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A Report on Service Competition in Taiwan's Mobile Market

By Jyhi-Kong Wey, Taiwan

The mobile phone penetration rate in Taiwan is growing at an alarming rate, as shown in Fig. 1. After telecom liberalization in 1997, digital cellular systems (i.e., GSM 900 MHz and DCS 1800 MHz) attracted the major portion of mobile subscribers with the analog AMPS 800MHz system holding a very small portion of subscribers. About 11.54 million mobile subscribers have signed on with a 52.24 percent penetration rate, demonstrating more than ten million subscribers and 45 percent penetration rate increase in the first two years since the mobile market was liberalized.

Due to the fierce competition in the mobile market, many value-added services have been launched by Chunghwa Telecom, the state-owned company, and six private operators for differentiating the market segments by services. A brief description of these services is abstracted in Table 1 and described in the following. Personalization is the paramount characteristic of these value-added services. In addition, the fever in mobile communications introduces a great chance for mobile phones and related commerce. It is believed that the mobile market in Taiwan has demonstrated a unique trend in the world.

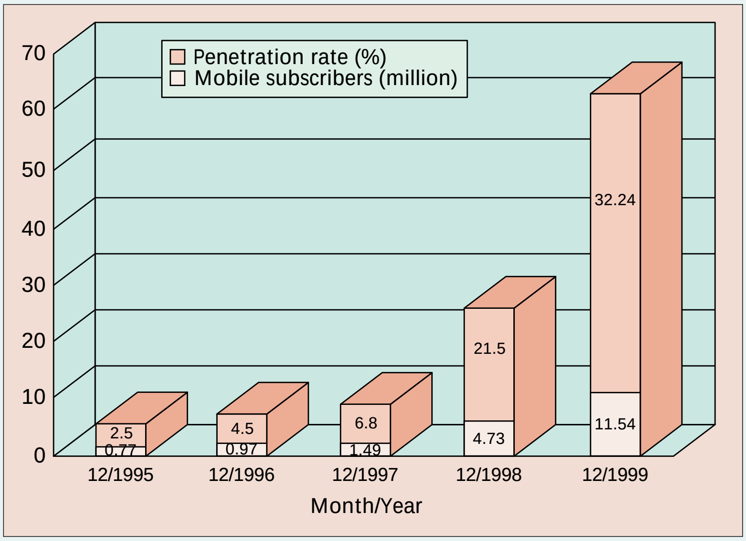

Figure 1. *Mobile phone subscribers and penetration rate in Taiwan.*

Mobile Banking

A mobile subscriber can use his/her handset to process bank account transfers, bank account balance inquiries, credit card balance inquiries, and lost credit card announcements. These services are based on STK (SIM toolkit, i.e., a smart card) or Wireless Application Protocol (WAP), and developed through cooperation of mobile operators and banks.

Mobile Information

A mobile subscriber can dial a set of designated service access numbers to acquire a lot of information services, such as security information, financial information, headline news,

Service category	Application	Technologies used
A Mobile banking	Bank account management, credit card account management	STK, WAP
B Mobile information	Security (e.g., stock order, market analysis), finacial management (e.g., foreign exchange), live (e.g., weather, food/flower order, train/airline order), entertainment (e. g., VIP discount, coupon), transaction (e.g., bookseller), travel, roadside help, map	IVR, voice recognition, PDA, WAP
C Mobile secretary	Personal reminder or secretary	Voice mail system, short message service center (SMSC)
D Web to mobile	Web phonebook directory	SMSC
E Voice mail	Personal safety, multicast delivery, callback	Voice mail system
F Prepaid	Prepaid card	Service node, intelligent network
G Short message	E-mail, dictionary lookup, personal reminder, preapid account management (e.g., balance inquiry, voucher recharge)	SMSC

Table 1. *The main value-added services in the mobile market of Taiwan.*

International Conference on Telecommunications

26-29 June, 2000, Heidelberg, Germany

By Dr. Heinrich J.Stüttgen, Germany

The IEEE Conference on High Performance Switching and Routing (HPSR) was held at the Crowne Plaza Hotel in Heidelberg in June. Over 150 scientists from five continents and 25 countries participated this year, as two previously separate but thematically related conferences were organized jointly under this new name. This event was the 6th IEEE ATM Workshop and the first to be held in Germany. Previous conference locations include Washington (1995), San Francisco (1996), Lisbon (1997), Fairfax (1998), and Kochi, Japan (1999). The second predecessor was the International Conference on ATM (ICATM) previously held in Colmar, Alsace, France, in 1998 and 1999. Next year both conferences will be separated again into IEEE HPSR 2001 in Dallas and ICATM 2001 in Seoul, Korea.

