

*Martin Lossie*

# Towards Mobile Telephony as the Default Solution for Personal Communications

*This paper analyses the explosive growth of GSM-based mobile telephony in various countries. Substitution of fixed telephony by mobile telephony has been taking place in some countries and will continue to do so in most countries, albeit at different speeds. Strategies of mobile telephony operators have changed from offering and promoting mobile telephony as a premium service into offering mobile telephony as everyone's default solution for voice and even data communications, at tariff rates that are competitive with fixed network rates.*

*The strategic, commercial and economical viability of the mobile telephone as the default communications vehicle both at home and on the move is analysed. This includes a review of possible strategies for different types of operators such as incumbents that own both fixed and mobile business, existing second GSM900 operators without fixed network ties and start-up DCS1800 operators. The value proposition for the end-user is reviewed, as well as the business case for this new role of mobile telephony networks.*

*Enabling technological aspects are discussed such as spectrum requirements, advances in radio engineering, network capacity, homezone solutions, availability of high-speed data and advances in handset technology. Migration to third-generation mobile communications systems is discussed. The paper concludes with an international review of successful end-user applications that have transformed the mobile telephone from a 'talking tool' into a powerful personal assistant that also offers e-commerce transaction support.*

## Impressive Growth

Figure 1 illustrates the impressive growth of mobile telephony users, where 16 countries have achieved penetration levels of more than 25%. These are penetration reaches levels that no one could dream of during the early 1990s, when the global system for mobile communications (GSM) was commercially introduced. In fact, with penetration of fixed lines ranging

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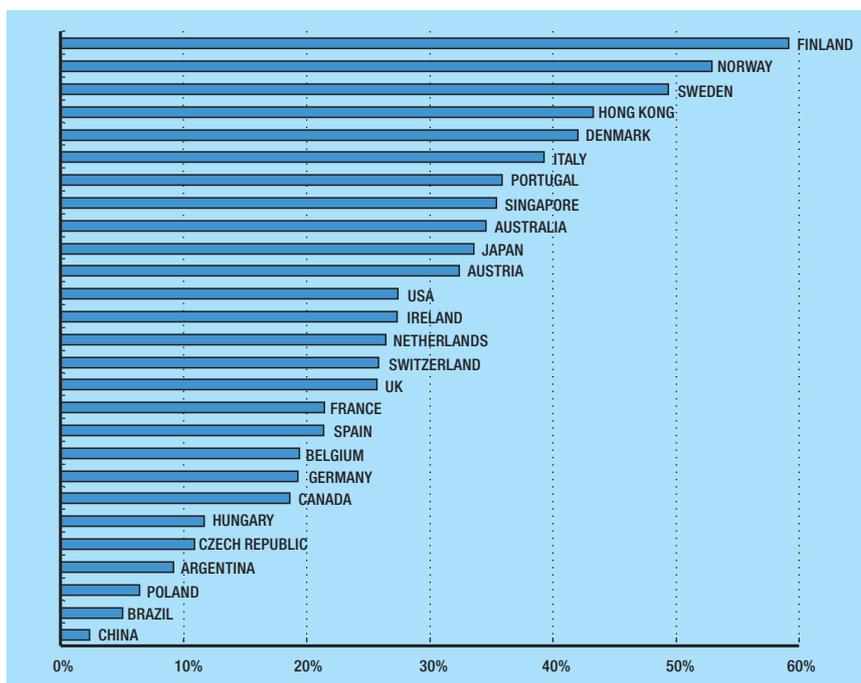
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between 50% and 60% in most countries, mobile penetrations have reached a level that ranges from half or equal that of fixed lines in a number of countries. Growth is expected to continue as illustrated in Figure 2

Figure 2 clearly illustrates that penetration is expected to reach very high numbers, while the growth rate itself is expected to vary per country. It may be surprising that early adopters of mobile telephony such as the UK and the USA are not expected to end up as the countries with highest penetration, but even lag behind the Czech Republic for example.

