In particular, young women need access to dedicated training and support (e.g. technical, digital, entrepreneurship and workplace competency skills) to overcome the social and economic barriers that still exist in many societies.

These are global challenges, and governments should work together to examine and understand the likely implications of automation and other technological shifts to develop the right policies to prepare at this critical time. Internationally, governments should share best practices in preparing youth for the future, from digital skills programs and education-to-work policies to exposing youth to international experiences and 21st-century skills.

"Education for global citizenship (GCE) should be a priority for governments. It helps to prepare young people for the world we live in: multicultural, inter-dependent, and with high levels of mobility for people, goods and information."

AVRIL KEATING (Director of the Centre for Global Youth at the UCL Institute of Education

c. Private sector

It is in the interests of the private sector that youth should be better off and better educated than their parents, as they are the future consumers, clients, talent and innovators on which companies' future will depend.

No company can afford to ignore the impact of technological change. Companies should invest in lifelong learning, with a focus on digital and 21st-century skills. Lifelong learning is needed to prepare young employees for a future where they will have to be flexible and resilient enough to adapt to changes that have not yet been imagined. Companies should also be open to innovation in their work practices, including the nature of the workplace. In many cases, doing so will help companies to equip themselves to manage change.

"People can learn anything, and it can take place outside schools. Every conversation is an opportunity to learn."

CARLOS TORRES, distinguished professor and UNESCO chair in global learning and global citizenship education, UCLA

d. NGOs

Non-governmental organizations can provide spaces and networks for youth to come together to jointly develop their preparedness for the future. Civil society offers an arena where youth can learn and put into practice many of the key 21st-century skills, such as helping others, working in a team and leading projects. Importantly, they can provide channels for international co-operation and experience-sharing among youth, helping to develop youth's exposure to international experiences.

NGOs can also provide a voice for youth in the local and international policy debate about global challenges—from the impact and governance of automation and AI to such issues as access to health, education, and water and food security—that have been highlighted in this survey. This is particularly useful as the young, more than any other age group, will be affected by these issues but will rarely be in a position to direct policy themselves.

The index indicators suggest that national and international networks of young entrepreneurs are somewhat better developed than national and international networks of youth organizations. Youth organizations could seek to learn from the models developed by young entrepreneurs to promote networking and experience-sharing, especially in light of the growth of social enterprises, which create hybrid models of youth organizations that combine entrepreneurship with civil society.

V. Recommendations

Education

Across all countries, education systems need to adapt to focus more on 21st-century skills for the younger generation, with a greater emphasis on teamwork, leadership, creativity and entrepreneurship. Policymakers should look to Japan, Denmark, Sweden, Russia, India and Turkey for examples of particularly well-developed government strategies for digital skills for youth.

To prepare for a fast-changing future, education needs to go beyond the traditional classroom and university to develop more flexible models for lifelong learning, which will be critical for youth once they enter the workforce. Social enterprises and NGOs could play a valuable role to advance multi-sector collaboration in education policy and curriculum design.

Online safety needs to be a key priority, and while some governments are developing awareness-raising programs on cybersecurity and cyberbullying, much more work needs to be done to educate youth to protect themselves from fraud, invasion of privacy, and so-called fake news. The potential impact of online risks could multiply in future as the Internet of Things increasingly blurs the line between cyberspace and the real world.

Youth may be able to adopt on their own methods of self-study, peer-to-peer learning and other ways of learning digital skills that do not rely on the traditional education system. Such approaches have the added benefit of being conducive to lifelong learning. To some extent, young people will do this for themselves if they have good ICT and internet access—underscoring the importance of infrastructure and connectivity.

Employment

Youth employment is a key social issue across the board. Even in countries where youth unemployment is low by international standards, such as in Sweden and South Korea, local societies express concern that it is a serious worry. This may be because youth unemployment tends to be much higher than total unemployment—globally, it is more than twice as high.

Youth unemployment is both a social and an economic issue, and there is scope for multi-stakeholder partnerships to devise solutions to it. For instance, Germany's successful dual training/apprenticeship system involves the private sector, vocational schools and civil society in the form of chambers of commerce, trade unions and professional associations. This ensures that the

scheme responds to the needs—and benefits from the insights—of all these stakeholders. Germany's very low youth unemployment rate also reflects broader economic strength.

Our survey suggests that **youth still rely mainly on family and friends to find information about jobs**. Using a wider range of sources—and encouraging the private sector to advertise vacancies widely—may help to improve job matches.

