ITU-BDT Regional Seminar on

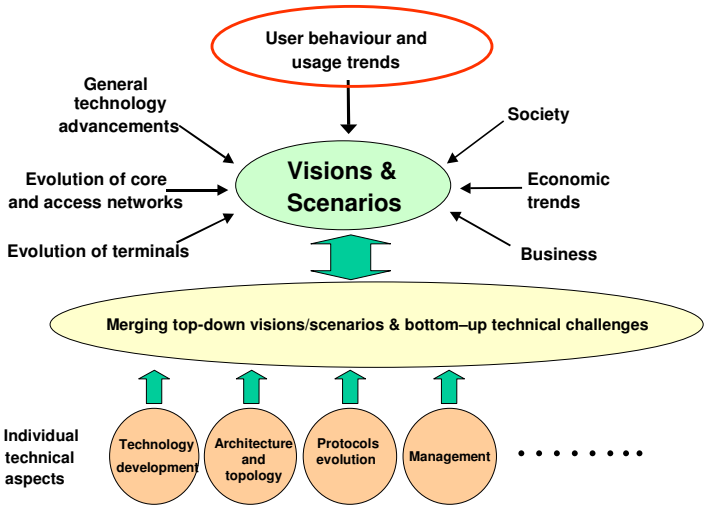
Fixed Mobile Convergence and Guidelines on the smooth transition of existing mobile networks to IMT-2000

Session 3.2.1

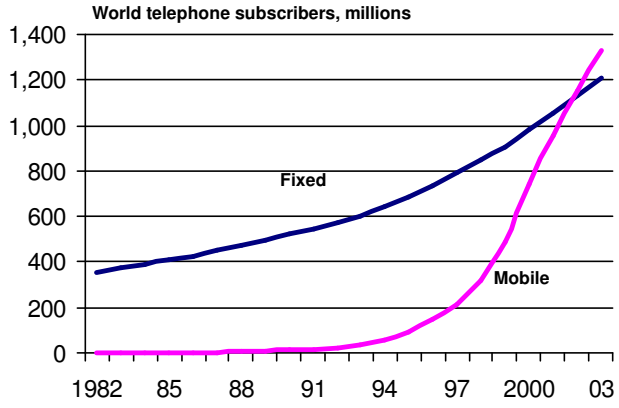
Trends for Fixed and Mobile users growth based on statistics data for ICT Indicators

Ignat Stanev

Networks Evolution Factors



Mobile and Fixed users

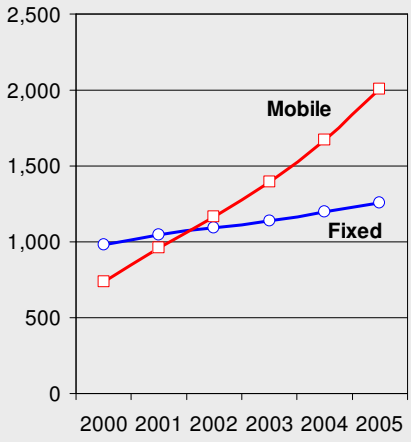


Worldwide GSM Subscribers as at end February 2004 = 1024.3 Million

GSM accounts for **72.5 % of the World's digital market** and **72% of the World's wireless market (1.4 B)**

Worldwide fixed and mobile subscribers

Worldwide fixed-line and mobile telephone subscribers, millions



Source: TMG, Inc. (2004 estimate and 2005 forecast).

- Mobile passed fixed in 2002 globally; since then the gap has grown
- Today almost every country has more mobile than fixed line subscribers

Telecommunications Management Group, Inc.

