



ISSN NO. 2320-5407

*Journal homepage: <http://www.journalijar.com>***INTERNATIONAL JOURNAL  
OF ADVANCED RESEARCH****RESEARCH ARTICLE****ICT Development Index (IDI) Ranking 2013 for Asia and Pacific Countries and Evaluation of ICT Subindexes and Indicators for Pakistan****Muhammad Bashir**

Pakistan Council for Science and Technology, Shahrah-e-Jamhuriat, Sector G-5/2, Islamabad, Pakistan.

***Manuscript Info******Manuscript History:***

Received: 11 November 2013

Final Accepted: 22 November 2013

Published Online: December 2013

***Key words:***

Information and Communication Technology (ICT), ICT Development Index, Asia and Pacific Countries.

***Abstract***

This paper presents ICT Development Index (IDI) Rankings for 28 Asia and Pacific Countries. ICT Development Index has been developed by International Telecommunication Union (ITU) to measure development progress across countries, in terms of level of access, usage among citizens and skills among 157 economies worldwide. The IDI is based on 11 ICT indicators, grouped in three clusters: access, use and skills. The access sub-index captures ICT readiness, and includes five infrastructure and access indicators (fixed-telephony, mobile telephony, international Internet bandwidth, households with computers, and households with Internet). The use sub-index captures ICT intensity, and includes three ICT intensity and usage indicators (Internet users, fixed (wired)-broadband, and mobile broadband). The skills sub-index includes three proxy indicators (adult literacy, gross secondary enrolment and gross tertiary enrolment). Seven Asia and Pacific economies represented in the top 20 in IDI Rankings 2013. The top 100 also features eleven other countries of the region. Pakistan has been ranked 129<sup>th</sup> among 157 countries in IDI, a benchmark made up of 11 indicators. Pakistan's IDI score had gone up from 1.78 in 2011 to 1.83 in 2012. Its ranking declined from 128 to 129 during this period. In the skills sub-index, which evaluates ICT capability or skills in terms of indicators that include adult literacy as well as gross secondary and tertiary enrollment, Pakistan was ranked 143 in 2012, the same position it had occupied in 2011. In terms of the use sub-index, which broadly measures the uptake of ICTs and the intensity of usage based on parameters such as Internet users per 100 inhabitants, fixed (wired)-broadband subscriptions per 100 inhabitants, and wireless-broadband subscriptions per 100 inhabitants, Pakistan has been ranked 132<sup>nd</sup>, down from 131 in 2011. And the access sub-index rankings place Pakistan in the 119<sup>th</sup> position, down from 115 a year ago.

*Copy Right, IJAR, 2013.. All rights reserved.***Introduction**

As more and more people join the global information society and high-speed communication networks become an indispensable infrastructure, the tracking and measurement of developments in information and communication technologies (ICTs) remain as relevant as ever. According to ITU estimates, there will be 6.8 billion mobile-cellular subscriptions by the end of 2013 – almost as many as there are people on the planet. While the ubiquitous availability of mobile-telephone services is undeniable, with close to 100 per cent of the population covered by a mobile signal, not everyone has a mobile phone. From a measurement point of view, the ongoing challenge thus remains to identify those who are still left without access to ICTs. By end 2013, there will be an estimated 2.7 billion people using the Internet worldwide. In other words, there are still 4.4 billion people who are not yet online. Priority attention needs to be given to the unconnected, and action needs to be taken to improve the accessibility and affordability of broadband Internet services everywhere in order to usher in an inclusive information society. Over

the past year, ICT deployment and uptake have continued to grow worldwide. While growth in mobile-cellular penetration is flattening, reaching 96 per cent by end 2013, mobile broadband continues to grow strongly, on average by around 40 per cent annually between 2010 and 2013. Fixed-broadband uptake, on the other hand, is growing more slowly – at around 10 per cent compound annual growth rate (CAGR) – albeit steadily, across both developing and developed regions. Reflecting the strong growth in mobile Internet uptake, growth in household access to the Internet has also accelerated over the past three years, mainly in the developing world, and will reach a penetration rate of over 40 per cent globally by end 2013. As a comparison, this figure corresponds to about half the proportion of households worldwide that have a TV (almost 80 per cent penetration in 2012).

## Definition of ICT and ICT Development Index

The World Bank defines ICTs as “the set of activities which facilitate by electronic means the processing, transmission and display of information” (Rodriguez and Wilson, 2000). ICTs “refer to technologies people use to share, distribute, gather information and to communicate, through computers and computer networks” (ESCAP, 2001). The ICT Development Index (IDI) is a composite index combining 11 indicators into one benchmark measure that serves to monitor and compare developments in Information and Communication Technology (ICT) across various countries. The ICT Development Index (IDI) is an index published by the United Nations International Telecommunication Union based on internationally agreed information and communication technologies (ICT) indicators. This makes it a valuable tool for benchmarking the most important indicators for measuring the information society. The IDI is a standard tool that governments, operators, development agencies, researchers and others can use to measure the digital divide and compare ICT performance within and across countries. The ICT Development Index is based on 11 ICT indicators, grouped in three clusters: access, use and skills.

