Juan VAZQUEZ RUIZ
H05571
Research Paper
Majeure Finance 2009

# Analysis of Market Entry Strategies of European Wireless Operators Into Underserved Markets

## The Case of Telenor

Research Tutor:
Tomasz Michalski

*Abstract*

The following paper presents a comprehensive framework for the study and assessment of the economic potential of wireless markets in developing countries. The framework is sequential and recursive, staggered in three stages. The first stage is a macro analysis at the level of the company's international business model. Its outcome will consist on the assessment of the positive or negative fit of the country's wireless market within the context of the company's strategy. The second part of the framework consists on a detailed scrutiny of the country's telecommunications regulatory conditions, as well as other considerations of nation-wide purview. The third and final stage of the model will be devoted to a careful study of the market conditions at the local level –the competitive structure of the market, the service mix, the estimation of demand and all other matters involving direct contact with clients will be the focus of this last part of the model. Lastly, the model will be put into practice when analyzing the expansion of the company Telenor into the Indian wireless market.

*Acknowledgements*

Many thanks to my tutor, Tomasz Michalski, for his advice and his patience.

## Table of Contents

## List of Figures

## List of Tables

## Introduction

Without any doubt, one of the most significant technological achievements of our day and age has been the creation of a global telecommunications network capable of transmitting voice and data in milliseconds across the world. The development of this –still arguably nascent– industry has been surprisingly fast: from the first transoceanic transmission of a single character ("S", as it happens) by Marconi in 1901 to unimpaired telephonic conversations at the turn of the following centuries, it's taken wireless communication less than one hundred years to conquer the world.

An argument can be made that telecommunications were created to be global and boundless, undisturbed by seemingly artificial national borders. This is, precisely, the world we are going towards… at a staggering pace. In the race towards globalization, multinational telecommunications operators strive to connect the world through a fast and reliable electronic network, and the search for growth has often led operators to expand beyond their home markets. What are the considerations that a wireless carrier needs to take into account when planning this foreign expansion? What market should it enter? Under which conditions?

This paper's aim is to provide an answer to these questions, by studying the dynamics of a developing wireless marketplace, its opportunities, and the constraints it imposes on foreign operators. We will try to present a comprehensive framework for operators wishing to gain access to the growth currently available only in developing markets, so that they can assess the many opportunities in a realistic and systematic manner. We will further put this framework into practice analyzing the latest move of Telenor in the Indian market.

## Structure of this paper

The body of this paper is structured along three main questions or topics:

*Question 1: Why enter foreign markets?*

The aim of this first part is to provide background and food for thought on the telecom industry and the international expansion of European telecom companies in the late 90s and early 00s.

*Question 2: How to enter foreign markets?*

The aim of this second part is to create a framework and a checklist for telecom companies entering developing markets. The framework will be all encompassing, and will be later used in Telenor's case study.

*Question 3: Case Study: Telenor's Asian Expansion*

Provides background information about the company and their history regarding international expansion and proceeds to apply the framework developed in Chapter 2 to the specific case of Telenor's entry in the Indian wireless market.

## Chapter 1: Why enter foreign markets?

To start analyzing the need for wireless telecom companies to expand their business beyond their national markets, let's place ourselves in the years before the turn of the last century. During the late 90s the world of electronic communications was undergoing transformation, driven not only by developments in technology but also by ever-changing regulatory constraints.

In the early nineties, the technological advancement was most evident in two areas: decreasing costs and increasing standardization. Intense competition among electronic consumer companies that entered the market for wireless telephone handsets caused the cost to consumers to plummet to widely affordable prices. At the same time, new, more efficient, communication protocols were constantly being developed by the major national providers, and GSM began to surface as the predominant wireless technology, slowly creeping its way into markets as far-flung as South East Asia and the southern countries of Africa.

However, unfettered expansion of multinational telecom operators (MTOs) would not have been possible without the wave of market liberalization that swept the telecommunications industry in the late 80s and the early 90s and which lifted some of the most cumbersome legal constraints. This liberalization had two major effects: The privatization of the state-owned (incumbent) operators, and the opening of national markets to foreign investment and competition in the wireless sector.

So it is in this context of technological convergence and newly discovered legal freedom that our economic analysis begins. In the following of the present chapter, we'll make the assumption that MTOs are pure wireless telecommunications providers. Although this is not the case for most of the

largest MTOs, the percentage of revenues driven by their wireless operations is high enough to make this nuance inconsequential.

Talking in simplistic terms, MTOs derive all new revenue from two sources:

- Upgrading services offered in markets where they are already present (moving to a "new generation" of services)
- Obtaining new subscribers

### New Generation Services

These services can be provided in the context of the so-called 3G technologies, or third generation communications. 3G technologies are the evolution of the GSM service in Europe, Asia, Africa and Latin America and of the CDMA service in the US. It allows for faster transmission of information for the tower to the terminal, new contents (eg. video and MMS) and broadband connection to the Internet.

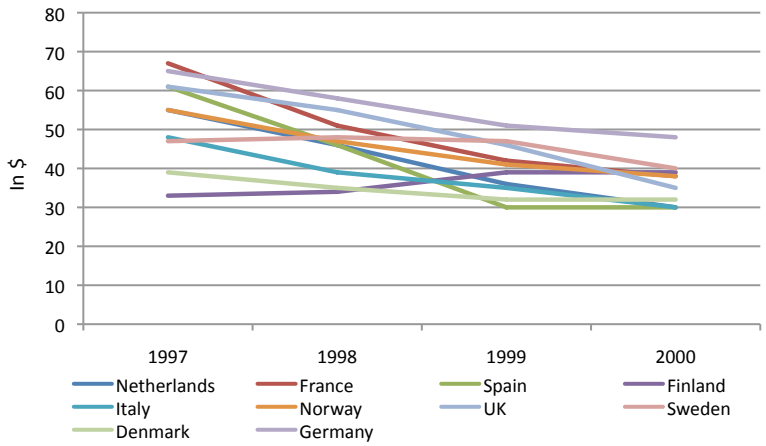
However, this approach to new revenue generation has, from the economic standpoint, two important drawbacks:

- Firstly, 3G technologies haven't converged and are focalized in different regions across the world. The European UMTS, an evolution of GSM, is constrained to those regions currently under the GSM rule. The US has developed CDMA2000 for their internal market and China is working in their own specifications.
- Secondly, making 3G available to customers will be necessary, but also very costly: most base stations will have to be changed, and new handset devices will put an upward pressure on prices for some time. That the initial outlay might be high would not be a problem if the dynamics of the demand in the wireless market were stable and well understood. If that were the case, a sequential investment plan could be put in place that accounted for this expected user demand –however high or low. Unfortunately, this is far from being the case.

To make things worse, European operators in the late 90s well all too aware that the revenue that each user generated (Average Revenue Per User, or ARPU) had

been steadily decreasing in recent years. The reasons were manifold, and we'll highlight just a few of the main factors that contributed to this decline:

- The introduction of prepaid cards in most European markets
- Increased competition, which forced formerly incumbent MTOs to lower their prices
- Cultural trends, namely the new preponderance of SMS and e-mail over calls as a means of communication.




Source: Frost & Sullivan's

**Figure 1 – European ARPU by country from 1997–2000. Source: Frost & Sullivan**

Although it was a well known fact that the third generation would arrive soon to all developed markets, this environment of declining ARPU made it hard to appreciate the viability of an investment outlay that would require consumers to pay a higher price for premium services.

## The hunt for new subscribers

The search for new subscribers was to be undertaken both inside and outside national markets. As MTOs strived to engage new customers, their first impulse was to fight for higher market shares. This extreme competition oftentimes brought about price wars, much in detriment of the whole industry. However, with European penetration rates climbing fast from 14% in 1997 to well over 60% in 2000, the limit of the old continent was soon to be reached, and

operators wasted no time looking for new potentially underserved populations to expand their customer base –and their topline.