Michael Minges, World Telecom/ICT Indicators Meeting
Geneva, Switzerland
10-11 February 2005

Impact of Cellular mobile development on the Fixed network:

The impact of the Cellular mobile development on the fixed network is based on the statistics for:

- Fixed network teledensity
- Percentage of residential lines
- Cellular mobile teledensity

The compound annual network growth of the telephone lines and the mobile subscribers could also serve as indicator

Impact of Cellular mobile on Fixed network - Fixed and Cellular mobile network growth

Network growth (compound annual growth rate in %)	New telephone lines added 1997-2002	New mobile subscribers added 1997-2002
Low Income	12,5	76,5
Lower Middle Income	14,4	67,6
Upper Middle Income	4,4	57,4
High Income	1,2	29,9
Africa	6,0	74,9
Americas	2,3	28,7
Asia	11,8	43,3
Europe	2,6	46,3
Oceania	0,4	24,3
WORLD	5,3	40,2

World telecommunication/ ICT indicators ITU Database

CAGR is computed by the formula:

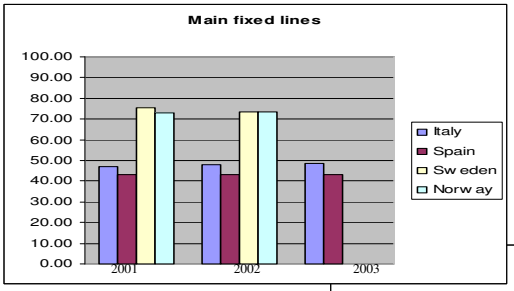
$[(Pv / P0)^{(1/n)}]-1$

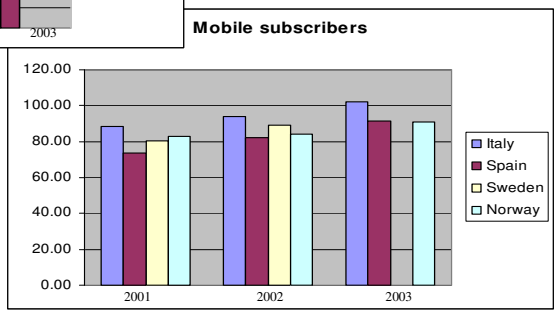
Pv = Present value

P0 = Beginning value

n = Number of periods

Fixed and mobile users growth (high income) :





Impact of Cellular mobile on Fixed network

Case of Italy:

1,4 % CAGR for fixed network ,
35,2 % CAGR for mobile network
for **1997-2002**

Year **1997**: fixed network teledensity **44,79 %** ,
residential lines **76,5 %**
cellular mobile teledensity **20.46 %**

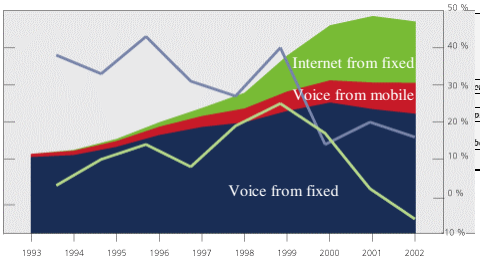
Year **2003**: fixed network teledensity **48,40 %** ,
residential lines **79,2 % (2001)**
cellular mobile teledensity **101.76 %**

Comparison of traffic for fixed line telephony and mobile telephony

Case of Norway:

	Trafikk fordelt på trafikkretninger *Traffic splitted on traffic directions*			Gjennomsnittlig varighet per samtale *Average duration per call*		
	Privat *Residential*	Bedrift *Business*	*Total*	Privat *Residential*	Bedrift *Business*	*Total*
Ordinære numre *Ordinary numbers*	45.5 %	61.2%	50.5%	5.8	3.5	4.6
Mobiltelefon *Mobile telephone*	7.1%	11.0%	8.3%	2.4	2.0	2.2
Utlandet *International*	1.9 %	3.1%	2.3%	7.9	3.8	5.3
8xx-numre *Premium services*	30.7 %	19.9%	27.3%	13.2	7.7	11.3
Andre numre *Other numbers*	14.8 %	4.8%	11.6%	5.7	1.3	3.9
Total	100.0%	100.0%	100.0%	7.0	3.7	5.4

