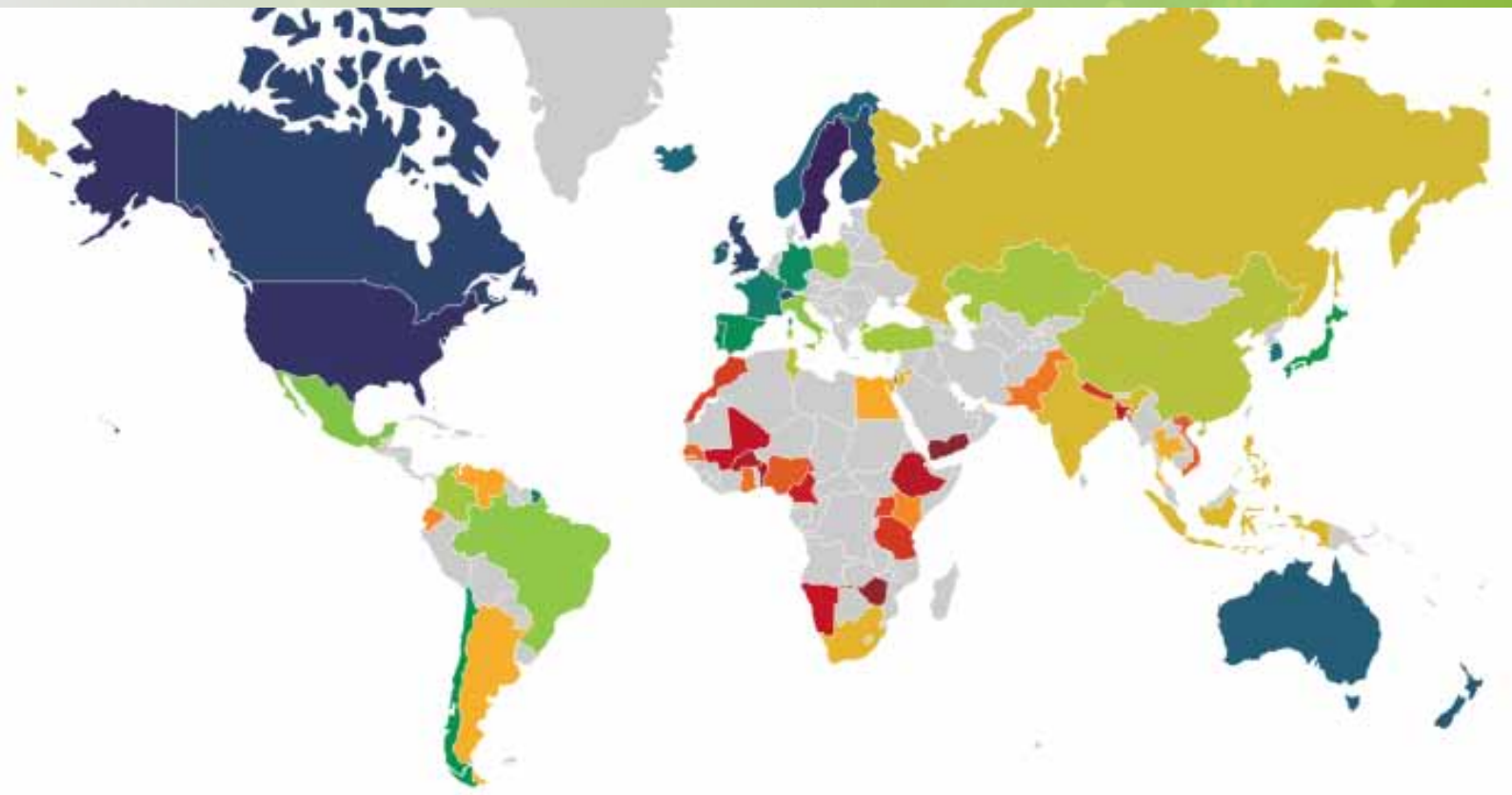
WEBINDEX 2012



WORLD WIDE WEB FOUNDATION

ACKNOWLEDGEMENTS

This report was written by Hania Farhan of the Web Foundation, and Debra D'Agostino and Henry Worthington of Oxford Economics.

The Web Index benefited from the help and advice of many people, and involved a rigorous process of collecting and analyzing data across a large number of indicators and countries, as well as consulting leading experts in various fields including Web and computer science, economics, education, health, statistics, communications, and the law.

Oxford Economics was contracted to assist with the production of the Index, and played a central role given their vast expertise in econometrics work.

Global Integrity set up and implemented the Expert Assessment survey via their Indaba platform, and their contribution to the project was essential. Special thanks go to Nathaniel Heller and Monika Shepard for their support.

Two consultative bodies provided valuable advice during the constructing of the Web Index: the Web Index Steering Group and the Web Index Science Council. The Steering Group members are: Tim Berners-Lee, Jeff Jaffe, Thomas Roessler, Wendy Seltzer, Nigel Shadbolt and Daniel Stauffacher. The Science Council members are: Robert Ackland, Paola Annoni, Stephane Boyera, Steve Bratt, Kilnam Chon, Eszter Hargittai, William Lehr, Nii Quaynor, Taylor Reynolds, Hans Rosling, Ola Rosling, George Sadowsky, and Piotr Strysczowski. We are grateful for their generous contribution of their time and expertise (please refer to the Web Foundation - Web Index Website for more details on the Steering Group and Science Council).

We owe a particular debt to the European Commission - Joint Research Centre, Unit of Econometrics and Applied Statistics-Ispra – IT. Their contribution in the area of methodological and statistical analysis has been of immense value to the project.

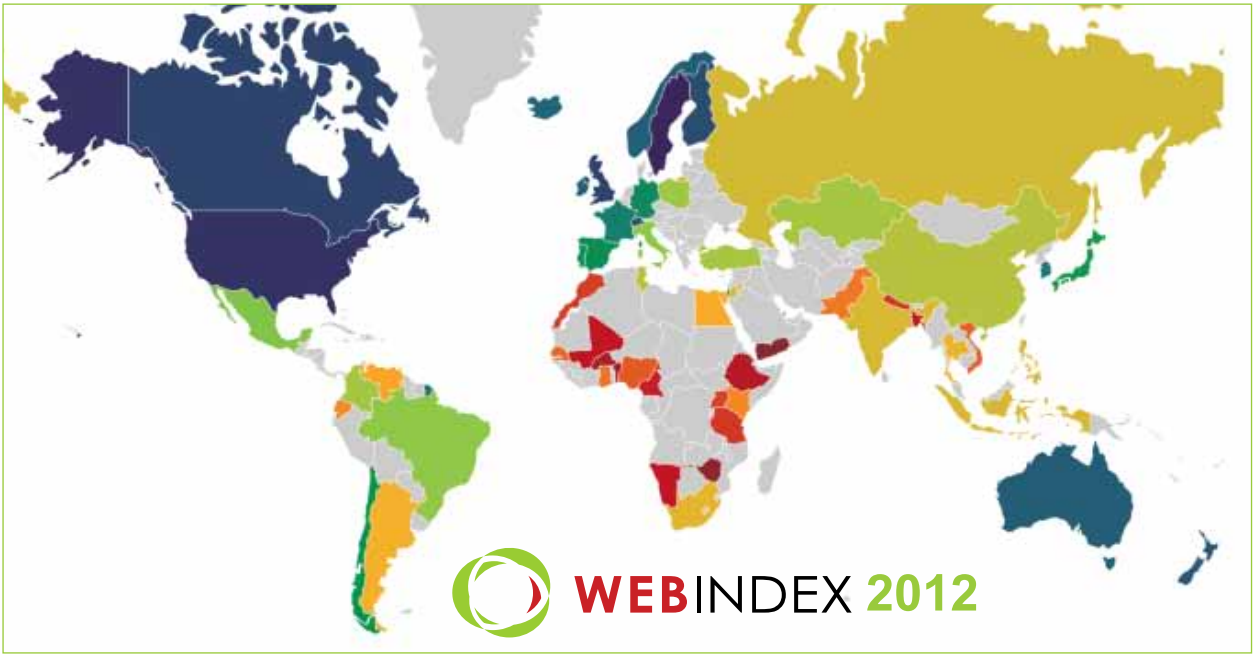
The following institutions have very generously allowed us to use and re-publish their data, and for that we are grateful: Ethnologue, Freedom House, International Energy Agency, Reporters Without Borders, The UN, The ITU, Wikimedia Foundation, The CIA Factbook, The World Bank, The World Economic Forum.

For more details on the individual indicators used from each data provider, please refer to the data provider's Website and the Web Foundation's Website: www.webfoundation.org

We also benefited from the strong support of patient and efficient production partners: Global Integrity, Iconomical, Oxford Economics, Portland Communications, WESO (Jose María Alvarez Rodríguez and Jose E. Labra , Departamento de Informática Edificio Facultad de Ciencias, Universidad de Oviedo, OVIEDO, Spain) and Zonda Design.

Hania Farhan led the Index, with able support from Jules Clement, Justin Edwards, Sofia Latif, and the rest of the Web Foundation team. Rosemary Leith, Jonathan Fildes, Andrew Williamson, UN Women, and Craig Gallen provided valuable assistance to the project at different levels and in various stages. Steve Bratt provided essential and critical input throughout the project, and special thanks are due to the large number of experts and professionals who assisted us with the Expert Assessment survey.

Finally, particular thanks must go to Google for seed funding the development and production of the first Web Index.



INTRODUCTION

Since its invention by Sir Tim Berners-Lee in 1989, and its subsequent explosive growth, the World Wide Web (the Web) has had a profound impact on humanity. This impact is evolving continuously with the creation of new content, connectivity software and infrastructure. Although the Web has been an important catalyst of social, political and economic change over the past two decades, its impact—both negative and positive—has been unevenly felt both within and across countries. Moreover, there is relatively little public debate on the reasons why some countries have moved faster and more effectively than others to harness the Web as an accelerator of development.

To begin to address this gap, we have created an Index that combines existing secondary data with new primary data to rank countries according to their progress and use of the Web. The Index is both an analytical tool for researchers and a resource for policy makers in various sectors, including the public sector, private sector, and NGOs.

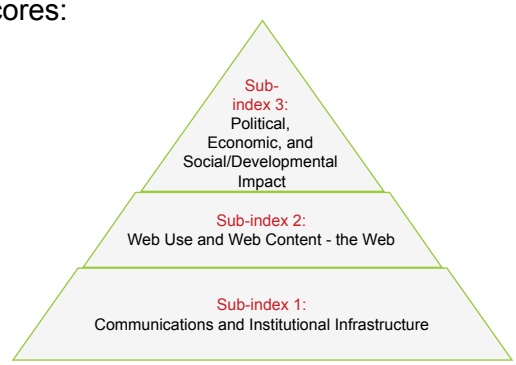
We hope that the Index will help deepen and broaden our understanding of the impact of this most powerful tool on humanity. There is full transparency in the construction of the Index: the data and methodology used to produce it are published openly and could be used by others to undertake their own research[1].

[1] The use and re-publication of the raw data that we use to compute the Index is subject to the licensing rules and stipulations that each data provider demands. Please refer to the Website of each data provider listed on page 5 below for details.

DESIGN AND STRUCTURE OF THE WEB INDEX

The design of the Web Index is relatively intuitive. To obtain *value* from the Web, we need a base of infrastructure to access it, over which content is laid, from which social, economic and political value is derived.

Therefore, as a composite measure, the overall Web Index score consists of three sub-Index scores:



1. **Sub-Index 1:** Communications and Institutional Infrastructure scores
2. **Sub-Index 2:** Web Content and Web use scores
3. **Sub-index 3:** Political, economic and Social Impact scores

Each sub-Index score is computed from a set of underlying indicators, which are grouped into components for ease of analysis.

However, although the design is fairly straightforward, it is not a one-way "causality stream," because—to an extent—the layers feed backwards into each other. That is to say, there is value in the "Infrastructure" and "Content" in themselves, not just as conduits for the top layer of social, economic and political value and impact. For example, while more and better infrastructure could/should allow for more content and access, an explosion in content could lead to more investment in infrastructure. Also, the derivation of a particular value (such as social use) could drive a rapid growth in content.

Moreover, the relationships between the sub-Indexes are not necessarily proportional. One country might have less developed infrastructure than another, but may derive far greater value from that lower level of infrastructure than a country with more developed infrastructure.

In fact, there appears to be a "threshold" in infrastructure or access levels, above which disproportionately higher value could be derived from the Web. More impact and utility could be derived from relatively less developed infrastructure, as exemplified most clearly by the recent events in North Africa, where only around 40% of the population uses the Web, but the impact of the Web as a tool for political change is arguably greater than in many countries where more than 70% of people use the Web. This (the Web use—or access—"threshold" effect) is an area of interest in which we hope to see much more research, as it could enhance our understanding of how future change—facilitated by the Web—might develop in different contexts and environments.

Finally, while the Index structure (at the sub-index level) should not change from year to year, it is open to refinements, particularly at the indicator level. The Index is therefore "alive" and open to the inclusion of new and better data as they become available, with the aim of becoming more accurate in capturing each dimension over time. This is especially important given the fast-changing environment of the Web.

METHODOLOGY

The Web Index is a composite measure that summarizes in a single (average) number the impact and value derived from the Web in various countries. There are serious challenges when attempting to measure and quantify some of the dimensions the Index covers (e.g. the social and political), and suitable proxies are used instead.

Also, as the Web Index covers a large number of countries, some of which have serious data deficiencies or were not covered by the data providers, we needed to impute the missing data. We worked with eminent experts in the relevant fields to overcome these challenges and produce a robust and rigorous Index (see Acknowledgements, page 1).

Two types of data were used in the construction of the Index: existing data from other data providers ("secondary data"), and new data gathered via a multi-country questionnaire ("primary data") that was specifically designed by the Web Foundation and its advisers. These primary data will begin to fill in some of the gaps in measurement of the utility and impact of the Web in various countries. Indeed, the data gaps in this field are significant, and we aim to expand those questionnaires in future editions of the Index, both in terms of the questions/indicators gathered and the number of countries covered by the Index.

The questionnaire used to collect the primary data was scored by various professionals - or experts - in various fields in each country, and the scores were checked and verified by a number of peer and regional reviewers for each country. Appendix III includes the Executive Summary from a technical report independently written by the European Commission - Joint Research Centre, Unit of Econometrics and Applied Statistics-Ispra, assessing the robustness of the Index using Rasch analysis and Uncertainty analysis. The report concludes that the Web Index "proved to be robust and consistent", and that "Overall, despite its multifaceted structure, the wide coverage of different countries and the fact that it includes both survey and hard data, from a statistical point of view, the Index is robust".

The nature of such expert assessment surveys is that they could only be scored for the recent year in question (2011 for our purposes). Therefore, given that the Index covers the period 2007-2011 for secondary data, the historical time-series Web Indexes computed for the five years 2007-2011 are not strictly comparable to the "headline" 2011 Index we have focused on and are discussing in the bulk of this paper. There is a separate section below that focuses only on the time-series Index, and the headline 2011 Index contains both primary and secondary data, whereas the 2007-2011 time-series Indexes contain only secondary data.

As a result, while the time-series comparisons—the trends over time of the Web Index—are important and produce very interesting results, they should be done with caution and should not be compared to the headline 2011 Index. The former consist of 34 underlying indicators each, compared to 85 underlying Indicators in the headline 2011 index (51 of which are from primary data and 34 indicators are from secondary data sources). The full list of indicators and countries covered can be found in Appendix I.

SOURCES OF SECONDARY DATA

The sources of the secondary data that we use are highly credible organizations that produce consistent and valuable data in various fields. We are grateful to those organizations for allowing us to use and reproduce their data. Specifically, those are (alphabetically):

1. Ethnologue http://www.ethnologue.com/show_country.asp
2. Freedom House http://www.freedomhouse.org/report/freedom-world-aggregate-and-subcategory-scores
3. International Energy Agency http://www.iea.org/weo/electricity.asp
4. Reporters without Borders http://en.rsf.org/press-freedom-index-2010,1034.html
5. The UN/ITU http://www.itu.int/ITU-D/ict/publications/world/world.html and http://unstats.un.org/unsd/demographic/products/socind/education.htm
6. Wikimedia Foundation-Wikipedia http://stats.wikimedia.org/EN/TablesArticlesTotal.htm
7. The CIA factbook https://www.cia.gov/library/publications/the-world-factbook/
8. The World Bank http://data.worldbank.org/indicator/IT.NET.SECR.P6
9. The World Economic Forum (WEF) http://www.weforum.org/reports
10. For more details on the individual indicators used from each data provider, please refer to the data provider's Website and the Web Foundation's Website: www.webfoundation.org/Webindex

INDICATOR INCLUSION CRITERIA

Before an indicator is included in the Index, it needs to fulfill five basic criteria:

1. Data providers have to be credible and reliable organizations (e.g., theirs is not a one-off dataset being published), and likely to continue to produce these data.
2. Data releases should be regular, with new data released at least every 3 years.
3. There should be at least two data years for each indicator, so that basic statistical inference could be made.
4. The latest data year should be no older than three years back from publication year. For example, if the first Index is published in 2012, data must be available for 2009 and before. Ideally, we would like the data to be available up to 2011, but the worst we would accept is 2009.
5. The data source should cover at least two-thirds of the sample of countries, so that possible bias—introduced by having a large number of indicators from one source that systematically does not cover one-third or more of the countries—is reduced.

