The Future of Mobile Data Services

presented by

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at the

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Purpose and Talking Points

- Identify trends in the American mobile data services market and forecast prevailing prices in 2015

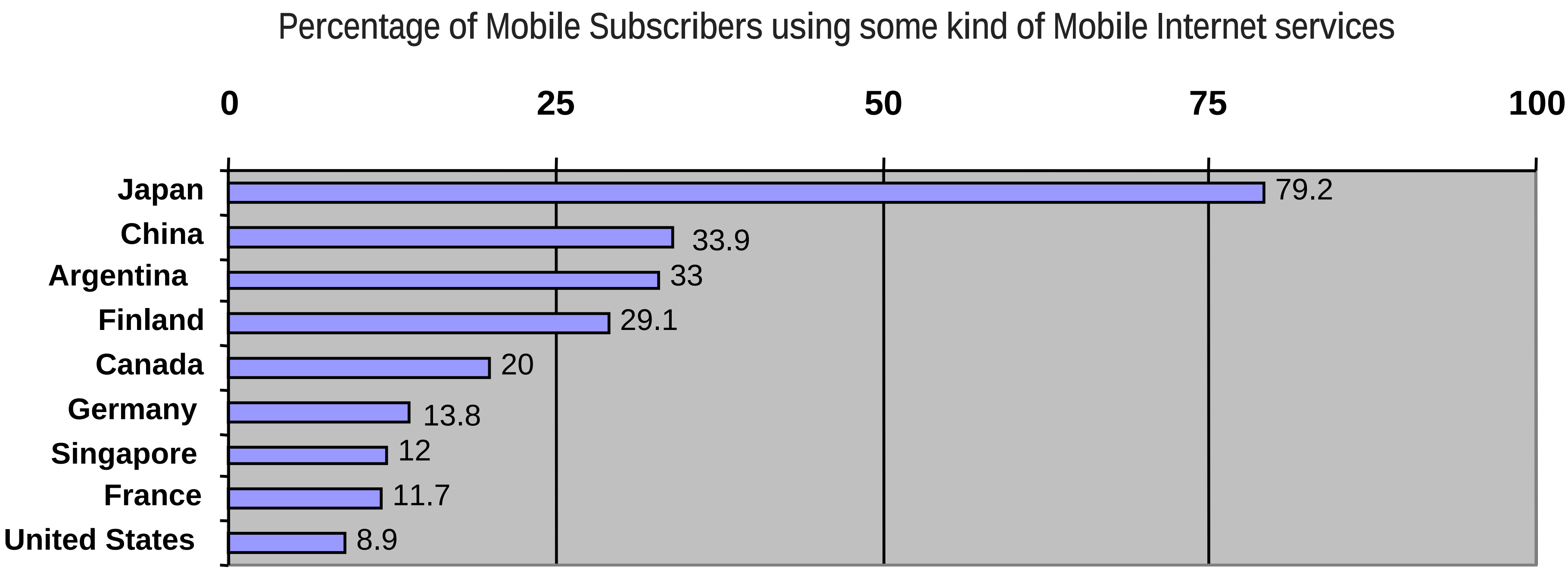
- Approach and organization of talk
  1. Market as it exists today
  2. Supply Side: Costs of providing services, pricing trends
  3. Demand Side: Household disposable income, the propensity to substitute wireless services for traditional wireline services
  4. Conclusions and Forecasts

