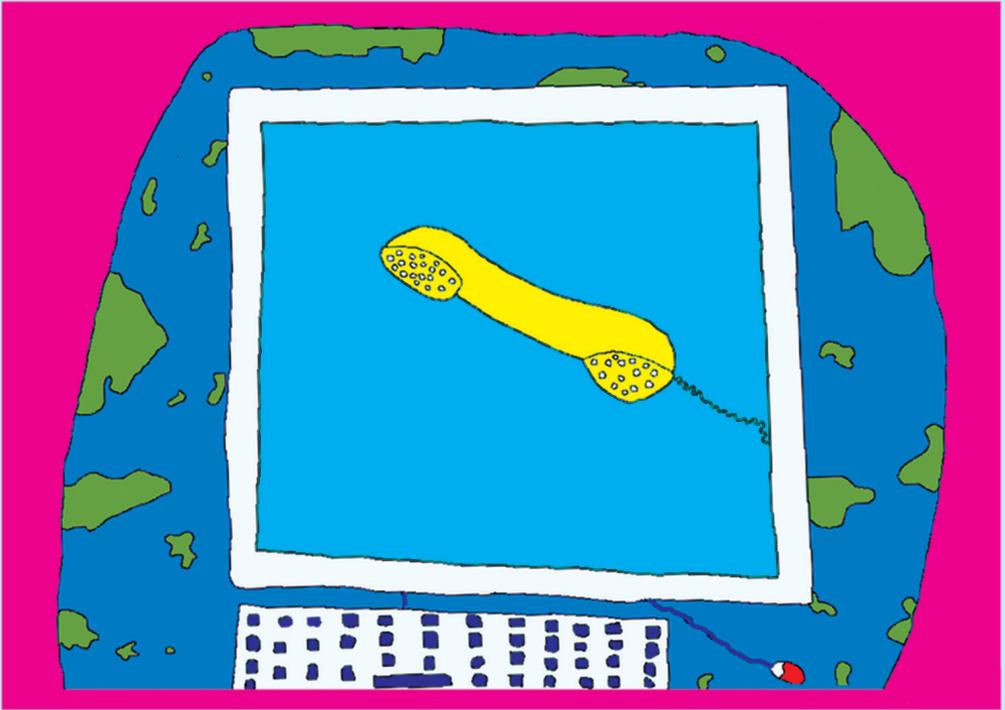


**WORLD
TELECOMMUNICATION
DEVELOPMENT
REPORT**

Reinventing Telecoms

World Telecommunication Indicators

SUMMARY



International Telecommunication Union

2002

WORLD TELECOMMUNICATION DEVELOPMENT REPORT 2002

Reinventing Telecoms

Executive summary



March 2002

INTERNATIONAL TELECOMMUNICATION UNION

This document is the executive summary of the International Telecommunication Union's (ITU) 2002 *World Telecommunication Development Report: Reinventing Telecoms*. The report was prepared by the Telecommunication Development Bureau and the Strategic Planning Unit. It was written by Tim Kelly, Michael Minges and Vanessa Gray. Taylor Reynolds and Yoshihisa Takada contributed to the data analysis. Nathalie Delmas formatted the report and Joanna Goodrick edited it. Stéphane Rollet designed the cover and Sophie Minges drew the picture. The full report, and ITU's World Telecommunication Indicators Database, are available for purchase from the ITU website, at www.itu.int/ITU-D/ict/. The authors would like to thank all those ITU Member States and Sector Members, public telecommunication operators, regulators and others that have provided data and other inputs to the report. The views expressed are those of the authors and may not necessarily reflect the opinions of the ITU or its members.

Note that the report was written early in 2002. Thus, year-end 2001 figures are provisional and subject to revision.

Foreword

The *2002 World Telecommunication Development Report* has been prepared for the World Telecommunication Development Conference, to take place in Istanbul, Turkey from 18 to 27 March 2002. It is the first global conference of its kind in the new millennium. Two years into a new century, the telecommunication sector finds itself at a crossroads. It has changed almost beyond recognition over the last twenty years. Privatization and competition are the order of the day, with a majority of countries having adopted these policies to advance their telecommunication sector. The results have been impressive, with the industry growing at an unprecedented pace, especially since the mid-1990s. This growth has added telecommunication infrastructure and new users faster than ever before. Ten years ago, those countries that had mobile cellular networks or were connected to the Internet were in the minority. Today, almost all nations have both. Encouragingly, the fastest growing nations recently have been the least developed countries (LDCs). They surpassed the psychological threshold of one telephone user per 100 inhabitants during 2001. This is an unmistakable sign that the digital divide is being reduced, albeit at too slow a pace.

At a global level, however, the acceleration in telecom growth rates was reversed in 2001, notably in key market segments such as mobile and Internet. Share prices declined precipitously, and expected profits turned to losses for many of the new market entrants in the sector. Is this the signal of a new, sober environment for telecommunications or just a temporary blip?

The Report attempts to answer that question by looking at where the telecommunication sector is, what it has accomplished over the last twenty years, and where it will go over the next few years. Anything beyond that would be a wild guess, especially when one considers that mobile cellular and the Internet barely existed two decades ago. Now, the marriage of the two brings with it the promise of a bright new future for the industry. Throughout its history, the telecommunication sector has reinvented itself; as the driver of growth it has shifted from data (the telegraph), to voice (telephone) and back again to data (the Internet). It appears that the industry is once again at such a crossroads, as technological change intersects with new market realities. The gale of creative destruction currently blowing through the industry will bring misery to some, but opportunity to many more. Above all, for telecommunication users, who will soon form the majority of mankind, a new age is dawning in which scarcity is being replaced by plentiful and ubiquitous supply. That is *telecoms reinvented!*

1. The New Telecommunication World

“Private, competitive, mobile and global... Most countries have initiated a reform process. Still, much fine-tuning remains to be done”

Four words sum up today’s telecommunication market: *private, competitive, mobile and global*. The pace at which these trends are taking shape is remarkable. In fact, events are moving so quickly, that calls to reform the sector are missing the point. It has already happened. Most countries have initiated a reform process. Still, much fine-tuning remains to be done.

At the beginning of 2002, more than half the countries in the world have fully or partially **privatized** their incumbent telecommunication operator. Even in countries that have not yet done so, the private sector accounts for an ever greater share of the market. One notable trend is the rise of new private mobile operators, created through licensing, not privatization. Countries with a privately-owned incumbent operator account for 85 per cent of the world market by revenue. Those with fully state-owned operators, in mobile as well as fixed-lines, account for just two per cent (Figure 1, top).

