

Source: UMTS Forum

Title: Market Evolution and Forecast

Agenda item: 11

Document for:

Decision	
Discussion	
Information	X

1 Introduction

The attached UMTS Forum Report is intended for use by the PCG members only.

"This document is produced by the UMTS Forum, an association of telecommunications operators, manufacturers and regulators as well as IT and media industries interested in broadband mobile multimedia who are active both in Europe and other parts of the world. All members of the Forum have supported the development of this document. However, the views and conclusions expressed in this report do not necessarily represent the views of every member and they are not bound by them. It should be borne in mind that since this report was published technologies and markets have moved on and therefore the contents may no longer be up to date and the UMTS Forum cannot be held responsible for any errors or omissions. Copyright UMTS Forum."

Report No. 35
Report from the UMTS Forum

Mobile Market Evolution and Forecast

Long term sociological, social and economical trends

Forecast of number of mobile users 

Table of content

1	Introduction	4
2	3GPP context	5
3	The State of the Mobile Communication penetration in 2002	6
3.1	Historical penetration statistics	6
4	Main sociological, social and economic trends – reference indicators	9
4.1	Major Historical Drivers for Mobile Penetration	9
4.2	Key Socio-Economic Drivers of the Mobile Communication Market – reference indicators	9
4.2.1	Income	9
4.2.2	Human Development	10
4.2.3	Technology Affinity	10
4.2.4	Urbanisation	10
5	Penetration forecast methodology	12
5.1	General description of the methodology	12
5.2	Reference indicators and categories of countries	13
5.3	Population, density distribution and environments	14
5.4	Historical mobile penetration	16
5.5	Long term penetration potential and maximum growth rate	17
5.6	The S-curve diffusion model	19
6	World Mobile User Base Forecast	21
7	Conclusions	24
	Annex 1 – Bibliography of market studies	25
	Annex 2 –list of countries and their categorisation	27
	Annex 3 - Mobile user forecasts per sub-continental grouping (in mio.)	32

This report is produced by the UMTS Forum, an international, cross-sector industry body comprising operators, manufacturers, regulators, application developers, research organisations and IT industry players. The UMTS Forum is promoting a common vision of the development of 3G/UMTS and of its evolution, aiming to ensure its worldwide commercial success. The UMTS Forum has a number of partnerships with international organisations, institutions and other industry bodies (ITU, EC, 3GPP, ETSI, GSMA, 3G Americas, GSA...)

The main activities focus on **Spectrum**, with studies and contributions on harmonisation of global spectrum for IMT-2000 and its evolution and spectrum arrangements. Other activities covers **UMTS Vision, Future Research & Market** (Studies into services & applications; market drivers; customer behaviour) but also **Regulation** (guidance to regulatory authorities and national administrations on licensing and other 3G-related issues), **Technical Studies & Implementation** (e.g. security, IMS, mTLD, portals, billing & payments and also complementary technologies including WLAN, TDD).

The work to write this report has mainly been done in the Operators Group, a sector group of the Forum with the support of LDA¹. This market study has been carefully developed on the basis of available data from ITU, UNO, World Bank and other International Organisations. It covers the timeframe from 2002 to 2020, where the world population increases by 22%. This report is written to be of interest to parties world-wide involved in the future development of the mobile telecommunications industry. This report is an input towards the preparations for the World Radio Conference WRC-2007 within ITU-R WP8F addressing mobile market evolution and trends.

This report follows on from the previous reports (N° 8, 9, 10, 11, 13, 17, 18 and 20) of the UMTS Forum which dealt with a market and services related issues.

Copyright © UMTS Forum, 2004. All rights reserved, respecting the rights of earlier copyright holders. Reproductions of this publication in part for non-commercial use is allowed if the source is stated. For other use, please contact the UMTS Forum Secretariat, Russell Square House, 10-12 Russell Square, London WC1B 5EE, UK. Telephone +44 20 7 331 2020.

All possible care has been taken to assure that the information in this report is accurate. However, no warranty of any kind can be given with regard to this material. The UMTS Forum shall not be liable for any errors contained in the report or for incidental consequential damages in connection with the use of the material.

¹ LDA, a consulting company : j.deloffre@ldanumsight.com

1 INTRODUCTION

This Report provides the results of the mobile market analysis and forecast of the future market, based on internal and external studies, until the year 2020 as well as detailed data on the forecast of mobile penetration in the world.

This document is structured in four main parts:

- The Status of the Mobile Communication penetration in 2002
This part describes the mobile penetration level reached end 2002 in the world as reported by ITU.
- The main sociological, social and economical trends and related indicators
This part describes the general trends envisaged by international bodies such the UN, the world bank, and proposed 4 indicators to quantify per country the impact of these trends.
- Penetration forecast methodology
This part describes a methodology to forecast the penetration of mobile per country using the current figures, the reference indicators. In order to obtain a single methodology applicable to all countries in the world, the countries are segmented in 6 categories.
- World mobile user base forecast.
This part establishes forecasts of mobile user base, per country (with details per geographical environment) using the methodology and parameters described above.

2 3GPP CONTEXT

The 3rd Generation Partnership Project (3GPP) is producing globally applicable Technical Specifications (TSs) and Technical Reports (TRs) for UMTS mobile systems based on evolved GSM core networks. The first release of the 3GPP 3G standard is now stabilised and the first 3GPP compliant networks are now operational.

Work is currently ongoing for 3GPP Release 6 which is expected to cover, inter alia, the following features: Multimedia Broadcast/Multicast Service (MBMS), network sharing, priority service, Wireless LAN/UMTS interworking and IMS(IP Multimedia Subsystem) phase 2. As diversity of services are expected to blow up every year, seamless application interoperability is needed to satisfy users. In fact 3GPP has developed a common service platform to provide service interoperability.

3GPP started also to consider the long term evolution of 3G system² and in particular to look at how it will evolve in the future to meet the requirements of the user and the industry, and to make use of emerging technologies.

3GPP developed a long term, high level roadmap focussed on items pertinent to the evolution of 3GPP specifications and identified concepts and trends intended to guide the future work. It should be noted that a number of drivers have been identified for the evolution of the 3GPP system and in particular the expectations coming from end users of what the evolution could deliver e.g.: ubiquitous mobile access, easy access to applications and services, inter-operability of services between diverse systems independent of access technology, appropriate quality at reasonable cost, long equipment and battery life, large choice of terminals, security of identity, personal data and “conversations”.

Among basic assumptions made for this high level roadmap it should be stressed that 3GPP considers that “Future is evolution not revolution” (see TR 21.902) and where possible re-use of existing techniques/technologies is envisaged taking into account commercial considerations.

The description of the 3GPP System Future Evolution is split in two parts:

- 3G Enhancements (short to medium term evolution) and
- 3G Long Term Evolution.

The 3GPP Long Term Evolution vision will gradually come into focus through a careful study of market trends, understanding of future user requirements and the availability of new network and wireless access technologies. Concerning Radio access network technology in long term, 3GPP will continue the performance improvements concerning spectral efficiency, higher bit rates, shorter delays etc. Long term target peak data rates are up to 100 Mbps in full mobility, wide area deployments and up to 1 Gbps in low mobility, local area deployments.

3GPP envisages also to consider new and innovative use of spectrum within a global harmonised frequency range; noting that spectrum is an ITU-R/WRC issue and outside the scope of 3GPP.

² TR 21.902, on Evolution of 3GPP System addresses the evolutionary aspects of subsequent 3GPP releases.

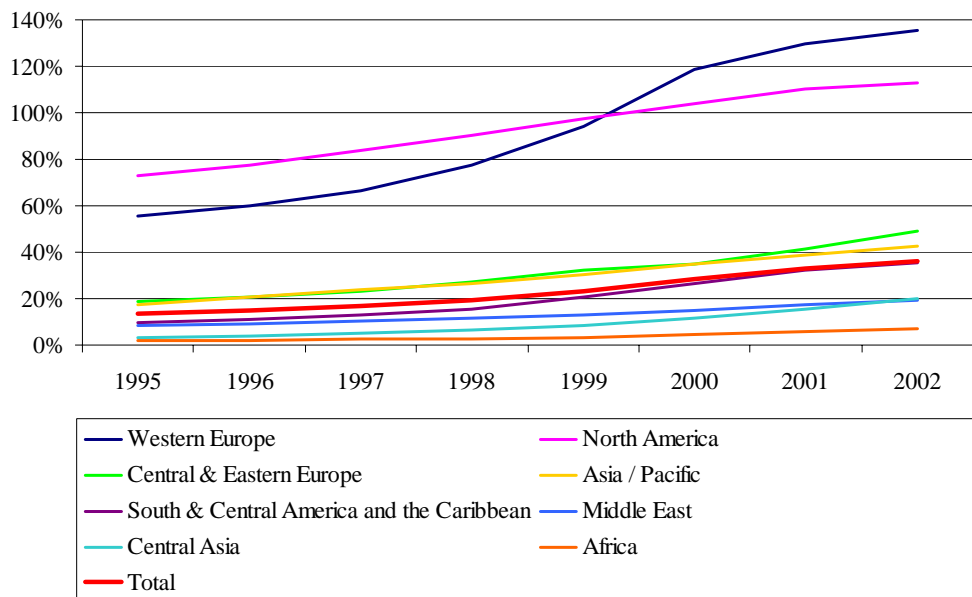
3 THE STATE OF THE MOBILE COMMUNICATION PENETRATION IN 2002

This section provides:

- data on the penetration per country as observed from mid of the 90's until now;
- analysis of these data;