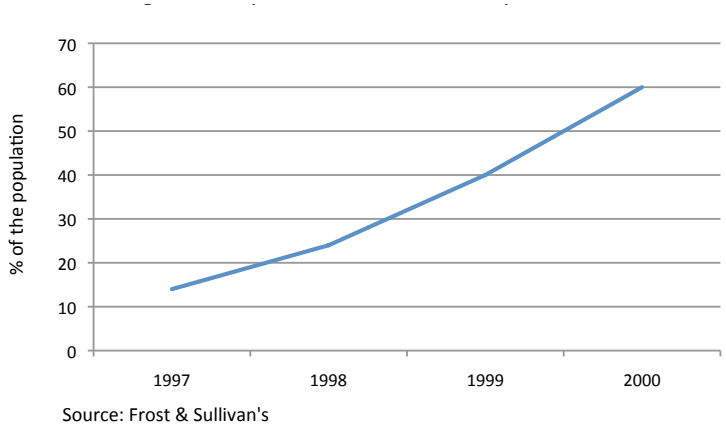



**Figure 2 – Average Mobile Penetration Rate in Europe from 1997–2000. Source: Frost & Sullivan**

A growing customer base had one further, very enticing, advantage for large European providers: they had already overcome all the technological problems in their home markets, and knew, with acceptable accuracy, the cost of implementing similar systems abroad. Once these new systems were implemented, in virtue of the supply curve of wireless services being totally elastic, the cost of adding a new subscriber to the network was close to naught. So on the balance, investing in underserved markets required one –admittedly major– outlay, but offered a vast upside, limited only by the underserved market's population.

## Underserved markets

To clearly understand the plight of MTOs, we need to clarify what we're referring to when we talk about underserved markets. As the name clearly states, underserved markets are those markets not currently being properly served by MTOs, be it in terms of quality or availability.

We can further segment the underserved markets into two categories: *remote markets* and *urban underserved markets*. Although this classification is vaguely related to population density ranges, the variables that make a region *remote* are

too country/region specific and cannot be put squarely down on account of population density. That's why these segments are better understood on a qualitative basis, rather than with a purely quantitative approach.

*Remote markets*

Remote markets consist of unreachable populations who cannot be economically served by conventional wireless technologies. This definition has a strong connotation of difficulty of access, which in turn could be due to a variety of reasons –for instance, the terrain itself could be difficult to traverse. Another reason could be that the transportation infrastructure to those areas is not built yet. Finally, access could also be impeded for political reasons.

This segment's purpose is to describe remote areas of any country, irrespective of it being developed or developing. The dynamics of exogenous supply-side constraints in these areas limit potential market growth to a greater degree than market forces, so most opportunities arise from national Universal Access and Universal Service goals.

Universal Access and Universal Service have very different definitions depending on the country, and projects related thereto are, most of the time, eligible for government aid and subsidies and called to tender. Also, these projects provide a foothold into a foreign market –a stepping-stone for future expansion.

*Urban markets*

The underserved urban market describes those markets –mostly in developing countries– that have a latent demand that, quite simply, has not been met yet. These markets will be the focus of this research paper, as they represent the biggest opportunities for MTOs. These markets tend to be dense communities that will require the deployment of a proper

telecommunications network to further their technological and economic advancement.

This market is much less pegged to the dynamics of tenders and much more defined by the dynamics of a consumer marketplace. Success of services in underserved urban markets is more prone to issues concerning price, marketing, distribution, and consumer demand.

Most of the following analysis is concerned with this urban underserved population, for the following reasons:

- It's the largest part of the worldwide underserved population
- Its analysis is more related to economic factors, and some of the most burdensome country specific regulatory matters can be avoided

Henceforth, whenever we mention underserved markets we will be referring to the urban underserved markets, unless otherwise specified.

The future of the telecom industry seemed thus destined to be global, and once domestic markets had been thoroughly explored, large MTOs set out to discover the –hopefully– underserved markets abroad.

### Market drivers in underserved markets

We now know the reasons why market operators were driven to explore markets outside their national borders in their search for growth. However, once we reach this point, we might ask ourselves what are the specific drivers that will foster the economic growth of MTOs outside their established markets. More precisely, what are the factors that will make this growth sustainable, and a worthwhile investment in the long term?

The first and main driver towards sustainability of demand in developing, underserved markets is demographics. Unmet demand is almost invariably located in developing nations with vast populations that continue to grow. The

most salient examples of these massive, underserved populations are the BRIC (Brazil, Russia, India and China) countries, but many other smaller countries share the same characteristics. As an example, see the difference in projected population growth for the regions of Northern Europe and the Asia-Pacific region.

Table 1 – Drivers for Sustainable Growth in Underserved Markets

| Drivers for sustainable growth in underserved markets |
|---|
| Large unmet demand for telephony services in developing markets |
| Large markets opening up thanks to the liberalization process |
| Improved and better regulation for local telecom markets |
| Universal Access and Universal Service objectives |
| Continued development of wireless technologies |
| Decreasing hardware costs |

Also to be considered is the fact that liberalization has resulted not only in markets open to foreign investment, but also –in most cases– in a much better regulation that protects investors and foreign companies and upholds the law in an efficient manner. We'll say a little more about country regulations in the next chapter.

The rapid evolution of communication technologies has provided for a sudden proliferation of technical solutions to address markets that could not be served before (be it because of excessive cost or because access was not feasible). Also, as productivity in developing nations increases and some hardware manufacturers relocate to developing nations, handset and other hardware costs continue to drop increasing profit margins for providers.

However, the demand in these markets must be harvested. Unlike the developed world, populations in developing countries do not often know that they have a need for advanced telecommunications services. There is no fast tracking the supply of telecommunication services, because increasing the demand in developing markets is a sequential process that can take years. This is why many

companies interested in underserved populations can't afford to look solely for short-term return on their investment, but need to focus on establishing a workable foothold in these markets instead.

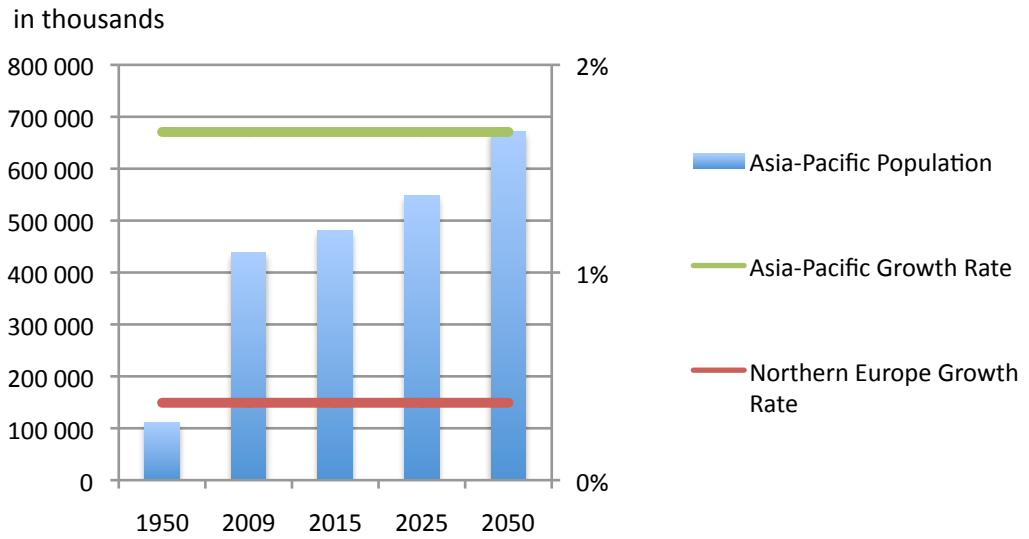



**Figure 3 – Asia Pacific Population Evolution and Asia Pacific and Northern Europe Population Growth Rates[1]. Source: UNDP Database**

As a result of this enticing set of drivers and the global economic environment of buoyancy at the turn of the century, the outcome is that most MTOs have adopted a international strategy that includes both their home, developed markets and developing, underserved markets.

