Digital divide: Improving Internet access in the developing world through affordable services and diverse content

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EXECUTIVE SUMMARY

Over 3.1 billion people in the world have access to the Internet. This includes around 642 million Chinese, 280 million Americans, 243 million Indians, 109 million Japanese, 108 million Brazilians, and 84 million Russians, among others.[1] These individuals use the Internet for economic development, entrepreneurship, education, and health care.

However, that leaves roughly 4.2 billion people outside the digital revolution. With Internet usage growing only 9 percent a year, around 58 percent of the world lacks Internet access.[2] Those individuals are unable to enjoy the social, economic, and civic benefits that derive from digital connectivity.

In this paper, I discuss the factors that make it difficult for people in the developing world to obtain Internet access and ways to promote greater connectivity. There are a number of steps that would narrow the current divide between Internet users and non-users, and foster a robust and open Internet. When individuals go online, they need affordable services, diverse content, reasonable costs, reliable infrastructure, uncensored information, and local language translation.

Zero rating programs represent effective ways to bring poor people from the developing world into the digital era and promote innovation and competition in the Internet sector. These programs enable people who lack the financial resources for expensive data plans to use certain applications without having that usage charged towards the individual's data cap. Around 45 percent of mobile operators around the world offer some type of zero rating services.[3] If countries can make progress in bringing unconnected people to the Internet, it would encourage greater economic development, improve education and health care, and strengthen civil society around the world.

Reducing taxes on mobile service providers and equipment also would boost Internet usage and thereby improve access to the digital economy. It is estimated that reducing mobile taxes would add up to 600,000 new subscribers in Mexico, 1,050,000 in Brazil, 620,000 in South Africa, 277,000 in Bangladesh, and 530,000 in Malaysia.[4]

Half of the world's unconnected (2.2 of the 4.3 billion) reside in China and India so those countries deserve special attention in terms of the need to improve Internet access and content. Addressing cost barriers, perhaps through zero rating programs, and providing diverse and uncensored content would go a long way toward reducing their digital divide. Those steps would bring their residents more closely to the technology era and provide access to valuable tools for economic development, social engagement, and public expression.

KEY BARRIERS TO INTERNET ACCESS IN THE DEVELOPING WORLD

There are a number of factors that make it difficult for people to obtain access to the Internet. These include things such as poverty; high device, data, and telecommunications charges; infrastructure barriers; digital literacy challenges; and policy and operational barriers. These challenges represent significant barriers for millions of people in the developing world.

Poverty, expensive devices, and high telecommunications fees
Lacking disposable financial resources makes it difficult to purchase devices or gain access to digital services. According to a Deloitte study, "income levels are a key barrier to internet access, and internet penetration is often the lowest in countries with the lowest GDP per capita."[5] Unless these individuals can utilize free or cheap products, they won't be able to gain the benefits of the technology revolution.

Global income statistics reveal that almost one-quarter of the world lives at a subsistence level on less than $1.25 per day. The Oxford Poverty & Human Development Initiative estimates that about 1.6 billion people fall below that threshold and live in extreme poverty. Around half of these individuals reside in South Asia and 29 percent live in sub-Saharan Africa.[6]

Even if people have higher incomes, expensive devices and data costs make it impossible to access digital services. Users must cover the device, connection fees, call costs, text messaging expenses, and broadband access. Cellphones and smartphones are expensive, and data plans put Internet access out of the range of many individuals.

In India, for example, smart phones run as much as $125, which is well above the affordability of many Indians.[7] According to a Gallup survey, the annual median household income there is $3,168.[8] Even though the price in some parts of that country has dropped below that level, that device cost still puts Internet-enabled phones beyond the financial capabilities of millions

of people given their need to cover the costs of food, housing, and transportation.[9]

Data charges also are very expensive. It is costly for users to access data and the more they use their phone, the more expensive it is going to be. And with video services coming online, data access fees likely will remain high in the near future.[10]

One of the reasons why telecommunications costs are high in India is that there are relatively few Internet service providers. The resulting lack of competition leads to large fees. Accessing one megabyte per second costs around $61, which makes it very expensive for the average person. Indians have broadband access charges that are "more than four times that of China, Brazil and Argentina, and 20 to 30 percent higher than that of Vietnam and Malaysia."[11]

In addition, per capita income in Brazil and China is double or triple that of India. Yet the average smartphone cost in those places runs between $200 to $300.[12] This again presents insurmountable barriers to digital access in those parts of the world.

In China, users complain about the high costs of 4G service.[13] They say this service costs five times what the same products run in Hong Kong. Expensive service makes it difficult to gain access to the Internet and give people the products they desire. Part of the problem on the mainland is the lack of telecommunications competition. China Mobile has a near-monopoly there, compared to the multiple providers in Hong Kong, and this keeps costs high.

