Report No. 17
Report from the UMTS Forum

The UMTS Third Generation Market Study Update

Including updated worldwide and regional forecasts for Mobile Intranet/Extranet, Customised Infotainment, Mobile Internet Access, Multimedia Messaging Service, Location-Based Services, and Voice

UMTS Forum, August 2001

This report has been produced by the UMTS Forum, an association of telecommunications operators, manufacturers and regulators who are active both in Europe and other parts of the world and who share the vision of UMTS (Universal Mobile Telecommunications System). UMTS is a modular concept, which takes full regard of the trend of convergence of existing and future information networks, devices and services, and the potential synergies that can be derived from such convergence. UMTS will move mobile communications forward from where we are today into the Information Society of third generation (3G) services, and will deliver speech, data, pictures, graphics, video communication and other wideband information direct to people on the move.

A key objective of this report is to provide updated worldwide service forecasts for 3G mobile networks. The study was carried out by the consulting company Telecompetition, Inc. under the guidance of and with contributions from the Market Aspects Group (MAG) of the UMTS Forum.

Revenue data is reported in current US dollars. Totals may not always add up due to rounding. Unless otherwise credited, the source of all diagrams and exhibits is Telecompetition, Inc.

This report follows on from other outputs which have dealt with: a regulatory framework and spectrum aspects for UMTS (Report #1), technical aspects (#2), impact of licence cost levels (#3), licensing conditions (#4), minimum spectrum requirements (#5), UMTS/IMT-2000 spectrum (#6), extensions to core band spectrum (#7), and the future market for mobile multimedia services, mobile voice and data services (#8), an extended vision (#10), and UMTS Report No. 9 and 13. These reports and others can be found on the UMTS Forum Web site, www.umts-forum.org/reports.html.

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1. Background

The economic downturn in the mobile and Internet industry sectors and in the high technology markets in general have prompted new concerns about the commercial viability of mobile data services, including 3G. ***The purpose of this report is to re-examine the worldwide market demand for 3G services in light of these new market challenges, to provide updated regional and worldwide forecasts that reflect any needed changes in assumptions.***

The UMTS Forum Report No. 9 presented the first results from a market study investigating 3G service revenue opportunities and proposed a 3G service framework that characterises the market opportunity from the user's perspective. Report 13 completed that study. This current report maintains the same frameworks, methodology, and model structure used in Reports 9 and 13 while providing updated worldwide service forecasts that incorporate modifications to some assumptions based on current market conditions. In addition, it provides regional detail based on the updated worldwide forecasts.

A secondary purpose of this report is to further explain the assumptions and methodology underlying these forecasts so that individual industry players are more confident using this information to assess their individual opportunities.

1.1 Analysis Conclusion

The re-examination shows that due to the current negative market conditions, the short term revenue generated by 3G services will be reduced 17% through 2004 –a total reduction of $10 billion. Over the long term, however, services enabled by 3G technology still represent a substantial market opportunity of $320 billion in 2010, $233 billion of which will be generated by new 3G services.[1] Using the conservative assumptions in this analysis, cumulative revenue of over one trillion dollars is still expected over this decade.[2]

1.2 Forecast Approach

Technology, economic and other market factors change rapidly, and often, perception is quite different than facts. The approach in Reports 9, 13 and in this updated forecast analysis is rigorous and based on as much fact as is available. The forecast approach avoids making changes based on mere speculation or simply increased uncertainty. This updated analysis makes changes in the baseline assumptions in those cases where there is evidence that such changes are warranted and backed by reasonable market evidence or fact-based rationale.

[1] UMTS Report 13 shows total 3G revenue in 2010 of $322 billion; $234 billion from new 3G services.

[2] This report shows cumulative revenue, including Simple Voice at $1.159 trillion. This is slightly lower than the $1.164 trillion projected in UMTS Report 13, taking into account the revised assumptions explained in the later sections of this report.

1.3 Forecast Assumptions

The following aspects of the 3G market were considered as part of this updated forecast:

- Propensity-to-buy (by service) - considers population demographics of age, occupation and industry that are most likely to use each service.
- Geogain Score (by service, by country, and by year) –considers a number of country specific factors for each service such as:
  - Country-level 3G network availability dates
  - Gross Domestic Product (GDP)
  - Internet penetration and PC usage
  - Media and TV Usage
  - Mobile penetration
  - Teledensity
- Worldwide Mobile Subscribers – the total potential subscribers for 3G services. Based on an adoption rate applied to world population.
- Worldwide Adoption Rate for 3G – the percentage of worldwide mobile subscribers that have access to 3G networks and services
- Worldwide 3G Services Demand – multiple service specific forecast inputs that determine total worldwide revenue and subscriptions for each service category.
- Willingness to Pay (by service and by year) – the average worldwide prices applied to service demand elements within each service category to determine total revenue for each service category.

1.4 Updated Assumptions

Certain assumptions from UMTS Forum reports 9 and 13 were modified based on the following market changes in the last six months:

- General worldwide economic downturn
- Telecom sector-specific downturn
- Delays in infrastructure and mobile terminal availability
- Operator announced trials and launch dates

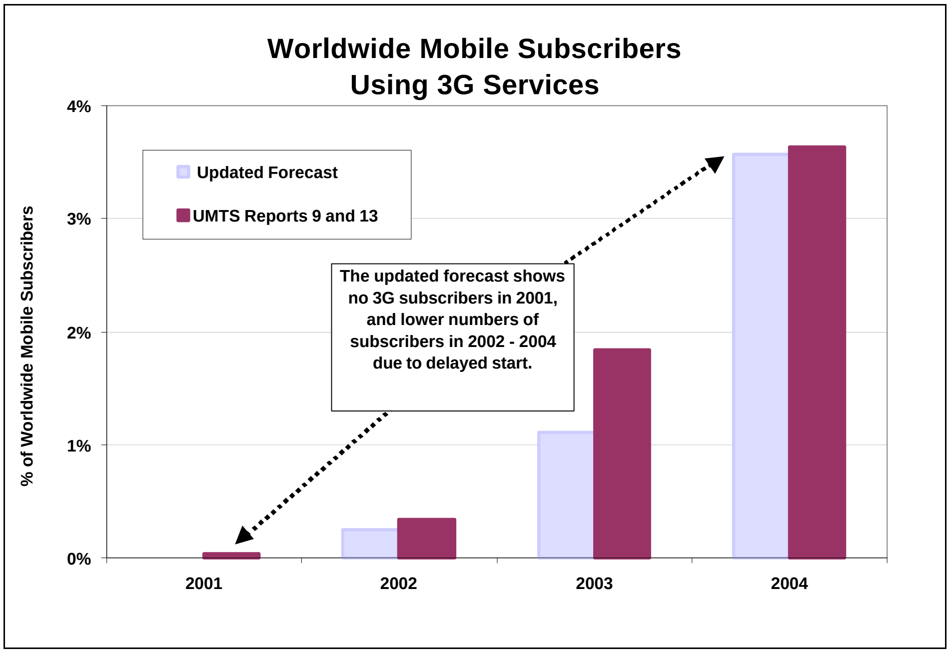
Based on these events, the following assumptions in the worldwide forecast have been changed:

- Worldwide adoption rate for 3G[3] (See Figure 1)

[3] The worldwide 3G adoption rate is an exponential curve that determines the worldwide percentage of mobile subscribers that use 3G networks and services.

- The shape of the 3G adoption curve was modified to account for slower start up in earlier years. The year 2010 adoption rate at 28% of worldwide mobile subscribers remains unchanged from Reports 9 and 13.4
- 3G adoption rate lowered between 2001 – 2004, with no 3G available in 2001.
- 3G adoption rate lowered between 2006 – 2008 to allow for more gradual ramp-up of countries just introducing 3G services in 2006-2008

Figure 1. Worldwide 3G adoption rate comparison.



Source: UMTS Forum and Telecompetition Inc., August 2001.

