INTERNATIONAL INTERNET CONNECTIONS COSTS

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A pivotal issue that has been discussed through all the preparatory process for both phases of the World Summit on the Information Society (WSIS) and in other international forums over the last seven years is international Internet interconnection charges.[1] Since, the perception of the developing countries on the issue is entirely different from that of the developed ones, the problem has yet to be resolved.

This chapter presents an overview of the impact of the current models of International Internet Connectivity (IIC) costs on the developing countries, and of the debate as to whether this issue requires global governance or not. The chapter then presents a brief case study of Egypt, a leading developing nation in the field of information and communication technology (ICT). The case study shows that IIC costs, despite having decreased rapidly over the past few years, are still considered a major component in the pricing of Internet services in Egypt. In the following sections, the chapter then summarizes the International Telecommunication Union's (ITU) efforts to advance solutions and explains why its Recommendation on the matter has never been implemented. Accordingly, the chapter proposes actions to be carried out by international organizations in light of the WSIS Plan of Action and the Working Group on Internet Governance (WGIG) Report, and raises the question of whether IIC should not be covered under the World Trade Organization's (WTO) framework. Finally, the chapter states that the IIC problem needs a grand collaboration among all stakeholders from developing and developed countries in order to attain practical mechanisms that would allow for fair distribution of cost among all Internet providers.

Background

The debate on IIC is not as widely known outside the industry as some other Internet issues as spam and cybersecurity. Nevertheless, a problem exists in ensuring that each provider of connectivity is fairly compensated for handling international traffic. This happens because Internet service providers (ISPs) based in countries remote from Internet backbones, particularly in the developing countries, must pay the full cost of the international circuits.

For example: "When an end user in Kenya sends E-Mail to a correspondent in the USA it is the Kenyan internet service providers (ISP) who is bearing the cost of the International

[1] "International Internet Connectivity - Are Poor Countries Subsidizing the Rich?", *ITU News Magazine, N° 03,* April 2005, www.itu.int/itunews/manager/main.asp?lang=en&iYear=2005&iNumber=03.

connectivity from Kenya to the USA. Conversely when an American end user sends E-Mail to Kenya, it is still the Kenyan ISP who is bearing the cost of the International connectivity, and ultimately the Kenyan end user who bears the brunt by paying higher subscriptions." [2]

This contrasts with the traditional accounting and settlements system in the telecommunication world, under which the operator in the country that originates the call has traditionally made a compensatory payment to the operator in the country that terminates the call.

Significant Impact on Developing Countries

This state of affairs has a significant negative impact on developing countries, where the payments from the settlement mechanisms that applied to international telephony have been a source of revenue that helped to subsidize universal service and/or to finance investment in telecommunications infrastructure. The ITU estimates that, between 1993 and 1998, net flows of telecommunications settlement payments from developed countries to developing ones amounted to some $US40 billion.[3]

As more telecommunication traffic is shifting to the Internet, this revenue is disappearing. According to the World Bank,

> …in 2002, US operators alone paid US$223.9m to African operators for terminating calls onto African networks, and received US$14.6m in return for terminating calls from Africa onto US networks and US $20.4m for transit to third countries. Under protest from US carriers and with changes to the international settlement regime this position has changed, eroding these revenues. In 1998 US carriers paid US$413.8m to African operators, whilst African operators paid US$67.3m to US carriers to terminate on their networks and US$260.5m for transit traffic to third countries. The revenue earned from terminating calls from the US has nearly halved over this period4.

[2] "The Halfway Proposition," "Background Paper on Reverse Subsidy of G8 Countries by African ISPs," Conference of African Ministers of Finance, Planning and Economic Development, Johannesburg, South Africa, October 19, 2002, www.afrispa.org/HalfwayDocs/HalfwayProposition_Draft4.pdf.

[3] See, *Accounting Rate Reform undertaken by ITU-T Study Group 3,* www.itu.int/ITU-T/studygroups/com03/accounting-rate/.

[4] "Identifying Key Regulatory and Policy Issues to Ensure Open Access to Regional Backbone Infrastructure Initiatives in Africa," Global ICT Policy Division, The World Bank, December 9, 2004 http://wbln0018.worldbank.org/ict/resources.nsf/a693f575e01ba5f385256b500062af05/74c4f7dbbc6d184485256f950062c5c9/$FILE/AfricaInfrastructurePolicyandRegulatoryReport.pdf.