- Access sub-index: This sub-index captures ICT readiness, and includes five infrastructure and access indicators (fixed-telephony, mobile telephony, international Internet bandwidth, households with computers, and households with Internet).
- Use sub-index: This sub-index captures ICT intensity, and includes three ICT intensity and usage indicators (Internet users, fixed (wired)-broadband, and mobile broadband).
- Skills sub-index: This sub-index captures ICT capability or skills as indispensable input indicators. It includes three proxy indicators (adult literacy, gross secondary enrolment and gross tertiary enrolment) and therefore is given less weight in the computation of the IDI compared with the other two sub-indices.

## Objectives

The ICT Development Index (IDI) comprises a variety of indicators that monitor and compare ICT development across the countries. The main objectives of the IDI are to measure:

- The *level and evolution over time* of the ICT developments in countries and in relative to other countries
- The *digital divide*, i.e. differences between countries with different level of ICT developments
- The *development potential* of ICTs or the extent to which countries can make use of ICTs to enhance growth and development, based on capabilities and skills.

## Methodology

The IDI has been produced by the International Telecommunication Union (ITU). The IDI is based on eleven indicators grouped into three sub-indices; ICT access, ICT use and ICT skills. Sub-indices were computed by summing the weighted values of the indicators included in the respective subgroup. *ICT access* is measured by fixed-telephone subscriptions per 100 inhabitants, mobile-cellular subscriptions per 100 inhabitants, international Internet bandwidth per Internet user, percentage of households with a computer and percentage of households with Internet access. *ICT use* is measured by percentage of individuals using the Internet, fixed (wired)-broadband Internet subscriptions per 100 inhabitants and wireless broadband subscriptions per 100 inhabitants. *ICT skills* are approximated by adult literacy rate, secondary gross enrolment ratio and tertiary gross enrolment ratio.

The values of the sub-indices were calculated first by normalizing the indicators included in each sub-index in order to obtain the same unit of measurement. The sub-index value was calculated by taking the simple average (using equal weights) of the normalized indicator values. For computation of the final index, the ICT access and ICT use sub-indices were given 40 per cent weight each, and the skills sub-index (because it is based on proxy indicators) 20 per cent weight. The final index value was then computed by summing the weighted sub-indices.

## Conceptual Framework

The recognition that ICTs can be a development enabler, if applied and used appropriately, is critical to countries that are moving towards information or knowledge based societies, and is central to the IDI's conceptual framework. The ICT development process, and a country's transformation to becoming an information society, can be depicted using the following three-stage model:

Stage 1: *ICT readiness* (reflecting the level of networked infrastructure and access to ICTs)

Stage 2: *ICT intensity* (reflecting the level of use of ICTs in the society)

Stage 3: *ICT impact* (reflecting the result/outcome of efficient and effective ICT use).

Advancing through these stages depends on a combination of three factors: the availability of ICT infrastructure and access, a high level of ICT usage and the capability to use ICTs effectively. Accordingly, the first two stages listed above correspond to two major components of the IDI: ICT access and ICT use.

Reaching the final stage, and maximizing the impact of ICTs, crucially depends on the third component of the IDI: *ICT skills*. ICT (and other) skills determine the effective use that is made of ICTs, and are critical to leveraging the full potential of ICTs for socio-economic development. Economic growth and development will remain below potential if economies are not capable of exploiting new technologies and reaping their benefits. Therefore, the IDI includes a measurement of the capability to use ICTs effectively. A single indicator cannot track progress in all three components (access, usage and skills) of the ICT development process, and it is thus necessary to construct a composite index such as the IDI. The IDI aims to capture the evolution of the information society as it goes through its different stages of development, taking into consideration technology convergence and the emergence of new technologies.

## Indicators included in the IDI

The following 11 indicators are included in the IDI (grouped by the three sub-indices: access, use and skills).

### ICT infrastructure and access indicators

Indicators included in this group provide an indication of the available ICT infrastructure and individuals' access to basic ICTs.

#### 1. Fixed-telephone subscriptions per 100 inhabitants

*Fixed-telephone subscriptions* refers to the sum of active analogue fixed-telephone lines, voice-over-IP (VoIP) subscriptions, fixed wireless local loop (WLL) subscriptions, ISDN voice-channel equivalents and fixed public payphones. It includes all accesses over fixed infrastructure supporting voice telephony using copper wire, voice services using Internet Protocol (IP) delivered over fixed (wired)-broadband infrastructure (e.g. DSL, fibre optic), and voice services provided over coaxial-cable television networks (cable modem). It also includes fixed wireless local loop (WLL) connections, which are defined as services provided by licensed fixed-line telephone operators that provide last-mile access to the subscriber using radio technology, when the call is then routed over a fixed-line telephone network (and not a mobile-cellular network). In the case of VoIP, it refers to subscriptions that offer the ability to place and receive calls at any time and do not require a computer. VoIP is also known as voice-over-broadband (VoB), and includes subscriptions through fixed-wireless, DSL, cable, fibre-optic and other fixed broadband platforms that provide fixed telephony using IP.

