

# Telecom Financial Situation in Europe 2002-2005

A PCC++ Summer School project

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## Table of Contents

1.	Introduction.....	3
2.	Present Situation .....	4
2.1.	The debt situation .....	4
2.1.1.	Swedish telecom market .....	4
2.2.	The 3G industry.....	5
2.2.1.	Potential actors .....	5
2.3.	Performance indicators.....	6
2.3.1.	EBITDA .....	6
2.3.2.	Penetration rate .....	7
2.3.3.	ARPU .....	7
3.	Identifying the source of the problem .....	9
3.1.	EU government's fault .....	9
3.2.	Huge Research and Development investment .....	10
3.3.	Hype effect: over belief in data services.....	10
3.4.	Users don't understand .....	10
3.5.	Underestimating alternative technologies.....	11
3.6.	Stock market volatility: Prediction overshoot .....	11
3.7.	Ignoring the minority of analysts.....	11
3.8.	Lowered Interest Rate.....	11
3.9.	Locked operators .....	12
3.10.	Governmental Policy .....	12
3.11.	Market downfall .....	12
4.	Is There a Way Out of the Crisis?.....	13
4.1.	Operators position .....	13
4.1.1.	First 3G network fiasco .....	13
4.1.2.	One G at a time .....	13
4.1.3.	Consolidation strategy .....	14
4.2.	Short term actions.....	14
4.3.	User reaction.....	14
4.4.	Regulatory reaction .....	15
4.5.	Swedish operators estimates.....	16
4.6.	External Actors.....	16
5.	Conclusions.....	17

## *1. Introduction*

This is a survey of the economical situation of the telecommunication industry, covering operators, suppliers and consumers considerations. Since 2000, the value of the stock markets has fallen dramatically all over the world. Companies, whose stocks are valued much less now, face increased difficulties in raising new funds for investments. We will try to describe the present situation, and find the reasons for these unfortunate events within the mobile telecommunication industry. With this knowledge we continue to look at the options that could bring the industry out of the negative trend.

The economical problems are not isolated to the telecommunications industry. They seem to occur on a wide front. Some segments are in more troubles than others. Particularly, the information technology, the biotechnology and the telecommunication industries have been hit hard. These segments of the economy have been involved in huge investments for the future. These industries have a common characteristic: It takes long time to form capital structure in these segments. A continuous accumulation of capital is therefore required to bring the projects in those segments to an end.

In the past, investors and banks have been more than happy to make that capital available. They were motivated by the promises of the positive financial forecast. Nowadays things have changed. Investors have become reluctant to provide the needed funds. This change in attitude jeopardizes the successful completion of these huge investments. Should the funding stop altogether, the enormous amounts of capital already locked into unfinished chains of production would be worth almost nothing.

Several causes of the change of investor attitude can be contemplated. They can be: lowered prediction of consumer demand, signs of too ambitions planning, lack of investor capital, or reduced creditworthiness of the operators and suppliers in the telecommunication industry, to name a few. Among these causes we reckon that the reduced creditworthiness plays an important role. The creditworthiness of both operators and suppliers has declined. This decline started when investors and banks began to worry about the great amounts of debt that the telecommunication businesses had gathered in the recent past.

The fact that the mobile telecommunication industry is heavily burden by the present financial situation is disturbing. It deserves our attention, considering it being perhaps the single most important reason for the economical problems within this industry. We will still try to shed some light on the other aspects that are seen to hamper the once so promising industry. We start by describing the present situation. Consequently, the causes for this debt accumulation will be contemplated. Finally, we will try to see some light in the end of the tunnel by considering scenarios that could lead the telecommunication industry back to prosperity.

## 2. Present Situation

In this chapter, we give an overview of the present situation of the mobile telecommunication industry.

Like many other new technologies, it takes longer than initially expected to deploy its huge infrastructure. We mainly attribute the deployment slow down to two factors: longer sales cycles resulting from an uncertain economy and the negative impact of the huge fiscal commitments taken by the industries with cellular 3G licenses. However, we will see that many factors converge together to create the crisis that we are experiencing right now.

### 2.1. The debt situation

Up to 2001, the global telecoms debts have amounted to \$650 billion. In European telecom market, the debts have already stood at €238 while the pending future investments in physical 3G infrastructure have been estimated as €140 billion [1]. There are two popular ways for the operators to get the 3G licenses: the auction and 'beauty contest'. Table 1 lists some countries along with the methods they used for the operators to get the licenses and the cost to get the licenses. The operators have paid enormous figures for the 3G licenses in some countries and in other countries like Sweden they have been forced to accept tough conditions in license agreements [2] and [3].

**Table 1: Cost of licenses for different countries**

Country	Method	Cost
United Kingdom	Auction	\$36 billion
Germany	Auction	\$46 billion
Italy	Auction	\$10.4 billion
Sweden	Beauty contest	€11000 + 0.15% of the turnover
Japan	Beauty contest	Free

#### 2.1.1. Swedish telecom market

The total number of mobile users in Sweden increased during the 2000 from 5 126 000 to 6 338 000. The total revenue for the GSM market in 1999 was € 1.4 billion and in 2000 it was increased to € 1.6 billion. Up till today only three operators have shared the 2G market: Telia (53 % of the market), Europolitan (25% of the market) and Tele2 (23 % of the market) [4].

