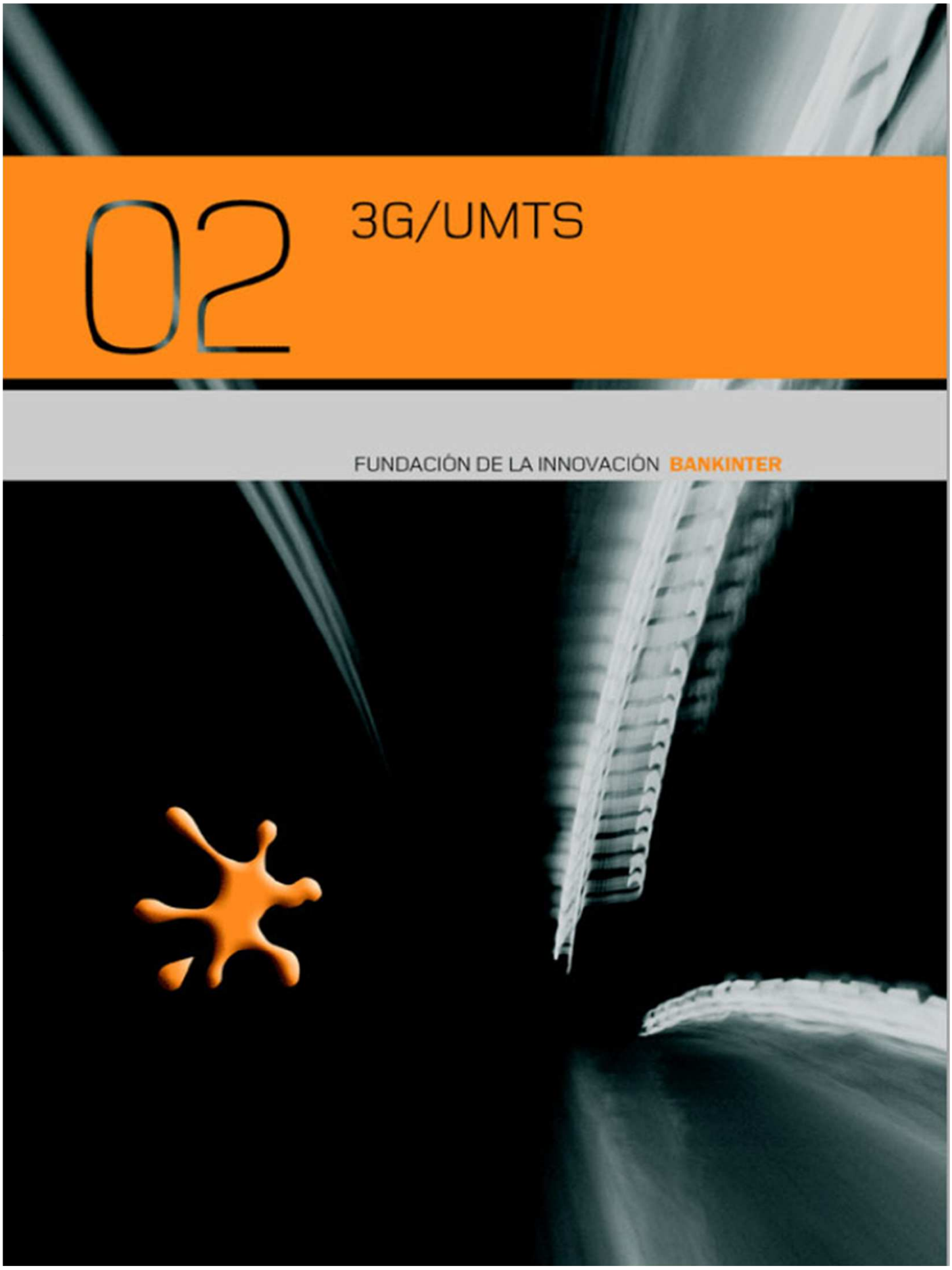
02 3G/UMTS

FUNDACIÓN DE LA INNOVACIÓN BANKINTER



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CHAPTER 1

Prologue

1 Prologue

After many false starts it would finally appear that third-generation technology (3G) is going to reach Europe. This coming Christmas the consumer will be able to choose from a broad range of equally fascinating products, as well as from services either new or improved.

What sort of impact will we see in the long run? Are we witnessing a technological revolution or simply the enhancement of services already offered in mobile telephony? The Future Trends Forum has sought to throw light on these questions, and some of its thinking is summed up in the present publication.

3G technology appears to be considered one of the greatest technological initiatives in the history of the modern economy. At the high point of the "new economy", exaggerated by the success at world level, and without competition, of GSM technology in the late 1990s, European policymakers smoothed the path toward the next stage in the conquest of mobile telephony: 3G spectrum licences. The mobile telephony operators didn't have to think much about it before seizing this opportunity. Further, mobile telephony was a gold mine where the collection of taxes was concerned.

So what point are we at, now that the technology has attained to legal age?

33G/UMTS is a fully standardized, broadband mobile technology, i.e. it is not a proprietary one. It operates on a spectrum with licence and offers an omnipresent service, as well as absolute mobility. 3G networks offer more capacity than GSM networks and provide video support of an acceptable quality. Thanks to the overall backing of the industry, the costs in using it will diminish. This will sooner or later lead to extensive coverage in the developed markets. With the early success of 3G technology, and with the insatiable demand for broadband having been met, the 3G extension devices such as HSDPA, which provide connection to 2 Mbps, will be used from 2005 onward.

3G technology has sufficient potential to affect at least four types of service offering:

1. Accelerate the replacement of fixed voice
2. Lend support to new types of data service for consumer mobiles.
3. Facilitate wireless access to broadband.
4. Mobilize the principal applications for businesses and firms.

Current mobile telephony services entail high premiums for mobility, at least in European markets. Although in principle mobile telephony is perceived as something that cannot be improved on, the high prices and the doubtful, lower quality of voice conveyance have in the past slowed down the transition from stationary to mobile. The 3G networks will help to overcome both barriers: networks of the future will be virtually unrestricted in capacity where voice is concerned and will provide sound of high quality, matching that offered by the fixed networks. Their use in markets with low premiums for mobility, such as the US, suggests that the replacement of fixed

voice is not only possible but also economically viable. Ultimately there is no reason to believe that the use of fixed telephony can survive.

However, what about data? Where are the *killer applications*?

We believe that data applications are inherently heterogenous. In the consumer market, a small percentage of the user base becomes a big user of specialized applications (e.g. games via mobile). The individual preferences are highly fragmented, as may be seen in easily observed use patterns. However, several long-term trends in consumer behaviour will smooth the way toward the use of data via mobile. Replacing traditional social models, the consumer will demand a higher level of interaction over a distance. Our firms, which are attaining to adulthood and thinking about health and safety, will add to the demand for new services. People will look for new ways of dealing with the complexities of day-to-day life. Finally the workplace concept will be transformed in the information economies and in the services of tomorrow.

The trend would seem to be toward the following:

1. Good communications: for example, on the basis of video, to share expe riences with those communities with which there are strong links.
2. Information available at any point: for example, personalized training and an environment that is intelligent and aware of the context.
3. Entertainment ("without a moment of boredom"), including virtual experiences in highly animated 3D environments.
4. Commerce and transactions: for example, medical and financial services, and trips without unpleasant surprises, based on intelligent systems and personal preference parameters.
5. Storage and personalization: for example, terminal personalization according to personal taste and access to own digital rights and personal data libraries.

Notes

The 3G mobile networks with sufficient broadband and capacity, which in addition facilitate things like localization, payment, and presence, will provide the platform for this new world.

3G technology also will make possible access anywhere to broadband data. Twenty years after telephony begins to function without cables, businesses and consumers will have the option of connecting to the Internet with a mobile phone no matter where they may be.

Businesses speak about security and integrity, speed, and reliability as their three principal needs in relation to mobility, and 3G technology will contribute to their being achieved. It is predicted that the applications market for mobile telephony will triple between 2003 and 2008. Also we expect that the first wave of applications for mobile telephony where businesses are concerned will be centred around basic functional/horizontal needs. It is highly probable that the second wave will meet more

complex requirements and in addition guarantee deep integration with business procedures. Many of the applications will require a real-time connection that is reliable. They will include direct access to ERP and other back-end computing systems, and will be much more data-intensive.

Only one convincing vertical computing application will be possible for mobiles if the ISVs, the systems integrators, and the OEM products seek the way to enter the field and meet the client's needs from start to finish. Within the consumers' domain, the suppliers of media contents and other industries directed at the consumer will have to learn the way mobiles are used and collaborate with the operators in order to reach the users of mobiles and promote the mobile as a new channel. The combination of the operator's capacities and those of the firms supplying content, integration, and functionality of the terminal can lead to rich economic ecosystems in the world of "info-entertainment" and of productivity based on wireless technology.

With an increase in the economic possibilities and a radical redirecting of costs away from the physical and back to the experiential (leisure, discoveries, tourism, entertaintment), the prior conditions for commercial success are there. The magnitude of the change that we see now will depend on the ability of the industry to launch innovative, easy-to-use services, as well as to develop commercial models that make sense from the client's point of view

Jens Schulte-Bockum
Director of Corporate Strategies, Vodafone Group

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CHAPTER 2

Introduction to the Foundation and to the Future Trends Forum

2 Introduction to the Foundation and to the Future Trends Forum

A new and impatient reality

All that we today possess, use, or understand was not long ago an idea, an intention, a possibility, a trend. Today this cyclic sequence quickens its step, and most of these advances come to be realities long before the market and our society can digest them. In many respects our reality does not succeed in making space for another impatient reality that is in stock. Thus, on occasion, a future ends up devouring another future. Examples, in greater or lesser measure, we all know.

In this new scenario, where present and future become confused, there appears a cloud of proofs and certainties that it would be opportune to clear. The search for shared and more accurate information, the monitoring or discovery of trends, and contextualization reveal themselves as the most reliable clues for leading us to a greater familiarity with our new technological future.

Further, in this context of accentuated and strongly interactive change, although new business opportunities triple, the capacity for taking hold of them becomes very much more complicated. In a sense because what is yet to come is already on the way out.

In short, the new rules require keener attention, a broader perspective, a more awake and active disposition.

To consolidate innovation

Thus Bankinter sets up its Fundación de la Innovación, or Innovation Foundation, with the aim of achieving some influence over the present through looking toward the future, as well as of stimulating and consolidating an innovative posture in Spanish business. An ambitious project, and certainly an innovative one, of which the main objectives are to heighten the social awareness of technology and to stimulate the creation of business opportunities based on the technologies seen to be emerging. A project that in addition seeks to reassert Bankinter's commitment to society.

Future Trends Forum (FTF)

The principal project of the Bankinter Foundation is the Future Trends Forum (FTF). A forum with an input from a select and exclusive number of experts belonging to various areas of knowledge, including scientists and intellectuals of the first order, at international level. Some of the most prestigious minds seeking to anticipate the immediate future, with a horizon of 3-6 years, detecting social trends, economic trends, and technological currents on the takeoff runway, analysing their potential implication in various contexts and determining the conclusions that should be disseminated to the strategic points of society. FTF bases its methodology on multidiscplinarity, neutrality, and globality, three essentials in virtue of which it can guarantee to society that no new response to the future will be affected by interests or favouritism of any kind.
To this end, in a first virtual phase, the members of the FTF, working through an

extranet, propose freely, vote, and finally decide on the theme that will later be debated in depth, in the company of the finest specialists, at one of the meets held twice yearly. In the months following, the conclusions will be studied and the impact they may have on the new future will be considered.

Responses, stimuli, and opportunities

Finally, each of these processes will conclude with dissemination to the businessmen, professionals, executives, firms, and institutions of the results of such research. This dissemination will be effected through conferences, which will go over the main points where Spain is concerned, and via this publication.

Thus on these pages you will find the conclusions of the first FTF meet, at which a theme was debated that they judged to be of priority status for our immediate future:

The third generation of mobility (3G/UMTS)

The Bankinter Foundation hopes on the one hand that this publication may provide you with answers, stimuli, and opportunities. And on the other hand, that the commitment and disinterested effort of so many persons may result in the definitive consolidation of innovation as a fundamental value and that, further, they may in our country serve to promote a clear intention to go forward.

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CHAPTER 3

The present state of 3G

3.1 What is 3G?

What is understood by 3G?

3G, understood as third generation, is a collective term for new procedures in communication, new standards, and new devices that will enhance the quality and speed of services in mobile telephony.
3G terminals will combine the functionality of a mobile telephone with that of a PDA[1] and a personal computer with broadband connection to the Internet, while the communication networks, according to the International Telecommunications Union (ITU), will enable devices thus prepared to transmit or receive data at 144 kbps[2] or above. (In practice the technology is facilitating ratios around 384 kbps, very much above the 14.4 kpbs of GSM or the 53.6 kbps of GPRS.)

ITU requeriments for 3G	
144 kbps	High velocity (cars)
384 kbps	Low velocity (pedestrians)
2 Mbps	Stationary wireless transmission

Table 1. Minimum velocities set by the ITU for 3G transmission.

Some of the most interesting functionalities with 3G, apart from improvement in the quality of voice transmission, will lie in its instantaneous communication capacities (fax, email, transmission of large files, transmission of images, etc.), broadband connection to the Internet (news, videos), videoconference, multimodality[3], processing capacities that facilitate complex applications by telephone as if with a personal organizer (PDA), GPS functionalities, payment systems, identification systems, communication with radiofrequency, infrared, transmission by commutation with packets greater than point-to-point (always online), global roaming, etc.

It should be taken into account that while 3G is associated mainly with the availability of greater bandwidth for the transmission of data and voice via mobile devices, the development of these networks will be accompanied by an increase in the processing, memory, and multimedia content capacities of the terminals. This increase will lead to the appearance of a more attractive mix when the time comes to design new uses in the context of mobility.

[1] The Personal Digital Assistant is a pocket computer that acts as a personal organizer.

[2] Kbps, kilobytes per second. At the end of the present document there is a glossary containing definitions of the technical terms here used.

[3] By *multimodality* is meant the capacity that telephones will have in the future to interact with the user in various manners simultaneously, e.g. facilitating access to telephone application menus via keyboard or voice, according to preference.

Acronym soup

In many cases the popularization of a new technology is preceded by the appearance of a strange soup of acronyms. With time the situation becomes simpler. Some acronyms disappear, others acquire a more precise meaning. In some cases the original meaning is replaced by a popular one.

Such a soup has come forth with third-generation mobiles. And perhaps it is being made yet thicker by the long wait between the first mention of services associated with the new generation and their actual availability for the majority of users. UMTS, 3G, CDMA, WCDMA, EDGE, I-mode, and many more are among the ingredients.

In the present chapter we'll take a quick look at all the technologies involved, at the various work groups and fora, at the devices, and so on, the aim being to sort out this confusion. At the end of the document there is a glossary of those terms, used throughout the text, that are newer or more technical.