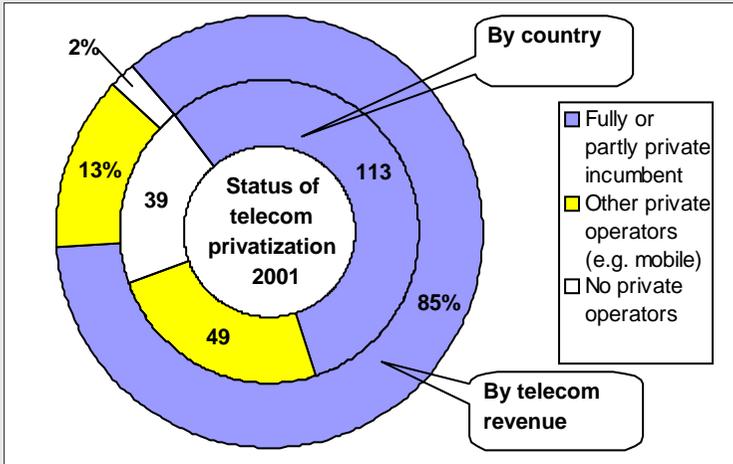
Competition has spread widely, although a majority of countries still retain monopolies in fixed-line services, such as local and long distance calls. However, an overwhelming majority of countries now allows competition in the mobile and Internet market segments, which increasingly substitute for fixed-line voice (Figure 1, bottom). The provision of mobile service by an operator other than the incumbent introduces competition, and a growing number of developing countries now have more mobile than fixed subscribers. In countries that do not legally allow multiple service operators for international calling, an indirect level of competition exists through call-back, calling cards, cellular roaming and voice over the Internet Protocol (VoIP).

Telecommunication services are increasingly **mobile**, that is, delivered by the medium of radio waves rather than over a fixed-line network. Until about 50 years ago, the majority of international telephone calls were delivered over short-wave radio, and people tuned into the radio for the latest news. Looking ahead into the future, the majority of international calls may be made from, and delivered to, handheld devices. Those same devices will receive updates from websites and real-time video streams from multiple sources around the globe. Radio is now being increasingly used to provide access networks, while wired networks provide the long-distance component.

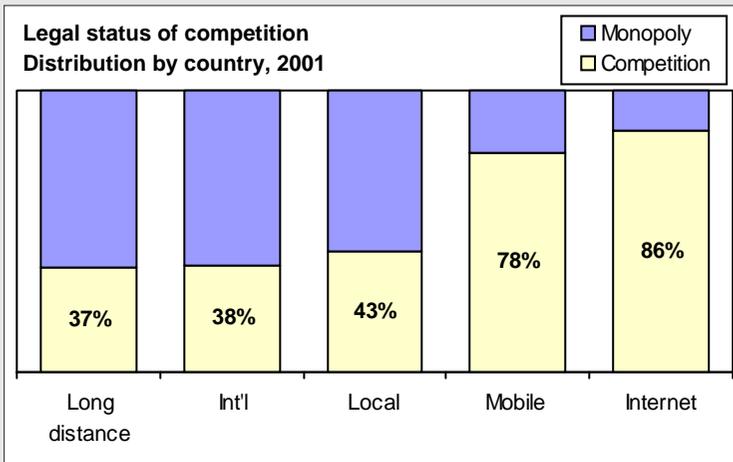
Globalization has affected the telecommunication sector in three ways. First, *global operations*. Many major telecommunication operators have holdings in operators in other nations. It is increasingly rare to find a country that does not have a strategic foreign investor. Second, *regional and multilateral agreements*. Governments have increasingly chosen to enshrine their market liberalizing moves in treaty-level commitments, notably in the context of the WTO’s basic telecommunications agreement. Third, *new global services*. These include mobile cellular roaming, global satellite systems, calling cards and others that allow customers to continue to use a service while away from their home country. Future third-generation (3G) mobile services have been designed from the start to be global, rather than national, in scope.

Figure 1: Private, competitive, mobile and global

Status of telecommunication privatization, by country and by share of global revenue, 2001



Legal status of telecommunication competition, by country, 2001



Note: Data for the top chart is based on 201 countries. “Other private operators” refers to the percentage of countries in the world that have not privatized their incumbent fixed-line telephone operator but have other private fixed, international or mobile cellular telecommunication companies. Data in the bottom chart refer to the legal rather than actual status. ‘Long distance’ refers to domestic while ‘Int’l’ refers to international long distance. ‘Mobile’ refers to digital cellular mobile networks. Percentages show countries that have adopted a degree of competition.

Source: ITU.

Box 1: As one gap closes, another opens up

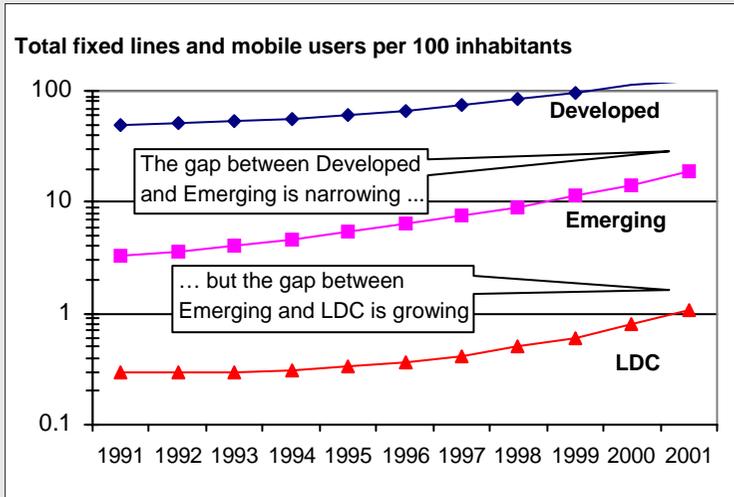
Much policy attention has been focused on the gap between developed and developing nations in terms of their access to information and communication technologies (ICTs); the so-called 'digital divide'. Recent initiatives have included the G8 Digital Opportunity Task Force (DOT Force), the United Nations ICT Task Force and the UNDP/Markle Foundation Digital Opportunities Initiative. But how do you measure the gap? Has it grown or narrowed over the last decade? Certainly in terms of basic telephone access, there are encouraging signs of a reduction in disparity.

In 1991, *total* telephone penetration (fixed-line plus mobile telephones) stood at 49.0 in developed nations, 3.3 in emerging nations and just 0.3 in the least developed countries (LDCs). A decade later, the corresponding levels stood at 121.1, 18.7 and 1.1. The ratio between developed and emerging nations dropped by more than half from 15:1 to 6:1. However, the gap between emerging nations and LDCs grew, from 12:1 to 17:1 (Box Figure 1, top). In fact, emerging nations, like China and Viet Nam, have done particularly well. The new digital divide is expressed in the growing gap between these countries and the LDCs, especially in terms of access to Internet (Box Figure 1, bottom). However, one bright note is that the growth rate in LDCs' telephone networks has been accelerating and was the highest of all three groups of countries in 2001.