- Country-level 3G network availability dates[5]
  - Japan moved to 2002 (from 2001)[6]
  - UK moved to 2002 and 2003 (from 2001)
  - All other Western European countries moved to 2003 (from 2002)
  - Several Eastern European and Rest of World countries moved to 2005 (from 2004)
  - United States unchanged with a 2004 availability date.

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[4] The rationale behind this is that lower start up (due to supply constraints) in earlier years does not necessarily result in lower adoption ten years out (a factor of demand, not supply). Telecompetition analysis shows that, over the long term, there will be sufficient pent-up demand with adequate network build-out to reach 28% of mobile users by 2010.

[5] Telecompetition assigns a country specific 3G network availability date for full service commercialisation. Full 3G commercialisation is defined beginning 12-24 months after the licence has been awarded and excludes the first six months or so of service, which typically consists of limited market trials.

[6] Some operators in the UK and Japan have maintained that they will offer 3G services in the first half of 2002, justifying some minimal, partial 2002 revenues for this forecast. Operators in other parts of Western Europe have announced initial launch of 3G services in the latter half of 2002, making the full service commercialisation start date of 2003, for a full year.

- Worldwide Mobile Subscribers - updated to reflect higher than expected EOY 2001 subscribers[7]
- Worldwide 3G Services Demand
  - The commercialisation date for video related services within the Rich Voice, and Multimedia Messaging Service categories moved to start one year later, reflecting the technical complexity in commercialising these services.
  - The addressable 3G market for Location-Based Services reduced slightly, reflecting the technical and market complexity in commercialising these services.

The remaining forecast assumptions are unchanged. Willingness-to-pay in Reports 9 and 13 used worldwide average prices for analogous services that change over time. Prices were reviewed, but no changes in the assumed prices or price trends were deemed necessary.

[7] As 3G network availability begins in 2002, this change does not affect the forecasts for 3G services.

2. Revised Worldwide Forecasts

The following summarises the revised worldwide forecasts for each service.

Table 1. Summary of revised worldwide revenue for 3G services – 2001-2010.

Revenues ($M)	2001	2002[8]	2003	2004	2005	2006	2007	2008	2009	2010	CAGR 2005-2010
Customised Infotainment	--	306	3,453	11,224	20,604	31,745	43,142	55,395	67,967	85,780	33.0%
Mobile Intranet/Extranet Access	--	165	1,898	5,816	9,786	14,993	20,773	32,449	47,397	60,663	44.0%
Multimedia Messaging Service (Consumer)	--	100	933	3,595	6,184	8,755	10,615	13,642	16,255	17,815	23.6%
Mobile Internet Access	--	42	484	1,483	2,495	3,822	5,295	8,271	12,845	14,154	41.5%
Multimedia Messaging Service (Business) [9]	--	3	151	862	2,140	5,016	8,780	14,634	21,437	23,747	61.8%
Location-Based Services	--	-	226	1,784	3,207	3,764	4,985	6,665	7,943	9,619	24.6%
Simple Voice	--	423	3,825	12,395	22,565	36,189	48,614	62,100	76,395	87,842	31.2%
Rich Voice	--	-	-	80	730	1,365	4,153	8,127	13,610	20,833	95.4%
Total ($B)	**--**	**1.0**	**11.0**	**37.2**	**67.7**	**105.7**	**146.4**	**201.3**	**263.9**	**320.5**	**36.5%**

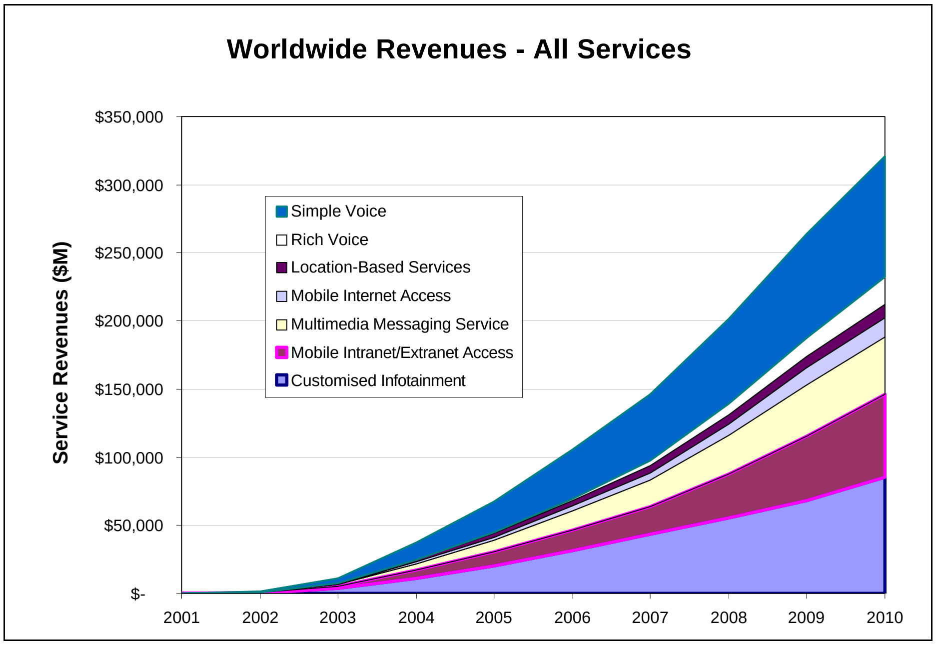
Source: UMTS Forum and Telecompetition Inc., August 2001.

Figure 2 illustrates the worldwide revenue for each service.

[8] Based on six months of revenue only. All other years are based on 12 full months of service.

[9] Revenue for MMS-Business includes machine-to-machine services and unified messaging, which are not directly attributable to individual business users of MMS services.

Figure 2. Worldwide demand for 3G services by revenue – 2001-2010.



Source: UMTS Forum and Telecompetition Inc., August 2001.

Table 2. Summary of revised worldwide subscriptions for 3G services – 2001-2010.

Subscriptions (M)[10]	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	CAGR 2005-2010
Total 3G subscribers	-	2.6	13.1	47.2	95.5	170.3	254.1	360.7	493.0	629.9	45.8%
Customised Infotainment	-	2.2	12.3	39.7	70.9	109.4	150.7	196.1	243.7	311.4	34.5%
Multimedia Messaging Service (Consumer)	-	0.9	4.1	17.2	33.0	53.0	71.1	90.9	111.8	128.5	31.2%
Mobile Intranet/Extranet Access	-	0.9	4.4	13.9	29.6	56.9	81.2	130.5	196.1	258.2	54.2%
Mobile Internet Access	-	0.1	1.1	3.5	7.5	14.5	20.7	33.3	53.2	60.3	51.5%
Multimedia Messaging Service (Business)[11]	-	0.1	1.6	5.8	13.7	29.4	46.8	83.9	140.5	206.5	72.0 %
Simple Voice	-	2.6	13.1	47.2	95.5	170.3	254.1	360.7	493.0	629.9	45.8%