### Market constraints in underserved markets

Market expansion to developing countries to serve unmet telecommunications demand is not without danger, though. As for any other unchartered market, business dynamics are ridden with unknowns and unplanned-for risks. Find below a –by no means all-encompassing– list of the major restraints for the telecom growth in the foreseeable future.

[1] For the purpose of the chart, Asia Pacific consists of Pakistan, Bangladesh, Thailand and Malaysia, the same countries where Telenor was present until October 2008.

Table 2 – Restraints to sustainable growth in underserved markets

| Restraints to sustainable growth in underserved markets |
|---|
| Financing is difficult to secure |
| Competition might appear quickly if the market opportunity is good |
| Specificity of local market conditions makes assessment difficult |
| Lack of stable regulatory regimes |
| Liberalization of telecom markets is a slow process |
| Extension of WLL is precluded for lack of backbone infrastructure |
| Low per capita incomes in most developing nations |

This industry requires significant up-front outlays before communication is established: antennae, licensing and other technical equipment account for an important share of the cost, but other costs such as marketing, distribution and brand building are also very significant and should not be neglected. In any case, initial investment is very high and return might come only in the long term –as we said before, in most developing markets demand grows fast, but it has to be carefully educated and directed towards higher end services.

Also, competition is fast to appear. When competition is intense in a limited number of markets between a limited number of players, incongruent interrelationships between the different actors is bound to occur. For example, this could lead to competitors fighting each other in one region and being partners in another. These odd partnerships introduce complexity into an already complex market, making implementation of business strategies even more complicated.

Developing and underserved telecom markets are not a single market. In fact, specificities of each market might be in such stark contrast with each other that the dynamics of demand might not even be similar. Underserved markets are an amalgam of bundled constraints and opportunities that is unique to every country, or even every region. These sharp differences demand that the company do a strict and rigorous analysis before embarking in a long-term investment in a

particular country, which increases the cost of deployment. Even then, precise assessment of opportunities in these countries might not be possible, since the input data required to analyze a certain market variable might just not be available. In such cases, proxies might be taken, always in detriment of accuracy.

Regulation is the buffer between supply and demand in any economy, but even more so in some developing countries immersed in a complex liberalization process that might bring about revolutionary changes in local markets. These markets carry an element of risk that needs to be factored in when assessing opportunities in underserved populations. Of paramount importance is also the regulatory body, which might be partial or inexperienced. Finally, the global trend toward the liberalization of markets is undeniable. However, liberalization is understood differently throughout the world.

On a more technical note, most MTOs only make themselves responsible for a part of the deployment required to provide communication services, because the count on the government to provide some of the most basic backbone infrastructure. In some underserved markets, this might be expecting too much, and the business model of the MTO has to be reviewed to account for that overestimate, having to deal even in the installation of long haul trunk lines and the such.

### Reviewing local opportunities worldwide

Having established our target markets, it will be the following task of a company to gauge the specific merits of different populations throughout the world as investment opportunities to be seized. Analysis might be conducted in many ways, and there are numerous exogenous factors that can play a role in the company's decision. For example, it is no coincidence that Telefónica Móviles, a Spanish company, has chosen to expand most aggressively in Latin America, given that the company shares the same language as its potential new clients. Likewise, Vodafone, a UK company, has established itself as the main operator in

many of the Commonwealth countries, Orange-France Télécom has started operations in most African countries with French heritage, etc.

For convenience and for the sake of this discussion, we'll split the developing world in six different regions: Asia Pacific, Latin America, Indian Region, Eastern Europe Region and the Middle East.

Asia – Because of its high population density and very low cell phone penetration rates, it stood to reason that Asia probably would represented the largest regional underserved market at the turn of the century. However, the economic power of the many developing Asian nations (especially China) has boosted economic development and given rise to some of the largest mobile operators worldwide –in fact, the largest MTO by number of subscribers is Chinese (China Mobile). It is probably worthwhile to mention that countries not under the Chinese clout still represent virtually untapped, dense markets for MTO expansion.

Latin America – We think Latin America's very high potential at the turn of the century is being explored by many multinational companies, amongst them Telefónica, Telecom Italia and other European and local operators. América Móviles, a Mexican operator is expanding fast in the region and is currently the fourth operator in the world by subscribers.

Indian Region – The Indian region, dominated by the Indian economy and companies, is probably the least developed of all the regions we'll discuss insofar as telecommunications are concerned. Given its huge population density and fast projected economic development, we think this is probably the region with highest potential, along with some countries in the South East Asia region.

Africa – Most African countries are submerged in a major infrastructure building effort that will most likely result in the set-up of a large number

of wireless installations in the near future. However, the poor state of their backbone infrastructure, at the time the telecom expansion started – and even now–, has deterred many MTOs from entering the African markets so far, as expansion in many of these countries would mean becoming involved in the infrastructure building effort. Other countries, however, are resolvedly committed to reaching their Universal Access goals, and are investing heavily in attracting foreign investment for the telecom sector.

Eastern Europe – Although still developing nations, most Eastern European countries are well in their way to European integration and telecom opportunities, although present, are not as evident as in many of the other developing nations, both in terms of a smaller population and an already much higher mobile penetration rate.

Middle East – Although still underserved, the main obstacles to leveraging market opportunities in the Middle East are its political instability and the limited upside due to the relatively small population.

Given this analysis, it is clear why the European operators' geographical choice for Expansion was not easy. All markets offered opportunities and deterrents, and consequently the responses from different operators to this set of constraints have been eclectic and dependent on many factors, both exogenous and endogenous to the companies proper. We will, however, try to extract similarities and common trends in the next chapter, so as to outline a business framework apt to gauge investment opportunities for operators in developing economies. This analysis will be later complemented by a case study on the expansion strategy of one of Europe's largest carriers in the Asian markets: Telenor of Norway.

## Chapter 2: How to enter foreign markets?

Although we have underlined in previous pages the specificity of telecom markets in different countries, up until now we have referred to the wireless operator business most of the time in all-encompassing, generic terms with global purview. However, and in order to produce a serviceable market analysis framework, the time has come to emphasize the particular characteristics of each market: the world underserved wireless market is not one market but consists of millions of individual local markets, and it is only in harnessing this distinctiveness that we can aim towards a global approach. In fact, the markets that concern us are widespread all over the world and have only one thing in common: they are all underserved by current mobile services.

The purpose of this chapter is to establish a workable framework within which one can start to build a business plan to address expansion in an underserved mobile market. By focusing on the required processes needed to do business planning rather than the data, we will try to identify key parameters that impact the prospective market entrant at different levels of the organization, in order to create a market-entry profile. We hope that this framework will further our analysis abilities in rendering assessment of emerging markets by MTOs a more routine task than it is today.

It is important to note that in this analysis we will mainly concern ourselves with the economics of market entry, rather than with any technical considerations. Evidently, technical decisions are material in the successful implementation of any wireless deployment, but we esteem that this task is, at present, thoroughly understood by all operators in business. Additionally, technological decision-making is intrinsically different from the development of a business framework, and we believe independent analysis should be carried out. Finally, we will discuss the state of the technology in potential candidate countries during some

of the stages of our framework elaboration, but technological complexity will be kept at a strict minimum.

### Presentation of framework

In the creation of this framework we have tried to clearly segment the decision process that any company considering expansion should undergo in order to assess the return on investment of a market-entry opportunity. We believe that this framework allows enough flexibility to be applied in multiple wireless markets, regardless of the differences between them, precisely because one of the model core characteristics is that it revolves around these specificities and incorporates them into the analysis.

A business framework is nothing more –or less– than a systematic procedure that will allow us to understand the market dynamics of a given business situation, and, hopefully, determine the optimal course of action. However, frameworks are by nature limited to being an aid to business planning, and specific implementation of these frameworks is heavily dependent on the company's culture and organizational knowledge base.

This is the reason why, in the preparation of this framework, we have taken into account the fact that organizational learning is a sequential, evolutionary, and path-dependent process (Xie, 2005).