Today’s Marketplace

Wireless Subscription Rates, May 2004

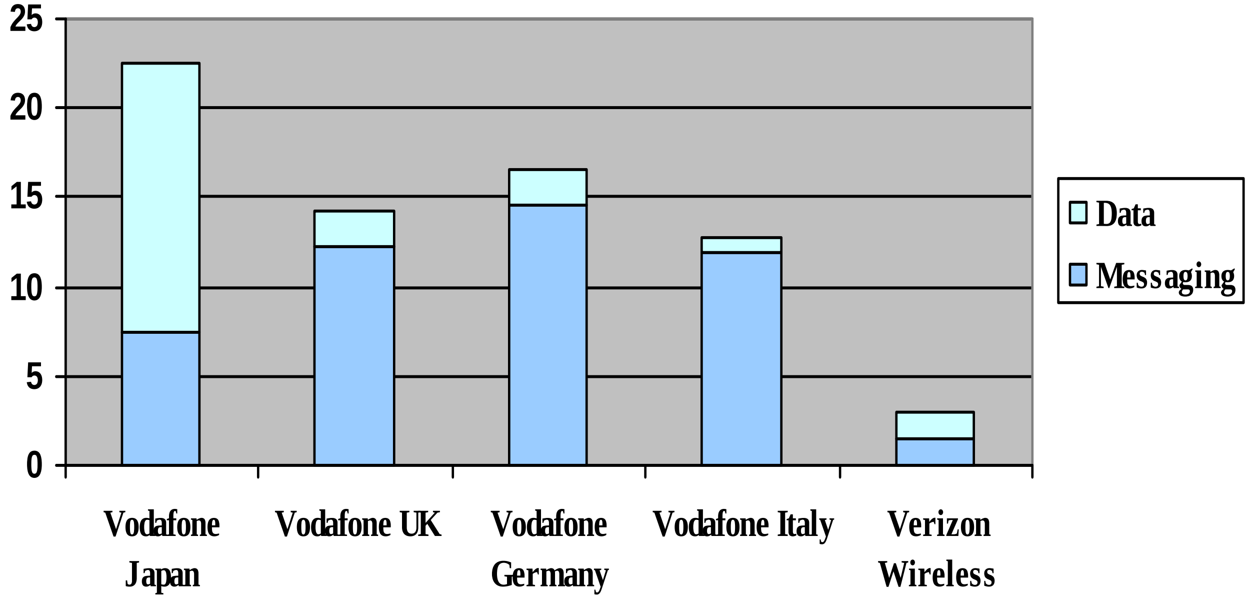
	Subscribers (Millions) 1998	Subscribers (Millions) 2003	CAGR (%) 1998-2003	Subscribers Per 100 Inhabitants, 2003
Hong Kong	3.174	7.241	17.9	105.75
Italy	20.489	55.918	22.2	101.76
Czech Republic	0.965	9.709	58.7	96.46
Spain	6.437	37.507	42.3	91.61
Norway	2.106	4.163	14.6	90.89
Portugal	3.074	9.341	24.9	90.38
Finland	2.846	4.700	10.6	90.06
Sweden	4.109	7.949	17.9	88.89
Denmark	1.931	4.785	19.9	88.72
Austria	2.293	7.094	25.3	87.88
Ireland	0.946	3.400	29.2	84.47
United Kingdom	14.878	49.677	35.2	84.07
Singapore	1.0925	3.313	31.9	79.56
Belgium	1.756	8.135	46.7	78.56
Germany	13.913	64.800	36.0	78.54
France	11.210	41.683	30.0	69.59
Korea	14.019	33.592	19.1	69.37
Japan	47.308	86.659	12.9	67.96
United States	69.209	158.722	18.1	54.30
World	**317.675**	**1,340.667**	**33.4**	**21.91**

US mobile Internet usage lags other developed nations



Source: ITU, 2004

Mobile Data as a Percentage of Total Revenue, 2003



Source: Vodafone 20-F, June 2004; Financial Times, July 2, 2004

US Switched Data Prices (July 2004)

Carrier	Wireless Technology	Pay-per Use	Unlimited Usage, Monthly Fee
AT&T Wireless	GPRS/EDGE	$19.99 Monthly Subscription includes first 8 Mbytes	$49.99
		$6.144/Mbyte (after exceeding 8Mbytes)	
Cingular	GPRS/EDGE	$9.99 Monthly Subscription includes first 2 Mbytes	54.99
		$10.24M/byte (after exceeding 2 Mbytes)	
Nextel	iDEN	$19.99 Monthly Subscription includes first 5 Mbytes	59.99
		$9.22/Mbyte(after exceeding 2 Mbytes)	
Sprint PCS	1xRTT/1xEV-DO	$40.00 Monthly Subscription includes first 20 Mbytes	80.00 (limited to 300Mbyte)
		$2.05/Mbyte(after exceeding 2 Mbytes)	
T-Mobile USA	GPRS	n/a	29.99
Verizon Wireless	1xEV-DO	n/a	79.99