**Table 2: ARPU for the GSM market**

Year	ARPU per year in €
1995	€ 396.2
1996	€ 366.4
1997	€330.3
1998	€ 327.5
1999	€ 304.2
2000	€ 278.7

The average revenue per user (ARPU) on voice traffic is listed in as given in [5] and wireless voice penetration rates are beginning to slow as they reach 80% and higher. The price per minute of voice service continues to decline and while minutes of use are increasing, revenue growth from voice services will likely slow over the next several years. In this environment, it is clear that data services will have to become increasingly important to drive revenue growth.

In December 2000, the Sweden 3G 'beauty contest' was settled, distribution of the four 3G licenses was finished and the winners were Europolitan, Hi3G, Tele2 and Orange. The license agreement said that each operator's radio infrastructure should cover at least 30 % of the population. The licenses agreement would give a total coverage area of 99% of the population and this should also be achieved before December 2003. This of course was a very good agreement for the Swedish state. Unfortunately the consequence for the operators is that 3G rollout will be extremely expensive. Only Hi3G has planned to build up to 20000

base stations to cover wide areas that are scarcely populated. Probably in some cases these scarce populated areas will be covered by several of the operators. The investments in infrastructure will be very high for the operators (Table 3) and some of them have to borrow large amount of money to be able to be successful in the 3G rollout.

**Table 3: Estimates of Swedish operators investments on infrastructure**

Operator	Total cost (€ million)	Debt Facilities	Debt (€ million)
Tele2	422	100%	422
Telia	388	0%	0
HI3G	1348	0%	0
Europolitan	1226	75%	920
Orange	894	50%	447

## 2.2. The 3G industry

The debt that the 3G operators have gained makes them very sensitive to the overall economic changes and price wars between operators in their struggle to gain high volume of users can easily jeopardize the calculated profit [4].

3G system can provide both voice and data services. Even though it will be difficult to gain money out of voice services due to the competition with GSM, we believe the voice services are still important in order to increase market share. Due to substantial excess capacity, the new 3G operators are most likely to sell their voice services very cheap and try to attract and secure their new customers for the more profitable wireless data services. In this sense, the 3G voice services can be seen as an enabler for the increase of the 3G market shares. On the other hand, the way to make money out of the data market is not defined very clearly by the future operators. As the investments on 3G licenses and infrastructure are massive, operators or associated third party will need to find some killer applications in order to get a reasonable pay back. Two attractive starting points for revenue sources are most likely to be m-commerce transactions and location-based applications. However, due to the recent financial crisis, companies developing these kinds of services have been strongly discredited.

However, services that can be offered by wireless Internet are extremely wide. Once 3G is rolled out, the competition will be dramatically broader than in earlier wireless generations. The original vertical integration tends to split since there is a clear gain to make at each step of the chain supply. The new entrants are mainly positioned at the service level. Indeed, operators need exhaustive lists of appealing services in order to penetrate relatively voice-saturated markets (at least in Europe). The data value chain under such circumstances is much more complex than for basic voice services. 3G operators and vendors are the two most important actors in the development of 3G systems. The operators' position will be discussed in detail later in this report.

### 2.2.1. Potential actors

3G offers new freedom to profit in a wild market. The operators are not mastering the game anymore. The wireless internet opens the door to a lot of new competitors other than the 3G networks operators. 3G offers a cost effective and advanced operating infrastructure. The barriers for new entrants in the wireless telecom industry are disappearing since the tools to offer services are getting simpler and simpler. The layered model of the market allows indeed a better integration between modules.

As a result the telecom actors will not be limited to the traditional manufacturer-provider-operator paradigm. Many more actors will join to provide their small information service gateway.

### 3G Operators

Operators secure their premium content to their subscribers and act as wireless content provider (like ISP-portals). They will be the first ones to identify and offer their own list of services. But, as experience tells, the users tend to escape situation in which they feel that they are trapped into one information system.

Intelligent operators will give total freedom to access any information and doing so they can identify the

services that will provide the best incremental revenue.

3G operators can also see opportunities to extend their billing system in order to accept mobile payments similar to credit card payments. They can also offer small cash payment services for parking booths or other similar coin machines. Doing so, operators will be able to extend their activities and compete with banks and credit card providers.

### *Mobile phone providers*

Mobile phone retailers are going to put their shortcuts in their mobile phones operating system (like Microsoft and hotmail icons on desktop). Once again, it is difficult to lock people into a small sample of services. Attempt to lock users by mobile phone retailers might have a long term negative effect on the increment service revenue. One drawback of the mobile phones is the small size of the screen and the difficulties to set your own user profile.

### *PDA manufacturers*

Handset (PDA) manufacturers are going to compete with mobile phones because of the integration of mobile phone functionalities in their products. The main problems with PDA are their prices and their size. However, they will offer a flexible platform on which users can set their own user profile and install their own third-party programs.