Some of the critical issues that we would have liked to address in more depth include Internet freedom, controls on the Web, and privacy and freedom of expression online. However, although there are some organizations that provide some data on these topics (such as Reporters Without Borders, the Global Network Initiative and Freedom House) data is often qualitative and country coverage is limited. Given how important this issue is, we are hoping to be able to work with such organizations to expand country coverage and develop valuable data that will be useful for a variety of research projects, including the Index. We will also include more indicators on those subjects in the 2013 Web Index expert assessment questionnaire.

We are also looking to develop more indicators on the potential negative impacts of the Web on society.

INDEX COMPUTATION

There are several steps in the process of constructing a composite Index. Some of those involve deciding which statistical method to use in the normalization and aggregation processes. In arriving at that decision, we took into account several factors, including the purpose of the Index, the number of dimensions we were aggregating, and the ease of disseminating and communicating it, in an understandable, replicable, and transparent way.

The following 10 steps summarize the computation process of the Index:

1. Take the data for each indicator from the data source for the 61 countries covered by the Index for the 2007-2011 time period.

2. Impute missing data for every (secondary) indicator for the sample of 61 countries over the period 2007-2011. Some indicators were not imputed as it did not make sense (logically) to do so. Those are noted in the Index file on the Website (www.Webfoundation.org/Webindex)

   Broadly, the imputation of missing data was done using two methods: country-mean substitution if the missing number is in the middle year (e.g. have 2008 and 2010 but not 2009), and taking geometric average growth rates on a year-by-year basis (so: calculate the growth rate year-on-year, and then take the geometric average).

   Most missing data for 2011 are imputed by applying the (geometric) average growth rate for the period, to the 2010 number (some data sources have not yet provided 2011 data for the selected indicators). For the indicators that did not cover a particular country in any of the years, no imputation was done for that country/indicator.

   None of the primary data indicators were imputed. Hence the 2011 Index is very different from the Indexes computed using secondary data only.

3. Normalize the full (imputed) dataset using z-scores, making sure that for all indicators, a high value is “good” and a low value is “bad”. For example, for the Freedom House indicators (raw data), a low score is good and a high score is bad. This was inversed after normalization so that it is consistent with all the other values in the Index where a high score is always good and a low score is always bad.

4. Cluster some of the variables (as per the scheme in the tree diagram), taking the average of the clustered indicators post normalization. For the clustered indicators, this clustered value is the one to be used in the computation of the Index components.

5. Compute the 7 component scores using arithmetic means, using the clustered values where relevant.

6. Compute the min-max values for each z-score value of the components, as this is what will be shown in the visualization tool and other publications containing the component values (generally, it is easier to understand a min-max number in the range of 0 - 100 rather than a standard deviation number). The formula for this is : [(x - min)/(max - min)]*100 .

7. Compute sub-Index scores by averaging the z-scores of the relevant components for each sub-Index, but applying the relevant weights as found in the “Reference Weighting Scheme” page of the Index file (and below). This is done by multiplying the assigned weight by the z-score value of the component.

8. Compute the min-max values for each z-score value of the sub-Indexes, as this is what will be shown in the visualization tool and other publications containing the Sub-index values.

9. Compute overall composite scores using the weighted average of the sub-Indexes. The weights are found in the “Reference Weighting Scheme” page (and below). This is done by multiplying the assigned weight by the z-score value of the sub-index)]

10. Compute the min-max values (on a scale of 0-100) for each z-score value of the overall composite scores, as this is what will be shown in the visualization tool and other publications containing the composite scores.

CHOICE OF WEIGHTS

For simplicity, we could have chosen to apply equal weights throughout the Index structure. However, after much consideration, and bearing in mind the values and beliefs of the Board and founders of the World Wide Web Foundation, we decided to give extra weight to the component that includes indicators on Web openness and censorship—“Institutional Infrastructure”—and to the “Impact” sub-Index. This decision reflects the Foundation’s belief in openness and freedom of expression, as well as the important role that the Web could play in delivering services to citizens in both developing and developed economies. Please see the full weighting scheme in Appendix II.

COMPOSITE OVERVIEW

The World Wide Web has seen explosive growth since its invention in 1989. With more than a trillion estimated public pages and roughly 3.4 billion users, the Web is no longer merely a place to seek content and information, but to actively connect with friends and peers, debate globally critical issues, collaborate and conduct business, and even create breakthrough innovations. And with the rapid global adoption of smart phones, tablets and other devices that are less expensive than traditional computers and laptops, the World Wide Web is increasingly accessible to an ever-growing population.

GLOBAL:

TOP 10 OVERALL

1 – Sweden
2 – United States
3 – UK
4 – Canada
5 – Finland
6 – Switzerland
7 – New Zealand
8 – Australia
9 – Norway
10 – Ireland

BOTTOM 10 OVERALL

52 – Nepal
53 – Cameroon
54 – Mali
55 – Bangladesh
56 – Namibia
57 – Ethiopia
58 – Benin
59 – Burkina Faso
60 – Zimbabwe
61 – Yemen

REGIONAL OVERALL

AFRICA
Leads – Tunisia
Lags – Zimbabwe

EUROPE
Leads – Sweden
Lags – Russia

AMERICAS
Leads– US
Lags – Ecuador

MIDDLE EAST/C ASIA
Leads – Israel
Lags – Yemen

ASIA-PACIFIC
Leads – New Zealand
Lags – Bangladesh

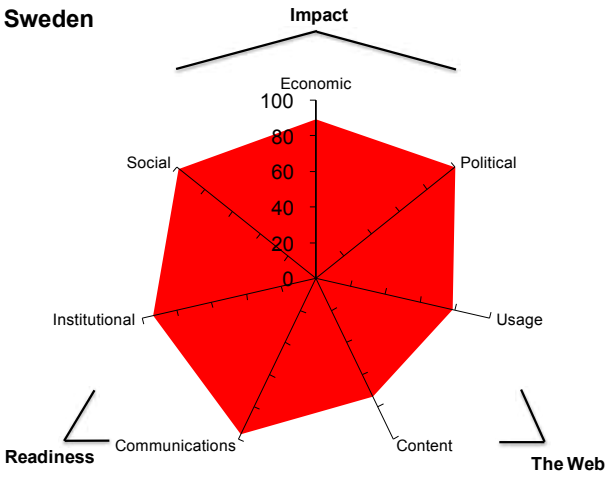
However, despite the increasing ease of access, more than 60% of the world's population do not have access to the Web, and are therefore excluded from directly benefiting from it. The endeavor to increase access to all people is one of the most important challenges facing policy-makers everywhere who hope to make use of this powerful tool.

We believe that if access to the Web increases dramatically, there will be significant social development and greater political representation among the billions of people who currently have no voice. This year's Index aims to establish a baseline to help policy-makers, international organizations, NGO's, investors and interested stakeholders identify some of the areas where investment in the Web could yield substantial positive impacts.

THE GLOBAL TOP 10

1. Sweden

Of all 61 countries, Sweden takes top place in this year's ranking, with high marks across the three sub-indexes. But some of its scores are surprising: Sweden tops the list for overall impact of the web (the most heavily weighted sub-index), taking first place for political, second place for social and third place for Economic Impact. And it is second highest on the global list in terms of Readiness, scoring third for Communications Infrastructure and fifth for Institutional Infrastructure. Yet in terms of the

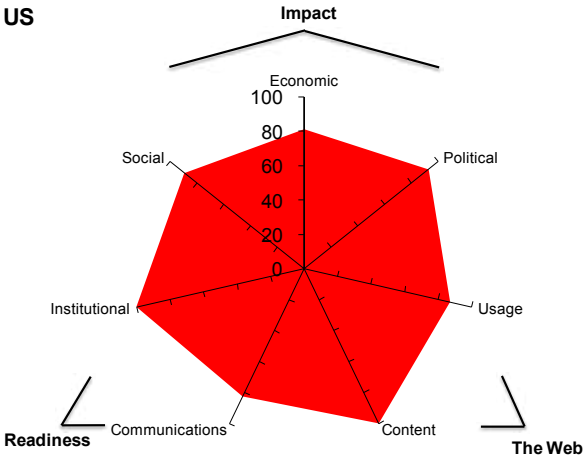


Source: Oxford Economics

use and breadth of the web, Sweden has definite room for improvement, taking the twelfth spot on the list overall. Why is this the case? According to our data, while roughly 91% of Sweden's population uses the web, the information available to them is surprisingly low compared with other top-ranking nations.

2. United States

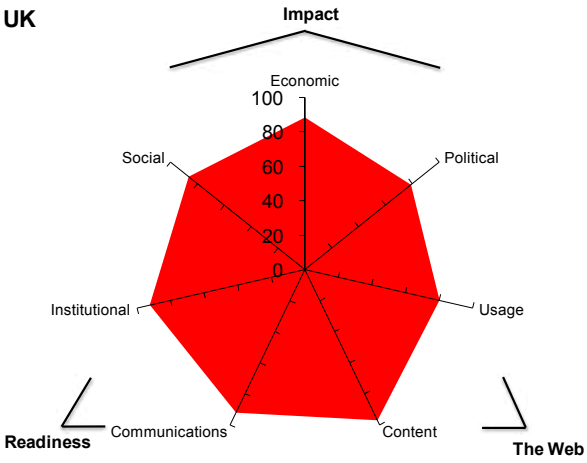
The United States comes in second overall on our list, with somewhat lower ranks for social, economic and Political Impacts compared with Sweden. It also ranks surprisingly lower in Communications Infrastructure. A few factors contribute to this: The US has a lower percentage of households with personal computers than a raft of countries, including Canada, Ireland, Japan and Norway. It also offers slower bandwidth per Internet user than a range of countries, most notably Iceland, Sweden and Singapore. The US does take the top spot for Institutional Infrastructure, for an overall Readiness ranking of fourth. It also takes first place globally for Web Content and Web use, receiving high marks for the quality and usefulness of government Websites to provide online information and services for its citizens, according to the Government Online Services Index published by the United Nations.



Source: Oxford Economics

3. United Kingdom

In third place is the United Kingdom, which ranks in the top nine countries globally for all components. It ranks fourth out of 61 for overall impact, second for the Web (just behind the US) and sixth for Readiness, boasting a higher percentage of both mobile and broadband subscriptions than the US, a higher proportion of households with computers, and much faster average Internet speeds (166,073 Mbits/Second, compared with just 47,174 Mbits/Second in the US). The UK also gets slightly higher marks than the US for accessibility of content for all citizens.



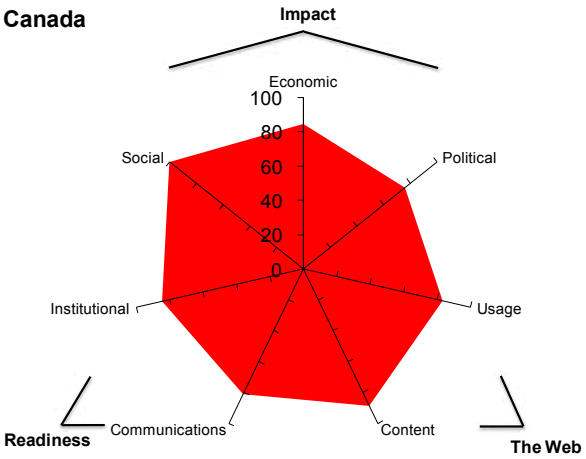
Source: Oxford Economics

Of all the sub-components in the Index, the UK ranks highest overall for Web Content, with the

second-highest rank (behind the US) globally. The strong performance in web content reflects high scores across both primary and secondary indicators. The scale and quality of available content has been boosted by various public sector initiatives, with the UK achieving a high score of 0.974 in the latest UN e-government online services index.

4. Canada

Canada ranks fourth overall on this year's list, and slightly outpaces the UK in terms of overall impact of the Web, primarily in terms of Social Impact, where it takes first place globally. The economic and Political Impacts of the Web are markedly lower in Canada—ICT service exports account for a much smaller share of GDP than in the UK, for example, and its e-participation index score is significantly lower than both the US and UK.

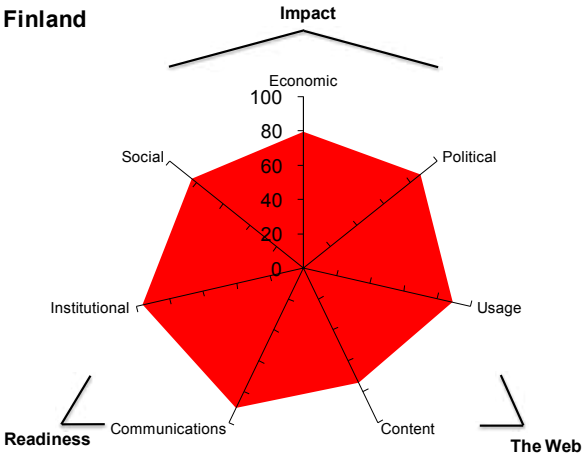


Source: Oxford Economics

In terms of Web use and content, Canada sits in third place overall, well ahead of Sweden. Still, both its communications and Institutional Infrastructure scores fall below the top 10—Canadian citizens suffer from relatively slow Internet speeds (though still well ahead of the US) while mobile phone subscriptions per capita are also low by international standards —indicating important areas of focus for the future.

5. Finland

Ranking fifth is Finland, with ranks across the board in the top 10—fifth for impact, third for Readiness and eighth for the Web. Finland ranks particularly highly in terms of the Political Impact of the Web (4), Web Usage (3) and Institutional Infrastructure (3).

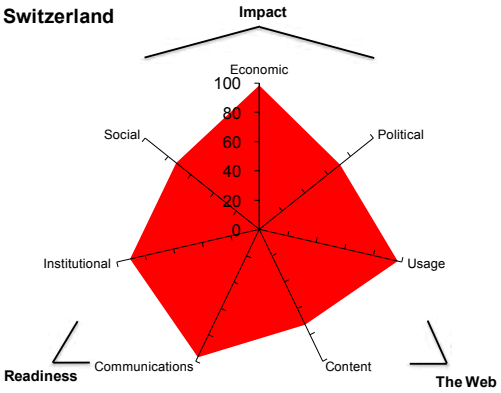


Source: Oxford Economics

The high quality of Finland's communications and institutional infrastructure has facilitated widespread access to the Web for Finnish citizens. This manifests itself in one of the highest usage rates in the world—89% in 2011—only bettered by Sweden, Norway and Iceland among other countries in the index. Meanwhile, our data indicates that available content has increased sharply in recent years. As a result, the socio-Economic Impacts have risen as well: According to the United Nations, the country's e-participation index score, which measures the extent to which governments use the Web to provide information, interact with stakeholders and engage citizens in decision-making, has risen from 0.273 in 2007 to 0.737 in 2011—a dramatic increase.

6. Switzerland

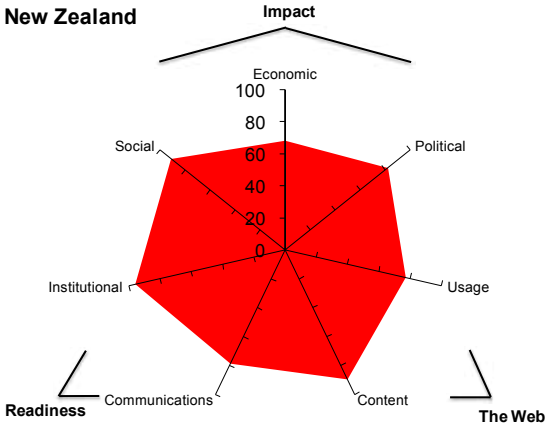
Switzerland ranks highest for the Economic Impact of the Web (2), Web Usage (2) and Communications Infrastructure (4). Yet some categories rank surprisingly lower, including social (15) and political (16) impacts, which leave Switzerland ranking 10th overall in the impact sub-index. For example, in contrast with Finland, Switzerland's e-participation index score has seen a slight decline over the past five years, falling from 0.41 in 2007 to 0.34 in 2011.