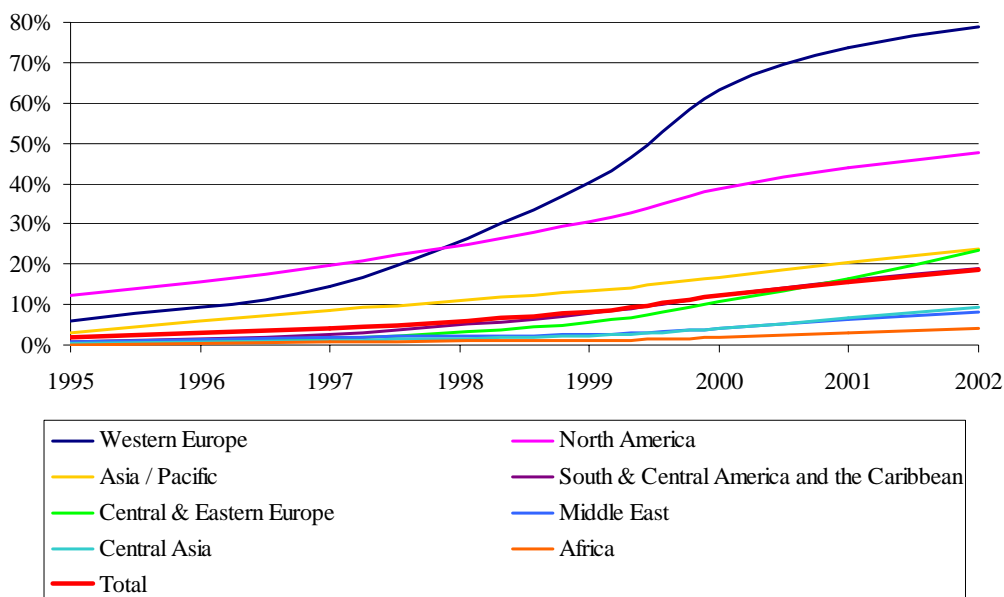
3.1 HISTORICAL PENETRATION STATISTICS

The penetration statistics (number of subscribers per country per year) are available from the ITU (International Telecommunication Union).



Historical Teledensity Growth (Sum of Fixed & Mobile Penetration) per Continent/Sub-Continent 1995 – 2002

(Source: ITU 2003 – World Telecommunication Indicators)



Historical Mobile Penetration Growth per Continent / Sub-Continent 1995 – 2002

(Source: ITU 2003 – World Telecommunication Indicators)

During the 1995-2002 period, the worldwide mobile penetration rate was multiplied by 10, from 1,8% up to 18,6%, more than 1 billion new customers being added. These figures cover a strong diversity between geographical areas at different stage of their mobile telecommunication development:

	Penetration 1995	Penetration 2002	CAGR 1995-2002 Subscriber Growth
Western Europe	5,9%	78,9%	45%
North America	12,4%	47,5%	21%
Asia / Pacific	3,0%	23,9%	37%
Central & Eastern Europe	0,3%	23,5%	88%
South & Central America and the Caribbean	0,8%	18,9%	59%
Central Asia	0,2%	9,4%	72%
Middle East	0,6%	8,2%	54%
Africa	0,1%	4,3%	74%
Total	1,8%	18,6%	43%

CAGR: Compound Annual Growth Rate

Mobile penetration evolution per continent / sub-continent 1995 – 2002

(Source: ITU 2003 – World Telecommunication Indicators)

In the same timeframe, the share of mobile users among the total fixed and mobile telecommunications network users grew strongly to exceed 50% in 2002. Most regions have -or are about to have- more mobile phones than wire lines: for high teledensity countries, mainly as a complement, or, for developing countries, as a substitute to expensive fixed infrastructures.

	1995	2002	Growth Ratio
Africa	7,4%	61,4%	8,3
Western Europe	10,7%	58,1%	5,4
Asia / Pacific	17,1%	56,4%	3,3
South & Central America and the Caribbean	8,1%	52,9%	6,5
Central & Eastern Europe	1,7%	48,1%	29,0
Central Asia	7,9%	47,6%	6,0
North America	17,0%	42,0%	2,5
Middle East	7,3%	41,9%	5,8
Total	13,1%	51,2%	3,9

Mobile share in teledensity evolution per continent / sub-continent 1995 – 2002

(Source: *ITU 2003 – World Telecommunication Indicators*)

4 MAIN SOCIOLOGICAL, SOCIAL AND ECONOMIC TRENDS – REFERENCE INDICATORS

4.1 MAJOR HISTORICAL DRIVERS FOR MOBILE PENETRATION

An extensive literature exists that describes the historical evolution of the fixed and mobile telecommunication penetration in the world. A list of such market studies, statistical reports and analyses is presented in Annex 1.

Many factors contribute to explain the current mobile penetration levels: some are linked to a country's historical peculiarities such as the nature of the regulatory environment, or the particulars of the operator's offerings – these factors are short-term by nature. Other factors are linked to fundamental social and economic characteristics of the country.

This document focuses on this second type of factors, as they are better suited to evaluate the long-term potential of a country: for instance, the country's income level, general stage of development, standard of living, and other factors that describe social development.

4.2 KEY SOCIO-ECONOMIC DRIVERS OF THE MOBILE COMMUNICATION MARKET – REFERENCE INDICATORS

In the long term, the forecasts for the evolution of telecommunication penetration, and particularly of cellular penetration, are based on the general socio-economic context and perspectives of each country.

Four major reference indicators are proposed to summarise the mobile telecommunication situation and potential development in each country:

- Income,
- Human Development,
- Technology Affinity,
- Urbanisation.

For each of these indicators an international body has been identified that provides values in the world e.g. World Bank for income, United Nations for Human Development etc.

4.2.1 INCOME

The income is the first step in understanding the strengths and weaknesses of an economy, and the general standard of living of its citizens. For mobile market forecasts, it can be considered as a first approximation for the average citizen's capacity to buy mobile telecommunication services.

The most relevant indicator for describing income is the Gross National Income (GNI) per capita, defined by the World Bank as "the sum of values added by all resident producers plus any product taxes (less subsidies) not included in the valuation of output plus net receipts of primary income from abroad divided by midyear population". GNI per capita in US dollars is converted using the World Bank Atlas method.

This indicator has been estimated for most countries (source: World Bank, 2002 World Development Indicators) and used to define 4 categories of countries:

- High income countries with a GNI per capita over \$9 266
- Upper middle income economies with a GNI per capita between \$9 265 and \$2 996
- Lower middle income economies with a GNI per capita between \$2 995 and \$756
- Lower income economies with a GNI per capita below \$755.

4.2.2 HUMAN DEVELOPMENT

As Gross National Income does not show what kind of goods and services the country produces, nor how equitable income is distributed among the population, other complementary indicators must be added to assess the general stage of development of each country: it is obvious that telecommunication growth is highly correlated to the level of fulfilment of other primary social needs such as health and education.

As many indicators contribute to describe the human development, a composite index has been developed by the United Nations Organisation: The Human Development Index (HDI). It is a "summary measure of the average achievements in a country in three basic dimensions of human development:

- A long and healthy life, as measured by life expectancy at birth
- Knowledge, as measured by the adult literacy rate and the combined primary, secondary and tertiary enrolment ratio
- A decent standard of living, as measured by GDP per capita."

(United Nations, Human development report 2002)

The United Nations Human Development Office defines a ranking of all countries based on their HDI, and splits countries in three categories of correspondingly High, Medium and Low Human Development.

4.2.3 TECHNOLOGY AFFINITY

The mobile communication penetration is strongly linked to local consumption patterns and the capacity of each country to participate in the "technological innovations of the network age".

The United Nations Human Development Office introduces the Technology Achievement Index (TAI) and defines it as "a composite index that measures achievements, efforts or input ... to capture how well a country is creating and diffusing technology and building a human skill base". It focuses on four dimensions of technological capacity:

- o Creation of technology
- o Diffusion of recent innovations
- o Diffusion of old innovations
- o Human skills

Estimates have been produced for 72 countries, classified into four categories: Leaders, Potential Leaders, Dynamic Adopters and Marginalized Countries.

4.2.4 URBANISATION

The concentration of people in urban areas is also an important driver of cellular penetration. In these areas, life styles are more favourable to mobile expansion, and the high density of population lowers the cost of providing the services.

The actual and forecast urbanisation level of each country is produced by the Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat in its "World Population Prospect – 2001 revision", according to national definitions of rural/urban areas.

These indicators strongly converge for countries with the higher or the lower socio-economic conditions, but complement one another to segment "middle-class" countries into different categories.

5 PENETRATION FORECAST METHODOLOGY

This section provides:

- a methodology to forecast the number of mobile users across time using observed penetration rates, markets categorization and hypothesis for the different categories;
- a classification of the countries in world into market categories using the analysis of current penetration and key socio-economic drivers for the mobile market, to be used in the methodology;
- a definition of environments (typically dense urban, urban, rural) on which the methodology will apply;

Anticipating the evolution of the worldwide mobile communication penetration for the next twenty years is a challenging work. In this timeframe, as the world population increases by 22% (from 6,2 Billion in 2002 up to 7,6 Billion in 2020)³, many factors will influence the particular situation of each country and their telecommunication development.

In order to take this marked diversity into account, the forecast methodology includes analyses conducted for each of the 192 independent states members of the United Nations.