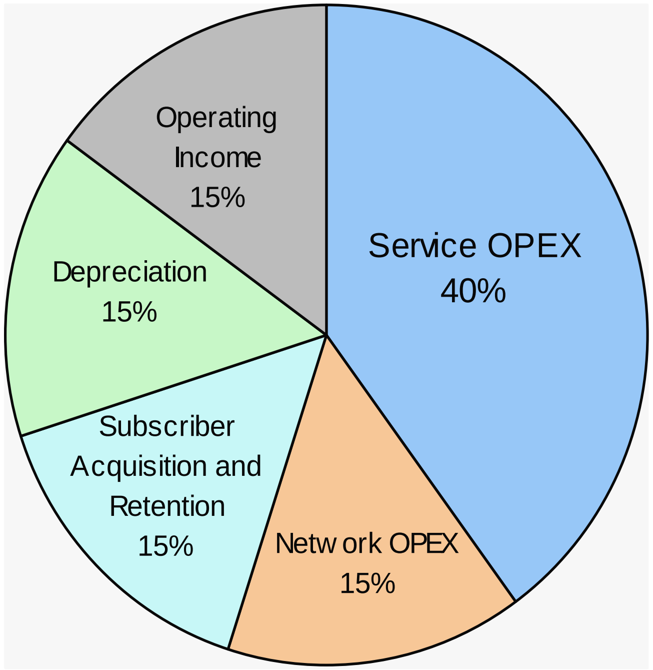
Source: Company Websites, July 2004

Supply Side

Wireless Service Provider Cost Structure

Subscriber Acquisition	Service Delivery	Network
• Terminal subsidies • Promotion • Distribution	• Customer care and billing • Service creation and management • Content and interconnection	• Coverage cost/square mile • Capacity cost/MegaByte • Site rental • Leased lines and other transport

Wireless Service Provider Cost Structure



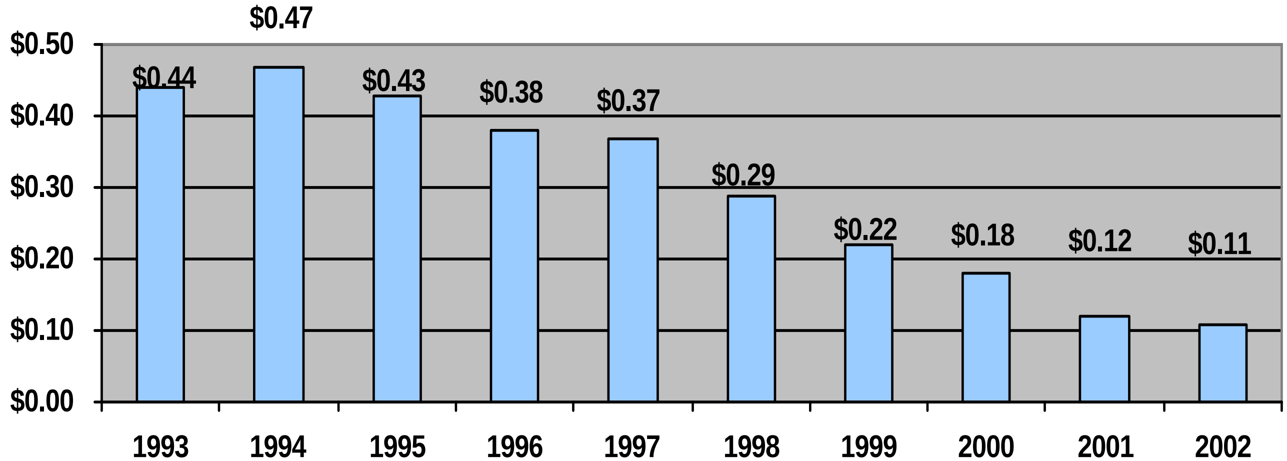
Source: Nokia, Mitretek

Cost of Delivering Mobile Data

	WCDMA	CDMA2000 1X	CDMA2000 1xEV
Revenue/User/Month (1)	$40.00	$40.00	$40.00
Network Cost/User/Month	$18.49	$15.81	$5.90
SGA/User/Month (3)	$16.00	$16.00	$16.00
Earnings before Interest & Taxes	$5.51	8.19	18.10
EBIT margin	14%	20%	45%
Average Cost/Megabyte (2)	$0.069	$0.059	$0.022

