

Global Connectivity Index (GCI) FAQ

GCI and study methods

Q1: Why is Huawei releasing the GCI?

A1: More and more countries are realizing that the era of the digital economy is here. If we do not actively embrace it and seize the opportunities presented by the transition, then we will miss out on the dividends made possible by the development of the digital economy. How countries decide to benchmark against the patterns of global digital development and identify gaps in their digital economic development will determine to what extent they are able to seize the coming opportunities. With all of this in mind, Huawei began investing in research in 2014, and has released a GCI report every year since that time. The company continually explores how ICT technology innovation and applications can drive the development of economies, and actively pursues open cooperation in the study of the digital economy with renowned universities, think tanks, and industry associations. The aim of these efforts is to provide an authoritative, objective, and quantitative assessment of how countries and industries are progressing with digital transformation.

Q2: What is unique about the GCI?

A2: Huawei has developed a unique research model for the GCI comprising 40 indicators that can be analyzed in terms of four economic pillars and five technology enablers. Based on these 40 indicators, the GCI fully and objectively measures, analyzes, and forecasts the tracked economies; quantifies the digital transformation journey they're undergoing; and provides a reference tool for policy makers. The four economic pillars are ICT Supply, Demand, Experience, and Potential. The five technology enablers are broadband, data centers, cloud, big data, and the Internet of Things (IoT). In addition, the GCI also provides the following value to policymakers:

(1) Based on broad data sample collection and analysis, the GCI assesses the progress of national digital economies against objectives to be reached by 2020. This future-oriented analysis allows countries that are at the leading edge of digitization to gain further insight into the space for future development.

(2) The indicators used to support the GCI measurement of digital economies include commonly used broadband technologies, as well as data centers, cloud, big data, and the Internet of Things (IoT). This can provide policymakers with suggestions for mid- to long-term investment.

(3) The definitions and boundaries of the digital economy have yet to be standardized across the industry, and it is difficult to specifically quantify its size. The GCI employs a metric analysis method that combines digital technology and digital applications, arranging 50 countries into three groups based on their GCI scores and GDP per capita: Starters, Adopters and Frontrunners. This provides a picture of progress in digitization of national economies, and allows countries to see where they stand in terms of progress, as well as their strengths and weaknesses.

Q3: What changes have been made in the GCI 2017 study model and assessment method?

A3: GCI 2017 continues to use the four economic pillars and five technology enablers as a methodology model. Having been used for three years, the model provides robust support for data analysis, key findings, and decision-making recommendations. Consistency in the methodology of the study across years is conducive to supporting the accumulation of data. The ongoing enrichment of comparative analysis and assessment of the data can also provide policymakers with a good reference for their decision-making.

Q4: How will GCI continue to extend its study of the digital economy?

A4: In order to continually improve the breadth of data around GCI indicators, and to strengthen the objectivity of study findings, the GCI research team pursues open cooperation with think tanks, scholars, and industry players around the world. The team also plans to extend the scope of research from countries to industries, looking at the influence of quantitative ICT infrastructure investment and construction on national industry and industry digital transformation.

Key findings of GCI 2017

Key finding 1: Every additional US\$1 invested in ICT infrastructure over time can yield up to \$5 to GDP by 2025

A nation that make an additional 10% investment in ICT Infrastructure, from 2016 to 2025, can benefit from a multiplier effect on that investment. Using this

economic impact model, we find that every additional US\$1 of ICT Infrastructure investment could bring a return of US\$3 in GDP at present, US\$3.70 in 2020 and the potential return increased to US\$5 in 2025. If we make an additional 10% ICT investment every year from 2016, it will bring accumulative potential impact of US\$17.6 trillion in GDP by 2025.

Key finding 2: Global digitization is ongoing, and there is a wide variance between countries in their progress in digitization, which can be explained by the "Matthew Effect".