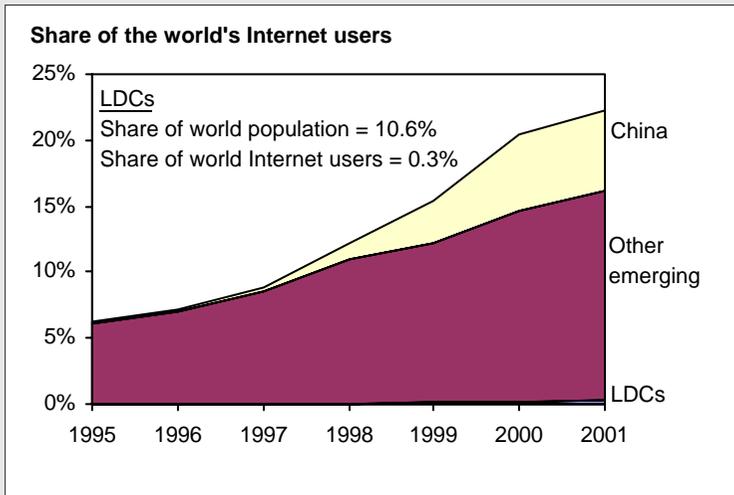
At last some overused clichés can now be put to rest. It was often said, for example, that "Tokyo has more telephones than the whole of the African continent." While this may have been true some 20 years ago, when the Maitland Commission drafted its report, today there are more than twice as many main telephone lines in Africa as in Tokyo. Similarly, the story which ITU reported in the 1997 Report, that there were "more mobile phones in Bangkok than in Africa," proved to be short lived. Africa now has more than 20 million mobile users, more than the total population of Bangkok. By the end of 2001, twenty-eight African nations—or over half the region's countries—had more mobile than fixed subscribers; a higher percentage than any other continent.

But new gaps are emerging, notably in terms of access to the Internet. These are harder to measure because they are not just about access, but also about the *quality* of the experience. For instance, international Internet bandwidth (or IP connectivity) is a good measure of users' experience with the Internet. The greater the bandwidth, the quicker the response times. The 400'000 citizens of Luxembourg between them share more international Internet bandwidth than Africa's 760 million citizens. Thus, even though Africa has some five million Internet users, many of them may be restricted to using just e-mail and may not be able to browse the World Wide Web. The reality is that high-speed Internet access, which has become fashionable in many parts of the developed world, such as the Republic of Korea and North America, is still a long way off in most developing countries. The new digital divide is about quality, not just quantity.

Box Figure 1: The telephone gap shrinks ...



But the Internet gap grows ...



Note: Top chart is logarithmic. Developed refers to the European Union, Iceland, Norway, Switzerland, Canada, United States, Japan, Australia, New Zealand, Hong Kong SAR, the Republic of Korea, Singapore and Taiwan-China. LDC refers to the 49 least developed countries. Emerging refers to all other countries.

Source: ITU World Telecommunication Indicators Database.

2. We found the missing link: It's mobile communications

“Mobile has raised access to communications to new levels... Policy-makers must look to mobile as a way of achieving social policy goals”

With just short of one billion subscribers at the end of 2001, mobile is poised to take over from fixed-lines in the early part of 2002 as the network with the most users (see Figure 2, top). It may be hard to believe, but less than one per cent of the world's inhabitants had access to a mobile phone in 1991 and only one third of countries had a cellular network. By the end of 2001, over 90 per cent of countries had a mobile network, almost one in every six of the world's inhabitants had a mobile phone and almost 100 countries had more mobile than fixed telephone subscribers (see Figure 2, bottom). Mobile has raised *access* to communications to new levels. In developing nations, and particularly in the LDCs, mobile is increasing telephone access in a surprisingly quick time. In developed countries, mobile penetration rates continually surpass industry forecasts.

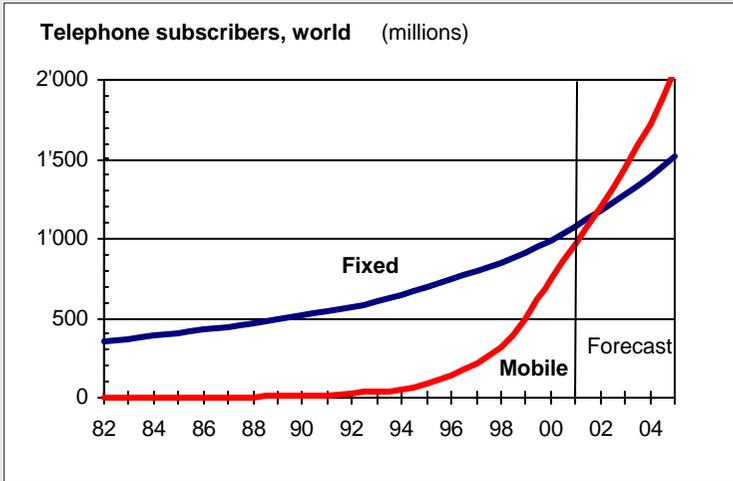
Uganda epitomizes the revolution that mobile has created among the LDCs. This East African country licensed a second nationwide operator (MTN Uganda) in 1998. MTN focused on prepaid mobile, with great success. Wireless networks are quick to install and while most Ugandans would not meet the financial criteria for subscription-based service, prepaid brought communication to the masses. The results were dramatic. Uganda's overall telephone density quadrupled between 1998 and 2001, rising from 0.41 telephone subscribers per 100 people to 1.72. In a little over one year, MTN emerged as the nation's largest operator. Since then, it has not rested on its laurels. It has been aggressive in expanding the network into what Ugandans refer to as “*up-country*,” that is the rural part of the nation. Over 50 per cent of the population is now covered by mobile cellular and some 80 towns have service. The Uganda recipe is being replicated successfully in a growing number of LDCs (see Box 2).

But what about the developed world? Anyone looking to see what the future of the mobile society might look like needs to look no further than **Finland**, the world trendsetter in all things mobile. It was the first country to launch a digital cellular network, the second (after Cambodia), where the number of mobile subscriptions surpassed fixed, and the first to license third-generation mobile networks. Today, some 90 per cent of all adults have a mobile phone in Finland. The mobile industry dominates, accounting for around 60 per cent of industry telephone revenues.