Dr. Heinrich Stüttgen, manager of NEC's Computer and Communications Research Laboratory in Heidelberg, organized the conference. Together with the German Electrical Engineering Society (VDE) and EURESCOM GmbH of Heidelberg, the NEC team put together an exciting conference program. Six tutorials and 65 scientific talks offered plenty of stimulation for discussion of the latest trends in the area of Internet technology.

In her opening address, Heidelberg's mayor, Beate Weber, outlined how information and communication technologies represent a fast growing part of Heidelberg's economic infrastructure. With strong support from the city administration, the burgeoning IT segment has grown to become the number two industry in Heidelberg, second only to Heidelberg's traditionally strong biotechnology sector. This effort was recently recognized by last year's survey of *FOKUS* magazine, ranking Heidelberg as the region in Germany with the best startup conditions.

Dr. Claudio Carrelli, director of Heidelberg's EURESCOM GmbH, gave the opening speech. His message to the attendees was that almost everything is possible in the Internet economy, but in the end, only those technologies that satisfy a clear market requirement will survive. Dr. Carrelli added that there are no universally valid doctrines, and that only courage in striving for permanent innovation and solid knowledge of real market demands can lead Internet companies to success. His appeal to the conference participants: "Don't fight the changes — cause the changes!"

As the new conference name HPSR already suggests, the conference program clearly indicated a shift from cell (ATM) to packet (IP) switching technologies. Among the tutorials on the first day, François Le Faucheur's (Cisco, France) MPLS tutorial drew the biggest crowd. There was also strong interest in the tutorials on "High Performance Routing and Active Networks" from Professor Dr. Martina Zitterbart and Till Harbaum, a Ph.D. student from Braunschweig University of Technology, as well as "Multiservice Optical Networks — IP over WDM" from Professor Dr. Andrzej Jajszczyk from the University of Mining and Metallurgy, Krakow, Poland. The latest developments in optical backbone and access networks were the focus of the keynote presented by Professor Piet Demeester from the University in Gent, Belgium. The keynote outlined how, in the next years, further development of the multiprotocol label switching (MPLS) protocol will drive technology toward MPLS, an efficient switching technology for the transport of IP-packets over wavelength-division multiplexing (WDM) networks.

The selection of the 60 best papers from the originally submitted 200 yielded a high-quality conference program. Besides IP over WDM, the focus was also on new protocols for wireless and cable access networks, scheduling methods for the next-generation terabit router, provisioning of quality of service for audio and video traffic within packet networks, as well as new approaches for a better separation of the switching hardware from the respective control and management software. Dr. Alexandra Smiljanic from AT&T Laboratories in New Jersey received the best paper award for her contribu-

EU Opens Bid for Interconnection of Research Networks

By Paolo de Sousa, Belgium

The European Commission issued on 19 May, 2000, a call for proposals for the Upgrade of the Interconnection of the National Research and Education Networks. This upgrade of the European research Internet networks will cost about 80 million euros and will ensure the development of infrastructure needed for the development of an "advanced research computing grid."

This call is part of the Fifth Framework program of the European Community for research, technological development, and a specific program on a user-friendly information society. Information about this program can found at http://www.cordis.lu/ist .

European research networking is currently served by the pan-European research network TEN-155. Following on from the TEN-34 network which delivered network service between February 1997 and December 1998, TEN-155 supplies access capacities of up to 155 Mb/s to 16 European national research networks, which makes TEN-155 the largest operational pan-European network. TEN-155 provides European scientists with a world-class backbone which offers the bandwidth and quality of service necessary to keep European research and development activities at the level at which they need to be to compete on a world stage. Thus, TEN-155 represents the beginning of support for the "virtual lab" and "virtual institute" in Europe.

The TEN-155 network combines both IP and ATM technology. TEN-155 is based on synchronous digital hierarchy (SDH) circuits with an asynchronous transfer mode (ATM) overlay which allows for bandwidth management for optimal loading of SDH capacity. The participating national research networks have the choice of ATM or SDH-over-IP access to the TEN-155 network.

The TEN-155 network is a direct result of the Quantum project, also cofunded by the European Commission. TEN-155 was planned, built, and managed by DANTE, the company providing pan-European network services to the European research community. It is thus no surprise that, in cooperation with the European national research networks, DANTE has already produced a blueprint for further development of the TEN-155 network. The proposal, known as GÉANT, calls for the current 155 Mb/s network to be replaced with a 2.5 Gb/s network in 2000, rising to at least 10 Gb/s by the end of 2004. The infrastructure would be available to all of the national research networks across Western, Central, and Eastern Europe.

In addition, for the first time, it is proposed to provide global connectivity between GÉANT and other world regional research networks as an integral element of the pan-European service.