### *Local/global content provider*

Since mobility means also proximity. Relationship with customer because of local basis or because of brand name are likely to compete over global content providers.

Global brand names will always get a part of the market but local providers will gain increasing shares because they will offer proximity services such as local entertainment, traffic, and weather.

### *Banks and investors*

Mobile banks seem to be a content provider segment which is going to be very important for the development of the secured services. They will compete with the providers in the race for mobile payment.

Banks are also global players having large influence on most of the industry world due to their financial investments. They might take over some weak 3G telecom operators in order to expand their mobile payment services.

### *Girls, gaming and gambling services*

One market segment that seem to be promising is the “3G = Girls, gaming, gambling.” The fact that privacy is even higher with personal mobile communication is a strong reason supporting the 3G success of these kinds of services.

However, the more there is privacy the more likely there exists a “Big brother” watching you. Operators might be reluctant to allow users to download inadequate content even if there is a huge economical interest.

## **2.3. Performance indicators**

We found that there was a misunderstanding and a misuse of performance indicators in the hi-Tech industries and especially in the start-up companies. For some, the reason is a poor knowledge of financial indicators. For others, it is purely a way to hide the truth. We identified three major indicators used for 2G: EBITDA, penetration rate, and ARPU. It seems that none of them is really adapted to the 3G paradigms unless we modify them slightly. Finally, Incremental Revenue Per User (IRPU) seems to provide a better image of the 3G market situation but it is almost never used.

### *2.3.1. EBITDA*

Earnings Before Interest, Taxes, Depreciation and Amortization - EBITDA - is an indicator of a company's

financial performance. It is calculated as: Revenue - Expenses (excluding tax, interest, depreciation and amortization). EBITDA can be used to analyze the profitability between companies and industries because it eliminates the effects of financing and accounting decisions.

EBITDA first came into common use with leveraged-buyouts in the 80s where it was used to indicate the ability of a company to service debt. Over time it became popular in industries with expensive assets that had to be written down over long periods of time. Lately, EBITDA is commonly quoted by many industries (especially technology) even when it isn't warranted. This has meant that more and more, EBITDA is being used as an accounting gimmick to dress up a company's earnings.

EBITDA is inappropriate for many industries because it ignores their unique attributes. It's a poor measure of cash flow for companies undergoing a great deal of technological change or for firms that have short-lived assets (three to five years) and need to keep upgrading their equipment to stay up-to-date. But it can be a valid measurement tool for organizations whose capital-intensive equipment lasts at least 20 years.

For example, the cable and media industries, which need to spend huge amounts of money to upgrade their technology, are ill-suited for using EBITDA. So are industries that receive cash long after their earnings cycles have ended, such as the hospitality sector, which operates time-share resorts; Internet companies, at which barter often replaces cash receipts; and the trucking industry, in which trucks, whose value depreciates quickly, have to be frequently maintained before service begins to slide.

Just as an example of the danger of EBITDA, many of the technology firms that went bankrupt during the last 5 years borrowed cash based on their EBITDA.

### 2.3.2. *Penetration rate*

Mobile penetration rates have been a reliable measure of success for mobile markets in the past and have been considered a reasonable indicator of revenues. This may not be the case in the 3G environment that will have characteristics closer to the Internet than to the traditional mobile world. The Internet community has also been using subscriber numbers as a performance measure but is now learning that high subscriber numbers without an underlying revenue stream does not guarantee a sustainable long-term business.

### 2.3.3. *ARPU*

ARPU is the short for Average Revenue Per User. It is used most in the context of a network operator's subscriber base. ARPU levels for voice calls have been falling steadily across the world as competition and increased penetration apply a downward pressure. On the other hand, ARPU for data services have been slowly increasing. Therefore, operators realize that expanding their data repertory will inevitably sustain their own existence long term.

In fact, ARPU has become the traditional way to measure mobile market success. In the single service voice world, ARPU is derived by dividing total revenue by total mobile subscribers. ARPU is an adequate measure in this environment where everybody takes the same service, and where subscribers and subscriptions are the same. When there is basically one product (i.e., voice) and only one subscription per subscriber, this makes sense: ARPU illustrates the net effect of declining prices and increasing usage for voice services.

In a 3G world, however, not all mobile subscribers will purchase 3G services and not all 3G subscribers will purchase the same mix or number of 3G services. With various services and service bundles, multiple business models and revenue sharing, ARPU is not a meaningful measure. It does not enable services providers to measure subscriber profitability or success of individual services. Incremental revenue per user becomes a more useful metric [6].

### 2.3.4. *IRPU*

Incremental Revenue per User (IRPU) is a relatively new type of indicator related to ARPU. The main feature of this indicator is the differentiation of the services performance. IRPU takes into account all offered services through a subscription and allows a fair judgment of the performance of each of them. It shows the return on the investment for each particular service. Increasing the IRPU is substantially more complex than for the ARPU since it has to take into account the readiness of users to buy an additional

service and the price it costs to offer this service. At the beginning of 3G, it could happen that even if the ARPU will be positive, some parts of the IRPU will be negative in which case the operators will need to review their billing model.