Sequential, because all learning in organizations must be founded on established and clear facts, easily understood throughout the organization, and that can be readily used in discussions regarding the future strategy of the company. This concept is transposed into the step-by-step approach we have chosen for our model.

Evolutionary, because of the constant need of companies for adaptability when faced with new stimuli: as the market environment changes, so should the company's response morph to seek an optimal outcome. Although this is simply

a business truism, we need to give it additional consideration in our case: developing countries are nothing if not unpredictable, and the suppleness in reevaluating situations after an unexpected change has occurred (regulatory change, shift in political direction, etc.) may very well be material to our success. In our model, this has been implemented through a reiteration process, with feedback loops connecting the successive stages of the process.

Finally, random elements make every business enterprise unique, as are the conclusions that we, as a business, might extract from it. Although this path-dependency is not translated into any specific features of the model, it is undoubtedly a consequence to be taken into account when we use previous experiences in our analysis. The fact that a company has encountered a great many problems with a particular local government might be due to ill-starred personal relationships does not mean that the next company that comes along will suffer the same thing. The lessons learn by the two companies, however, will be nothing similar.

Our model is then recursive and sequential. It can be sketched in three steps:

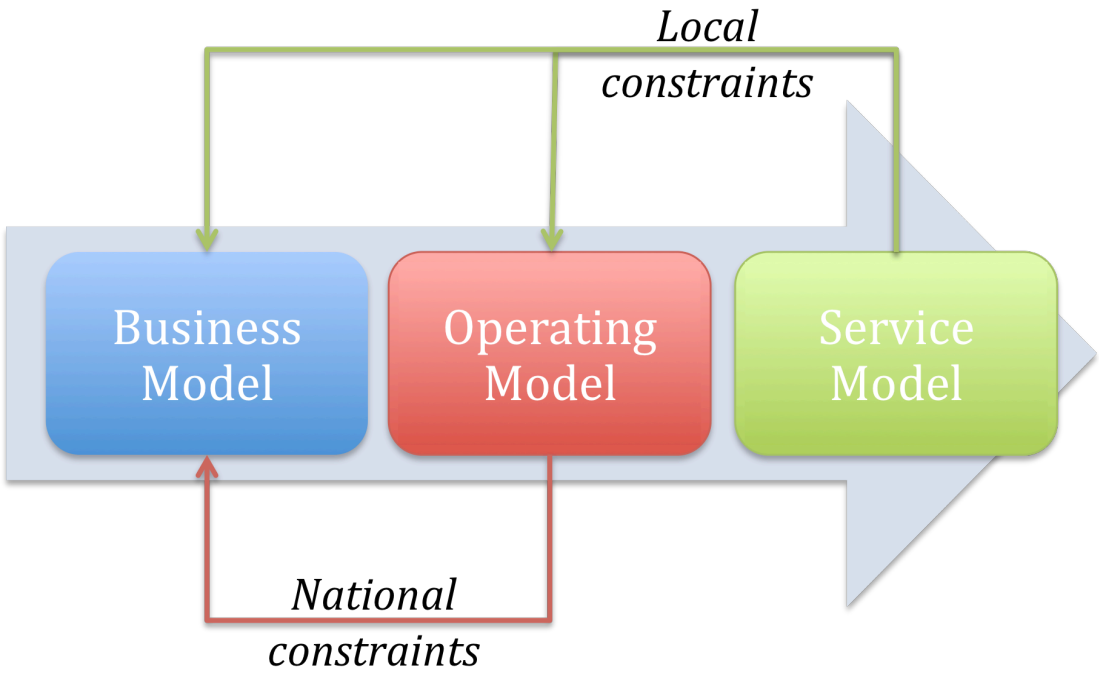



Figure 4 – Sketch of business framework

### Step 1: Business Model Level

This step consists of the analysis of the grand strategy of the company. This will take into account endogenous factors, which are intrinsic to the company business model. Giving the green light to a project at this stage is obviously *conditio sine qua non* to proceeding on to the next level of analysis. Typical considerations at this stage will be the acquisition strategy of the company, possibilities of financing, etc.

### Step 2: Operating Model Level

This step will give us the opportunity of looking at the potential wireless market at a national level. We will examine a number of issues regarding the national economic, technical, political and regulatory environments so as to have a solid understanding of the context of our operations. Typical national constraints will include those mentioned above plus some other macroeconomic and national variables.

### Step 3: Service Model Level

This is the local level. At this stage we'll assess the local community's will and ability to sustain a wireless market, as well as the capability of the company to deliver its services in the local environment. Typical considerations will be local demand, ability to supply, marketing, branding, existing competition, etc.

The brunt of our analysis –specially during the development of the case study on the next chapter– will be borne by stages one and three, the Operating Model being more of a factual, usual procedure in order to become acquainted with the country where we want to set up operations. We believe this information gathering process to be typically well understood by companies and we will not devote special attention to it.

The different parts of the framework can also be seen as sources of restrictions:

- *Global restrictions* – Imposed by the business model,
- *National restrictions* – Imposed by the country of choice, possibly by the government
- *Local restrictions* – Imposed by the local population and local business practices

## The Business Model Level

Let us elaborate on the first milestone of our business framework. This analysis should provide clarity on the internationalization strategy of the company and on how it meshes with the company's overall business model. At this level, we'll structure our assessment around four pillars of a company's business model: Corporate strategy, Financial Considerations, Marketing Strategy and Technical Solutions.

All factors will now be examined at the highest corporate level. Notice that some of the concepts discussed here (eg. competition, which we will discuss both in this segment and in the Service Model Level) might be reviewed in following steps. The reason for this is the recursive nature of market analysis that we mentioned before. Our step-by-step three-pronged approach might need to loop back to an earlier state given new information that arises at a later stage. This constant revisiting and retracing is the reason business models evolve and adapt. We have tried, however, to keep this relapses at a minimum, and we'll be sure to mention this feedback effect whenever it occurs.

**Table 3 – Components of the Business Model Level**

| Corporate Strategies | Financial Considerations | Marketing Strategy | Technology Solutions |
|---|---|---|---|
| Portfolio decisions | Financial strength | Territories | System Design |
| Entry strategies | Return on Investment | Competition | |
| Strategic partnerships | | | |

We'll now proceed to analyze each of the four sub-segments before moving on the Operational Model Level.

### Corporate Strategies

Corporate strategy captures the direction in which the company's top management envisions the future of the company and its place in the economic landscape. Is the company striving to increase its market share in its home market? Does it want to become a global player? Is it looking to be an ongoing concern, or does it intend to be sold in the market in the near future? Are we looking to create a diversified conglomerate or a company focused on a few core strengths?

The MTO's management provides the answers to these grand questions, and the framework takes that as an input on which to build an appropriate business strategy. Once we know the general course that the management has set for the company we can focus on more actionable parameters. We have chosen to focus on three parameters, which, we believe, encompass enough factors to account for most of the company's definite decisions.

First, portfolio decisions include all decisions relative to the *timeliness* of a particular investment. As in any investment strategy, it is important not only to enter the right market at the right time, but also that our portfolio remains balanced in time. This means that our projects must not yield positive returns all at the same time, or the purpose of becoming an ongoing concern is defeated in the long-run. In order to generate sustainable growth we need to make we measure the future growth of our operating activities, and that the growth in different regions will complement each other. Not accounting for this fact could result in a company whose central structure is eaten up by peripheral, non-core growth, depriving other parts of the company of much needed resources. We'll analyze this in detail during our case study.

Also part of the portfolio decisions is making sure we are consistently able to profit from advantageous investment environments that exist only for a limited window of time.

Second, the entry strategy plays an essential role in the definition of our expansionary policy, and is sometimes defined by default in a company. In fact, this used to be the case in the telecommunication sector during the 70s and 80s, when large incumbent operators had no incentive to search for growth outside their borders and made small, financial investments in companies abroad.