Other research estimates that the global benefit derived by United States from inbound transmission and transit costs was US$1.3 billion in 2003, and is expected to rise to US$2.7 billion in 2006.[5]

To Regulate or Not to Regulate

There is an ongoing debate between those who allege inequitable and anti-competitive behavior by the Tier-1 carriers - sometimes referred to as Internet Backbone Providers (IBPs) - at the expense of smaller providers, and those who argue that the market is working and that any government intervention is unnecessary and would risk stifling Internet development. Although this debate is far from being settled[6], there is a growing perception in many quarters, and particularly in the developing countries, that some kind of international regulation is needed.

It has been said that in the complete absence of rules protecting competition, industries that display strong network effects, like IBP market, have a tendency to drift toward monopolization, most probably through the aggressive takeover of rivals. That is why some researchers have suggested that competitive forces could use a hand from governments: "In general, the market outcome cannot be relied upon to generate the greatest benefits for end users. Governments can intervene usefully to improve on the market outcome. This is precisely what the US government did for the early commercial Internet, despite a persistent myth that the Internet developed because of non-intervention by government."[7] For example, in a related area, the European Union recently introduced some regulation "to stimulate the emergence of a competitive leased lines market"[8].

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[5] John Hibbard, et al, "International Internet Connectivity and its Impact on Australia", *Final Report on an Investigation for the Department of Communication Information Technology and the Arts,* (Canberra, Australia, May 31, 2004), www.dcita.gov.au/__data/assets/word_doc/16616/IIC_report_-_web_version.doc.

[6] Daniel Roseman, "The Digital Divide and the Competitive Behaviour of Internet Backbone Providers: A Way Forward," paper presented at a special meeting of the ITU rapporteur's group dealing with international internet connectivity, Brussels, April 2003, www3.sympatico.ca/droseman/RosemanIISPaper.pdf.

[7] Daniel C.H. Mah , "Explaining Internet Connectivity: Voluntary Interconnection Among Commercial Internet Service Providers," paper presented at the 31st Research Conference on Communication, Information and Internet Policy, Arlington, VA, September 20, 2003, web.si.umich.edu/tprc/papers/2003/181/Explaining_Internet_Connectivity_Mar26-03.DOC.pdf.

[8] Commission of the European Union, *Explanatory Memorandum of the Recommendation on the Provision of Leased Lines in the European Union,* C(2005) 103/2, (Brussels, January 1, 2005), <http://europa.eu.int/information_society/policy/ecomm/doc/info_centre/documentation/recomm_guidelines/leased_lines/expl_memo_en.pdf>

Finally some observers are concerned that this issue could affect the stable functioning of the Internet in the long run. As a recent study suggests:

> …without the adoption of a settlement regime that supports some form of cost distribution among Internet providers, there are serious structural problems in supporting a highly diverse and well populated provider industry sector. These problems are exacerbated by the additional observation that the Internet transmission and retail markets both admit significant economies of scale of operation. The combination of these two factors leads to the economic conclusion that the Internet market is not a long term sustainable open competitive market that is capable of supporting a wide diversity of players both large and small.[9]

Conversely, some analysts have said that regulation is not needed because the reduction of the revenues that developing countries receive from international telephony settlements can be compensated by the lower costs of the Internet based telecommunication services. But this savings can occur only in countries where the infrastructure is already in place, and this is not the case for most of the developing countries. And even if lower costs are made available to ISPs in developing countries, the fact remain that the flow of revenue is reversing. As more telephone and fax traffic shifts to the Internet, what will replace the yearly US$7-10 billion developing countries receive from telecommunications settlements?

This has created the paradox that in many developing countries, the use of newer and lower cost technologies, like Voice over Internet Protocol (VoIP), are seen as more as threats than as beneficial. This is because they deprive national carriers of the revenue needed to modernize infrastructure and to deploy widely new technologies such as Internet. This applies regardless of whether a country has a liberalized competitive regime or a traditional monopoly one.