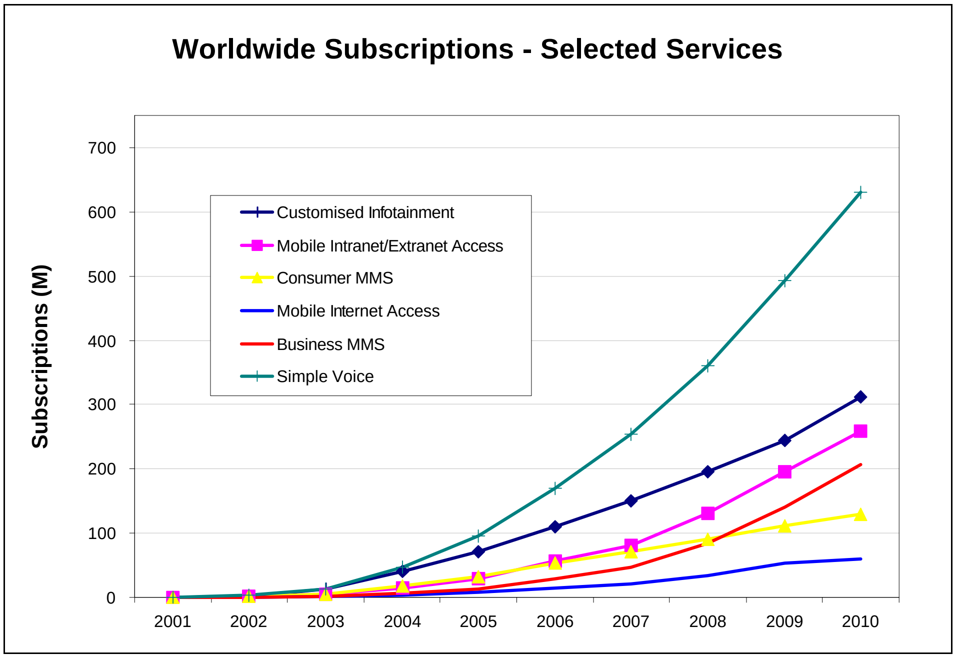
Source: UMTS Forum and Telecompetition Inc., August 2001.

[10] Subscription numbers for Rich Voice and Location-Based Services are not included, as these service revenues are a summation of several components, some of which are not calculated on a per-subscription basis. For additional reader comparisons, total 3G subscribers are also provided in the table.

[11] Revenue for MMS -Business includes machine-to-machine services and unified messaging, which are not directly attributable to individual business users of MMS services. The MMS-Business subscriptions shown throughout this report indicate mobile business users of 3G multimedia messaging services only, not including machine "users" or users of unified messaging services.

Figure 3 illustrates the worldwide subscriptions, where applicable, for each service.

Figure 3. Worldwide demand for 3G services by subscriptions – 2001-2010.



Source: UMTS Forum andTelecompetition Inc., August 2001.

The revenue impact of the assumption changes in the early years of the updated forecast as shown in Table 3 below[12].

Table 3. Comparison of 3G revenue – Report 13 and Updated Forecast.

3G Revenue ($M)	2001	2002	2003	2004
Report 13	$ 155	$ 3,111	$ 18,804	$ 37,395
Updated Forecast	$ -	$ 1,038	$ 10,970	$ 37,239
Difference	($ 155)	($ 2,072)	($ 7,834)	($ 156)

Source: UMTS Forum and Telecompetition Inc., August 2001.

[12] On a year-to-year basis, the updated (reshaped) 3G adoption curve results in reduced revenue in years 2001 – 2004 and in years 2006 – 2008 with increased revenue in 2005. Cumulative revenue changes in specific services range from 0 to 8% and are due to the changes in the 3G adoption curve as well as delayed commercialisation of the multimedia / complex components of Multimedia Messaging Service, Rich Voice, and Location-Based Services.

3. Updated Regional Forecasts

This section provides regional detail based on the revised worldwide forecasts.

Table 4. *Summary of 3G revenue by region – 2001-2010.*

Revenues ($M)	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Asia Pacific	-	725	4,311	10,614	26,044	41,947	56,993	76,842	98,177	118,540
Europe - Total	-	314	6,658	17,071	24,448	36,155	49,632	65,267	84,605	102,974
EU 15 Only	-	314	6,394	15,912	21,427	31,626	42,306	55,505	71,916	86,407
Rest of Europe	-	-	264	1,159	3,022	4,532	7,330	9,769	12,697	16,577
North America	-	-	-	8,125	12,312	19,866	28,084	40,131	55,549	68,094
Rest of World - Total	-	-	-	1,429	4,907	7,680	11,645	19,038	25,511	30,835
Latin America	-	-	-	859	3,432	5,326	8,396	11,406	15,370	18,492

Source: UMTS Forum and Telecompetition Inc., August 2001.

Table 5. *Summary of 3G subscribers by region – 2001-2010.*

Subscribers (M)	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Asia Pacific	-	1.8	5.3	14.0	38.1	69.6	102.7	142.8	189.7	241.1
Europe - Total	-	0.8	7.9	21.8	33.9	56.7	84.2	113.5	152.9	196.4
EU 15 Only	-	0.8	7.6	20.3	29.6	49.4	71.2	95.7	128.7	162.5
Rest of Europe	-	-	0.3	1.5	4.3	7.3	13.0	17.8	24.2	33.9
North America	-	-	-	9.6	16.5	31.5	46.6	69.2	100.9	128.9
Rest of World - Total	-	-	-	1.8	7.0	12.5	20.6	35.2	49.5	63.5
Latin America	-	-	-	1.1	4.9	8.6	14.7	20.8	29.5	37.7

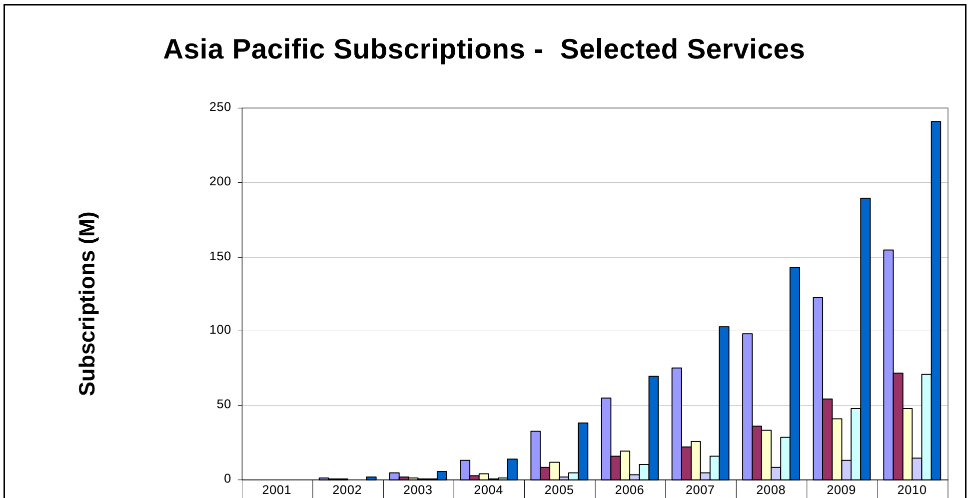
Source: UMTS Forum and Telecompetition Inc., August 2001.

As in Report 13, Asia Pacific continues to lead the remaining regions in total revenue from 2005 through 2010. Changes in revenues for all regions follow the same pattern as in the worldwide forecasts described in the previous section.[13]

[13] Unlike the other regions, Europe shows a slight increase in revenue as compared to Report 13. This is due to the addition of Croatia and Ukraine into the 3G forecasts and the reclassification of Russia from the Asia Pacific Region to Europe in order to maintain consistency with ILO definitions.

3.1 Asia Pacific

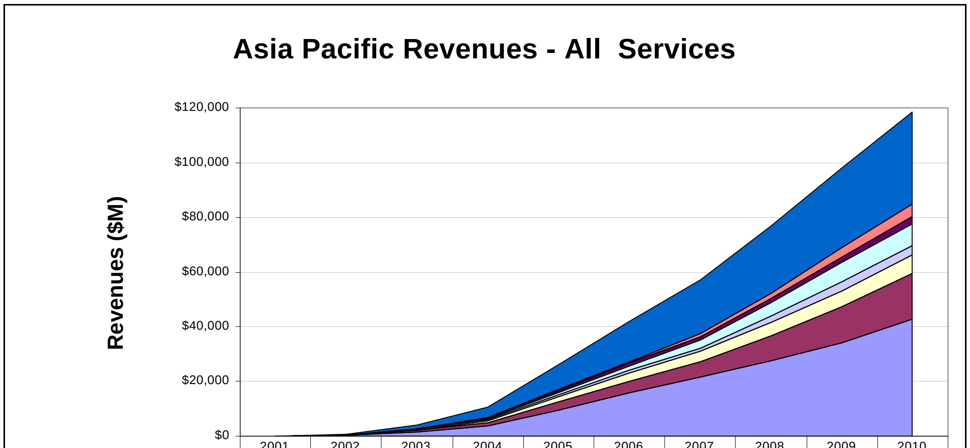
Figure 4. Asia Pacific demand for 3G services by subscriptions – 2001-2010.