Despite the growth of the subscriber base in mobile communications, a word of caution is appropriate as financial backers are increasingly worried about the sector's decimated profitability, with decreasing usage, falling tariffs and increasing churn,

Figure 1—Mobile penetration levels at March 1999 (source: EMC Publications)



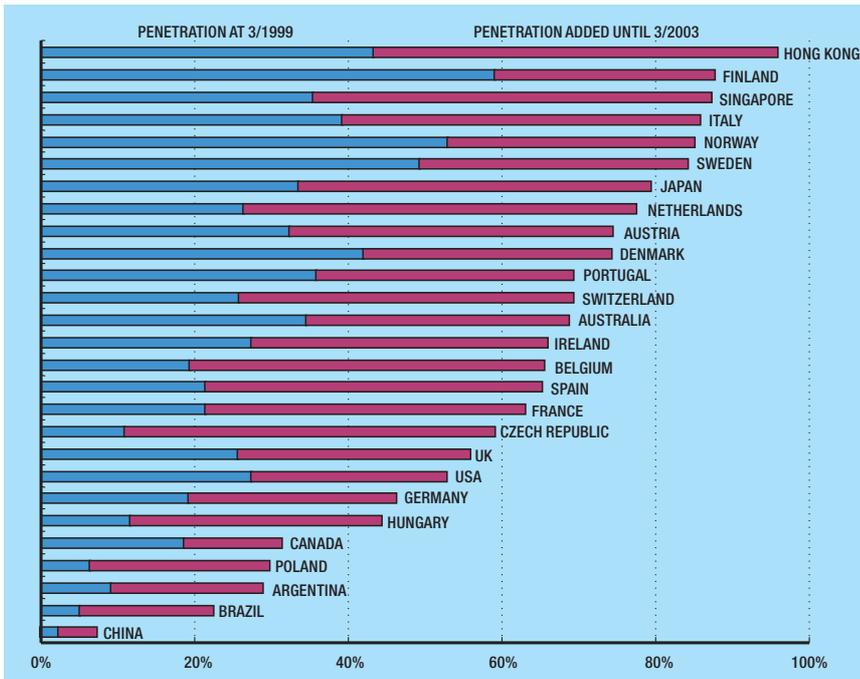


Figure 2—Forecast mobile subscribers by March 2003 (source: EMC Publications)

fraud and bad-debt†. On the other hand, it is perhaps too early to have worries over the long-term success of the mobile communications industry. In other industries, it has been demonstrated that customers are willing to spend a significant share of their wallet on the service as long as convenience is offered. Examples are the electricity industry with very high penetration levels and a multitude of applications, and the automotive industry. Both industries started as a premium service for the rich and happy few, followed by a growth of the customer base to near mass market levels and subsequently followed by increase of usage and value at completion of the mass market status. This is illustrated in Figure 3.

One could argue that the mobile communications industry is on its way from stage 1 to stage 2 (see Figure 3). It may take a while until the point is reached that average usage per user can be increased. There is little doubt that this will eventually happen as our society is characterised by increasing mobility of individuals and increasing communication between individuals and institutes. The convenience offered by mobile communications will eventually be similar to that of electricity, cars and (wrist)watches. All items only very few could afford at one stage, but unthinkable to be without nowadays.

† Ross, Malcolm. Presentation given at the 1999 GSM World Congress in Cannes.

### Increasing Convenience

The increase of convenience associated with mobile communications is illustrated in Figure 4. Datacommunications used to be fixed location activity, where local area network (LAN) and wide area network (WAN) technology supported the exchange of high data volumes between locations. With GSM, the ability was introduced to do short messaging (SMS) and datacommunications at 9600 bit/s. That was sufficient for small amounts of data. Next generations of technology such as GPRS, HSCSD and UMTS will open up the opportu-

Figure 3

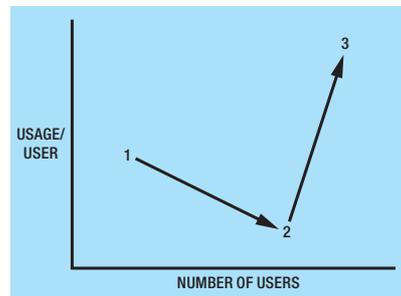
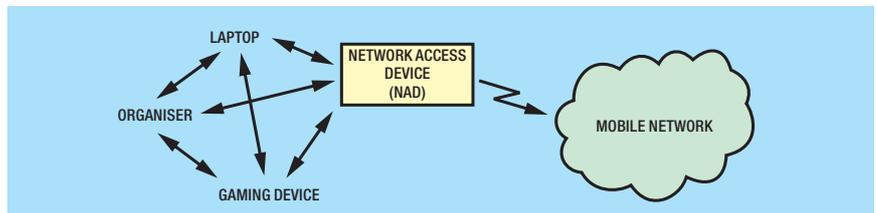