The Case of Egypt

History of Internet in Egypt

The first Internet gateway in Egypt was set up in October 1993 by the Egyptian Universities Network (EUN) via a 9.6 Kbps link to the European Academic and Research Network (EARN). The Egyptian Cabinet Information and Decision Support Center (IDSC) that used to play a major role in introducing the Internet to the Egyptian society, was also connected through the same gateway. Since that date, EUN started offering Internet access to the research and education sector, whereas IDSC providing Internet services to the governmental

[9] Geoff Huston, "Where's the Money? - Internet Interconnection and Financial Settlements," *The ISP Column,* Internet Society (January 2005), <http://ispcolumn.isoc.org/2005-01/interconns.pdf>

sector. In 1994, IDSC leased for the first time in Egypt a digital international Internet connection and invested in another gateway to run parallel to the EUN. In order to encourage the diffusion of Internet services all over the country, the government allowed IDSC to offer free Internet access not only to government entities, but also to private sector, international organizations as well as civil society.

In December 1995, a decision was taken by the government, in coordination with the incumbent carrier Telecom Egypt (TE), to liberalize the Internet market and allow private sector ISPs to step in and offer commercial services to end-users. This was in fact one of the earliest landmarks in the move towards liberalizing telecommunications services in the Egyptian market. The number of ISPs increased from twelve in 1996 to almost forty five in 1999 while the total number of Internet users has grown from few thousands to 200,000 during the same period of time.[10]

Telecommunication Reform and Internet Evolution

Following the establishment of the Ministry of Communications and Information Technology (MCIT) in October 1999, the National Telecommunication Regulatory Authority (NTRA) has developed a new licensing framework regarding Internet service provision in Egypt. According to this new scheme, there are three categories of service providers, classified as Class A, B and C. Both Class A and B can build and own infrastructures, as well as co-locate equipment within TE exchanges. While Class A providers have an agreement with TE to acquire international bandwidth capacity via one of the cable operators, Class B providers have to go via one of their Class A counterparts to get international access. Another difference between Class A and Class B is that the former offer services either to other providers (wholesale) or to end-customers (retail), whereas the latter can only sell to end-customers. Both Class A and B are usually referred to as Network Service Providers (NSPs). On the other hand, Class C ISPs do not have the right to build infrastructures nor do they have direct access to international bandwidth. Instead, they lease ports and capacity from NSPs and provide services to end-customers. It is most likely that Class C providers work as resellers for NSPs in remote areas where the latter do not have a presence. To date there are four Class A providers, five Class B (four of which are currently operational), and around 200 Class C providers.[11]

[10] Mohamed A. El-Nawawy, "Profiling Internet Users in Egypt: Understanding the Primary Deterrent Against Their Growth in Number," *INET 2000 Conference Proceedings,* <http://www.isoc.org/inet2000/cdproceedings/8d/8d_3.htm>

[11] www.ntra.gov.eg/english/DPages_DPagesDetails.asp?ID=128&Menu=3

The number of Internet users in Egypt is now estimated to be around 5 million.[12] The exponential increase in the number of users is a result of regulatory reforms in this sector as well as an unparalleled support offered by the government. The regulatory reforms were partially addressed in the licensing frameworks in which the relation between Telecom Egypt and the NSPs are described and monitored by NTRA. Also, such reforms were mostly reflected in the Telecommunication Act number 10 of year 2003, which defines in eighty seven articles all regulations concerning the provisioning of any telecommunication services in Egypt.

At the same time, the government's support has been articulated through initiatives promoted by the MCIT. Examples here include: "Free Internet," which allows dial-up Internet access with the cost of local phone call (US$0.21 per hour); "PC for every home" and "Laptop for every professional," which provide affordable means for individuals and businesses to acquire computers through monthly installment payment; "IT Clubs" that makes basic computer training and Internet access available in rural and deprived areas; and "Broadband Access," which has brought asynchronous digital subscriber line prices down by fifty percent and promoted broadband wireless services as well.

Telecom Egypt, which is wholly owned by the government, has also developed special pricing schemes for NSPs as regards local and international bandwidth. Over the past five years, a number of discounts have been applied on bandwidth capacity, which cumulatively represents seventy five percent and sixty percent of local and international bandwidth, respectively.