	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Customised Infotainment	-	1.6	4.9	13.2	33.0	54.7	75.0	98.3	122.3	154.8
Mobile Intranet/Extranet Access	-	0.6	1.7	2.9	8.2	15.7	22.1	36.1	54.2	71.4
Consumer MMS	-	0.6	1.3	3.9	12.0	19.3	25.7	33.4	41.2	48.2
Mobile Internet Access	-	0.1	0.4	0.8	1.9	3.5	5.0	8.2	13.2	14.9
Business MMS	-	0.0	0.6	1.6	4.7	10.2	15.9	28.8	48.3	71.1
Simple Voice	-	1.8	5.3	14.0	38.1	69.6	102.7	142.8	189.7	241.1

Source: UMTS Forum and Telecompetition Inc., August 2001.

Figure 5. Asia Pacific demand for 3G services by revenue – 2001-2010.

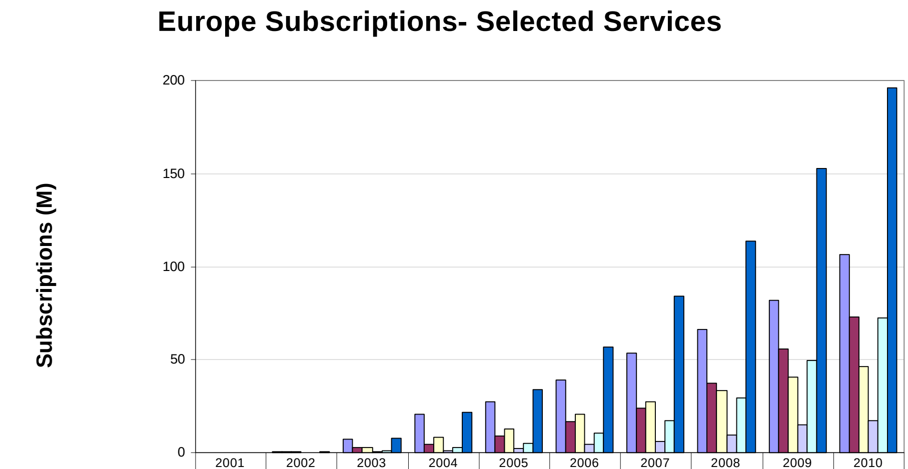


	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Simple Voice	-	$299	$1,532	$3,675	$9,006	$14,788	$19,653	$24,589	$29,394	$33,628
Rich Voice	-	-	$0	$24	$196	$332	$931	$1,855	$3,120	$4,802
Location-Based Services	-	-	$88	$564	$909	$969	$1,180	$1,601	$1,917	$2,336
Business MMS	-	$2	$60	$238	$739	$1,732	$2,988	$5,025	$7,368	$8,170
Mobile Internet Access	-	$28	$192	$337	$628	$923	$1,271	$2,034	$3,194	$3,509
Consumer MMS	-	$64	$296	$814	$2,256	$3,198	$3,833	$5,016	$5,986	$6,681
Mobile Intranet/Extranet Access	-	$112	$757	$1,227	$2,701	$4,133	$5,660	$8,964	$13,100	$16,778
Customised Infotainment	-	$219	$1,387	$3,734	$9,607	$15,872	$21,476	$27,758	$34,097	$42,636

Source: UMTS Forum and Telecompetition Inc., August 2001.

3.2 European Demand – Total Europe

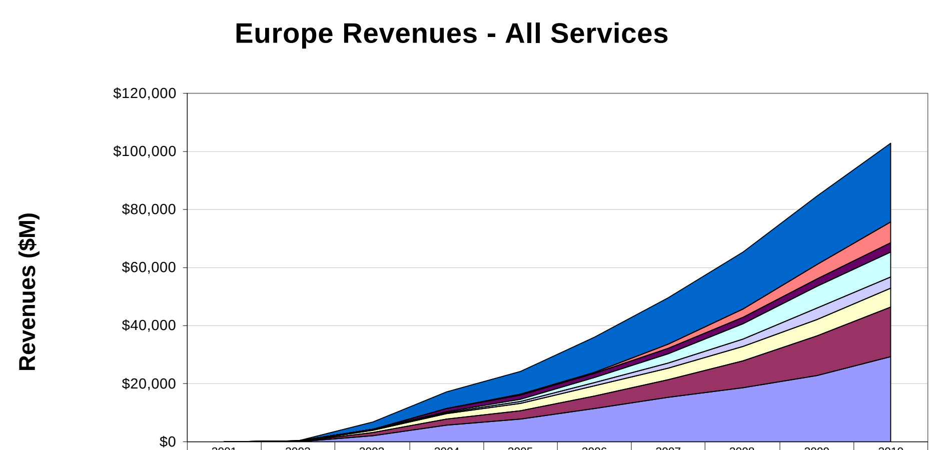
Figure 6. European demand for 3G services by subscriptions – 2001-2010.



	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Customised Infotainment	-	0.6	7.4	20.5	27.2	39.1	53.6	66.2	81.9	106.2
Mobile Intranet/Extranet Access	-	0.3	2.6	4.6	8.8	16.7	23.8	37.4	55.8	73.1
Consumer MMS	-	0.3	2.8	8.6	12.8	20.4	27.2	33.4	40.9	46.3
Mobile Internet Access	-	0.0	0.7	1.3	2.4	4.4	6.3	9.7	15.2	17.1
Business MMS	-	0.0	1.0	2.5	5.1	10.8	17.1	29.8	49.6	72.6
Simple Voice	-	0.8	7.9	21.8	33.9	56.7	84.2	113.5	152.9	196.4

Source: UMTS Forum and Telecompetition Inc., August 2001.

Figure 7. European demand for 3G services by revenue – 2001-2010.

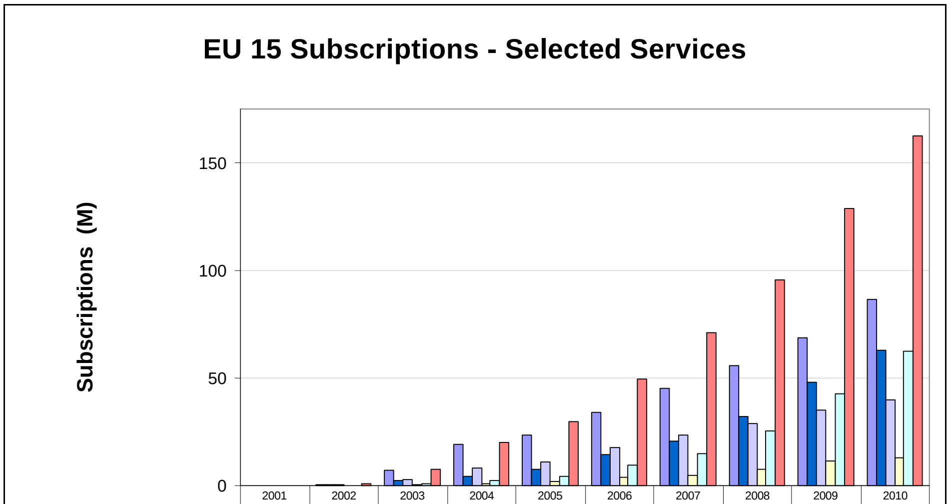


	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Simple Voice	-	$125	$2,293	$5,717	$7,996	$12,056	$16,107	$19,545	$23,691	$27,386
Rich Voice	-	-	$0	$41	$322	$533	$1,477	$2,833	$4,705	$7,134
Location-Based Services	-	-	$138	$897	$1,380	$1,444	$1,736	$2,277	$2,699	$3,252
Business MMS	-	$1	$91	$375	$789	$1,841	$3,209	$5,195	$7,571	$8,344
Mobile Internet Access	-	$14	$292	$538	$782	$1,154	$1,612	$2,412	$3,672	$4,008
Consumer MMS	-	$36	$637	$1,791	$2,388	$3,366	$4,060	$5,016	$5,946	$6,420
Mobile Intranet/Extranet Access	-	$52	$1,141	$1,928	$2,891	$4,403	$6,091	$9,287	$13,492	$17,175
Customised Infotainment	-	$87	$2,066	$5,785	$7,899	$11,358	$15,339	$18,703	$22,829	$29,256

Source: UMTS Forum and Telecompetition Inc., August 2001.