Source: Oxford Economics

7. New Zealand

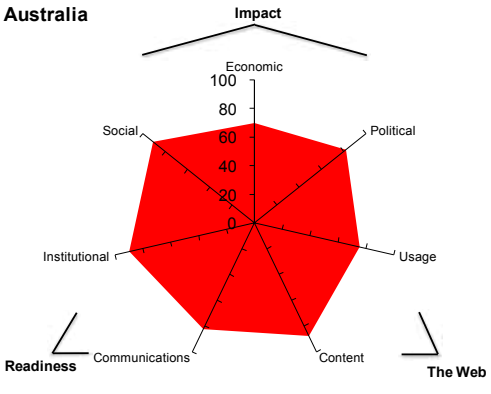
New Zealand ranks high on our list, scoring eighth for impact, seventh for the Web and ninth for Readiness. The Social Impact of the Web is quite significant, with New Zealand ranking third globally for that component. It ranks considerably lower in terms Economic Impact (17), Communications Infrastructure (15) and Web Usage (11). For example, New Zealand's average Internet speeds are among the slowest of all developed nations. However, New Zealand is making improvements in its use of the Web for commerce—according to survey data, the extent to which businesses use the Web has risen substantially over the past five years.



Source: Oxford Economics

8. Australia

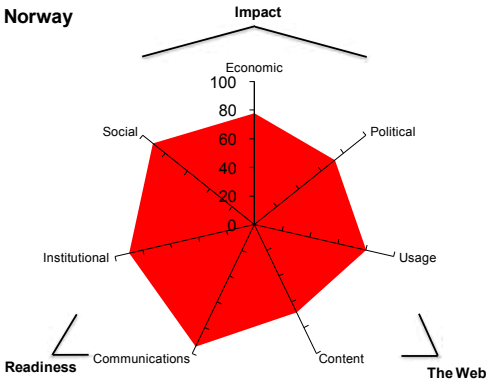
Ranking seventh for overall impact, ninth for the Web and tenth for Readiness, Australia takes eighth place overall in this year's ranking. Similar to New Zealand, it gets the highest marks for Social Impact (5) and lowest for Economic Impact (14). Its Readiness ranking is 10, with a broadly similar performance in terms of communications infrastructure (11) and institutional infrastructure (9). Although scoring fairly highly across most indicators, it is



Source: Oxford Economics

noticeable that Australia lags behind leading European and North American economies in terms of core IT infrastructure, resulting in a lower rate of broadband penetration, slower bandwidth and so on.

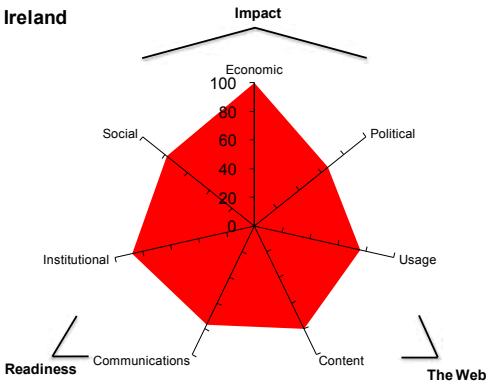
9. Norway



Source: Oxford Economics

Norway ranks ninth overall on our global list, with the highest marks for Social Impact (4), Communications Infrastructure (5), and Web Usage (7). Norway is blessed with a fairly advanced IT infrastructure, with broadband penetration of 36.6%, amongst the highest in the world in 2011, and 94% of households having access to a personal computer, again a figure that compares favorably in a global context. This has helped to facilitate one of the highest usage rates of any country (in 2011 94% of Norwegians used the Web, bettered only by Iceland). Yet it ranks much lower in terms of available Web Content (16). Its rank of 15th for Political Impact is also rather low; our data indicates that perceptions of the country's use of ICT to improve government efficiency has declined slightly over the past five years, revealing important areas of concentration for future improvements.

10. Ireland



Source: Oxford Economics

Rounding out the top 10 is Ireland, ranking sixth for overall impact, tenth for the Web and eleventh for Readiness. Ireland outpaces all other countries in the Web Index in terms of the Web's effects on its economy: Between 2007 and 2010, ICT service exports accounted for 14.8% of GDP —exponentially ahead of any other nation. Yet there is considerable room for improvement in other areas. The Political Impact of the Web (21) in Ireland is substantially lower than any of the countries in our top 10, ranking below nations including Chile, Colombia and Egypt. Ireland' e-participation index score in 2011 was a lowly 0.132, implying significant scope for the Government to increase the extent to which it uses the Web to engage and interact with citizens.

Spotlight on: Japan

The world's third largest economy ranks surprisingly low on our global list. In 20th place, Japan is outpaced overall by Chile, Spain and Portugal, among others. Japan's highest marks are in Web Content (10), Social Impact (12) and Communications Infrastructure (14) and Economic Impact (16), yet the country receives substantially lower ranks for Political Impact (30th out of 61), Institutional Infrastructure (21st) and Web Usage (21st).

Looking deeper into the data reveals some insights. In terms of Institutional Infrastructure, Japan's tertiary enrolment rates are lower than 19 countries, including Chile, Portugal and Venezuela. And its school life expectancy is shorter than many countries—15.28 years compared with 18.79 for Ireland. Meanwhile, in terms of the Web's economic impact, it is noticeable that while businesses adoption and use of the Web is high by international standards, the extent of consumer Web-based activity lags behind most other leading economies. Similarly, Web usage, at 79.5% in 2011, is relatively high in a global context is lower than in most other OECD countries.

Additionally, when we look at Japan's scores for Political Impact of the Web, we find some surprising points. For example, Japan ranks in the bottom half of all countries in terms of how its government uses ICT to improve efficiencies. Relatively little political campaigning appears to be done over the Web, and Web use for political mobilization also seems very low.

THE GLOBAL BOTTOM TEN

Of the countries that appear at the end of our ranking, seven are in Africa and two are in the Asia-Pacific region. These include Nepal, Cameroon, Mali, Bangladesh, Namibia, Ethiopia, Benin, Burkina Faso and Zimbabwe. The country that ranks lowest on the Web Index is Yemen, which underwent a political uprising last year as part of the Arab Spring. As a new constitution is rewritten in Yemen, steps are being taken to slowly improve available content on the Web.

GLOBAL:

TOP 10 OVERALL

1 – Sweden
2 – United States
3 – UK
4 – Canada
5 – Finland
6 – Switzerland
7 – New Zealand
8 – Australia
9 – Norway
10 – Ireland

BOTTOM 10 OVERALL

52 – Nepal
53 – Cameroon
54 – Mali
55 – Bangladesh
56 – Namibia
57 – Ethiopia
58 – Benin
59 – Burkina Faso
60 – Zimbabwe
61 – Yemen

REGIONAL OVERALL

AFRICA
Leads – Tunisia
Lags – Zimbabwe

EUROPE
Leads – Sweden
Lags – Russia

AMERICAS
Leads– US
Lags – Ecuador

MIDDLE EAST/C ASIA
Leads – Israel
Lags – Yemen

ASIA-PACIFIC
Leads – New Zealand
Lags – Bangladesh

According to our research, these low-ranking countries suffer from a vicious cycle of poor infrastructure and high costs of access. Looking by region at the cost of broadband as a percentage of monthly GDP per capita reveals striking differences (see tables below).

Table 1.1: Summary of the cost of broadband by region

Regional Cost of Web Access (Fixed Broadband monthly subscription as a % of GDP per capita)					
Region		2008	2009	2010	2011
Africa	Simple average	553.5	314.2	198.1	125.5
	Population weighted	590.8	290.1	160.6	69.3
The Americas	Simple average	10.2	8.1	7.0	4.9
	Population weighted	4.9	3.7	2.9	2.2
Asia Pacific	Simple average	55.0	44.1	34.7	29.5
	Population weighted	13.9	11.9	7.7	6.4
Europe	Simple average	2.3	2.1	1.7	1.7
	Population weighted	1.8	1.6	1.4	1.3
The Middle East & Central Asia	Simple average	81.7	67.9	50.8	36.3
	Population weighted	89.9	82.8	58.7	39.1
World	Simple average	166.9	100.5	66.1	44.0
	Population weighted	89.4	49.1	28.8	15.1

Source: ITU, IMF and Oxford Economics estimates

**Note: These figures refer to the average of all countries per region where data was available; not only the 61 countries included in this year's index. Estimates were made based on countries where data on the cost of broadband and population data was available (172 in total). Where data on web use was not available for all years, values were imputed using techniques described in the methodology section at the beginning of this paper. No estimate is provided due to lack of data.*

As a result, it is of little surprise that the regions where Web access is costliest is where use is lowest. When weighted for population, Africa has the fewest Web users followed by Asia Pacific.

Table 1.2: Summary of Web usage by region

Regional Web Usage (% of Popluation)						
Region		2007	2008	2009	2010	2011
Africa	Simple average	5.5	7.2	8.6	10.3	11.8
	Population weighted	6.0	8.7	12.2	13.7	15.6
The Americas	Simple average	29.3	33.0	36.3	39.6	43.5
	Population weighted	42.6	44.2	46.0	49.1	53.4
Asia Pacific	Simple average	23.7	25.2	27.0	29.3	32.4
	Population weighted	14.1	17.2	20.1	23.4	26.3
Europe	Simple average	52.6	57.1	61.2	65.1	67.0
	Population weighted	47.1	51.5	54.9	60.9	62.4
The Middle East & Central Asia	Simple average	18.9	23.9	29.3	35.6	44.1
	Population weighted	11.4	13.9	17.2	21.3	27.2
World	Simple average	25.5	28.6	31.5	34.7	37.9
	Population weighted	20.8	23.7	26.6	29.9	32.8

Source: ITU, IMF and Oxford Economics estimates

**Note: These figures refer to the average of all countries per region where data was available; not only the 61 countries included in this year's index. Estimates were made based on countries where data on the cost of broadband and population data was available (188 in total). Where data on web use was not available for all years, values were imputed using techniques described in the methodology section at the beginning of this paper.*

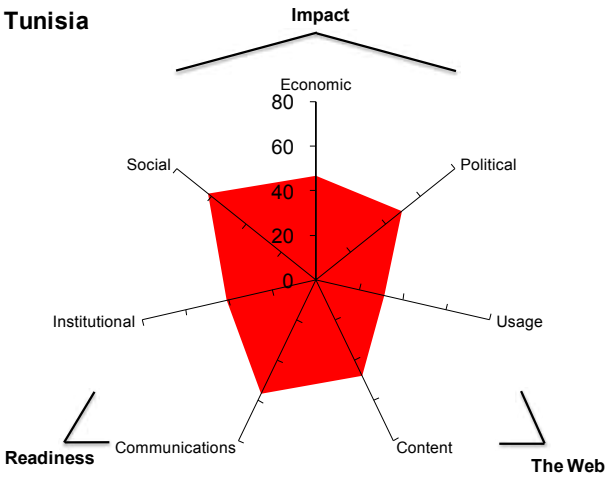
REGIONAL RANKINGS

In addition to the top and bottom 10 countries in our ranking, there are some standout results when we look at the scores by region.

Africa

In Africa, **Tunisia** takes first place in our ranking, and rounds out the top half of our global list, in 30th place. While it has seen declines over the past five years in terms of institutional and Communications Infrastructure, it has made important gains in improving access and the amount of Web Content. In 2007, only 17% of Tunisia's population were Web users; today that figure has risen to 39%.

South Africa ranks second regionally, followed by **Egypt** (3) and **Mauritius** (4). **Kenya** takes first place in terms of Economic Impact of the Web, though it ranks fifth in the region overall. **Morocco**, meanwhile, though ranking 10th in the region overall takes second place in terms of Web use.



Source: Oxford Economics

Americas

Chile takes third place in the Americas, behind Canada and the US, and 19th on our global list, just ahead of Japan. Chile also has made substantial strides in improving access and content—more than half of its population now has access to the Web, compared with just 36% in 2007. And its e-participation scores have risen significantly over the same period.

Mexico takes fourth place in the Americas and is ranked 22nd globally. Its highest ranks are in the areas of Web Content and use, as well as Political Impact. **Brazil,** in contrast, ranks higher than Mexico in Readiness, but lower in terms of overall Political Impact, taking 5th place in the regional ranking.

Asia Pacific

Singapore follows New Zealand and Australia in the Asia-Pacific region, and ranks in 11th place on our global list. Singapore boasts impressive figures in a number of areas, including Communications Infrastructure (ranking 2 on our global list), and Web Content (3). But perhaps most surprisingly, it takes second place on our global list for Political Impact—it receives the highest scores of any country for using ICT efficiently in government, and the United Nations ranks it second globally for e-participation. Singapore also offers the fastest Internet speeds in the world—at 547,064 Mbits/Second, its rates are almost twice as fast as second-fastest Iceland, at 287,139 Mbits/Second.

In fourth place is **South Korea**, with highest rank for Web impact—it takes first place for Political Impact of the Web. **Japan** and **China** rank fourth and fifth, respectively. **Thailand**, meanwhile, ranks surprisingly high in terms of Economic Impact—fifth in the region—though it takes 10th place for the region overall.

Europe

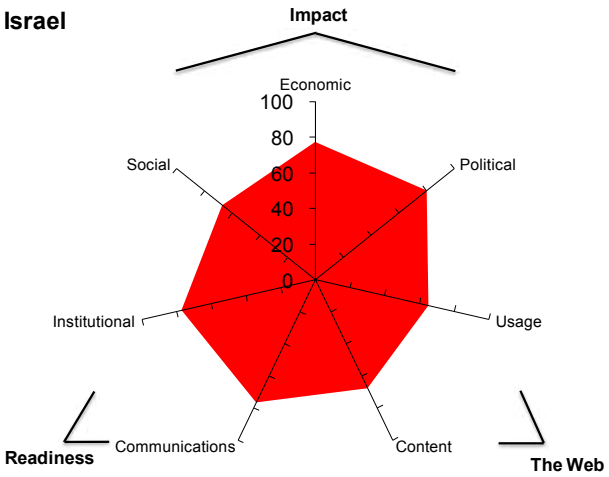
Sweden, the UK, Finland, Switzerland, Norway and Ireland all rank in the top 10, but **Iceland** ranks ahead of them all in terms of overall Readiness. Among other indicators in this area, Iceland offers the fastest Internet speeds in Europe on average (and the second in the world), and boasts the most households with personal computers. It also takes first place regionally in terms of Web use.

France and **Germany**, meanwhile, rank toward the middle of the list, in eighth and ninth place, respectively. Portugal ranks surprisingly high in Web Content, in fourth place regionally, but rates an overall 10 out of 15 for Europe.

Middle East and Southeast Asia

Among the countries in Middle East that were included in this year's study, Israel leads and takes 15th place overall in our global ranking. **Israel** ranks in the top 20 for all components, and rates most highly for Political Impact (8th globally). Its use of ICT for government efficiency is matched only by a small set of countries (and well above the US and UK), and it stands in 6th place in the United Nations' e-participation index.

Qatar ranks in second place regionally, followed by **Kazakhstan**. Both countries have made seen significant improvements in overall Web use over the past five years, a trend we expect to continue.



Source: Oxford Economics

Envisioning the impact of the Web Index

For Jeff Jaffe, non-executive director of the World Wide Web Foundation, the biggest surprise of our study wasn't which countries ranked highest or lowest—it was that such an index didn't already exist. "When you consider the criticality of the Web as a core infrastructure for everything from entertainment to commerce, from government to education, this is a key critical infrastructure for the world," he says. "It's maddening that no one ever thought to do this before; how we are doing as a country, as the world. The Web has unquestionably had a profound impact on humanity, and can fundamentally improve lives. So it is fantastic that we have set out to create this."

The Index, says Jaffe, who is also CEO of the Web standards body W3C, will help governments, companies and other organizations improve their use of the Web. "Now we have a tool that policy-makers can use to diagnose and identify strengths and weaknesses to create a platform for improvement," he says. "Every country needs to assess where they are to bring the Web to its full potential."

Over time, as the Web Index expands to include more countries and indicators, Jaffe is confident that the data from the rankings will lead to important insights about how countries should focus their efforts. "It's a work in progress. We've only reached 61 countries, and in many cases we didn't have primary data. But over time, the methodology will improve."