3.2 3G networks

ITU has approved, as official 3G standards, a set of systems that have arisen from agreement between various companies, grouped under the general name International Mobile Telecommunication 2000 (IMT2000), including five radio-transmission technologies:

IMT 2000 radio-transmision technologies

IMT-DS Direct Sequence (referred to as UTRA-FDD, W-CDMA, UMTS-FDD)
IMT-MC Multi-Carrier (referred to as CDMA2000)
IMT-TC Time Code (referred to as UTRA-TDD) and China's TD-SCDMA
IMT-SC Single Carrier (referred to as UWC-136/EDGE)
IMT-FT Frequency Time (referred to as DECT)

Of these five standards, basically three technologies have been popularized, namely CDMA2000[4], WCDMA[5] and EDGE.

CMDA2000.

The plan is to introduce this protocol into countries with cdmaOne[6] networks, since it is a natural development from the latter, approved by the ITU as standard IMT-2000.

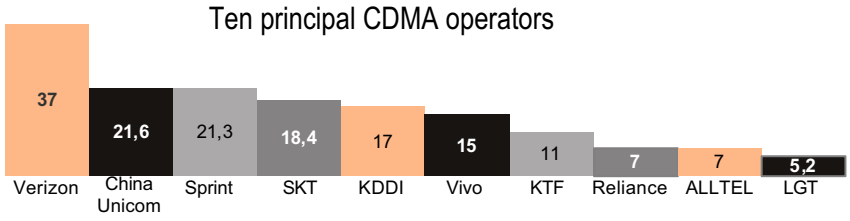


Fig. 1. Source: QUALCOMM, May 2004.

Two phases are envisioned for the takeoff of this protocol. First, introduction of CMDA2000 1X, which offers approximately double the bandwidth of the current cdmaOne, with 144 kbps (back compatible). The second phase will include two further developments of the protocol, namely the DO version and the DV version of the CDMA200 1xEV (Fig. 2).

[4] Code Division Multiple Access 2000.

[5] Wideband CDMA.

[6] Current mobile communication standard in some countries, especially America and Asia.

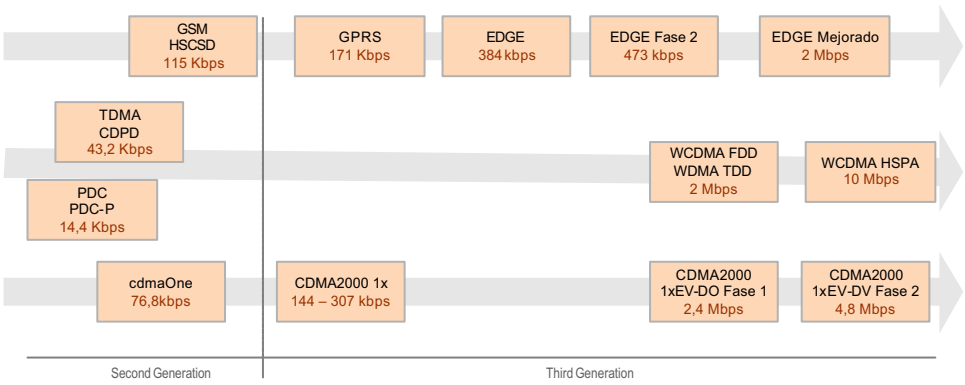


Fig. 2. The evolution of the various protocols available, with their theoretical maximum velocities. Note how 3G protocols follow on from certain of today's 2G protocols. Source: UMTS World.

WCDMA

The idea behind this 3G technology is to offer high bandwidth for voice and data, with velocities up to 2 Mbps, sufficient for such applications as videoconference. This technology is a good choice for the mid term or long term, since it offers greater possibilities. This in spite of its greater complexity. For example, the receptor algorithm is computationally more complex than that of telephones of the preceding generation.

EDGE

This is not really a 3G protocol, since the aim behind its design was to enable GSM and TDMA, networks of the second generation, to transmit data at 384 kbps within their frequency space. Ericsson developed this technology for those operators of 2G networks that were outside the 3G spectrum auctions, hence it will be adopted mainly by those companies that encounter problems in having available a spectrum that will allow them to transmit with CMDA2000 or WCDMA, perhaps as an intermediate solution until they have a spectrum.

3.3 3G applications

Concepts such as *ubiquity, locating,* and *identification* are associated with the new mobile telephones. Along with the capacity of the new terminals for high-speed data transmission and multimedia (music, photos, video), they will revolutionize the applications and services offered to 3G users.

It is general opinion in the industry (as reflected in UMTSWorld[7]) that 3G will not introduce a *killer application*[8] that might tip the balance in favour of this technology, as has occurred with others. Rather it is a large group of them that will take advantage of the new bandwidth available as well as the capacities in processing, memory, and multimedia of the new terminals.

The UMTS Forum divides possible applications into two large groups: connectivity contents (the telephone as a unit of equipment that can exchange information) and mobility contents (the telephone as a portable unit that "we always carry with us"). And these in turn into six groups:

Personal applications that combine entertainment and information.
Multimedia message services.
Mobile access to intranets and extranets..
Mobile access to the Internet.
Locating systems.
Enriched voice.

It is possible, of course, to find many other classifications. For example, through agreement with NOKIA, 3G applications and services will be divided into six large groups:

Wireless advertising.
Mobile information.
Business solutions.
Mobile transactions.
Mobile entertainment.
Person-to-person communications.

[7] UMTSWorld is an important and known forum, independent of the Internet, whose aim is to provide free and independent information regarding 3G industries and technology (http://www.umtsworld.com).

[8] See the glossary at the end for a definition of the term *killer application*.

It may be concluded that mobile applications of the future will be based on what it means to have a mobile telephone of the present generation, i.e. with the capacities and service available today. We can thus identify four broad uses for the mobile of the future:

The various functions of a mobile	
The mobile as multimedia computer	Games, organization, office automata, music, video
The mobile as telecommunications equipment	Voice enhancement, videoconference, radio and digital TV, Internet surfing, access to intranets, transactions, geolocating, navigation
The mobile as remote control	Interactions with local equipment at home or in the office, automatic tellers, vending, payment in shops
The mobile as container	Purse, credit card, container for certificates

Notes

3.4 Market division

Introduction

It is not simple to give any single figure for the distribution of the 3G market for the simple reason that there are different opinions as to exactly what 3G is. In addition there are many details regarding the telephony contracts of operators that are not public, or else they are statistics supplied by operators or manufacturers but based on estimates and not on solid data.

However, the UMTSWorld forum has endeavoured to compile statistics on the deployment of UMTS/3G networks. These fall into three types:

Communications infrastructure.
Users' terminals.
Operators and subscribers.

The makers of infrastructure for mobile communications

Here the undisputed leader, whatever the generation, is Ericsson. According to sources in the Yankee Group, its share in 2002 was 27% (Fig. 3). It is followed by Siemens, Nokia, and Motorola.

Shares in the mobile infrastructure market

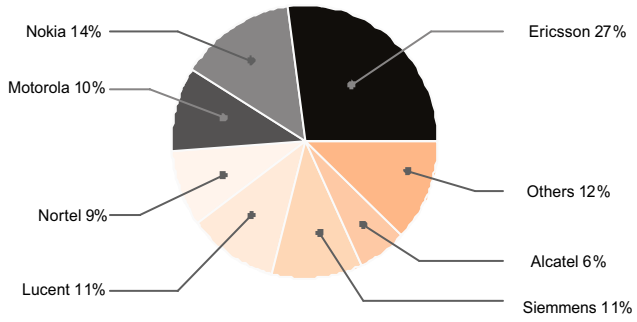


Fig. 3. Source: Yankee Group. Data: 2002.

In 3G, Ericsson has known how to maintain this leadership. It was leader for example in 3G WCDMA in 2003 with 38% of the market (Fig. 4). In addition it is the leader in EDGE technology, so that it is in a position to offer a 3G solution to operators that with 2G GSM or TDMA networks not have secured broadband in the WCDMA spectrum.

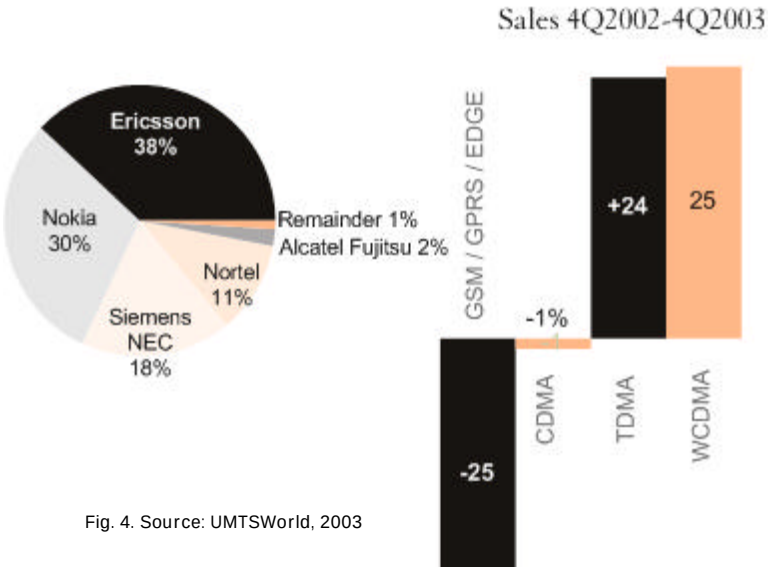


Fig. 4. Source: UMTSWorld, 2003

The makers of mobile terminals

In recent years the global market[9] for mobile terminals has grown beyond all expectation. More than 515 million mobile telephones were sold in 2003[10], 20% up on the previous year. It is in Europe, the Near East, and Africa that the market shows the strongest growth (and Gartner Dataquest reports that sales in EMEA grew by 35.5% in 2003). Also, terminals are in strong demand in China.

Where companies are concerned, Nokia in Finland remains undisputed leader with more than 179 million telephones sold in 2003 (19% up on the previous year). With a market share of 34%, it is followed by Motorola in the US, Samsung in Korea, and Siemens in Germany. (See Fig. 5 for global market figures.)

[9] World market for mobile telephones of every generation. More than 600 million terminals are predicted for 2004.

[10] Average figures on the basis of studies carried out by the Gartner Group and Strategy Analytics.

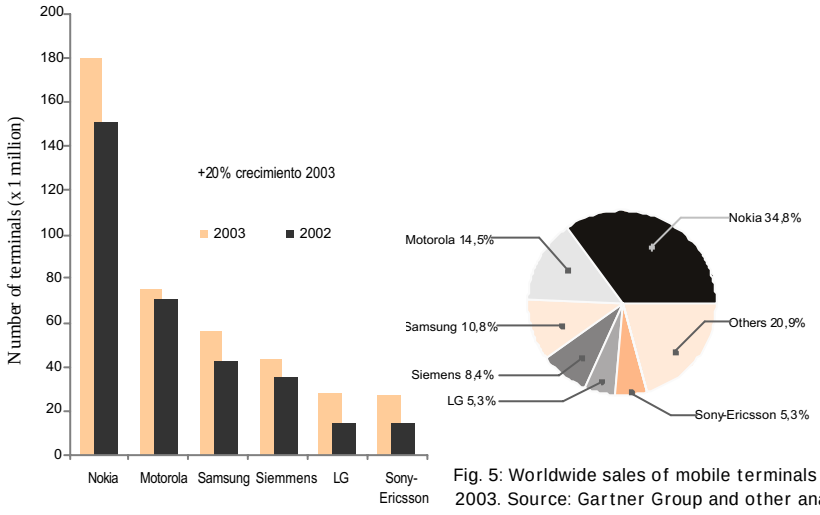


Fig. 5: Worldwide sales of mobile terminals 2002-2003. Source: Gartner Group and other analysts.

All the leading makers of mobile terminals have hurried to develop new models compatible with 3G technologies. However, the major penetration of 3G in Korea and the high levels of telephone turnover there mean a boost for the Korean firms Samsung and LG in the race for the broadband telephone market.

Operators and subscribers

The mobile market

Various sources estimate that by late 2004 there will be 1379 million subscribers to mobile telephones throughout the world, up 186% in five years.

In China, though penetration there is low in percentage terms, there are almost 300 million subscribers. It is thus the biggest market on the planet, followed by the US with 164 million, Japan with 82, and Germany with 64.4 (Fig. 6).

A multitude of operators are to be found in this vast market. At the end of 2003 the biggest in terms of subscription were China Mobile, Vodafone Group, and China Unicom (See chart).

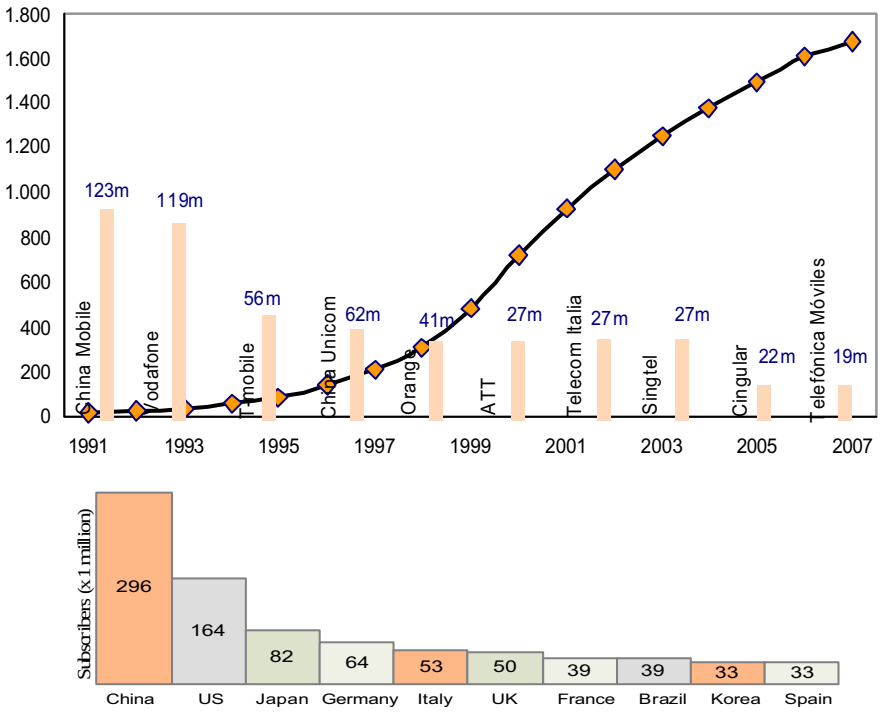


Fig. 6: Principal markets and operators. Sources: UMTSWorld and eMarketer, November 2003.

3G

Where countries are concerned, the leader in 3G is without doubt South Korea[11], with 21% penetration among the population. Thirty per cent of the mobile telephones in South Korea are 3G, followed by other countries in Asia, Canada, and northern Europe. (See Fig. 7 regarding mobile broadband penetration.)