3.2.1 European Demand – EU 15 Only

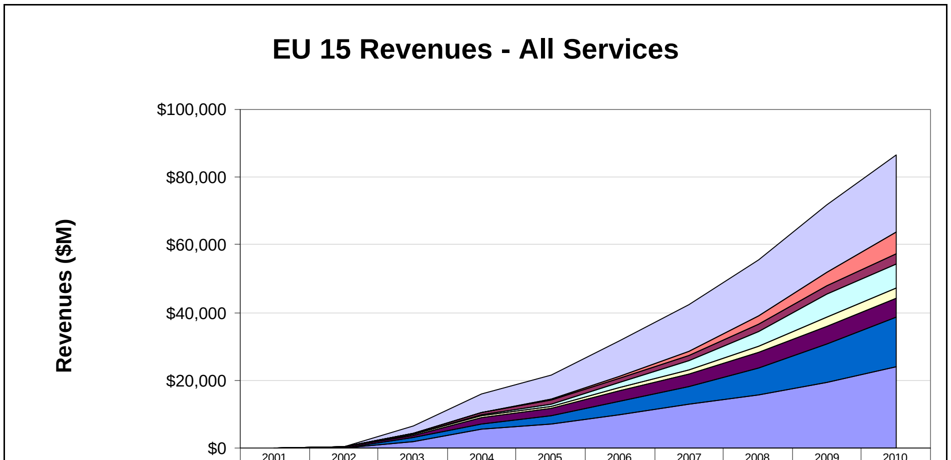
Figure 8. EU 15 demand for 3G services by subscriptions – 2001-2010.



	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Customised Infotainment	-	0.6	7.1	19.1	23.8	34.2	45.3	55.8	68.9	86.7
Mobile Intranet/Extranet Access	-	0.3	2.5	4.3	7.7	14.6	20.5	32.1	48.0	62.8
Multimedia Messaging Service - Consumer	-	0.3	2.7	8.0	11.2	17.9	23.6	28.9	35.3	40.0
Mobile Internet Access	-	0.0	0.6	1.2	2.0	3.7	5.0	7.6	11.7	13.0
Multimedia Messaging Service - Business	-	0.0	0.9	2.3	4.5	9.5	14.8	25.7	42.9	62.6
Simple Voice	-	0.8	7.6	20.3	29.6	49.4	71.2	95.7	128.7	162.5

Source: UMTS Forum and Telecompetition Inc., August 2001.

Figure 9. EU 15 demand for 3G services by revenue – 2001-2010.

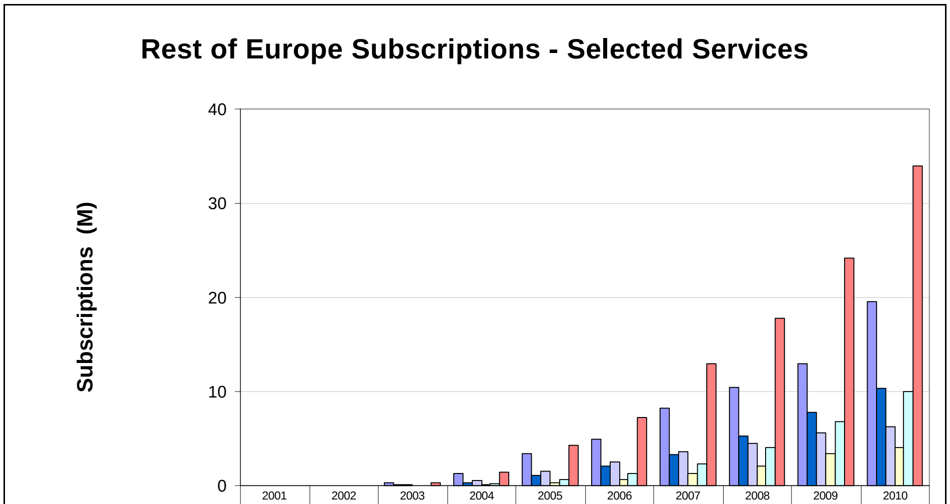


	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Simple Voice	-	$125	$2,205	$5,334	$6,984	$10,510	$13,628	$16,472	$19,938	$22,658
Rich Voice	-	-	$0.2	$38	$292	$484	$1,328	$2,545	$4,226	$6,406
Location-Based Servoces	-	-	$128	$826	$1,252	$1,309	$1,559	$2,043	$2,421	$2,916
Multimedia Messaging Service - Business	-	$1	$87	$348	$694	$1,618	$2,777	$4,486	$6,536	$7,201
Mobile Internet Access	-	$14	$279	$494	$666	$974	$1,277	$1,883	$2,836	$3,047
Multimedia Messaging Service - Consumer	-	$36	$610	$1,675	$2,098	$2,956	$3,520	$4,336	$5,138	$5,545
Mobile Intranet/Extranet Access	-	$52	$1,096	$1,788	$2,533	$3,854	$5,250	$7,986	$11,598	$14,759
Customised Infotainment	-	$87	$1,989	$5,410	$6,907	$9,921	$12,967	$15,754	$19,224	$23,876

Source: UMTS Forum and Telecompetition Inc., August 2001.

3.2.2 European Demand – Rest of Europe

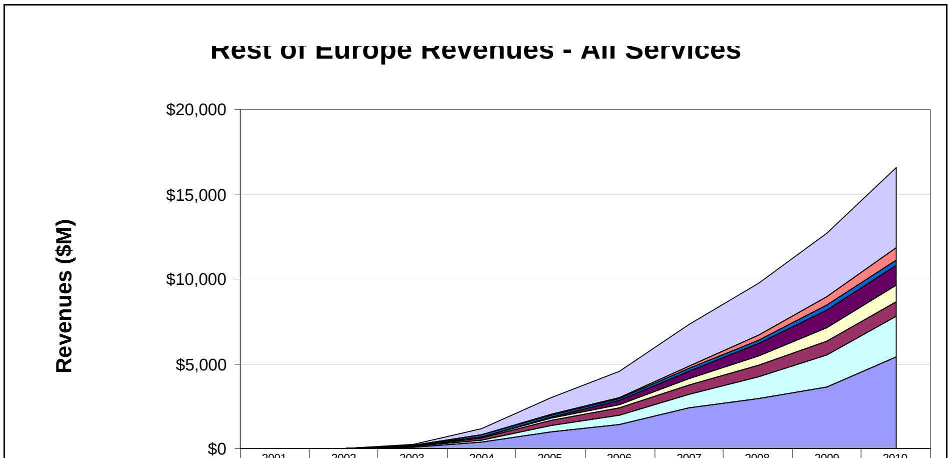
Figure 10. Rest of Europe demand for 3G services by subscriptions – 2001-2010.