PER CAPITA INCOME LEVELS AND THE WEB INDEX RANKINGS

Is it always the case that the higher the income, the greater the benefits from the Web in a country? We conducted some preliminary regression and correlation analyses, as well as simple rank comparisons on the Index results, to begin to examine the links between the Web Index rankings and GDP per capita.

Looking at comparative ranks, Column A in the table below ranks countries by GDP per capita (in ppp US$ terms), and column B gives the corresponding Web Index ranks for those countries. Column C shows the difference between those two rankings.

Table 2.1: Comparing GDP and Index ranks

Country	Column A GDP/ capita (US$ ppp) ranks	Column B Web Index ranks	Column C Difference	GDP per capita, PPP (current international US$)
Qatar	1	21	20	88,919
Singapore	2	11	9	61,103
Norway	3	9	6	57,092
United States	4	2	-2	48,442
Switzerland	5	6	1	47,817
Ireland	6	10	4	41,642
Sweden	7	1	-6	41,447
Canada	8	4	-4	40,541
Australia	9	8	-1	39,466
Germany	10	16	6	39,414
Finland	11	5	-6	37,581
Iceland	12	12	0	37,115
United Kingdom	13	3	-10	36,511
France	14	14	0	35,194
Japan	15	20	5	34,278
Spain	16	18	2	32,701
Italy	17	23	6	32,569
New Zealand	18	7	-11	30,864
Korea (Rep. of)	19	13	-6	30,206
Israel	20	15	-5	28,007
Portugal	21	17	-4	25,444
Russia	22	31	9	21,358
Poland	23	25	2	21,281
Argentina	24	38	14	17,674
Chile	25	19	-6	17,125
Turkey	26	27	1	16,885
Mexico	27	22	-5	15,340
Mauritius	28	41	13	14,523
Kazakhstan	29	28	-1	13,189
Venezuela	30	40	10	12,836
Brazil	31	24	-7	11,719
South Africa	32	36	4	11,035
Colombia	33	26	-7	10,103
Tunisia	34	30	-4	9,415
Thailand	35	37	2	8,703

(Table 2.1 continued)

Ecuador	36	43	7	8,486
China	37	29	-8	8,442
Namibia	38	56	18	6,826
Egypt	39	39	0	6,324
Jordan	40	35	-5	6,007
Morocco	41	50	9	4,986
Indonesia	42	34	-8	4,668
Philippines	43	32	-11	4,140
India	44	33	-11	3,650
Viet Nam	45	47	2	3,435
Pakistan	46	44	-2	2,763
Nigeria	47	48	1	2,532
Cameroon	48	53	5	2,383
Yemen	49	61	12	2,349
Senegal	50	46	-4	1,981
Ghana	51	45	-6	1,884
Bangladesh	52	55	3	1,788
Kenya	53	42	-11	1,718
Benin	54	58	4	1,628
Tanzania	55	51	-4	1,521
Uganda	56	49	-7	1,354
Burkina Faso	57	59	2	1,310
Nepal	58	52	-6	1,256
Ethiopia	59	57	-2	1,116
Mali	60	54	-6	1,099
Zimbabwe	61	60	-1	477

Overall, the correlation between the rankings is very tight. The Spearman's rank correlation coefficient is 0.917 which is significantly different from zero at the 1% level. In practice this means that the absolute differences between the rankings were generally small. Countries that stood out as underperforming in the index relative to their GDP per capita included: Qatar (the richest country in the list but with a composite index ranking of 21); Namibia (the 38th richest country but with an index ranking of 56); and Argentina (the 24h richest country with a composite index ranking of 38). On the other hand, several countries seemed to outperform in the index relative their GDP per capita including: Kenya (53rd versus 42nd); India (44th versus 33rd); the Philippines (43rd versus 32nd); and New Zealand (18th versus 7th).

The reasons for these discrepancies could be traced back in part to the components and underlying indicators of the Index. For example, in Qatar's case, the country scores relatively poorly in the areas of political impact of the Web as well as Web content. However, those are not the only reasons behind the rank discrepancies, and more research is needed to understand the nature of this relationship better.

CORRELATION ANALYSIS

Although possible, we did not set out to use the Index or any of its constituent parts as a potential predictive tool. However, using some basic correlation and OLS regression analysis of income per capita, and both the Impact sub-Index and the overall composite Index scores, we found that both the composite Index and impact sub-Index scores are highly correlated with GDP per capita. The simple correlation coefficient between GDP per capita (measured in US$ at PPP exchange rates) and the impact sub-Index scores is 0.784, and the correlation coefficient between GDP per capita and the overall composite Index scores is 0.810.

A visual inspection of those two series against each other (see Chart 1 and Chart 2 below) suggests that the relationship is non-linear—a fairly typical feature of most statistical relationships involving GDP per capita. In particular, the relationship appears logarithmic rather than linear, and an OLS regression of the natural logarithm of GDP on the Impact and overall Composite score yields relatively high R-squared values, implying that variations in a country's GDP per capita are able to explain a high proportion of the difference in country index scores.

Still, we do not imply causality between the Index and GDP or any other variables. This aspect needs further investigation and research.

Chart 2.1: Impact sub-Index scores and GDP per capita

Impact sub-Index scores

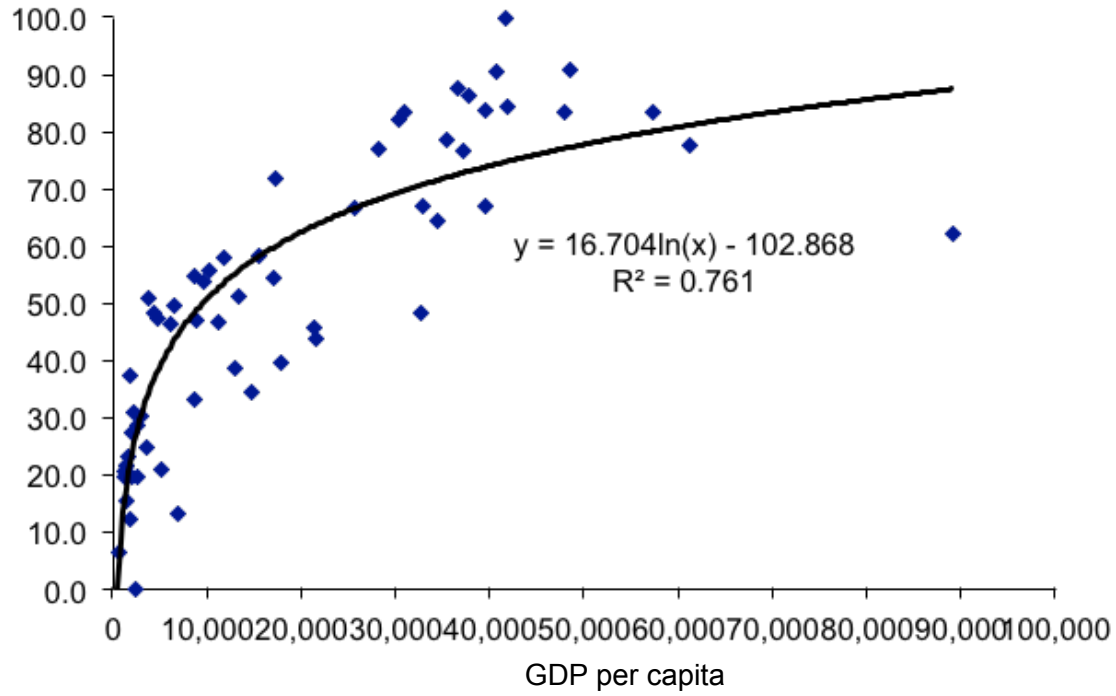
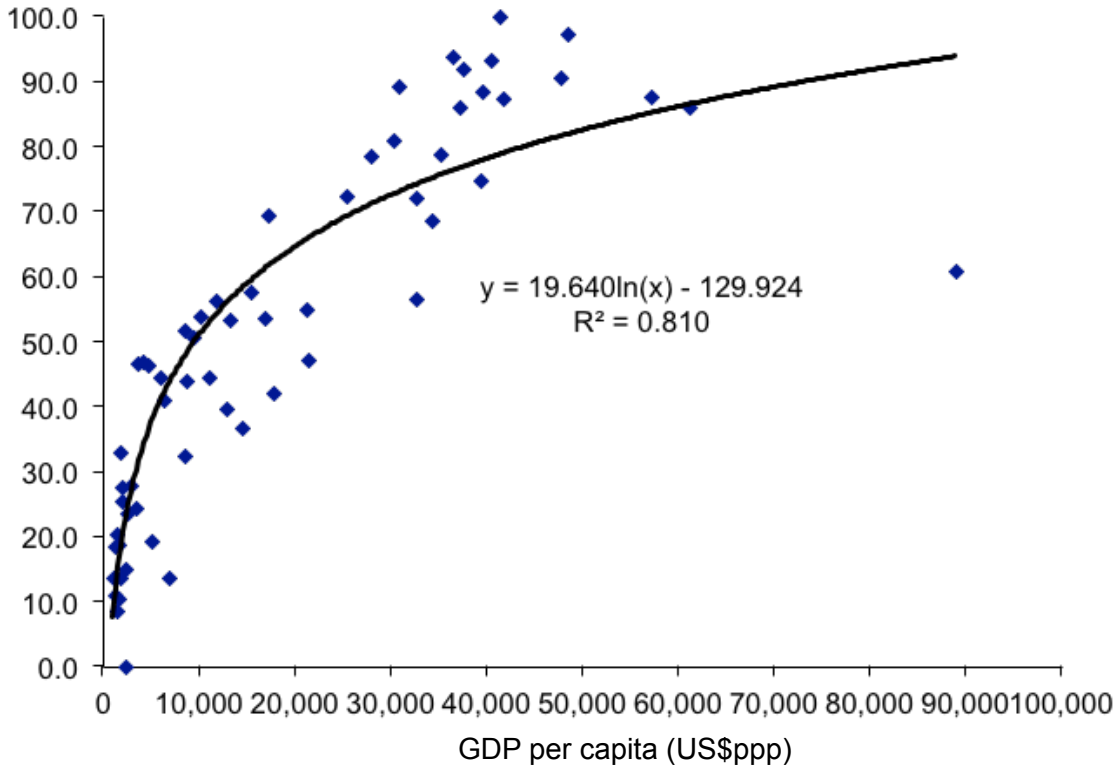


Chart 2.2: Overall Composite Index and GDP per capita

Overall composite Index scores



SUB-INDEX AND COMPONENT RANKINGS

READINESS

Readiness refers to the extent to which countries have expanded their communications and Institutional Infrastructure to build upon and provide greater access to the Web, and is a key baseline for our study—the Web cannot exist without the proper architecture to connect computers, servers, mobile devices and so on. In this area, Iceland leads the global list, followed by Sweden, Finland, the US and Switzerland to round out the top 5 countries.

READINESS:

TOP 10 OVERALL	BOTTOM 10 OVERALL	REGIONAL OVERALL	
1 - Iceland	52 - Nigeria	**AFRICA**	**EUROPE**
2 - Sweden	53 - Tanzania	Leads - Mauritius	Leads - Iceland
3 - Finland	54 - Cameroon	Lags - Zimbabwe	Lags - Russia
4 - US	55 - Bangladesh		
5 - Switzerland	56 - Nepal	**AMERICAS**	**MIDDLE EAST/C ASIA**
6 - UK	57 - Mali	Leads - US	Leads - Israel
7 - Singapore	58 - Ethoiopia	Lags - Ecuador	Lags - Yemen
8 - Norway	59 - Yemen		
9 - New Zealand	60 - Burkina Faso	**ASIA-PACIFIC**	
10 - Australia	61 - Zimbabwe	Leads - Singapore	
		Lags - Nepal	

From a regional perspective, Mauritius ranks highest in Africa, Singapore leads in Asia-Pacific, and Israel ranks highest among Middle Eastern nations. In the Americas, Chile ranks just behind the US and Canada, for third place.

Looking deeper into the sub-components of this category reveals some interesting differences.

Communications Infrastructure

As previously noted, the Communications Infrastructure component takes into account such factors as international bandwidth per Internet user, broadband subscribers, mobile phone subscriptions, and the cost of access—factors that paint a picture of overall public access. Here Iceland leads again, followed by Singapore, Sweden, Switzerland, and Norway. In this category the US ranks at the bottom of the top 10, along with South Korea and Germany. Regional standouts in this area include Mauritius, which leads in Africa, along with Israel for the Middle East.

COMMUNICATIONS INFRASTRUCTURE:

TOP 10 OVERALL	BOTTOM 10 OVERALL	REGIONAL OVERALL	
1 - Iceland	52 - Yemen	**AFRICA**	**EUROPE**
2 - Singapore	53 - Benin	Leads - Mauritius	Leads - Iceland
3 - Sweden	54 - Uganda	Lags - Burkina Faso	Lags - Turkey
4 - Switzerland	55 - Cameroon		
5 - Norway	56 - Mali	**AMERICAS**	**MIDDLE EAST/C ASIA**
6 - UK	57 - Tanzania	Leads - US	Leads - Israel
7 - Finland	58 - Nepal	Lags - Venezuela	Lags - Yemen
8 - Germany	59 - Ethiopia		
9 - Korea	60 - Zimbabwe	**ASIA-PACIFIC**	
10 - US	61 - Burkina Faso	Leads - Singapore	
		Lags - Nepal	

Institutional Infrastructure

INSTITUTIONAL INFRASTRUCTURE:

TOP 10 OVERALL	BOTTOM 10 OVERALL	REGIONAL OVERALL	
1 – US	52 – Pakistan	**AFRICA**	**EUROPE**
2 – Iceland	53 – Mali	Leads – Mauritius	Leads – Iceland
3 – Finland	54 – Vietnam	Lags – Zimbabwe	Lags – Russia
4 – New Zealand	55 – Morocco		
5 – Sweden	56 – Bangladesh	**AMERICAS**	**MIDDLE EAST/C ASIA**
6 – UK	57 – Ethiopia	Leads – US	Leads – Israel
7 – Switzerland	58 – Burkina Faso	Lags – Ecuador	Lags – Yemen
8 – Norway	59 – Egypt		
9 – Australia	60 – Zimbabwe	**ASIA-PACIFIC**	
10 – Ireland	61 – Yemen	Leads – New Zealand	
		Lags – Bangladesh	

While Communications Infrastructure looks mainly at the physical and communications base that provides access to the Web in general, Institutional Infrastructure looks at the extent to which institutions, organizations and government support and promote Web access, and the extent to which information about their organizations is made available on the Web. To determine the rankings for this sub-index we looked at data related to press freedom and overall censorship, education, gender, and government openness in sharing data. The US takes first place in this category, followed by Iceland, Finland, New Zealand, and Sweden. Mauritius and Israel again lead their respective regions in this area. In the Americas, Chile ranks third for both Communications Infrastructure and Institutional Infrastructure.

Spotlight on: India

India harbors an immense wealth of engineering and information technology (IT) talent, and the country's strength in technological services has coincided with the growth in Internet consumers: Google predicts that India will add 200 million Internet users within the next two years as telecom companies invest in high-tech infrastructure and mobile phones become less expensive.

Yet India's scalability issue is a challenging one. The number of India's Internet users is currently around 121 million, a small fraction of the country's population of 1.2 billion. At the same time, there are some 898 million mobile subscribers in the country, 292 million of whom live in rural areas. Internet connectivity will largely be driven by the growth of mobile phones and the ability of people to use those to access the Web, particularly in rural areas where landline infrastructure is relatively undeveloped.

Unsurprisingly, there are a number of obstacles for rural Internet use. Currently, only about 2% of rural India has access to the Web, according to the Internet and Mobile Association of India (IMAIA) and 18% of these rural users have to walk 10 km or more to do so. Many rural inhabitants are also computer illiterate. Educational reforms are therefore necessary to help rural inhabitants learn how to use technology to improve their lives.

The Indian government is taking steps to improve access. One example is the Aakash, a new low-cost tablet that will be introduced into Indian schools this year to teach students in poor and rural areas the critical digital literacy skills they will need for the future. Village computers will also be made accessible to everyone, overruling the Hindu caste hierarchy, which privileges certain members of society over others.

As for Web Content, the biggest change will be in the increase of Websites in local languages. In a country of over 100 languages, most Websites are currently in English, Hindi and Bengali. Wikipedia is proving to be one of the leading organizations that provides regional language versions of its Website.