In brief, if the actors want to stay competitive, they must effectively manage a sophisticated portfolio of services and target segments, continually developing new services, improve existing ones, and targeting high value customers.

### 3. Identifying the source of the problem

Was there a general folly within the telecommunications industry? What made all entrepreneurs make the same mistakes at the same time? The problem is well stated by Herbener:

“Rothbard called the central puzzle of the business cycle the ‘cluster of entrepreneurial error.’ During the boom, most entrepreneurs and investors appear to be geniuses, earning extraordinary profits year after year. During the bust, their fortunes are suddenly reversed, and they seem like dunces and suffer losses year after year. Yesterday's profitable ventures mutate into a mountain of malinvestments.”

There are, of course, several reasons for the troublesome massive debt that actors within the telecommunication industry have taken on. In the following, we try to summarize the identified factors that lead to this situation.

A few years ago, everyone wanted to be in the 3G boat - manufacturers, operators, service providers. With a directive from the European Union to build 3G networks, it was more a question of *when* it would happen rather than *if*. Speculation about data services becoming increasingly popular with a wide 3G deployment created a new market for content providers, wireless portals and application development consultants. 3G was predicted to be the next big thing, and if you were not in the boat you would drown within a few years – older technologies would become phased out and customers would migrate to the new services and the networks providing them. Still blissfully unaware of the failure of Wireless Application Protocol (WAP) and General Packet Radio Service (GPRS) to come [7], there was a widespread belief that new data services would generate a lot of income both for operators and service providers.

This hype of the 3G future – hype that is now in itself hyped – in combination with limited resources in terms of licenses, specialists, etc... made the prices for licenses go sky-high in countries where auctions were used as means of distributing licenses. In some countries, new constellations were formed to increase the financial resources, while in others, like Switzerland, foul plays in the form of illegal pacts were suspected. Where auctions were not used, operators were forced by the government to make economically unsound investments, e.g., to provide a certain nation-wide coverage.

Smaller companies made large investments in the development of new services to be provided in 3G. To cover increasing expenses, loans were taken and stocks were used as a currency. A sense of positivism, based mainly on predictions about how the network would be used, put the corresponding part of the market into an upward spin.

In the middle of all the positivism, there were some disturbing signals that became stronger and ultimately caused the market in a downward spin. As it turned out, customers were not prepared to embrace the new technology and its related services to as large extent and as quickly as first had been thought [8]. It was simply not *that* much better - promised data rates of 2 Mbit/s were hard to achieve, and a more realistic figure was in the order of 60-384 kbit/s [9]. WAP – which is a key component in 3G systems - turned out to be a failure compared to its expectations [10-11]. The primitive interface, low performance and sandboxed environment were too limited to please the early adaptors. WAP services today are used only by a few percent of the users, which is far below the expectations.

As a result, stocks fell – stocks that had been used as a currency. Much of the money disappeared from the market, putting smaller companies into financial trouble. Operators, which had the largest debts, had a financial crisis coming up. Companies that had planned to provide mobile portals have had to rethink their strategies, and the deployment of the access network is delayed due to financial problems for several operators as well. For many of them, fines are waiting around the corner to add up onto the already large debts if they cannot fulfill their contracts on time. And in the middle of all this, concurrent services using alternative technology have begun to pop up.

From the above discussion we can extract several major factors that caused the situation:

#### 3.1. EU government's fault

EU government and “Direction General XIII” are at the origin of the enormous amount of research money that was used to define the foundation of UMTS. In the beginning of the nineties, many telecom related

companies got involved in the European research framework such as RACE II and ACTS. The large research funds were provided because there was an obvious next generation to the successful 2<sup>nd</sup> generation.

No one at that time would have tried to limit this investment: the new era had to be the information era, exactly the same as the industrial the automotive, the telephone, or the Internet revolution. In these previous cases, governments were pressed by the industrial and economical changes and they decided to provide funds to build proper infrastructure. Taking these examples as step stones of the evolution of the society, the EU government was allegedly right to assume the mobile infrastructure was one of the next infrastructures that should be financed. However, it seems they went even further and committed themselves into the definition of the new mobile data communication industry.

If EU government did not speculate on the evolution of the mobile industry and did not force a lot of research money into the system, one could think that the expectation would not have been so high.

### **3.2. Huge Research and Development investment**

Added to the seed research money from the EU, most companies invested an enormous amount of work force in order to develop and agree on a common standard for mobile data communication systems. The results were satisfactory but there was still a large amount of work that had to be done in order to develop the end-products.

In the end of the nineties, equipment providers invested most of their R&D to the finalization of the WCDMA products totaling more than ten years of research and development efforts in the 3G systems.

### **3.3. Hype effect: over belief in data services**

Did anyone think about the need for such a system? Yes, of course! For the past 6-7 years, people have tried to find the killer applications for the new 3G.

No one did really come with any strong suggestions but merging the Internet and the 2G systems was never seen as a mistake. Some suggested there was a lot to gain in terms of bandwidth efficiency, user capacity and price. So, companies blinded by the amount of money they already invested could not let the train go without them.