#### 2. Mobile-cellular telephone subscriptions per 100 inhabitants

*Mobile-cellular telephone subscriptions* refer to the number of subscriptions to a public mobile-telephone service which provides access to the public switched telephone network (PSTN) using cellular technology. It includes both the number of postpaid subscriptions and the number of active prepaid accounts (i.e. that have been active during the past three months). It includes all mobile-cellular subscriptions that offer voice communications. It excludes subscriptions via data cards or USB modems, subscriptions to public mobile data services, private trunked mobile radio, telepoint, radio paging and telemetry services.

#### 3. International Internet bandwidth (bit/s) per Internet user

*International Internet bandwidth* refers to the total used capacity of international Internet bandwidth, in megabits per second (Mbit/s). It is measured as the sum of used capacity of all Internet exchanges offering international bandwidth. If capacity is asymmetric, then the incoming capacity is used. *International Internet bandwidth (bit/s) per Internet user* is calculated by converting to bits per second and dividing by the total number of Internet users.

#### **4. Percentage of households with a computer**

A *computer* refers to a desktop computer, a laptop computer or a tablet or similar handheld computer. It does not include equipment with some embedded computing abilities, such as smart TV sets, and devices with telephony as a main function, such as mobile or smart phones. *Household with a computer* means that the computer is available for use by any member of the household at any time.

#### **5. Percentage of households with Internet access**

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, irrespective of the device used (not assumed to be only a computer – it may also be a mobile phone, games machine, digital TV, etc.). Access can be via a fixed or mobile network. *Household with Internet access* means that the device to access the Internet is available for use by any member of the household at any time.

## **ICT use indicators**

The indicators included in this group capture ICT intensity and usage.

### **1. Percentage of individuals using the Internet**

*Individuals using the Internet* refers to people who used the Internet from any location and for any purpose, irrespective of the device and network used. It can be via a computer (i.e. desktop computer, laptop computer or tablet or similar handheld computer), mobile phone, games machine, digital TV etc.). Access can be via a fixed or mobile network.

### **2. Fixed (wired)-broadband subscriptions per 100 inhabitants**

*Fixed (wired)-broadband subscriptions* refers to the number of subscriptions for high-speed access to the public Internet (a TCP/IP connection). High-speed access is defined as downstream speeds equal to, or greater than, 256 kbit/s. Fixed (wired) broadband includes cable modem, DSL, fibre and other fixed (wired)-broadband technologies (such as Ethernet LAN, and broadband-over-powerline (BPL) communications). Subscriptions with access to data communications (including the Internet) via mobile-cellular networks are excluded.

### **3. Wireless-broadband subscriptions per 100 inhabitants**

*Wireless-broadband subscriptions* refer to the sum of satellite broadband, terrestrial fixed wireless broadband and active mobile-broadband subscriptions to the public Internet. *Satellite broadband subscriptions* refer to the number of satellite Internet subscriptions with an advertised download speed of at least 256 kbit/s. It refers to the retail subscription technology and not the backbone technology.

*Terrestrial fixed wireless broadband subscriptions* refer to the number of terrestrial fixed wireless Internet subscriptions with an advertised download speed of at least 256 kbit/s. This includes fixed WiMAX and fixed wireless subscriptions, but excludes occasional users at hotspots and Wi-Fi hotspot subscribers. It also excludes mobile-broadband subscriptions where users can access a service throughout the country wherever coverage is available.

*Active mobile-broadband subscriptions* refer to the sum of standard mobile-broadband subscriptions and dedicated mobile-broadband data subscriptions to the public Internet. It covers actual subscribers, not potential subscribers, even though the latter may have broadband-enabled handsets. *Standard mobile broadband subscriptions* refers to active mobile cellular subscriptions with advertised data speeds of 256 kbit/s or greater that allow access to the greater Internet via HTTP and which have been used to set up an Internet data connection using Internet Protocol (IP) in the past three months. Standard SMS and MMS messaging do not count as an active Internet data connection, even if the messages are delivered via IP. *Dedicated mobile-broadband data subscriptions* refers to subscriptions to dedicated data services (over a mobile network) that allow access to the greater Internet and which are purchased separately from voice services, either as a standalone service (e.g. using a data card such as a USB modem/ dongle) or as an add-on data package to voice services which requires an additional subscription. All dedicated mobile-broadband subscriptions with recurring subscription fees are included regardless of actual use. Prepaid mobile-broadband plans require use if there is no monthly subscription. This indicator could also include mobile WiMAX subscriptions.

## ICT skills indicators

The indicators included in this group are: adult literacy rates and gross secondary and tertiary enrolment ratios.