These barriers are not limited to poorer countries. Even in a developed country such as the United States, there are access issues linked to income levels. There is a well-documented connection between income and smartphone ownership. According to survey data, 81 percent of people having incomes above $75,000 own smartphones, compared to 47 percent for those earning below $30,000.[14]

Poor infrastructure, digital illiteracy, and lack of digital trust
Weak infrastructure is a major barrier to digital access. This includes things such as fiber optic lines, cell towers, Internet routers, wireless spectrum, reliable electricity, and the like. It is one

of the reasons why Internet penetration is much lower in rural than urban areas. In India, for example, nine percent of rural dwellers have access to the Internet, compared to 64 percent of those living in metropolitan areas. Weak infrastructure is a serious limiting factor in that nation's Internet penetration level.[15]

In other countries, there are substantial differences in Internet usage based on age groups. In China, for example, around half of Internet users are under the age of 30 years old. When one looks at the overall usage distribution by age, 25.7 percent of those younger than 19 use the Internet, compared to 30.4 percent among those 20 to 29, 25 percent for those 30 to 39, 12.4 percent for people 40 to 49, and 6.2 percent among those 50 or older.[16]

Part of the challenge for older people is a lack of digital literacy. Many of them do not access the Internet because they do not understand its benefits or they fear its risks. In an online survey of India's businesses, numerous respondents "cited the lack of education on using the Internet as among the top three reasons that prevent consumers from using the Internet."

Part of the challenge for older people is a lack of digital literacy. Many of them do not access the Internet because they do not understand its benefits or they fear its risks. In an online survey of India's businesses, numerous respondents "cited the lack of education on using the Internet as among the top three reasons that prevent consumers from using the Internet." Overall, literacy remains low in India secondary school enrollment is limited among impoverished parts of the population. This is especially the case in rural areas.[17]

A number of senior citizens in India have disabilities that impede technology usage. Around 40 percent claim they have a "physical or health condition that makes reading difficult or challenging" or a "disability, handicap, or chronic disease that prevents them from fully participating in many common daily activities". People in this category are far less likely (49 percent) to go online compared to seniors with few physical impairments (66 percent).[18]

In China, many of the elderly cite a lack of trust in the Internet. For them, technology is new and unknown, and therefore seen as risky or dangerous. They report high levels of stress and anxiety in learning how to use the Internet. Others express worry about computer viruses, hacking, surveillance, or identity theft. They read stories about unwanted intrusions and fear that their identities will be compromised.[19]

For the world as a whole, a report from McKinsey estimates that 18 percent of non-Internet users are senior citizens, 28 percent are illiterate, 52 percent are female, and 50 percent have

incomes below their country's poverty line.[20] The variation in kinds of non-users suggests different groups face contrasting barriers to Internet access.

Policy, taxes, and operational barriers
Many countries in the developing world have policy and operational barriers that constrain Internet usage. This includes things such as monopoly telecommunications providers, tech sector taxes, lack of digital content, the absence of local language content, and censorship by civil or governmental authorities.

Monopolies keep telecommunications prices high and make it difficult for impoverished residents to access digital services. Insufficient digital content prevents people from understanding the benefits of the digital world and seeing how they personally could gain from the Internet. In many places, content may be available only in a non-native language and that keeps local speakers from accessing Internet services.

Some places, such as Mexico, South Africa, Bangladesh, Malaysia, and Brazil have taxes on mobile broadband that discourage Internet access. These "connectivity taxes" and fees increase the cost of mobile services and represent a significant barrier, especially for underserved communities where affordability is a major consideration. In those places, it is hard to expand Internet usage when people can't afford mobile devices or services due to high taxation. Similarly, some countries impose per-user fees on mobile operators, discouraging them from investing in services for unconnected communities (because they will generate less revenue, yet comparable tax bills.)

Reducing these taxes is an effective way to expand Internet access. As shown in Table 1, a Telecom Advisory Services study by Raul Katz, Ernesto Flores-Roux, and Judith Mariscal finds that reducing the Mexico mobile tax from 16.1 to 15.1 percent would increase the number of mobile subscribers between 300,000 and 600,000. Brazil has a 43.3 percent tax on mobile services that if reduced by one percentage point, could raise the number of subscribers between 520,000 and 1,050,000. The South Africa tax is 14.9 percent and a cut in it by one point would increase the subscribers between 310,000 and 620,000 people. The Bangladesh tax is at 54.8 percent. Cutting it by one point would raise the subscribers by 137,000 to 277,000 individuals. Malaysia has a 6.1 percent tax and a reduction there would increase subscribers between 260,000 and 530,000 people.[21]

TABLE 1: IMPACT OF MOBILE TAX REDUCTION ON NUMBER OF NEW MOBILE SUBSCRIBERS	
Mexico	300,000-600,000 new subscribers
Brazil	520,000-1,050,000
South Africa	310,000-620,000
Bangladesh	137,000-277,000
Malaysia	260,000-530,000

Source: Raul Katz, Ernesto Flores-Roux, and Judith Mariscal, "The Impact of Taxation on the Development of the Mobile Broadband Sector," Telecom Advisory Services for GSMA, 2014, pp. 6-7.