5.1 GENERAL DESCRIPTION OF THE METHODOLOGY

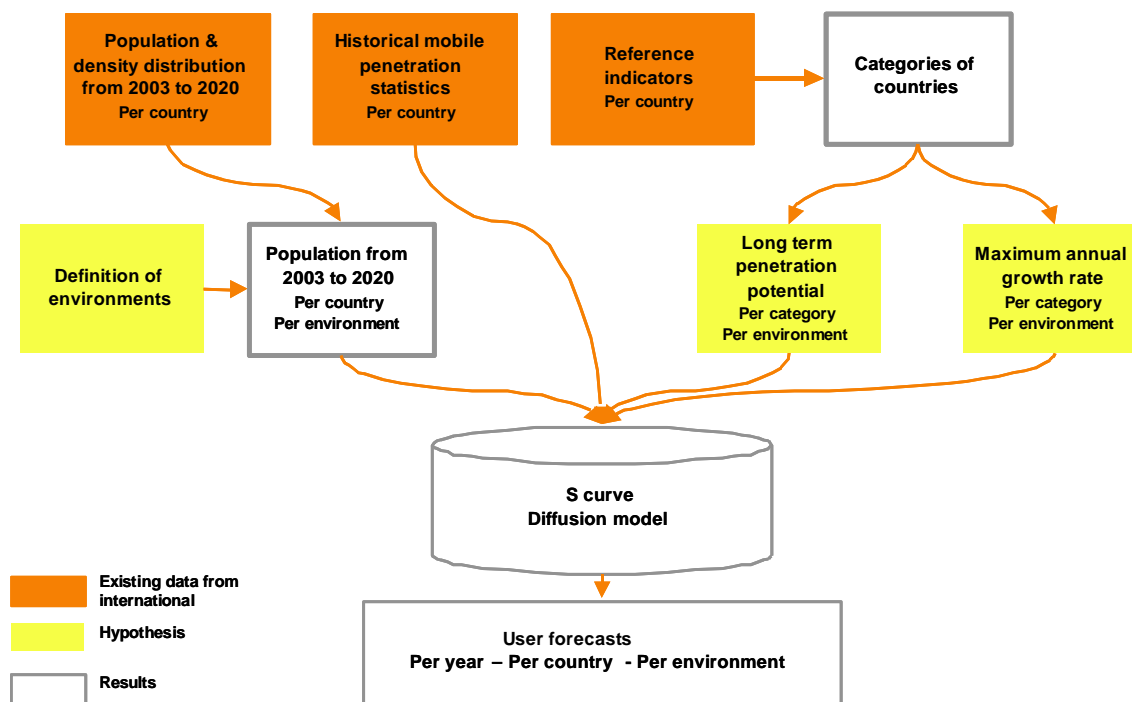
In the methodology presented in this document, mobile penetration is defined as the percentage of mobile-equipped users among the country's population (not including multiple terminals, multiple subscriptions, nor Machine-to-Machine terminals).

The penetration forecast are set in two steps:

- First are set the long-term mobile penetration levels that the countries are expected to reach or approach in 2020, as well as the maximum speed of penetration increase over the timeframe,
- The penetration evolution for every country, and for every year in the period 2003-2020 is then computed using the S-Curve model.

The figure below describes of the methodology used for the Mobile Penetration forecast and the inputs needed for this methodology.

³ Source: UNO, World Population Prospect – 2001 Revision



Synoptic of the Mobile Penetration Forecast Methodology

The evolution of the mobile penetration is modelled per country and per environment as an S-curve diffusion process with the following parameters:

- The historical mobile penetration in the country as provided by the ITU (initial value),
- The long-term penetration potential for the country,
- The maximum year-on-year penetration growth rate (which occurs at the inflexion point of the penetration curve).

The Maximum Penetration and Maximum Speed of Penetration Increase parameters are both set globally for each country category and not per individual country.

Combined with the forecast of population per environment in the country, this figure provides the number of subscribers forecasted per environment per country and per year.

5.2 REFERENCE INDICATORS AND CATEGORIES OF COUNTRIES

Estimates for the long term penetration potential are not set individually for each country, but globally for groups of countries that exhibit similar characteristics in terms of telecommunication development and other relevant socio-economic indicators.

These reference indicators are the 4 indicators described in section 5: income,

- Income, represented by the GNI (Gross National Income),
- Human Development, represented by the HDI (human development index)
- Technology Affinity, represented by the TAI (technology affinity index)
- Urbanisation

Using these reference indicators, all countries have been divided into 6 groups presenting similar evolution perspectives:

- **Group A:** the most developed countries, with high income and high development

index. This group mainly includes North-American and West-European nations, as well as the richest of Asia/Pacific and petrol exporting countries. Current high penetration rates (average around 65%) indicate that their mobile market will be mature in the short term, with reduced room for growth of their subscriber base.

- **Group B:** countries with middle income (mainly upper middle), high or middle HDI and a present telecommunication penetration (fixed and mobile) over 36%. Most of them are potential leaders in technology. This group typically includes future EC members, most developed areas of South and Central America and some major tourism-based economies. They have an average mobile penetration rate of around 30% in 2002 and large progression perspectives in the short and middle term.
- **Group C:** countries with middle income (mainly lower middle), medium HDI and current telecom penetration level between 36% and 17% (fixed + mobile). They rank today among averagely developed economies with a significant potential. Most of them are Dynamic Adopters in technologies. All geographic areas, apart from Western Europe and North America, are represented in this category. Their current mobile penetration is close to 20% and is awaited to grow significantly over and after the forecast period.
- **Group D:** less wealthy among the middle income countries, with medium HDI and a telecom penetration under 17%. Additionally, this category also includes some emerging countries, despite their low income, because of their Dynamic Adopter position in technology. Their current mobile penetration is low but should take off within the 2003-2020 period.
- **Group E:** developing countries with low income but long term growth capabilities linked to their investment in health and education (middle HDI). Their current mobile penetration is low but will progress moderately over the period.
- **Group F:** least developed countries, with low income, low HDI and/or Technologically Marginalized. Due to conflicts, agricultural centric economy, export dependence, poor infrastructure, or demographic problems, their mobile penetration will remain very low, though a significant growth rate of their subscriber base.

The detail of the categorisation of countries is given in Annex 2.

5.3 POPULATION, DENSITY DISTRIBUTION AND ENVIRONMENTS

The input data (population per country from now until 2020, density of population) are obtained from UNO. Using the environments defined the population per country per environment per year is computed.

Between 2000 and 2020, more than 1,5 Billion additional people will be added to the world population. Around 40% of them will come from Central Asia, though Africa and Middle East will have the most important demographic growth rate. Most of Western, Central and Eastern Europe countries are planned to stagnate or even decrease.

	2000	2005	2010	2015	2020	Evolution 2000 - 2020
Country Category A	929	951	970	986	1 000	8%
Country Category B	446	468	489	509	528	18%
Country Category C	1 944	2 024	2 102	2 177	2 243	15%
Country Category D	1 567	1 683	1 795	1 897	1 992	27%
Country Category E	221	235	250	266	282	28%
Country Category F	950	1 079	1 220	1 372	1 534	61%
Total	6 057	6 441	6 826	7 207	7 579	25%

Population forecasts by Country category 2000 – 2020
(Source: UNO – World Population Prospect – 2001 Revision)

The geographical distribution of human settlements throughout the world is very diverse, at a continental level as well as within each country.

A comprehensive survey of population density structure for each country is therefore necessary to set differentiated penetration hypotheses per environments (dense urban, urban, rural, ...) driven by density classes.

Moreover, information on the population density distribution makes it possible to estimate the geographical distribution of users, and to forecast traffic density at various geographical levels. The world surface and population can be divided in as many census units as administrative boundaries exist in each country across the world. For instance, public sources of information exist that provide population density statistics for around 127 000 geographical units around the world, including, at different levels of detail, almost every country. This allows to conduct the analysis precisely on pieces of land with an average size of around 45 000 inhabitants and 1 100 km², for the entire world. Such data are made available through the combined work of the United Nations, the Centre for International Earth Science Information Network (CIESIN), the Columbia University, the International Food Policy Research Institute (IFPRI) and the World Resources Institute (WRI).

In this document and methodology, it is proposed to use four categories of geographical environments, defined through their population density:

- **Dense urban areas**⁴, with densities higher than 1 000 inhabitants per square kilometre.
- **Urban areas**⁴, with densities between 400 and 1 000 inhabitants per km².

These two categories represent cumulatively 47% of the world population, which is consistent with the percentage of urban population figures issued by the Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat (World Population Prospects – The 2001 revision).

- **Rural areas**, with densities between 1 and 400 inhabitants per km².
- **Desert areas**, with less than 1 inhabitant per square kilometre.

⁴ The population density figures in urban areas are defined from 400 to higher than 1000 per square km. The Forum has used in the past fairly high figures (10.000 – 120.000).

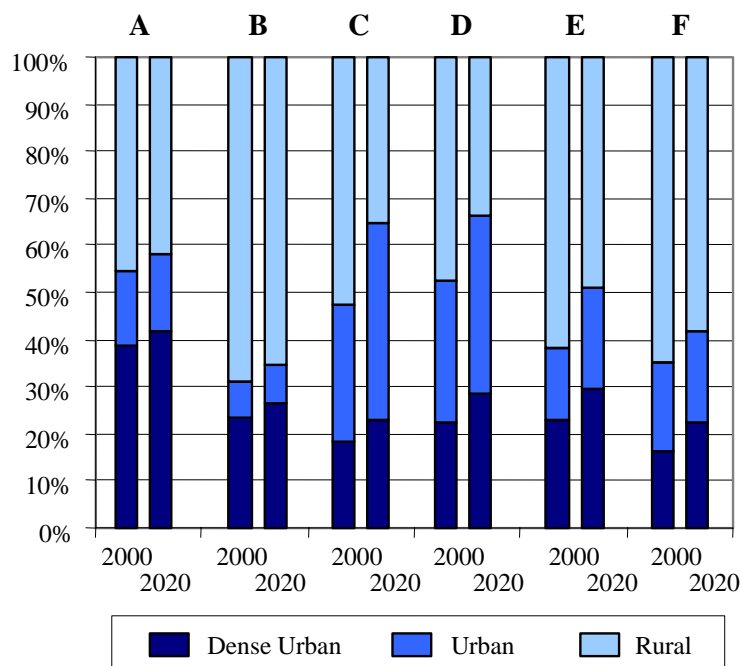
	Dense Urban		Urban		Rural		Desert	
	% Pop	% Area	% Pop	% Area	% Pop	% Area	% Pop	% Area
Country Category A	39,0%	0,5%	15,9%	0,8%	44,8%	35,7%	0,3%	63,1%
Country Category B	23,8%	0,2%	7,5%	0,3%	68,2%	69,7%	0,5%	29,7%
Country Category C	18,6%	0,3%	30,4%	2,4%	50,7%	59,6%	0,2%	37,7%
Country Category D	22,9%	0,8%	30,4%	3,5%	46,6%	67,0%	0,2%	28,8%
Country Category E	23,3%	0,4%	15,9%	1,1%	60,4%	75,4%	0,3%	23,1%
Country Category F	17,0%	0,3%	19,1%	1,2%	63,7%	81,6%	0,1%	16,9%
Total	23,1%	0,4%	24,2%	1,7%	52,5%	60,5%	0,2%	37,4%

Population Distribution by Environment and Country Categories 2002

(Source: CIESIN, IFPRI, WRI, Local Census administrations)

This population distribution will change over time, according to a general trend of urbanisation. Using UNO year-on-year forecasts issued for each country, this evolution has been taken into account to determine the basis on which specific penetration rates are applied in the model.