Figure 5



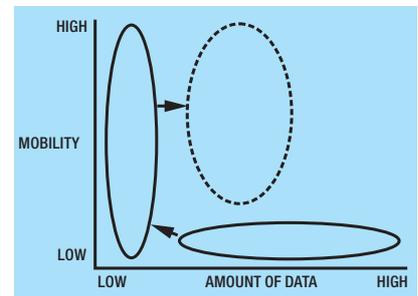
nity for mobile datacommunications where the amount of data exchanged per event can be substantial. That opens up a range of applications that can drive up the convenience of using a mobile telephone, such as:

- large file exchange from a notebook computer when away from the office,
- browsing knowledge databases when away from the office,
- WWW access,
- e-commerce,
- image messaging (a picture says more than 1000 words doesn't it?),
- multi-party gaming (probably a good service to tap revenue from the scooter generation), and
- gambling (to tap revenue from the rest of the population)

The term *mobile telephone* may not be so correct any longer, since this relates perhaps too much to voice communications. As a matter of fact, users may not want any longer a single portable device that does it all. Perhaps users want a set of end user equipment that fits the particular application. A technology like Bluetooth may play a crucial role in such developments where the user has a network access device (NAD) that provides the prime link to the mobile network while end user devices such as laptop computers, organisers and gaming devices may be connected to the NAD and the other end user devices via Bluetooth technology (Figure 5).

The NAD can potentially be very small, and for example fit into the pocket of a suit without having the

Figure 4



need to take it out other than for recharging batteries, or changing a SIM card. Making a telephone call should be done straight from the organiser: plug in the earpiece into the organiser, look up the number to dial, and have the notepad ready to scribble whatever is needed. As said before, the organiser connects to the NAD and through the NAD to the network.

## Commercial, Technical and Economic Viability

A scenario where mobile communications is the default for most of our communications is commercially and technically viable:

### Commercial viability

- The use of the mobile network based applications can be made attractive even when being at locations where a fixed network is available by offering differentiated tariff options for being on the move or stationary at home or the office
- The customer will have a transparent customer experience through familiar user interfaces at all times.

### Technical viability

- Offering differentiated tariffs for being on the move or stationary at home or the office is already applied in Denmark through so-called *homezoning* technology
- Regulators are likely to free up large amounts of spectrum for value-creating mobile applications
- Technology for handportable end-user devices has been developing quickly:

- increasing battery life;
- large and cost efficient memory;
- full colour liquid crystal display (LCD) technology;
- decreasing power consumption;
- decreasing size and weight;
- Internet user interface under development (WAP);
- WAP and SIM toolkit offers over-the-air programmable menus to support context driven applications (including JAVA); and
- compression technologies keep bandwidth requirements to a minimum.

### Economic viability

The economic viability is more difficult to assess. New technology developments do not come without risk for those who invest in the

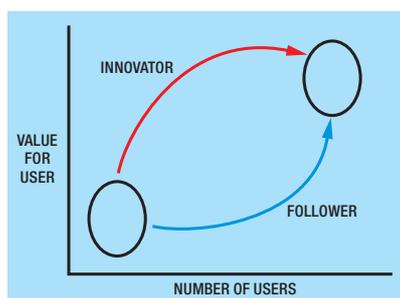
infrastructure and end-user devices. The key question is: where is the value going to be created? It is useful to look at the another industry: water. The water network typically is everywhere, and everyone uses it as needed. It goes even as far as people using vast amounts of drinking quality water to maintain their garden or wash the car. The analogy with (mobile) communications is that bandwidth and usage may become virtually unrestricted by the cost of the basic service. In the water industry arena, content is the real creator of value. Think about Coca Cola. Add a very specific taste to a litre water and the value per litre is up by a factor 1000 easily. Content is not even needed. Some mineral waters are said to be in fact not much more than carbonated tap water under a well-developed brand name. Another good example for adding value in the water industry is the health and spa resort. Have people take a bath there and see how much they are willing to pay compared to taking a bath at home.

The real challenge for the mobile communications industry sector is to have applications developed that offer true value to the end-user such that willingness to pay for the application is sufficiently high to make the business case. This may have to include strong branding like 'application connected by XYZ'; compare with 'Intel inside'.

Two core routes towards increased value can be followed to get there: innovation and following, as illustrated in Figure 6.