Egypt's International Telecommunications

Due to its privileged geographical location, Egypt is considered an international telecommunication hub. A number of global and regional fiber optic cables have landing points in Egypt, such as SEA-ME-WE 1, 2, 3 and 4 submarine cables that link the country to the outside world across the Mediterranean, South East Asia and Western Europe. Egypt is also linked to the FLAG cable with two landing points in Alexandria and Suez that connect Egypt and the whole Middle East to Europe, as well as to the Far East. In addition, there are a number of regional optical fiber cables that connect Egypt to countries like Italy, Greece, Syria, Lebanon, Jordan and Sudan. Satellite communication has also been used extensively in various applications but has recently become expensive for data and Internet access compared to terrestrial solutions.[13]

Although Telecom Egypt has so far enjoyed a monopoly over international communications, Egypt's commitments under the WTO's basic telecommunications agreement bring this to an

[12] http://www.mcit.gov.eg/publication.asp

[13] International Telecommunication Union, "Internet on the Nile: Egypt Case Study," March 2001, <http://www.itu.int/osg/spu/wtpf/wtpf2001/casestudies/egypt1.pdf>

end as of January 1st 2006. Prices for international bandwidth have experienced a number of successive reductions during the last five years, showing a clear sign of the government's commitment to link the country to the global society. Accordingly, Egypt's international capacity to the Internet has experienced an exponential boost, attaining 3.345 Gbps at present.[14] At the IP level, local NSPs are getting transit services from different global IP carriers such as UUNet, Teleglobe and FLAG.

Furthermore, in July 2000, TE signed an agreement with FLAG for building a local Point of Presence (PoP) in Cairo in order to provide licensed NSPs with managed bandwidth services, as well as IP transit. As demand for bandwidth increases over time, this agreement has resulted in more reduction in prices since FLAG has so far been the only international carrier in Egypt that offers one-stop-shop services (both transmission and IP connectivity) which gives it a competitive edge over the others.

International Internet Connectivity[15]

The cost of IIC comprises two elements: the transmission link from Egypt to the United States, and the IP port. Although it is quite common for an ISP to get the transmission from one carrier and the IP port from another one, most of the Internet connections in Egypt, as well as their IP peering ports, are offered via FLAG for the reasons explained in the above paragraph.

Traditionally, Egyptian NSPs used to lease bandwidth capacities via either FLAG or SEA-ME-WE 3. Four years ago, the leasing price for a 45 Mbps link was US$150,000 per month versus US$230,000 for a 155 Mbps one. Two years later, the prices were reduced by almost 30% to reach US$165,400 per 155 Mbps per month. Today, the leasing price for a 155 Mbps link is around US$100,000 per month.

By early 2003, FLAG and TE reached an agreement with the local NSPs allowing the latter to own the bandwidth instead of leasing it. This model is known everywhere as Indefeasible Right of Use (IRU) which is a long-term lease of a certain bandwidth capacity of an international cable. The IRU contract between the local NSPs, TE and FLAG allows the NSPs to lease the capacity for 15 years. Under this model, the NSP was able to acquire a 155 Mbps for US$3.675 million. With continuous support from the government as well as the rollout of nationwide broadband services, demand for international bandwidth increases, hence prices have rapidly decreased over the past couple of years reaching US$1.25 million, which is the present IRU price for a 155 Mbps link.

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[14] http://www.mcit.gov.eg/publication.asp

[15] The information in this section comes from interviews with carriers and service providers that operate in Egypt.

Although the IRU model puts a lot of burden on the cash flow of the NSPs, which need to pay the full amount up front, it seems to be more economic compared to the leasing model. On the other hand, the IRU model is quite rewarding to FLAG, not only because it collects the whole payment upfront, but also because it retains its customers for quite a long time. So, the model seems tempting for both sides and therefore all Egypt's international Internet bandwidth today has been contracted based on the IRU scheme.

By depreciating the IRU numbers over a fifteen year contract period, it turns out that the monthly charge for a 155 Mbps link is around US$7,000. However, this is a theoretical calculation because the bandwidth value decreases over time so linear depreciation does not work in this case. Therefore, operators either do depreciation over a shorter period of time such as 4 years, or calculate the depreciation value in a descending manner.