As a reference and as background information, let's briefly review the market entry policy of incumbent MTOs in recent times:

> Before 1990, international acquisition of major telecommunication companies was rare and infrequent. The 90s was indeed one of the most expansionary periods for the telecommunications industry, and as early as five years into the decade two broad categories of companies emerged:
> Incumbents from large European economies (Germany, UK, France, Italy and Spain), who launched themselves into an acquisition spree of majority stakes, gaining control over their investments.
>
> Incumbents from smaller economies (Nordic countries, primarily) who chose instead to systematically make small opportunistic investments in other countries' (not necessarily underdeveloped) incumbents.
>
> Although there is an argument that smaller incumbents lacked the financial might to undertake large majority investments, the trend reversed soon enough. After the peak acquisition period of 1999-2000 (Vodafone's acquisition of Mannesmann in 2000 and of Air Touch in 1999, T-Mobile's acquisition of One-to-One in 1999, etc.) even small incumbents started investing strongly in majority stakes, divesting in the process most of the minority holdings they had. This trend is very clear in the case of Telenor, as we will see during the case study.

As proposed by Gerpott and Jakopin (2004) this reversion of the trend might be due to the fact that MTOs with more extensive international operations were able to set up a good reputation for themselves that, in turn, allowed them to convince foreign governments to open their markets to controlling-stake foreign investment. However, it could also indicate that it is harder to increment the efficiency of a foreign operator if the company doesn't take complete control over the operations.

Whichever the case, it seems clear that a company's acquisition strategy is sometimes set by default by management, and that challenging that strategy might take time and possibly involves missing out on a few deals.

Now let's turn to a classification of the different internationalization strategies that MTOs have used to expand their businesses abroad (Gerpott and Jakopin, 2004):

- Investment in an existing MTO: this is evidently the quickest way to gain access to a foreign wireless market, although buying an existing operation might limit the acquiring company's leeway to implement their own business model. Whatever the case, the investment can be a majority stake or a minority participation.
    - The majority stake typically seeks to achieve synergies in production and sales through economies of scale (procurement of network elements and handsets) and economies of scope (through brand building and standardization practices).
    - The minority stake is considered to be a foothold inside a foreign company, from which to leverage the generally superior technical expertise of the acquirer. It has also been proposed (Clegg and Kamell, 1998) that minority participations can be considered options to obtain control at a later stage, or as a first step to increase the acquirer's knowledge base and decrease the cultural distance between the two entities.

- Start-ups are most common to markets without established or predominant wireless networks. Most of the time this markets are very underdeveloped and yield returns only in the long-term.

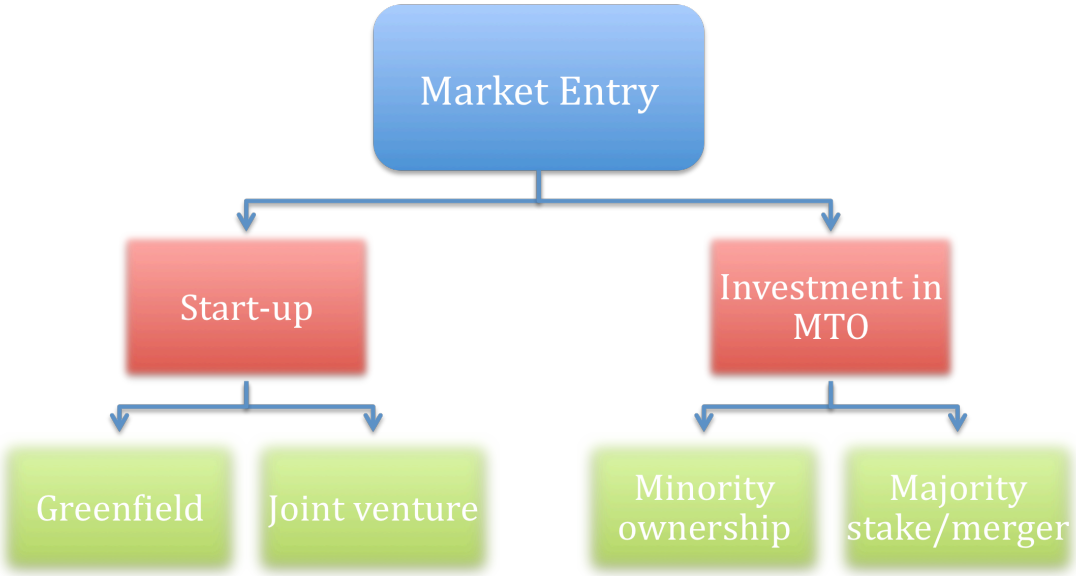



Figure 5 – Classification of Market Entry Strategies

Finally, there's the issue of a local partner, with whom to start a joint venture or enter into some other kind of commercial relationship. This might be advisable especially in the case of a start-up, because the local knowledge might allow you to:

- Leverage the market characteristics in your product innovation processes
- Use local connections to establish distribution channels

Local partners can also provide motivation for a company to decide to enter one market instead of another, as the wealth of knowledge provided by the local partner might make one option more economically viable than the other. If market entry is done through an acquisition, all this local expertise will typically be found within the acquired company.

Partnerships are one of these recurrent themes we warned the reader about in the previous section. Local partners play a vital role in the operation of an MTO and as such have an impact in all three levels of the model. However, they are most relevant in this first stage and during the Service Model Level, when we'll

analyze the impact of the MTO's immediate economic surroundings. We have chosen to mention them here, but please keep in mind we could have included them in any of the three levels.

### Financial Considerations

While the potential unmet demand in underserved markets is huge, financing to exploit all the existing markets opportunities isn't as easy to come by. Whatever kind of market entry strategy the MTO chooses, the initial outlay to cover infrastructure, licensing and marketing investment will be considerable. On top of that, foreign exchange fluctuations as well as political and economic risks make for a financial investment package that needs to be handled with extreme care.

However, in order to foster investment in developing economies, governments and institutions provide special kinds of financing for telecommunication projects that are not available in developed economies. Among these:

- Subsidies and guarantees: in order to reach Universal Service goals, many governments make funds available to foreign companies willing to enter the telecom market in exchange for technical expertise.
- Microcredit programs: on top of being an integral part of many business models in the developing world, microcredit programs are another source of funding that companies can use to finance franchisers of the company's brand. This can certainly help in speeding up the creation of distribution channels for the company in rural and remote areas
- International aid programs: Although there are many such programs, aid is rarely provided to corporations looking to expand

### Marketing Strategy

Certain operators portray themselves in a certain fashion vis-à-vis their consumers, and then leverage their brand image as a marketing tool to either retain existing clients or obtain new ones. For instance, for an MTO who claims to have worldwide presence, it is important to keep up investments in certain

geographical areas to live up to its perceived image. Similar arguments can be used for specific –e.g., developing– areas (sustainable development, millennium development goals, etc.).

Special mention should be given to the effect of competition in these markets. Even though a more detailed analysis will be performed at the Service Model Level, the importance of competition often warrants a few considerations during corporate strategic discussions, as competition dynamics in these markets might be complicated. The subtleties of real world influences that normally corrupt market behavior are simply compounded here by shifting regulation, ever-changing policies, confusing spectrum and license auctions by cash-starved governments, etc.

### The Operational Model Level

The Operational Model Level defines variables that are defined at the national level, relating the corporate objectives of the company as a whole to the economic, regulatory and political constraints that exist at the national level.

Although economic factors and regulations might be locality-specific, we thought that a national approach to economic, regulatory and political matters was suitable for the immense majority on analyses. Also, it should be noted that in this segment we discuss the macroeconomic environment of the country when we talk about the economic factors. Micro- and socio-economic considerations will be the object of further analysis of the following chapter.