A study by Deloitte for GSMA of mobile sector taxes in 19 countries found that mobile operators paid over $13.5 billion in taxes. It concluded that "taxation on mobile services is more than 30 percent of mobile sector revenues in more than half of the 19 countries studied." In a number of these nations, half of the tax burden explicitly derives from taxes that target mobile operators. If this tax burden was decreased by one percentage point, its researchers estimated that mobile broadband penetration would increase by 1.8 percentage points and economic growth would rise by 0.7 percentage points (see Table 2).[22]

TABLE 2: IMPACT OF MOBILE TAX REDUCTION ON BROADBAND PENETRATION AND ECONOMIC GROWTH	
Broadband Penetration	+1.8 Percentage Points
Economic Growth	+0.7 Percentage Points

Source: Deloitte for GSMA, "Mobile Taxes and Fees," February, 2014, p. 6.

Other nations have proposed new Internet usage taxes. The government of Hungary, for example, suggested that it would add 150 forints (around 60 cents) to each gigabyte downloaded and uploaded by Internet service providers in that nation. Prime Minister Viktor Orban proposed that this monthly tax be capped at 1,000 forints (around $4).[23] However, following angry street protests, he shelved the excise tax, but indicated he wanted a broader discussion of ways to regulate and tax the Internet.[24]

In addition, proposed regulations on Internet applications and services known as over-the-top (OTT) content can stifle innovation, inflate costs, and undermine efforts to expand access. Despite these harms, India is considering regulations on web-based calls and texts through

platforms such as Skype and WhatsApp.[25] In Europe, there have been similar requests to regulate these kinds of mobile services.[26]

In some places, policy barriers take the form of censorship from the government or civil society that puts information behind a firewall or makes it difficult to access useful content. This is true in authoritarian societies where there is overt censorship. In China, for example, there are substantial barriers that block Internet content for millions of people. It is estimated that the government employs over 50,000 people whose primary job is censorship enforcement.[27] In other societies, isolationist values may insulate residents from the global world. Authorities in those nations use cultural rationales to keep digital information and services away from their people.

Addressing major policy and operational barriers is important because even though a rising number of people in the developing world have gained access to the Internet, many remain outside the digital revolution. Tanzania, for example, has seen substantial growth in access between 2010 and 2013, but most still do not use the web (see Table 3). Overall Internet usage has risen from 2.9 percent in 2010 to 4.4 percent in 2013. The number of individuals with fixed broadband subscriptions rose from 3,150 to 51,903 while those with mobile broadband subscriptions have risen from 466,918 to 1,332,519.

TABLE 3: INCREASE IN INTERNET USAGE IN TANZANIA				
	2010	**2011**	**2012**	**2013**
Percent Using Internet	2.9	3.5	3.95	4.4
Number with Fixed Broadband Subscriptions	3,150	26,943	39,805	51,903
Number with Mobile Broadband Subscriptions	466,918	569,979	1,093,085	1,332,519

Source: International Telecommunication Union, "World Telecommunication/ICT Indicators Database", June, 2014.

Similar patterns have been seen in other nations. In Zambia, Internet usage has risen from 10 to 15.4 percent of the population (see Table 4). The number with fixed broadband subscriptions has risen from 10,267 to 10,850. Those with mobile broadband subscriptions have increased from 34,436 to 107,952.

TABLE 4: INCREASE IN INTERNET USAGE IN ZAMBIA				
	2010	**2011**	**2012**	**2013**
Percent Using Internet	10	11.5	13.5	15.4
Number with Fixed Broadband Subscriptions	10,267	15,902	14,794	10,850
Number with Mobile Broadband Subscriptions	34,436	31,559	91,130	107,952

Source: International Telecommunication Union, "World Telecommunication/ICT Indicators Database", June, 2014.

Rwanda has seen an increase in the percentage of people using the Internet from 8 to 8.7 percent (see Table 5). The number with fixed broadband subscriptions has risen from 2,640 to 2,781 over the past four years. Those with mobile broadband subscriptions have gone from 3,502 to 686,800.

TABLE 5: INCREASE IN INTERNET USAGE IN RWANDA				
	2010	**2011**	**2012**	**2013**
Percent Using Internet	8	7	8	8.7
Number with Fixed Broadband Subscriptions	2,640	4,994	2,716	2,781
Number with Mobile Broadband Subscriptions	3,502	116,512	368,477	686,800

Source: Source: International Telecommunication Union, "World Telecommunication/ICT Indicators Database", June, 2014.

The Philippines has seen some of the greatest growth as Internet usage has increased from 25 to 37 percent (see Table 6). Those with fixed broadband has gone from 1,722,400 to 2,572,800, while those with mobile broadband has gone from 2.1 to 26.8 million people.