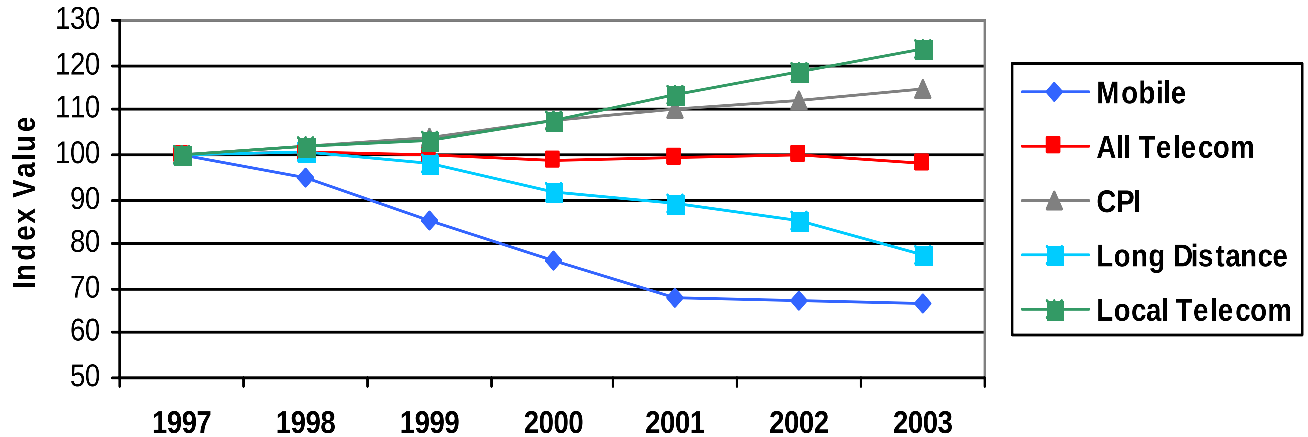
Source: Qualcomm

Recent Pricing Trends



Average Revenue Per Minute for US Wireless Service

Source: CTIA



Change in Consumer Price Index

Source: Bureau of Labor Statistics

Long-term Trends in Communications Pricing

- General trend has been towards simpler pricing and decreasing price discrimination
- Historical evidence suggests that flat-rate pricing has proven to be the most effective method for stimulating demand
- Some economists suggest that as marginal costs approach zero for telecom services, a flat rate may be the only practical pricing method