### **1. Adult literacy rate**

According to UIS, the *Adult literacy rate* is defined as the percentage of population aged 15 years and over who can both read and write with understanding a short simple statement on his/her everyday life. Generally, 'literacy' also encompasses 'numeracy', the ability to make simple arithmetic calculations. The main purpose of this indicator is to show the accumulated achievement of primary education and literacy programmes in imparting basic literacy skills to the population, thereby enabling them to apply such skills in daily life and to continue learning and communicating using the written word. Literacy represents a potential for further intellectual growth and contribution to economic-socio-cultural development of society."

### **2. Gross enrolment ratio (secondary and tertiary level)**

According to UIS, "The *gross enrolment ratio* is the total enrolment in a specific level of education, regardless of age, expressed as a percentage of the eligible official school-age population corresponding to the same level of education in a given school-year."

## ICT Development Index (IDI) Ranking 2013 for Asia and Pacific Countries

The regional digital divide is very pronounced in the Asia and the Pacific region. The region is home to some of the IDI's front runners, including the global number one, the Republic of Korea. Other economies with high IDI values, above the global (4.35) and the developed-country (6.78) averages, include Hong Kong (China), Australia, Japan, Macao (China), Singapore and New Zealand. This group of economies clearly stands apart from the rest of the Asia and the Pacific region, and the gap between the regional number seven (New Zealand, with an IDI of 7.64) and number eight (Brunei Darussalam with an IDI of 5.06) is striking. While Brunei Darussalam, Malaysia and the Maldives still have IDI values above the global average, the remaining Asia and the Pacific countries do not. The gap in IDI values becomes even more severe at the bottom of the regional ranking: 12 countries have IDI values below the developing-country average of 3.44. Solomon Islands, Pakistan, Myanmar and Bangladesh have the lowest IDI values in the region, and rank very low globally. Three countries from the Asia and the Pacific region – Australia, Bangladesh and Mongolia – are among the most dynamic in the 2012 IDI. Australia's IDI value increased thanks mostly to advances in the use sub-index, in particular in regard to wireless-broadband penetration, and the country was able to overtake Japan in the IDI ranking. Bangladesh made most progress in the access sub-index, in particular with regard to mobile-cellular penetration and international Internet connectivity. Nonetheless, Bangladesh still remains at the bottom of the regional ranking and in 135th position globally. Mongolia, on the other hand, moved up five places in the global IDI between 2011 and 2012, overtaking both Viet Nam and the Islamic Republic of Iran.

A comparison of the global rankings in 2011 and 2012 shows that the majority of Asia and the Pacific countries are falling behind in international comparison (i.e. losing at least one place in comparison with the previous year). Japan, which saw one of the lowest increases in use sub-index value in 2012, lost four places compared to 2011. Countries that fell two places in 2012 compared to the previous year include Brunei Darussalam, the Islamic Republic of Iran and Viet Nam (Table 1). While the Asia and the Pacific region's relative performance in relation to other regions has been lower, all countries in the region increased their absolute IDI values between 2011 and 2012. The region's developing countries improved mostly in the access sub-index, while the high-income developed countries generally progressed most on the indicators included in the use sub-index. This reflects the three stages of the conceptual framework upon which the IDI has been built. Cambodia is the country registering the highest increase in the access sub-index regionally and indeed improved well above the global average (0.18). An increase in mobile cellular penetration, the second highest in the region, is mostly responsible for this improvement. Penetration increased by 37 per cent, reaching 132 per cent by end 2012. On the other hand, some of the countries with the lowest penetration, most notably India and the Islamic Republic of Iran, added very few new mobile-cellular subscriptions in 2012. The proportion of households with Internet access is highest globally in the Republic of Korea (97 per cent), followed by New Zealand (87 per cent) and Japan (86 per cent). A number of developing countries saw significant increases in household Internet connectivity, and hence average growth in the access sub-index. The proportion of households with Internet access has improved by more than 21 per cent in China.