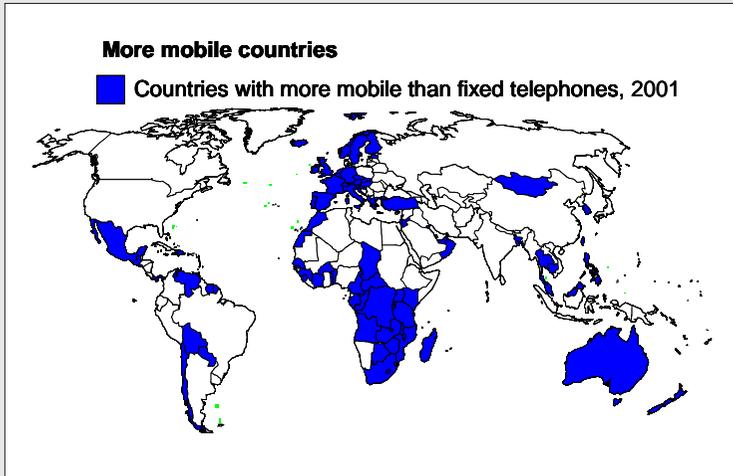
But perhaps more interesting is how mobiles are becoming a substitute to fixed-line telephones, even in a developed country such as Finland. The number of Finnish households with a fixed-line telephone has been falling since 1990, when it peaked at 94 per cent. Some 19 per cent of Finnish households now have a mobile telephone but no fixed-line telephone (only two per cent have no phone at all). Those with a preference for a mobile phone as a *substitute* for a fixed-line telephone fall into four categories: students, the unemployed, single-person households or those frequently moving residence. With the possible exception of the last category, all these are at the low end of the income scale. For them, mobile phones, not fixed-lines, are now providing universal service. The example of Finland has serious implications for the way universal access to telecommunications sector as a whole is being regulated. It shows that policy-makers and regulators must overcome their fixation with fixed-lines and look to mobile as a way of achieving social policy goals.

Figure 2: Mobile as the new global network

Mobile and fixed telephone subscribers worldwide, 1982 - 2005



Countries with more mobile than fixed telephone subscribers, 2001



Note: In the upper chart, 1982-2001 is based on real data; 2002-05 on projections. In the lower chart, 97 countries that are shaded had more mobile users than fixed-lines, as at year-end 2001.

Source: ITU World Telecommunication Indicators Database and ITU projections.

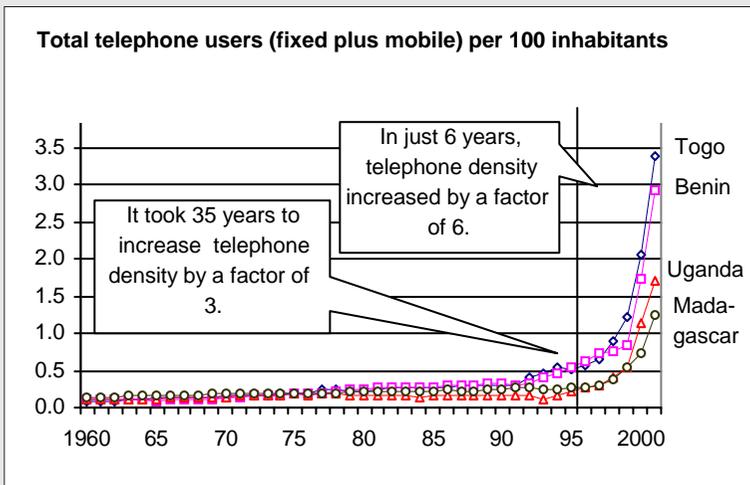
Box 2: LDCs leaping ahead with mobile

The combination of mobile communications, competition and prepaid cards has been a blessing for the world’s LDCs, many of which are experiencing unprecedented growth in telephone access. The main reasons are:

- Competition stimulates rapid growth. There is a direct link between the number of operators and network growth. Almost all LDCs that have managed to expand their mobile networks rapidly have done so with multiple operators.
- Mobile penetration does not appear to be heavily dependent on income in the early stages of development. Instead there is a strong desire for communications and perhaps also significant hidden wealth that does not show up in official statistics. Prepaid cards help those that would not qualify for a post-paid subscription. Thus LDCs do not need to be mired in telecommunication poverty.
- Mobile is helping to eliminate waiting lists. For the fixed-line network, potential users have to wait for the incumbent to lay copper in the ground to reach them. With a mobile network, consumers can just buy a mobile phone and start using it as soon as the first base stations are in place. The investment burden shifts from the state to the consumer.

These lessons are being widely applied. By the end of 2001, twenty-two out of 49 LDCs had more mobile than fixed subscribers. In many cases, the transition took only a couple years. There is no longer any reason why an LDC, with sufficient political will, cannot replicate this.

Network doublers



Source: ITU World Telecommunication Indicators Database.

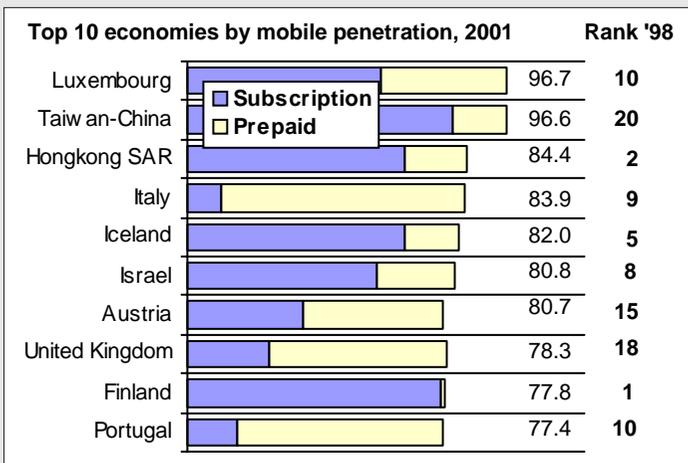


Box 3: Who is number one in mobile?

After several years of being top dog in mobile communications, Finland recently lost its title, rather surprisingly, to the Grand Duchy of Luxembourg. By December 2001, Luxembourg had almost cracked the 100 per cent mobile penetration level, meaning it will soon have more mobile phones than citizens. Part of this is explained by the estimated 70'000 'frontaliers' that commute to work in Luxembourg from bordering countries. Mobile has grown rapidly in Luxembourg since it introduced competition in May 1998, the last European Union member to do so. At the end of 2001, Finland only ranked ninth in mobile penetration. Why the slide? The answer is prepaid. Finland has very few prepaid mobile subscribers, only around two per cent of the total in 2000. If prepaid subscriptions were stripped out, Finland would be ranked second. Prepaid subscriptions can distort mobile cellular numbers. That is because some operators continue to count prepaid subscribers who have not used the network for months. Users may also have multiple accounts, allowing them to take advantage of each operator's special offers.

Ultimately, it is only a matter of pride as to who is number one. However mobile penetration rates are measured, the current level of mobile penetration in developed countries would have been unimaginable a few years ago. If we consider that these are *per capita* figures, including children, then we can safely assume that in most developed markets, the adult segment is reaching saturation in terms of mobile phones. That also provides an indication of where penetration is heading in the developing world. But it is difficult to determine what happens next, after saturation. Will subscriber growth continue? One scenario is that, with the advent of the mobile Internet, a typical user may purchase subscriptions for several different devices, including for their car and their home computer, as well as for their mobile phone. Another scenario is that users may purchase several different mobile phones in the same way that today they might buy several different watches or radios, to match their lifestyle. One thing is certain: mobile equipment manufacturers are busy dreaming up new ways to sell us more mobile phones.