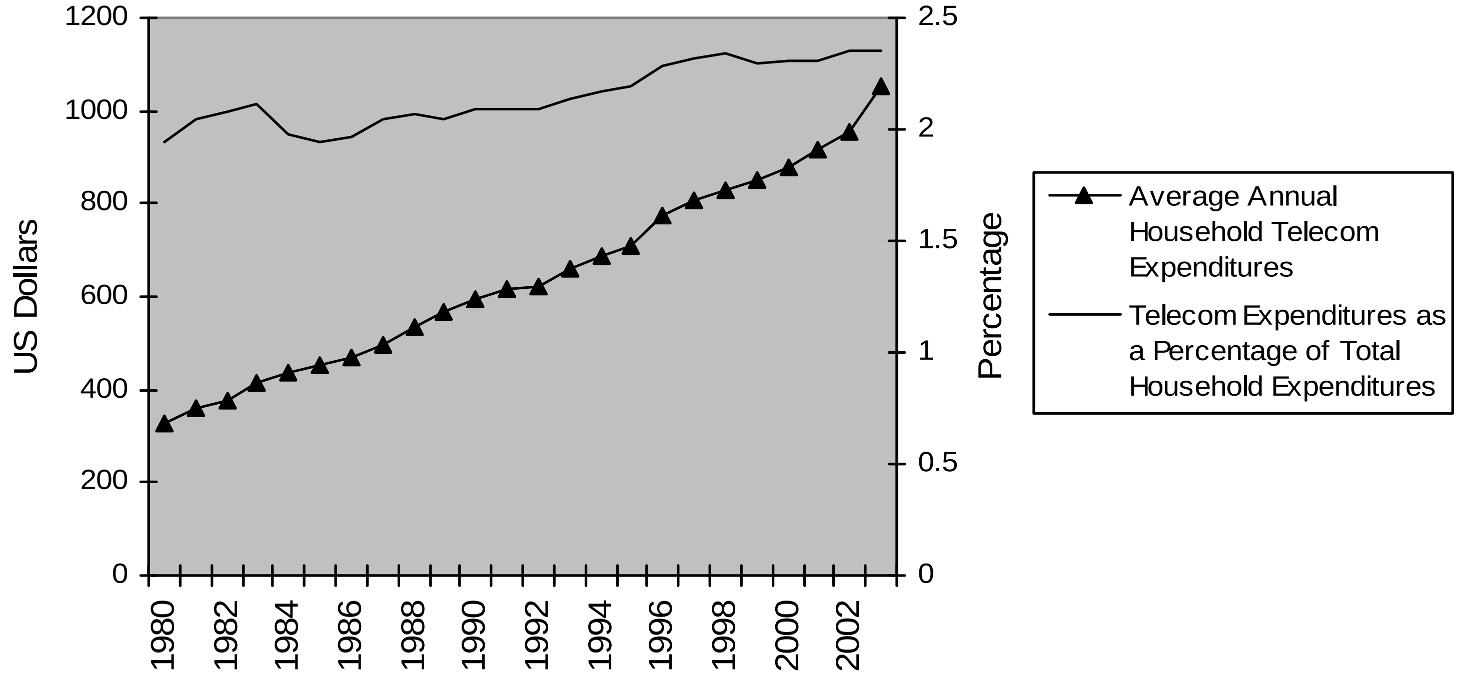
U.S. Postal Service Rates for First Class Mail

Year	Parcel	Price
1799	Single Letters No more than 40 miles 41 - 90 miles 91 - 150 miles 151 - 300 miles 301 - 500 miles over 500 miles	\$0.008 0.10 0.125 0.17 0.20 0.25
1845	Single letters No more than 300 miles Over 300 miles	0.05 0.10
1863	First half ounce	0.03
1885	First ounce	0.03
2004	First ounce	0.37