**Table 1 ICT Development Index (IDI) Rankings for Asia and Pacific Countries**

<b>Economy</b>	<b>Regional rank 2012</b>	<b>Global rank 2012</b>	<b>IDI 2012</b>	<b>Global rank 2011</b>	<b>IDI 2011</b>	<b>Global rank change 2011-2012</b>
<b>Korea (Rep)</b>	1	1	8.57	1	8.51	0
<b>Hong Kong</b>	2	10	7.92	10	7.66	0
<b>Australia</b>	3	11	7.90	15	7.54	4
<b>Japan</b>	4	12	7.82	8	7.77	-4
<b>Macao</b>	5	14	7.65	13	7.57	-1
<b>Singapore</b>	6	15	7.65	14	7.55	-1
<b>New Zealand</b>	7	16	7.64	18	7.31	2
<b>Brunei Darussalam</b>	8	58	5.06	56	4.93	-2
<b>Malaysia</b>	9	59	5.04	57	4.81	-2
<b>Maldives</b>	10	73	4.53	71	4.31	-2
<b>China</b>	11	78	4.18	79	3.86	1
<b>Fiji</b>	12	82	3.99	81	3.79	-1
<b>Mongolia</b>	13	85	3.92	90	3.59	5
<b>Viet Nam</b>	14	88	3.80	86	3.65	-2
<b>Iran (I.R)</b>	15	90	3.79	88	3.61	-2
<b>Thailand</b>	16	95	3.54	94	3.42	-1
<b>Indonesia</b>	17	97	3.43	97	3.14	0
<b>Philippines</b>	18	98	3.34	98	3.14	0
<b>Tonga</b>	19	101	3.23	101	3.09	0
<b>Sri Lanka</b>	20	107	3.06	107	2.92	0
<b>Bhutan</b>	21	118	2.40	117	2.19	-1

<b>Cambodia</b>	22	120	2.30	121	2.05	1
<b>India</b>	23	121	2.21	120	2.13	-1
<b>Lao P.D.R</b>	24	123	2.10	122	1.99	-1
<b>Solomon Island</b>	25	125	1.97	124	1.91	-1
<b>Pakistan</b>	26	129	1.83	128	1.78	-1
<b>Myanmar</b>	27	134	1.74	132	1.70	-2
<b>Bangladesh</b>	28	135	1.73	139	1.62	4
<b>Average</b>			4.37		4.20	

Table 2 IDI Access sub-index Rankings for Asia and Pacific Countries

Economy	IDI access sub-index				IDI use sub-index				IDI skills sub-index			
	Rank 2012	Access 2012	Rank 2011	Access 2011	Rank 2012	Use 2012	Rank 2011	Use 2011	Rank 2012	Skills 2012	Rank 2011	Skills 2011
<b>Korea</b>	11	8.28	10	8.19	2	8.22	1	8.17	1	9.86	1	9.86
<b>Hong Kong</b>	1	9.18	1	9.13	16	6.62	18	6.02	51	7.98	51	7.98
<b>Australia</b>	22	7.64	21	7.55	8	7.46	12	6.66	9	9.29	9	9.29
<b>Japan</b>	16	7.73	17	7.64	6	7.51	6	7.49	34	8.62	34	8.62
<b>Macao</b>	15	7.93	13	7.91	13	6.88	11	6.71	31	8.63	31	8.63
<b>Singapore</b>	8	8.31	9	8.21	11	7.25	7	7.12	77	7.12	77	7.12
<b>New Zealand</b>	18	7.69	22	7.49	15	6.72	17	6.09	7	9.38	7	9.38
<b>Brunei Darussalam</b>	42	6.55	42	6.35	70	2.53	62	2.39	76	7.16	75	7.16
<b>Malaysia</b>	54	6.09	54	5.76	61	3.11	57	2.85	92	6.81	92	6.81
<b>Maldives</b>	64	5.62	63	5.38	76	2.32	77	2.02	94	6.77	94	6.77
<b>China</b>	80	4.36	82	4.04	66	2.70	69	2.24	93	6.77	93	6.77
<b>Fiji</b>	94	3.86	93	3.76	87	1.99	88	1.60	43	8.24	43	8.24

<b>Mongolia</b>	88	4.04	95	3.69	95	1.64	100	1.17	44	8.23	44	8.23
<b>Viet Nam</b>	89	4.04	89	3.87	83	2.22	78	2.01	101	6.49	101	6.49
<b>Iran (I.R)</b>	77	4.68	77	4.53	110	1.14	110	0.85	66	7.30	66	7.30
<b>Thailand</b>	90	4.00	92	3.77	107	1.23	104	1.10	69	7.26	65	7.34
<b>Indonesia</b>	98	3.62	100	3.35	96	1.64	98	1.21	98	6.61	98	6.61
<b>Philippines</b>	103	3.41	106	3.19	101	1.46	99	1.18	86	6.94	86	6.94
<b>Tonga</b>	107	3.25	104	3.23	106	1.24	109	0.90	75	7.17	75	7.17
<b>Sri Lanka</b>	104	3.36	105	3.21	115	0.87	116	0.67	90	6.84	90	6.84
<b>Bhutan</b>	114	2.68	116	2.46	112	1.05	111	0.83	119	4.56	123	4.38
<b>Cambodia</b>	109	3.14	112	2.72	131	0.41	139	0.19	123	4.42	122	4.42
<b>India</b>	122	2.50	114	2.47	121	0.65	124	0.46	117	4.79	117	4.79
<b>Lao P.D.R</b>	121	2.53	122	2.36	129	0.46	129	0.36	121	4.53	120	4.53
<b>Solomon Island</b>	134	2.02	131	1.97	128	0.47	130	0.35	116	4.88	116	4.88
<b>Pakistan</b>	119	2.56	115	2.47	132	0.38	131	0.34	143	3.27	143	3.27
<b>Myanmar</b>	150	1.62	150	1.53	156	0.04	156	0.03	111	5.39	111	5.39
<b>Bangladesh</b>	133	2.03	138	1.81	139	0.24	138	0.20	127	4.10	127	4.10