In addition, the cost of the IP port for a 155 Mbps link is in the range of US$7,000 to US$10,000 per month based on the negotiations between the local NSP and the IP provider (FLAG in most cases, UUNET and Teleglobe in few cases). As a matter of fact, the NSPs usually negotiate with their IP providers for better peering prices according to the ratio of the inbound versus the outbound traffic. However, in some cases the ratio is around 1.4:1 though the minimum price that an NSP can get for peering is US$7,000 per 155 Mbps per month which is quite a considerable amount.

To calculate the total value paid in US$ by Egyptian NSPs for international Internet bandwidth, the following assumptions are taken into account:

- The current IRU price for a 155 Mbps which is US$1.25 million
- An average price for a 155 Mbps IP port which could be US$8,000 a month
- Depreciating the IRU number over four years

The results are as follows:

- The IRU price per Mbps per month is US$168
- The IP port price per Mbps per month is US$52
- This gives a total of US$220 paid per Mbps per month

Since the international capacity is currently 3.345 Gbps, it turns out that the total amount paid in international bandwidth is US $735,900 per month. Needless to say that this figure is calculated based on a best case scenario in which the minimum prices of the present time are taken into account, while most of the capacities were acquired in the past for much higher prices.

Why are NSPs Paying All This?

Actually, Egyptian NSPs, like any other non-Tier-1 carriers, have no choice but to pay the full amount of the transmission as well as of the peering or precisely the transit. This is because they cannot fulfill any of the Tier-1 carriers' polices for settlement-free interconnection. Such policies are by all means impossible for any of the NSPs to achieve.

As an example of such Tier-1 policies, MCI requires any operator seeking settlement-free interconnection with its network to have coverage in at least fifty percent of the geographical region in which MCI has facilities. The policy also asserts that the ratio of traffic exchange shall not exceed 1.8:1. It further entails certain requirements in the backbone network of the requester such as full redundancy, minimum capacities of 2.4 Gbps for interconnection with MCI-US, 622 Mbps with MCI-Europe and 155 Mbps with MCI-Asia Pacific.[16] Therefore, it comes at no surprise that with the current norms of the Tier-1 carriers, Egyptian NSPs will always be deemed as customers to such carriers and hence bear the whole cost for both the bandwidth as well as the peering.

There are a number of arguments that have been raised over the past few years describing the IIC issue from a business perspective, and putting forward solutions that may help operators from developing countries overcome this problem and in some cases be in a stronger position while negotiating with Tier-1 carriers.

A well-known debate is the lack of national peering in most of the developing nations' networks. The argument here is if operators in such countries manage to build national exchange points and aggregate local traffic, they can save in their international capacities because local traffic will stay local rather than traveling oversees, thus the overall amount paid in international bandwidth will be less. The same argument is used on a regional level, that if a number of countries in a certain region were connected via some regional exchange point, again this will keep regional traffic regional and may as well attract other exchange points of Tier-1's to peer with.

More importantly, building local and regional Internet Exchange Points (IXPs) shall help operators of the developing world to attract content from developed countries to be mirrored and hosted in such IXPs, thus lessen the asymmetry in the traffic exchanged between developed and developing nations. However, building IXPs in itself does not change a fundamental aspect in the current model of IIC, which is the fact that operators from developing countries will keep paying the full amount no matter how much this amount is.

[16] "MCI Policy for Settlement-Free Interconnection with Internet Networks", <http://global.mci.com/uunet/peering/>.

As per the Class A and B licenses in Egypt, local peering is mandatory for all NSPs. However, not all NSPs are connected to the exchange point and even those who are connected do not see much of a benefit. Establishing a peering point in Egypt has never been technically challenging for the NSPs. The challenge comes primarily from the competition between NSPs, agreement on a certain peering criteria as well as the inability to recognize a mutual benefit obtained from such a local connectivity. Nevertheless, it is expected that with the continuous development and increase in local content, NSPs will be more eager to effectively interconnect and hopefully save some of their international bandwidth costs.

On the other hand, regional peering between Egyptian NSPs and other operators from Africa and the Arab World has even been more challenging. There have been some negotiations between more than one NSP and other counterparts from the Arab region, yet nothing has been materialized. According to NSPs, Egypt has a lot more Arabic content than any other neighbor country does, and that's why operators from such countries have expressed interest in peering with them. But those operators want to equally share the peering cost with the NSPs, which does not convince the latter because they have larger customer base as well as more content. So, as with local peering, the problem is not technical, it is rather the lack of a business model that looks appealing and satisfactory for both sides.