TABLE 6: INCREASE IN INTERNET USAGE IN THE PHILIPPINES				
	2010	**2011**	**2012**	**2013**
Percent Using Internet	25	29	36	37
Number with Fixed Broadband Subscriptions	1,722,400	1,791,000	2,146,600	2,572,800
Number with Mobile Broadband Subscriptions	2,175,300	3,190,000	23,200,000	26,800,000

Source: International Telecommunication Union, "World Telecommunication/ICT Indicators Database", June, 2014.

WAYS TO IMPROVE ACCESS IN THE DEVELOPING WORLD

Given the benefits of digital technology, it is important to expand Internet access and bring digital services to a wider range of people. Key to improving access is reducing telecommunications costs and improving network efficiency, keeping connectivity taxes

But improved access is not just a question of government policy. It is important to implement new data compression and caching techniques that make telecommunications networks operate more efficiently. This can be lines that help electronic signals travel quickly, redesigning file servers, deploying open source hardware, or making more efficient use of spectrum.

and licensing fees affordable, expanding digital infrastructure, strengthening digital literacy, providing diverse content, encouraging multilingualism and free expression, enabling affordable services, and promoting digital competition. As I discuss below, adoption of these ideas would narrow the gap between Internet users and non-users, and bring more people into the digital era.

Reducing Costs and Improving Network Efficiency

Reducing costs is vital to promoting access. There are different challenges in various countries ranging from high access charges and high taxes on service providers to pro-monopoly policies and insufficient networks. Data plans need to become more affordable and consumers must be able to benefit from policies that give them meaningful options.

An example of this is taking place in Mexico where a government agency, the Federal Telecommunications Institute, is seeking to promote consumer choice and thereby bring down telecommunications costs by reducing entry barriers into the sector. It is doing this by altering the rules on network sharing and allowing new firms to utilize the lines of established operators. The hope is that this new policy will double Mexico's current 26 percent Internet penetration level to something close to the 45 percent rate that exists in places such as Brazil.[28]

In other countries, governments are eliminating barriers that protect monopoly providers from new companies. This includes opening up markets, encouraging venture capital firms to provide financing of new players, and allowing smaller operators to use existing wireless or fiber-optic networks. In order to provide consumer choices, companies require affordable means of connecting to established networks.[29]

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Compression techniques can reduce the cost of service delivery and therefore help operators provide better services without depleting their profits. According to Facebook chief executive

officer Mark Zuckerberg, "implementing compression in large scale apps or developing services that you route all your data through and compress everything would yield large data use savings."[31] Continuing, he noted that "the technology that some of our partners have developed to amplify data signal from inside buildings is a good example of the type of improvement that will help us achieve an order of magnitude improvement."[32] The company has launched an Open Compute Project designed to develop improved servers and data centers.

Keeping connectivity taxes and licensing fees affordable

High connectivity taxes and fees discourage the growth of online services and the economic benefits they offer. It is harder for firms that provide Internet service to make the necessary investments when their cost structures are too high. That impedes investment and makes it more difficult for the ecosystem to offer the products that consumers and businesses need in order to grow.

With this in mind, governments need connectivity policies that lower the cost of market access and encourage economic, social, and civic development. It is understandable that governments in developing nations adopt revenue-generating actions, but they need to be careful that mobile regulations and policies don't stymie long-term economic growth. They should follow approaches that draw more people into the Internet and help them take advantage of digital goods and services. If people get higher quality Internet service, it will encourage them to engage in trade and commerce with others.

A similar rationale applies to licensing fees. Governments often use these to finance new projects or fund activities in other areas. Yet as shown in earlier sections, these kinds of fees can act as a disincentive for business investment and consumer access to the Internet. It is for that reason that mobile fees should be kept low in order to foster greater market access.

Expanding digital infrastructure

Other approaches to improving access involve improving digital infrastructure, especially in remote areas. For example, Google's Project Loon tries to promote access through balloons. In 2013, engineers launched 30 balloons over New Zealand to test connectivity prospects. It gave antennas to people to allow them to access the Internet via the balloons.[33] The company now has expanded its experiments to other nations.

Several companies are testing drones as a vehicle for Internet service delivery. Google has purchased the

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drone manufacturer Titan as part of its efforts. Facebook meanwhile is using its Connectivity Lab to determine if drones can be an effective delivery system.[34] Early projects suggest that these kinds of unmanned vehicles can affordably provide service to medium-sized cities or remote rural areas that currently have no service.

Still others have suggested that new optical systems or lasers should be part of the digital ecosystem. According to Zuckerberg, "free space optical communication, or FSO, is a way of using light to transmit data through space. These are basically invisible laser beams in the infrared part of the spectrum. FSO is a promising technology that potentially allows us to dramatically boost the speed of internet connections."[35]

Earth satellites furthermore should become part of the infrastructure network. This can be done through low-Earth or geosynchronous Earth orbits. Satellites are more expensive than drones or balloons due to high manufacturing and launch costs. But as countries develop economically, satellites are likely to become more affordable and therefore help reduce gaps in digital access.