Between 2000 and 2020, the worldwide urbanisation rate (percentage of people living in dense urban and urban areas) should grow from 46% up to 57%, with some major contrasts among country categories:



Evolution of Human Settlement by environments and Country Categories 2000 – 2020

(Source: CIESIN, IFPRI, WRI, Local Census administrations and UNO-World Population Prospects)

5.4 HISTORICAL MOBILE PENETRATION

The historical mobile penetration values are provided by the ITU pr country, as described in section 4.

5.5 LONG TERM PENETRATION POTENTIAL AND MAXIMUM GROWTH RATE

The categories of countries defined previously group together countries of similar telecommunication development potential. The long-term mobile penetration level that those countries should reach, as well as the speed of evolution of the mobile penetration are therefore set globally once per country category and per type of environment: all countries within one category share the same long-term penetration hypotheses per environment. For each country category, assumptions for the long-term maximum mobile penetration and maximum yearly increase in penetration are made separately for the types of environment defined: Dense Urban, Urban and Rural. The Desert environment is not considered. The number of inhabitants of desert environments is of course very low, so the number of mobile users in such environments can safely be neglected.

The tables below list the penetration assumptions, per country category and per environment. It is foreseen that an average penetration ratio will vary from 90% to 3 % in year 2020 and that a yearly increase will vary from 20% to 5% depending on the country category and environment category.

<i>Maximum penetration in 2020</i>			
	Dense Urban	Urban	Rural
Country Category A	90%	85%	80%
Country Category B	80%	70%	55%
Country Category C	70%	55%	25%
Country Category D	50%	35%	15%
Country Category E	35%	20%	5%
Country Category F	25%	10%	3%

<i>Maximum speed of Increase (in % of max. Penetration)</i>			
	Dense Urban	Urban	Rural
Country Category A	20%	20%	20%
Country Category B	12%	12%	12%
Country Category C	7%	7%	7%
Country Category D	6%	6%	6%
Country Category E	5%	5%	5%
Country Category F	5%	5%	5%

Long-Term Penetration Potential Hypotheses

These hypotheses have been set while taking into account the long term growth prospects of each country category in terms of macroeconomic, technical and human capital characteristics.

In particular, they take into account the evolution of the countries' average revenue per inhabitant over time, as well as its level of equality.

We assume that, through significant economies of scale, prices of infrastructures and handsets will continue to decline over the period, allowing carriers to deliver the services at acceptable prices for most people. This will be reinforced by increased competition between operators in most countries, especially developing ones.

Combined with the improvement of the average revenues and its more egalitarian distribution furthering the emergence of a larger middle class, which can afford the service, significant penetration rates should be obtained in urbanised areas of most countries, even those belonging to the most underprivileged regions.

In those regions, it is believed that revenue increases will rapidly drive the adoption of communication technologies, which have certainly proven to be more essential than most other types of household equipments. The availability of appropriate and well-proven technologies and the constant level of technical progress will help to fulfil the communication needs of all categories of countries. In that sense, mobile telephony could spread more rapidly in emerging countries than it did in OECD countries where mobile communication technologies at first had to compete with other established services or technologies (fixed-line telephone, television, Hi-fi, ...), while suffering from initial quality problems and high costs.

The maximum penetration assumptions belong to the dense urban areas of countries belonging to the A category. This maximum penetration corresponds to a situation where every adult, every child over 10 years old and 50% of the children between 5 and 10 years old would be equipped. Given the age group structure in different parts of the world, the maximum penetration should not be higher than 90% obtained in average in A category. In other country categories, this figure should be lower, their population being younger (for instance, a maximum theoretic penetration rate derived using similar assumptions would be 77% in Africa). (*Source: Population Division of the Department of economic and Social Affairs of the UN – World Population Prospects: The 2002 Revision and World Urbanization Prospects*).

This theoretical maximum penetration should occur in dense urban areas where average revenues, level of employment, lifestyles, transportation and mobility as well as better coverage converge to create more favourable conditions for the spread of mobile communication. The penetration in other urban perimeters and rural areas has thus been discounted compared to the dense urban penetration.

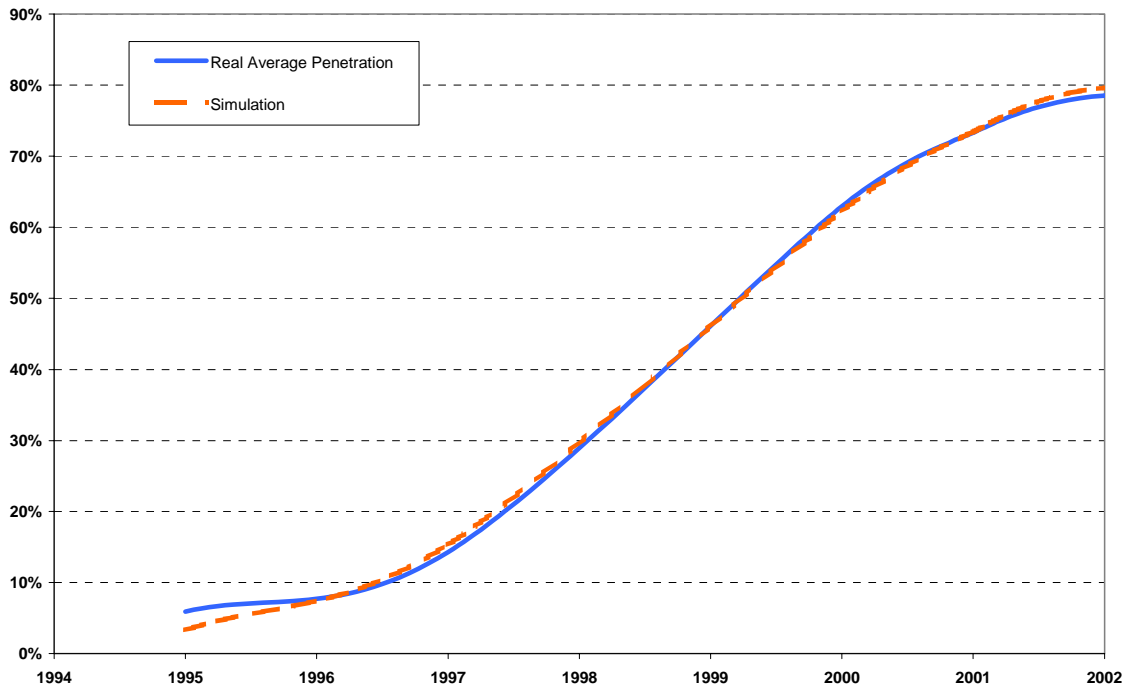
Generally speaking, the least developed countries have the most important economic and social gap between their urban and rural areas. To reflect this reality, larger spreads have been set between penetration rates in dense urban, urban and rural environments for decreasing potential stage of development of country categories.

In this six-tier categorisation of countries, hypotheses set for C and D classes are central elements. As these categories are formed by most populated countries, a special attention has been paid to some specific ones which, due to their very significant weight in population, are representative of their whole category.

China, for instance, will account in 2020 for 19% of the world population and 65% of the “C” country category population. In the next 18 years, the percentage of urban population in China will be multiplied by 1.4, the Gross National Product will be multiplied by 4 (as forecast by Chinese authorities) significantly improving the average income and living standard of a growing upper and middle class. Mobile penetration already reaches high levels: the current penetration is 62% among urban households with high revenues (which make up 12% of the total Chinese households) and 32% among urban households with mid-rank revenues in 2002. Taking into account the current situation and general economic growth forecasts, the global mobile phone penetration is forecasted to reach 51% in 2020.

The speed of increase have been calibrated to meet the past performances of countries that had already reached a high penetration level. For instance, historical data for mobile penetration in Western Europe is consistent with an S-Curve penetration model with a

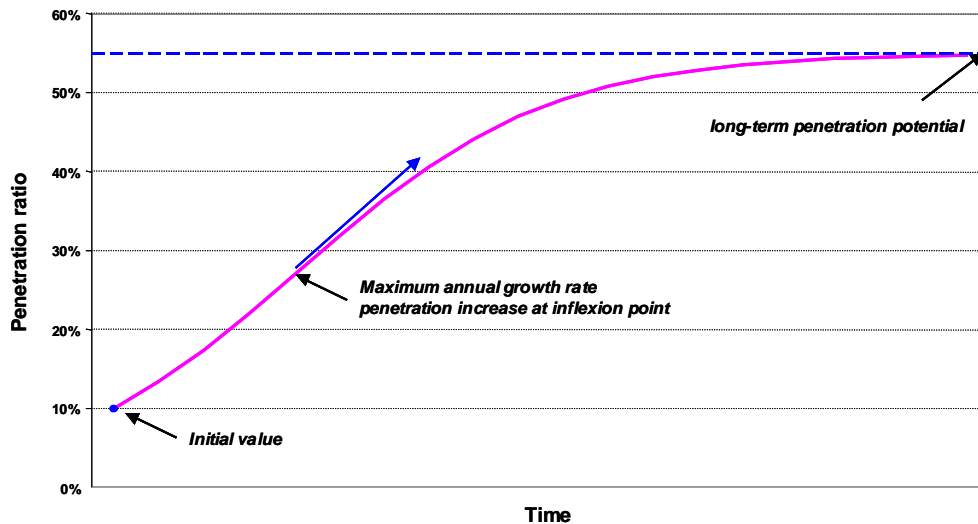
maximum penetration of 85% (weighted average between the different environments) and a maximum rate of increase per year equal to 20% of the maximum penetration, as shown in the figure below:



Historical and Simulated Penetration, Western Europe

5.6 THE S-CURVE DIFFUSION MODEL

The figure below shows an example of a penetration curve modelled using an S-Curve method:



Example of a Penetration Evolution Modelled using an S-Curve Formula

The model is a standard S-Curve diffusion model, with 3 parameters:

- the Maximum Penetration
- the Maximum Speed
- the initial value.