The Fifth IEEE Symposium on Computers and Communications (ISCC 2000)

By Mostafa Hashem Sherif, USA

The Fifth IEEE Symposium on Computers and Communications (ISCC 2000) took place in Antibes, Juan les Pins, France, 3–6 July, 2000. This series of symposia started in 1995 to focus on the convergence of communications and computer technologies. In particular, the discussions center on practical problems related to the design, deployment, and utilization of information and networking systems. Previous meetings took place in Alexandria, Egypt (1995 and 1997), Athens, Greece (1998), and Sharm El-Sheikh, Egypt (1999).

This year, paper submission and the review process were conducted electronically with the use of a subset of ConfMan (further information is available at http://ConfMan.unik/no).

The Symposium comprised 123 presentations divided into 23 sessions. Sessions on the first day dealt with various aspects of the Internet and World Wide Web, such as performance, access, security, electronic commerce, and standards. Additional topics included network management and satellite communications. The papers of the second day covered multimedia communications including broadband network design and quality of service. The subjects of the third and final day related to mobility and wireless communications, coding and signal processing, distributed systems, multicast, routing, and scheduling.

On the basis of the first author's institution, the geographic breakdown of the papers at the Symposium was as follows.

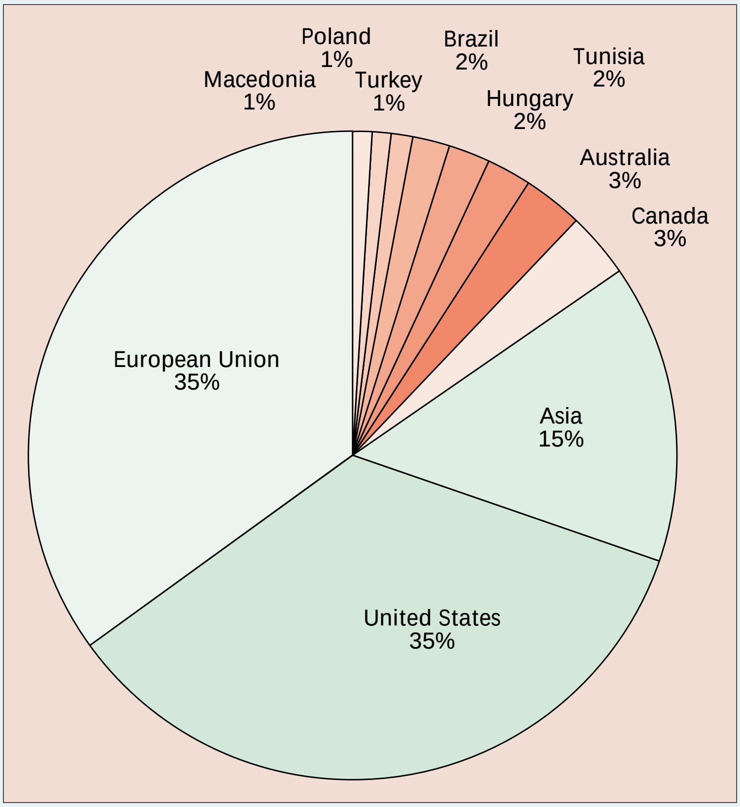

Figure 1. *A geographic breakdown of papers presented at ISCC 2000.*

Plenary sessions were organized to give insight into new developments in the theory and practice of telecommunications. Professor Jean Pierre Hubaux from École Polytechnique Fédérale de Lausanne (EPFL), Switzerland, discussed the research program he is supervising on self-organized mobile ad hoc networks. Professor Koichi Asatani from Kogakuin University, Japan, presented his views on next-generation networks and services. Professor Ian Akyildiz from Georgia Institute of Technology, United States, discussed the use of satellites in future networks. Finally, Dr. Gilles Kahn of INRIA, France, gave his perspective on the subjects and management of research in the convergence era.

Veli Sahin, Senior Director, Marconi Communications, United States, organized a panel discussion on network management with several industry participants. These were Salah Aidarous, Director, Product Planning, NEC America, United States; Omar Mansour, Vice President of Engineering, Kamputech, United States; Hanafy Meleis, President and Chief Executive Officer, Trendium, United States; and Markus Noller, Director, Strategic Product Planning and Marketing, Marconi, Germany.

The Symposium was preceded by tutorials on "Voice over IP," presented by Tasos Dagiuklas from OTE-Consulting, Greece; "Multiservice Optical IP Networking," presented by Andrzej Jajszczyk from the University of Mining and Metallurgy, Krakow, Poland, and a co-general chair of the Symposium; and the "Impact of IP on the Evolution of Telecom Networks: Business, Technology and Management," presented by Salah Aidarous.