Improving digital literacy

For certain populations, improving digital access requires education regarding the value of online services. For example, showing people the value of diverse content and having consumers expand their usage of basic services can propel digital activities in a variety of other areas.

In India, for example, instructional classes train adults (especially rural dwellers, senior citizens, and poor people) how to use the Internet. They learn that they do not have to physically go to stores or government offices to access services or complete transactions. Through digital platforms or mobile apps, people can find the latest information on business opportunities and market conditions. This improves their ability to make effective decisions.[36] Through initiatives such as the National Knowledge Network, AADHAR (Unique Identification Authority of India), and eSeva, Indians can bring the most up-to-date information to their fingertips.[37]

That country also has pioneered the National Optical Fibre Network that seeks to bring needed telecommunications service to rural areas and underserved populations. However, there isn't much money to support this network and it has been difficult to bring access to those who are outside the technology revolution.[38] Providing needed funding would improve service delivery and narrow the digital divide in Internet access.

The India Ministry of Information Technology has launched an "IT for Masses Program" program with the goal of improving digital literacy by 2020. This effort will train rural women on government services and provide loans and market information to would-be entrepreneurs.

India represents an interesting example of this problem as only around 12 percent of Indians speak English. For the country as a whole, there are 22 official languages, which complicate access to digital information. People are most likely to use the Internet when information is delivered in local languages, through multilingualism, or via image-based graphics. Reaching underserved populations or people who live in rural areas especially benefits from these kinds of presentations. Translations and pictures help people access information and gain the benefits of the digital era.

It has a budget of $20 million to meet this goal and matches those in need of training with stakeholders who are digitally literate.[39]

In other nations, officials have developed programs to train people on Internet usage. For example, Sri Lanka's Ministry of Education promotes digital literacy using computer learning centers and training programs.[40] They use libraries and schools after-hours to teach people how to make use of digital resources. This helps seniors understand the benefits of digital services for their day-to-day lives.

The value of diverse content

Having diverse content represents another way to encourage people to use digital services. For example, in the early days of desktop computing, having programs such as email, word processing, and spreadsheet management encouraged people to use computers. Once they mastered those programs, it was easy for them to find other software that appealed to them and enabled them to become more productive and efficient.

This also has been the case in terms of online services. One illustration is Ghana's CocoaLink project (www.worldcocoafoundtion.org) for the agricultural sector. It helps connect cocoa producers with industry experts in 15 communities. Those who have particular expertise can send text messages to others who need advice and consultation.

According to the World Cocoa Foundation, 3,720 people have registered for this service and around 100,000 SMS messages have been sent through the network. Among the inquiries that have been generated include information on production, distribution, and marketing. The goal is to generate additional revenue for markets and improve their overall livelihood. All it takes is a cell phone, with messages delivered in English or the local language. It is estimated that 65 percent of rural dwellers in western Ghana have cell phones.[41]

Similar developments have unfolded in India. Various agencies offer online services such as paying taxes, renewing driver's licenses, or ordering business permits. More than 40 percent of taxes now are paid online. This reduces the time required to visit government offices or provide paper documents for tax officials.[42] It demonstrates that people are open to digital services when those products are affordable and accessible.

Encouraging multilingualism and free expression

Another way to improve digital access is through multilingualism and the use of local languages. According to British Professor Richard Rose, there are more than 6,900 different languages in the world. About 400 of them have at least one million speakers.[43] This "Tower of Babel" creates enormous challenges in terms of information access. Although English is the most common language on the Internet, it is the native language of only seven percent of the global population.[44] For people who don't speak English or whose language is not available over the Internet, it is hard to make digital information and services useful to them.

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Service providers there are starting to provide information in languages such as Hindi and Tamil in order to reach non-English speakers. Some of this is occurring through local content, while other services are incorporating translation features that allow people to tailor information to their own preferred language or dialect.[46]

Government censorship remains a challenge in many places around the globe. Internet service providers sometimes are asked for confidential information on web viewership or electronic communications. Some social media platforms have been blocked in order to limit grass roots organizing or free expression that is critical of political leaders.[47] Discouraging these kinds of overt limits is vital in order to encourage more people to go online.

The benefits of zero rating practices

Many firms have launched what they call "zero rating" practices as a way to improve Internet access among the disenfranchised. This policy allows people who lack the financial resources for expensive data plans to use certain applications without having that usage charged towards the individual's data cap. It frees them to use the Internet and access various services without additional fees, and in conjunction with free Wi-Fi networks or library-based devices,

represents a way to bring digital access to those who otherwise could not pay for desired services.