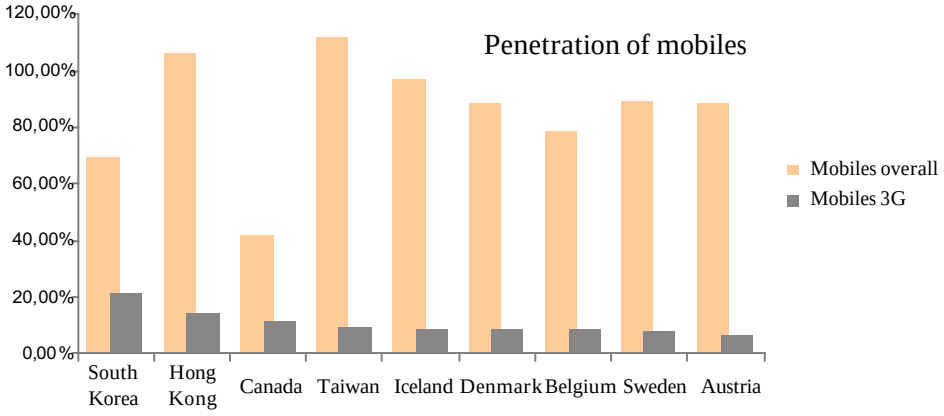


Fig. 7. Showing the nine countries with highest 3G penetration in 2003 in comparison with overall mobile penetration, in each case in relation to population. Note that in some countries, e.g. Taiwan and Hong Kong, there is more than one mobile per inhabitant, which gives us figures over 100%. (Source: ITU, late 2003.)

[11] See Appendix A for a study of 3G in Korea.

3.5 Demand

The considerable growth of mobile second-generation telephony in recent years, leading almost to saturation in many developed countries, suggests a promising future for solutions in 3G telephony, mainly data applications. It is clear that there are various factors that will facilitate this development, such as the following:

Social

Emergence of a society with a computer culture.
Among the population, an increase in mobility and travelling.
Digitization of many processes[12].

Technologies

Falling price of electronic devices.
Appearance of integrated multimedia applications.
Appearance of devices that are steadily richer in features, more usable, and more attractive.

Market trends

Rapid penetration of mobile telephones.
Adoption of the Internet.
Development of electronic trading.
Development of portable devices and PDA

Also there are inhibiting factors, however, such as the following:

In many cases there is no clear business model (hence there are not sufficient incentives for the content developers).
For many of the services offered there is no well-defined demand. (We find ourselves faced with a supply market. Such a situation, with its attendant bad experience, arose with electronic trading on the Internet.)
The question is one not of technological rupture but of technological growth, for which reason it is not so easy to persuade people to adopt the new technology.
It may prove expensive, i.e. the consumer may see the price as exceeding his/her own value appraisal.
The consumer with whom advanced mobility triumphs is the city user, who in many cases has a high level of technological knowledge and spends a lot of time on public transport (Japan, Korea). This profile is unlikely for some time to show up in Europe or the US.

[12] See the glossary at the end for a definition of the term digitization of *processes*.

3.6 The sector

Introduction

The deregulation of communications, the rapid and forceful penetration of mobile telephony, and the emergence of new businesses, such as that of data via mobile, have encouraged, especially in recent years, many firms to become part of this sector. Operators, generators of content, the makers of infrastructure technology, and the makers of mobile terminals crowd into the value chain of this industry.

Most of these companies are taking up positions in readiness for the third generation. Operators are choosing the technologies most conducive to the takeoff of their networks, looking for their business models in the new applications and services, and planning for penetration into the markets. Manufacturers are developing technologies and preparing for any redeployment of investments (Fig. 8). And naturally the generators of content, who at present assume greater importance with the appearance of many new applications and services that exploit the advantages of 3G, are also getting ready.

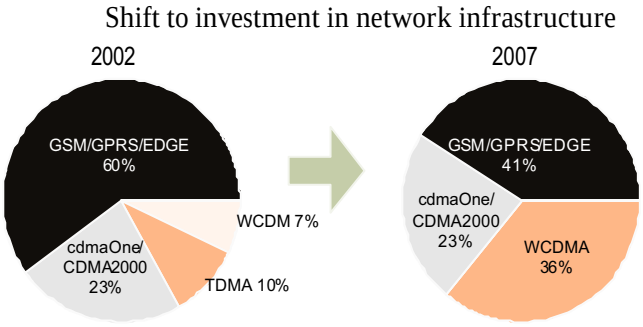
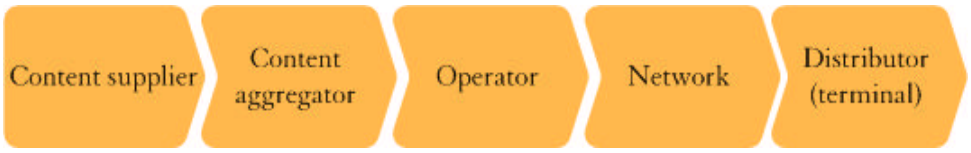


Fig. 8. Source. The Yankee Group

Value chain

One of the keys to the success of 3G lies, without doubt, in establishing a suitable business model, one that is valid for all those making up the value chain.

Here the value chain can be seen as made up of five great links, namely content suppliers, content aggregators, suppliers of communication services (operators), suppliers of communication infrastructure (network), and final distributors (see figure below).



The content providers undertake to design and develop services via mobile. Although voice, the principal service at this time and killer application[13] in mobility, is a service provided by the actual operator. Data services, including mBanking, mCommerce, GPS, the Internet, music, and video, are provided by third parties.

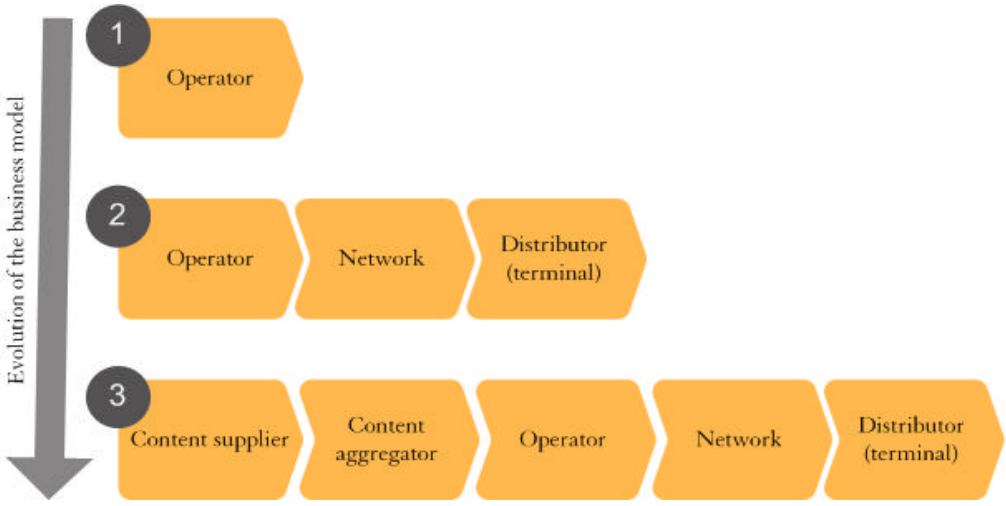
The content aggregator is the value chain link that makes it possible to group all the services on offer in such manner that the user may easily find what he needs. This is the case, for example, with the Internet sites on mobiles[14], the searchers or aggregators of various types of information.

Operator and network are basic infrastructure links, normally dominated by telephone companies. In most countries today they are the parties in charge of invoicing the client. The success of the business model depends to a great extent on how they organize this invoicing, and on what part is transferred to the other links.

The final link in the chain is the distributor of the service, basically the telephone terminal. In the case of 2G, noteworthy success has resulted from the contribution made by other links to its costs. However, the client has in consequence got used to the idea of paying little for the hardware (the telephone), although he pays somewhat more for the service (normally in the form of calls). This will have to be taken into account in the development of the 3G business model.

The business model

The business model in telephony (fixed and mobile, voice and data) may be illustrated as follows:



[13] See the glossary for a definition of the term *killer application*.

[14] As is the case of I-mode (referred to as E-moción in Spain) and Vodafone Life.

1. Initially a single company held a monopoly in all telecom services.

2. Later the operator and the access network became disjoint, and in addition the terminals were freed. This model appeared both in cable telephony and in wireless telephony.

3. The value chain becomes complicated when data services are offered, at which point the content supplier is clearly distinguished from the operator. Also it is possible to discern an extra link with the function of content aggregator (or site), initially offered by the operator.

The business model insofar as concerns data via mobile telephone, and this clearly is the 3G model, would appear to rest on a set of starting points:

The content supplier receives a part of the operator's invoicing, so that, on the one hand, its business may be profitable.

The user must continue paying a single invoice (the phone bill), though in reality he is paying for all the value services he receives. The operator has to distribute these revenues along the value chain.

The terminal continues to be subsidized by the other elements in the chain, since the user does not ascribe too much value to the hardware.

A problem for coming years is that of deciding whether this business model will have to be altered.

Lessons to be learned from the success of Internet via mobile in Japan

In the appendices we look at the considerable success of surfing via mobile in Japan (especially with NTT DoCoMo's I-mode). >From this model we can derive lessons for possible application to incipient 3G business in Europe and the US.

In Japan there is no legislation already worked out. Rather there is swifter deregulation, and the competition is admitted more swiftly than in other countries[16].

[16] The deregulation of various aspects of mobile telephony began sooner in Japan than in other countries.

The dominant mobile operator, NTT DoCoMo, had a clear strategy for coor dinating the entire business model, the key to developing a technology with a great many associated systems (terminals, software, gateways, contents, and networks) and DoCoMo dominated the entire value chain[17].

DoCoMo provided economic incentives for the development of content, for example 91% of the content fees remain with content providers. In addition the technology was flexible and was introduced in steps (with the appearance of color, Java, etc. in different stages, while back-compability was constantly maintained).

The choice of technology was the right one. I-mode uses cHTML, a subas sembly of HTML, well known to the developers, instead of WML, which uses WAP. WAP is a new language that the developers have had to learn.

The Japanese, unlike the Europeans, have aimed not only at the youth market but also at older people and at the business market, developing appropriately vertical systems

Third generation in Spain

The UMTS[18] licence auction in Europe in 2000 cost European operators over 100,000 million euros. The rationale behind this vast layout was based on such unrealistic expectations as that of supposing that by 2004 there would be ten million 3G users in Germany, when in reality the various companies, having launched their 3G services, enjoy only an insignificant number of subscribers.

Today, in 2004, with expectations much more conservative, studies by various consultancies suggest that 3G operators are unlikely to recover their investment in less than ten years, and in many cases are likely to have overrun their licence period before they do.

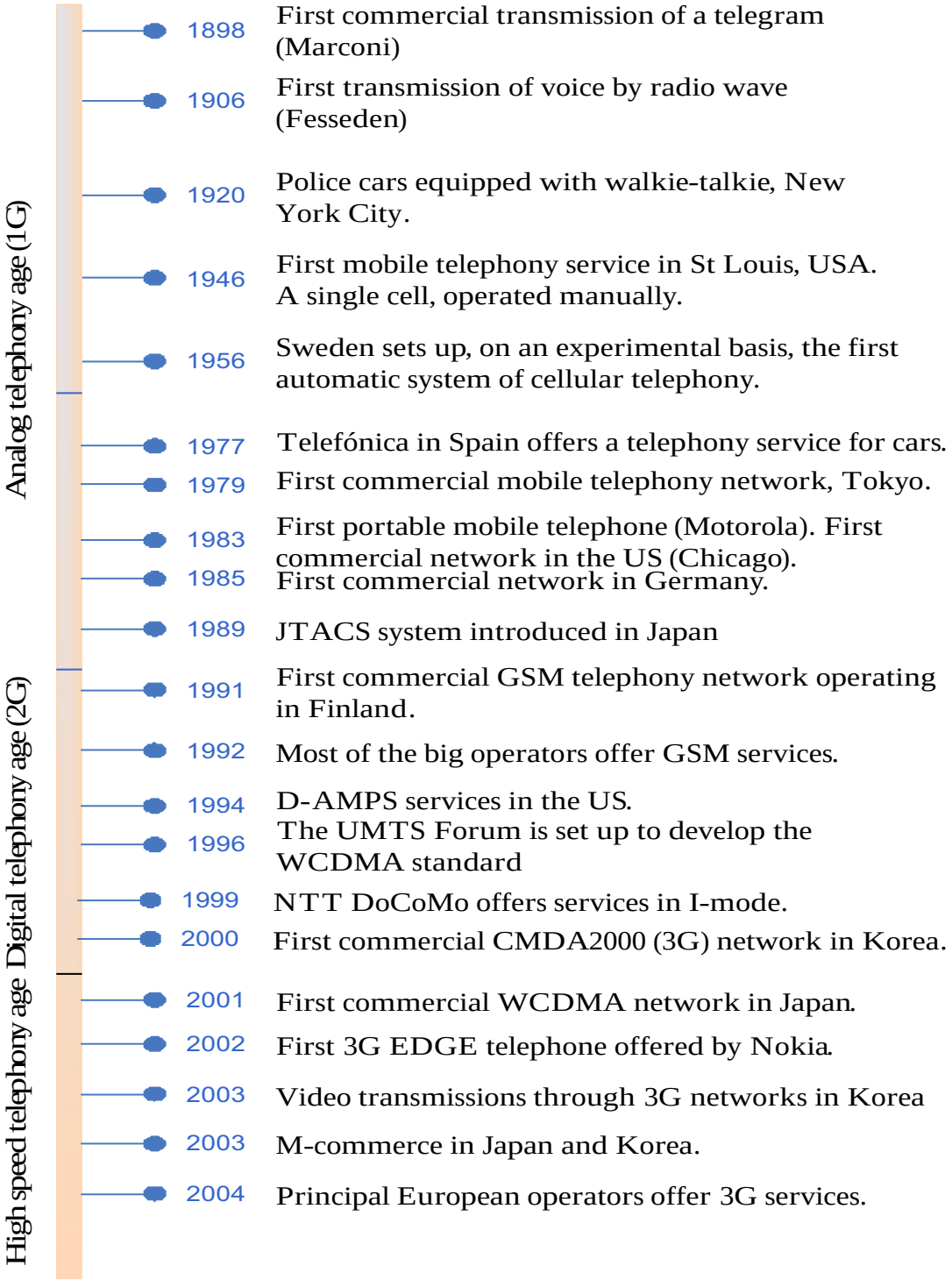
In these circumstances the Spanish Government in 2004 made the conditions more flexible. These concern mainly periods and coverage, though agreements relating to investments will be maintained (11,200 million euros in ten years) and the creation of 16,000 jobs within five years is expected.

Of the four companies awarded UMTS licences in Spain (Telefónica, Vodafone, Amena, and Xfera), only Telefónica and Vodaphone have so far undertaken to place terminals on sale. This they did, somewhat timidly, in late March 2004. Thus it is too soon to speak about established market shares or business models.

Notes

[17] Universal Telecommunications System, the evolution of mobile telephony from its current state (second generation) to third generation.

[18] According to analysts' reports, in 2003 the number of SMSs sent per month was 156 million, which figure would correspond to 19,000 million euros.



3.7 Conclusions to the chapter

"3G" is a collective term embracing new communication procedures, standards, and devices aimed at enhancing the quality and velocity of mobile telephony and at facilitating the development of new applications, such as videoconference.