Top mobile markets



Note: Subscription and prepaid shares based on 2000 percentages.

Source: ITU World Telecommunication Indicators Database.

3. The new missing link: The digital divide

“The nature of the digital divide is shifting, from quantity to quality... Effective solutions will require a triumvirate pact between governments, development agencies and the private sector”

The idea that access to information opens doors to wider economic and social development opportunities is not new. In 1984, the Commission for Worldwide Telecommunications Development, headed by Sir Donald Maitland, published the *Missing Link* Report. The Report pointed to the fact that the lack of telecommunication infrastructure in developing countries impedes economic growth. But its scope was limited in that it was mainly concerned with access to telephones rather than today’s wider concept of information and communications technologies (ICTs).

In 1996, Dr Pekka Tarjanne, then Secretary-General of ITU, initiated a United Nations inter-agency project for the “Right to Communicate,” aimed at providing access to basic ICTs for all. The motivation behind the project was to help reduce information poverty for developing countries. This goal is now at the heart of plans to hold a World Summit on the Information Society (WSIS), in Geneva in 2003 and Tunis in 2005, to focus global attention on this issue.

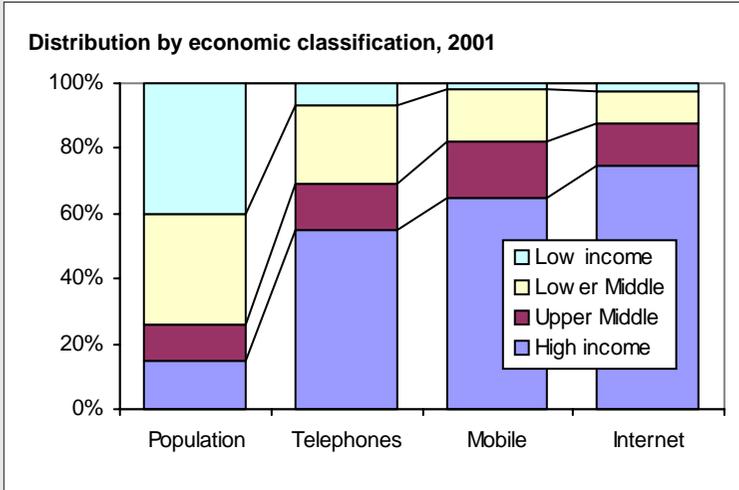
Today, the ‘missing link’ is referred to as the ‘digital divide’. The term is commonly taken to apply to differences in access to the Internet, which is much less evenly distributed than telephone access (see Figure 3, top). The divide exists between countries at different levels of development, and within a country, for instance between urban and rural areas, between men and women, between the educated and the unschooled or between the young and the elderly. It is a result of socio-economic disparities and thus little different from other income, health and education divides. The root cause of these disparities is poverty. The less money a country’s citizens have, the less likely they are to use ICTs. (see Figure 3, bottom).

But equating the digital divide to Internet access alone is too narrow a definition. The Internet is of little use to people who are not able to exploit electronic access to information to improve their lives. Access to information is a measure of power in society, and thus the digital divide reflects how power is distributed. There is a shortage of conclusive research and examples of how ICTs can transform the development process. To be used more widely, ICTs have to be relevant, easy-to-use and addictive. Training and locally relevant content will therefore be key factors in bridging the divide.

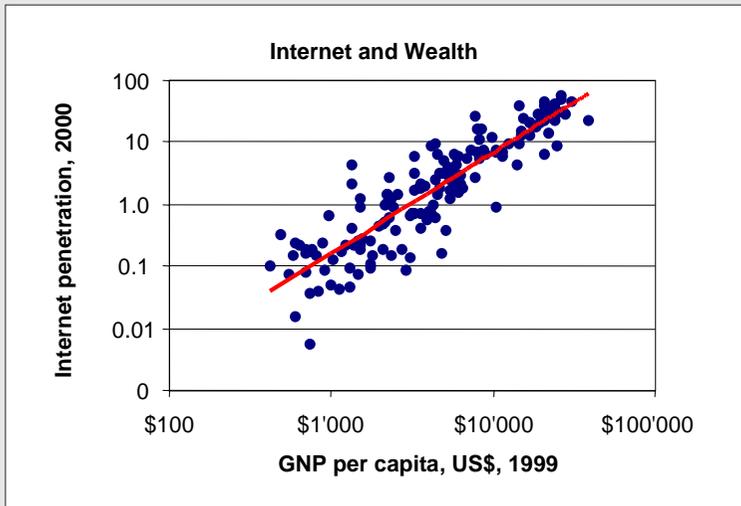
There is evidence that the divide in access to ICTs is shrinking. Developing nations have raised their share of the world’s Internet users from two per cent in 1991 to 23 per cent of the half a billion or so users around the world in 2001. But the nature of the divide is shifting; from basic to advanced communications, and from quantity to quality (see Box 1). The developed world has launched a number of initiatives to study the problem. Thus far, there has been much talk and hand-wringing but little action. Effective solutions will require a triumvirate pact between governments, development agencies and the private sector. The developed world can do much to help, for example by funding innovative grass-roots projects that harness ICTs to improve the livelihoods of local communities, incubating developing nation dot.coms and facilitating international connectivity to the Internet, especially among the least developed countries. Developing country governments must also play their part. This includes adopting appropriate national ICT strategies—based around private sector participation, market liberalization and independent regulation—and developing ambitious universal access policies.

Figure 3: The digital divide is an economic divide

Distribution of population, main telephone lines, mobile cellular subscribers and Internet users by country economic classification, 2001



Relationship between Internet (users per 100 inhabitants) and wealth (GNP per capita)



Note: Bottom chart: Logarithmic scales. Each dot represents one economy. GNP is in terms of purchasing power parity.

Source: ITU World Telecommunication Indicators Database.

4. Telecoms reform: What worked, what did not?

“Three basic ingredients for reform: privatization, competition, independent regulation... The difference between fast and super-fast growth is often the quality and timing of reform”

The year 2002 marks the twentieth anniversary of the first steps taken towards telecom sector reform, which can be dated quite precisely to 8 January, 1982: This was when AT&T agreed to the break-up of the Bell system monopoly. Since then, most countries around the world have embarked upon a process of reform, albeit using very different recipes. Once started, reform tends to be irreversible. And most countries have followed recipes that include three basic ingredients: private sector participation, market competition and creation of an independent regulatory body.