GCI 2017 report shows that compared to GCI 2015, GCI scores rose 4 points overall. As part of this, Starters saw an average increase of 2.4 points. Adopters saw an average increase of 4.5 points, and Frontrunners saw an average increase of 4.7 points. Looking at the scores, the speed of development of countries in each of the three categories differed, causing a continued increase in imbalanced development that is line with the "Matthew Effect". GCI 2016 report showed that a one-point increase in a country's GCI rating correlates to a 2.1% increase in competitiveness, a 2.2% increase in innovation, and a 2.3% increase in productivity. This shows that countries that invest in ICT infrastructure will gain a first-mover advantage in the global digital economy. Study of industry indicators can establish connections through relevant analysis. The GCI also used common industry practices to establish connections with national productivity, innovative capabilities, and competitiveness.

Note: The GCI research found that the GCI score is positively correlated with GDP. Therefore, we established a positive correlation between GCI score and national productivity (per-capita GDP), and found that for every one-point increase in GCI score, national productivity rose by 2.3%.

The GCI positively correlates with the Global Innovation Index (GII) jointly released by the Cornell University, INSEAD, and World Intellectual Property Organization (WIPO). We found that for every one-point increase in GCI score, innovation rose by 2.2%. The GCI score also positively correlates with the World Economic Forum's Global Competitiveness Index. We found that for every one-point increase in GCI score, competitiveness rose by 2.1%.

Key finding 3: Of the five major technologies that drive growth in GCI scores, broadband, big data, and cloud computing rank highest in influence.

Based on the 40 indicators of the GCI, the five indicators that grew the fastest in the past three years were 4G coverage, per-capita data generation, FTTH

penetration, cloud migration, and broadband download speeds. This shows that broadband investment is the greatest driver of development. In addition, analysis of the indicators shows that global per-capita data generation is rising significantly, with cloud computing applications growing rapidly.

Starters, Adopters, and Frontrunners have their own specific preferences based on their stages of development. Starters and Adopters focus on resolving basic connectivity issues, and investment is focused on 4G coverage. Frontrunners focus more on investment into FTTH. Cloud has a greater influence on the GCI ranking of Adopters and Frontrunners. Once cloud develops to a certain stage, the economic stimulus provided by aggregate IoT equipment becomes more pronounced.

Key finding 4: Cloud investment and applications make it possible for countries to realize leapfrog development in their digital transformation. Correlation analysis between GCI indicators shows that once broadband penetration reaches a certain level, this will catalyze the development of cloud. The development of cloud computing then leverages growth in IoT and big data.

Based on analysis of the technical influences of the 50 countries arranged into three groups based on their GCI scores (Starters, Adopters and Frontrunners), it is clear that cloud has become the hub for the five technology enablers. Cloud migration exhibits a major uptick when the fixed broadband penetration rate reaches 10% and 35%, respectively. When the rate of cloud migration reaches 3%, investment in big data analysis and IoT rises dramatically. There is no shortcut to a country's digital transformation. Investment in new technologies and actively pursuing their application will propel countries more quickly to the next level of development. To more fully bolster national digital transformation, countries listed as Starters and Adopters must increase investment in broadband while also more rigorously developing and introducing cloud.

Key finding 5: In the GCI 2017 ranking, the top three developed nations are the United States, Singapore, and Sweden, respectively. The top three developing nations are the United Arab Emirates, Qatar, and China.

Key finding 6: In comparison with GCI 2015, the four countries whose ranking rose the most in GCI 2017 were Malaysia, New Zealand, Chile, and Argentina, respectively. Malaysia's ranking rose by 5 positions, while New Zealand, Chile, and Argentina each rose by 3 positions.

The common thread between these countries is that their governments have

consistently increased investment in ICT infrastructure, with a particular emphasis on cloud computing investment and application. By formulating ICT industry policy, these countries have provided policy support for cloud services, big data analysis, IoT, and other innovative technological applications and infrastructure in the ICT sector.

Where can I find more information?

For more information about the GCI, please visit:

<http://www.huawei.com/minisite/gci/en/>

Please download the GCI Report from the website. You can browse by country to learn more about the performance of specific countries in digital economy development. You can also search by year to compare against benchmark countries (the system supports comparison of up to three countries at a time), to assess respective strengths and weaknesses.

If you have any questions or suggestions, please feel free to contact the GCI Project Team at hwgci@huawei.com.