With a few exceptions, such as Korea and European Nordic countries, 3G is still more a promise than a reality in most advanced countries, and, although few analysts expect it to take off in the short term, generally there are seen to be many factors that will in time heighten the demand for these services and products, such as the digitization of many services and the high penetration of second-generation mobile telephony.

The leaders in 2G know that there will be heavy investment in 3G, and they carefully watch developments in the field.

Finally, it is clear that the basis necessary for 3G to take off is to be found in the establishment of the right business model, one in which account is taken of all elements in the value chain. It will have to be understood that the 2G model is not necessarily susceptible of extrapolation to the new model, and that what works well in one country (Japan) may fail to work well in others (e.g. in Europe).


4

CHAPTER 4

Conclusions at the Forum

4.1 Conclusions at the Forum

The future has many names: for the weak, the unachievable; for the fearful, the unknown; for the valiant, opportunity.

Víctor Hugo

I never think about the future; it comes soon enough.

Albert Einstein

Introduction

In May 2004 its Chairman, César Alierta, said that Telefónica had thrown 6000 million away when it purchased European UMTS licences. They had served for nothing, he added. Telefónica had to amortize the enormous losses in 2003, with serious consequences for the profit and loss account. By then the European operators in telecommunications, anticipating a 3G takeoff, had together paid out 109,000 million euros for licences. Without doubt this was one of the greatest transfers of cash from the private sector to the public in history. The money paid up was in fact a kind of tax, paid by the operators for the privilege of using radio frequencies lying within the spectrum controlled by European governments.

Nevertheless the technology has failed to take off, to the frustration of those who had such high expectations. The sector, exhausted by bidding wars, has not yet been able to derive profit from the new technologies. Only this year have they begun to offer 3G services, so far without great success. The third generation will not succeed unless the companies, once the great sums paid out have been discounted, are able to adapt their offer to real market needs.

The forum experts are making a study of our present circumstances in the hope of determining what those factors are that are essential to the success of 3G, as well as determining which sectors and segments will most benefit from the new technology.

Technology

As regards the level of maturity of the technology, the members of the Forum were inclined to agree that this level is good for the launching of services, although some things were seen as needing to be further developed. The exceptions were among some with profiles more oriented toward businesses that felt further investment in technology would be necessary before 3G services could be launched on a large scale.

Networks

Intelligent network

When we speak about 3G we are in reality referring to new communication procedures, standards, and devices that will take us beyond the currently available quality and velocity of mobile telephony. The key concept here is that of ***mobility***. 3G will be required, where necessary, to facilitate permanent connection to a broadband telecommunications network.

The present-day mobile telephony networks will be gradually replaced by a network featuring greater capacity and quality. Will such a network differ from those of today only in virtue of its wide band? An expert at the Forum took the view that the factor distinguishing a 3G network from those we know will be its "intelligence", and the term he used was ***Intelligent Information Network*** (IIN).

> "Think of IIN as the eye of the hurricane. It is always advancing and feeding the storm around it, while itself it remains calm."

IIN would know the identity of each user, would know his/her tastes, and would know what he/she needs in order to succeed. Behind this concept is the idea that a common platform is needed that can feed data to the rest of the system, which will be steadily seething with advances in technology. 3G will thus entail layers that are integrated and controlled by the intelligent network, which will in time be the key element in the system. The experts at the Forum agree that the appearance of this intelligent network is a necessary condition for the development of 3G technology. It is broadly agreed that the intelligence of the system cannot reside only in the mobile devices.

How is an intelligent network set up? To begin with it is understood that the network must be stable and long-enduring in order to provide stability to the system. Its architecture must anticipate and accommodate advances in radiotelecommunications and state-of-the-art technology. Already a great many providers of mobile services use IP to carry data, SMS, MMS, and even voice. There are technologies, such as MPLS (Multiprotocol Label Switching, developed in concert by the principal makers of telecommunications equipment), that make it possible to separate the traffic between

private networks and high-quality networks, the aim being to deal with each packet in accordance with its requirements.

However, the icing on the cake is the intelligence installed in the network. The intelligent layer provides the operator with full control over network traffic, so that he can discriminate between entries on the basis not only of traffic volume but also of their nature.

This network (which will function invisibly for the users) will be developed not only in order to increase access velocity but also in order to facilitate the administration and management of the data (repositaries in the network) providing intelligence. In this way it will not be necessary to carry all the information with oneself since one will be able to access the resident information more quickly.

Intelligent networks will make possible a variety of invoicing models, by way of inspection of packets, thus facilitating value based charging. Thus on the basis of the employee's profile it will be possible, for example, for a company to assign consumption figures of different natures. Also possible will be prepayment models, post-payment models, etc.

In the context of security (self-protective networks not only proactive but also reactive), an intelligent network will also be able to manage filters for the inspection of illegal content, consumption time for certain services, etc., the aim being to increase the employees' productivity.

Drink or sip?

Notes

The field of telecommunications is advancing toward a "network of networks", where the most important thing is not what network is accessed but rather the option to remain connected as long as required. In this regard third-generation mobile telephony, even in Europe, goes far beyond UMTS. This was one of the points most emphasized at the expert meet. Technologies such as GPRS, WLAN, WiMAX, and i-Mode will have to facilitate a fluid interconnection.

Thanks to the Internet, the world is today connected by a worldwide IP network, which in itself continues to be a network of networks. All the individual networks are connected and speak the same IP language, from the biggest access provider up to governments, from large business networks down to small networks at home or in the small firm. Thus the basic requirement for 3G is essentially the same, i.e. it must be able to integrate all cable-free-access networks.

An important characteristic of these networks will thus be their horizontality. They will be able to manage different access technologies and to distribute to different mobile devices in a manner totally transparent for the user. A mobile user must be able to connect to the best network available.

With this "system convergence", in which the user may access his connectivity and multimedia services independently of the access network available at a given moment, the idea is that the call will be routed to the operator that has the user's profile information.

Not all networks will have the same data transmission capacity, of course. The user will not always be able to "drink" from an abundant source, and at times will have to "sip", a byte at a time, if he finds himself in a spot with poor coverage. But the network of networks will have to facilitate constant and compatible access to any mobile device. This is one of the criteria on which the success of 3G will depend.

Layered structure

Thus it is clear that 3G must rest on a structure of horizontal layers. At one end will be the content providers, which will rest on certain applications, and these, in turn, will be distributed by this network of networks.

At the other end, the user will have full access via the electronic device of his choice, wherever he may be. It is the operators who will grant access to the system, but only those will succeed who guarantee a high level of interoperability. It is thus essential for an operator to have that role of principal agent, the layer that contracts, manages, and invoices in respect of services to the user.

Between both ends, perhaps forming part of the network of networks, will be the intelligent network (the eye of the hurricane we referred to above). This is what will regulate, manage, and organize the traffic while it facilitates the dynamic incorporation of new technologies, networks, or applications.

Standards: public or private?

So that all these layers may function in an integrated manner, the experts believe, it is desireable that the industry agree on standards in relation to operating systems, hardware formats, security systems, and programming languages. The problem so far is that few firms dare to opt for one single way of proceeding, and the majority are highly cautious. One thing they fear is that if they invest in a certain operating system, and later the market opts en masse for another standard, their investments will have been lost. SONY had to learn a hard lesson when it opted for the Betamax video system without licencing it to others. JVC, on the other hand, undertook to popularize its VHS system as much as possible, and in the end SONY had to adapt itself to what the market was producing.

The experts agree that standards are fundamental if 3G is to take off. In particular they believe there must be standards in relation to such interfaces as navigators, memory cards, and infrared connectors.

They conclude that it would be desirable to have cooperation between the various agents (operators, integrators, content providers, manufacturers of mobile devices) in order to launch 3G technology effectively. It is not considered necessary that some particular company lead the takeoff with such force that the others opt to follow its specifications. However, this is one of the most open points at the Forum. Reference is made to the example of Japan, where the apparent integration of all layers is due to the almost exclusive force of a powerful company, namely NTT DoCoMo. The cooperation exemplified by the Internet is perhaps not valid in this case, since the network was constructed by specialists on the strength of public subsidies (which will not be granted in the case of 3G) and services were provided with the network already in operation.

Governments are thus necessary, in the opinion of some experts, for the construction of the technological system in collaboration with the various agents. So far the public sector has restricted itself to controlling broadcast frequencies and to collecting the high tariffs imposed on operators. Henceforth they will have to take on a major role in setting the rules of the game. Otherwise the industry will have to await a leader ready to lay down the guidelines at its own risk.

Following collaboration between various international standardization bodies, it would appear to be the architecture IMS (IP Multimedia Subsystem) that is gaining ground. This establishes three broad levels for the network: access and transport level, session control level (on which would rest a large part of the network intelligence), and the services level (voice, multimedia, etc.). The IP networks, initially developed on fixed networks, are highly decentralized: there is no operator to centralize the information regarding the user, as there is in the case of 2G mobile networks. Accordingly what the operators want, using IMS architecture, is the control that so far they have not had with IP.

Who has my data?

The problem with the intelligent network, forming part of this structure of layers, is the administration of the data managed within it. Who controls the intelligent network? Is it acceptable that a supplier of technology, in many cases unknown to the user, should manage sensitive data from firms and from individuals? It is this point that gives rise to major problems. Thus the objections and reservations regarding the deposit of data in a shared network.

The experts at the Forum stressed with great conviction that users will always be ready to surrender a little of their privacy in return for value-added services, since they have so acted in the past: when GSM mobile telephones appeared, and even when the first conventional phones appeared, the consumer sacrificed privacy in return for useful services (call identification in the case of mobiles, option to receive calls at any moment, etc.). In addition, what worries the present-day user of mobile telephony is precisely the possibility of not being online. One of the experts makes the telling comment that on average it takes eighteen hours for a person to realize he has lost a credit card, but only six minutes to realize he has lost his mobile telephone.

But it is clear that without a rigid guarantee in respect of security and privacy, the user will shy away from 3G if this technology is based on an intelligent shared-information network. To take an example, it was commented at the Forum that a mobile device could serve in the future as an identification document and as a credit card. From a technological point of view, in fact, this is already feasible. Will governments and the banking authorities permit that these data be in the hands of private firms? What guarantees will be required?

Such questions remain unresolved. As always, technology is ahead of legislation. The competent authorities will have to consider the matter before conflicts arise, and at a minimum this should be done at European level.

Terminals

Important elements

One of the points most addressed at the Forum was the design of mobile devices. To begin with, it seems clear that 3G is not going to take off until there is a critical mass of suitable terminals in the hands of users.

The most important factor here is user experience. The level of convenience and of adaptation to the needs of terminals is what will determine the degree to which the technology is made use of. To take an example, it is believed that the time spent in using a mobile telephone is in direct proportion to its ease of use.

There is a certain tendency among operators to establish isolated alliances with the manufacturers of mobile devices, beyond the traditional financing of terminals. The objective is to have these latter support a standardized interface provided by the operator. Thus the operator (who so far manages the relationship with the final user) wishes to assure itself of the fidelity of its clients even if they change terminal.

But the question arises whether the design and the functionalities of the "old" 2G equipment will be valid for all the applications that appear under the umbrella of 3G. If we restrict ourselves to the mobile telephone, a small screen and a keyboard that is tricky to use will not be acceptable. Indeed, they are already so viewed. Screens tend now to be larger, and there are already telephones with expanded keyboards. There is a tendency away from equipment dealing mainly with voice to equipment dealing mainly with data.

This transition will not be easy. "3", the Hutchison Wampoa operator that launched the first 3G service in the UK, used compatible terminals. However, their poor success, according to some analysts, is due to terminals that are too big and involved.

Regarding the question as to what terminal elements are more important for the user, it was commented to begin with that user experience would be successful if the user were not conscious of the developments where that element is concerned: in other

words, if a component is so highly developed that the user does not have to concern himself with the service rendered by the device, in the same way that it does not matter to us what type of cylinder we have in a car if the car is performing perfectly. With high-technology products there is always technological "interiorization". The user has no wish, nor is he able, to concern himself with the most fundamental elements of the product, which are assumed to have been perfected before the device becomes something used daily. To continue with the example of the car, the user does not concern himself with the motor's cooling system, since this is taken for granted, even though without it the car would not function, while on the other hand he does concern himself with accessories, such as a sun-roof, and these can influence the buyer's choice of car. This is not to say that the sun-roof is more important than the cooling system. When the user takes for granted a certain keyboard, for example, this is because that keyboard enables him to interact effectively with the device, not because it may have ceased to be important.

Perhaps for this reason there was little consensus as to what the most important elements of a mobile device might be. To take an example, reference was made to short battery life as something that discourages use. But the battery, which is a crucial part of any mobile terminal, begins to be "internalized" by the user in the sense that no one, unless its duration is exceptionally short, worries about hours in use before recharging is necessary.

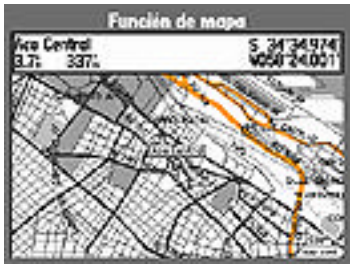
The design or aesthetics of the unit were referred to as "of little importance". However, polling of potential users in the UK make it clear that one of the reasons for rejecting 3G is that the terminals are "ugly". The doubtful honour for least attractive design went to the Motorola A830.

The technology should facilitate interaction between user and device. The ease of this interaction is what will determine the user experience. Herein lies the attraction of access multimodality. A mobile device should be activated by voice, keyboard, touch screen, or any other medium available. The applications that 3G facilitates will require this swiftness and flexibility of interaction.

Compatibility and cost

Another of those factors that most contribute to a negative user experience with 3G is the incompatibility of terminals. When a user sends an MMS, he or she doesn't have to know whether the message is received in visible format or distorted. Standardization is a recurrent subject in a 3G context, but it becomes difficult to opt for a single system.

The high cost of 3G terminals may be an entry barrier working against the mass acceptance of the new technologies. The fact of the matter is that the manufacture of mobile terminals is a tremendously competitive business, with steadily narrower margins, in which firms need an annual growth rate of at least 10% simply to avoid losses. Since licences were auctioned in 2000, the manufacturers of mobiles have been



caught in a vicious circle. There have not been sufficiently many users to produce the critical mass that would allow lower prices, while high prices prevent the formation of such a mass. It may be, though at a late stage, that we are already seeing the light at the end of the tunnel.

In any case there are those who believe we are heading for what some experts call the "Swiss-army knife" of telecommunications. A mobile device will function as a camera, as a means of payment, as a personal computer, as an agenda, as GPS, as music player, and, of course, as telephone. Although perhaps, unless mobile telephones and PDAs converge, the user will face the dilemma of having to choose between voice and data. In this regard it is not known what will happen.

Content

It is not an easy task to develop specific applications for wireless devices. It is not a question simply of taking into account the various 3G networks (UMTS and its versions throughout the world), of programming for the mobile telephones of very different makers, PDAs, portables, or any other device, of effectively distributing everything to the final user, and of collecting for services rendered. The industry has to be capable of integrating all of these things in order to make a reliable, technological, reasonably priced scale model from which to derive these applications. It is not surprising that our experts should fail to be in agreement as to what type of application would best contribute to 3G expansion.