While the mobile telecommunication industry was working and investing hard on their new mobile generation, most of the analyses were forecasting a boom in the mobile data industry. All the data from different new technologies were speaking for themselves: Internet around the world was a general success; GSM and other mobile voice services were booming; SMS services, prehistoric version of data services, became a new golden mine for the operators. Nothing was clearer! Or?

Another factor that distorted the market expectation was the use of inadequate performance indicators for high-tech companies. EBITDA was often used in order to attract investments. But, most of the times, depreciation in these types of companies is too strong to show any EBITDA stability.

### **3.4. Users don't understand**

So, why is there a crisis? The answer is basically among the end users.

The pace at which the new technologies have been introduced has increased dramatically. The end-user would be ready to switch to a new technology if there was an obvious added value in the new product. The new services have to beat the former with at least one of the following added-values: Price, mobility, service, ease-of-use, privacy, and quality.

Let us take the example of NMT in Sweden around 1985: price was extremely high, service and quality was the same as in fixed telephony, but it was nothing compared to the added mobility. So, the service took off! GSM followed the same footsteps, price and quality was the new target. Later SMS gave the GSM an unexpected new added service. And if everything goes, GPRS should boost it with an "always Internet connected" service. So, what's left for 3G? It should provide a better flow of information with better quality of service.

But, compared to the first added value, i.e. the mobility, is it right to expect the same financial success with

the new 3G data services?

The added-value's values are also changing with the spread of new technologies: with the Internet, data services are more and more considered to be free from a fixed computer as compared to voice services not at all free in 1985. Would someone decide to pay a lot more to get a mobile data connection when you can get one for free around the corner? Well, everything depends on the ease-of-use of the new terminals, hopefully the terminals will be easy to configure and to synchronize with private databases. Indeed, compared to a few years ago, no one is ready to spend time in order to configure or to understand a new system anymore; they want it simple and with all what you need for yourself. If any new 3G services get popular, ease-of-use and privacy (meaning access to private information) will be behind its success.

### **3.5. Underestimating alternative technologies**

Another aspect of the government's fault is the time a technology need in order to get standardized. It took approximately 10-12 years for the GSM to come to the market. It took the same time for the WCDMA.

In the mean while technology and knowledge went faster and faster. If the time-to-market for the GSM was appropriate, the WCDMA time-to-market is way out of proportion compared to other alternative technologies using free frequency bands, hence, not associated with hard standardization constraints.

The so-called WLAN (Wireless Local Area Network) technologies, using IEEE802.11x family and HiperLAN, are taking over the major parts of the cities where there is a real demand for wireless data access. As opposed to WCDMA, WLAN is a computer data-oriented technology. The wireless access points try to serve the users the best it can in a random manner. Therefore, the quality of service is not as good as the promised performance of WCDMA. But, the added-values are nonetheless very attractive: it is basically free since it is a simple extension to the existing Internet infrastructure; It offers a high data throughput (10-20 times faster than WCDMA); It could be installed everywhere in populated areas.

The problem comes from the fact that these technologies were made available very fast to the market. It was impossible to predict their success even 4-5 years ago. At that time the WCDMA industry had already worked more than 6 years on their new standard.

### **3.6. Stock market volatility: Prediction overshoot**

While the 3G research was at its maximum pace, while the users were not getting ready to the 3G, and while WLANs were deployed in micro-sites, the stock market was flooded with an incredible amount of investment money. Everyone believed his neighbor and chose to invest at high risk on the telecom new and old stocks shares. And it was normal! When you see stock market values doubling in a matter of weeks, you do not want to invest in bonds. It is hard to blame anyone for the global folly.

Since there exist a huge number of potential services connected to Internet, GPRS and 3G, there was also a huge number of new ideas at the same time. Mobile data is there only as an enabler.

### **3.7. Ignoring the minority of analysts**

The boom was so dramatic, that very few analysts were warning the markets. In one way it proves that when we need them the analysts are not doing their job. To the public, they show a similar negative or positive picture. They often follow each other's recommendations and ignore small indexes. Only a handful of people have access to the whole picture and can make the right decisions but it takes time and efforts.

### **3.8. Lowered Interest Rate**

The bubble economy was also partly driven by easy credit which made speculation in the telecommunication market profitable. The resulting high stock prices allowed the 'lucky' actors to take on cheap debt. Such credit-induced boom is, of course, never sustainable. When the market finally crashed, many of the actors involved were stuck with massive debt.

Consumer's readiness to save, i.e., making resources available for investment in production, manifests itself in the interest rate. Very little saving forces investors to bid up the price of capital, i.e., the interest rate, and vice versa. Is it possible to distort this vital information? Central banks in all countries take great pride in

how well they control the interest rate. So, if we were trying to find an organization powerful enough to affect the market rules, it was easy. Herbener gives us the picture:

“Profits earned by entrepreneurs no longer correspond to the satisfaction of consumer preferences. Instead the artificial spending stream fed by the central bank systematically distorts them. Entrepreneurs are misled by the credit expansion into shifting the use of factors into activities considered less-valuable by consumers.”

Low interest rates allow entrepreneurs to embark on long projects. Long projects will be preferred, due to the expected high profitability.