It is estimated that 45 percent of mobile operators around the globe provide some type of zero rating applications.[48] Zero rating programs for popular services free up data that users can employ to explore other sites, including local ones. In many places, platforms such as Facebook, Google, and Wikipedia are very popular. Even in a diverse digital marketplace such as the United States, surveys show that people spend about 40 minutes each day on Facebook, and they rely upon that site for about 24 percent of the total time they spend on mobile devices.[49] In the developing world, usage is more concentrated on global Internet sites like Facebook, especially when tight data caps exist.

By exempting high-usage sites from data caps, operators give people the ability to see more of the web without spending additional money. Or to put it differently, zero rating can reduce the cost of Internet access to local sites for poor consumers because their consumption of data on global applications does not take their entire data caps. In the end, poor people get more data for their money.

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In a number of countries, zero rating services have enabled people to get access to the Internet who otherwise had no access. As shown in Table 7, an analysis of the Filipino Network Globe found that "what we're seeing in Globe users is the number of people who are using the internet—the data—was doubled, and Globe subscribers have grown by 25%."[50]

In Paraguay, an Internet.org project has generated an increase in "the number of people using the internet by 50% over the course of the partnership and [an] increase [in the] daily data usage by more than 50%." A partnership between technology companies and the TIGO mobile operator has brought 3 million new people to the Internet who previously lacked service.[51]

Meanwhile, several African nations have reported substantial upticks in Internet usage following introduction of Facebook Zero. The number of Facebook users, for example, rose 154 percent in Nigeria, 85 percent in Ghana, and 50 percent in Kenya. For the continent as a whole, there was a reported 114 percent increase in Facebook users after the launch of Zero.[52]

TABLE 7: THE IMPACT OF ZERO RATING SERVICES ON INTERNET USAGE	
Paraguay	+50%
Kenya	+50%
Ghana	+85%
Nigeria	+154%

Source: The Paraguay figure comes from Internet.org, "Connecting the World from the Sky," undated report, and the Nigeria, Ghana, and Kenya numbers come from April Deibert, "Google Free Zone and Facebook Zero: Products Targeting Developing Populations, Innovation Series, February 19, 2013.

At a recent Internet Governance Forum, zero rating programs were cited as a popular way to provide Internet service in developing nations.[53] For example, Wikipedia offers a "zero" version of its informational website for mobile platforms to 350 million people in 30 developing nations and it attracts around 65 million page views each month.[54] Facebook meanwhile offers a "zero" service through 50 operators globally that has enabled Internet usage by low income people.[55]

Internet.org is an organization supported by companies such as Ericsson, Mediatek, Opera Software, Samsung, Facebook, Nokia, and Qualcomm dedicated to connecting the unconnected. Beginning in 2014, Internet.org is partnering with mobile operators to put together a diverse set of applications for people in a number of developing nations to access for free. The content is customized for local interest and language, providing access to basic services such as Accuweather, Facts for Life (how to raise healthy children), Kokoliko (a job board service), the Mobile Alliance for Maternal Action (information for new and expectant mothers), Facebook, Google Search, Wikipedia, and Women's Right Application (information on the rights of women), among many others.

This service has been popular in the countries where it has been launched. In Tanzania, for example, few individuals have Internet access, according to the Tanzania Communications Regulatory Authority. David Zacharia, the head of data and devices for mobile phone operator Tigo, predicted that the partnership would "accelerate internet penetration in the country but will also open new socio-economic opportunities to the users in the fields of education, technology and commerce".[56]

One zero rating service in Tanzania that has proved very popular is text messaging for mothers and pregnant women. The program regularly sends them information designed to reduce infant mortality and improve maternal health. Over a two-year period, 500,000 parents received 40 million text messages about "safe motherhood". This helped reduce infant mortality by 64 percent and maternal mortality by 55 percent. Airtel Tanzania supports

this service on a zero rating basis in order to improve health care in that nation.[57]

In many parts of the developing world, telecommunications data plans are expensive and it is hard for people to afford plans themselves and the usage fees that accompany them. In these places, zero rating programs help people access valuable services in e-commerce, health care, education, and communications. For example, OLX is an online site for people to buy and sell things, and it attracts 360 million page views each day. Being included in the Internet.org app —which results in being able to access it without incurring data cap charges—is a major benefit for entrepreneurs.[58] This website dramatically expands access to digital services for natives who do not speak English.[59]

In Zambia, the Women's Rights Application (WRAPP) compiles information on women's health and legal rights. Before connecting with Internet.org, only 1,000 women had used its website. But through the broader partnership, 15 percent of the country's population that had access to the Internet was able to connect to the site.[60] This increased the reach and impact of the platform. According to Facebook chief operating officer Sheryl Sandberg, WRAPP allows a woman "to say to her husband, 'I have the right to a vote' or 'I have the right to access health care.' Sometimes women don't know those things. The goal is that giving out this information can be transformative and this is a very scalable way to do it."[61]

Having access to applications developed by the Mobile Alliance for Maternal Action has a positive impact on child care. In Bangladesh, for example, 69 percent of mothers who accessed the site received medical care, compared to 32 percent of non-users (see Table 8). On average, site users had at least four clinical appointments where they received medical care for their young child.[62]

TABLE 8: HOW TECHNOLOGY BOOSTS MEDICAL CARE	
Technology Users	69% Get Medical Care
Technology Non-Users	32% Get Medical Care

Source: Caroline Fairchild, "For Facebook, Access to Women's Rights Information Is a Basic one." Fortune, August 14, 2014.