Traffic minutes for fixed line telephony



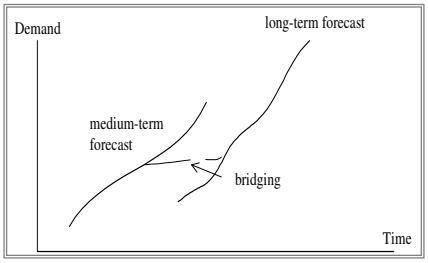
	Trafikk fordelt på trafikkretninger *Traffic splitted on traffic directions*		Gjennomsnittlig varighet per samtale *Average duration per call*	
	2001	*2002*	*2001*	*2002*
	55.5%	58.9%	1.47	1.48
ors fixed network	37.7%	34.1%	2.18	2.17
	3.7%	4.2%	2.97	3.19
phical	1.3%	1.4%	1.42	1.38
bers)	1.9%	1.5%	1.65	1.34
	100.0%	100.0%	1.63	1.62

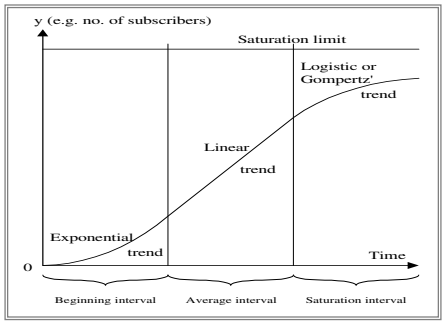
Traffic minutes for mobile telephones

- ***ratio fixed / mobile – above 3 / 1***

Long term / strategic network planning :

Based on long-term forecasting - for urban, sub areas, populated places, etc.





Demand/service forecasting uses different methods, including trend methods based on saturation limit

Problem: how to define a saturation limit

Fixed network users potential

Highly developed countries (close to saturation):

Country	Population (in thousands)	Teledensity [%]	Average house-hold size	Teledensity per house-hold [%]	Percent of residential lines
Australia	19,157	53,86	2,64	101,2	75,0
Canada	30,750	63,45	2,65	98,2	63,9
France	58,892	56,89	2,46	94,0	69,2
Germany	82,260	65,08	2,16	95,5	77,0
Italy	57,298	48,07	2,71	96,9	79,2
Japan	126,919	55,83	2,70	116,8	75,8
New Zealand	3,831	44,81	2,91	103,0	78,5
Republic of Korea	47,300	48,86	3,04	105,5	74,1
Spain	40,600	50,62	3,25	100,8	83,5
Sweden	8,881	68,20	2,22	98,7	67,9
Switzerland	7,204	74,42	2,39	99,6	60,0
United Kingdom	59,766	59,086	2,38	93,0	71,0
United States of America	275,130	64,58	2,58	94,1	67,6

- *teledensity per house-hold about 100%*
- *ratio residential to business from 2 / 1 to 3 / 1*

Simple method to evaluate fixed subscribers potential :

Assumptions:

- **Teledensity per household in the highly developed countries - around 100% (one connection per household)**
- **Ratio residential to business subscribers - in the range 2 to 1 - 3 to 1 , possibly depending on the strength of the economy**

Note: Average household size in the highly developed countries - between 2 and 3

Simple method:

- Fixed network subscribers potential is **number of** households **increased by** 1/3 for high potential economies or by 1/4 for others

Application of the simple method for evaluating fixed network users potential :

Bulgaria :

2,9 Million households (2,7 HH size) - potential of 3,9 Million fixed subscribers (50 % teledensity) – 38,0 % teledensity now*

China :

347 Million households (3,7 HH size) – potential of 462 Million fixed subscribers (36 % teledensity) – 16,7 % teledensity now *

South Africa :

10,2 Million households (4,5 HH size) – potential of 13,6 Million fixed subscribers (30 % teledensity) – 11,0 % teledensity now *

Russia:

52 Million households (2,8 HH size) – potential of 78 Million fixed subscribers (53 % teledensity) – 24,2 % teledensity now *