The private sector will need to factor in the need for greater on-the-job training for young employees to ensure their future workforce is able to manage change. Our survey suggests that across the board young people's experience of on-the-job training, including in ICT skills, is alarmingly limited. Policymakers may be able to help incentivize companies to do more. They could consider tax credits or subsidies for on-the-job training for youth, with a focus on ICT and 21st-century skills.

Youth unemployment needs to be seen as a worldwide challenge, and one that merits international, multi-stakeholder co-operation to research its drivers and identify best-practice policy solutions.

Entrepreneurship

Entrepreneurship is already acknowledged by many governments to be critical to future job creation. This is an area where some emerging markets are making real progress. Yet our survey respondents generally said they lacked support to set up their own enterprises.

The survey results suggest that **enabling attitudes toward entrepreneurship are strong among young people, even in countries where broader social norms are not favorable to entrepreneurship**. The extent to which this represents a generational change in attitudes in different countries is worth further research.

Youth should use their voice to make the case for social and cultural support for entrepreneurship. This will also need support from policymakers, to address regulation and financing, and from business leaders.

Global citizenship

Exposure to international experiences is far stronger among youth from wealthy countries than those from emerging markets, according to the findings of the survey. Less well-off **countries should identify lower-cost ways to ensure their youth are exposed to international experiences, including through the use of technology to pair students with language partners or international learning partners remotely**. Such models could be developed by civil society or private-sector actors as well as governments.

The survey results suggest that youth across the countries recognize global challenges as important and that they believe they are well informed and can make a difference. However, **actual civic participation varies more than attitudes toward civic participation**. In general, the experience of youth civic participation is higher in Western countries, but in our survey China is also in the top ten, and its extensive programs for volunteering, community work, sports and arts may be particularly worth examining for non-Western countries. Policymakers should encourage youth civic participation, not least because it can be a key element in developing their 21st-century skills.

Knowledge-economy ecosystem

While countries will naturally continue to compete among themselves for investment, it is critical that all countries recognize a common interest in shared prosperity. **Future growth in the global economy will depend in part on enabling the younger generation in emerging markets to close the gap with their counterparts in advanced economies**.

Automation and shifts in the new economy have the ability to radically shift patterns of work, with potentially huge positive effects in terms of prosperity, productivity and leisure, but they also have the potential to create large groups of economic losers. **Public- and private-sector stakeholder action and co-ordination is key**. At a global and national level, policymakers need to plan to provide educational and social policies that will maximize the benefits and reduce the risks of these major shifts. The private sector should seek to develop the enormous economic opportunities represented by the youth who are currently being left behind.

VI. Conclusion

Advances in automation, AI and technology have generated both excitement and anxiety about their potential to revolutionize the economy and society. The human impact of this great technological change on the world's youth will be shaped by the decisions that are made now.

Beyond the high-tech industry itself, a broad range of jobs and functions are likely to be altered. There is huge potential to automate tasks and free up workers' time for higher-value, innovative and creative activities, but there are also concerns about disruption to labor markets and skills becoming obsolete. It will be important to take a proactive and holistic policy approach that looks at the impact on society while learning from previous experiences of dramatic economic and technological change—including industrial revolutions, globalization and structural adjustment.

There is both an opportunity and a need to prepare young people to work with new technologies to boost productivity and innovation. To do this, they will need to develop the flexible skills and working styles that stand a better chance of being able to adapt to future changes. This requires a holistic approach to education, ranging from ensuring the quality of basic education to developing lifelong learning, informal education and on-the-job training.

Already, too many of the world's youth are outside employment, education or training. This is especially true for young women. Even as policymakers and the private sector prepare for a rapidly changing future economy, they need to find ways to create jobs for young people today, while they are at a formative stage for their learning and career path. Making improvements to traditional core skills, including language and mathematics, will be a necessary prerequisite to developing more cutting-edge knowledge. And it will remain important to ensure that the economy has the right business environment to attract investors, in order to ensure that the ecosystem for a knowledge economy is in place. The traditional need to have quality infrastructure, institutions and regulations will remain vitally important. This is where a number of emerging markets need to catch up. Meanwhile, some of the advanced economies need to do more to encourage entrepreneurship and innovation to sustain their own knowledge economies.

Youth respondents to our survey repeatedly indicated their positive attitude toward learning, entrepreneurship and tackling global challenges. Policymakers, NGOs and the private sector need to work together with youth to make the most of their optimism about the future. If young people's expectations are disappointed, it will represent a huge opportunity cost; conversely, making the most of youth potential represents an enormous opportunity for the future economy.