Data

The unexpected success of the SMS caught the industry by surprise. Short messages today account for 12-14% of the revenues of European operators . Since the payout of enormous sums at the radio spectrum auctions, the operators have been anxious to repeat the success of the SMS with more advanced data transmission applications. Already attempts have been made to offer videoconference services by mobile, but with little success.

Four years later, however, there appears to be growing interest in high-speed data transmission. The most interesting initiatives are in areas of specific demand, such as the downloading of music among the younger segment of the population. The manufacturers of mobile telephones have begun to seek joint ventures in this field in order to be ready for a promising future. (If the downloading of tones is so popular, they ask, why not also that of complete melodies?) In this line Motorola has joined up with Apple, the leader in legal downloading of music via the Internet, with its iTunes Music Store, while Nokia has done the same with LoudEye, another virtual music shop. But it is still too early to know whether these initiatives will find a mass market or prove mere curiosities in wireless telecommunications.

Our experts cite not only music but also video, MMS, and geolocating services as potential mass applications of high-speed data transmission. On the other side there is

persistent reference to the possibility of installing sophisticated sensors in any object or on any person it may be desired to monitor, with everything connected to a control centre.

The interesting aspect of the matter is that if the operators succeed in maintaining the primary relation with the final client, they will be the principal beneficiaries of the movements of other firms in the sector because they distribute data via 3G networks.

Voice

But what happens with voice transmission? No one wants to appear in public associating 3G with yesterday's voice transmission, i.e. with conventional telephone calls. It will sell better to speak about novel and even futuristic applications. In addition, voice is not sufficient to justify a higher velocity in the networks.

However, and to the surprise of many, some of our experts believe that the application most likely to contribute to the success of 3G will be low-cost telephone calls. Third-generation networks make it possible to transmit voice at a fraction of the current price, thanks especially to the fact that they have up to three times as much capacity for the transmission of calls as the present-day networks. This could encourage operators to promote the use of 3G mobile terminals by offering calls even cheaper than those via fixed line, with packets of minutes at very low cost. It might then happen that 3G would become popular, which development would in itself be paradoxical: after years of praise for the virtues of 3G as a means of high-speed data transmission to wireless equipment, in the end the old, overly-familiar telephone services would constitute the killer application of 3G.

Notes

"The Killer Application"

Although, certainly, no one is speaking about a killer application, while some of the experts at the Forum continue to believe that it will appear.

Four years ago everyone was speaking about videoconference as the breakthrough application in 3G. It sounded good, but its launching in Japan, South Korea, the UK, and Italy has been a failure. No one uses videoconference. (Curiously, it appears that women are especially reluctant to be seen while they are on the phone.)

On the other hand MMS would appear, in view of the overwhelming success of SMS, to be a firm candidate for the title of killer application. But in general it has failed to take off, even though it has been around for some time. Japan and South Korea, where messages can be sent with photos and tunes, are notable exceptions.

But in no case, say the experts, will the development of a killer application lead directly to the success of 3G. If it comes it will follow the consolidation of the new technology.

Value chain

Who invests?

The money invested in the radio spectrum auctions in Europe has been discounted. Firms and shareholders have entered into the profit and loss account the enormous payment that had to be faced up to in the year 2000.

However, expenses for the operators did not finish here. The consulting firm iSuppli estimates that these firms must spend the same amount over the period to 2007 in order to develop the UMTS networks. In the face of such a prospect, some, so that they are not obliged to invest, have opted to return to the governments the licences for which they had paid. The venture continues to be highly risky. The mobile telephony operators are those most interested in the success of 3G.

But other firms must also opt for the new technology if they wish to be among those who benefit. The experts say it is the content generators and the manufacturers of terminals who must invest most heavily (after the operators) if 3G is to be a success story.

Some point out that, given the high "tax" paid by the private sector to governments in order to have access to third-generation mobility, governments should contribute to the investments necessary through grants to technological development and fiscal incentives.

Revenues

Here we should look at a question relating to the interest taken by the industry in promoting 3G. The experts agree that what we see now is not a revolution but rather an evolution. But if 3G does not in reality entail a radical break with older technology, why has the telecommunications industry placed so much hope in it? Why were such exhorbitant amounts paid out that the actual industry could have been endangered?

As the number of people with mobile telephones has grown, the ARPU (average revenue per user) has diminished. This is because the most valued clients, those who make the most calls and use the most services, were the first to adopt the technology. Other users spend much less. In a saturated market (already exceeding 85% in most European countries), with prices steadily more competitive and a cost structure that demands high growth rates, the industry began to look for a way of offering value-added services, such as video and Internet access. Thus the importance of 3G.

Who collects?

With the current mobile telephony model, it is the operator who manages the relationship with the end user and collects for the service. In addition the operator acts as intermediary in collecting for third-party services: downloading of tones and logos is paid for via the monthly invoice issued by the operating company, and this latter pays a part to the content supplier.

Some experts at the Forum question whether this model can be sustained, and to illustrate their point they cite the case of the Internet. The user pays directly to the content provider, not to the telecommunications firm that sells him the connection, for the services he contracts on the Web. And in spite of its slow takeoff, far behind the exaggerated expectations of the late 1990s, e-commerce would appear to be the viable model for the long term.

And so the question is, Who will charge the end user for 3G services? Will it continue to be the operator? Or will it be the content provider?

Operators

The operators may fall into the temptation of passing on to the consumer the high costs that they have had to pay for 3G licences in Europe. The experts refer to this danger, and predict that 3G will take off only if prices are made more flexible, the aim being to create a critical mass of consumers, and if the losses occasioned by the auctions have been discounted. But will the shareholders show sufficient patience after having borne such losses in recent years? Could this be a factor affecting the 3G business model?

A significant proportion of the experts consulted believe, in any case, that it will continue to be the operator who charges, i.e. that the present model will be maintained, with a monthly invoice that includes connection charges as well as charges for additional products and services contracted. They argue in this case that their principal tools for competing are confidence, security, and competitive price.

Now if voice services continue to account for a large part of 3G revenue, the operators may seek to encourage the use of the new devices by drastically reducing the cost of calls. Indeed, the offer of packets of minutes at very low cost is encouraging many, especially among young people, to dispense with a fixed line. At all events the operators are terrified of entering a price war, since an excessively attractive price reduction could eat up their revenues if their most active clients took full advantage of the discounts. But this may be inevitable: in addition to the increase in wireless competition that will result from 3G, the operators will have to contend with the low prices offered by "voice via IP" technology, presence of which is already being noticed.

As regards data traffic, without doubt there is the temptation to charge according to connection time or volume, since for the operator such a procedure seems the most natural one. However, the experts at the Forum were sure this model would not be viable. They believe that the operators must do the same as they did in the case of the Internet, i.e. impose a flat rate for 3G connections. The door is thus open for content providers to charge for their services, which would in turn lead to a model similar to that of the Internet: the operators would charge for providing the connection, and the content manufacturers would charge for the services they offer.

Content providers

It is possible that finally the operators will themselves be the content providers. But most experts believe this will not happen, that outside firms will produce content and engage the operators to distribute it. A question then arises. If the content providers are not themselves operators and they wish to charge the user directly (e.g. for a download), how are they going to do so? Will a payment means be built into the mobile device? Will the cost be added to the operator's monthly invoice?

Various problems would be entailed if changes were made to the charging model so far used. First, the user would have to be convinced that the new model were better, though this is not always clear. Second, the operators would without doubt be very reluctant to lose the control they now hold over relations with the client. And third, there is also the logistic problem of charging independently of location. Clearly there are security problems when payment is made at a distance via credit card. If mobile devices end up having a secure, uninversally accepted means built in for payment, as some predict, the content providers will be able to charge directly. Otherwise they will continue to depend on the operators, both for sending their products to the end user and for collecting from him/her. At all events the standardization of such a means of payment is neither easy nor imminent.

How is charging effected?

Few are in favour of a variable charge corresponding to the duration of the connection or to the number of bytes downloaded. From the flat rate for Internet connection it is almost impossible to return to the traditional system employed with fixed telephones, with its monthly charge and also its charge for connection time. On the other hand an interesting argument put forward by some experts is that a charge in respect of data downloaded would hinder broadband use.

So how should charging be effected? There are basically two possibilities, namely by service unit and via flat rate. The experts believe that a combination could be the ideal solution. There would be a flat rate for connection from any wireless device, but at the same time some services would entail additional cost. Indeed, the Internet already functions in this manner: there is a flat rate (e.g. with an ADSL contract), but in addition there may be a charge for a value-added product or service (e.g. music, videos).

There is only one small objection to such a system. If the prices were too accessible, this might lead to a volume of traffic at peak hours that the incipient 3G network could not accommodate. At all events the costs for access to the new technology are for the moment very high, and the fault lies especially with the high price of 3G mobile terminals.

The 3G market

Push or pull?

As with all markets, supply and demand must be sufficient to allow the fixing of prices for services that provide value.

In the case of offer (*push*), the operators are still licking their wounds following the unfortunate telecommunications spectrum auctions. Very cautiously they have since then been developing the wireless networks for UMTS, and only now are they beginning again to reveal their interest in awaking the sleeping giant.

Demand (*pull*), on the other hand, is still awaited. The expectations, or *overpromise*, have not been matched, and the result is a certain scepticism. Data traffic on GPRS has not proved swift. Neither the private users nor the firms have been able get from it what they were promised.

We thus find ourselves at a crossroads. The supply is reluctant to invest as it did a few years ago, and the demand no longer believes in all the benefits that 3G promises. So who should lead the takeoff? Must the operators invest more and promote the new technology? Or will it be demand that provides the pressure needed to obtain as soon as possible a set of utilities of high added value?

In the case of 3G, most of the experts believe that the offerers (i.e. the service providers and the content manufacturers) must take the first step toward attracting the consumer. It is said that there is a latent demand for third-generation value-added services, and, although so far no one has hit on what the market wants, the firms in the industry are keen to give a new push to telecommunications, which is in a state of relative crisis since the Internet bubble burst.

In addition the operators want to see this first step taken, in view of the enormous sums invested (referred to above). Although these sums have been written off as losses, and it would be suicide to try to set prices in this incipient market in line with what has already been spent on 3G, these operators have shareholders who want to see good operating results after several years of slight dividends.

If we look at the Japanese model, described in detail in one of the annexes, we see two salient factors responsible for its success. These are the generation of services with high added value, which stimulate the demand for third-generation connections, and a painstaking segmentation of the public aimed at. We'll look again at this latter point below. In any case it is a salient fact that supply pushes demand. It is not the case that demand pushes supply. This observation is consistent with the majority view of our experts, who believe that only when there has been a first wave of applications with relatively successful added value will there appear a strong demand for new applications. Only the sociologists reject this point: for them the 3G takeoff, if in the end it happens (and there are those who remain unsure), will be brought about by the

conjunction of two things, namely the offer of innovation and the demand for new applications.

Accelerators and inhibitors

In seeking to determine what factors will assist or hinder 3G, we have to take into account the fact that certain prior needs work in its favour. The experts refer to four as important:

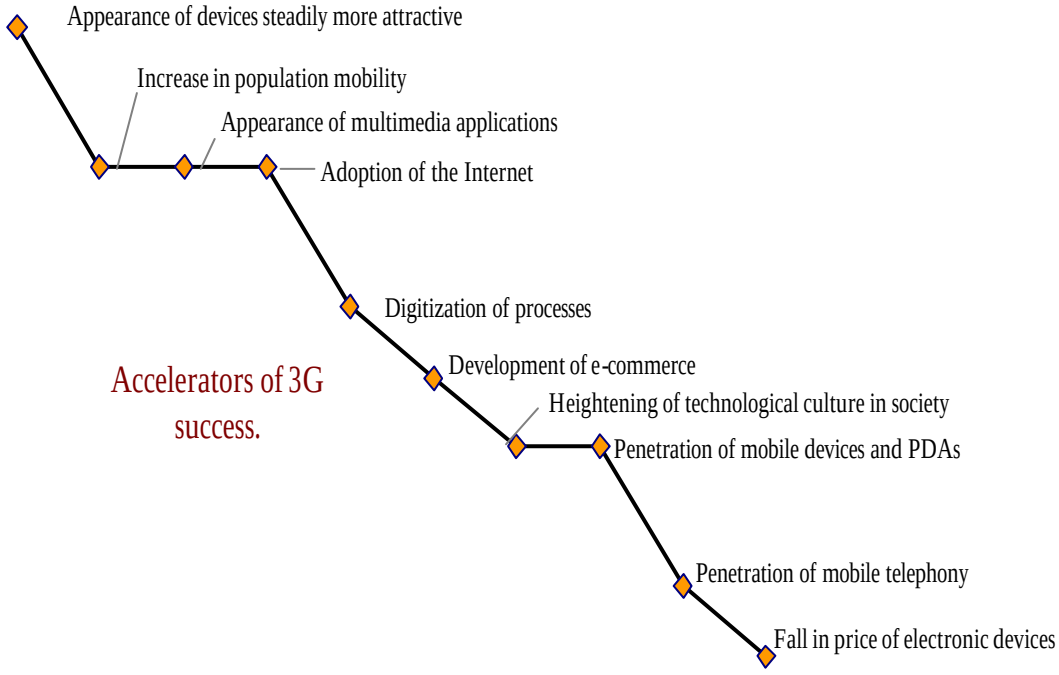
1. The need to be up-to-date.
2. The importance of leisure and socialization
3. Sense of belonging to a group or community.
4. Content for adults.

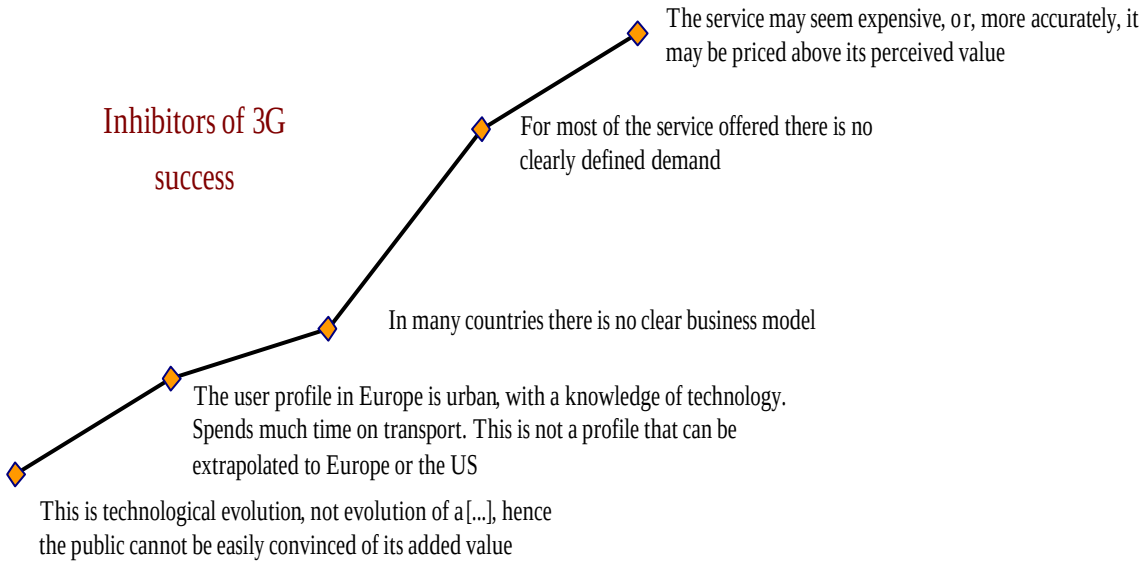
The foregoing should bring out a latent demand for these new technologies, which the firms will have to be able to capitalize.