The S-Curve is computed using the following formula:

$$Penetration(t) = Max_Penetration \times \frac{1}{1 + \exp\left(-4 \times \frac{Max_Speed}{Max_Penetration} \times (t - t_0)\right)}$$

where t_0 is the year where inflexion occurs (deduced from the initial value).

6 WORLD MOBILE USER BASE FORECAST

This section provides forecasts of mobile users until year 2020 using the described methodology and input data.

In addition to this methodology, some specific adjustments have been made to meet the current situation of particular countries:

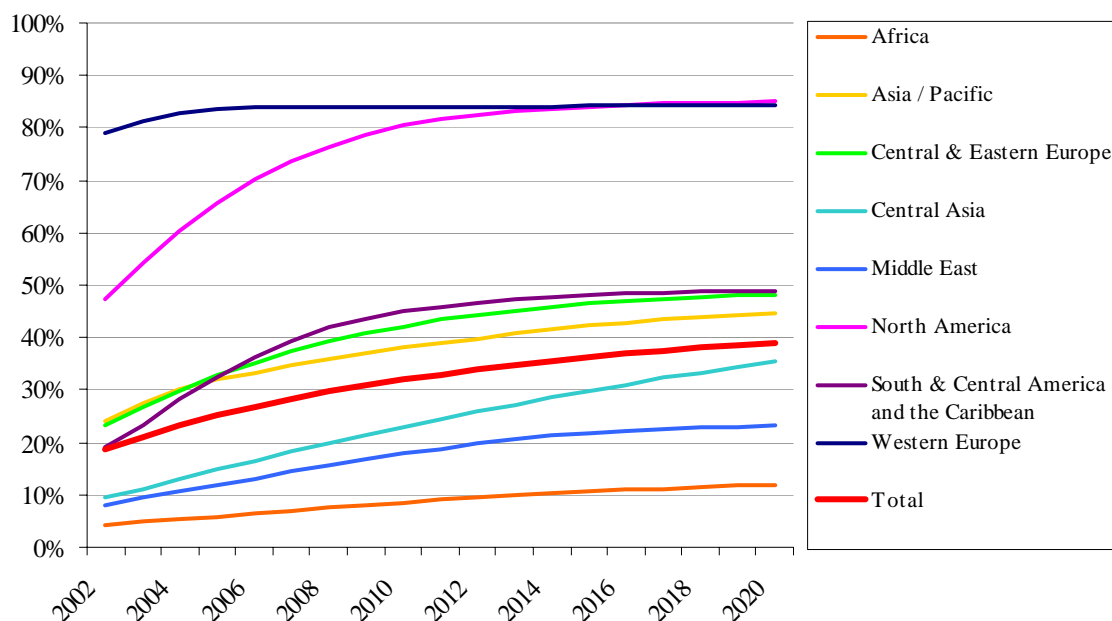
- For the few countries that are already about to reach the maximum penetration allowed by their category and environment-mix, an additional growth potential has been allocated by applying, in each environment, the maximum penetration of the category above (maximum speed of increase remaining unchanged).
- Some countries, which have currently a very low penetration or even no network, would be heavily penalized by the standard S-curve diffusion process. In order to adequately reflect the expected take-off within the forecast timeframe, their speeds of increase have been upgraded to those of the category above (when penetration in 2002 is lower than 1%) or to those of two categories above (when there were no subscriber in 2002). Their maximum penetration hypotheses per environment are not modified.

As an added note, it should be noted that all the penetration figures in this document only apply to the studied country's local population: visitors and tourism flows are not specifically taken into account (although of course any mobile-equipped tourist is counted as a mobile user in his home country).

Yearly mobile penetration forecasts for the period 2003-2020 have been derived for each country using the methodology and the hypotheses set in the previous sections.

Results per country for years 2006, 2010 and 2020 are provided in annex 3.

The following figures present the results of Penetration Forecast calculations – the penetration rate corresponds to the percentage of human beings equipped with a mobile, not including multiple terminals or subscriptions nor Machine terminals.



Evolution of Penetration Rates by Geographical area 2002-2020

Within the 2002-2020 time frame, the worldwide mobile penetration will more than double to reach 39%. This corresponds to a situation where 46% of the population at the eligible age uses a mobile phone.

Western Europe will experience reduced penetration growth due to its current high level. In 2006, the market will be very close to saturation.

Comparable standards of living should make North America and Western Europe converge in the middle term towards equal penetration levels. This should happen around 2012, after North America resolves its historical obstacles to larger mass market development.

Central and Eastern Europe is a very diverse region: while many countries, especially future EC members such as Slovenia, Lithuania, Czech Republic, Hungary and Poland are forecasted to experience a period of strong growth to reach Western Europe penetration levels, Ukraine, Georgia or Azerbaijan mobile penetration is expected stay below 20%. Penetration in Russia is expected to reach 50% in 2020. Some countries should experience a relative stagnation in their subscriber numbers partly due to a significant decrease of their population over time.

South and Central America subscriber growth should remain high. Major countries in that region, such as Argentina, Brazil, Chile, Uruguay or Venezuela, should reach significant penetration levels in the middle or long term, despite their current economic difficulties.

Asia/Pacific Region will be on average close to 50%, lead by major countries such as Australia, Japan and Korea. Malaysia and Philippines are among the countries with the most important growth potential.

In Central Asia, penetration will be multiplied by 3.8 mainly due to the huge impact of China. Moreover, around 300 millions new subscribers should be added in India between 2003 and 2020.

Middle East should reach an average penetration of 23% around 2020, though most of countries in the Arabian Gulf will be at much higher penetration levels.

Africa will reach 12% average penetration (corresponding to 15,5% of the population of an eligible age) despite a currently low level. While the major growth phase for this continent is expected to take place after the forecast period, some countries in Maghreb and Austral Africa will have Penetration Growth Rates above 30%. In addition, some wealthy segments in almost all African countries will be able to afford mobile phones in the short and middle term. The widespread adoption of mobile communication in this continent should be achieved later, concurrently with sustained economic development and poverty reduction.

As a consequence, the total worldwide number of mobile users is forecast to be close to 2.2 Billions before 2010 and to reach 3 Billions in 2020.

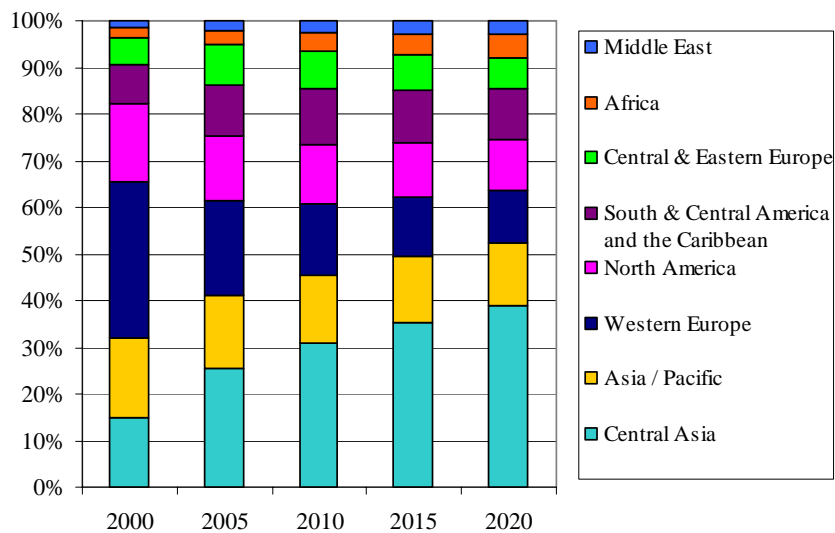
	2002	2005	2010	2015	2020	CAGR 2002 - 2010	CAGR 2010 - 2020
Central Asia	251	412	676	924	1 145	13,2%	5,4%
Africa	35	52	85	119	146	11,6%	5,5%
Middle East	22	33	55	76	88	12,5%	4,8%
South & Central America + Caribbean	100	179	265	300	322	13,0%	2,0%
Asia / Pacific	183	252	315	366	402	7,0%	2,5%
North America	154	218	279	303	319	7,7%	1,4%
Central & Eastern Europe	99	137	175	191	196	7,4%	1,2%
Western Europe	310	329	332	331	330	0,8%	0%
Total	1 154	1 613	2 182	2 610	2 947	8,3%	3,1%
Penetration	18,6%	25,0%	32,0%	36,2%	38,9%		

Mobile User Base Evolution by Geographical Area 2002-2020 (in mio.)

The 2002 figure for Western Europe in the above table shows 310 mio mobile users. These figures corresponds to 325 mio actual mobile subscriptions reached by end 2002.

Between 2002 and 2020, 1.8 Billion new mobile users will be added, 50% out of them coming from Central Asia.

Africa, Middle East and South & Central America will improve their share in the world while Western Europe will account for only 11% of mobile users instead of a current 27%.



Evolution of the share of Geographical areas in World Mobile Subscribers

7 CONCLUSIONS

This market study is based on data from ITU, UNO, World Bank and other International Organisations. It covers the timeframe from 2002 to 2020, where the world population increases by 22% from 6,2 bio in 2002 to 7,6 bio in 2020, 40% of the growth will be in Asia, Africa and Middle East.