One can argue that, the Keynesian idea of “economy stimulus”, i.e., artificially lowered interest rates is just that kind of information distortion we feared. Such distortion misleads entrepreneurs to start invest in long projects even though the real prerequisite for such actions wasn't there. [12]

### **3.9. Locked operators**

Governments indirectly forced operators to take on additional debt. Either the operators had to pay expensive fees for licenses auctioned on an overheated market, or were obliged to extensive coverage if they won a beauty contest. Requirements made by governments forced the operators into economically unsound obligations. To meet these, more debt was taken.

There are vast inequalities in the prices paid for 3G licenses across Europe. In Scandinavia, operators paid relatively little up-front, opting instead to give the government a share of profits once services were up and running. In other countries, including the UK, operators paid billions for the 3G networks. As a consequence, UK users could end up paying twice as much as someone in Scandinavia.

It is estimated that users will have to spend up to 10 times more than they currently do on mobile services to make 3G profitable.

### **3.10. Governmental Policy**

It is natural for governments and its politicians to demand some compensation for allowing entrepreneurs take part in market activity. Either forcing the entrepreneurs to accept social commitments, which make politicians popular, or requiring direct contribution to political parties. We let DiLorenzo bring our point:

“Politicians also play a role that is essentially no different from the role played by organized crime in demanding protection money from businesses in return for ‘protection’ from being robbed or beaten by the thugs. Rather than threatening to break anyone's kneecaps, however, Congressmen frequently demand campaign contributions and personal payments in return for the granting of a business license.

For example, after access to long-distance telephone markets were closed to the ‘Baby Bells,’ the companies made almost \$10 million in campaign contributions during the 1984-1993 period and ‘hired scores of former federal officials’ as lobbyists to help them gain governmental permission to compete in the long-distance telephone market.” [13]

Increasingly critics are calling on the governments that set such high prices for the network to allow mobile firms off the hook as the only way of stopping mobile technology from being stifled. If the government wants to see mobile technology develop, it will have to renege on the license fees.

### **3.11. Market downfall**

At that time the operators had spent much money on license fees and expensive equipment; manufacturers had outstanding orders that could not be paid; and service providers had to reconsider their activities with the failure of WAP.

The markets for operators, manufacturers, content providers and consultants within the 3G area were surrounded by a hype, based on over-optimistic speculations on how new data services would be embraced by customers. When WAP failed, both among early adaptors and customers in general, much of the markets were put in a negative spin. Smaller companies went out of business, others had to rethink their business strategies or stay put with increasing debts and future threats of having to pay fines to governments for not being able to deploy the network as quickly as promised.

## 4. *Is There a Way Out of the Crisis?*

In this section, we try to identify the operators' position facing their important debts and having to build and start to operate their 3G networks. We also list a series of important short-term actions that will be important in order to attack the market in good financial shape. We give a practical example covering the Swedish operators situation. Further the user and regulatory reaction is discussed. Finally the options available to external actors, such as WLANs, are elaborated.

### 4.1. Operators position

#### 4.1.1. *First 3G network fiasco*

In August 2002, NTT DoCoMo, the world's first third-generation (3G) mobile phone operator, has said more people are using the service but that they were spending less. The average revenue per user in the three months to 30 June fell by 7.5% from the previous quarter and was down 25% from October to December, the first quarter after its launch.

DoCoMo blamed the fall in revenues on discounts it offered during the quarter. From April it cut basic 3G fees by up to 55% for existing subscribers of 2G services to upgrade. Subscribers have reportedly been reluctant to sign up to the new service because of poor battery life, limited coverage area and costly handsets.

The European markets are watching these numbers very closely. And they get scared! This autumn will see the 3G ball set in motion in the UK as Hutchison becomes the first of the five British operators to roll out a full network. The rest have delayed their plans, saying it is too early for 3G services.

Developments in the rest of Europe suggest that not all operators are as brave as Hutchison. In July Spanish telecoms firm Telefonica decided to cut its losses and ditch its 3G mobile operations in all but the Spanish-speaking world. Despite wiping 4.49bn euros off its value for the closure of 3G operations in Germany, Italy, Switzerland and Austria, shares immediately rose on the news suggesting share-holders at least were relieved to be free of the burden of 3G.

#### 4.1.2. *One G at a time*

The technology race has been too fast for the markets and the consumers. Telecoms firms were too quick to believe their own hype and blind to the real consequences of their spectrum purchase.

It is time for the operators to exploit their infrastructure and show what data services are good for. Basically, operators need to market GPRS first and get that right. Then they can begin migrating users slowly to 3G.

The potential of GPRS has been overwhelmed by the 3G shock news. GPRS is indeed a promising technology based on the GSM infrastructure and providing the first real "always connected" mobile experience. Unless, operators and third-party service providers do not manage to lift this market, they will not be able to lock the users into the mobile data loop.

What services to offer and what price to offer them at will be crucial. There will be hundreds of micro-markets and it will be far more about lifestyle than technology. Operators have to share their clients with others who will understand these new markets. GPRS will be a good test of how much demand there is for innovative data services.