The innovator will develop true value-added services at an early stage while growing the subscriber base. The follower will focus at growing the subscriber base in the first place, and focus at increased value for the user at a later stage. In particular, the innovator path may be a tricky one to follow. Look at the Apple case: high-value highly-appreciated graphical applications

Figure 6



that made the firm a standard in for example market communications and desk-top publishing environments, while DOS was the best Microsoft could offer to its customers at that time. Now Microsoft is said to have about 90% of the PC operating system market with its Windows products with increasing value for the user, leaving Apple far behind.

Innovator strategies may work however. Intel is probably a good example of an innovative firm that shared some of the PC experience with Microsoft in the days that the 8086 and 8087 processors were the flagship products. Innovation at Intel seems to be a never-ending story with generations such as 286, 386, Pentium, Pentium II following each other at a steady pace.

## Strategies for the Mobile Operators

Where does all this leave mobile operators?

The answer is: probably confused and surrounded with uncertainty. Key questions for a mobile operator are:

- Should we take the lead in developing innovative value-added applications, or should we assume a role as follower?
- Should we do all the value creation ourselves, or should we involve third parties?

The answer to these questions can be pragmatic: develop innovative value-added applications for market segments where you have a well established position, and take a more passive role for other segments. Such a passive role may be one of being a follower, leaving initiative to competition in these non-priority segments. It may however also be a role of changing the position in the value chain, involving third parties for being the innovator (at their own risk) and reducing the own role to a plain old mobile service (POMS) operator.

It is hard to tell what strategy would work best for different types of mobile operators (first-operator GSM tied to a fixed network, second-operator GSM or DCS1800). Everyone is moving from position 1 to 2 as in Figure 3. A long-term winning position has to be achieved on the way from 2 to 3. Key considerations to take into account when choosing a strategy are:

- nature and needs of the market segments where an established position has been achieved, and
- internal capabilities to develop innovative applications

Operators who choose the evolution towards a highly value-added mobile services and applications environment may need the spectrum for fast-data applications. A UMTS licence is essential in that case. The migration from current GSM services to UMTS-based services will certainly require all kinds of network and radio engineering issues to be addressed. But the real crux will be to offer true benefits to the end-user by means of the value-added applications as discussed before. For migrating towards the wonderful world of unlimited UMTS-based services, it is probably never too early to start working with the priority market segments to develop value-added applications with currently available technology. That can help operators go through some of the learning curve now and create a certain level of intimacy with those priority segments ('working together on increasing the utility of mobile communications'). At the same time, network operators can learn about complex radio network engineering, with services that offer two-wall indoors penetration where needed, supporting all kinds of mobility speeds as well, while providing a capacity that is sufficient to serve the mass market.

Already it is possible to encounter useful applications that make the mobile telephone much more than a talking device:

- automatic teller machine type functionality, to do banking transactions from the telephone, using the identification and authentication capabilities of GSM;
- dial-a-coke—calling a number on the vending machine and getting a coke (charged to the telephone bill);
- dial-a-wash—calling a number to pay for the car wash (charged to the telephone bill); and
- on-demand information services such as traffic, weather, stock exchange

These are services that have one thing in common: they serve the user on particular moments in life and increase convenience levels. As

everybody's lifestyle is different, operators should not be hunting for the one big killer application. Personalisation is the killer application and in that sense telecommunications is not different from a pizza delivery service: who wants salami gets salami, who wants mushrooms gets mushrooms. Do your own pizza—do your own telecommunications service. Being able to adapt quickly to changing customer needs, is what will make the real winner in this business. Understanding the customer is therefore key, as well as the ability to use the knowledge on the customer base in the right way.

### Conclusion

Mobile telephony as the default vehicle for our personal communications is a scenario for the future that is not at all unrealistic. A large number of countries are expected to have mobile penetration levels exceeding 60% by 2003. It is up to the industry to drive up the value of the service and associated applications such that sustainable revenue streams can be generated at levels that are high enough to support the investments required. The commercial success of GSM is less than 10 years old. It took other industries much longer to arrive at high-volume and high-value positions. Continued focus on the customer and personalised services through exploiting the technology capabilities are likely to be key to future success.

### Acknowledgements

All trademarks are acknowledged.

### Biography



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Martin Lossie graduated as an electrical engineer from the Delft University of Technology in The Netherlands. He has over 11 years experience in the telecommunications industry and is currently with PricewaterhouseCoopers Management Consultants. His current specialism is technology and market oriented strategy for mobile telephony operators. He has been working with leading mobile telephony clients in setting up new mobile businesses as well defending positions of existing mobile businesses in a number of countries.