Still, as the recent power outages—which left a staggering 620 million citizens across India without power for days—have shown, significant work remains to develop a truly sturdy, scalable infrastructure that will give all Indians reliable access to the Web.

THE WEB

To determine the overall components of this sub-index we looked at such indicators as Web use as well as the content available in each country. The US ranks highest in this category, followed by the UK, Canada, Switzerland, and Singapore. Tunisia ranks highest in Africa, and Israel again takes the top spot for the Middle East. For the Americas, Mexico takes third place, behind the US and Canada, while Iceland ranks third in Europe.

THE WEB:

TOP 10 OVERALL	BOTTOM 10 OVERALL	REGIONAL OVERALL	
1 – US	52 – Tanzania	**AFRICA**	**EUROPE**
2 – UK	53 – Namibia	Leads – Tunisia	Leads – UK
3 – Canada	54 – Cameroon	Lags - Ethiopia	Lags – Turkey
4 – Switzerland	55 – Senegal		
5 – Singapore	56 – Benin	**AMERICAS**	**MIDDLE EAST/C ASIA**
6 – Iceland	57 – Burkina Faso	Leads – US	Leads – Israel
7 – New Zealand	58 – Zimbabwe	Lags – Ecuador	Lags – Yemen
8 – Finland	59 – Bangladesh		
9 – Australia	60 – Mali	**ASIA-PACIFIC**	
10 – Ireland	61 – Ethiopia	Leads – Singapore	
		Lags – Bangladesh	

Further examination of the sub-components for this category reveals additional insights.

Web Usage

The variables we included in this category are indicators of Web Usage—the number of people per country who use the web , as well as "accessibility" indicators for people such as the elderly, people with a number of disabilities, and those with low literacy. Iceland leads this ranking, followed by Switzerland, Finland, the US, and Canada. At the regional level, Tunisia takes the top rank for Africa, and Singapore for Asia-Pacific.

WEB USAGE:

TOP 10 OVERALL	BOTTOM 10 OVERALL	REGIONAL OVERALL	
1 – Iceland	52 – Yemen	**AFRICA**	**EUROPE**
2 – Switzerland	53 – Cameroon	Leads – Tunisia	Leads – Iceland
3 – Finland	54 – Senegal	Lags – Mali	Lags – Turkey
4 – US	55 – Zimbabwe		
5 – Canada	56 – Benin	**AMERICAS**	**MIDDLE EAST/C ASIA**
6 – Germany	57 – Namibia	Leads – US	Leads – Israel
7 – Norway	58 – Burkina Faso	Lags – Ecuador	Lags – Yemen
8 – UK	59 – Bangladesh		
9 – Sweden	60 – Ethiopia	**ASIA-PACIFIC**	
10 – Singapore	61 – Mali	Leads – Singapore	
		Lags – Bangladesh	

Web Content

Because of the difficulty of obtaining reliable and consistent data on the exact numbers of pages on the Web in various languages and in different countries, we used as a proxy the number of Wikipedia articles per language. This indicator is part of the Web Content component in the Index, which also includes indicators on the type of data and information that is accessible on the Web in each country, including government data and data on public health and education. Again the US takes top ranking, followed by the UK, Singapore, New Zealand, and Canada.

WEB CONTENT:

TOP 10 OVERALL	BOTTOM 10 OVERALL	REGIONAL OVERALL	
1 – US	52 – Namibia	**AFRICA**	**EUROPE**
2 – UK	53 – Burkina Faso	Leads – Tunisia	Leads – UK
3 – Singapore	54 – Mali	Lags – Zimbabwe	Lags – Turkey
4 – New Zealand	55 – Benin		
5 – Canada	56 – Cameroon	**AMERICAS**	**MIDDLE EAST/C ASIA**
6 – Australia	57 – Senegal	Leads – US	Leads – Israel
7 – Ireland	58 – Bangladesh	Lags – Ecuador	Lags – Yemen
8 – Finland	59 – Morocco		
9 – Portugal	60 – Ethiopia	**ASIA-PACIFIC**	
10 – Japan	61 – Zimbabwe	Leads – Singapore	
		Lags – Bangladesh	

Spotlight on: China

As the world's second largest economy, and the largest engine for economic growth, China stands in 29th place in this year's Index, ranking lowest for Readiness (35th) yet highest for overall Impact (25th). A look at China's ranks across the various components of the Index reveals some interesting results. For example, while its ranks over time for Communications Infrastructure have remained relatively flat, Institutional Infrastructure has risen dramatically. Still, while overall Web use has increased slightly, Web Content has remained relatively flat. China also ranks 40th in terms of the Web's Political Impact.

But beyond the numbers, it appears that China's citizens are embracing the Web in a variety of ways. For example, online shopping represents the largest growth segment of Internet use in China. A recent Boston Consulting Group report noted that the number of Chinese online shoppers is expected to grow to 329 million by 2015, making it greater than that of the United States and Japan combined. Meanwhile, although Twitter and Facebook are banned in the country, a number of domestic social networking sites are immensely popular, such as Qzone, Sina Weibo, Tencent Weibo, and RenRen.

Still, according to a Global Internet Freedom Consortium report, the government in Beijing polices the Internet by blocking IP addresses, redirecting traffic through the Domain Name System (DNS), URL filtering, packet filtering, requiring the installation of filtering software in personal computers and by forcing companies to comply with government controls. In fact, the "Great Firewall of China" is one of the most sophisticated systems of government control over the Internet in the world. The government also prohibits anonymity – all Chinese netizens must use their real names on their websites. Western Internet companies that want to do business in China have to balance the fine line of complying with Beijing's censorship directives and adhering to their own standards of free expression and openness.

IMPACT

Of all three sub-indexes in our ranking, Impact carries the greatest weight, accounting for 60% of the composite Index score (compared to 20% each for Readiness and the Web sub indexes). There are three components within the Impact sub-Index: Social, Economic and Political Impacts. To an extent, this sub-Index reflects the utility and the value of the Web to people, as well as its impact on people and countries. All countries that rank in the top 10 in this sub-index are industrialized, with Sweden taking the top spot followed by the US, Canada, the UK, and Finland.

IMPACT:

TOP 10 OVERALL	BOTTOM 10 OVERALL	REGIONAL OVERALL	
1 – Sweden	52 – Morocco	**AFRICA**	**EUROPE**
2 – US	53 – Mali	Leads – Tunisia	Leads – Sweden
3 – Canada	54 – Cameroon	Lags – Zimbabwe	Lags – Russia
4 – UK	55 – Bangladesh		
5 – Finland	56 – Ethiopia	**AMERICAS**	**MIDDLE EAST/C ASIA**
6 – Ireland	57 – Burkina Faso	Leads – US	Leads – Israel
7 – Australia	58 – Namibia	Lags – Ecuador	Lags – Yemen
8 – New Zealand	59 – Benin		
9 – Norway	60 – Zimbabwe	**ASIA-PACIFIC**	
10 – Switzerland	61 – Yemen	Leads – Australia	
		Lags – Bangladesh	

At the regional level, Tunisia receives the highest score among African countries. Australia leads all countries in Asia-Pacific, and Israel ranks first for the Middle East.

When we look into the components of this category, we see other differences.

Social Impact

To determine the Social Impact of the Web we looked at a number of indicators including the use of social networks, the use of the Web to disseminate important public health information, the availability of distance learning services, and the impact of ICT on access to basic services. Canada ranks in first place in this regard at the global level, with Sweden, New Zealand, Norway and Australia also appearing in the top 5. At the regional level, Tunisia ranks highest in Africa, and Qatar edges past Israel in the Middle East.

SOCIAL IMPACT:

TOP 10 OVERALL	BOTTOM 10 OVERALL	REGIONAL OVERALL	
1 – Canada	52 – Tanzania	**AFRICA**	**EUROPE**
2 – Sweden	53 – Uganda	Leads – Tunisia	Leads – Sweden
3 – New Zealand	54 – Senegal	Lags – Zimbabwe	Lags – Russia
4 – Norway	55 – Cameroon		
5 – Australia	56 – Ethiopia	**AMERICAS**	**MIDDLE EAST/C ASIA**
6 – US	57 – Benin	Leads – Canada	Leads – Qatar
7 – Iceland	58 – Burkina Faso	Lags – Ecuador	Lags – Yemen
8 – UK	59 – Mali		
9 – Finland	60 – Zimbabwe	**ASIA-PACIFIC**	
10 – Korea	61 – Yemen	Leads – New Zealand	
		Lags – Nepal	

Economic Impact

Economic Impact assesses the extent to which the Web affects the economy and business in a country. Examples of indicators used to determine these scores and ranks include the extent to which governments and organizations disseminate information to farmers, the extent of business Internet use, and the extent to which people trust the Web as a means of buying and selling goods and services. This component also includes indicators that assess the extent of criminal activities in each country using the Web, the data for which we gathered through the country expert assessment surveys we conducted. It proved very difficult to find reliable and consistent data on the extent of cyber crime in each country from secondary sources, and this is an area where we hope more data should become available in future.

ECONOMIC IMPACT:

TOP 10 OVERALL	BOTTOM 10 OVERALL	REGIONAL OVERALL	
1 – Ireland	52 – Zimbabwe		
2 – Switzerland	53 – Burkina Faso	**AFRICA**	**EUROPE**
3 – Sweden	54 – Cameroon	Leads – Kenya	Leads – Ireland
4 – UK	55 – Ethiopia	Lags – Benin	Lags – Russia
5 – Canada	56 – Tanzania		
6 – US	57 – Morocco	**AMERICAS**	**MIDDLE EAST/C ASIA**
7 – Finland	58 – Namibia	Leads – Canada	Leads – Israel
8 – France	59 – Bangladesh	Lags – Venezuela	Lags – Yemen
9 – Norway	60 – Benin		
10 – Israel	61 – Yemen	**ASIA-PACIFIC**	
		Leads – Korea	
		Lags – Bangladesh	

Ireland takes first place among the global ranking of countries. Switzerland, Sweden, the UK, and Canada also appear in the top five. Looking at the other regions, Kenya takes first place for Africa, and South Korea leads in Asia-Pacific.

Political Impact

This component looks at the extent to which political parties use the Web to campaign and mobilize their constituents, as well as the use of ICT to enhance government efficiency and e-participation. Sweden ranks highest out of the 61 countries in this component, followed by Singapore, the US, Finland, and South Korea. Chile ranks 10th, just below the UK and Israel. Regionally, Egypt ranks

POLITICAL IMPACT:

TOP 10 OVERALL	BOTTOM 10 OVERALL	REGIONAL OVERALL	
1 – Sweden	52 – Ghana	**AFRICA**	**EUROPE**
2 – Singapore	53 – Nepal	Leads – Egypt	Leads – Sweden
3 – US	54 – Morocco	Lags – Zimbabwe	Lags – Poland
4 – Finland	55 – Burkina Faso		
5 – Korea	56 – Vietnam	**AMERICAS**	**MIDDLE EAST/C ASIA**
6 – New Zealand	57 – Bangladesh	Leads – US	Leads – Israel
7 – Australia	58 – Yemen	Lags – Argentina	Lags – Yemen
8 – Israel	59 – Benin		
9 – UK	60 – Namibia	**ASIA-PACIFIC**	
10 – Chile	61 – Zimbabwe	Leads – Singapore	
		Lags – Bangladesh	

Spotlight on: Egypt

Egypt suffers from a relatively under-developed physical and Institutional Infrastructure for the Web: In 2011, the International Telecommunications Union estimated the Internet penetration rate in Egypt to be 36%. And there are only 10 Internet service providers (ISPs) across the country (or just 0.12 per million people), making access to the Internet easy to control (in contrast, the US has more than 3,000, or around 9.57 per million people). Despite this, Egypt scores high in terms of Political Impact, largely as a result of the use of the Web as a tool to disseminate information and organize parts of the 2011 revolution that toppled former president Hosni Mubarak. .

While the Mubarak regime was able to shut down the Internet temporarily during the 2011 protests, some of the citizens of Egypt were particularly Web-savvy and circumvented the shutdown by using older technology—often landline telephones over which they could access modems in foreign countries. In some of this effort they were aided by international net-citizen groups, such as "We Rebuild" and the infamous hacker group Anonymous.

Since the toppling of the Mubarak regime, the Web landscape has opened to online journalism, including independent bloggers and joint initiatives from citizen journalists (such as campaigns against police brutality and corruption). In addition, a Website was set up to monitor President-elect Mohammed Mursi on his election promises (http://www.morsimeter.com/).

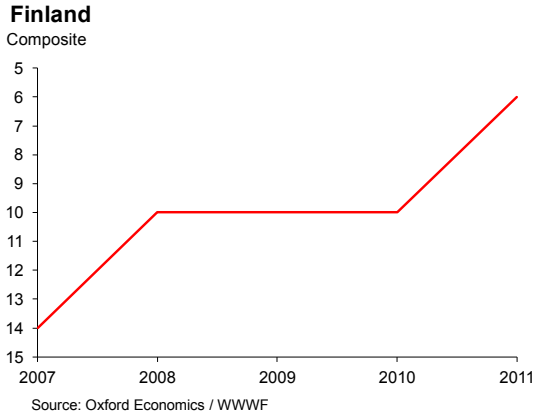
CHANGES OVER TIME

As mentioned above, primary data is only available for 2011, as the expert assessment survey could not be conducted retrospectively, and we did not think it suitable to impute the results retrospectively. Therefore, the results and analysis above relate to the 2011 "headline" Index, or the one with both the primary and secondary data indicators.

However, we also constructed the Index historically for the period 2007-2011 using secondary data alone, as it was clear that there is value in analyzing the trends in these data over time. The results for the secondary Index rankings show that for some countries, such as Brazil, Spain, Sweden, and Switzerland, overall ranks have remained fairly steady over the past five years. For others, there were more significant changes over time.

According to our analysis, the following countries have experienced the most significant positive and negative shifts are:

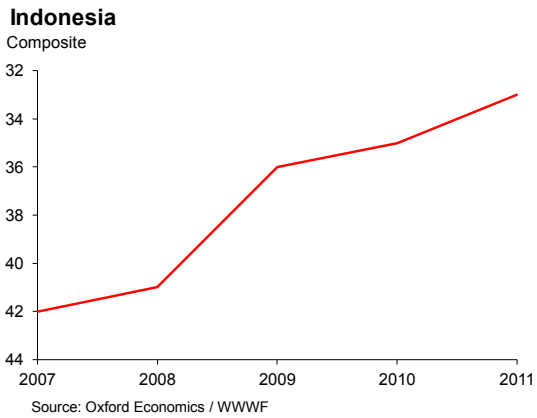
Finland (+8). In 2010, Finland became the first country to make broadband Internet use the right of every citizen and ensure that reasonably priced broadband connections are available to everyone. According to Statistics Finland's ICT 2011 survey, 89% of those aged 16 to 74 in Finland use the Web—and three out of four use it daily. In fact, the use of the Web has increased particularly in the older age groups. The share of users among those



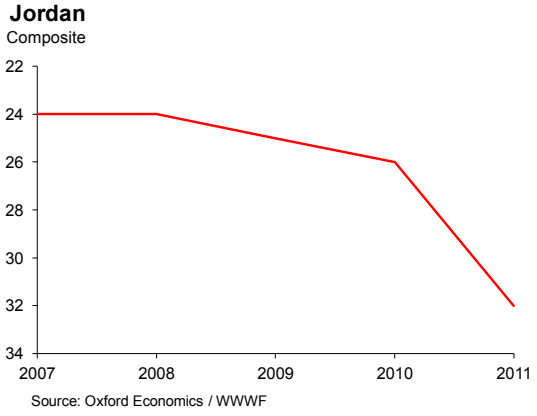
Source: Oxford Economics / WWWF

aged 65 to 74 has grown by 10 percentage points to 53%. The Web is having a growing impact on government and the political process: 58% of citizens aged 16 to 74 had searched for information on public authorities' Web pages during the past 12 months, and 40% had sent a filled-in form on the Internet.