Appendix A: Global Youth Index results tables

a. Overall results

Rank	*Country*	*Score*
1	Sweden	64.2
2	Australia	62.9
3	UK	62.2
4	China	60.6
5	Canada	60.1
6	South Korea	59.9
7	US	59.8
8	Germany	59.2
9	Denmark	58.4
10	France	55.7
11	Japan	54.3
12	Italy	52.1
=13	Russia	49.0
=13	South Africa	49.0
15	Turkey	48.8
16	India	48.5
17	Mexico	47.2
18	Argentina	46.5
19	Brazil	46.2
20	Saudi Arabia	45.8
21	Indonesia	45.7
22	Nigeria	38.4
23	Egypt	38.3
24	Jordan	37.6
25	Pakistan	34.8

Key findings: By domain

Domain 1. Education and skills

Rank	*Country*	*Score*
1	Australia	69.9
2	South Korea	64.8
3	UK	62.7
4	Canada	61.8
5	Sweden	61.5
6	China	61.4
7	France	60.6
8	Denmark	59.6
9	Germany	59.4
10	Russia	58.8
11	US	57.0
12	Japan	56.7
13	Italy	55.7
14	Argentina	52.9
15	Saudi Arabia	51.3
16	South Africa	49.0
17	Mexico	48.5
18	India	48.0
19	Turkey	47.1
20	Brazil	44.2
21	Jordan	38.9
22	Indonesia	37.2
23	Egypt	32.7
24	Nigeria	25.5
25	Pakistan	22.6

Domain 2. Employment

Rank	*Country*	*Score*
1	Australia	60.8
2	UK	59.9
3	US	59.2
4	Denmark	56.3
5	Canada	55.3
6	China	54.1
7	Germany	53.3
8	Sweden	52.4
9	South Korea	51.9
10	Japan	50.4
11	France	49.4
12	Argentina	46.5
13	Indonesia	46.0
14	Italy	45.1
15	Russia	44.8
16	Brazil	44.4
17	Saudi Arabia	44.2
18	South Africa	42.8
19	Nigeria	40.6
20	Mexico	40.2
21	Egypt	39.9
22	India	38.4
23	Turkey	37.9
24	Pakistan	35.6
25	Jordan	34.4

Domain 3. Entrepreneurship

Rank	*Country*	*Score*
1	Canada	66.1
2	Australia	60.6
3	Sweden	59.9
4	US	59.7
5	China	57.9
6	South Africa	55.9
7	Denmark	54.9
=8	Brazil	54.3
=8	Germany	54.3
=8	India	54.3
=8	Mexico	54.3
12	Nigeria	53.2
13	UK	53.1
=14	South Korea	51.9
=14	Turkey	51.9
16	France	49.3
17	Italy	48.9
18	Argentina	48.7
19	Indonesia	48.5
20	Saudi Arabia	45.8
21	Japan	44.7
22	Russia	42.9
23	Egypt	37.8
24	Pakistan	37.2
25	Jordan	30.9

Domain 4. Global citizenship

Rank	*Country*	*Score*
1	UK	75.2
2	Australia	72.7
3	Sweden	71.9
4	Italy	68.5
5	Germany	67.0
6	Russia	65.0
7	Canada	64.1
8	South Korea	63.3
9	South Africa	62.5
10	Nigeria	62.4
11	France	61.5
12	Denmark	60.9
13	China	60.6
14	US	60.0
15	Brazil	59.4
16	India	59.0
17	Indonesia	58.6
18	Turkey	58.1
19	Mexico	57.3
20	Japan	56.2
21	Pakistan	54.6
22	Argentina	54.2
23	Jordan	52.8
24	Saudi Arabia	51.0
25	Egypt	43.1

Domain 5. Knowledge economy ecosystem

Rank	*Country*	*Score*
1	Sweden	75.1
2	China	69.1
3	South Korea	67.6
4	Japan	63.6
5	US	62.9
6	Germany	62.2
7	Denmark	60.3
8	UK	59.8
9	France	57.6
10	Canada	53.0
11	Australia	50.6
12	Turkey	48.8
13	India	42.8
14	Italy	42.3
15	Indonesia	38.4
16	Egypt	37.9
17	Saudi Arabia	36.7
18	Mexico	35.5
19	South Africa	34.8
20	Russia	33.6
21	Jordan	30.9
22	Argentina	30.3
23	Brazil	28.9
24	Pakistan	23.8
25	Nigeria	10.2