As GPRS matures and multimedia handset functionality, such as color screens, becomes standard, much of this content may well provide a compelling enough experience to negate the need for consumer to make the expensive upgrade to 3G.

Once the operators have learned a lot of the difficulties of marketing data services focused on their users need, they will be ready to offer 3G and financial institutions will be ready to invest.

### 4.1.3. Consolidation strategy

An own-build network strategy provides the greatest level of control and flexibility. However, it will also incur the highest cost and potentially the longest rollout time. A financially strong 3G incumbent in a small country with a high market share and low license fees should adopt this strategy in urban and suburban areas. It may also be a viable strategy in rural areas, depending on the circumstances at the time the decision needs to be taken, but we recommend that site or network sharing should be considered in rural areas.

Incumbent operators with strong ARPUs can obtain more value by increasing market share than by reducing licensing and network costs. In their home country, incumbents should focus on increasing market share and ARPU, as it becomes the main value driver, given their larger subscriber base. In addition, 3G operators with high market shares should consider sharing sites and the RAN with other operators with similar market power. However, we do not expect to see RAN sharing in urban areas because these areas will require the greatest capacity in the shortest timescale, and sharing will limit the capacity available to each operator.

New entrants will have a harder time obtaining a return on their investment. They should strive to do the following: share networks, increase ARPU by 30%, obtain subscribers early on, and increase market share. They should benefit most from sharing because it will allow them to cut their costs and reach a wider customer base, thereby increasing their market share. However, once they have met their coverage obligations in countries where the license cost was high, using roaming on another network will be a better option than network sharing outside their coverage areas. In short-time forecast period, the operator gains more value by network sharing but as the available capacity decreases, it could become a dramatic problem in the long term.

Partnerships and alliances with content providers, portals and application developers are crucial to the success of next generation services, as it directly affects ARPUs.

## 4.2. Short term actions

Considering the list of advices given in Analysys research report [14], a few inevitable short-term actions need to be addressed in order to survive the low 3G conjuncture.

The reduction of the debt is obviously a priority. It will enable the companies to strengthen their balance sheet and, therefore, regain control of their strategies.

The capital expenditure will have to be minimized. Increased caution in business strategies and risk taking will help maximizing the return from existing infrastructure and other assets.

The low conjuncture period is an attractive time for mergers that can offer to generate economies of scales or to invest in targeted services or geographic areas.

Restructurations of companies are often source of new funding and optimized long-term strategies.

Use capital efficiently by focusing on return on capital measures rather than on growth such as ARPU (Average Revenue Per User) or EBITDA (Earnings Before Interest, Taxes, Depreciation and Amortization). Companies should try to move towards profit and quickly find the poor segments.

Identify growth areas as early as possible. Companies need to effectively identify the users behavior trends and show early the path towards future growth.

## 4.3. User will not pay unless...

There is only very limited interest from customers in new mobile data services, and an unwillingness to pay a premium for them today. For the small proportion of business customer that are interested in using data on the move and willing to pay for it, the focus continues to be on e-mail and intranet access. We think that the customer craze for messaging continues in the youth market. As users get older their usage will shift dramatically to superior services bringing a legacy of know-how. About four or five years from now, there will be a strong interest in new data service providing more than simple messaging services, but much of the demand will remain unmet due to technical and economical barriers with 3G rollout.

In addition, we can foresee that migration of voice traffic from fixed to mobile will continue but it does not mean people are willing to pay dramatic prices for mobile web browsing. People will spend money on what they feel is useful for them; at the moment, mobile voice is the service they want, in the future, mobile messaging is a good bet. However, it is not certain they want it with fancy MMS pictures.

Consumers will begin to adopt broadband services in greater numbers, but might tend to focus on those offered by incumbents and by major players with trusted brands. Only aggressive strategies from new entrants might put a lot of pressure on the market if they use the right advertising tools. But the information will need to be focused on the particular user otherwise the services will be victim of the same negative effect that spam emailing has on email providers.

On the broadcasting point of view, it is not realistic to think people will want to watch TV on the road. Customers will most probably continue to rely on TV for broadcast programs. Customers will use TV to access digital and interactive content about four or five years. The interactive information and transaction capabilities will first need to be deeply anchored in the fixed user habits before it can take off in the mobile community.

The initial investment for new 3G equipment seems to be a major factor. Give away prices, ease-to-use can bring 3G to a success. But it might not be competitive enough against the WLAN.

#### **4.4. Regulatory bodies need to react**

The telecommunication regulation in the 3G market is being called into question. The traditional control of telecommunication operators by national regulatory agencies is no longer appropriate. As we mentioned earlier, the number of actors participating to the eventual success of 3G will be dramatically higher than in the earlier 2G paradigm. The regulatory bodies are not used to rapid technological change neither to complex pricing and discriminating tariffs [15]. Also the convergence of many new players is short cutting the role of the well-defined regulatory actors. Unregulated and regulated markets have to find a common market place on the 3G market. For this reason, regulatory actions need to be done fast and in a flexible way. In the following discussion we try to identify relevant issues for which regulators need to act in order to secure a 3G relative success.