** Available WTID data*

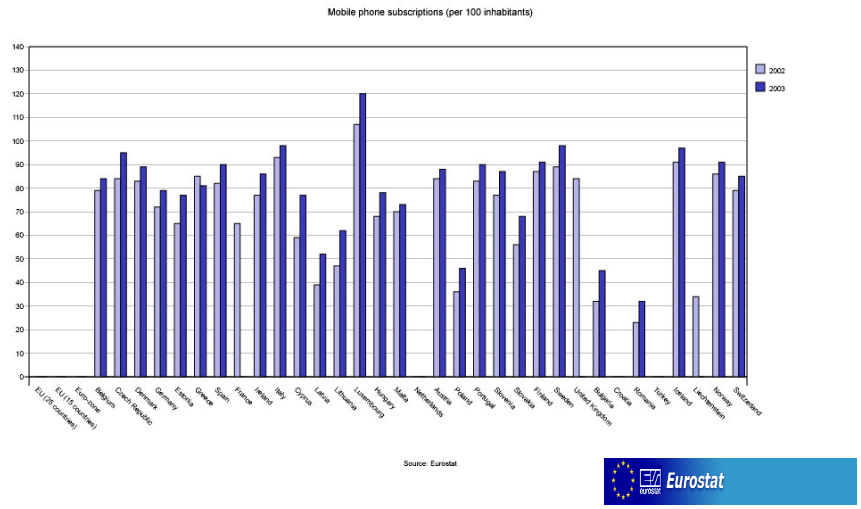
Cellular mobile network users potential

Highly developed countries:

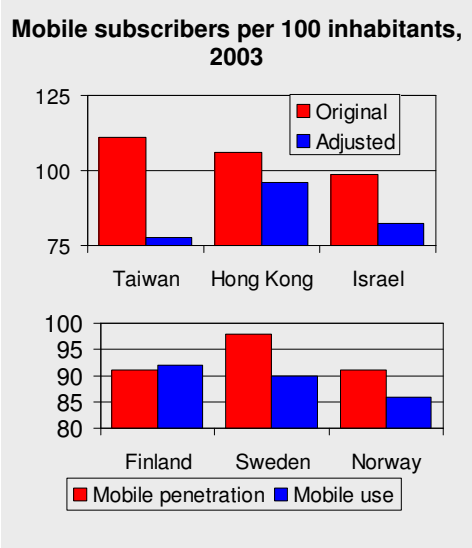
Country	Population (in thousands)	Population below 6 [%]	Population above 80 [%]	Cellular mobile Teledensity [%]
Australia	19,662	-	-	71,9
Canada	31,414	-	-	41,7
France	59,637	-	-	69,60
Germany	82,537	-	-	78,5
Italy	56,464	4,5	4,0	101,8
Japan	127,440	-	-	68,0
New Zealand	3,939	-	-	64,8
Republic of Korea	47,600	-	-	69,4
Spain	40,683	4,6	3,8	91,6
Sweden	8,943	5,1	5,0	88,9
Switzerland	7,281	-	-	84,3
United Kingdom	59,088	-	-	84,1
United States	288,370	-	-	54,3

- *teledensity above 90%, related to population brake down*

Mobile subscribers - EU



Mobile subscribers



Important to be precise about subscribers in countries already exceeding 100 %

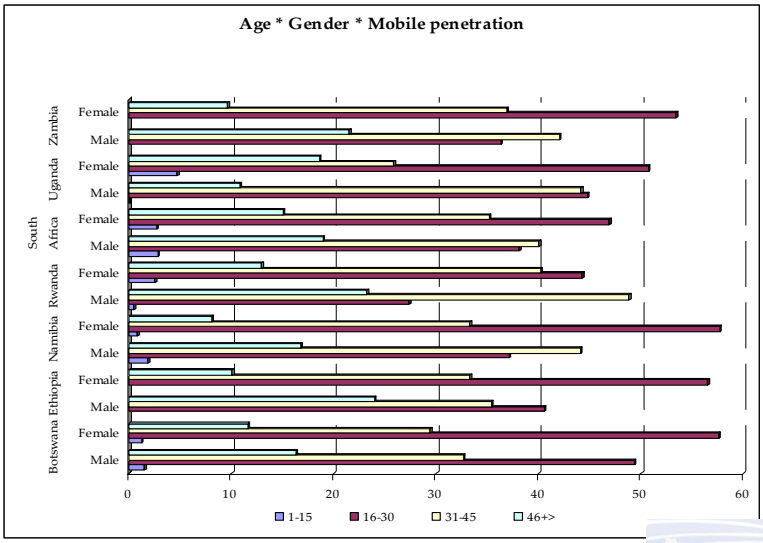
- Taiwan: **20-30%** have 2nd SIM card
- Hong Kong: **24%** of prepaid non-active
- Israel: ~ **20%** double counted (due to churn and "liberal" counting policies) or non-resident subscribers

Age ranges for mobile use:

- Finland: **15-74**
- Sweden: **16-75**
- Norway: **9-79**

Source: TMG, Inc. adapted from national regulatory & national statistical agencies.