However, currently there are specific factors that may accelerate or inhibit the consumer's acceptance of 3G technology. Among the first we find steadily more attractive terminals, multimedia functionalities, and a growing technological culture in European society in general. The major inhibitors cited, on the other hand, are the high cost of 3G products and services and the lack of standardization, the latter being a hindrance to corporate investment in one or another direction.

Accelerators and inhibitors are represented graphically in the figure below. The higher they are in the figure, the greater the importance ascribed to them by the experts.

Third-generation mobility, unlike e.g. mobile telephones and the Internet, does not entail a technological breakaway. The question is more one of evolution. In other words it is necessary to convince the users of mobiles, PDAs, and PCs that the new technology gives them added value. As with all highly consumed technological products, the firms must undertake to convey that the value and suitability of its products and services are greater than those currently available.





Segments

While in the case of traditional telephony it is not a problem, in that of 3G a very accurate segmentation is necessary if revenues are to be maximized. Clearly, not all the features of a mobile device will be attractive to every member of the public. The reason is simple. There will be so many options that the user will not be able to assimilate them all at once (*option overload*). He or she will choose only those that provide greater utility and are easy to use. Thus the key for firms in 3G is to understand the attraction of each feature for the user of each type. This in turn requires careful market segmentation.

Let's take the European operators as an example. With 3G, will one brand image be sufficient, or will the operators begin to create specific brands for specific segments (e.g. young people, or business people)? It is possible that general services will continue to be offered that are attractive to all segments, such as voice. But there will be utilities that require very specific marketing, with a target public very well defined. The question is not necessarily one of a mass market.

Further, opportunities are thus offered to firms that up to now have had nothing to do with telecommunications. If a large company is able to offer personalized services to its clients via 3G, perhaps it can reach an agreement of some sort with "general" operators. In fact this is already happening. Firms such as Tesco and 7-Eleven have set themselves up as virtual operators (or MVNOs, *mobile virtual network operators*), reselling operators' minutes but taking care of the marketing to very specific segments. (Source: *The Economist*.)

Notes

As segments that are interesting in general terms for 3G, the experts cited two in particular on the basis of experience with the Internet: young people and teleworkers.

It should be taken into account, however, that the high cost of 3G services and terminals constitutes a major impediment to their adoption by the youngest segment of society, even though the young have a greater learning capacity.

But even within the general segment of young people, the experts believe that firms in the industry will have to carry out a careful segmentation and offer products/services specific to each. In the case of South Korea, for example, there are specific products for older people and for women. In addition, it will be interesting to see to what point growth continues in the supply of products specifically for the female public. While the same thing does not hold in the case of the Internet, the use of mobile telephones by women is much the same as by men. It is possible, some experts believe, that the advent of 3G will contribute to equalizing the use of technology between the sexes.

As regards teleworkers, and in view of the fact that flexible work mode and quality of life are more and more highly valued, it is probable that high-speed wireless technology will make possible a considerable dispersion of work stations. As the experts see it, this would have profound sociological and economic implications that in themselves called for a later study.

Sectors

The experts believe that most business sectors are going to benefit in one way or another from 3G. Where there is considerable consensus is in the view that it would be difficult for a given firm to create a significant opening for itself via a specific use of the new technologies. "This is not the Internet," said one of the experts. A firm not already using the Internet will see itself relegated to the lowest ranking among competitors, whatever its sector, but the same thing does not happen in a 3G context. The experts assert that there is no urgent need to achieve an advantage as *first mover*. In many cases it will be preferable to adopt a conservative strategy in order to see what applications and services are best adapted to each industry.

However, wireless technologies are becoming vital as strategic infrastructure in the case of natural disasters, collapse of fixed networks, power supply problems, etc. In addition, the firm must be able to determine what utilities will increase the productivity of its employees, complement its distribution networks, or enhance its logistics.

In the longer term, the mass acceptance of third-generation wireless technologies may have a major effect on the firm's organization, making for greater decentralization in the taking of decisions, enhanced worker mobility, and a less rigid internal hierarchy.

On the other hand it is possible that the new wireless technologies will facilitate the emergence of sectors or segments up to now nonexistent. Naturally these would base their competitive advantage on 3G. In particular those firms stand out that have emerged from the Internet revolution, and a salient point is how some of them could improve their distribution processes. Also there is the possibility of monitoring persons (e.g. an old person living alone) and livestock, while security firms, multiplying rapidly, can have a permanent connection with what they are keeping an eye on, wherever it may be. But this will depend on the applications that arise from the adoption of the technology, and at this juncture it is difficult to predict what industries of a new cast may come into being. The best we can do is speculate.

Where the shorter term is concerned, the experts point to various applications through which the new technology may be widely accepted, either by firms or by private users.

Applications for firms

The wireless voice networks for firms continue to be a business little exploited by the mobile operators. The new technologies, as we have seen, make possible significantly cheaper calls by mobile, and this should mean major savings for companies if they switch form fixed telephony to mobile.

Where firms are concerned, however, the product that many experts cite as of key importance right now is email. According to a study for western Europe entitled "Mobile Data Solutions for Businesses: maximising take-up and revenue", around 40% of the people with a business mobile will use email via mobile in 2008, compared

with only 1% in 2003. This means that operator revenue under this heading may rocket from $40 million in 2003 to $2900 million in 2008.

In a 3G context one thinks of video applications. A few years ago it was anticipated that there would be a massive use of wireless video conferences on the part of firms, but this has not happened. The quality of reception is still not optimal when the networks are loaded, and the screen of a mobile terminal does not facilitate these things. Where images are concerned, the operators' hopes now appear to lie with MMSs, even though their mass use will probably require a resizing of the networks so that traffic at peak times can be handled.

In general the experts were agreed that 3G will triumph in specific sectors with very specific applications, whether they be voice, data, or images.

Among the sectors that could most take advantage of the possibilities of 3G, our experts cited banking, the leisure industry, tourism, education, and security.

The agricultural sector merits a chapter apart. One of the experts points to the vast growth in 3G when sensors of all sorts begin to appear. So far the great problem with measuring equipment has been the difficulty in effectively, immediately, and cheaply transmitting the information picked up. With 3G it should be possible, to take an example, for each plant to have sensors attached that will measure its growth, advise of the appearance of plagues or diseases, and monitor the need for irrigation or fertilization. All these sensors would be permanently connected to a control system. Such a procedure could also be useful in "labelling" each plant with respect to origin and its state at a given moment.

Applications for the individual

Applications for individuals fall into two types, those for the young and those for teleworkers. In general the experts agree that, although the technology is standard, applications must meet the very specific needs of more or less large market niches. It will be very difficult to come across an application with universal appeal, except possibly for voice at very low cost. Companies in the sector, including content providers, will have to segment the market very effectively and determine how to meet the specific needs of each segment.

The success of the SMS among the younger population in European countries would seem to indicate that the operators can anticipate an increase in revenue from data transmission if they find the right utilities. However, the successor to the short message, the MMS, is not having too much success, in spite of the fact that it has for some time been promoted in various countries. Is this lack of enthusiasm the result of insufficiently rapid networks? Or is the question one of a not very attractive product?

The sense of belonging to a social group, an urban tribe, or a demographic segment has been successfully exploited in Japan and South Korea. In these countries the firms

in the industry specialize according to segment. They offer products and services custom-designed to suit tastes and needs. Although we refer below to the difficulty in extrapolating from Japan and Korea to Europe, some experts believe they can draw very useful conclusions from the business model adopted by the wireless telecommunications industry in other countries.

On the other hand, and in conjunction with the organizations, applications are foreseeable that facilitate or enhance telework. In this regard email may be one of the most immediate and successful applications.

Finally reference is made again to education at a distance as a possible field of applications for private persons in 3G.

Europe

Regarding the rate of 3G takeoff in Europe, most of the experts believe that this will vary according to country. First they cite cultural reasons. If the Internet serves as an indicator of 3G penetration in the future, it is clear that the northern countries are much more prepared for the intense use of wireless connections. However, penetration of mobile telephones is very widespread in the south of Europe, and it may be that some of the applications coming into being appeal to another target public, different from that which the Internet has so far used (for example, stress is laid on the participation of the woman in this new technology). But in general, where the question is to opt for one European region or another as an *early 3G adapter*, the experts incline in their majority to the Nordic countries.

Secondly they refer to more or less intangible market barriers that could inhibit 3G in some European countries. Reference is made to legislation, security measures, and protection of user intimacy as factors that might impede this technology.

One of the sociological trends most visible in recent years on the Continent is the ageing of the population. The experts point out that this will clearly have its consequences for future models of 3G business. We have already observed that the mass development of sensors of every kind may contribute to enhancing the quality of life of elderly persons living alone. It is foreseeable that with the new technologies there will appear a subsector dedcated exclusively to dealing with their needs.

With regard to the development of 3G in Europe, the experts turn to the Japanese model (explained in detail in the annex) and ask to what extent it can be extrapolated to our continent. Most of them have their reservations, and even the sociologists affirm that not much of use can be learned from the success of 3G in Japan. They argue that the Japanese population is much readier to adopt technological novelties than a more traditional European population, and that in any case the Japanese are much more homogeneous in taste and fashion than the more diverse populations of Europe.
They do agree that the Japanese experience should be studied, but they warn against the deception that could result from making extrapolations with respect to our own continent.

FTF Conclusions

In general the experts believe that 3G does not entail a technological breakaway, but rather an evolution; that its success will depend especially on the skill with which the firms in the industry adapt their products and services to what society really needs. The technology appears to be sufficiently mature to allow third-generation mobility to develop, and there are latent factors, or factors that may appear in the near future, that should contribute to its takeoff.

The appearance of richer, more usable, and more attractive terminals.
Increase in the mobility and travel experience of the population.
Appearance of integrated multimedia applications.
Adoption of the Internet.

On the other hand there are factors that could hinder the success of 3G. Firms in the sector, whether operators, manufacturers of devices, or content suppliers, must bear in mind that without a collective effort to standardize it will be impossible to overcome two of the major obstacles observed by experts, namely:

It may be dear, or, more accurately, the price of service may exceed the value perceived.

For most of the services offered there is no clearly defined demand..

To sum up, the definitive acceptance of 3G will to begin with be the result of attractive content that is cheap, easily accessible in easy-to-use devices, and aimed at a mass market steadily more accustomed to electronic devices.

5

CAPÍTULO 5

Apéndices

5.1 Las comunicaciones móviles en Japón

Sin duda, los tres principales eventos que han marcado el desarrollo del mercado de las telecomunicaciones en Japón en los últimos años han sido:

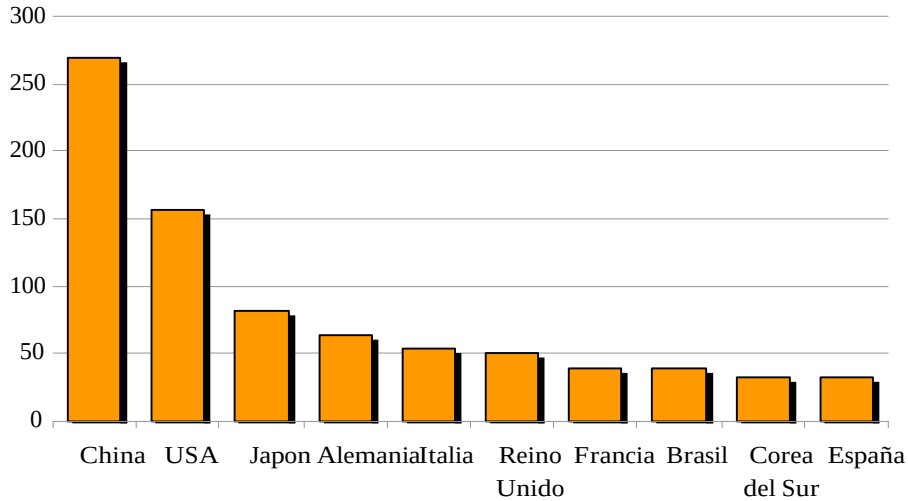
Privatización de la industria de las telecomunicaciones a mediados de los 80 (antes que otros países de su entorno).

La competencia surgida con los dispositivos tales como pagers personales y los teléfonos móviles en las décadas de los 80 y 90.

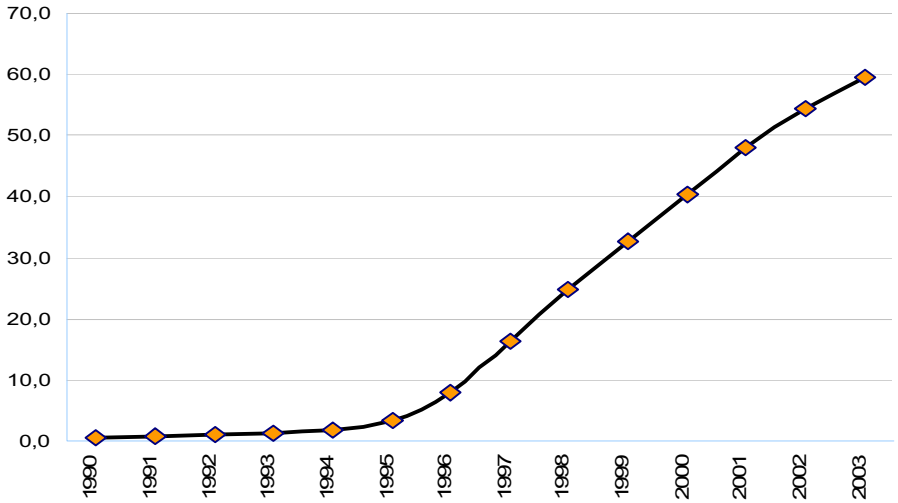
El establecimiento del modelo de negocio de la compañía de telecomunicacio nes japonesa NTT DoCoMo como modelo de éxito de finales de los 90. En especial con el rotundo éxito del servicio de acceso a Internet vía teléfono móvil conocido por I-mode.

El mercado.

Japón es el tercer mercado de telefonía móvil más importante del mundo después de China y Estados Unidos (*véase el cuadro a continuación*). Basando su modelo de competencia en tres grandes compañías: NTT (el antiguo monopolio, líder del país y con NTT DoCoMo como subsidiaria móviles), KDDI (Au es el servicio móviles) y Vodafone K.K. (anteriormente J-Phone, subsidiaria de Japan Telecom que fue absorbida por la multinacional Vodafone) que se reparten la mayor parte del mercado total de servicios de telecomunicación en Japón.