Promoting competition

Some critics assert that zero rating programs limit competition and are discriminatory. Their fear is that services that don't count against the data cap disadvantage all the other services which do count. This has led nations such as Chile to ban zero rating programs on grounds that they are anti-competitive and discriminatory.[63] In addition, the Norwegian Communications Authority has argued that zero rating practices violate net neutrality by advantaging certain types of services or applications.[64] The European Union is considering legislation that could limit zero rating practices.

Yet there are several reasons to dispute those criticisms. First, zero rating programs may encourage competition and limit discrimination by increasing access and fueling demand for Internet usage and Internet content. As an example, providing free Wi-Fi or access through public terminals in schools or libraries allows people to access zero rating services as well as those that count against data caps. Those who worry about discrimination assume people who get free services will limit themselves to those offerings and not utilize other services. In reality, people who go online access other products and find ways to limit their data cap charges.

Mobile providers in a number of countries offer their own zero rating programs. They are combining services from other firms with video streaming or popular applications that people like to use. As long as they draw on services from large as well as small companies and feature a diverse range of applications, they do not seriously limit consumer options or harm competition.[65]

In fact, zero rating programs can promote competition, because they lead to more local eyeballs online, increasing demand for local content, and stimulating the local content creation sector. By offering costless access to global content and popular local content, zero rating gives consumers an incentive to get a phone and a data plan, which in turn, creates more of an audience for local content providers. Thus, zero rating can increase demand for local developers and local content, and promote greater competiveness and diversity in the process. It is also a way for mobile wireless firms to differentiate themselves from competitors by bundling "unique" content with their mobile wireless services, increasing competition among mobile operators and potentially further lowering data costs.

Officials in many places believe that zero rating programs benefit consumers, especially those from disadvantaged backgrounds. Alejandro Pisanty, director general for academic computing services at the National University of Mexico, says that "users of zero rated programs combine them with wifi network access to access the rest of the internet."[66] This brings the virtues of the Internet to people who otherwise would have no connectivity.

Participants in a recent Internet Governance Forum rejected the anti-competition argument on grounds that "the programs are offered on a non-discriminatory basis, so other services can also be a part of the package."[67] Helani Galpaya, the chief executive officer of LIRNEasia, claims that a way to promote competition is to combine partnerships with locally-developed apps and government services. That would guarantee there is diverse content and create a market for local programmers.[68]

A way to stimulate local applications is through prize competitions. In India, for example, an Innovation Challenge project awards $250,000 to the top app, website, or service that helps women, students, farmers, or migrant workers. There also are Impact Award prizes of $25,000 in each of these four categories. These kinds of cash prizes encourage developers to make digital services that will improve the daily lives of regular folks.[69]

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In short, zero rating services offer the advantage of improving digital access for those who otherwise cannot afford Internet services, as well as increasing the amount of connectivity available to those who currently have minimal internet access. Concerns that these programs could threaten competition are mitigated because such efforts are designed to free up data under caps and allow users to browse content they would not otherwise choose to view. This stimulates demand for local content and innovation, and helps government and business pursue initiatives that provide inexpensive internet access through Wi-Fi or publicly-available terminals. Overall, zero rating programs build tremendous public value in developing markets by creating demand for local content and significantly expanding Internet access, including to sites that are not zero-rated. The benefits of free services encourage people to seek products that bring them into the electronic world.

THE BENEFITS OF IMPROVED INTERNET ACCESS IN THE DEVELOPING WORLD

If countries in the developing world can make progress on Internet access, it would stimulate consumer demand, move millions out of poverty, and create enormous opportunities for economic development and social inclusion on many different fronts. Having a robust, diverse, and open Internet ecosystem would be beneficial to many different people.

Economic growth

Improved Internet access would promote economic growth and move large numbers of people out of poverty. According to a Deloitte study, "extending internet access to levels seen in developed countries today means that long run productivity could be enhanced by as much as 25% in developing countries. Deloitte estimates that the resulting economic activity could generate $2.2 trillion in additional GDP, a 72% increase in the GDP growth rate, and more than 140 million new jobs" (see Table 9).[70]

TABLE 9: ECONOMIC AND SOCIAL IMPACT OF IMPROVED INTERNET ACCESS IN THE DEVELOPING WORLD	
Productivity Gains	+25%
Total GDP Improvement	$2.2 Trillion
GDP Growth Gain	+72%
New Jobs	140 Million Jobs
Personal Income Gains	$600 Per Person Each Year
Number Lifted Out of Extreme Poverty	160 Million People
Lives Saved Through Improved Health Care	2.5 Million Lives

Source: Deloitte, Value of connectivity: Economic and social benefits of expanding internet access, February, 2014.