Source: A. M. Odlyzko

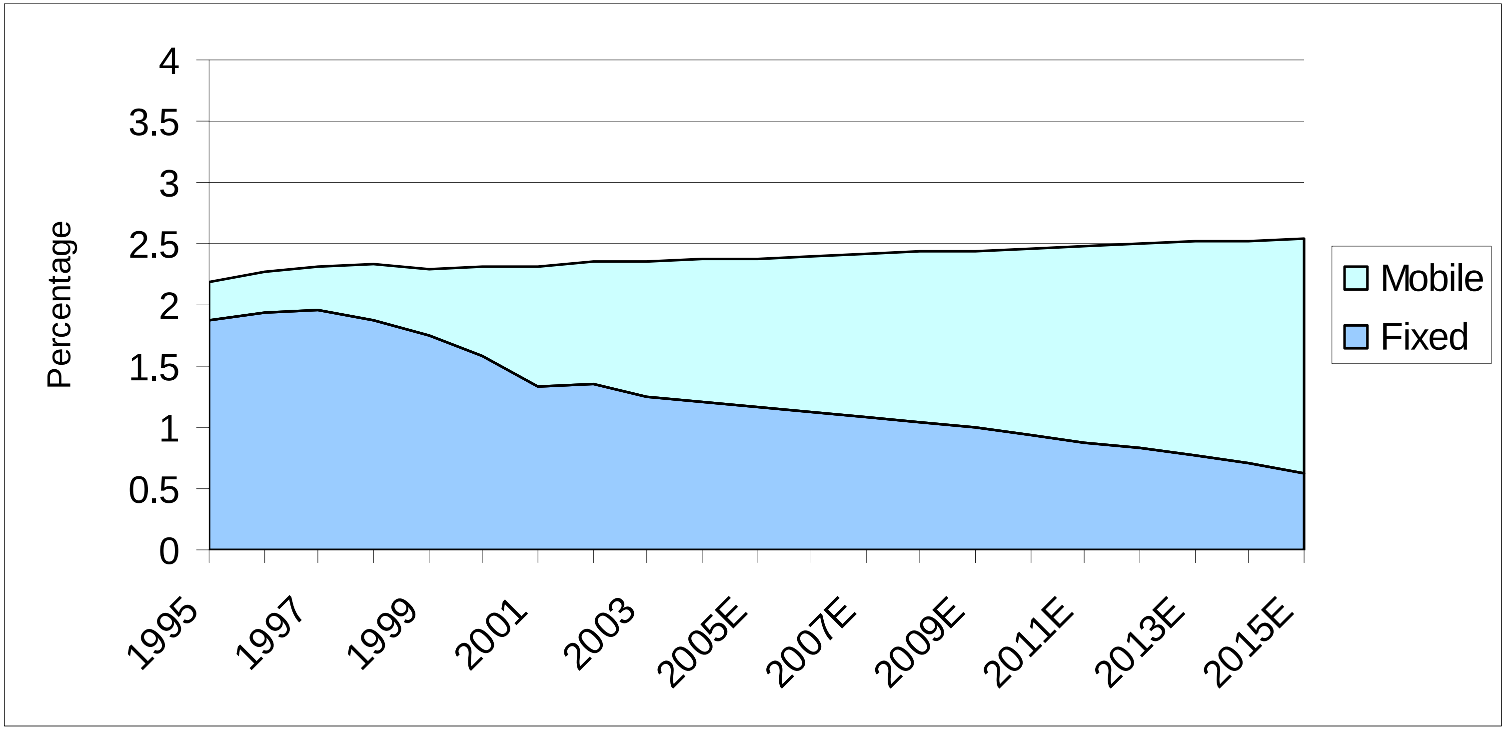
Demand Side

Average Annual Household Telecom Expenditure



Sources: Bureau of Labor Statistics, FCC

Telecom Expenditures as a Percentage of Total Household Expenditures



Sources: Bureau of Labor Statistics, Mitretek

Wireless Substitution

- IM Migrates to Mobile
  - According to In-Stat/MDR, there were 27.2M AOL IM users, 22.7M MSN IM users, and 15.6M Yahoo IM users in 2003
  - AOL reported that the use of IM doubled during 2003. More than 2B IM messages are sent and received daily, surpassing the 400M e-mails sent daily by AOL users
- "Cutting the Cord"
  - According to Ovum, approximately 12 percent of EU households are *mobile only* households; in Finland, 29 percent of households have "cut the cord"
  - According to the FCC, only about five percent of US households are *mobile only; In-Stat/MDR estimates that 29.8 percent will cut the cord by 2008*

Conclusions and Forecasts

- Flat-rate pricing for unlimited data transmission will be the dominant pricing model in 2015
- Service providers will offer flat-rate plans and bundle new and innovative services in order to maintain targeted ARPU figures
- Best commercial retail flat-rate monthly will be approximately US$15.00 (*2004 dollars*)
- U.S. mobile service subscription rate will exceed 90 percent of inhabitants (i.e., approximately 281 million subscribers)
- Of those subscribing to mobile services, no less than two-thirds will be users of data services

Conclusions and Forecasts (continued)

- Spending for telecom services will constitute about 2.5 percent of total household expenditures
- Average monthly household spending for wireless services - including voice and data - will be about US$86 *(2004 dollars)*
- Nominal price of delivering one megabyte of wireless data will be less that $0.02. According to classical economic theory, prices (eventually) decline and approximate the marginal cost of providing the good or service.