Table 3 Access Indicators for Asia and Pacific Countries

Economy	Fixed-telephone subscription per 100 inhabitants		Mobile-cellular subscription per 100 inhabitants		International internet bandwidth Bit/s per internet user		Percentage of households with computer		Percentage of households with internet access	
	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012
<b>Korea</b>	60.9	61.9	108.5	110.4	17170	26035	81.9	82.3	97.2	97.4
<b>Hong Kong</b>	61.0	60.6	214.7	227.9	1079661	1239849	79.1	80.3	77.5	78.6
<b>Australia</b>	46.8	45.7	108.3	106.2	50079	69463	82.6	85.2	78.9	81.4
<b>Japan</b>	51.1	50.8	105.0	109.4	23393	33038	80.0	80.0	86.0	86.0



<b>Macao</b>	29.9	28.6	243.5	284.3	45300	58120	84.9	85.8	80.5	81.0
<b>Singapore</b>	38.9	37.8	150.2	153.4	343728	391106	86.0	87.7	85.0	87.7
<b>New Zealand</b>	42.6	42.1	109.2	110.3	23706	31052	87.4	91.2	83.3	87.4
<b>Brunei Darussalam</b>	19.7	17.2	109.2	113.8	21995	39861	83.2	86.9	69.0	72.4
<b>Malaysia</b>	15.7	15.7	127.0	140.9	10651	16378	64.1	66.9	61.4	64.7
<b>Maldives</b>	7.5	7.1	165.7	172.8	30659	26589	62.9	67.2	28.9	34.3
<b>China</b>	21.2	20.6	73.2	81.3	2692	4165	38.0	40.9	30.9	37.4
<b>Fiji</b>	15.0	10.1	83.7	98.1	8020	9221	29.3	31.7	22.1	24.4
<b>Mongolia</b>	6.7	6.2	104.6	117.6	85370	91895	24.2	30.3	9.2	14.0
<b>Viet Nam</b>	11.5	11.4	143.4	149.4	9998	13518	16.0	17.5	14.0	15.6
<b>Iran (I.R)</b>	37.1	38.0	74.9	76.9	3540	3772	38.5	41.8	25.2	26.5
<b>Thailand</b>	9.6	9.1	111.6	120.3	24634	24998	24.7	26.9	13.4	18.4
<b>Indonesia</b>	15.8	15.5	102.5	115.2	10487	17209	12.3	15.1	5.3	6.5
<b>Philippines</b>	3.7	4.1	99.3	106.8	12360	14303	15.1	16.9	15.0	18.9
<b>Tonga</b>	28.7	28.6	52.6	53.4	3827	2735	13.7	15.5	10.6	12.0
<b>Sri Lanka</b>	17.1	16.3	87.0	95.8	5224	5927	13.6	15.0	8.1	10.3
<b>Bhutan</b>	3.7	3.6	65.6	74.7	2999	3248	14.1	16.4	8.1	11.6
<b>Cambodia</b>	3.7	4.0	96.2	132.0	13530	13982	4.9	5.4	2.8	3.9
<b>India</b>	2.6	2.5	72.0	68.7	6319	5186	9.5	10.9	6.0	9.5
<b>Lao P.D.R</b>	1.7	1.8	87.2	101.9	2048	1752	7.8	8.7	4.2	5.1
<b>Solomon Island</b>	1.5	1.4	49.8	53.3	3893	3507	4.4	5.1	3.5	4.2
<b>Pakistan</b>	3.2	3.2	61.6	66.8	8172	7251	11.0	12.5	7.0	8.3
<b>Myanmar</b>	1.1	1.1	2.6	11.2	11231	10213	1.8	2.3	1.4	1.8

<b>Bangladesh</b>	0.6	0.6	56.1	63.8	1528	2890	4.0	4.8	1.1	2.1
-------------------	-----	-----	------	------	------	------	-----	-----	-----	-----