This would have a dramatic impact on poverty alleviation and strengthening the middle class. The research found that "extending internet access in developing economies to the level seen in developed countries can raise living standards and incomes by up to $600 per person a year, thus lifting 160 million people out of extreme poverty in the regions covered by this study."[71]

The value of the Internet is that it leads to increased investment and creates jobs for high-skilled workers in the developing world. This has been the case in Rwanda, which has formed partnerships with leading technology companies. These kinds of collaborations have brought valuable new funding into the country and broadened Internet access across the

country. It has helped advance the knowledge society and provided benefits for millions of people.

Health care and education

Two of the sectors that are likely to grow as a result of improved Internet access are health care and education. In the developing world, both are vital to future economic growth and improved life quality. Both patients and health care providers benefit from timely access to medical information. They can use mobile devices to find out which drugs are most effective for certain illnesses, check for drug interaction effects, and access a database that will tell them whether particular medications are counterfeit.[72]

Increasingly, health care providers are using remote monitoring devices to check vital signs. Patients who live a great distance from treatment centers can electronically transmit health information to physicians, who can let them know if they have abnormal readings. This helps developing countries deal with health care disparities between rural and urban areas, and brings expert diagnosis even to physically remote locations.

According to a Deloitte study, "evidence on the link between health literacy and mortality rates suggests that access to the internet has the potential to save nearly 2.5 million lives across the regions covered by this study, if they were to achieve the level of internet penetration seen in developed economies."[73]

Technology also improves education. It connects students and teachers with electronic resources and digital textbooks. It gives them access to new forms of information such as instructional videos and computer games. Students appreciate digital education because it engages them in the learning process and provides instant feedback on their academic performance.[74]

Facebook has implemented an innovative education program with the non-profit edX and Airtel in Rwanda. Called SocialEDU, the project gives students free access to the group's educational software plus a free phone to access the information. Pupils can take online classes and collaborate with fellow students through social media accounts.[75]

Civic education, governance, and social cohesion

Expanded Internet access is helpful for governance and civil society. Having more people online with access to information improves transparency and accountability in the public sector. It helps to distribute information more broadly around the population. If people and reporters have access to budget information or policy decisions, it empowers them and helps them hold officials responsible for their governmental decisions.

Civil society also benefits through improved connectivity and bringing diverse sets of people together. One of the biggest challenges in a disconnected world is getting people from different cultures and backgrounds to understand one another. It is easy in that situation for mistrust and intolerance to proliferate when people do not understand each other or have opportunities to communicate.

The virtue of the Internet is that it gives people a valuable means for interaction and communication. If people see themselves as part of a global community, it broadens their perspectives and helps them overcome parochial considerations. In that way, it promotes social cohesion and political integration.

CONCLUSION

To summarize, there are a number of ways to improve technology access and bring the benefits of a robust and open Internet to people around the world. This includes steps such as reducing telecommunications access costs, improving network efficiency, expanding digital infrastructure, strengthening digital literacy, providing diverse content, encouraging multilingualism, promoting free expression, enabling affordable services, and increasing digital competition. Each of these actions helps to reduce the gap between Internet users and non-users, and works to maintain the freedom, openness, and diversity that are the cornerstones of the Internet.

It is especially important to make progress on digital access in the cases of India and China. Those two nations are home to an estimated 2.2 of the 4.3 billion people with no Internet access. Addressing cost problems, providing diverse content, promoting free expression, and enabling affordable services in that part of the world would go a long way toward closing the digital divide. Since more than half of the world's population lacking Internet access reside in those countries, it is crucial to make changes there that will make it easier for the unconnected to use digital services. That would bring them into the technology era and give them access to valuable tools for economic development and social integration.

From this research, it is clear that zero rating programs represent effective ways to expand access by bringing impoverished people into a diverse and competitive digital world and

driving demand for local content and services. These approaches help to address the affordability challenges that exist, especially in many parts of the developing world. Some of the most significant barriers involve poverty, mobile or telecommunications taxes, and the high cost of computer devices and access fees. Zero rating practices improve access by allowing those with limited financial resources inexpensively to access digital services.

Policies that promote telecommunications competition help reduce access charges and thereby enable more people to use Internet services. And if people can access a wide range of digital content through multilingualism or their local languages, it will promote greater literacy and show people the social, economic, and civic benefits of Internet connectivity. With these kinds of changes, it is possible to narrow the digital divide and bring digital benefits to billions of people around the world.

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