The forecasts are considering all mobile customers including 2G, 3G and beyond 3G. Additional service subscriptions of users, machine to machine communication are not counted, as mobile services are not investigated here, thus they have to be investigated in service related studies. The mobile user forecast figures are already split up into Regions. For the worldwide market the following figures are estimated:

Year:	2010	2015	2020
Mobile users:	2.18 billion	2.6 billion	2.95 billion

ANNEX 1 – BIBLIOGRAPHY OF MARKET STUDIES

- [1] CIESIN (Centre for International Earth Science Information Network), Gridded Population of the world, 2001
- [2] Columbia University, Gridded Population of the world, 2001
- [3] CMA/ESPICOM, Communication Market Analysis, 2001/2002
- [4] Datamonitor, The Mobile Consumer, 2002
- [5] Forrester, Forrester forecast, January 2002
- [6] Forrester, Sizing US consumer Telecom, January 2002
- [7] Gartner, Mobile services 1998-2007 (exec. summary), May 2003
- [8] Gartner, Mobile services : Western Europe, 1998-2007, April 2003
- [9] Gartner, Mobile data 1999-2006 (exec. summary), Septembre 2002
- [10] Gartner, Public Wireless LAN Hot Spots : Worldwide trends & forecasts, August 2002
- [11] Gartner, Cellular Services Market (exec. summary), Novembr 2001
- [12] Gartner, Worldwide Telecom. services Market overview 1999-2005, November 2001
- [13] IFPRI (International Food Policy Research Institute), Gridded Population of the world, 2001
- [14] IDATE, Atlas mondial des mobiles - Note de conjoncture, 2002
- [15] IDATE, Les opérateurs de telecom dans le monde, 2002
- [16] IDATE, Services de données Mobiles, 2002
- [17] IDATE, Services Mobiles en entreprise : Nouvelle donne & perspectives, 2002
- [18] IDATE, Internet Mobile, 2001
- [19] IDC, Worldwide wireless subscriber & services revenue forecast, July 2002
- [20] IDC, Marché des solutions mobiles à l'horizon 2005, 2001
- [21] ITU (International Telecommunication Union), World Telecommunication Indicators, 2003
- [22] Jupiter, Market Forecast : European SMS & MMS, Septembre 2002
- [23] Ovum, [Mobile@Ovum](#), 03/2001 - 07/2002
- [24] Ovum, Ovum Forecasts : Global Wireless Markets, 2002
- [25] Ovum, 2G & 3G connections & data revenues
- [26] Pyramid, Mobile Market Atlas, february 2002
- [27] Strategy Analytics, Worldwide Wireless Subscriber Forecasts (2003-2008), April 2003
- [28] Strategy Analytics, Consumer Cellular Data Forecast, Octobre 2002
- [29] Strategy Analytics, Cellular Data Forecast , Septembre 2002
- [30] Strategy Analytics, The North American Wireless Market: Outlook & Forecast, May 2002
- [31] Strategy Analytics, W. European cellular user forecast , February 2002
- [32] Strategy Analytics, Worldwide cellular user forecast, March 2001
- [33] Strategy Analytics, Global Cellular data applications, revenues & 3G, December 2000
- [34] Strategy Analytics, Mobile commerce market forecast, December 1999

- [35] The mobile UMTS Forum Report No. 1: “A Regulatory Framework for UMTS”, October 1998.
- [36] UMTS Forum Report No. 5: “Minimum spectrum demand per public terrestrial UMTS operator in the initial phase”, September 1998.
- [37] UMTS Forum Report No. 6: “UMTS/IMT-2000 Spectrum”, December 1998.
- [38] UMTS Forum Report No. 8: “The Future Mobile Market”, March 1999.
- [39] UMTS Forum Report No. 9: “The UMTS Third Generation Market – Structuring the Service Revenue Opportunities”, October 2000.
- [40] UMTS Forum Report No. 10: “Shaping the Mobile Multimedia Future”, October 2000.
- [41] UMTS Forum Report No. 11: “The UMTS Third Generation Market – Structuring the Service Revenue Opportunities”, October 2000.
- [42] UMTS Forum Report No. 13: “”, October 2001. UMTS F Market Report No. 13, April 2001
- [43] UMTS Forum Report No. 17: “”, October 2002.
- [44] UMTS Forum Report No. 18: “”, October 2002.
- [45] UMTS Forum Report No. 20: “”, October 2002.
- [46] UMTS Forum Report No. 21: “”, October 2002
- [47] United Nations, Human Development Report Office, Human Development Report, 2002
- [48] United Nations, Human Development Report Office, Human Development Report, 2001
- [49] United Nations Organisation, List of member states, 2002
- [50] UN Statistics Division, Database of the National accounts, 2002
- [51] UN Statistics Division, Indicators on human settlements, 2002
- [52] UN Secretariat, Population Division of the Department of Economic and Social Affairs, World Urbanization Prospects: The 2001 Revision, 2002
- [53] U.S. Census Bureau, International Database and The World Factbook, 2001
- [54] US State Department - Office of the Geographer and Global Issues, Dependencies and areas of special Sovereignty, 2002
- [55] World Bank, World Development Indicators, 2002
- [56] World Bank, Global Economic Prospects, 2003
- [57] World Resources Institute, Gridded Population of the world, 2001
- [58] Yankee Group, Wireless / Mobile Forecast , April 2003
- [59] Yankee Group, Wireless Mobile Asia Pacific, Septembre 2002
- [60] Yankee Group, Wireless Mobile Latin America, Septembre 2002
- [61] Yankee Group, Wireless Mobile Europe, August 2002
- [62] Yankee Group, Wireless Mobile Services Vol.2, Issue 8, June 2001

ANNEX 2 –LIST OF COUNTRIES AND THEIR CATEGORISATION

List of countries, grouped by sub-continent with categorisation, current and forecasted population (in mio.)

Country	Category	Pop 2002	Pop 2005	Pop 2010	Pop 2015	Pop 2020
Algeria	D	31,4	33,1	35,6	38,0	40,4
Angola	F	13,9	15,3	17,8	20,8	24,3
Benin	F	6,6	7,2	8,3	9,4	10,7
Botswana	C	1,6	1,6	1,6	1,7	1,8
Burkina Faso	F	12,2	13,4	15,8	18,5	21,7
Burundi	F	6,7	7,4	8,7	9,8	11,1
Cameroon	E	15,5	16,6	18,3	20,2	22,1
Cape Verde	C	0,4	0,5	0,5	0,6	0,6
Central African Republic	F	3,8	4,0	4,4	4,9	5,4
Chad	F	8,4	9,2	10,7	12,4	14,3
Comoros	E	0,7	0,8	0,9	1,1	1,2
Congo, Democratic Republic of the	F	54,5	60,2	71,3	84,0	98,6
Congo, Republic of the	E	3,2	3,5	4,1	4,7	5,5
Côte d'Ivoire	F	16,7	17,8	19,6	21,5	23,4
Djibouti	E	0,6	0,7	0,7	0,7	0,7
Egypt	D	70,2	73,8	79,3	84,4	89,7
Equatorial Guinea	D	0,5	0,5	0,6	0,7	0,8
Eritrea	F	4,0	4,5	5,1	5,7	6,4
Ethiopia	F	66,0	71,0	79,9	89,8	100,9
Gabon	C	1,3	1,4	1,6	1,8	2,0
Gambia, The	F	1,4	1,5	1,6	1,8	1,9
Ghana	F	20,2	21,6	23,9	26,4	28,8
Guinea	F	8,4	8,8	10,0	11,3	12,7
Guinea-Bissau	F	1,3	1,4	1,5	1,7	1,9
Kenya	F	31,9	33,7	36,9	40,0	42,7
Lesotho	E	2,1	2,1	2,1	2,1	2,2
Liberia	F	3,3	3,8	4,7	5,6	6,5
Libyan Arab Jamahiriya	D	5,5	5,9	6,5	7,1	7,5
Madagascar	F	16,9	18,4	21,1	24,1	27,3
Malawi	F	11,8	12,6	14,0	15,7	17,5
Mali	F	12,0	13,1	15,2	17,7	20,4
Mauritania	F	2,8	3,1	3,6	4,1	4,7
Mauritius	B	1,2	1,2	1,3	1,3	1,3
Morocco	C	31,2	33,0	35,7	38,0	40,2
Mozambique	F	18,9	20,0	21,6	23,5	25,7
Namibia	D	1,8	1,9	2,1	2,3	2,5
Niger	F	11,6	13,0	15,6	18,5	21,9
Nigeria	F	120,0	129,7	146,9	165,3	184,2
Rwanda	F	7,9	8,5	9,4	10,5	11,7
São Tomé and Príncipe	E	0,1	0,2	0,2	0,2	0,2
Senegal	F	9,9	10,7	12,1	13,5	15,0
Seychelles	B	0,1	0,1	0,1	0,1	0,1
Sierra Leone	F	4,8	5,5	6,3	7,1	8,0
Somalia	F	9,5	10,8	13,1	15,4	18,1
South Africa	C	44,0	45,0	45,1	44,6	44,0
Sudan	F	32,6	34,9	38,7	42,4	46,1
Swaziland	D	0,9	1,0	1,0	1,0	1,1
Tanzania (United Rep. Of)	F	36,8	39,4	44,1	49,3	54,9
Togo	F	4,8	5,1	5,8	6,6	7,4
Tunisia	D	9,7	10,0	10,6	11,3	11,8
Uganda	F	24,8	27,3	32,6	38,7	45,8
Zambia	F	10,9	11,6	13,0	14,8	16,8
Zimbabwe	D	13,1	13,8	15,0	16,4	17,6
Total Africa		831	891	996	1 109	1 230