	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Customised Infotainment	-	-	0.3	1.3	3.4	5.0	8.3	10.4	12.9	19.5
Mobile Intranet/Extranet Access	-	-	0.1	0.3	1.1	2.1	3.3	5.2	7.8	10.3
Multimedia Messaging Service - Consumer	-	-	0.1	0.6	1.5	2.5	3.6	4.5	5.6	6.3
Mobile Internet Access	-	-	0.0	0.1	0.4	0.7	1.3	2.1	3.5	4.1
Multimedia Messaging Service - Business	-	-	0.0	0.2	0.6	1.3	2.3	4.1	6.8	10.0
Simple Voice	-	-	0.3	1.5	4.3	7.3	13.0	17.8	24.2	33.9

Source: UMTS Forum and Telecompetition Inc., August 2001.

Figure 11. Rest of Europe demand for 3G services by revenue – 2001-2010.

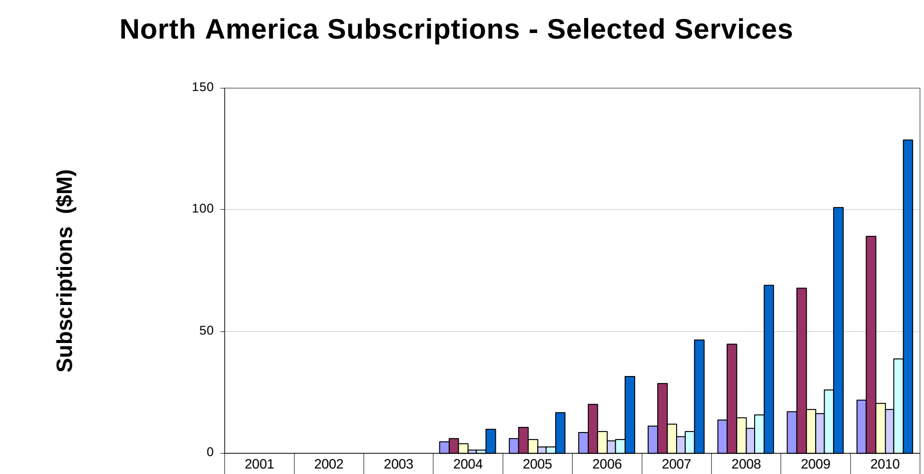


	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Simple Voice	-	-	$88	$383	$1,012	$1,545	$2,479	$3,072	$3,753	$4,728
Rich Voice	-	-	$0	$3	$30	$49	$149	$288	$479	$728
Location-Based Servoces	-	-	$10	$71	$129	$135	$178	$234	$278	$336
Multimedia Messaging Service - Business	-	-	$4	$27	$96	$225	$435	$715	$1,044	$1,153
Mobile Internet Access	-	-	$13	$43	$116	$181	$335	$529	$836	$961
Multimedia Messaging Service - Consumer	-	-	$27	$116	$290	$411	$540	$680	$808	$875
Mobile Intranet/Extranet Access	-	-	$45	$140	$358	$549	$841	$1,301	$1,894	$2,416
Customised Infotainment	-	-	$77	$375	$991	$1,437	$2,372	$2,950	$3,604	$5,380

Source: UMTS Forum and Telecompetition Inc., August 2001.

3.3 North American Demand

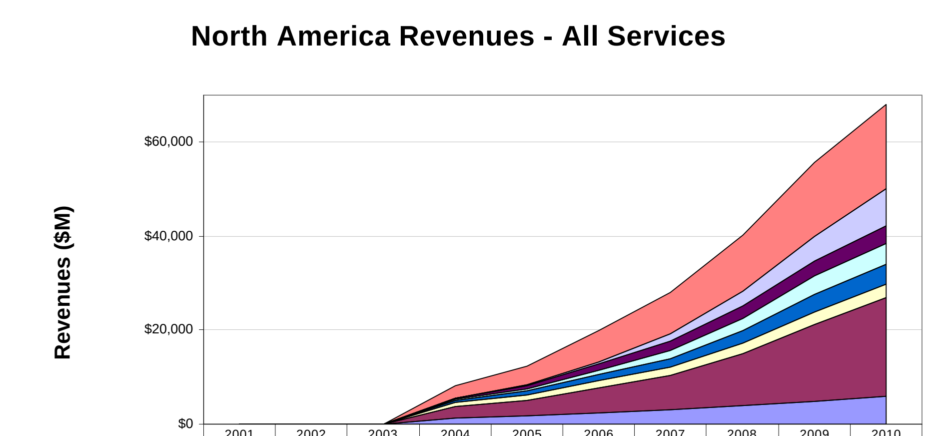
Figure 12. North American demand for 3G services by subscriptions – 2001-2010.



	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Customised Infotainment	-	-	-	4.6	5.8	8.3	11.1	13.8	17.2	21.8
Mobile Intranet/Extranet Access	-	-	-	5.8	10.5	20.2	28.5	44.9	67.6	89.2
Consumer MMS	-	-	-	3.9	5.6	8.9	11.9	14.6	18.0	20.6
Mobile Internet Access	-	-	-	1.2	2.4	4.9	6.7	10.3	16.1	18.0
Business MMS	-	-	-	1.4	2.6	5.7	8.9	15.6	26.2	38.6
Simple Voice	-	-	-	9.6	16.5	31.5	46.6	69.2	100.9	128.9

Source: UMTS Forum and Telecompetition Inc., August 2001.

Figure 13. North American demand for 3G services by revenue – 2001-2010.

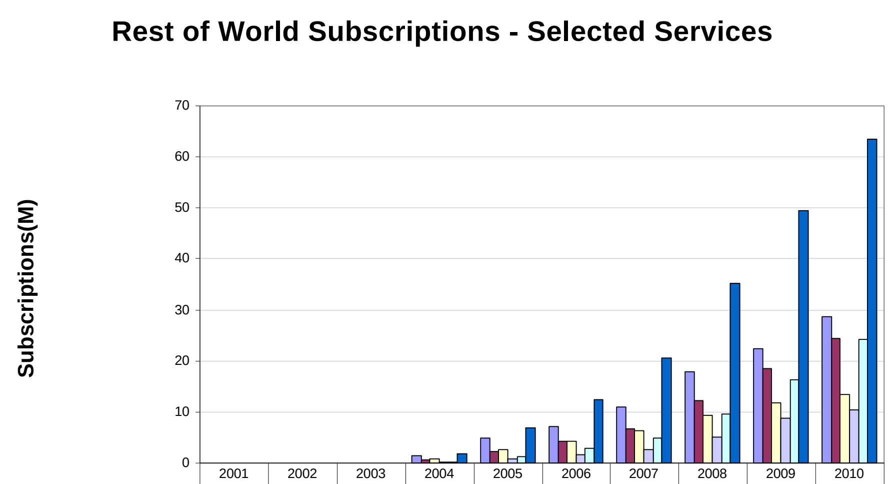


	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Simple Voice	-	-	-	$2,529	$3,906	$6,694	$8,920	$11,911	$15,639	$17,977
Rich Voice	-	-	-	$14	$187	$455	$1,606	$3,119	$5,232	$8,011
Location-Based Services	-	-	-	$300	$816	$1,239	$1,917	$2,550	$3,034	$3,659
Business MMS	-	-	-	$205	$413	$968	$1,674	$2,723	$3,996	$4,434
Mobile Internet Access	-	-	-	$520	$807	$1,295	$1,717	$2,557	$3,889	$4,219
Consumer MMS	-	-	-	$824	$1,040	$1,476	$1,770	$2,196	$2,621	$2,849
Mobile Intranet/Extranet Access	-	-	-	$2,432	$3,470	$5,318	$7,295	$11,176	$16,347	$20,950
Customised Infotainment	-	-	-	$1,301	$1,673	$2,420	$3,186	$3,899	$4,792	$5,994

Source: UMTS Forum and Telecompetition Inc., August 2001.