Table 4 Use Indicators for Asia and Pacific Countries

Economy	Percentage of individuals using the Internet		Fixed (Wired)-broadband subscriptions per 100 inhabitants		Active mobile-broadband subscriptions per 100 inhabitants	
	2011	2012	2011	2012	2011	2012
<b>Korea</b>	83.3	84.1	36.9	37.6	105.1	106.0
<b>Hong Kong</b>	72.2	72.8	31.6	31.6	56.0	73.5
<b>Australia</b>	79.5	82.3	23.9	25.1	80.7	102.7
<b>Japan</b>	79.1	79.1	27.6	27.9	104.0	113.1
<b>Macao</b>	60.2	64.3	24.7	25.5	216.1	283.3
<b>Singapore</b>	71.0	74.2	25.6	26.1	115.6	124.9
<b>New Zealand</b>	86.0	89.5	25.8	27.8	53.9	65.9
<b>Brunei Darussalam</b>	56.0	60.3	5.7	4.8	6.3	7.6
<b>Malaysia</b>	61.0	65.8	7.4	8.4	12.3	13.6
<b>Maldives</b>	34.0	38.9	5.4	5.5	17.5	21.5
<b>China</b>	38.3	42.3	11.6	13.0	9.5	17.2
<b>Fiji</b>	28.0	33.7	2.7	1.5	15.5	23.4
<b>Mongolia</b>	12.5	16.4	3.2	3.6	17.4	26.9
<b>Viet Nam</b>	35.1	39.5	4.3	5.0	18.0	19.0
<b>Iran (I.R)</b>	21.0	26.0	2.4	4.1	0.5	1.4
<b>Thailand</b>	23.7	26.5	5.5	6.2	0.1	0.1
<b>Indonesia</b>	12.3	15.4	1.1	1.2	22.1	31.9
<b>Philippines</b>	29.0	36.2	1.9	2.2	3.4	3.8
<b>Tonga</b>	25.0	34.9	1.2	1.4	0.1	0.1
<b>Sri Lanka</b>	15.0	18.3	1.7	2.0	2.3	4.4

<b>Bhutan</b>	21.0	25.4	1.8	2.2	0.9	2.5
<b>Cambodia</b>	3.1	4.9	0.2	0.2	2.2	6.9
<b>India</b>	10.1	12.6	1.1	1.1	1.9	4.9
<b>Lao P.D.R</b>	9.0	10.7	0.7	1.5	0.6	0.8
<b>Solomon Island</b>	6.0	7.0	0.4	0.4	3.8	6.3
<b>Pakistan</b>	9.0	10.0	0.4	0.5	0.4	0.7
<b>Myanmar</b>	1.0	1.1	0.0	0.0	0.0	0.0
<b>Bangladesh</b>	5.0	6.3	0.3	0.3	0.4	0.5

Table 5 Skills Indicators for Asia and Pacific Countries

Economy	Gross enrolment ratio				Adult Literacy rate	
	Secondary		Tertiary		2011	2012
	2011	2012	2011	2012		
<b>Korea</b>	97.1	97.1	103.1	103.1	99.0	99.0
<b>Hong Kong</b>	80.1	80.1	60.4	60.4	99.0	99.0
<b>Australia</b>	131.3	131.3	79.9	79.9	99.0	99.0
<b>Japan</b>	102.2	102.2	59.7	59.7	99.0	99.0
<b>Macao</b>	95.6	95.6	67.8	67.8	95.6	95.6
<b>Singapore</b>	74.1	74.1	43.8	43.8	95.9	95.9
<b>New Zealand</b>	119.1	119.1	82.6	82.6	99.0	99.0
<b>Brunei Darussalam</b>	111.8	111.8	19.6	19.6	95.4	95.4
<b>Malaysia</b>	69.1	69.1	42.3	42.3	93.1	93.1
<b>Maldives</b>	91.8	91.8	13.0	13.0	98.4	98.4
<b>China</b>	81.4	81.4	26.8	26.8	95.1	95.1
<b>Fiji</b>	90.4	90.4	61.8	61.8	95.1	95.1

<b>Mongolia</b>	92.6	92.6	57.2	57.2	97.4	97.4
<b>Viet Nam</b>	77.2	77.2	24.4	24.4	93.4	93.4
<b>Iran (I.R)</b>	85.7	85.7	48.6	48.6	85.0	85.0
<b>Thailand</b>	79.2	78.2	47.7	46.4	93.5	93.5
<b>Indonesia</b>	80.7	80.7	24.9	24.9	92.8	92.8
<b>Philippines</b>	84.8	84.8	28.2	28.2	95.4	95.4
<b>Tonga</b>	101.3	101.3	16.1	16.1	99.0	99.0
<b>Sri Lanka</b>	102.4	102.4	14.3	14.3	91.2	91.2
<b>Bhutan</b>	70.1	75.3	8.8	8.8	52.8	52.8
<b>Cambodia</b>	44.4	44.4	14.5	14.5	73.9	73.9
<b>India</b>	63.2	63.2	17.9	17.9	62.8	62.8
<b>Lao P.D.R</b>	45.8	45.8	17.7	17.7	72.7	72.7
<b>Solomon Island</b>	48.4	48.4	16.1	16.1	82.0	82.0
<b>Pakistan</b>	35.0	35.0	8.3	8.3	54.9	54.9
<b>Myanmar</b>	54.3	54.3	14.8	14.8	92.7	92.7
<b>Bangladesh</b>	51.9	51.9	13.6	13.6	57.7	57.7

### Evaluation of Subindexes and ICT Indicators for Pakistan

Pakistan has been ranked 129<sup>th</sup> among 157 countries in terms of progress in the realm of information and communication technology (ICT) in ICT Development Index (IDI), a benchmark made up of 11 indicators. Pakistan with lower IDI value was unable to improve its IDI value to any significant extent, and is falling behind in international comparison. Pakistan is ranked at the bottom of the 2012 regional IDI value of less than two, even lie far below the developing countries average of 3.4 and global average of 4.4. Pakistan IDI barely improved, from 1.78 in 2011 to 1.83 in 2012, with the result that the country lost one place in the global IDI ranking and fall in ranking from 128 in 2011 to 129 in 2012.