Africa

Country	Category	Pop 2002	Pop 2005	Pop 2010	Pop 2015	Pop 2020
Australia	A	19,5	20,1	21,0	21,9	22,7
Brunei Darussalam	A	0,3	0,4	0,4	0,4	0,4
Cambodia	E	13,8	14,8	16,6	18,6	20,5
Est Timor (Lorosae)	F	0,8	0,9	1,0	1,1	1,2
Fiji	C	0,8	0,9	0,9	0,9	0,9
Indonesia	D	217,3	225,3	237,7	250,1	261,9
Japan	A	127,4	128,0	128,2	127,5	126,0
Kiribati	D	0,1	0,1	0,1	0,1	0,1
Korea, Dem. People's Rep. of	F	22,6	23,0	23,7	24,4	25,2
Korea, Republic of	A	47,4	48,3	49,6	50,6	51,4
Lao People's Dem. Rep.	F	5,5	5,9	6,6	7,3	8,1
Malaysia	B	23,0	24,2	26,1	27,9	29,6
Maldives	D	0,3	0,3	0,4	0,5	0,5
Marshall Islands	D	0,1	0,1	0,1	0,1	0,1
Micronesia, Federated States of	D	0,1	0,1	0,2	0,2	0,2
Myanmar (Burma)	E	48,9	50,6	53,0	55,3	57,8
Nauru	C	0,0	0,0	0,0	0,0	0,0
New Zealand	A	3,9	3,9	4,1	4,2	4,2
Palau	C	0,0	0,0	0,0	0,0	0,0
Papua New Guinea	D	5,0	5,4	6,0	6,6	7,3
Philippines	C	78,5	83,0	89,9	95,9	101,4
Samoa	D	0,2	0,2	0,2	0,2	0,2
Singapore	A	4,2	4,4	4,6	4,8	4,9
Solomon Islands	E	0,5	0,5	0,6	0,7	0,8
Thailand	C	64,3	66,5	69,7	72,5	75,1
Tonga	D	0,1	0,1	0,1	0,1	0,1
Tuvalu	D	0,0	0,0	0,0	0,0	0,0
Vanuatu	D	0,2	0,2	0,3	0,3	0,3
Vietnam	E	80,2	83,4	88,7	94,4	100,2
Total Asia / Pacific		765	791	830	867	901

Asia / Pacific

Country	Category	Pop 2002	Pop 2005	Pop 2010	Pop 2015	Pop 2020
Bangladesh	F	143,3	152,6	167,9	183,2	197,6
Bhutan	F	2,2	2,4	2,7	3,1	3,5
China	C	1 300,9	1 329,1	1 374,4	1 418,7	1 455,0
India	D	1 040,1	1 088,6	1 164,0	1 230,5	1 291,3
Mongolia	E	2,6	2,7	2,9	3,1	3,3
Nepal	F	24,1	25,9	28,9	32,1	35,4
Pakistan	F	148,6	160,3	181,4	204,3	227,8
Sri Lanka	D	19,3	19,8	20,7	21,5	22,1
Total Central Asia		2 681	2 781	2 943	3 096	3 236

Central Asia

Country	Category	Pop 2002	Pop 2005	Pop 2010	Pop 2015	Pop 2020
Afghanistan	F	23,4	26,2	31,3	35,6	40,2
Bahrain	A	0,7	0,7	0,7	0,8	0,8
Iran (Islamic Republic of)	C	72,3	75,4	80,8	87,1	93,5
Iraq	D	24,2	26,3	29,9	33,6	37,1
Israel	A	9,7	10,5	11,8	13,0	14,3
Jordan	C	5,2	5,7	6,4	7,2	7,9
Kazakhstan	D	16,1	15,9	15,8	16,0	16,1
Kuwait	A	2,0	2,2	2,5	2,8	3,0
Kyrgyzstan	E	5,0	5,2	5,5	5,8	6,2
Lebanon	B	3,6	3,8	4,0	4,2	4,4
Oman	C	2,7	3,0	3,5	4,1	4,7
Qatar	A	0,6	0,6	0,7	0,7	0,7
Saudi Arabia	C	21,7	23,8	27,6	31,7	36,1
Syrian Arab Republic	D	17,0	18,4	20,8	23,2	25,5
Tajikistan	E	6,2	6,3	6,6	7,1	7,6
Turkmenistan	D	4,9	5,2	5,7	6,1	6,4
United Arab Emirates	A	2,7	2,8	3,1	3,2	3,4
Uzbekistan	E	25,6	26,7	28,5	30,6	32,5
Yemen	F	19,9	22,5	27,4	33,1	40,0
Total Middle East		264	281	313	346	380

Middle East

Country	Category	Pop 2002	Pop 2005	Pop 2010	Pop 2015	Pop 2020
Albania	D	3,2	3,2	3,3	3,4	3,6
Armenia	E	3,8	3,8	3,8	3,8	3,8
Azerbaijan	E	8,1	8,3	8,5	8,7	8,9
Belarus	C	10,1	10,0	9,8	9,7	9,5
Bosnia and Herzegovina	D	4,1	4,2	4,3	4,3	4,2
Bulgaria	B	7,8	7,6	7,2	6,8	6,5
Croatia	B	4,7	4,7	4,7	4,6	4,6
Czech Republic	B	10,3	10,2	10,1	10,0	9,9
Estonia	B	1,4	1,3	1,3	1,2	1,1
Georgia	E	5,2	5,1	5,0	4,8	4,6
Hungary	B	9,9	9,7	9,5	9,3	9,0
Latvia	B	2,4	2,4	2,3	2,2	2,2
Lithuania	B	3,7	3,7	3,6	3,5	3,5
Macedonia, TFYR	B	2,0	2,1	2,1	2,1	2,1
Moldova	E	4,3	4,2	4,2	4,2	4,1
Poland	B	38,5	38,4	38,3	38,0	37,7
Romania	C	22,3	22,2	21,8	21,4	21,0
Russia	C	143,6	140,9	137,0	133,3	129,7
Slovakia	B	5,4	5,4	5,4	5,4	5,4
Slovenia	A	2,0	2,0	2,0	1,9	1,9
Turkey	B	68,4	71,2	75,1	79,0	82,9
Ukraine	D	48,6	47,3	45,2	43,3	41,5
Yugoslavia	B	10,5	10,5	10,4	10,3	10,2
Total Central & Eastern Europe		420	418	415	411	408

Central and Eastern Europe

Country	Category	Pop 2002	Pop 2005	Pop 2010	Pop 2015	Pop 2020
Andorra	A	0,1	0,1	0,1	0,1	0,2
Austria	A	8,1	8,0	8,0	7,8	7,7
Belgium	A	10,3	10,3	10,3	10,3	10,2
Cyprus	A	0,8	0,8	0,8	0,9	0,9
Denmark	A	5,4	5,5	5,5	5,5	5,5
Finland	A	5,2	5,2	5,2	5,2	5,2
France	A	61,9	62,6	63,6	64,4	65,1
Germany	A	82,0	81,9	81,4	80,7	79,9
Greece	A	10,6	10,6	10,6	10,5	10,3
Iceland	A	0,3	0,3	0,3	0,3	0,3
Ireland	A	3,9	4,0	4,2	4,4	4,6
Italy	A	57,4	57,2	56,4	55,2	53,9
Liechtenstein	A	0,0	0,0	0,0	0,0	0,0
Luxembourg	A	0,4	0,5	0,5	0,5	0,5
Malta	A	0,4	0,4	0,4	0,4	0,4
Monaco	A	0,0	0,0	0,0	0,0	0,0
Netherlands	A	16,3	16,5	16,7	16,8	16,9
Norway	A	4,5	4,6	4,6	4,7	4,7
Portugal	A	10,0	10,1	10,1	10,0	9,9
San Marino	A	0,0	0,0	0,0	0,0	0,0
Spain	A	39,9	39,9	39,6	39,0	38,3
Sweden	A	8,8	8,8	8,7	8,6	8,6
Switzerland	A	7,2	7,1	7,1	7,0	6,9
United Kingdom	A	60,0	60,4	60,7	61,0	61,4
Vatican City (Holy See)	A	0,0	0,0	0,0	0,0	0,0
Total Western Europe		394	395	395	394	392

Western Europe

Country	Category	Pop 2002	Pop 2005	Pop 2010	Pop 2015	Pop 2020
Canada	A	31,3	32,0	33,2	34,4	35,6
United States of America	A	292,7	300,6	313,3	326,2	339,3
Total North America		324	333	347	361	375

North America

Country	Category	Pop 2002	Pop 2005	Pop 2010	Pop 2015	Pop 2020
Antigua and Barbuda	B	0,1	0,1	0,1	0,1	0,1
Argentina	B	37,9	39,3	41,5	43,5	45,3
Bahamas, The	B	0,3	0,3	0,3	0,4	0,4
Barbados	B	0,3	0,3	0,3	0,3	0,3
Belize	C	0,2	0,2	0,3	0,3	0,3
Bolivia	D	8,7	9,3	10,2	11,2	12,2
Brazil	B	174,6	181,1	191,4	201,4	210,6
Chile	B	15,6	16,1	17,0	17,9	18,8
Colombia	C	43,5	45,6	49,2	52,6	56,0
Costa Rica	C	4,2	4,5	4,9	5,2	5,6
Cuba	D	11,3	11,4	11,5	11,6	11,7
Dominica	C	0,1	0,1	0,1	0,1	0,1
Dominican Republic	C	8,6	9,0	9,6	10,1	10,6
Ecuador	D	13,1	13,8	14,9	15,9	16,9
El Salvador	C	6,5	6,9	7,4	8,0	8,5
Grenada	B	0,1	0,1	0,1	0,1	0,1
Guatemala	D	12,0	13,0	14,6	16,3	18,0
Guyana	C	0,8	0,8	0,8	0,7	0,7
Haiti	F	8,4	8,8	9,5	10,2	10,9
Honduras	D	6,7	7,2	8,0	8,7	9,4
Jamaica	B	2,6	2,7	2,8	3,0	3,1
Mexico	C	101,7	106,1	112,9	119,2	125,0
Nicaragua	F	5,3	5,8	6,5	7,2	7,9
Panama	C	2,9	3,1	3,3	3,5	3,6
Paraguay	C	5,8	6,2	7,0	7,8	8,6
Peru	D	26,5	27,8	29,9	31,9	33,8
Saint Kitts and Nevis	B	0,0	0,1	0,1	0,1	0,1
Saint Lucia	C	0,2	0,2	0,2	0,2	0,2
Saint Vincent and the Grenadines	C	0,1	0,1	0,1	0,1	0,1
Suriname	B	0,4	0,4	0,4	0,4	0,4
Trinidad and Tobago	B	1,3	1,3	1,4	1,4	1,4
Uruguay	B	3,4	3,5	3,6	3,7	3,8
Venezuela	B	25,1	26,5	28,7	30,9	32,9
Total South & Central America and the Caribbean		528	551	588	624	657

South & Central America and The Caribbeans

Note 1: All figures are issued from "the World Population Prospects – the 2001 revision" produced by the Division of the Department of Economic and Social Affairs of the United Nations Secretariat.