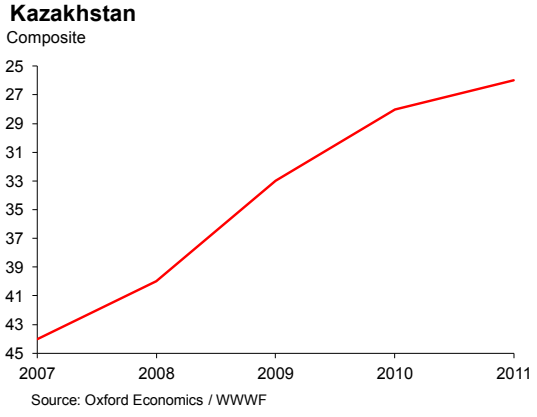
Indonesia (+9). Our scores indicate that the impact of the Web on politics has been noteworthy in Indonesia. There has been a rise in the country's "e-participation" index score over the past several years, for example. And according to a recent Association of Southeast Asian Nations (ASEAN) report, Web use will also allow for "e-balloting" and improve citizens' access to pertinent government information. Such projects can improve the government's communications and information dissemination capabilities in the country, especially in rural areas, though transparency of government systems and processes will be critical.



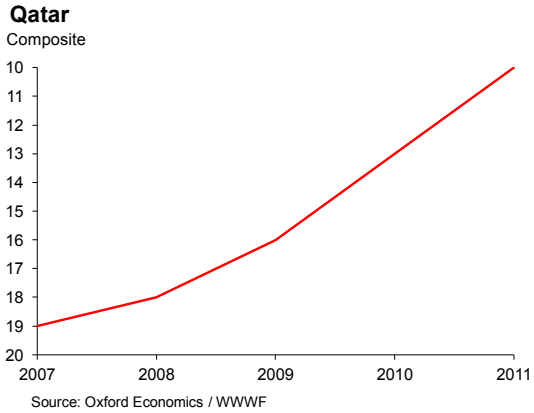
Jordan (-8). According to our data, Jordan has endured a relatively steep decline since 2007, particularly in terms of available Web Content and Political Impact, in spite of a paradoxically striking relative improvement in Communications Infrastructure. The reasons are numerous. Like other nations in the Middle East, Jordan suffers from high unemployment and a poorly functioning economy. The Internet is largely under government control and restricted, particularly since the 2011 protests. Civil liberties and popular participation in government are restricted. As a monarchy, supreme executive and legislative authority rests with the king. This structure makes any political reforms slow and limited in scope.



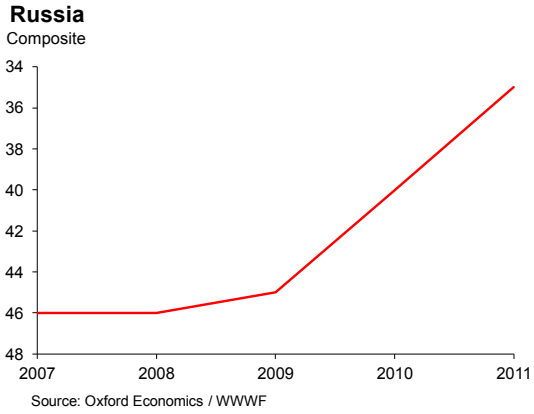
Kazakhstan (+18). Kazakhstan has experienced robust economic growth for most of the 21st century, slowing down only recently as a result of the 2008 financial crisis. Internet penetration has increased significantly over the past several years, primarily seen in the expansion of mobile connectivity thanks to a progressive reform of its telecom sector. As a result, our data shows that Kazakhstan's overall use of the Web is increasing. Still, more can be done to improve the institutional structures which underpin full access to the Web. Kazakhstan has an authoritarian government that periodically censors and even blocks the Internet, particularly material that is politically sensitive.



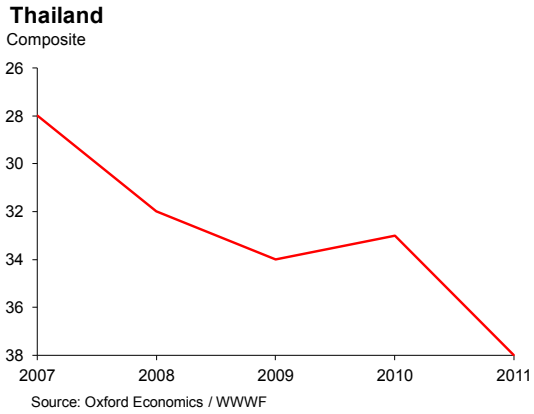
Qatar (+9). At $88,000, Qatar's GDP per capita was the highest in the world in 2010. More than half of its $184.3 billion GDP (2011 estimate) comes from its huge natural gas and oil reserves. But recently, the country has decided to diversify and build a knowledge-based economy. Some of the energy revenue is thus being re-invested in the technology sector with the goal of making the country a technology hub for much of the Middle East, and aiming to make broadband accessible to 95% of the population by 2015. Perhaps as a result, Qatar is seeing significant improvements in its use of the Web, particularly with respect to Web Usage (ranked 17th), Web Content (14th), and Economic Impact (10th). Coinciding with this investment in infrastructure is one in education, to provide its citizens with the skills necessary to thrive in an information economy.



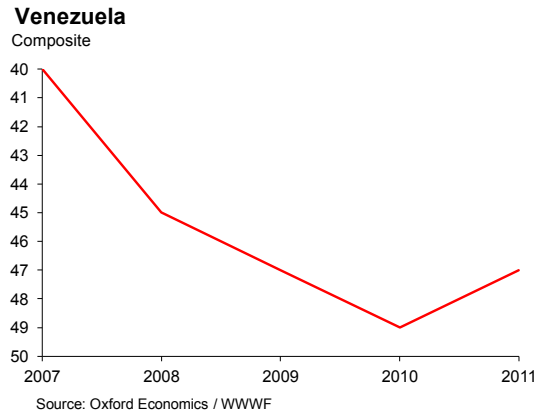
Russia (+11). According to our data, overall use of the Web in Russia has improved over the past five years, and particularly in the past two years, with the biggest increase in the area of Political Impact. Our data indicates an improvement in communications infrastructure (7), web content (18) and political impact (25). Like India and China, the country has a large reserve of engineering and technological talent to draw from. It also contains the largest number of Internet users in Europe, at 61.5 million, according to internetworldstats.com. The central government plans to invest in broadband so that penetration rates will reach 90-95% by 2020. In terms of content, the growth of the blogosphere in Russia has created an environment for discussion and civic engagement, and provided an alternative to the state-dominated traditional mass media. However, there have been recent legislative attempts by the central government to curb this grass-roots activity.



Thailand (-10). Thailand's relative decline has been broad-based across all components of the index. Its Internet penetration rate, for example, is relatively low, at 27.4%, and only about one quarter of Thailand's households have personal computers. But steps are being taken to improve access: In 2010, the number of Internet users in Thailand grew by 27% to 20 million. This growth was largely attributed to the growth in smartphones, tablets and an expanding broadband network. In addition, 3G has been recently introduced to improve the wireless market, and 4G LTE trials are beginning in certain areas. Still improvements within the regulatory framework are needed to support further growth.



Venezuela (-7). Like Thailand, Venezuela's global ranking for each component has declined since 2007, with the exception of Web Content, where the country enjoyed a modest one-place improvement. The area that has seen the most significant decline is Political Impact. One probable explanation stems from Hugo Chavez's control of government and limit on press freedoms. In 2010, the Venezuelan parliament formally approved tighter regulation of the Internet.



Both Venezuela's Communications Infrastructure and Institutional Infrastructure have slipped over the past five years. Internet and broadband speeds in the country are below average for Latin America, which is surprising since Venezuela's GDP per capita is the highest in the region. This can be explained by the monopoly of state-owned CANTV, which dominates broadband. While mobile internet use is growing, the country's mobile subscription rates also lags behind almost all other countries in the region, with the exception of Mexico.

Using the Web Index for deeper dialogue

At the ICT4Peace Foundation (www.ict4peace.org), Dr. Daniel Stauffacher's mission is to help companies, countries and other organizations use the web for peace-making and disaster recovery efforts. From that perspective, having a tool that helps countries understand in which areas the web is in greatest need of improvement is critical. "We have an interest in a well-developed global information society where countries and people have access and are empowered through the Web, promoting democracy and freedom of speech," he says. "So if the Web Index can help us on those fronts, we welcome that."

One of the key issues Stauffacher's organization is concerned with is how countries alert their citizens to major issues, such as tsunamis or tornados. "There is still a long way to go in alerting the public," he says, particularly in developing nations where high costs prevent many citizens from accessing the Web. "This is a major hindering block to overcome if the Web is to reach its full potential."

Another concern, says Stauffacher, who is also a non-executive director of the Web Foundation, is the privatization of data. "When you think about social networks like Facebook and Google and Twitter—what is happening with that data? Who owns it? What are the policies around using it? We need some reasonable checks and balances, like a code of conduct for the Web."

Some countries, particularly those in developing regions, have made significant progress. "Kenya is a model country," he says. "It has an open government data policy, and an availability of local talent." He notes the development of iHub, an open space in Nairobi with whom the Web Foundation partners to provide opportunities for Kenya's technologists, investors, tech companies and even hackers to connect, innovate and find mentors. "Kenya has policies, processes and people—people who have left the country and have now come back."

But Stauffacher warns against using single examples as best practice for other countries to follow. "This Index is a tool to help us analyze together with governments, companies and other stakeholders to develop some actionable recommendations per country," he says. "There is still a lot of analysis—and a lot of work—to be done."

CONCLUSION AND NEXT STEPS

The aim of this year's Web Index is to help begin a useful discussion among corporate executives, government officials, policy-makers and other stakeholders around how access to and use of the Web can be improved. By providing specific data and rankings by component and sub-component, our goal is to help pinpoint the specific areas where an increased focus will have the biggest benefit. "We want to be able to answer people when they ask what they need to do next," says Sir Tim Berners-Lee. "Now we can have that discussion because we have a carefully constructed set of measurements."

At the same time, the Web Index ranking is meant to underscore the true criticality of the Web in improving the lives of billions of people around the world. "We want to take this issue about whether or not people are a part of the information society," says Berners-Lee, "and help increase awareness that it's as important as access to water and vaccinations—it's not a secondary issue."

As such, Berners-Lee cautions countries that rank highly this year to not rest in their efforts to keep improving. "It would be a shame if countries at the top of the list felt they didn't need to do anything simply because they rank highly," he says. Even countries that have well-developed infrastructure and Web use may find pockets of populations that are in dire need of improvement. "There is a missed opportunity to capitalize on getting that last 25% online, for example," he says. "It can mean much greater efficiencies for everyone, including government." At the same time, governments, companies and citizens must be aware of the ongoing threats to the World Wide Web, such as degradation of service for commercial, political or religious incentives.

Over the longer term, Berners-Lee hopes that the Web can be used as the basic framework that supports true cultural transformation. "When people go on social networking sites today, they often connect with people they know—often these are people who aren't very different from themselves. As a result, they can unknowingly demonize other cultures without even being aware of their own inhumanity," says Berners-Lee. "The real key is to embrace other cultures, to get to know one another at the global level."

As this transformation occurs, a parallel expectation is that governments will evolve—and citizens will participate far more often and deeply in debate and discussion around key global issues. "It's not just about building systems that will let people communicate more," he explains. "It's about building frameworks that rely on accountability, so that debates are based on actual dialogue by people who have knowledge and expertise, instead of the shouting matches that sometimes persist in politics."

To that end, Berners-Lee hopes that future iterations of the Web Index will probe more deeply into critical issues, such as government openness and censorship, along with more granular analysis in many more countries around the world. Accomplishing these goals will require the work of many partners who can help us by providing additional data sources and resources.

APPENDIX I: LIST OF COUNTRIES AND INDICATORS IN THE 2011 WEB INDEX

The Web Index ranks 61 developed and developing countries across Africa, the Americas, Asia-Pacific, Europe, the Middle East and Central Asia.

The choice of countries covered in this first Index was largely determined by three criteria:

1) Secondary data availability for the country (from selected sources such as the World Bank, United Nations, International Telecommunication Union, World Economic Forum, etc.)

2) Finding country experts to score country questionnaires in the limited time available

3) Availability of resources to cover the fees of the selected experts.

In addition, the final selection of countries needed to ensure a sufficient spread across the continents. Future editions of the Index will expand country coverage to over 100, resources permitting.

Below is the full list of countries covered in the 2011 Web Index:

	AFRICA		AMERICAS		ASIA PACIFIC		EUROPE		MIDDLE EAST/ CENTRAL ASIA
1	Benin	1	Argentina	1	Bangladesh	1	Finland	1	Israel
2	Burkina Faso	2	Mexico	2	India	2	France	2	Jordan
3	Cameroon	3	Colombia	3	Indonesia	3	Germany	3	Qatar
4	Egypt	4	Ecuador	4	Korea (Rep. of)	4	Italy	4	Yemen
5	Ethiopia	5	Brazil	5	Nepal	5	Iceland	5	Kazakhstan
6	Ghana	6	Canada	6	New Zealand	6	Turkey		
7	Kenya	7	Chile	7	Pakistan	7	Poland		
8	Mali	8	United States	8	Phillipines	8	Portugal		
9	Mauritius	9	Venezuela	9	Singapore	9	Ireland		
10	Morocco			10	China	10	Norway		
11	Namibia			11	Japan	11	Russia		
12	Nigeria			12	Thailand	12	Spain		
13	Senegal			13	Australia	13	Sweden		
14	South Africa			14	Viet Nam	14	Switzerland		
15	Tanzania					15	United Kingdom		
16	Tunisia								
17	Zimbabwe								
18	Uganda								

Web Index Tree Diagram						
Readiness weight: 0.2		The Web weight: 0.2		Impact weight: 0.6		
Communications weight: 0.33	Institutional weight: 0.67	Use weight: 0.5	Content weight: 0.5	Economic weight: 0.33	Political weight: 0.33	Social weight: 0.33
ITUD weight: 1	FHA weight: 1	Q11a weight: 0.17	Q8b weight: 1	Q15 weight: 1	WEFN weight: 1	Q6 weight: 1
ITUE weight: 1	FHB weight: 1	Q11c weight: 0.17	Q8c weight: 1	Q14 weight: 1	Q1 weight: 1	WEFJ weight: 1
ITUF weight: 1	WEFF weight: 1	Q11b weight: 0.17	Q3 weight: 1	Q17 weight: 1	Q2b weight: 1	Q4 weight: 1
ITUG weight: 1	WEFG weight: 0.25	Q11e weight: 0.17	Q8a weight: 1	WBC weight: 1	UND weight: 1	Q7 weight: 0.5
ITUA weight: 1	WEFD weight: 1	Q11d weight: 0.17	WIKIA weight: 1	Q12 weight: 1		WEFI weight: 0.5
ITUB weight: 1	WEFE weight: 1	Q11f weight: 0.17	Q2a weight: 1	WEFL weight: 1		
ITUC weight: 1	WBB weight: 1	ITUH weight: 1	Q22 weight: 1	WEFM weight: 1		
Q20 weight: 1	WEFC weight: 0.5		Q23d weight: 0.1	WEFK weight: 1		
WBA weight: 1	WEFH weight: 0.25		Q23e weight: 0.1			
IEAA weight: 1	Q16 weight: 1		Q23f weight: 0.1			
WEFA weight: 1	Q10 weight: 1		Q23g weight: 0.1			
WEFB weight: 1	Q13 weight: 1		Q23a weight: 0.1			
Q18 weight: 1	RSFA weight: 0.5		Q23b weight: 0.1			
	Q9h weight: 1		Q23c weight: 0.1			
	UNA weight: 1		Q23h weight: 0.1			
	UNB weight: 1		Q23i weight: 0.1			
	Q9cd weight: 0.5		Q23j weight: 0.1			
	Q9ab weight: 0.5		Q26 weight: 1			
	Q9l weight: 1		UNC weight: 1			
	Q9i weight: 1		Q5a weight: 0.33			
	Q25 weight: 1		Q5c weight: 0.33			
	Q9e weight: 0.25		Q5b weight: 0.33			
	Q9g weight: 0.25		Q24 weight: 1			
	Q9f weight: 1		Q9k weight: 1			

Secondary data indicators:

Indicator	Name	Description	Component	Source
FHA	Political rights	Ratings are determined by the total number of points each country receives for 10 questions associated with political rights. Countries receive 0-4 points for each question with zero points indicating the least degree of freedom and four points the greatest degree. An overall score between 1-7 is then computed where a country is deemed to be free if it scores between 1 and 2.5, partially free with a score between 3 and 5, and not free with a score between 5.5 and 7.	Institutional Infrastructure	Freedom House
FHB	Civil liberties	Ratings are determined by the total number of points each country receives for 15 questions associated with civil liberties. Countries receive 0-4 points for each question with zero points indicating the least degree of freedom and four points the greatest degree. An overall score between 1-7 is then computed where a country is deemed to be free if it scores between 1 and 2.5, partially free with a score between 3 and 5, and not free with a score between 5.5 and 7.	Institutional Infrastructure	Freedom House
IEAA	Electrification rate	Measued as the proportion of the population with access to electricity. Data is collected from industry, national survey and international sources. Data is typically source locally meaning that definitions and data quality will vary from country to country.	Communications Infrastructure	IEA
ITUA	International Bandwidth (Mbits/Second) per internet user	Capacity of all Internet exchanges that backbone operaters provide to carry traffic. Based on responses from countries of an annual questionnaire supplemented with data from ITU research. Measured in terms of Mbits per second per internet user	Communications Infrastructure	ITU
ITUB	Broadband subscribers per 100 population	Refers to total fixed (wired) broadband Internet subscriptions (that is, subscriptions to high-speed access to the public Internet (a TCP/IP connection) at downstream speeds equal to, or greater than 256 kbit/s) divided by population and multiplied by 100.	Communications Infrastructure	ITU
ITUC	% of households with personal computers	Refers to the percentage of households with a computer. A computer can include a desktop, portable or handheld computer (e.g. a personal digital assistant). It does not include equipment with some embedded computing abilities such as mobile phones or TV sets.	Communications Infrastructure	ITU

(Secondary data indicators cont:)

ITUD	Mobile phone subscriptions per 100 population	Refers to the subscriptions to a mobile cellular telephone service, including number of pre-paid SIM cards active during the past three months, divided by the population and multipled by 100.	Communications Infrastructure	ITU
ITUE	Fixed broadband internet monthly subscription as % of monthly GDP per capita	The monthly subscription charge for fixed (wired) broadband Internet service. Fixed (wired) broadband is considered any dedicated connection to the Internet at downstream speeds equal to, or greater than, 256 kbit/s, using DSL. Where several offers are available, preference should be given to the 256 kbit/s connection. Taxes should be included. If not included, it should be specified in a note including the applicable tax rate. This indicator is expressed in US$ as a share of monthly GDP per capita	Communications Infrastructure	ITU/World Bank
ITUF	ITU mobile-cellular sub-basket as a % of monthly GDP per capita	This a composite indicator calculated by ITU to quantify the affordability of mobile-cellular correspondance. Technically, it sums the price of 30 outgoing calls (peak, off-peak, on-net and off-net) plus 100 SMS messages and expresses it as a share of monthly GDP per capita measured at PPP exchange rates.	Communications Infrastructure	ITU/World Bank
ITUG	Percentage of population covered by a mobile cellular network	Mobile cellular coverage of population in percent. This indicator measures the percentage of inhabitants that are within range of a mobile cellular signal, irrespective of whether or not they are subscribers. This is calculated by dividing the number of inhabitants within range of a mobile cellular signal by the total population and multiplying by 100. Note that this is not the same as the mobile subscription density or penetration. When there are multiple operators offering the service, the maximum amount of population covered should be reported.	Communications Infrastructure	ITU
ITUH	Percentage of individuals using the internet	Refers to the percentage of the population using the Internet. The Internet is a worldwide public computer network. It provides access to a number of communication services including the World Wide Web and carries e-mail, news, entertainment and data files. Internet use may be facilitated by any device enabling Internet access (not only a computer). This includes a mobile phone, PDA, games machine and digital TV. Use can be via a fixed or mobile network.	Web Use	ITU

(Secondary data indicators cont:)

RSFA	Press freedom index	Score based on questionnaire filled out by independent sources. Questions cover violations affecting journalists (murder, imprisonment etc) and news media (censorship, confiscation of newspaper issues) plus the degree of self-censorship i.e. the ability of the media to investigate and criticise. Also takes into account the legal and economic status of the media (state monopoly, private monopoly etc).	Institutional Infrastructure	RSF
UNA	School life expectancy (years)	Number of years of schooling that a child can expect to receive assuming that the probability of his or her being enrolled in school at any particular future age is equal to the current enrolment ratio at that age. Includes repeat years.	Institutional Infrastructure	UN
UNB	Literacy rates	Defined as the percentage of the population aged 15 and over who can with understanding read/write a short simple statement about their everyday life.	Institutional Infrastructure	UN
UNC	Government online services index	Assesses the quality, relevance and usefulness of government websites for providing online information and participatory tools and services for people.	Web Content	UN
UND	E-participation index	Index score measuring the extent of Web use to facilitate provision of information by governments to citizens, interaction with stakeholders and engagment in decision-making processes	Political Impact	UN
WBA	Secure internet servers per million people	Servers using encryption technology in transactions divided by population multiplied by 1,000,000.	Communications Infrastructure	World Bank
WBB	Tertiary enrolment rates (gross)	Gross enrollment ratio is the ratio of total enrollment, regardless of age, to the population of the age group that officially corresponds to the level of education shown. Tertiary education, whether or not to an advanced research qualification, normally requires, as a minimum condition of admission, the successful completion of education at the secondary level.	Institutional Infrastructure	World Bank
WBC	ICT service exports as a % of GDP	Information and communication technology service exports include computer and communications services (telecommunications and postal and courier services) and information services (computer data and news-related service transactions). The value is expressed as a share of nominal GDP.	Economic Impact	World Bank

(Secondary data indicators cont:)

WEFA	Accessibility of digital content	Survey Question: In your country, how accessible is digital content (e.g. text and audiovisual content, software products) via multiple platforms (e.g. fixed-line Internet, wireless Internet, mobile network, satellite, etc)? [1 = not accessible at all; 7 = widely accessible]	Communications Infrastructure	WEF
WEFB	Firm-level technology absorption	Survey Question: To what extent do businesses in your country absorb new technology? [1 = not at all; 7 = aggressively absorb]	Communications Infrastructure	WEF
WEFC	Freedom of the press	Survey Question: How free is the press in your country? [1 = totally restricted; 7 = completely free]	Institutional Infrastructure	WEF
WEFD	Quality of educational system	Survey Question: How well does the educational system in your country meet the needs of a competitive economy? [1 = not well at all; 7 = very well]	Institutional Infrastructure	WEF
WEFE	Internet access in schools	Survey Question: How would you rate the level of access to the Internet in schools in your country? [1 = very limited; 7 = extensive]	Institutional Infrastructure	WEF
WEFF	Burden of government regulation	Survey Question: How burdensome is it for your businesses in your country to comply with governmental administrative requirements (e.g. permits, regulations, reporting)? [1 = extremely burdensome; 7 = not burdensome at all]	Institutional Infrastructure	WEF
WEFG	Importance of ICT to government vision of the future	Survey Question: To what extent does the government have a clear implementation plan for utilizing information and communication technologies to improve your country's overall competitiveness? [1 = no plan; 7 = clear plan]	Institutional Infrastructure	WEF
WEFH	Government priortization of ICT	Survey Question: How much priority does the government in your country place on information and communication technologies? [1 = weak priority; 7 = high priority]	Institutional Infrastructure	WEF
WEFI	Use of virtual social networks	Survey question: How widely are virtual social networks (e.g. Facebook, Twitter, LinkedIn) for professional and personal communication in your country? [1 = not used at all; 7 = used widely]	Social Impact	WEF
WEFJ	Impact of ICT on access to basic services	Survey question: To what extent are information and technology technologies enabling access for all citizens to basic services (health, education, financial services etc) in your country? [1 = do not enable access at all; 7 = enable access significantly]	Social Impact	WEF

(Secondary data indicators cont:)

WEFK	Extent of business internet use	Survey question: To what extent do companies within your country use the Internet for their business activities? (e.g. buying and selling goods, interacting with customers and suppliers) [1 = not at all; 7 = extensively]	Economic Impact	WEF
WEFL	Impact of ICT on organisational models	Survey question: To what extent are information and communication technologies creating new organisational models (virtual teams, remote working, telecommuting etc) within businesses in your country? [1 = not at all; 7 = significantly]	Economic Impact	WEF
WEFM	Impact of ICT on new services and products	Survey question: To what extent are information and communication technologies creating new business models, services and products within your country? [1 = not at all; 7 = significantly]	Economic Impact	WEF
WEFN	ICT use and government efficiency	Survey Question: To what extent has the use of information and communication technologies by the government improved the efficiency of government services in your country? [1 = no effect; 7 = has generated considerable improvement]	Political Impact	WEF
WIKIA	Wikipedia articles in local language	Number of wikipedia articles in local language (taking end-year values). Local language data is sourced from the CIA which mainly draws on national census data and Ethnologue which provides a database of academic studies. The number of articles in each relevant language is weighted by the share of the population that speak that language.	Web Content	Wikipedia/CIA/ Ethnologue

Primary data indicators:

Indicator code	Indicator name	Question
Q1	Web use for political mobilisation	To what extent has the Web been used for political mobilisation in your country (e.g. through the use of social networking sites)?
Q2a	Political party Websites	Do the main political parties have Websites?
Q2b	Web-based political campaigning	Do they campaign through the Web - if it is legal to do so (e.g. to mobilise supporters, or push their political agenda)?
Q3	Web-Based health information	To what extent is there reliable and trusted health information on the Web, to help, for instance, identify ailments, and offer preventative or curative measures, in a language readable by the local population (the official languages of the country)?
Q4	Web use for public health	In cases of outbreak of widespread infectious diseases or epidemics (e.g. Avian Flu or Cholera), does the government proactively provide information to the public about disease control or prevention via the Web? For example, by using Web-based messaging systems to contact the population via email or mobile phones, guiding people to a Website for further information?
Q5a	Primary education curriculum	To what extent is the local/state curriculum available on the Web (including supporting academic material), for each of the following stages of education: primary education
Q5b	secondary education curriculum	Secondary education:
Q5c	tertiary education curriculum	Tertiary education:
Q6	Teacher training via the Web	To what extent is distance learning used for the training of teachers?
Q7	Social networking sites	To what extent are social networking sites (local or international) used in the country?
Q8a	Information on safety and security	To what extent is there relevant and useful content in the local official languages of the country in the following areas: : Personal Safety and security across the country
Q8b	General news availability	General news - both local and international
Q8c	Information on jobs	Searching for jobs

(Primary data indicators cont:)

Q9ab	boy:girl computer training	Ratio of the extent to which boys are trained in the use of computers, relative to girls trained in the use of computers?
Q9cd	boy:girl encouragement to study science and technology	Ratio of the extent to which boys are encouraged to focus on science and technology, compared to the extent to which girls are encouraged to focus on science and technology?
Q9e	Government encouragement of Web use	To what extent does the government publicize the importance of access to the Web to all the population?
Q9f	Government encouragement of Web use for women	To what extent does the government publicize the importance of access to the Web specifically for women?
Q9g	Government ICT training	To what extent are there government programmes specifically focusing on funding training for their staff in ICT use?
Q9h	Government ICT training for women	To what extent are there government programmes specifically focusing on funding training for their women staff in ICT use?
Q9i	Female role models in ICT field	In your country, to what extent are there female "role models" in the ICT field (such as Women in senior positions in IT-sector firms, or women in senior government positions in the field of science or IT).
Q9k	Women's groups Websites	In your country, to what extent are there women's groups' Websites?
Q9l	% of women ICT graduates	In your country, in tertiary education, what proportion of ICT graduates are women?
Q10	Government Website censorship	To what extent does the government impose restrictions on access to Websites (censorship)?
Q11a	Web use by the Elderly	To what extent do the segments of society listed below (a. to e.) have effective and useful access to the Web: Elderly people
Q11b	Web use by illiterate people	Illiterate people or people with very low literacy
Q11c	Web use by those with visual disability	People with visual disability
Q11d	Web use by those with learning disabilities	People with learning disabilities
Q11e	Web use by people susceptible to seizures	People susceptible to seizures

(Primary data indicators cont:)

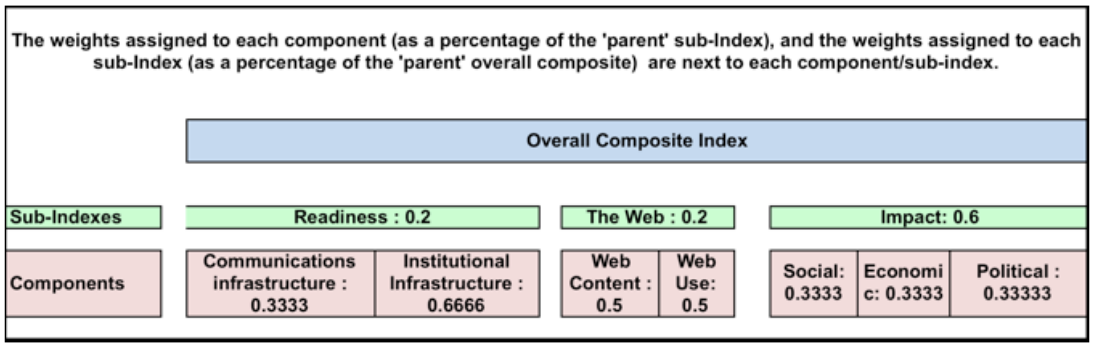
Q11f	Web use by those with hearing disability	People with hearing disability
Q12	Criminal activities	To what extent do you think that the Web is making it easier to undertake criminal activities in your country?
Q13	laws against cyber crime	To what extent are there laws against cyber crime in your country?
Q14	Trust in the Web for commerce	To what extent would you say that the Web is trusted as a means of buying and selling goods and services in your country?
Q15	Web use for Agriculture	To what extent do government or non-government agencies use the Web to disseminate important information to farmers (for example on prices, weather conditions, fertilizers and pesticides, dealing with plant and livestock diseases, etc.)?
Q16	Quality of training for computer engineers	To what extent would you consider your country to be ranking amongst the World's best in training computer engineers?
Q17	Business development around the Web	To what extent would you consider your country to have developed successful businesses based on the use of the Web?
Q18	Reliability of electricity supply	How reliable is the electricity supply in your country?
Q20	Affordability of Web access	To what extent would you say that Web access is affordable (cost of Internet connection, downloads, etc.) to the large majority of the population in your country?
Q22	Government use of open licenses	To what extent are government agencies publishing information on the Web using open licenses?
Q23a	publication of trade data on the Web	To what extent are there government data on the Web in the following areas: International trade data
Q23b	publication of fiscal data on the Web	Detailed data on budgeted and actual spending of different departments
Q23c	Publication of health data on the Web	Data on health sector performance (hospitals, doctors, etc.)
Q23d	Publication of education data on the Web	Education performance data
Q23e	Publication of transport data on the Web	Transport data and schedules
Q23f	Publication of census data on the Web	Census data –age, income, voting, migration, etc.

(Primary data indicators cont:)

Q23g	Publication of map data on the Web	Map data (full map coverage of the country)
Q23h	Tax filing via the Web	Information on tax returns and how to submit those
Q23i	Information on contacts in government departments	Information and contact details of whom to reach for different government services (e.g. local police stations/libraries, etc.)
Q23j	Publication of crime data on the Web	Data and statistics on crime in the country
Q24	Ease of access of government data	How easy is it to access government data (as listed in Question 23 above) on the Web in open, machine readable formats (.csv or .xls file, XML, RDF, etc.)?
Q25	Extent of Open Government Data Initiative	Does the government have a specific Open Government Data initiative?
Q26	Creation of new services based on government data	To what extent are Web applications and services in areas such as health, education, security, budgets, etc., "built" on top of government data (i.e. has there been new and useful information and services derived from the published government data in those fields)?

APPENDIX II

Index tree diagram, weighting scheme and description of components and sub-Indexes.



		Description
Component	Communications Infrastructure	This component assesses the state and availability of the physical and Communications Infrastructure that enables access to the Web
Component	Institutional Infrastructure	This component assesses the state of the institutional ecosystem - including education, laws and regulations - that enable access to the Web
Component	Web Content	This component assesses the extent to which relevant and useful content is available on the Web
Component	Web use	This component assesses the extent of Web use in a country, including by disabled sections of the population
Component	Political Impact	This component assesses the utility of the Web and its impact on politics and government
Component	Economic Impact	This component assesses the utility of the Web and its impact on business and the economy
Component	Social Impact	This component assesses the utility of the Web and its impact on health, education and social activities
Sub-index	Readiness	This sub-Index assesses the state of the communications and Institutional Infrastructure that is needed to be able to access the Web in a country
Sub-index	The Web	This sub-index assesses the availability of relevant and useful content, as well as the number of Internet and Web users in a country
Sub-index	Impact	This sub-Index assesses the impact and utility of the Web in the political, economic and social dimensions

APPENDIX III

"Executive Summary" and "Conclusions" extracts from a paper entitled: "ASSESSMENT OF THE WEB INDEX, survey questionnaire calibration and uncertainty analysis", by Annoni P., Weziak-Bialowolska D. and Nardo M., European Commission, Joint Research Centre Econometrics and Applied Statistics Unit. (Report EUR 25476 EN, ISBN 978-92-79-25988-3)

EXECUTIVE SUMMARY

The purpose of this analysis is a comprehensive assessment of the Web Index 2011 (WI), published by the World Wide Web Foundation in September 2012. The WI aims to measure the *state and value of the Web* focusing on the impact of the Web on people and nations. The Index covers 61 countries worldwide and consists of 85 underlying indicators across seven components and three sub-indexes. Primary data, coming from an ad hoc expert assessment survey, and secondary data coming from official datasets are combined in the WI.