3.4 Rest of World Demand (including Latin America)

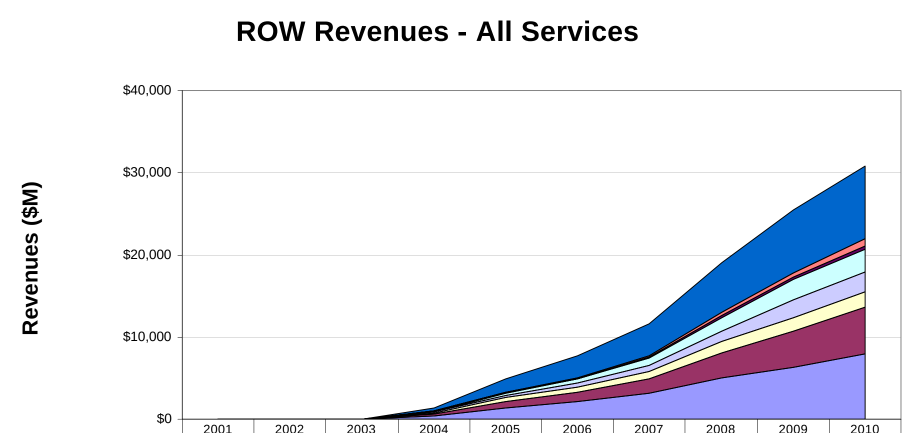
Figure 14. Rest of World demand for 3G services by subscriptions – 2001-2010.



	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Customised Infotainment	-	-	-	1.4	4.9	7.2	11.0	17.8	22.4	28.7
Mobile Intranet/Extranet Access	-	-	-	0.5	2.2	4.3	6.8	12.2	18.4	24.5
Consumer MMS	-	-	-	0.8	2.7	4.3	6.4	9.4	11.7	13.5
Mobile Internet Access	-	-	-	0.2	0.8	1.7	2.7	5.1	8.7	10.3
Business MMS	-	-	-	0.3	1.3	2.8	4.8	9.7	16.3	24.3
Simple Voice	-	-	-	1.8	7.0	12.5	20.6	35.2	49.5	63.5

Source: UMTS Forum and Telecompetition Inc., August 2001.

Figure 15. Rest of World demand for 3G services by revenue – 2001-2010.

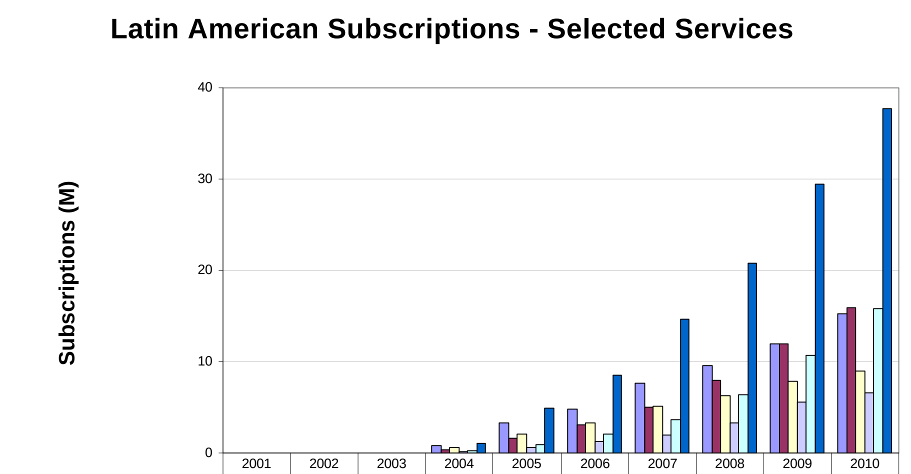


	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Simple Voice	-	-	-	$474	$1,657	$2,652	$3,934	$6,055	$7,672	$8,851
Rich Voice	-	-	-	$1	$25	$44	$138	$319	$554	$886
Location-Based Services	-	-	-	$23	$102	$112	$152	$237	$293	$372
Business MMS	-	-	-	$44	$198	$473	$905	$1,685	$2,493	$2,789
Mobile Internet Access	-	-	-	$88	$277	$449	$695	$1,269	$2,090	$2,418
Consumer MMS	-	-	-	$166	$500	$715	$952	$1,414	$1,702	$1,866
Mobile Intranet/Extranet Access	-	-	-	$228	$724	$1,139	$1,728	$3,023	$4,458	$5,759
Customised Infotainment	-	-	-	$404	$1,425	$2,095	$3,141	$5,035	$6,250	$7,894

Source: UMTS Forum and Telecompetition Inc., August 2001.

3.4.1 Latin American Demand

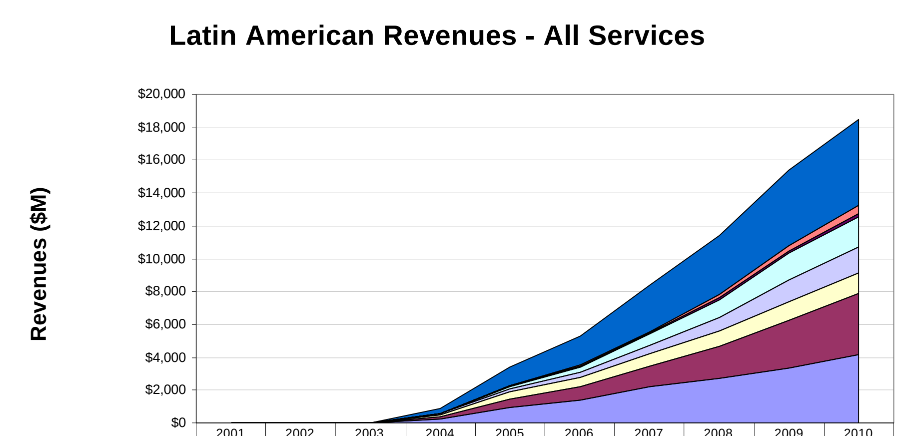
Figure 16. Latin American demand for 3G services by subscriptions – 2001-2010.



	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Customised Infotainment	-	-	-	0.8	3.3	4.8	7.6	9.5	11.9	15.2
Mobile Intranet/Extranet Access	-	-	-	0.3	1.6	3.1	5.0	7.9	12.0	15.9
Consumer MMS	-	-	-	0.5	2.1	3.3	5.1	6.3	7.8	8.9
Mobile Internet Access	-	-	-	0.2	0.6	1.2	2.0	3.3	5.6	6.6
Business MMS	-	-	-	0.2	0.9	2.0	3.6	6.3	10.7	15.8
Simple Voice	-	-	-	1.1	4.9	8.6	14.7	20.8	29.5	37.7

Source: UMTS Forum and Telecompetition Inc., August 2001.

Figure 17. Latin American demand for 3G services by revenue – 2001-2010.



	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Simple Voice	-	-	-	$279	$1,146	$1,821	$2,814	$3,578	$4,569	$5,255
Rich Voice	-	-	-	$0	$14	$25	$86	$174	$307	$503
Location-Based Services	-	-	-	$7	$56	$63	$92	$128	$161	$209
Business MMS	-	-	-	$28	$145	$342	$675	$1,105	$1,630	$1,819
Mobile Internet Access	-	-	-	$66	$206	$329	$509	$818	$1,348	$1,552
Consumer MMS	-	-	-	$113	$387	$553	$756	$944	$1,133	$1,239
Mobile Intranet/Extranet Access	-	-	-	$143	$529	$815	$1,278	$1,969	$2,897	$3,733
Customised Infotainment	-	-	-	$223	$948	$1,379	$2,186	$2,690	$3,325	$4,182

Source: UMTS Forum and Telecompetition Inc., August 2001.

4. Population Tables

Population projections are a significant input in calculating the regional service forecasts provided in this report. As there is no one single source of population projections for all the countries addressed in this report, Country level population projections were compiled by Telecompetition, Inc. from a number of sources including the International Labour Organisation, the International Telecommunications Union, U.S. Census Bureau and the CIA country database. The country level projections were then summed to provide the regional projections shown in Table 6.