**Table 4 – Components of the Operational Model Level**

| Revenue Expectations | Regulatory Issues | Government Policy |
|---|---|---|
| Purchasing power | Liberalization process | Political stability |
| Economic stability | Market regulator | Policy direction |
| | Auctions and licenses | |
| | Corporate law | |

### Revenue Expectations

We concerned with the macroeconomics of a given country because economic aggregates are proxies that we can use to project the revenues the incoming MTO will be able to extract from a given region. The underlying assumption is, therefore, that the economic power of a country can be equated to revenue potential. Thus, classical analysis would say that the larger the economy, the higher the potential to generate revenue for the communications company.

We, however, will argue against that overly simplistic notion. In rural and underserved markets, buying power or ability to pay is certainly a factor, but even countries with low GDP figures can be viable telecom opportunities. The experience of many businesses –including a large number of MTOs implanted in developing economies– strongly support this idea. We will discuss this view further in the next chapter and in the case study.

What is vital, however, is the solvency and stability of the economy. Since this industry requires long-term investments, and costs are only covered after a number of years, a humble, stable and sure economy is oftentimes more enticing than a buoyant but volatile one.

Among many other things, stability is a function of a country's industrial base and the degree of integration into world markets. Thus, a country having extensive trading relationships with neighboring countries is far more likely to achieve stability in its economy that one that remains isolated. Belonging to international trade associations like the WTO can also prove to be helpful.

### Regulatory Issues

The regulation of telecommunications is probably one of the most complex issues to deal with when assessing market opportunities. There aren't two regulatory regimes that are the same, so each case must be studied individually.

Amongst the most important legal issues to consider we find the stage or market liberalization, which adopts different forms in different countries. Very closely related to this process is the role of the telecommunications regulator and its interaction with the MTOs. One of the best examples of how important a regulator can be is the case of New Zealand: after the market was liberalized in 1989, the incumbent was still able to hold on to a market share of over 90% for years. The most likely reason was that there was no regulator to actually implement the liberalization laws that the congress had approved!

Given that companies need to be licensed to be able to sell their services, and given that they need to purchase part of the electromagnetic spectrum to do just that, transparency in the way the spectrum is allocated and licenses are granted is vital for the development of a functioning telecommunications industry.

As for Corporate Law, short of expounding on the individual characteristics of any particular country, we will emphasize that probably the greatest concerns of a company setting up a business abroad is the transparency of the legal system and the laws that regulate repatriation of profits. Other legal issues of interest for new entrants could be:

- Transfer Pricing
- Tax Laws
- Tax incentives/holidays
- Incorporation laws
- Labor Laws
- Trade Laws

### Government Policy

Political stability is key in creating a positive business environment. For instance, some countries allow the policing power to be concentrated by a few high level ranked officials. If a change of the party in power were to occur, telecom policies would be liable to change overnight, upsetting long-run strategic business plans.

To assess the potential sources of political instability, MTOs should carefully examine certain elements of a countries political structure:

- System of governance
- Recent history and policies of parties in power
- Lobbying mechanisms

Although this analysis of the political structure of a country can be complex, we can focus on the most notorious policies of governments to assess the general direction of their policy-making. In doing so, we might be able to observe the natural trend of present and future regulation. Two of the most important points are:

- Is the government committed to fomenting foreign investment?
- What are the motivations for liberalization? Are they socially driven or is it being used as a financial instrument to attract foreign money?

### The Service Model Level

In this level we finally deal with the potential end-users of the services provided by the entering MTO. While the purpose of the previous two steps was to assess the economic potential and the suitability of a given underserved market, the goal of the present segment is however to delineate the company's strategy vis-à-vis their potential clients. That is, instead of asking ourselves whether a market is worth being entered or not, we will be deciding upon the best way to go about it.

This section will be therefore slightly more "hands-on" than the others. We would like to point out, however, that although this section's main objective is to provide somewhat clear guidelines towards the implementation of a given market entry strategy decided upon in step one, there is a chance that what we learn here might make us reconsider previous decisions. For instance, let's imagine the case where a given market meets our corporate strategy and our financial criteria, and has clear and transparent liberalized market. Let's further imagine that we have decided that our corporate expansion policy is the acquisition of controlling stakes in national incumbents. If we then discover, at

this stage, that the natural geographical characteristics of the country call for a technological solution that we don't have (say cities are sparse and far apart, and servicing a large population requires satellite coverage), we might decide to reconsider our corporate expansion policy, backtracking to step one of our analysis. Once we're back in step one, we might decide that the best strategy, in light of what we've discovered in the Service Model Level would be to buy a minority stake on an existing MTO, to learn more about how currently operating companies are dealing with the issue.

As a result of this feedback effect we have just mentioned, it is only after the service model has been defined and analyzed that we can assess the economic potential of a wireless market we would like to enter.

Now that we've established how the service model can alter our whole market entry strategy, let us turn back to carrying out our analysis of the local constraints. The main components of a service model at the local level consist of the service mix demanded, the existing competition and the operating plan. Thus, to tackle this question, we will be taking a four-pronged approach:

**Table 5 – Components of the Service Model Level**

| Service Mix | Demand dynamics | Operations | Competition |
|---|---|---|---|
| Social development | Consumer demand | Distribution | Market structure |
| Customer needs | Technical literacy | Ability to pay | Carrier indicators |
| Price | Price elasticity | Maintenance | Customer indicators |
| Marketing | Cultivating demand | Technical specifics | Market trends |
| | Network effects | Workforce | |

### Service Mix

The service mix definition process addresses the question of what services will be delivered to the end user, and at what price. This local, retail level is the company's interface with the market, and the success of all other elements in the business plan depends on this interface working properly. In fact, all other assumptions, models and economic forecasts are done under the understanding

that the service mix provided to clients is suitable, appealing, affordable, and capable of engaging a revenue that will be sustainable over time.

We'll see, however, that striking just the right mix is not easy. A service mix is the set of price policies attached to the products that the company has chosen to sell, along with the marketing and publicity strategies that the company has decided to put in place to stimulate demand. The optimal service mix will be the one that satisfies consumer demand while fulfilling social and business objectives. The problem is that neither assessing consumer demand nor finding the right way to fulfill social or business objectives are simple matters!

Traditionally, it has always been considered that any wireless operator serves two kinds of clients:

- Business clients
- Private clients

Businesses were the first to jump onboard when mobile services appeared, largely because only large organizations could afford the originally high call rates. In emerging economies this is changing at a striking pace, however, and in developed countries this trend has reversed completely: cell phones are so ubiquitous that consumer demand has completely overwhelmed business demand. In fact, cell phones have become such a big part of our daily life that, whether to conduct business or social relations, most people simply carry their handset just about anywhere. This is why, from this point on, we won't make any distinctions between the both types. We believe this simplification is in order for all the reasons above, and it will simplify –roughly by half– the task of estimating demand in the coming section.

Let us now turn to the reconciliation of the service mix offered to our clientele and the tackling of the many social issues that the country or region might be facing. It is a well-known fact that providing communication services to a community is much more that engaging in a purely economic transaction. Wireless is, of course, no exception to this.

In order to secure goodwill from governments, potential clients and business partners, most MTOs pay very close attention to include the fulfillment of social objectives in their business plans. So much so, in fact, that this was probably the raison-d'être of most PPP[2] structures during the early stages of the telecom liberalization process in most developing economies. An increasing number of MTOs are now trying to leverage social development opportunities to increase the chances of success of a business project.

This social backdrop brings along the –most of the time, unwitting– collaboration of the local community and reinforces most of the marketing effort through positive feedback effects. We will see a very clear example of this phenomenon during the case study in the next chapter.

Quite naturally, the first step towards finding the right service mix and satisfying the demand is making it affordable for the company's potential customers. Let us remember that we are dealing with emerging economies and, accordingly, per capita incomes are liable to be very low. Convention dictates that this is a negative sign for the viability of the economically profitable activity. Although this is a compelling notion, abundant empirical data provided by companies in a plethora of business lines strongly contradicts this conception.

Interestingly, the income per capita can be an extremely misleading indicator of purchasing power. The main reason behind this fact is that spending patterns differ widely from market to market. In other words, although GDP per capita might be a good indicator of the affluence of a population, it may not be a good indicator of what they're going to spend their money in.