The participants felt that future symposia should spend more time on some of the emerging topics such as cable telephony, telework, and electronic commerce, as well as project management in telecommunications. The challenges facing future meetings is to attempt to define network and information technologies that are suitable in a given context — in other words, how to take the environmental and societal factors into consideration, to predict the rate of technology adoption, and to assess the overall acceptance of a given technological solution.

The Sixth IEEE Symposium on Computers and Communications (ISCC 2001) will take place in Hammamet, Tunisia, from 3–5 July, 2001. Further details are available at http://www.comsoc.org/iscc/2001/iscc2001.html

The First North American Chapter Chairs Congress

The North American Chapter Chairs are gathering for their first Annual Chapter Chairs Congress on November 26–27, 2000, in San Francisco, California, in conjunction with GLOBECOM 2000. The agenda for the event contained, as special features, workshops, reports by all Chapter Chairs, the presentation of the ComSoc portal, as well as the presence of a member of the Argentina Region who will share their TV broadcast program to supplement the overviews of membership and programs. Funding to assist with travel and logistics has been available, upon application to IEEE Communications Society. Contact Celia Desmond at c.desmond@comsoc.org for further information.

TAIWAN'S MOBILE MARKET/*(Continued from page 1)*

live information, and entertainment information. The retrieval information can be downlinked by voice announcements directly or by short message response at a later time.

Mobile information service is basically designed in an IVR manner. For example, a user can choose alerting prices for a set of stocks. Once the selected stocks are at the alerting prices, the mobile operator's system will notify the mobile subscriber to take action. In addition, mobile subscribers could register their personal and car information initially, and then dial a special roadside service help number when needed.

Mobile Secretary

The server in the Internet also can support a personal secretary service. The mobile subscriber visits the mobile operator's Web site, and fills in dates and meeting schedules. According to the schedules, the Web site server will notify the mobile subscriber in time. The notification method can be a voice mail call, a short message, or both. In addition, the notification can be scheduled by the subscriber.

Web to Mobile

Mobile subscribers usually book a lot of phone numbers in the SIM memory of a mobile handset. Once the mobile handset is lost or the SIM damaged, mobile subscribers must work a long time to recover their lists of phone numbers. IN particular, some least recently used phone numbers are lost. Furthermore, the user input interface of most of mobile handsets are complex, especially in Chinese. Therefore, some mobile operators set up Web sites for their mobile subscribers to book their directory (phone) numbers. The created phonebook can be downloaded to the SIM of a mobile subscriber by the short message approach.

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Voice Mail

Mobile operators here promote some very attractive voice mail services, for example, dialing a designated special number to enter a voice mail system, and then entering a taxi's identification for protection purposes. This personal safety service is very welcomed by female subscribers, especially for taking taxis at night.

Voice can be recorded in the voice mail system in advance. The recorded voice can be multicast to a predefined set of destination phone numbers by a voice mail delivery procedure. The voice mail system can also register calling numbers automatically for fast callback. The callback procedure can be undisturbed and played in sequence.

Prepaid

According to informal statistics, about 10 percent of subscribers are prepaid. Originating prepaid, which means calling party pay, is used here. Therefore, prepaid subscribers mostly migrate from the pager market.

Short Message

A simple short message services is e-mail. Mobile subscribers can also look up a word in a dictionary from a mobile operator server's dictionary database by short message. Ver important, mobile subscribers can book their schedules in the database of the mobile operator. The database will depend on the schedule and send a short message as a personal reminder. Short message service is also applied to mobile prepaid service, mostly for keeping the account balance of the mobile subscriber.

The personalized value-added services mentioned above can be a WAP application service. Especially, mobile information and mobile secretary services are good choices for realization by the WAP approach. They are realized by some operators now. It is believed that personalized service with WAP is the key to success in Taiwan's mobile market competition.

CONFERENCE ON TELECOM/*(Continued from page 2)*

tion, "Flexible Bandwidth Allocation in Terabit Packet Switches. The best student paper award was given to Till Harbaum from Braunschweig Technical University for his paper, "Hardware Support of the RSVP Protocol."

A special highlight was the conference party in the EURESCOM garden. The warm summer evening facilitated many interesting discussions and new contacts. Even the soccer fans did not miss a thing, since the EURESCOM-team had installed a big TV-screen for the semi-final of the European Championship. A special thanks to the industrial sponsors — ALCATEL SEL, Cisco Systems, Deutsche Telekom, Ericsson, EURESCOM, IBM, Lucent Technologies, NEC Europe and Siemens — who made the conference possible through their generous financial support.

Contributions from members
in all regions are welcome.
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