Note 2: Only independent states, registered as members of the United Nations, are presented. All figures relative to dependencies and areas of special sovereignty are included in their sovereign country as identified by the Office of the Geographer and Global Issues, Bureau of Intelligence and Research, U.S. Department of States.

**ANNEX 3 - MOBILE USER FORECASTS PER SUB-CONTINENTAL GROUPING
(IN MIO.)**

Country	Subs. 2006	Subs. 2010	Subs. 2020
Algeria	1,6	4,5	8,2
Angola	0,4	0,7	1,1
Benin	0,4	0,7	1,2
Botswana	0,6	0,7	0,9
Burkina Faso	0,3	0,4	1,0
Burundi	0,2	0,4	0,7
Cameroon	1,0	1,5	2,6
Cape Verde	0,1	0,1	0,2
Central African Republic	0,1	0,1	0,4
Chad	0,1	0,2	0,4
Comoros	0,0	0,0	0,1
Congo, Democratic Republic of the	0,9	2,3	6,5
Congo, Republic of the	0,3	0,5	0,8
Côte d'Ivoire	1,2	1,4	1,9
Djibouti	0,0	0,1	0,1
Egypt	10,1	17,6	33,2
Equatorial Guinea	0,0	0,1	0,1
Eritrea	0,0	0,2	0,2
Ethiopia	0,2	0,7	3,8
Gabon	0,5	0,6	0,9
Gambia, The	0,1	0,2	0,3
Ghana	0,6	1,0	2,1
Guinea	0,2	0,4	1,2
Guinea-Bissau	0,0	0,0	0,2
Kenya	2,0	2,6	3,8
Lesotho	0,1	0,1	0,1
Liberia	0,0	0,2	0,3
Libyan Arab Jamahiriya	0,2	0,4	1,2
Madagascar	0,5	0,8	1,7
Malawi	0,2	0,4	0,5
Mali	0,3	0,5	0,8
Mauritania	0,3	0,4	0,5
Mauritius	0,7	0,9	0,9
Morocco	9,6	11,7	14,3
Mozambique	0,5	0,9	1,9
Namibia	0,2	0,2	0,3
Niger	0,0	0,1	0,5
Nigeria	3,4	6,3	15,0
Rwanda	0,2	0,3	0,6
São Tomé and Príncipe	0,0	0,0	0,0
Senegal	0,8	1,0	1,5
Seychelles	0,1	0,1	0,1
Sierra Leone	0,1	0,2	0,6
Somalia	0,1	0,4	1,0
South Africa	14,2	15,2	15,6
Sudan	0,6	1,1	2,2
Swaziland	0,1	0,1	0,2
Tanzania (United Rep. Of)	1,3	1,8	3,1
Togo	0,3	0,4	0,7
Tunisia	1,0	1,6	2,3
Uganda	0,7	1,2	2,7
Zambia	0,3	0,5	1,1
Zimbabwe	0,9	1,8	3,9
Total Africa	57,722	85,354	145,659

Africa

Country	Subs. 2006	Subs. 2010	Subs. 2020
Australia	16,4	17,2	18,7
Brunei Darussalam	0,3	0,3	0,4
Cambodia	0,6	0,9	1,8
Est Timor (Lorosae)	0,0	0,0	0,1
Fiji	0,2	0,2	0,2
Indonesia	28,0	50,9	97,5
Japan	106,9	108,6	106,9
Kiribati	0,0	0,0	0,0
Korea, Dem. People's Rep. of	0,1	0,6	1,7
Korea, Republic of	41,3	42,6	44,3
Lao People's Dem. Rep.	0,1	0,2	0,3
Malaysia	14,2	16,8	19,6
Maldives	0,1	0,1	0,3
Marshall Islands	0,0	0,0	0,0
Micronesia, Federated States of	0,0	0,0	0,0
Myanmar (Burma)	0,3	1,7	4,7
Nauru	0,0	0,0	0,0
New Zealand	3,3	3,4	3,6
Palau	0,0	0,0	0,0
Papua New Guinea	0,1	0,4	1,2
Philippines	26,1	36,6	49,3
Samoa	0,0	0,0	0,0
Singapore	4,0	4,1	4,4
Solomon Islands	0,0	0,0	0,0
Thailand	20,3	22,4	26,0
Tonga	0,0	0,0	0,0
Tuvalu	0,0	0,0	0,0
Vanuatu	0,0	0,0	0,0
Vietnam	4,1	7,9	21,1
Total Asia / Pacific	266	315	402

Asia / Pacific

Country	Subs. 2006	Subs. 2010	Subs. 2020
Bangladesh	4,1	11,5	38,2
Bhutan	0,0	0,1	0,1
China	421,9	571,4	748,7
India	33,8	82,0	328,9
Mongolia	0,3	0,3	0,4
Nepal	0,1	0,4	2,6
Pakistan	3,4	6,6	18,3
Sri Lanka	2,1	3,8	7,4
Total Central Asia	466	676	1 145

Central Asia

Country	Subs. 2006	Subs. 2010	Subs. 2020
Afghanistan	0,2	1,1	1,9
Bahrain	0,6	0,6	0,7
Iran (Islamic Republic of)	7,5	13,5	22,7
Iraq	0,9	3,8	9,6
Israel	9,1	10,1	12,3
Jordan	1,6	2,0	2,5
Kazakhstan	1,8	2,8	4,5
Kuwait	1,7	2,0	2,4
Kyrgyzstan	0,1	0,2	0,7
Lebanon	2,0	2,6	3,0
Oman	0,8	1,0	1,5
Qatar	0,5	0,5	0,6
Saudi Arabia	5,6	6,7	9,0
Syrian Arab Republic	0,8	1,6	3,5
Tajikistan	0,1	0,3	1,0
Turkmenistan	0,1	0,3	1,4
United Arab Emirates	2,3	2,5	2,7
Uzbekistan	1,0	2,4	5,5
Yemen	1,0	1,4	2,8
Total Middle East	38	55	88

Middle East

Country	Subs. 2006	Subs. 2010	Subs. 2020
Albania	0,6	0,7	0,7
Armenia	0,1	0,2	0,6
Azerbaijan	1,0	1,0	1,2
Belarus	1,2	2,4	4,4
Bosnia and Herzegovina	0,5	0,6	0,6
Bulgaria	3,6	4,0	3,7
Croatia	2,7	2,8	2,8
Czech Republic	8,4	8,3	8,1
Estonia	1,0	1,0	0,9
Georgia	0,7	0,8	0,8
Hungary	7,6	7,7	7,4
Latvia	1,2	1,2	1,2
Lithuania	2,3	2,4	2,3
Macedonia, TFYR	0,8	1,1	1,1
Moldova	0,4	0,6	0,7
Poland	20,5	21,9	22,0
Romania	6,4	6,4	6,3
Russia	34,4	51,4	65,3
Slovakia	3,1	3,1	3,1
Slovenia	1,6	1,6	1,6
Turkey	38,4	43,5	48,9
Ukraine	5,6	6,6	7,0
Yugoslavia	4,9	5,6	5,6
Total Central & Eastern Europe	147	175	196

Central and Eastern Europe

Country	Subs. 2006	Subs. 2010	Subs. 2020
Andorra	0,1	0,1	0,1
Austria	6,7	6,6	6,5
Belgium	8,7	8,7	8,7
Cyprus	0,6	0,7	0,7
Denmark	4,5	4,5	4,5
Finland	4,2	4,2	4,2
France	52,3	53,7	55,0
Germany	68,2	68,4	67,2
Greece	8,7	8,7	8,5
Iceland	0,2	0,2	0,2
Ireland	3,3	3,5	3,8
Italy	46,9	46,2	44,2
Liechtenstein	0,0	0,0	0,0
Luxembourg	0,4	0,4	0,5
Malta	0,4	0,4	0,4
Monaco	0,0	0,0	0,0
Netherlands	14,2	14,4	14,6
Norway	3,7	3,8	3,9
Portugal	8,6	8,6	8,5
San Marino	0,0	0,0	0,0
Spain	33,9	33,7	32,7
Sweden	7,2	7,1	7,0
Switzerland	6,0	5,9	5,8
United Kingdom	51,8	52,1	52,8
Vatican City (Holy See)	0,0	0,0	0,0
Total Western Europe	331	332	330

Western Europe

Country	Subs. 2006	Subs. 2010	Subs. 2020
Canada	20,3	25,6	29,8
United States of America	214,6	252,9	288,9
Total North America	235	279	319

North America

Country	Subs. 2006	Subs. 2010	Subs. 2020
Antigua and Barbuda	0,0	0,0	0,0
Argentina	18,4	25,6	29,7
Bahamas, The	0,2	0,2	0,2
Barbados	0,2	0,2	0,2
Belize	0,1	0,1	0,1
Bolivia	1,3	1,6	2,1
Brazil	88,0	115,8	133,9
Chile	10,0	11,2	12,6
Colombia	10,2	16,5	24,9
Costa Rica	1,1	1,7	2,6
Cuba	0,1	0,4	2,6
Dominica	0,0	0,0	0,0
Dominican Republic	2,7	3,4	4,3
Ecuador	2,4	3,0	3,9
El Salvador	1,9	2,9	4,2
Grenada	0,0	0,0	0,1
Guatemala	2,5	3,3	4,7
Guyana	0,1	0,2	0,2
Haiti	0,3	0,5	1,1
Honduras	0,7	1,1	1,9
Jamaica	1,5	1,7	1,9
Mexico	36,8	43,7	52,0
Nicaragua	0,3	0,5	0,7
Panama	0,8	1,0	1,2
Paraguay	2,3	2,8	3,6
Peru	4,1	5,8	8,3
Saint Kitts and Nevis	0,0	0,0	0,0
Saint Lucia	0,0	0,0	0,0
Saint Vincent and the Grenadines	0,0	0,0	0,0
Suriname	0,2	0,2	0,3
Trinidad and Tobago	0,7	0,9	1,0
Uruguay	1,7	2,2	2,5
Venezuela	14,1	17,9	21,2
Total South & Central America and the Caribbean	203	265	322

South & Central America and The Caribbeans