As an example consider the following: data collected by Barrantes and Galperin (2008) suggests that the percentage of household income spent on telecommunication services varies can be as high as 6% in some countries and as

[2] Public-Private Partnership

low as 0.5% in others. Even if their average incomes are very different, the revenue generated for wireless operators might still be the same! In fact this would be only natural, since different economies have very different needs. In some local economies, people barely spend anything in rent, whereas in developed countries rent can be as high as 50% of your available income.

This discussion on affordability brings us, finally, to the matter of pricing. During the initial deployment of cellular services the price was prohibitive and only business subscribed wireless services. However, advancement of technology and a struggle by operators to gain more market share by catering to the masses drove prices, airtime and ARPU down.

Although shattering prices is a simple technique for increasing market share, it should be noted that there exists the risk of cannibalizing current and future revenues. After the market liberalization process, this has become an even greater risk. That is why operators have come up with innovative solutions to segment the market and setting differentiating pricing procedures:

- Prepaid cards: Although this service started out as a way to introduce potential clients in the lower economic strata to wireless services, its great success has turned prepaid cards into a fully fledged business model, adopted –at least partially– by almost every mobile operator throughout the world. Its appeal stems from the fact that, in spite of higher airtime price, prepaid subscribers don't have to pay a set monthly fee. This allows clients o have better control of their mobile usage, given that the prepaid card has stored value in itself.
- Value added services: The most basic value added services to wireless telephone calls –call waiting, call display, SMS, voice mails, etc.– were implemented at the onset of mobile communication. However, new technologies have given rise to a plethora of ancillary services based on wireless data transmission –as opposed to voice–, ranging from medical assistance to email, faxing, e-commerce, and m-banking[3].

[3] mobile banking

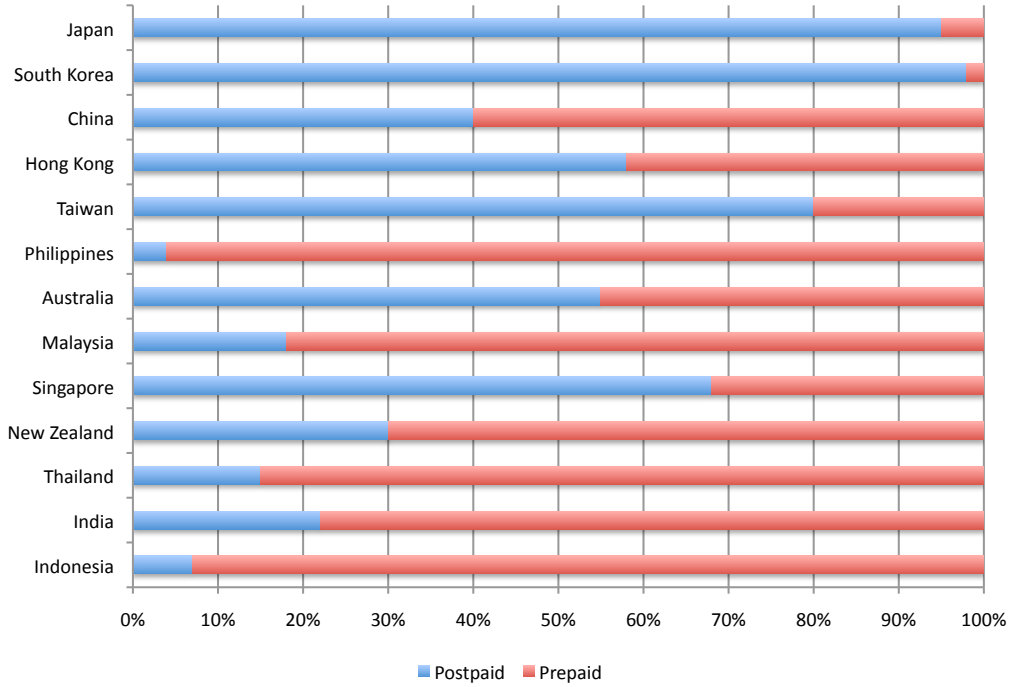



**Figure 6 – Proportion of Postpaid and prepaid subscribers by country (Asia Pacific) in 2004. Source: LirneAsia, 2004**

The most interesting part of the development of this complementary services to mobile communications is, without any doubt, that the development of value added services has become the crossroads between the catching up of developing markets in the usage of data transmission and a field laboratory of sorts for all kinds of new applications based on the specific needs of people in underserved markets.

To extraordinary problems, extraordinary solutions, as the saying goes, and so the specificity of underserved markets has given rise to many technical solutions that had not been envisaged in developed countries. One very clear example of this is mobile banking, which consists in using your cell phone as an electronic purse. Money can be stored in your handset, and spent in associated stores and venues. This has proven to be very useful in countries where access to a retail bank office is restraint by geographical or political conditions, and has been fully implemented in some African and Asian countries. In more traditionally developed countries, however, this service is not yet available.

**Table 6 – Uses of mobile services among BOP teleusers. Source: LirneAsia, 2005**

| Uses of mobile services among BOP teleusers, 2005 | | | | | | |
|---|---|---|---|---|---|---|
| | ***Bangladesh*** | ***Pakistan*** | ***India*** | ***Sri Lanka*** | ***Philippines*** | ***Thailand*** |
| Taking phone calls | 100,00% | 100,00% | 99,00% | 100,00% | 89,00% | 100,00% |
| Receiving phone calls | 100,00% | 100,00% | 98,00% | 100,00% | 99,00% | 100,00% |
| Sending/receiving "missed calls" | 94,00% | 84,00% | 84,00% | 73,00% | 86,00% | 39,00% |
| Sending/receiving SMS | 32,00% | 47,00% | 33,00% | 52,00% | 100,00% | 53,00% |
| Sending/receiving MMS | 1,00% | 4,00% | 4,00% | 6,00% | 13,00% | 4,00% |
| Sending/receiving emails | 0,00% | 0,00% | 1,00% | 0,00% | 0,00% | 1,00% |
| Browsing the Internet | 0,00% | 1,00% | 1,00% | 2,00% | 0,00% | 2,00% |
| Taking photos/video clips | 4,00% | 2,00% | 1,00% | 8,00% | 4,00% | 18,00% |
| Playing games (individual) | 13,00% | 18,00% | 7,00% | 21,00% | 14,00% | 17,00% |
| Playing games (interactive) | 1,00% | 1,00% | 1,00% | 1,00% | 3,00% | 1,00% |
| Listening to the radio | 0,00% | 7,00% | 3,00% | 12,00% | 5,00% | 22,00% |
| Listening to music | 4,00% | 5,00% | 3,00% | 7,00% | 3,00% | 22,00% |
| As an organizer (keep appointments, etc) | 1,00% | 7,00% | 8,00% | 4,00% | 9,00% | 14,00% |
| To check the bill/credit balance | 11,00% | 40,00% | 25,00% | 50,00% | 3,00% | 39,00% |

The inception of these new services characteristic of underserved markets is at least partially explained by the concept of leapfrogging: given social, political and geographical differences, technology in developing economies is evolving in patterns that are different to those detected in developed markets. For example, most people in developing economies have started using cell phones, without ever owning a landline. The same happens with online services: many people will log on to the Internet for the first time through their handset instead of a tower computer or a laptop at their home. We'll also briefly discuss one specific manifestation of this phenomenon when analyzing mobile demand.

This means that their dependence on a wireless technology is also very different. Unlike customers from old, established markets, these new clients depend on their wireless connection for much more than just talking! For these and other reasons, many MTOs also use their presence in underserved markets to experiment with new products that have not yet arrived to more developed economies. This fact has a very clear significance when looking for the right service mix: in most developing economies, customers will expect MTOs to provide them with services that are curtailed and designed to their specific needs, be it m-banking, GPS, internet connection, government services…

Another effect of market liberalization in most wireless markets has been a drastic change in the kind and quantity of marketing and publicity. Given the nature of the wireless market competition immediately after liberalization was

based on price. However, given the limited number of licenses in a market (and thus the limitation on the number of players), MTOs typically enter into some sort of declared or tacit collusion to keep prices at profitable levels. It is at this point that the marketing strategy of MTOs, which used to be based on price, changes direction and leverages other qualities of the wireless operator to gain market share. The most evident examples are ancillary services, quality of customer services, coverage, and the ancillary, market-specific services we just mentioned above.