Another possible scenario that may help Egyptian NSPs mitigate the burden of their international costs involves having more international cable providers in Egypt, either with their own landing points installed or at least with permission to use TE's landing points. As indicated earlier in this chapter, there are currently FLAG as well as the SEA-ME-WE 3 & 4 international cable systems that pass through Egypt serving most of its current as well as its prospect international telecommunication services. However, the SEA-ME-WE system has so far not been able to compete with FLAG as far as Egypt's Internet international business in concerned. Therefore, the question is what if a new cable system is laid down across the Mediterranean linking Egypt with Europe? Would this create more competition and help the NSPs get better offerings for international bandwidth? Although prices have been falling rapidly following the FLAG agreement with TE to provide NSPs with IRU-based bandwidth, some NSPs do envisage that having an alternative to FLAG would allow them to get more competitive offerings.

The last model is the one led by Australian and Asian operators who have invested in their infrastructures and built PoPs around the world in order to co-locate with Teir-1 carriers, hence be able to negotiate better deals with them. It is not deemed impossible that an Egyptian operator could take the same approach, despite the fact that the size of any of the existing NSPs is yet too small compared with any giant telecom carrier. Also, the number of Internet subscribers in Egypt, five million, is much less than that in many developed countries on the Asian-Pacific side, which consequently reflects on much less traffic volumes as well.

ITU-T Recommendation D.50

In 1998, ITU-T Study Group 3 started discussing the issue of "International Internet Connectivity (IIC)".[17] In October 2000 the ITU World Telecommunications Standards Assembly approved the ITU-T Recommendation D.50 regarding "Peering" or "Transit" arrangements between ISPs and Internet backbone providers.

The purpose of the Recommendation was to set out the *principle* for negotiating agreements to transmit international Internet traffic. The possible need for compensation between the providers carrying the traffic was also recognized in the recommendation. When providers install Internet circuits, they generally have a choice between on one hand the "sender-keeps-all" or peering system of bilateral connections when traffic is more or less balanced, and on the other hand an asymmetrical system whereby the initiating provider pays for the whole connection with the other country (full-circuit cost). The latter is the case today for most of the developing countries. The Recommendation called for arrangements to be negotiated and agreed upon on a commercial basis when direct Internet links are established internationally. It required only that the two providers involved reach a mutual agreement.[18]

Recommendation D.50 also said that the parties involved could take into account the possible need for compensation for elements such as traffic flow, number of routes, geographical coverage and the cost of international transmission when negotiating such commercial arrangements. Although the Recommendation D.50 is voluntary, it has been hotly contested and is not being implemented, most notably by key industrialized countries and elements of the global private sector.

Study Group 3 agreed in June 2001 to pursue further studies on IIC, and established two Rapporteur Groups, one for developing further guidelines to facilitate the implementation of Recommendation D.50, and the other for examining the possibility of using traffic flow as a main factor of negotiation for IIC.

The search for objective, fair and cost-oriented charging rules received an impulse in late 2002 when China submitted a proposal to modify the Recommendation D.50. China proposed to consider bulk traffic flow as a costing element to be taken into account in commercially negotiated connection arrangements. In June 2004, Study Group 3 adopted Amendment 1, on "General considerations for charging criteria and options for international Internet connectivity", which complements Recommendation D.50. However, the study on the traffic

[17] See, ITU-T Study Group 3, <http://www.itu.int/ITU-T/studygroups/com03/index.asp>.

[18] *A Handbook on Internet Protocol (IP)-Based Networks and Related Topics and Issues* (Geneva: ITU, 2005), <http://www.itu.int/ITU-T/special-projects/ip-policy/final/IP%20Policy%20Handbook-FINAL%20VERSION.pdf>.

flow methodology was not concluded and work continues during a new study period 2005-2008.

Recommendations for Future Action

Since the first phase of WSIS many recommendations have been put forward to advance in the solution of this issue. The WSIS has stated:[19]

- "Internet transit and interconnection costs should be oriented towards objective, transparent and non-discriminatory parameters, taking into account ongoing work on this subject."
- "The creation and development of regional ICT backbones and Internet exchange points, to reduce interconnection costs and broaden network access."