As a result, the 3G regulatory situation remains one of the main uncertainties for telecom operators. Even following the European directives, there is a large difference between countries in terms of price control, infrastructure separation, unbundling and spectrum licensing. In addition, national governments are traditionally used as watchdogs in order to make sure there is a reasonable stability. In the 3G case, the role of the regulatory bodies is even more important since they are mostly the reason for which so many companies have critically increased their debt.

In a liberalized telecom market, it is clear that the final goal of any regulation should focus on enabling the competition at all layers of the value chain by enforcing strict rules to all incumbents and competitors. In order to do this, the regulators have to detect early enough an eventual negative effect of their 3G policies and find a fast solution. For example, PTS, the Swedish regulator, has granted the permission to share 3G infrastructure costs and accepted the Telia – Tele2 cooperation. In other countries, regulators delayed deployment deadline or decreased expansion rate requirement. Nevertheless, any future reaction attempt to a detected threat concerning the 3G markets is going to be doomed to failure unless regulators can make fast decisions followed by their strict applications.

On a global term, the regulatory attitude should tend to unify or clarify the structure and rules in the different countries if they want to facilitate the attempts to consolidate the telecom markets.

The fixed broadband access policy is also a major regulatory trend that will create one more step towards the wireless information society. It is indeed important to educate all potential users, i.e. all the society, to the benefits of information before we tell them to use it in a wireless manner.

Security and privacy policies will have to be pushed forward by regulators, governments or content providers such as banks. Regulators could be seen as neutral parties which would influence the trust and therefore boost the use of the secured services.

#### 4.5. Swedish operators estimates

The 3G technology decisions being made today will determine which operators will be successful in the coming years. The key is to increase the operator revenues and justifying the high prices paid for the 3G spectrum and the physical infrastructure.

According to an estimate done by J. Björkdahl and E. Bohlin in [4] the ARPU will be relative constant in the transformation process from the 2G system to the 3G system. This fact is due to the substitution from voice to data traffic. The ARPU for voice traffic possibly decrease further but it will be compensated by the increase of more expensive data traffic. It should also be mentioned that some experts have a very optimistic estimate of the average revenue per user for the 3G system. They estimate that in 2005 the average revenue per user should be in the area of €110 per month. But such an increase in the ARPU level probably demands for a drastically change of the users lifestyle to become true.

The profit estimates for the Swedish 3G operators done in [4] show that they will have profit problems, as can be seen in Table 4 The reasons pointed out are lack of increased revenues, the increase in number of operators and the large costs involved in the deployment of the 3G system. The estimation is limited for 2015 years since the 3G licenses last to 2015 and it is based on net present value (NPV), breakevens and paybacks.

**Table 4: Estimated profit of Swedish operators**

Operator	NPV million €	Breakevens	Payback	Debt facilities
Europolitan	-1	2007	2011	75%
HI3G	-1267	2007	Not within 2015	0%
Tele2	669	2006	2009	100%
Orange	-429	2007	2013	50%
Telia	113	2007	2012	0%

The figures in Table 4 point out that it's likely that some of the operators will be out of business in the near future or they will merge with other operators. Merging between different operators has already taken place today. Telia for example did not get any own license, but they will cooperate with Tele2 that has established a co-owned company that will run the network. Also HI3G and Europolitan have established a joint venture and Orange HI3G/Europolitan has written a letter of intent regarding the rollout. But still after all this merging the estimated profit figures look like Table 4. There is still a very high probability that some of the operators will be out of business in some years if not something is done to change the operators situation.

#### 4.6. External Actors

The deployment of unregulated and cheap WLAN access points in core of the cities can probably steal another large amount of the data traffic from the 3G operators. WLAN has the price advantage comparing with 3G system. One typical WLAN router only costs €100 - €200 while one 3G mast will cost € 100000 [1]. However the capacity that WLAN can provide is even higher than 3G system. The capacity that 3G system can provide is 4.5 Mbits/s when 15 MHz spectrum is used while for WLAN, the capacity is up to 5.5 Mbits/s when using 16-20 MHz spectrum. If large amount of WLAN access points are deployed in urban areas and the WLAN users are allowed to roam between them, the WLAN may probably take away a big part of the market from 3G system.

The only way the operators can fight the WLAN wave is to enter the WLAN market and ensure that 3G and WLAN fit together. Telia is already a WLAN actor focusing mainly on the Business segment. There is little doubt they will extend their activities and offer a attractive billing system to the small WLAN islands.

## *5. Conclusions*

We foresee a slow rollout of 3G systems. A delayed time schedule will mean that some debt burdened actors with limited endurance will default. This situation is not all out bad, because the defaults will free resources previously held by inefficient organizations. The freed resources are then available for better use, possible in other parts within the telecommunication industry. Actors in better shape, i.e. with less debt, may endure this slow rollout and they may even benefit from the inexpensive resources made available in the wake of the defaults that we foresee.

In the last chapter, we extended the discussion to the different actions and reactions from users and actors. We saw also that WLAN will have to coexist with 3G. It is the operators decision to fight it or to use it to their advantage.

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