The acceleration in growth rates in the telecommunications sector in the final years of the twentieth century is a vindication that the basic recipe for reform was right. But what made the difference between fast and super-fast growth? One factor seems to have been a commitment to move swiftly, and not to miss out important steps. Both Chile and Argentina privatized their telecommunication operators around the same time. But whereas Chile moved ahead with competition, Argentina hesitated, allowing the incumbent a seven-year exclusivity period, later extended by three years. As a result, Chile's fixed-line teledensity, which stood at only half that of Argentina's at the time of privatization, had overtaken it by the time Argentina first introduced competition (see Figure 4, top).

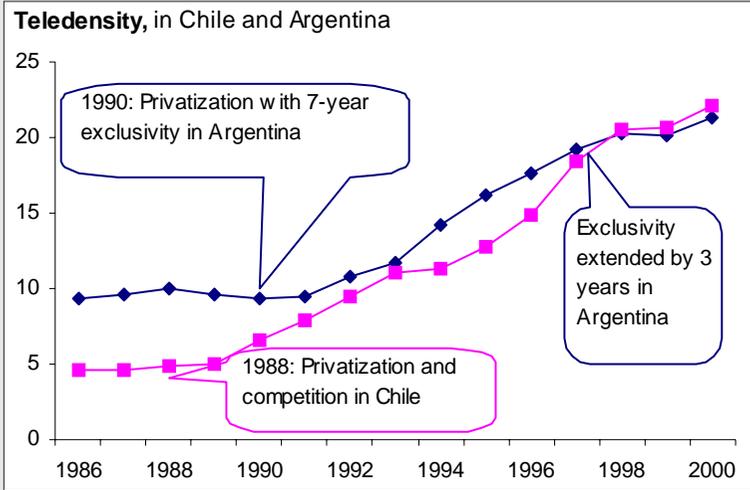
A similar pattern emerges in mobile communications. Both Hong Kong SAR and Singapore seem ideally suited to this service, having young, urban populations who spend their day on the move. But whereas Hong Kong introduced competition at an early stage, with a duopoly in 1988 and full competition in 1993, Singapore hesitated, delaying competition until April 1997. Consequently, Hong Kong gained a lead over its regional neighbour of around 18 months. After it had introduced competition, Singapore subsequently reduced this gap, but has not eliminated it (see Figure 4, bottom).

How can success and failure be measured, when all have succeeded, to a greater or lesser degree? One way is to look at the change in rankings over time. Table 1 shows those countries that experienced the greatest change in ranking (up or down) for total teledensity (the sum of fixed-lines and mobile users per 100 inhabitants) between 1990 and 2000. Among those that succeeded in improving their status during the decade are many countries that embarked on a process of reform early in the decade, like Chile, Hungary or the Philippines, as well as several that started more recently, like Botswana or Morocco. The stand-out cases are China and Viet Nam, which both followed a strategy of encouraging competition between different government ministries as well as private sector investment in their mobile sectors. When a government is truly committed to telecommunications investment, it can make a big difference relatively quickly.

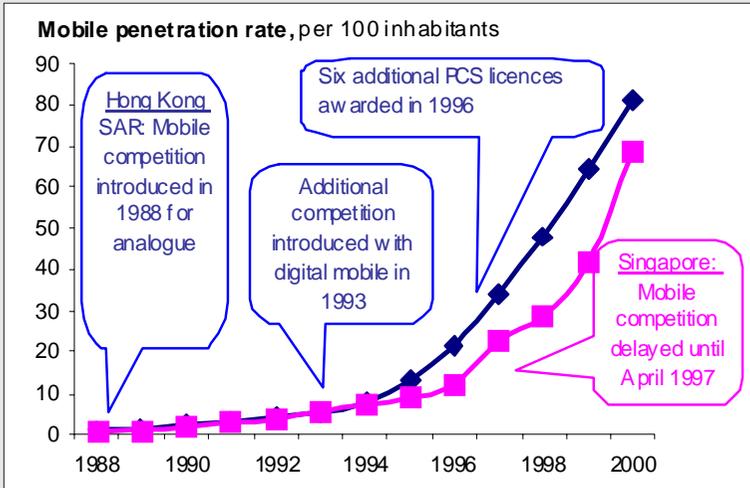
Among those that did not fare so well during the decade are several countries that have suffered from civil war and many that have retained state-controlled incumbents. But why does Canada feature in the list? Despite doing most things right from the policy viewpoint, Canadians, like their southern neighbours, never really seemed to embrace mobile communications as willingly as Europeans. But there's still time...

Figure 4: Sector reform in action

Growth in fixed-line teledensity, Chile and Argentina, 1986-2000



Growth in mobile teledensity, Hong Kong SAR and Singapore, 1988-2000



Source: ITU World Telecommunication Indicators Database.

Table 1: Winners and losers*Changes in total teledensity rank, between 1990 and 2000, for selected countries*

<i>Economies with rising rank</i>					
<i>Country</i>	<i>2000</i>	<i>1990</i>	<i>Rank</i> <i>2000</i>	<i>Rank</i> <i>1990</i>	<i>Change</i>
China	17.8	0.6	95	159	+64
Viet Nam	4.2	0.1	141	189	+48
Botswana	21.6	2.1	91	129	+38
El Salvador	21.8	2.4	90	125	+35
Jamaica	34.1	4.5	71	106	+35
Hungary	67.4	9.6	43	78	+35
Mauritius	38.6	5.4	67	100	+33
Chile	44.4	6.7	61	93	+32
Philippines	12.4	1.0	112	143	+31
Morocco	13.3	1.6	107	136	+29
Paraguay	20.7	2.7	92	120	+28
Cambodia	1.2	0.0	167	194	+27
Cape Verde	17.2	2.4	98	125	+27
Taiwan-China	137.0	31.4	5	31	+26
Poland	45.6	8.6	60	85	+25
<i>Economies with falling rank</i>					
<i>Country</i>	<i>2000</i>	<i>1990</i>	<i>Rank</i> <i>2000</i>	<i>Rank</i> <i>1990</i>	<i>Change</i>
Armenia	15.6	15.7	102	60	-42
Iraq	2.9	3.9	149	109	-40
Tajikistan	3.6	4.5	143	105	-38
Uzbekistan	6.9	6.9	128	92	-36
Kyrgyzstan	7.9	7.2	125	90	-35
Angola	0.7	0.8	177	146	-31
Liberia	0.2	0.4	190	162	-28
DPR Korea	4.6	3.8	138	111	-27
Canada	96.1	58.6	33	6	-27
Turkmenistan	8.4	6.0	123	97	-26
Cuba	4.4	3.1	140	115	-25
Moldova	16.5	10.6	99	74	-25
Kazakhstan	12.5	8.0	111	87	-24
Comoros	1.0	0.8	171	149	-22
Ukraine	22.7	13.6	87	66	-21

Note: Total teledensity is the sum of fixed-lines and mobile users per 100 inhabitants. 194 economies were ranked.

Source: ITU World Telecommunication Indicators Database.