The WGIG made the following recommendations on interconnection costs:[20]

- Invite international agencies and the donor community to intensify their studies in this area, in particular to examine alternative solutions, such as the development of regional IP backbones and the establishment of local and regional access points.
- Call on the groups studying Internet governance issues to take note of the WSIS Declaration of Principles, i.e., to be multilateral, transparent and democratic and to have the capacity to address Internet governance in a coordinated manner, based on a multi-stakeholder approach.
- Invite relevant international organizations to report on these matters to whatever forum, body or mechanism(s) that the WSIS will create for issues related to Internet governance and global coordination.
- Encourage donor programs and other developmental financing mechanisms to take note of the need to provide funding for initiatives that advance connectivity, IXPs and local content for developing countries.
- Build on current international agreements, encourage interested parties to continue and intensify work in relevant international organizations on international Internet connectivity issues.

Other recommendations that have been made are in the course of the global debate include the following:

- Promote the establishment of national and regional IXPs and hubs to provide a better utilization of international capacities by keeping local/regional traffic local/regional.[21] This

[19] "WSIS Plan of Action," paragraph C2. 9. (Geneva, December 12, 2003), <http://www.itu.int/dms_pub/itu-s/md/03/wsis/doc/S03-WSIS-DOC-0005!!PDF-E.pdf>.

[20] *Report of the Working Group on Internet Governance,* (Geneva: United Nations, June 2005) www.wgig.org/docs/WGIGREPORT.pdf.

aggregation will also give smaller networks and ISPs in developing countries greater bargaining power when negotiating international interconnection arrangements. Additionally, content providers of developed countries should be encouraged to mirror their content in those regional exchanges.

- Promote the creation of local content in developing countries that can be of interest to Internet users in developed countries. Then the indirect network benefits provided by content providers in developing countries to the backbone operators could be taken into consideration in the interconnection prices offered to developing countries ISPs.
- Encourage national authorities to take steps to open markets to competitive entry and promote increased competition in the market place, to create an enabling environment that encourages investment and/or international infrastructure assistance.
- Include provisions from the ITU-T Recommendation D.50 in a treaty-level instrument, for example the International Telecommunication Regulations, so as to give them binding force. It has also been suggested that there should be a binding international dispute resolution mechanism similar perhaps to what exists in the WTO, to deal with these matters.
- Include Internet services under the WTO agreement on basic telecommunications services because it offers a suitable framework within which access to Internet backbone services would be ensured in cases where these services are supplied by dominating suppliers.
- Encourage developing countries to associate the IIC issue with other issues that might be of interest to developed countries, such as enforcement of intellectual property rights, liberalization of services, etc. That is, much as the developed countries link implementation of the WTO TRIPs provisions to other trade provisions of interest to developing countries, developing countries could, at least in principle, link resolution of the IIC costs issue to ongoing negotiations on other trade liberalization matters.

Conclusions

After seven years of discussion in international forums, publication of research papers and even some limited press coverage[22], the fact remains that the IIC costs issue remains as an important obstacle to the dissemination of Internet access at affordable prices throughout the developing countries.

It is quite evident from the above analysis that the current cost models of IIC are based on market power without considering any public policy objectives related to Internet development. Businesses of the developed world have frequently argued that market competition, local peering and infrastructure expansions shall help developing nations

[21] "Via Africa: Creating local and regional IXPs to save money and bandwidth," Discussion paper prepared for IDRC and ITU for the 2004 Global Symposium for Regulators, (ITU, Geneva, 2005), <http://www.itu.int/ITU-D/treg/publications/AfricaIXPRep.pdf >.

[22] "The Great African Internet Robbery," BBC News, (April 15, 2002), <http://news.bbc.co.uk/1/hi/world/africa/1931120.stm>.

overcome this problem. On the other hand, Egypt's case study has shown that such factors are reasonably achieved in Egypt and yet the cost model of IIC remains unchanged.

This proves the need to seriously contemplate the IIC issue, not only through the forums where it has been discussed for quite a long time, but through some high level international Internet governance mechanisms that needs to be created. The main challenge here is to come up with an innovative solution that on one hand maintains the dynamism and efficiency of the Internet, while on the other hand allow operators in developing nations to provide better, widespread and cost-effective services for all. And this is most likely to entail the concerted political will of governments and the decisive participation of the rest of the stakeholders.