Mobile penetration - Africa



researchICTafrica.net

Simple method to evaluate cellular mobile network users potential :

Assumptions:

- **Cellular mobile Teledensity in the highly developed countries**
  - **in a range 40% to 90% (one case above 100%)**
- **Individual usage of the network obviously related to the population volume**
- **Possible correlation with population brake down by age**
  - **e.g. All above 6 and below 80 are users**

Simple method:

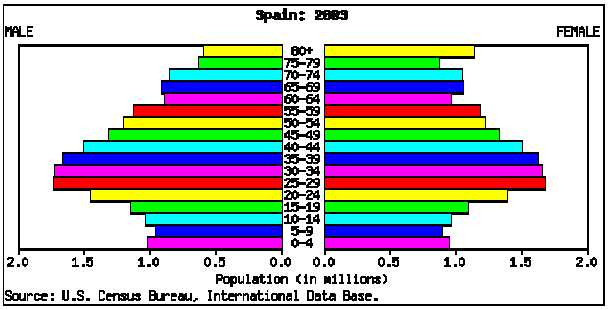
- Cellular mobile network users potential is **related to** population brake down by age **excluding only** unable/unwilling to use telecommunications, e.g. age below 6 and above 80

Cellular mobile network users potential

Case of Spain :

Cellular mobile teledensity from ITU database - **91.6 %**

Correlation with population - brake down by age



4,6 % of population below **6**

3,8 % of population above **80**

- ***user potential of about 91,6 % expected***

Teledensity statistics for some LDCs

Country	Total number of subscribers	Total teledensity [%]	Mobile teledensity [%]	Teledensity per household [%]
Angola	**215,000**	**1,54**	**0,93**	**-**
Eritrea	**38,078**	**0,92**	**0,0**	**-**
Ethiopia	**532,830**	**0,77**	**0,14**	**1,3**
Guinea	**137,670**	**1,78**	**1,44**	**-**
Lesotho	**125,450**	**5,79**	**4,47**	**5,6**
Malawi	**220,110**	**2,1**	**1,29**	**-**
Myanmar	**423,840**	**0,85**	**0,13**	**-**
Tanzania	**1,040,300**	**2,95**	**2,52**	**2,0**
Solomon Islands	**7,600**	**1,71**	**0,31**	**-**

User behaviour and usage trends

Findings of the United Nations :

- all growth in population will concentrate in urban areas, no growth in rural areas
- most of the growth will concentrate in urban areas of less developed regions

Users will concentrate in urban areas, as urban areas put higher pressure on the individual to "do what the others do" and from technical point it is easier to connect people in urban areas

Teledensity statistics for largest cities

	Population as % of total	Large city teledensity [%]	Rest of country teledensity [%]	Overall teledensity [%]	
Low Income	6,0	9,26	2,15	2,54	1 : 4,3
Lower Middle Income	5,8	24,84	7,30	8,77	1 : 3,4
Upper Middle Income	16,1	30,77	21,10	22,94	1 : 1,5
High Income	10,8	57,49	54,83	55,21	1 : 1,05
Africa	12	6,42	1,39	1,99	
Americas	13,6	34,8	21,72	11,39	
Asia	4,8	25,97	6,94	7,84	
Europe	10,9	48,24	30,19	31,98	
Oceania	17,8	45,97	36,77	38,38	
WORLD	7,7	17,4	25,25	9,20	

ITU WTID 2002

Rural network development

Conclusions based on the above data:

- **Big gap between large cities and rural areas in low and middle income countries**