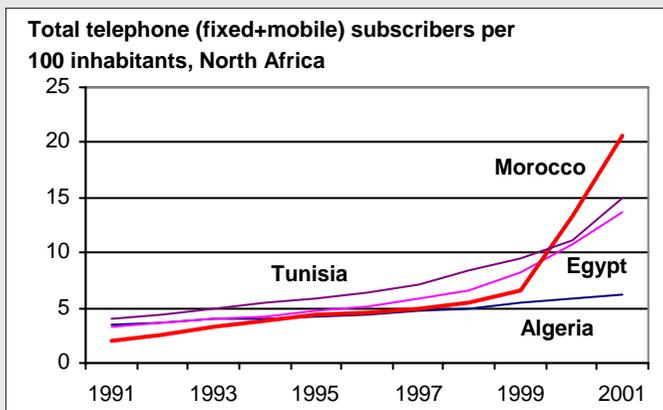
Box 4: Morocco leaving the rest behind

North Africa has been slow to embrace telecommunication reform. It was not until 1998, when Egypt issued two mobile licenses, that the regional market opened. Morocco, the poorest nation in the area, followed with a series of market liberalization moves. It licensed a second mobile operator, Médi Telecom, in July 1999, setting a record for a developing country with the auction price of US\$ 902 million. In December 1999, it sold 35 per cent of its incumbent operator, Maroc Telecom, to Vivendi of France. Since then, Morocco has not looked back. It has gone from the region's lowest telephone access levels to its highest, leaving its neighbours far behind.

By August 2000, just six months after the second operator was launched, there were more cellular than fixed telephone subscribers in Morocco. By the end of June 2001, Médi had 754'821 customers and covered around 70 per cent of Morocco's population. Not to be outdone, Maroc Telecom, spent around US\$ 275 million building out its network. From a base of only 369'000 subscribers at the end of 1999, Maroc Telecom had reached one million clients in June 2000, two million in November 2000 and three million in May 2001. Now, some 95 per cent of Morocco's population is covered by a mobile signal. A prepaid package, including a handset, can be obtained for DH 408 (US\$ 36), roughly 2.6 per cent of average income. Recharge cards come in denominations as low as DH 50 (US\$ 4.44), providing ten minutes of peak time conversation (15 minutes off peak).

Why has Morocco done so much better than the others? First, Médi's strategic investors were eager to recoup the cost of the license fee, so did everything to get the network going quickly. The same could be said of Maroc Telecom's new owners. Second, relatively high fixed-line tariffs encouraged a jump to mobile; indeed Morocco's fixed-line subscribers declined in 2001. Third, Morocco has North Africa's most independent regulator, which has inspired confidence in investors. By contrast, Egypt's incumbent actually sold off its mobile network. Algeria, witnessing what was going on in neighbouring Morocco, auctioned a second mobile license in 2001. Tunisia, unsatisfied with bids it received for a second mobile license, has put the process on hold. Meanwhile, Morocco is getting further and further ahead.

Morocco on the move



Source: ITU World Telecommunication Indicators Database.

5. Reinventing telecoms

“A gale of creative destruction is currently blowing through the industry... The telecommunication sector must reinvent itself for a new age of plentiful and ubiquitous supply”

The telecommunication industry has undergone a major transformation over the last two decades. Convergence has pushed traditional telecommunication operators into new areas such as Internet and broadcasting. New technologies, such as mobile communications, and service innovations, such as prepaid cards, have changed the economics of network roll-out, especially in developing countries. The new telecom players are global in nature, with interests that cut across different sectors. The industry in 2000 was worth almost a trillion US dollars in terms of service revenues, and the top ten operators alone generated profits of almost US\$ 50 billion. So why the pessimism?

During calendar year 2001, more than 470'000 job losses were announced. Share prices plummeted and several bold ventures—to surround the planet with satellites (Iridium) or with fibre optic cable (Global Crossing)—ended in bankruptcy. Internet, the mere mention of which was sufficient to create a scramble for share options in the 1990s, became a dirty word in the new century as dot.com turned to dot.bomb. What went wrong?

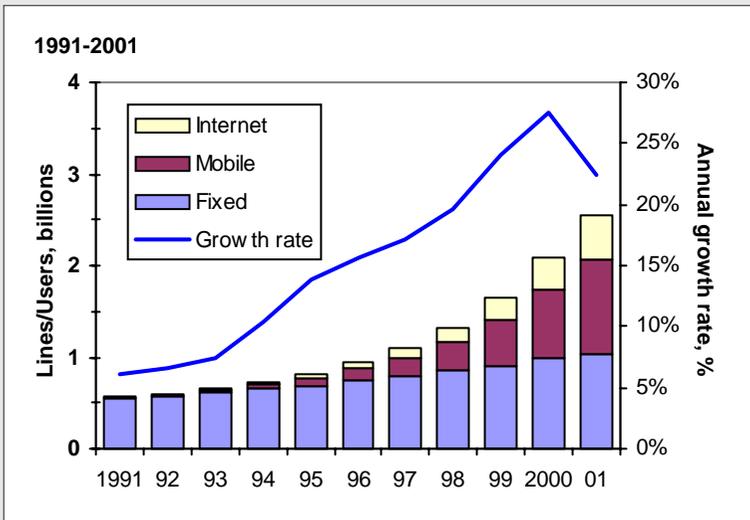
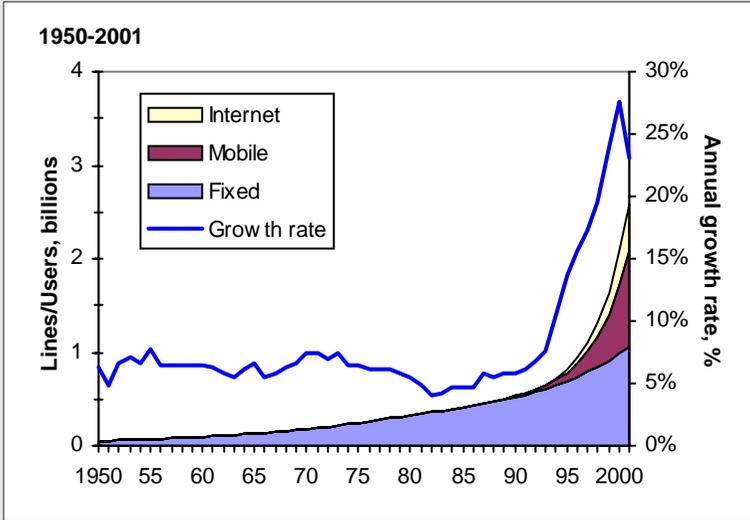
As ever, it pays to take a historical perspective. For most of the period since the Second World War, the industry has bumbled along with comfortable network growth rates of between five and seven per cent per year. But things changed around the mid-1990s when growth rates started to go up and up, peaking at a heady 28 per cent in 2000. Underlying these statistics is a period of high and sustained investment. Much money was spent in acquiring shares in telecommunication companies (e.g., through privatizations, which raised more than US\$ 100 million in the last years of the twentieth century) and acquiring licences to provide services (which cost approximately the same sum in the first years of the twenty-first century). But the main investment was in creating new networks and extending old ones. In 2000, more than US\$ 200 billion was invested, just by traditional telecommunication operators. This is almost twice the level of a decade earlier.

