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CHAPTER 4

Conclusions at the Forum

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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 (repositories 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 desirable 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.

"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.

Notes

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 exorbitant 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, univ ersally 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:

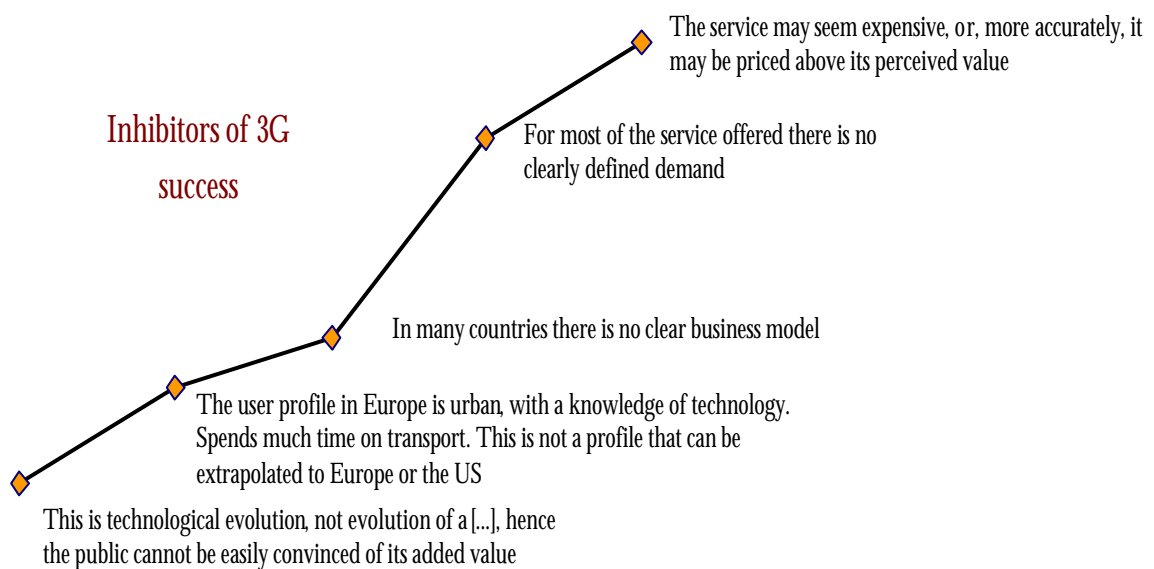
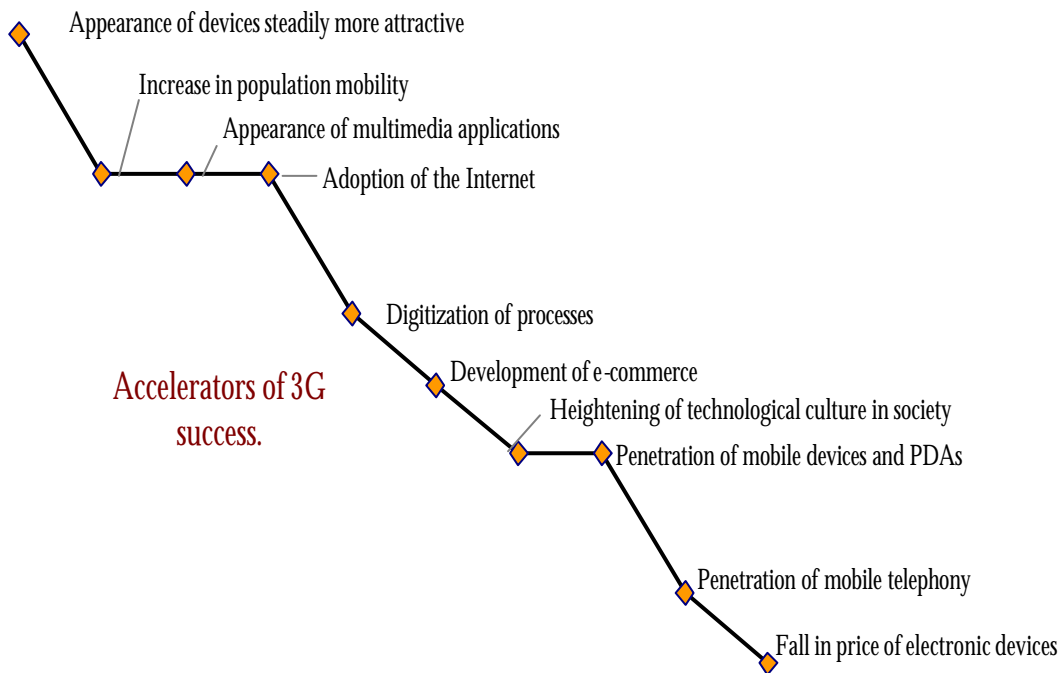
1. The need to be up-to-date.
2. The importance of leisure and socialization
3. Sense of belonging to a group or community.
4. Content for adults.

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.)

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.

Notes



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 from 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 dedicated 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.