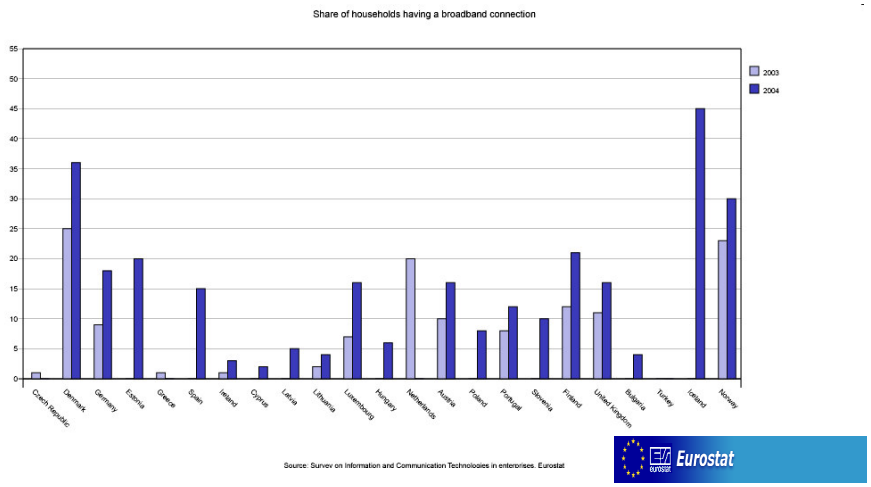
Low Income:
9,3 % teledensity versus 2,1 %

Middle Income:
24,8% teledensity versus 7,3 %

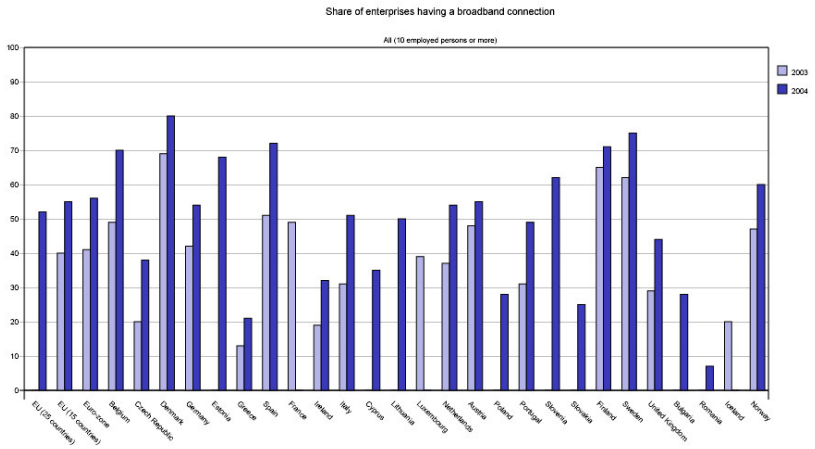
EU Project - Broadband for All

- To develop the network technologies and architectures allowing a generalised and affordable availability of broadband access to European users, including those in **less developed regions, peripheral and rural areas**.
- Optimised access technologies, as a function of the operating environment, **at affordable price** allowing for a generalized introduction of broadband services in Europe including less developed regions

Broadband connection – households(EU)



Broadband connection – enterprises(EU)



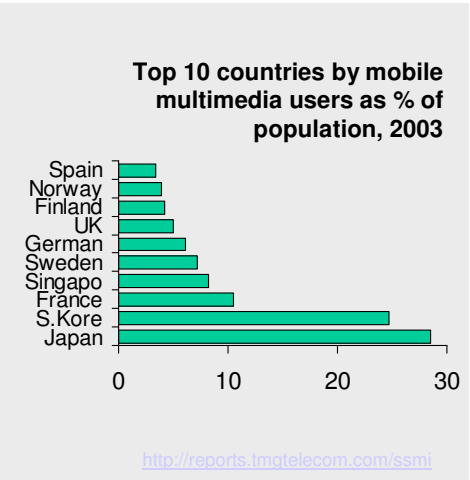
Connected to exchange with support of xDSL-technology, cable network upgraded for Internet, or other broadband technologies.