Given that a user's capacity to make and receive telephone calls or browse the Internet is finite, and that competition has succeeded in doing its job of reducing prices, and thereby profit margins, something had to give. What finally did break was investor confidence. It is now much harder to raise venture capital to build new networks, at least in the already well-supplied countries of the developed world. Only in the emerging nations, where consumers' appetite is still far from being satisfied, do speculative investments still seem a good bet.

What happened in the late 1990s is the sort of radical shift that usually only happens every fifty years or so. Economists call it a “kondratieff long wave”; journalists call it a “feeding frenzy”. It is generally caused by the confluence of rapid technological change with a shift in market expectations, in this particular case associated with mobile overtaking fixed-line networks, and with data overtaking voice. Add to this rich mix the fact that the process of sector reform, begun in the 1980s, was finally bearing fruit, and the results are evident. We may not see its like again. But it was fun while it lasted.

Figure 5: The fifty-year long wave

Fixed-lines, mobile phones and Internet users (in billions), and annual growth (in %)



Source: ITU World Telecommunication Indicators Database.

6. Reinventing targets

“The beginning of a new century is an opportune time to set new targets... For developing countries, mobile coverage is now a key indicator”

The Maitland Report ended with a plea that all of humanity be brought into the reach of a telephone by the end of the century. That rather abstract target was always difficult to measure. It has also become a bit outdated, now that we have mobile phones and the Internet.

The beginning of a new century is an opportune time to reinvent measurable targets for ICT access. It is important to distinguish between *Universal Service* and *Universal Access*. Universal Service refers to a high level of ICT penetration at the household level and is more suitable for high and upper middle-income countries. Universal Access refers to a high level of ICT availability. This can be provided via homes, work, schools and public access locations and this measure is more appropriate for lower-middle and low income developing nations.

The Universal Service ICT targets include a mix of telephone lines, personal computers and Internet access, the common essentials for plugging into the online age. One problem with Universal ICT Service is that households should not be forced to adopt computers or the Internet if they do not want to. Nonetheless, if the benefits of ICTs were clearly understood, then it seems that a high percentage of homes would use them. Targets for Universal ICT Service are set at levels reached by high achievers (see Figure 6, bottom). This includes a telephone penetration rate of above 90 and personal computer and Internet subscription rates at over 50, to be achieved by 2006. These may need to be re-examined in the future, particularly in light of broadband and mobile Internet access developments. Every country in the high and upper-middle income category should try to gather these statistics in order to gauge the level of ICT availability in their nations.

Mobile is the largest telecommunication network in many countries, particularly lower income nations. It seems appropriate that it be included in universal access determination. Furthermore, mobile cellular has the added feature that accessibility to the network is easy to measure. It would be defined as the percentage of the population within the reach of a terrestrial mobile cellular signal, regardless of whether they are subscribers. This is the first comparable measure that allows tracking of the Maitland Report recommendation that all of humanity be brought into reach of a telephone. Most developed nations, and some developing ones, have mobile population coverage rates of close to 100 per cent. Considering the critical importance of telecommunications, governments should encourage their mobile operators to achieve a coverage rate of at least 90 per cent by 2006. All developing countries should strive to collect this key indicator of telecommunication accessibility.

Table 2: Millennium ICT goals

Telecommunication targets to be achieved by 2006

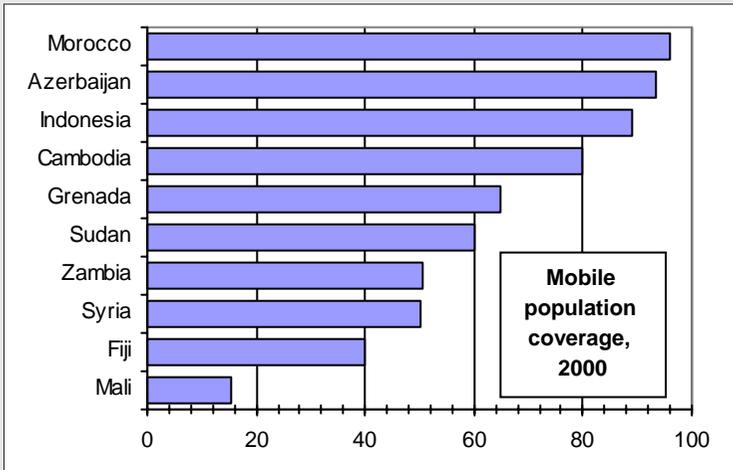
High and upper middle economies	Household telephone penetration > 90 % Household PC Penetration > 50 % Household Internet Penetration > 50 %
Lower-middle & low income economies	Mobile population coverage > 90 %

Note: Telephone penetration includes mobile and fixed. Mobile population coverage refers to the ability to receive terrestrial mobile cellular signals.

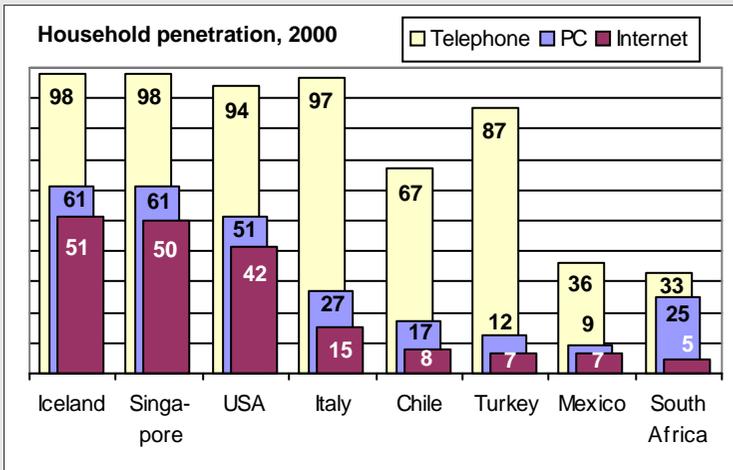
Source: ITU.

Figure 6: Different targets for different people

Mobile population coverage, selected countries, 2000



Household telephone, PC and Internet penetration, selected countries, 2000



Note: In the top chart, mobile population coverage refers to the percentage of the population that is within reach of a terrestrial mobile cellular signal. In the bottom chart, data for Iceland refer to 1998. Data for Turkey refer to urban areas.

Source: ITU World Telecommunication Indicators Database, national statistical agencies and Nielsen/NetRatings.

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Reinventing Telecoms

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