Table 6. Total residential population by Region – 2001-2010 (Millions).

Population (M)	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
World	6,152.7	6,221.0	6,292.4	6,367.0	6,444.9	6,526.1	6,610.7	6,698.8	6,790.6	6,886.0
Asia Pacific	3,503.5	3,538.4	3,575.0	3,613.3	3,653.5	3,695.5	3,739.3	3,785.1	3,833.0	3,882.8
Europe - Total	794.2	793.4	792.8	792.5	792.6	792.9	793.5	794.5	795.7	797.2
EU 15 only	374.8	374.5	374.3	374.2	374.2	374.2	374.4	374.7	375.0	375.5
Rest of Europe	419.4	418.8	418.5	418.3	418.4	418.7	419.1	419.8	420.7	421.7
North America	310.4	312.5	314.6	316.7	319.0	321.4	323.9	326.4	329.1	331.9
Rest of World - Total	1,544.5	1,576.8	1,610.1	1,644.4	1,679.8	1,716.3	1,753.9	1,792.8	1,832.8	1,874.1
Latin America	520.1	526.7	533.6	540.7	548.0	555.5	563.3	571.3	579.6	588.2

Source: Telecompetition Inc. analysis of various sources.

5. Appendix A

5.1 Forecast Definitions and General Assumptions

3G Services. The revenue forecasts in this report refer specifically to services delivered to subscribers on 3G networks. 3G networks in this study are defined as those conforming to the IMT-2000 family of systems specifications.[14] Revenue forecasts do not include revenues from the same or equivalent services offered over alternative delivery mechanisms including 2.5G networks. All revenues in this study refer to the amounts retained by the mobile operator or services provider.[15]

3G Service Demand. The service revenue forecasts in this report refer to the **market demand** at a regional level. Those revenues will be shared between the different services providers operating in that region. The studies make no attempt to forecast revenues at a services provider level.

Average Worldwide Service Price. Service revenue forecasts are based on "willingness to pay" as demonstrated by price levels and growth rates of analogous services available today amongst relevant market and demographic sectors. Revenue forecasts should therefore be regarded as conservative. They are based on price levels acceptable today, assume a significant decline in price between now and 2010, and, in general, assume that no "mobility premium" can be charged.

Revenue forecasts do not prescribe a specific pricing regime or billing mechanism. Forecasts are based on estimates of the dollar amount users are prepared to pay for a service. This dollar amount may be collected through any combination of subscription fees and usage charges, based on either time or volume, and may or may not be subsidised through a share of additional revenue streams such as advertising.

Subscriptions vs. Subscribers. In the 3G environment, it is important to

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[14] Task Group 8 of the ITU Radiocommunication Sector agreed upon five radio interface standards for the terrestrial component of IMT-2000. These are:

- IMT-DS Direct Sequence (UMTS Terrestrial Radio Access - Frequency Division Duplex (UTRA-FDD), Wideband CDMA (W-CDMA) or UMTS-FDD using paired spectrum
- IMT-MC Multi-Carrier (cdma2000 3X) using paired spectrum
- IMT-TC Time Code (UTRA-TDD (Time Division Duplex) and TD-SCDMA (exact specification still to be finalised) using unpaired spectrum
- IMT-SC Single Carrier (UWC-136 (US TDMA)) using paired spectrum
- IMT-FT Frequency Time (Digital Enhanced Cordless Telecommunications (DECT)) using both paired and unpaired spectrum

1xRTT is not considered to be a 3G technology in this study. In August 2001, the ITU recognised 1XEV-DO as a 3G / IMT2000 standard, but final approval is not expected by the ITU until November 2001. This updated forecast does not consider the additional demand that might be created by the addition of this standard into the IMT2000 family.

[15] The term "services provider" is introduced to indicate the changed role of the mobile operator in the 3G world. Services providers include mobile network operators, mobile service providers and mobile virtual network operators.

appreciate the distinction between subscribers and subscriptions. Not all subscribers will take a subscription to all services. Service revenue forecasts include an estimate of the proportion of the subscriber base that takes a subscription to that service.

5.2 Region Definitions

Table 7. Countries and administrative regions considered in updated 3G forecast.[16]

Countries and Administrative Regions							
ASIA PACIFIC		**EUROPE**[17]		**NORTH AMERICA**	**REST OF WORLD**[18]		
Afghanistan	Macau	Albania	Italy	Canada	Algeria	The Gambia	Nicaragua
Armenia	Malaysia	Austria	Latvia	United States	Angola	Gaza Strip	Niger
Australia	Maldives	Belarus	Lithuania		Argentina	Ghana	Nigeria
Azerbaijan	Mongolia	Belgium	Luxembourg		The Bahamas	Guadeloupe	Oman
Bangladesh	Myanmar	Bosnia and Herzegovina	Macedonia		Bahrain	Guatemala	Other Melanesia
Bhutan	Nepal	Bulgaria	Malta		Barbados	Guinea	Panama
Brunei	New Zealand	Croatia	Moldova		Belize	Guinea Ecuatorial	Paraguay
Cambodia	North Korea	Cyprus	Netherlands		Benin	Guinea Bissau	Peru
China	Pakistan	Czech Republic	Norway		Bolivia	Guyana	Puerto Rico
China (Taiwan)	Papua New Guinea	Denmark	Poland		Botswana	Haiti	Qatar
East Timor	Philippines	Estonia	Portugal		Brazil	Honduras	Reunion
Fiji	Singapore	Fed. Rep. of Yugoslavia	Romania		Burkina Faso	Iran	Rwanda
Georgia	Solomon Islands	Finland	Russia		Burundi	Iraq	Saudi Arabia
Hong Kong S.A.R.	South Korea	France	Slovakia		Cameroon	Israel	Senegal
India	Sri Lanka	Germany	Slovenia		Cape Verde	Ivory Coast	Sierra Leone
Indonesia	Tajikstan	Greece	Spain		Central African Rep.	Jamaica	Somalia
Japan	Thailand	Hungary	Sweden		Chad	Jordan	South Africa
Kazakhstan	Turkmenistan	Iceland	Switzerland		Chile	Kenya	Sudan
Kyrgyzstan	Uzbekistan	Ireland	Turkey		Colombia	Kuwait	Surinam
Laos	Vietnam		Ukraine		Comoros	Lebanon	Swaziland
			United Kingdom		Congo (Brazzaville)	Lesotho	Syria
					Congo (Kinshasa)	Liberia	Tanzania
					Costa Rica	Libya	Togo
					Cuba	Madagascar	Trinidad and Tobago
					Dominican Republic	Malawi	Tunisia
					Ecuador	Mali	Uganda
					Egypt	Martinique	United Arab Emirates
					El Salvador	Mauritania	Uruguay
					Equatorial Guinea	Mauritius	Venezuela
					Eritrea	Mexico	Yemen
					Ethiopia	Morocco	Zambia
					Gabon	Mozambique	Zimbabwe
						Namibia	
						Netherlands Antilles	

Source: Telecompetition Inc. August 2001

[16] Some countries do not appear separately in this table as their demographic data are incorporated into other regions in the ILO database. Most countries identified as lower income countries by the ITU are forecast to have no 3G services within the forecast period of this report.

[17] The countries included in the EU 15 forecasts are Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, The Netherlands, Portugal, Spain, Sweden, and the United Kingdom.

[18] The countries included in the Latin America forecasts are Argentina, The Bahamas, Barbados, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guadalupe, Guatemala, Guyana, Haiti, Honduras, Jamaica, Martinique, Mexico, Netherlands Antilles, Nicaragua, Panama, Paraguay, Peru, Puerto Rico, Surinam, Trinidad and Tobago, Uruguay, and Venezuela.

6. Appendix B – Market Study Project Team Contributors

This report was prepared by Telecompetition, Inc. for the UMTS Forum and Market Study Project Team.

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