Broadband fixed connection – high income

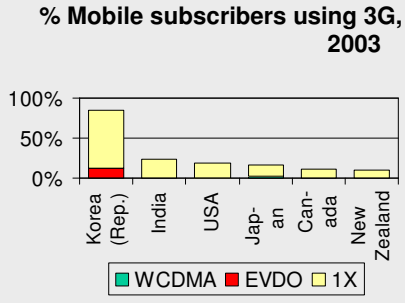
Countries	Population	DSL Internet	Cable modem Internet
Australia	19941000	372000	215400
Austria	8073000	261000	340000
Belgium	10372000	518920	353480
Canada	31720000	2170000	2483000
Denmark	5393500	473480	243600
Finland	5219000	405700	85400
France	59900000	2967400	393850
Germany	82510000	4500000	60000
Greece	11457000	360	0
Iceland	289000	40419	0
Ireland	4025300	25300	4900
Italy	54952000	2200000	0
Japan	127520000	11197000	2578000
Korea (Rep. of)	48424000	6436000	3828200
Luxembourg	451500	5697	130
Netherlands	16285000	920000	930000
New Zealand	4009600	39000	4500
Norway	4580600	308520	69734
Portugal	10336000	184340	315580
Spain	40940000	1562500	571710
Sweden	8976100	421400	2352900
Switzerland	7317700	487000	350000
United Kingdom	58117000	854000	960000
United States	292300000	9333000	15777000
Total	**913109300**	**45683036**	**31917384**

8.5 % penetration for end of 2003

Broadband Mobile subscribers



http://reports.tmgtelecom.com/ssmi



IT density as bases for new services requiring PC/Internet access

Density statistics for Information technology :

	Internet hosts per 10 000 inhabitants	Internet users per 10 000 inhabitants	PCs per 100 inhabitants
Low Income	0,98	62,21	0,59
Lower Middle Income	4,32	264,94	2,45
Upper Middle Income	78,69	992,66	8,24
High Income	1 484,20	3 992,87	37,31
Africa	3,38	84,89	1,06
Americas	1 332,97	2 164,28	26,57
Asia	28,73	433,97	2,18
Europe	191,47	1 804,54	17,94
Oceania	885,26	2 771,59	39,91
WORLD	232,66	820,81	7,74

Ratio Low Income/High Income : 1 : 64 1 : 15 1 : 63 1 : 15

Millennium Development Goals - trends 1990-2003

	Telephone lines and cellular subscribers per 100 population		Personal computers in use per 100 population		Internet users per 100 population	
	1990	2003	1990	2003	1990	2003
World	10	41	2	**10**	<1	**11**
Developed regions	38	125	9	**45**	<1	**45**
Developing regions	2	25	<1	**3**	0	**5**

Source: World Telecommunication Indicators Database

IT penetration in some countries from Africa Region :

Country	Population	Personal computers	Internet users per 100 inhabitants
Angola	14,358,000	27,000	0.29
Botswana	1,760,000	70,000	3.49
Cameroon	16,258,000	90,000	0.38
Central African Rep.	4,140,000	8,000	0.13
Chad	8,084,000	13,000	0.19
Congo (Democratic Republic of the)	52,771,000		0.09
Congo	3,500,000	15,000	0.43
Eritrea	4,151,000	12,000	0.23
Ethiopia	69,363,000	150,000	0.11
Ghana	22,444,000	82,000	0.78
Kenya	31,708,000	204,000	1.27
Lesotho	2,174,000		0.97
Madagascar	16,340,000	80,000	0.43
Mozambique	18,831,000	82,000	0.28
Namibia	1,924,000	191,100	3.38
Nigeria	123,314,000	853,000	0.61
Sudan	33,286,000	200,000	0.9
Swaziland	1,044,000	30,000	2.59
Tanzania	35,313,000	200,000	0.71
Uganda	25,599,000	102,500	0.49
Zambia	11,195,000	95,000	0.61
Zimbabwe	11,765,000	620,000	4.3
South Africa	46,365,000	3,300,000	6.82

High Income:

39.93

Conclusion for user behaviour and usage trends

- There is still considerable potential of telecom users in the world, most of all in the developing countries
- Users in the developing countries are concentrated and will continue to concentrate in urban areas
- Traditional voice service is expected to dominate in the developing countries for the low density of Information technology