Fuente Unión Internacional de Telecomunicaciones



Fuente Oficina Japonesa de Estadísticas

NTT DoCoMo.

Mis notas

Se trata del operador de servicios móviles más importante de Japón con más de 46 millones de abonados en Japón, lo que constituye un 56% de cuota de mercado. El inesperado éxito de su servicio de datos en 2.5G I-mode llegó incluso a saturar la capacidad de frecuencias de la compañía, lo que impulsó a un desarrollo rápido de la telefonía 3G creándose la red FOMA[19].

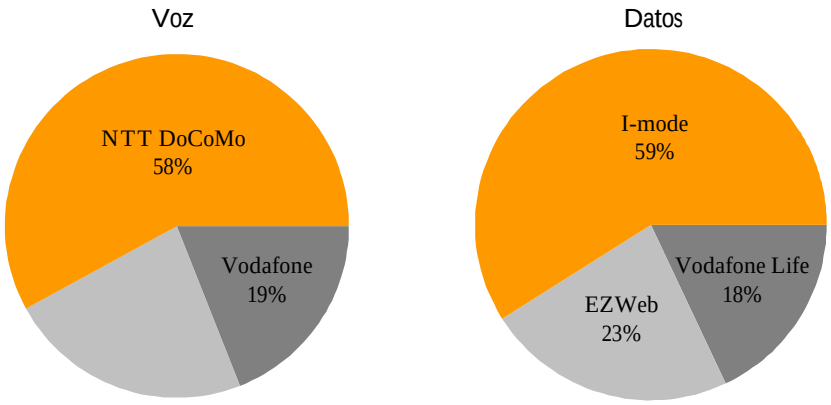
Con 82 millones de abonados (*véase el cuadro a continuación*) es evidente que el mercado de las telecomunicaciones en Japón empieza a estar maduro, por lo que las estrategias de esta compañía a medio y largo plazo están en:

Desarrollar completamente los contenidos multimedia, en el mundo 3G e incluso 4G.

Ubicuidad, evolucionando el concepto de comunicación persona a persona con el de máquina a máquina, permitiendo las comunicaciones con los electrodo mésticos de casa, telemática del automóvil, comercio electrónico, etc.

Globalización: En el sentido de promover su tecnología 3G WCDMA en todo el mundo.

[19] Freedom of Mobile Multimedia Access. Red comercial de tercera generación basada en el sistema W-CDMA, que cumple el estándar internacional IMT-2000.



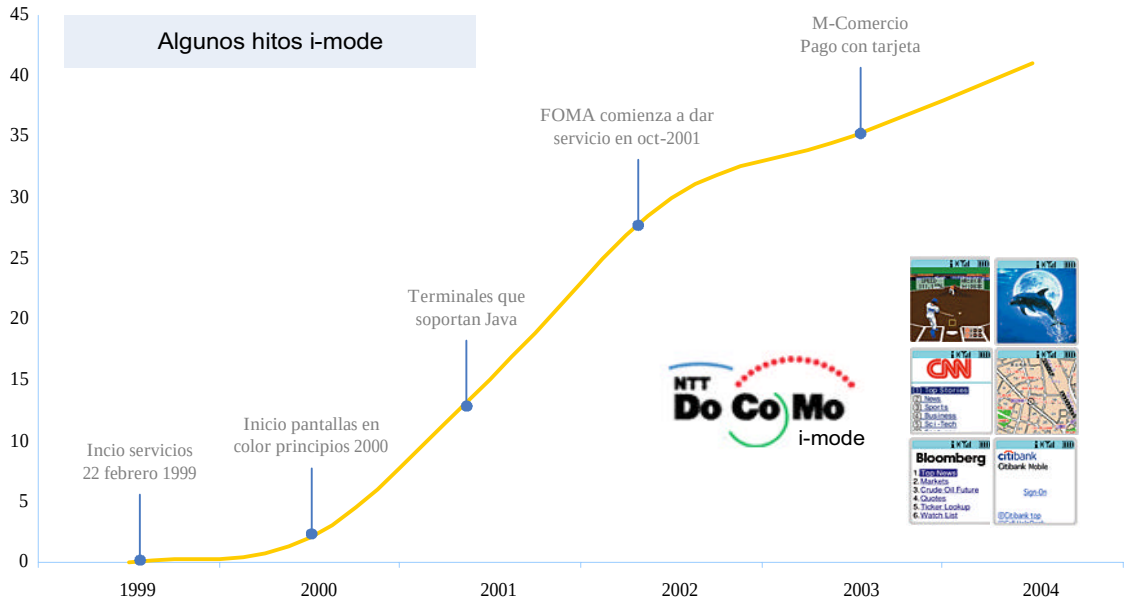
Compañía	Servicio (2G)	Red 3G
NTT DoCoMo	i-mode	FOMA
KDDI	EZWeb	CDMA2000
J-Phone (Vodaphone)	Vodafone Life	J-Phone 3G

Fuente Japan Telecommunications Carriers Association (Abril 2004)

I-Mode.

El sistema móvil i-mode de NTT DoCoMo ha revolucionado conceptos de ocio y trabajo en Japón en los cinco años que lleva en funcionamiento. Actualmente cuenta con más de 41 millones de abonados y 80.000 sitios en Internet.

Se trata de un servicio de acceso a Internet vía teléfono móvil, mediante una conexión de datos (normalmente a 9,6kbps en 2G) que es facturado al usuario por cantidad de paquetes de datos transferidos en vez de por tiempo de conexión.



Fuente sitio web de NTT DoCoMo

En el punto de este mismo apéndice titulado modelo de éxito de Internet móvil en Japón, analizo con cierto detalle cómo funciona I-mode, y cuál ha sido el secreto de su inesperado éxito.

FOMA (Freedom of Mobile Multimedia Access).

Visto el elevado éxito del servicio I-mode en redes 2G, NTT DoCoMo se lanzó a desplegar una red 3G que elevase el ancho de banda disponible para sus clientes, basada en el sistema W-CDMA que cumple con el estándar industrial IMT-2000.

Esta red no ha crecido tan rápidamente como se esperaba, básicamente debido a la baja cobertura inicial[20] , el incremento de precio de los terminales 3G frente a los 2G y la aún escasa oferta de contenidos disponibles específicamente para la nueva tecnología.

KDDI.

KDD se funda en 1953 para dar ciertos servicios de telecomunicación como cable a través del Pacífico o satélite en el consorcio INTELSAT. En el año 2000 se fusionaría con DDI (una compañía fundada en 1985 que daba entre otros servicios de comunicación móvil, e IDO, empresa que daba servicios como telefonía para coches (1988), y telefonía digital (PDC) en 1994.

[20] Tokio y alrededores de partida, posteriormente ampliada a Osaka y Nagoya.

Actualmente es la segunda compañía del país, con un 21% de cuota de mercado de abonados a telefonía móvil.

El servicio EZweb de KDDI se encarga de competir con I-mode de DoCoMo. Actualmente, con 14 millones de abonados es el segundo en importancia del país.

Su servicio de tercera generación, CDMA2000, a pesar de haber sido lanzado 6 meses después del servicio FOMA de DoCoMo[21] , es líder indiscutible en el país con una cuota de mercado superior al 80% debido principalmente a la elevada cobertura del servicio que cubre al 90% de la población[22] .

Vodafone K.K.

J-Phone, la antigua división móvil de Japan Telecom, actualmente pertenece a la multinacional Vodafone (fue adquirida octubre de 2001).

Vodafone Life (anteriormente J-Sky) es el servicio de datos con el que la compañía compite con I-mode y EZweb, incluyendo servicios semejantes como e-mail, navegación web, aplicaciones en lenguaje java, etc.

Dentro de la tercera generación (3G) Vodafone, utilizando W-CDMA es la tercera oferta de banda ancha a través de móvil disponible aun incipiente entre los usuarios japoneses.

[21] El servicio 3G de KDDI se lanzó en abril de 2002 mientras que el 3G FOMA de DoCoMo en octubre de 2001.

[22] En marzo de 2004 en Japón había 16,69 millones de usuarios 3G, de los cuales 3,5 millones eran abonados de FOMA, 13,5 millones de KDDI y unos 137.000 de Vodafone.

El modelo de éxito de Internet móvil en Japón.

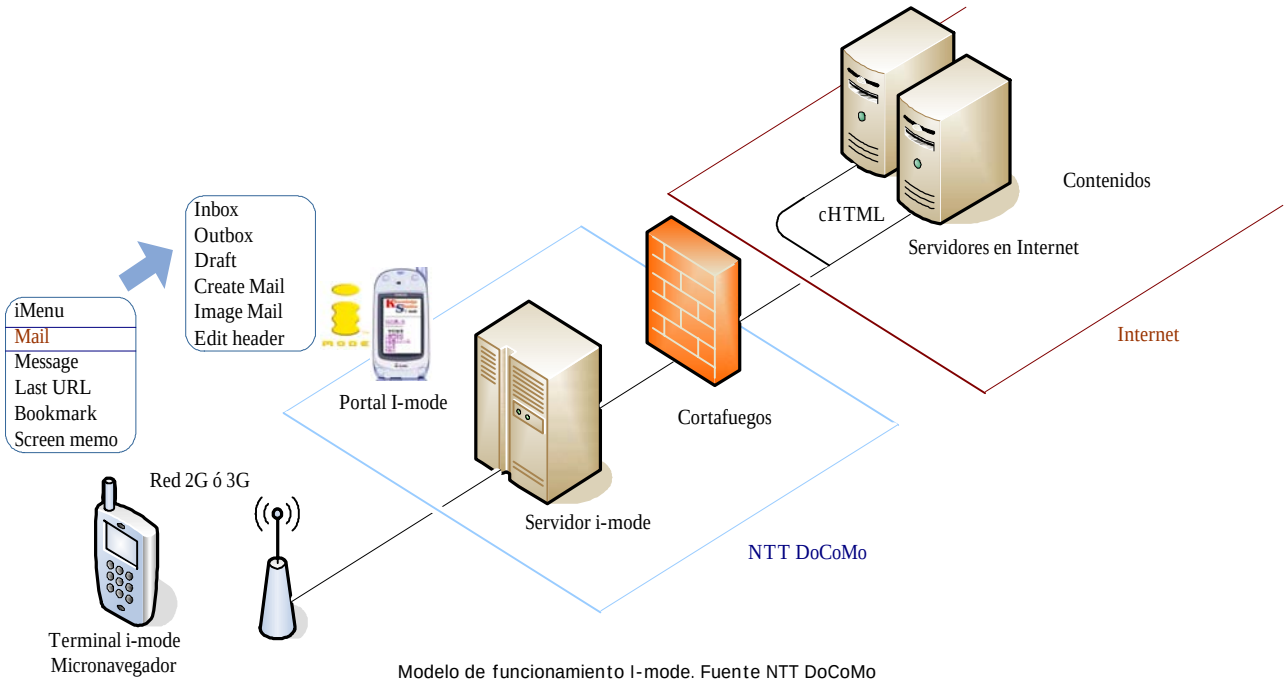
NTT DoCoMo ha tenido un éxito sin precedentes (e inesperado según algunos analistas) en su modelo de negocio de acceso a Internet a través del móvil para generación 2G, conocido por el servicio I-mode.

Los principales componentes del servicio son:

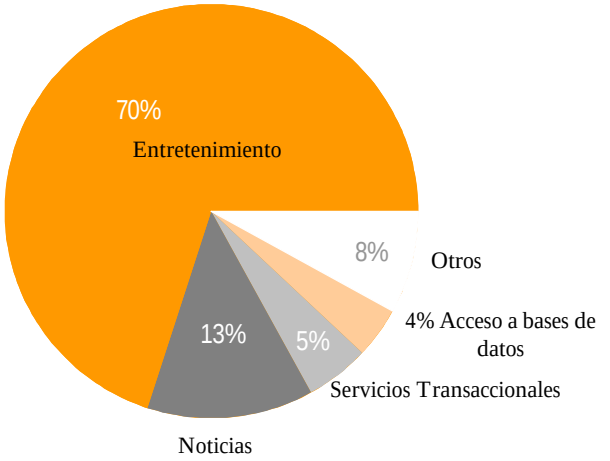
- Teléfono móvil personal con pantalla gráfica y micro-navegador.
- Transmisión por red conmutada 2G.
- Servidor I-mode como pasarela entre servidores de contenidos y el móvil.
- Portal de acceso.
- Páginas de contenidos, oficiales (accesibles desde menú I-mode)[23] , y no oficiales (accesibles tecleando la URL)[24] , escritas en cHTML (subconjunto de HTML).
- Sistema de micropagos.

[23] En el verano de 2003 había 3.450 sitios oficiales de i-mode, lo que constituye una cifra espectacular.

[24] Unos 60.000 en junio de 2003.



Modelo de funcionamiento I-mode. Fuente NTT DoCoMo

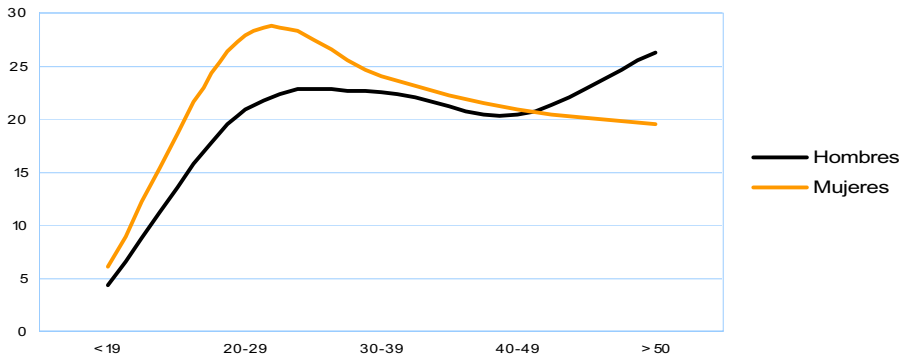


Distribución de contenidos del servicio i-mode. Datos 2003 NTT DoCoMo
Los servicios transaccionales corresponden a m-banking, compra venta de acciones, etc.

Tradicionalmente se ha dado como explicación del éxito del servicio I-mode las tarifas bajas, la mentalidad japonesa y la correcta elección de la tecnología. También se habla de la baja penetración de ordenadores de sobremesa que existe en Japón, una de las menores entre los países adelantados, debido a la poca superficie disponible en las viviendas urbanas, y el elevado tiempo de desplazamiento al trabajo o colegio, que ha lanzado a los japoneses a conectarse a Internet a través del móvil (por ejemplo para usar correo electrónico).

Sin embargo, de un análisis más profundo se concluye que el verdadero secreto del éxito está en la alineación de todos los actores implicados: operadora, fabricantes de móviles, proveedores de contenidos, creadores de software y gobierno en la búsqueda de un modelo de negocio viable, algo así como una cadena de valor perfectamente integrada.

Mis notas



Fuente NTT DoCoMo. Diciembre 2003

Modelo de negocio.