The usage of primary data is one of the innovative aspects of the first release of the WI. They play a remarkable role in the construction of the composite indicator as they account for about 60% of the WI indicators. They are sourced via an expert assessment survey and reviewed by national peers. Given that the expert assessment survey has been specifically designed for the first release of the Index, the analysis of the survey outcomes is of particular importance. To this aim a statistical model designed for the analysis of survey data is employed. Based on the model outcomes we provide suggestions on how to improve data gathering in future surveys.

The second part of the analysis contains the robustness analysis of the WI. Every composite index is the result of a number of choices on the framework, the number and identity of indicators to include, their normalization, the weights to attach to each indicator and component, the aggregation method and many others. As with every composite index, some choices are openly normative and subjective, driven by developers' and experts' opinion, others can be justified on the basis of statistical analysis, mathematical simplicity or common practice. The uncertainty analysis presented in this study aims at assessing to what extent these choices might affect the country scores and ranks based on the composite indicator. To this purpose six alternative scenarios are simulated each challenging one particular assumption made in the WI. The assessment of different scenarios is always done taking the official WI index, version 2011, as the reference one. In uncertainty analysis of composite indicators country rank volatility is generally caused by the country scoring relatively high in some indicators/components and low in others. Our analysis shows no cases of remarkable volatility. There are some countries with relatively high volatility for some scenarios. They are likely to feature as a sort of unbalance of scores in the different WI indicators/components.

Analysis of survey data

Primary data are the backbone of the WI. The survey consists of a detailed questionnaire submitted to the experts/professionals from 61 countries worldwide and assessed by national and regional peer reviewers. Designing a questionnaire is generally a difficult task. The WI case is particularly challenging given the complex nature of the topic surveyed and the wide coverage required. Our analysis of primary data aims at providing survey designers with some insights into possible problematic questions and/or unexpectedly behaving countries. A specific

model belonging to the family of the Rasch models is employed. Rasch analysis is a statistical measurement tool originally conceived as a psychometric method for the social sciences and designed for the treatment of survey data. The analysis of WI primary data allows us to check for a series of issues: category redundancy, questions' unexpected answers , questions' relative difficulty and the validity of the selected framework. Results show that the questionnaire is balanced and the response structure organised in a ten-category scale is always appropriate. Few questions stand out as problematic: Q10 (To what extent does the government impose restrictions on access to websites (censorship)?), Q25 (Does the government have a specific Open Government Data initiative?), Q2a (Do the main political parties have websites?) and Q12 (To what extent do you think that the Web is making it easier to undertake criminal activities in your country?). Some of these questions do not seem to be clear enough for the respondents, while others appear to be too technical or counter-oriented with respect to the concept under measurement. The general suggestion for all of these questions is a rephrasing to make them clearer. No country shows a notable unexpected pattern of answers, confirming that the questionnaire was always scored by experts with their best efforts. Question difficulty is almost always as expected with a clear indication that gender bias does matter. Finally, survey data describe an almost unique factor in each WI component, as supported by the Rasch dimensionality analysis. This means that the grouping of the different survey indicators into different WI components is statistically appropriate.

Uncertainty analysis

Scenario 1. Weighting. Weights assigned to each component/sub-index of the WI are changed for checking the volatility of scores/ranks with respect to the reference WI. Very extreme configurations are also tested by choosing a wide range of variability for the simulation weights. Overall the WI is not highly affected by the change in weights confirming the robustness of the Index with respect to the reference weighting structure. Equal weighting either at the sub-index level or at both component and sub-index levels is also tested and shows a maximum shift of 5 positions in the ranking. Iceland, Argentina and Namibia would be the most favoured countries if equal weighting were used for the WI. With more extreme weighting scenarios, distant from the reference one, the most affected countries would be Switzerland, Ireland, Singapore, Colombia, Poland, China and Russia, with shifts in rank higher than 10% of the maximum possible shift.

Scenario 2. Different aggregation for three indicators. The Communications Infrastructure component is meant to capture if people can (easily) access the Web, not how it is accessed. In order to take into account different access modalities for different countries, we adopt an alternative way to aggregate some of the indicators describing web access in the WI and check the impact on country scores and ranks at component, sub-index and Index levels. The WI is almost not affected by the change in the way Web access is included in the Index. A modest volatility in ranks is observed for the sub-index Readiness and the component Communications Infrastructure. For the Readiness sub-index differences in ranks are at most of 2 positions for Uganda (downward in the WI scale) and 3 positions for Pakistan (upward). In the case of Communications Infrastructure the maximum shift amounts to 5 for Tunisia and 4 for China, they would then gain some positions.

Scenario 3. Inclusion of four additional indicators. The Institutional Infrastructure component of WI contains a set of indicators designed to describe possible gender biases in the access and use of the Web *(gender indicators)*. In particular two indicators describe implicit gender bias in computer training and in focusing on science and technology expressed as a "distance"

between respective levels for girls and boys. In order to take into account also the level of these indicators, four additional indicators are added to the Institutional Infrastructure component which measure the level of computer training and focusing on science and technology among girls and boys respectively. The addition has almost no effect on the final results. The highest observed difference in the WI ranking is of 1 position only. As expected, the volatility increases when the sub-index and the components are concerned. The biggest observed differences in the sub-index Readiness are of 4 (Morocco) and 3 (Benin) positions, while in the component Institutional Infrastructure the highest shift is of 5 positions (Ecuador and China).

Scenario 4. Different treatment for survey data. In the Index computation primary and secondary data are treated in the same way: after a statistical preliminary transformation , they are normalised and then aggregated across components and sub-indexes. In this scenario a different method is used to derive *'numbers'* from survey data, i.e. the Rasch method employed also for the overall analysis of the survey data. The replacement in the WI of the original survey indicators with the new statistically quantified indicators turns out to be the biggest challenge to the WI structure as the structure of four out of seven components are partially altered due to technical reasons related to the use of the Rasch model. Still the comparison between the reference WI and our simulations shows a rather robust Index: the largest changes are those for Australia and Philippines with a modest improvement of 4 positions in the WI ranking and by Singapore, Iceland and Benin which decline by 4 positions. A much higher ranking volatility can been seen at the sub-index and component level especially for the Web Content component where Indonesia could drop 14 positions in the WI ranking while Bangladesh and Ecuador would climb by 16 positions and South Africa by 13.

Scenario 5. Compensability. Can high web use or a high social impact compensate for poor institutional or communications infrastructure? The aggregation used in the WI assumes it can, as poor performances in some sub-indexes (components) are linearly compensated by good scores in others. We test a different aggregation where *bads* are less easily compensated by *goods*. WI passes the test easily: no country scores relatively high in some components and low in others so compensability does not seem an issue with this dataset.

Scenario 6. The contribution of each component and sub-index. In this scenario the contribution of each component to the Index is assessed by excluding one component at a time and comparing scores/ranks to the reference ones. Our analysis highlights the Political, Social and Economic Impact components as the three most influential ones, while the least influencing one turns out to be the Communications Infrastructure component. This reflects the weighting scheme of the WI where 60% of the overall weight is assigned to the sub-index Impact.

The correlation pattern of the WI is also tested. The weights assigned by developers to different sub-indexes and components, with the aim of attributing to these a pre-established scale of importance, are compared with the importance the same sub-indexes and components have as measured by a statistical measure. Our analysis finds the following:

Within Components: In the Communications Infrastructure indicator ITUG (% of population covered by a mobile cellular network) is much less important than what the weight assigned to it by the World Wide Web Foundation would suggest. The same happens in the Institutional infrastructure to the indicators WEFF (Burden of government regulation), Q9l (In your country, in tertiary education, what proportion of ICT graduates are women?), Q10 (To what extent does the government impose restrictions on access to websites?), Q16 (To what extent would you

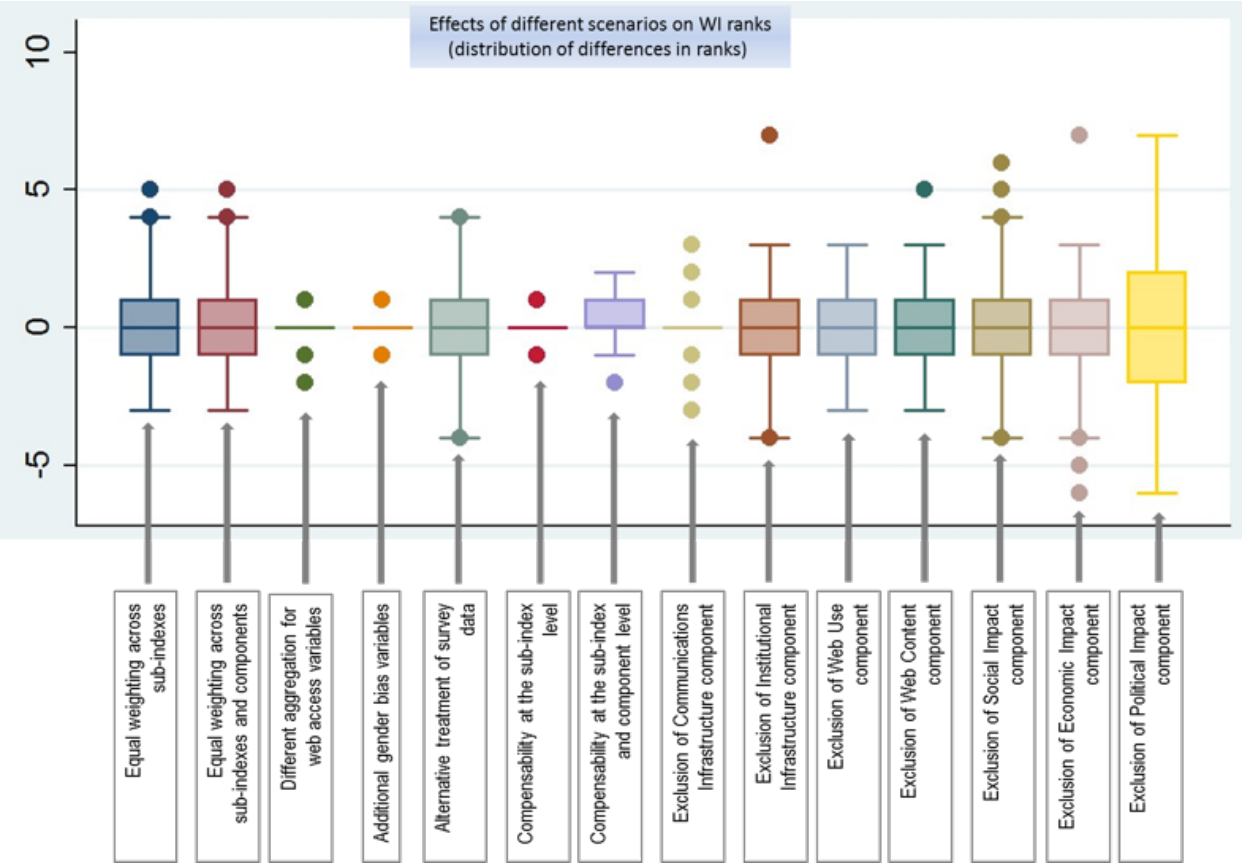
consider your country to be ranking amongst the World's best in training computer engineers?), Q25 (Does the government have a specific Open Government Data initiative?) and the cluster of Q9a-Q9d on gender bias.

We notice that the indicators WEFF, Q9l, and Q9a-Q9d are not significantly correlated with the WI components. They seem to follow a different behaviour as compared with all other indicators in the dataset. The same happens for Q12 (To what extent do you think that the Web is making it easier to undertake criminal activities in your country?) and to some extent also for WBC (ICT service exports as a share of GDP) in the component Economic Impact. These indicators count much less in the composite than the weight theoretically assigned to them.

Within sub-indexes. All the components and sub-indexes scores are highly correlated among themselves and with the WI. This means that whatever weights are assigned to the components or the sub-indexes the change in the WI is only marginal (as proved by our first scenario). Although to the sub-index Impact is assigned 3/5 of the overall weight, it actually weights much less being extremely correlated with the other two sub-indexes. In other words, the WI is not really "multi" dimensional as all components look pretty much the same from the statistical point of view. If the correlation structure is confirmed in other editions of the Index, there might be room for a reduction in the number of indicators included in the WI framework.

The overall picture of the effect of different tested scenarios on country ranks is shown in Box 1.

Box 1: Comparison of different scenarios on country ranks



CONCLUSIONS

This study is an assessment of the Web Index 2011 (WI), published by the World Wide Web Foundation in September 2012. The Index, computed for 61 countries, is composed of 85 indicators and uses both survey (primary) data and hard (secondary) data. We analyse both the survey questions with the aim of checking the statistical consistency of the answers, and the WI in order to evaluate its robustness with respect to some of its main methodological assumptions.

The presence of primary data is one of the innovative aspects of the first release of the WI. They play a remarkable role in the construction of the Index as they account for about 60% of the WI indicators. The survey to collect primary data constructed ad hoc for the first release of the Index consists of a detailed questionnaire submitted to experts/professionals from 61 countries worldwide and assessed by national and regional reviewers. Designing questionnaires is generally a difficult task. The WI case is particularly challenging given the complex nature of the topic surveyed and the wide coverage required.

Our analysis of primary data aims at providing the questionnaire designers with some insights into possible problematic questions and/or unexpectedly behaving countries. To this purpose a specific model belonging to the family of the Rasch models is employed. Results show that the questionnaire is balanced and the response structure organised in a ten category scale is always appropriate. A few questions stand out as problematic: Q10 (To what extent does the government impose restrictions on access to websites (censorship)?), Q25 (To what extent does the government have a specific Open Government Data initiative?), Q2a (To what extent do the main political parties have websites?) and Q12 (To what extent do you think that the Web is making it easier to undertake criminal activities in your country?). Some of those questions are too technical for the respondents while others are not clear enough or seem counter-oriented with respect to the concept to be measured. In general, we suggest the rephrasing of the problematic questions to make them clearer. No country shows a notable unexpected pattern of answers, confirming that the questionnaire has been always scored by experts at their best. Question difficulties are almost always as expected with a strong indication that gender bias does matter. Finally, primary data from the questionnaire describe an almost unique factor in each WI component, as supported by the Rasch dimensionality analysis. This means that the grouping of the different survey indicators into different WI components is statistically appropriate.

The second part of this report contains the robustness analysis of the WI. Every composite index is the result of a number of choices on the framework, the number and identity of indicators to include, their normalization, the weights attached to each indicator and component, the aggregation method and many others. As with every composite indicator, some choices are openly normative and subjective, driven by developers' and experts' opinion, others can be justified on the basis of statistical analysis, mathematical simplicity or common practice. The uncertainty analysis presented in this study aims at assessing the extent to which some of these choices might affect the country scores and ranks based on the composite Index . To this purpose six alternative scenarios are simulated each challenging one particular assumption made in the WI, including different aggregation methods and different weighting schemes. The assessment of the scenarios is always done in comparative terms with respect to the reference scenario, that is: the WI published by the World Wide Web Foundation in September 2012.

The WI proved to be robust and consistent. For each of the six simulated scenarios, even for the most distant from the reference one, the maximum shift in WI country ranks is always in the band ± 6, which corresponds to 10% of the maximum possible shift in this case. Nevertheless, a few indicators are found to be not in line with the underlying concept, while the general high correlation across WI elements (indicators, components and sub-indexes) highlights a possible redundancy in the number of indicators included.

Overall, despite its multifaceted structure, the wide coverage of different countries and the fact that it includes both survey and hard data, from the statistical point of view the index is robust.

ABOUT OXFORD ECONOMICS

OXFORD ECONOMICS

http://www.oxfordeconomics.com/

Oxford Economics is a leading organisation in quantitative analysis and economic forecasting. Oxford Economics played a central role in the production of the Index, including the data collection, statistical analysis and computation, and the country surveys.