In the skills sub-index, which evaluates ICT capability or skills in terms of indicators that include adult literacy as well as gross secondary and tertiary enrollment, Pakistan was ranked 143 in 2012, the same position it had occupied in 2011. In terms of the use sub-index, which broadly measures the uptake of ICTs and the intensity of usage based on parameters such as Internet users per 100 inhabitants, fixed (wired)-broadband subscriptions per 100 inhabitants, and wireless-broadband subscriptions per 100 inhabitants, Pakistan has been ranked 132<sup>nd</sup>, down from 131 in 2011. And the access sub-index rankings place Pakistan in the 119<sup>th</sup> position, down from 115 a year ago. This sub-index has to do with ICT readiness in terms of fixed-telephone subscriptions, mobile cellular telephone subscriptions, international Internet bandwidth per Internet user, percentage of households with a computer, and percentage of

households with Internet access. The IDI includes Pakistan among a group of 39 least connected countries (LCCs) with low IDI 2012 values. In these LCCs, most ICT access and use is limited to basic voice and low-speed data services.

It is concluded that the number of households with internet access increased from 7.0 to 8.3 percent. The percentage of households with internet access is extremely low in Pakistan, far short of the developing country average of 24 percent. The number of household with computer is also very low, and little progress has been made from 2011 to 2012. Fixed telephone penetration in Pakistan stood at 3.2 percent in 2012, compared to the Asia and the Pacific regional average of 13 percent and the developing country average of 11 percent, while mobile cellular subscription went up from 61.6 to 66.8 inhabitants from 2011 to 2012. This represents 8 percent growth in mobile penetration, well below the world average of 91 and Asia and Pacific average of 83. The country's international internet bandwidth decreased substantially, by almost 13 percent from 8172 in 2011 to 7251 in 2012. Pakistan managed only very small and below average increase in its use sub-index and has thus lost ground in global comparison between 2011 and 2012. In Pakistan, wireless-broadband penetration, the most dynamic indicator globally has progressed little. Both fixed (wired) broadband and wireless broadband penetration remain below 0.8 percent. The proportion of individuals using internet went up to 10.0 percent in 2012 from 4.0 in 2011

## Conclusion

The ICT development index prepared by the International Telecommunications Union ranks a total of 157 countries on the basis of ICT usage, access and skills. IDI is a composite index that combines 11 indicators, classified under the three sub-indices of access, use, and skills, into one measure that helps monitor and compare developments in ICT across countries. The access sub-index measures ICT readiness and includes infrastructure and access indicators such as mobile subscriptions and percentage of households with Internet access. The use sub-index captures ICT intensity, including three indicators – percentage of Internet users, fixed-broadband subscriptions, and active mobile broadband subscriptions. The last sub-index of skills determines if countries are effectively leveraging the full potential of ICTs for socio-economic development. The sub-index includes three proxy indicators – adult literacy, gross secondary enrolment and gross tertiary enrolment. There are seven Asia and Pacific economies represented in the top 20, namely South Korea, Hong Kong, Japan, Macao and Singapore. Most countries in the Asia and Pacific region have declined in the IDI 2012 ranking compared to 2011. However, Mongolia (up 5 places) and Bangladesh (up 4 places) are two of the most dynamic countries in world, in terms of IDI improvements. Only seven countries from the Asia and Pacific region are above the world's IDI average value of 4.35. And six countries from the Asia region are in the least connected countries category, with IDI of less than 2.33. South Korea has topped a ranking of ICT development for the third year in a row. Australia jumped four places to number 11 in ICT development index ranking 2013. Mongolia significantly improved its score, jumping five places to reach number 85 in the 2013 ranking. Bangladesh jumped 4 places to number 135, while Cambodia increased to 120, compared to 121 in the 2011 ranking. However, it is worth noting that little change was seen among the largest economies in the region. Korea, Hong Kong, Indonesia and Philippine maintained their places at 1, 10, 97 and 98 respectively. Meanwhile, a range of countries, including Macao, Singapore, Fiji, Thailand, Bhutan, India, Lao P.D.R Solomon Island and Pakistan fell by one place in the ranking. The largest decrease in the region was seen by Japan, which fell four places to 12. On a worldwide level, Korea retained its position as the most developed country in terms of ICT, while Bangladesh remained the least developed of the Asia and Pacific countries included in the scale.

## Reference

Measuring the Information Society, 2013, International Telecommunication Union