Los sitios oficiales de I-mode están agrupados en un menú de partida, por categoría. La principal prioridad de NTT DoCoMo en el diseño de este menú es la facilidad de uso, no permitiendo a los proveedores priorizar su posición pagando a la compañía[25]. La tarifa que cobra DoCoMo (suscripción de 3$/mes) es una manera de agrupar un sistema de micropagos hacia los miles de sitios oficiales de I-mode (la operadora reparte el 91% de esta recaudación entre estos generadores de contenidos).

Cadena de Valor contenidos oficiales

Proveedor de contenidos	Operadora	Distribuidor (terminal)

Lecciones que podemos extraer del modelo de negocio i-mode.

No existe una legislación premeditada, sino una más rápida lilberalización e introducción de la competencia que en otros mercados[26].

El operador móvil dominante, DoCoMo, tenía una estrategia clara de coordinación de todo el modelo de negocio, clave cuando se desarrolla una tecnología que implica un montón de sistemas asociados (terminales, software, pasarelas, contenidos y redes) y DoCoMo dominó toda la cadena de valor[27].

DoCoMo proveyó de incentivos económicos al desarrollo de los contenidos, por ejemplo el 91% de las tarifas de contenidos se quedan en los proveedores de contenidos. Además la tecnología era flexible y se introdujo en pasos (apareciendo el color, el java, etc. en diferentes etapas, pero manteniendo en todo momento la compatibilidad hacia atrás.).

La elección de la tecnología fue correcta. I-mode usa cHTML, un subconjunto del HTML y por lo tanto ya conocido por los desarrolladores, en vez del WML que usa el WAP, que es un nuevo lenguaje.

Los japoneses, a diferencia de los europeos, no solo se han focalizado en el segmento de los jóvenes, sino han sabido ir a otros segmentos, incluidos el de los negocios o el de las personas de mayor edad, desarrollando adecuadamente servicios verticales.

[25] Este modelo de no priorización comercial también ha sido usado normalmente por Google. Que tradicionalmente prioriza sus resultados por el número de links de Internet que le apuntan u otros algoritmos objetivos pero no permitiendo que estos sean patrocinados en su ventana de resultados principal.

[26] La liberalización de los distintos aspectos relativos a la telefonía móvil fue llegando a Japón antes que a otros países.

[27] En cambio en Europa la aparición de WAP fue mucho más descoordinado.

M-Comercio en Japón.

En términos generales, el comercio a través del móvil actualmente está más evolucionado en Asia que en el resto del mundo. Sin embargo no es Japón sino Corea el líder en este momento con sistemas como MONETA de tarjetas de crédito chips integrados en el móvil y métodos de pago utilizando radiofrecuencia o infrarrojos.

No obstante la mayoría de las entidades financieras están presentes en Internet móvil (por ejemplo en i-mode de NTT DoCoMo), habiendo constituido un elemento clave en la popularización de los servicios de datos en los teléfonos móviles. El interés de los japoneses por operar en bolsa, consultar saldos de sus cuentas, transferir dinero entre estas y en menor medida pagar con el móvil es tan alto que, en algunos casos, superan las transacciones por móvil a las transacciones desde PC[28].

Es importante destacar el hecho de que son las compañías operadoras las que están liderando la mayoría de las iniciativas de comercio, en asociación con otras compañías como entidades financieras o empresas de tecnología. En concreto en Japón existen algunas iniciativas interesantes. NTT DoCoMo esta creando alianzas con grandes compañías con el fin de potenciar su modelo de negocio i.-mode., ofreciendo nuevas formas de comercio electrónico. Destaco *cmode y Mobile GEO*.

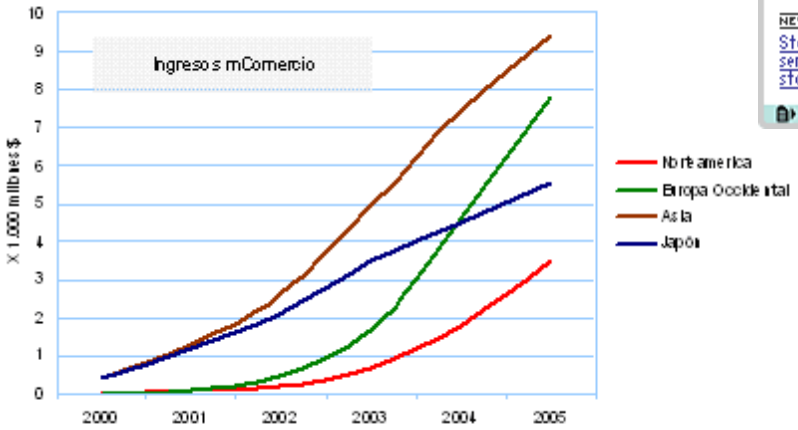
Cmode.

En septiembre de 2001, Coca Cola Japón, NTT DoCoMo e Itochu Corporation crean el servicio *cmode*, que permite comprar bebidas en máquinas de *vendig*. Un año después, el sistema *cmode* ya tenía 136.000 usuarios. La máquina de *vending cmode* no solo es capaz de vender refrescos sino también logos, tonos, tickets, etc, mediante la transmisión al teléfono de códigos de barra tridimensionales.

[28] Por ejemplo, el banco Sakura indicó que 71.800 clientes hicieron uso de su banca en I-mode en un periodo en el que solo usaron el servicio transaccional para PC 61.100 de ellos.

Mobile GEO.

Desarrollado por GEO e Index Corporation, permite al usuario de i-mode autentificarse con su teléfono vía transmisión infrarroja en la popular red de alquiler de vídeos japonesa GEO.



Servicios financieros.

Las principales instituciones financieras de Japón están presentes en i-mode, normalmente gestionando sus propios contenidos, no obstante, DoCoMo dispone de un servicio que facilita a instituciones más pequeñas estar online sin necesidad de infraestructura especial.

Japón, al igual que otros países de Asia como Singapur y Corea, está embarcado en proyectos para incluir en los teléfonos móviles tarjetas chip IC que actúen como tarjetas de crédito, permitiendo pagos online (vía Internet móvil, por ejemplo en comercios) u offline (vía infrarrojos y radiofrecuencia, por ejemplo en máquinas de vending o en medios de transporte públicos).

Conclusiones.

Del caso japonés podemos extraer interesantes lecciones de un modelo de telecomunicaciones móviles de éxito, como son la elevada integración de la cadena de valor, el modelo de reparto de la facturación entre componentes de la cadena de valor o las tecnologías elegidas.

No obstante debemos ser conscientes que no se trata de un modelo directamente exportable a otros países, ya que muchas de las razones del éxito depende del funcionamiento concreto de la industria en Japón.

5.2 Miembros del FTF

Ponentes.

Massimo Migliuolo:
EMEA,Vicepresident CISCO.
País: Italia/Reino Unido.

Jens Schulte-Bockum:
Corporate Strategy Director VODAFONE
País: Alemania/Reino Unido.

Paul Van Doorn:
Executive Director DOCOMO.
País: Holanda/Reino Unido.

Moderador.

John Hoffman:
Director-GSM Association, President and CEO,Roamware.
País: USA.

Asistentes.

Alpheus Binham:
Vice-president e-LILLY.
País: USA.

Max Bruguer-Calderon:
Socio-Director Ejecutivo APAX PARTNERS.
País: Alemania.

Antonio Carro:
Ex-Consejero delegado JAZZTEL.
País: España.

Dereck Reisfield:
Fundador I-HATCH VENTURES.
País: USA.

Rolf Tarrach:
Ex-President CSIC.
País: España.

Javier Garcia:
Information Officer Global Demand LILLY.
País: USA.

Thomas G.Whiston:
Ex-President Comisión Premio Príncipe Asturias.
País: Dinamarca.

Juan José Gonzalez:
President Boston Consulting Group.
País: España.

Antonio Hidalgo:
Director Innovacion UPM.
País: España.

Thomas Lee:
Nanotecnologia-UNIV.STANFORD.
País: USA.

Ramón López-Mántaras:
CSIC-Inteligencia Artificial.
País: España.

Lluís Martínez-Ribes:
Director Marketing ESADE.
País: España.

Mauro Guillén:
Catedrático Sociología WHARTON.
País: USA.

Carlos Mira:
ExPresident LUCENT Mobiles Europa.
País: España.

Juan Soto:
Ex-President Comisión para el Desarrollo de la Información.
País: España.

Angel Cabrera:
President Thunderbird University.
País: España/USA.

Srivatsa Rao:
Intelligent Optical Systems.
País: USA.

Annabel Dodd:
Premio Consejo de Telecomunicaciones.
País: USA.

Christopher Meyer:
President Center Business for Innovation.
País: USA.

Noordin Sopiee:
Chairman & CEO ISIS (Institute of Strategic and International Studies).
País: Malasia.

José Manuel Páez:
Vice-rector Relaciones Internacionales UPM.
País: España.

Fundación de la Innovación Bankinter.

Mónica Martínez Montes:
Director.
País: España.

Bankinter.

Fernando Alfaro Águila-Real:
Director General Adjunto Área de innovación.
País: España.

Marcelina Cancho Rosado:
Ejecutivo Área de innovación.
País: España.

Ignasi Serrahima Arbestain:
Director Proyecto Área de innovación.
País: España.

Nicolás Moya García-Lujan:
Coordinador Proyectos Área de innovación.
País: España.

5.3 Glosario

0-9

2G, entendido como segunda generación, corresponde al presente de los servicios, redes y terminales de telefonía móvil en la mayoría de los países.
Por lo tanto, en Europa, 2G, significa GSM, en el sentido que es la tecnología utilizada por los teléfonos móviles. En ocasiones, al sistema de transferencia de datos GPRS, se le denomina 2,5G por constituir una evolución o mejora del sistema GSM.

3G, entendido como tercera generación, es un término colectivo para nuevos procedimientos de comunicación, estándares y dispositivos destinados a mejorar la calidad y velocidad de los servicios actualmente disponibles en teléfonos móviles.

B

Bluetooth®, es una especificación de la industria de las telecomunicaciones que describe cómo los teléfonos móviles, los PDA y los ordenadores pueden interconectarse de una manera sencilla utilizando una conexión inalámbrica de corto alcance, gracias a un chip transponedor de bajo coste incluido en cada dispositivo.

C

CDMA2000, protocolo para redes 3G perteneciente a la familia IMT-2000 aprobada por la ITU, constituye una evolución del sistema cdmaOne, por lo que normalmente es adoptada por operadoras que usan esta tecnología.

D

Digitalización de procesos, la introducción masiva de los ordenadores en las sociedades avanzadas está provocando que procesos y procedimientos tradicionales, sean automatizados eliminando componentes físicos. Así, la venta de billetes de avión a través de Internet o la descarga de música, eliminan los billetes físicos, a los intermediarios e incluso a los soportes CD.

E

EDGE, protocolo de telefonía móvil diseñado para permitir que las redes de segunda generación GSM y TDMA puedan transmitir datos a velocidades superiores a 384 kbps. Ericsson desarrolló esta tecnología para aquellos operadores de redes 2G que se quedaron fuera de las subastas de espectro 3G y por lo tanto será adoptado principalmente por aquellas compañías que tengan problemas para disponer un espectro que les permita transmitir con tecnologías CMDA2000 o WCDMA, quizá como solución intermedia hasta que obtengan espectro.

Extranet, puede ser descrita como una Intranet (véase descripción de este término en este mismo glosario) que presenta conectividad desde otra red distinta (normalmente otra Intranet).

I

I-mode, se trata de un servicio de acceso a Internet vía teléfono móvil, mediante una conexión de datos (normalmente a 9,6kbps en 2G) que es facturado al usuario por cantidad de paquetes de datos transferidos en vez de por tiempo de conexión.

I-mode comenzó estando disponible en Japón, a través de la compañía NTT DoCoMo para, posteriormente extenderse a otros países, entre ellos España, donde toma el nombre de *e-moción* de la mano de Telefónica Móviles.

Tecnologías de radio-transmisión de IMT2000

IMT-DS Direct Sequence (referred to as UTRA-FDD, W-CDMA, UMTS-FDD)
IMT-MC Multi-Carrier (referred to as CDMA2000)
IMT-TC Time Code (referred to as UTRA-TDD) and China's TD-SCDMA
IMT-SC Single Carrier (referred to as UWC-136/EDGE)
IMT-FT Frequency Time (referred to as DECT)

IMT-2000, se trata de una familia de estándares surgidos de la colaboración entre varias entidades y aprobados por la Unión Internacional de Telecomunicaciones (ITU), que incluye 5 tecnologías de radio-transmisión:

Intranet, red informática con forma de sitio web usada internamente en una organización y normalmente de acceso restringido.

ITU, *International Telecommunication Union*, Unión Internacional de las Telecomu-nicaciones. Se trata de una organización internacional, con sede en Ginebra, encuadrada dentro de la Organización de las Naciones Unidas, en la cual los gobiernos y el sector privado coordinan los servicios y redes mundiales de telecomunicaciones.

K

Kbps, *kilobits por segundo o miles de bits por segundo*. Unidad de medida de velocidad de transferencia de información a través de dispositivos electrónicos.

Dispositivo	Velocidad de transmisión
Módem tradicional	9 kbps
Móvil GSM	Hasta 14'4 kbps
Móvil GPRS	Hasta 53'6 kbps
Banda ancha ADSL	Desde 64 hasta 512 kbps

Killer Application, suelen denominarse así a aquellos usos o aplicaciones de un determinado producto que se ha convertido en un fenómeno de masas. Así, por ejemplo el envío de mensajes cortos (SMS) a móviles ha supuesto una autentica revolución social que convierte a esta aplicación en una *killer* de los móviles.

M

mBanking, se está denominando de esta manera a los distintos servicios que los bancos ofrecen a través de los teléfonos, incluyendo consulta de datos o realización de transacciones que impliquen movimiento de fondos. El término aparece por comparación con *ebanking* que es su equivalente para servicios bancarios a través de Internet y desde un ordenador personal.

mCommerce, de la misma forma que el término *mBanking*, este término se está popularizando para describir todas aquellas operaciones de comercio (compra/venta) realizadas a través del móvil. De nuevo el término aparece por comparación con e*Commerce* o comercio electrónico.

N

NTT DoCoMo, es el operador de servicios móviles más importante de Japón con 46 millones de abonados (56% de cuota de mercado). Creador del conocido servicio de datos I-mode.

P

PDA, *personal digital assistant*. Se trata de un ordenador de bolsillo que actúa como organizador personal, soportando la ejecución de aplicaciones ofimáticas tales como procesadores de texto, agendas electrónicas o hojas de cálculo electrónicas, similarmente a cómo se haría con un ordenador personal de sobremesa. Para más información por ejemplo consultar la web:
http://www.hp.com/country/us/en/prodserv/handheld.html

U

UMTS, Universal Mobile Telecommunications Systems, representa la evolución de las actuales redes móviles disponibles en la mayoría de los países en términos de velocidad de transferencia, prestaciones de los terminales y servicios disponibles a una nueva época de movilidad denominada tercera generación.

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