### Demand dynamics

A proper analysis of the demand for a given product –in our case, wireless service– is vital for the success of any business strategy. Alas, given the lack of market studies and other information, this demand is extremely difficult to estimate for MTOs.

As we mentioned above, the use of a cell phone varies significantly from one market to the next, and this difference is even starker when we compare developed and underdeveloped markets. This is the reason why some of the business ratios that MTOs find to be accurate in their home markets, might not hold true in underserved markets. For instance, if we could only assume that the mobile penetration ration will converge to the same value in every country, we could readily find the potential demand of whichever market. However, as we discussed, dependence on the cell phone differs greatly from one country to the next, so this approach seems blunt at best, and botched-up at worst.

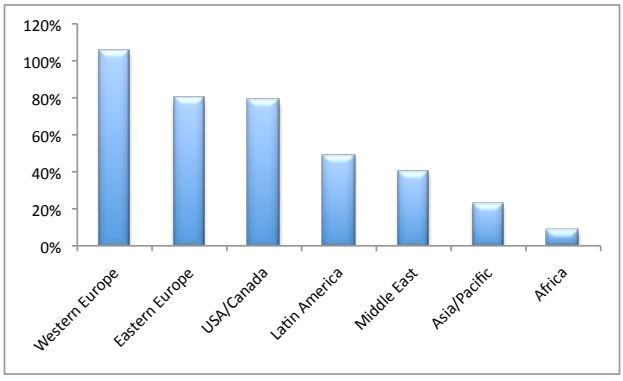



**Figure 7 – Wireless penetration by major regions of the world. Source: Wirless Intelligence, 2006**

We will, therefore, devise another approach to estimating potential demand in underserved markets. Our process will consist of three sequential steps, where we'll carry the result of each one onto the next. These steps will be interconnected by a series of operators, which will filter the raw input into a usable parameter on the next stage:

1. Firstly, we'll calculate the total amount corresponding to the underserved population. Starting with absolute population –which equates the absolute maximum number of subscribers– we'll then compare this amount to the country or region's teledensity[4]. From this teledensity, we'll reach a reasonable estimate of the amount of people that are currently being served, as well as of the nature of the services they receive. We will call the difference between these two figures –population and properly served population– the *potential market*.
2. Secondly, we will group this total potential market into households. We find that this is a more convenient way of measuring potential demand, as it provides for a more universal definition that one single individual (for instance, it will likely be easier to estimate the needs on a per-family basis than on a per-person basis. People might have very different needs according to their age, hobbies, occupation, etc. A household enshrouds the individual and provides some useful generality to our subjects of study). Different parts of the world will have different average households size, and we will need to account for that. We will call this the *addressable market*.
3. Next, we will apply a series of filters to characterize the nature of the country or region's demand. These filters should address issues such as education, regulation, level of liberalization, etc. The outcome of applying all these filters will be our *market estimate*.

---

[4] Teledensity is a measure of the ability of an average individual to establish remote communications in a given area or country. The term used to refer to the amount of landlines per citizen, but with the advent of mobile services and the internet this definition has been extended to encompass other forms of telecommunication. Further information on this term can be found here: http://www.itu.int/itudoc/itu-t/com3/focus/72404.html.

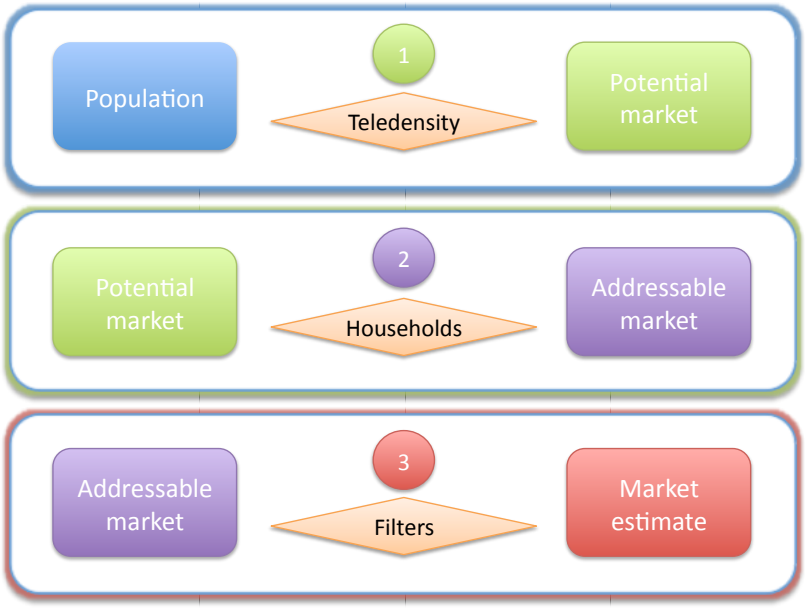



Figure 8 – Estimation of market demand

Let us now briefly discuss the filters we would need to consider during the third step of our estimation exercise to account correctly characterize the market potential:

Table 7 – List of main filters to characterize our demand

| Economic Filters | |
|---|---|
| Region's economy | Aggregates defining the general state of the economy in a region are good indicators of the affluence of its denizens. This affluence, in turn, should be –cautiously– used to estimate the demand for telecommunication products |
| Level and timing of industrialization | Knowledge-driven economies have a deeper need for wireless communications than an agriculture-based economy, and this should be taken into account in our analysis |
| Level of liberalization | As we said before, liberalization is understood differently in different markets |
| Availability of financing | This factor will determine the amount of investment companies will be able to make |
| State of the technology | Critical in assessing the ability of potential customers to use the products the MTO will be offering. Also to be |

| | |
|---|---|
| | considered is the leapfrogging phenomenon we discussed earlier. Namely, in developing countries there has been a marked deviation from the pattern of development of telecommunication services in developed economies. This process, known as the Fixed-Mobile Substitution (FMS) looks to explain the fact that mobile subscriptions have now overtaken landline connections in many emerging markets (cf. Figure 9) |
| **Demographic Filters** | |
| Education and Literacy | Under this broad term, we find three different indicators that will have an important impact on demand:<br>Literacy – The higher the literacy rate on a country, the higher we can expect the demand to be on a general basis<br>Techno literacy – Acquaintance with computers and other electronic equipment might prepare a given population to embrace wireless products<br>Amount of skilled labor – Arguably, skilled labor will have a greater need to stay connected. This does not mean that unskilled labor will not be a part of our clientele, however |
| Distribution of cities | By cities we mean major economic centers. In a country where most citizens live within a very conscripted geographical area, connectivity will be very high, and according to experience, connectivity begets connectivity. |
| Cultural diversity | In countries where population has been regionalized due to cultural differences (e.g. different languages) establishing wireless links between is much more unlikely |
| Income disparity | Higher income inequality tends to retard growth in poor countries and encourage growth in well-developed regions (Barro, 1999). Inequality erodes social cohesion and limits access to services, skewing allocation towards those better off and leaving large populations underserved |
| Means of transportation | The perceived distance to the people we want to talk to is vital in determining our utility when subscribing a wireless service. If transportation is bad, or slow, we will experience a more pressing need to establish wireless bridges. |

Also consider that, just as we mentioned in the previous chapter, oftentimes underserved population will not be aware of their telecommunication needs, and it will be up to the MTO to educate the population in the possibilities offered by the wireless market. In such a situation, the ease of use of the product becomes paramount, as word of mouth will be material in the success of our distribution campaigns. Alternatively, we can also seed awareness by using local personalities during the promotion campaigns of the MTO's product.

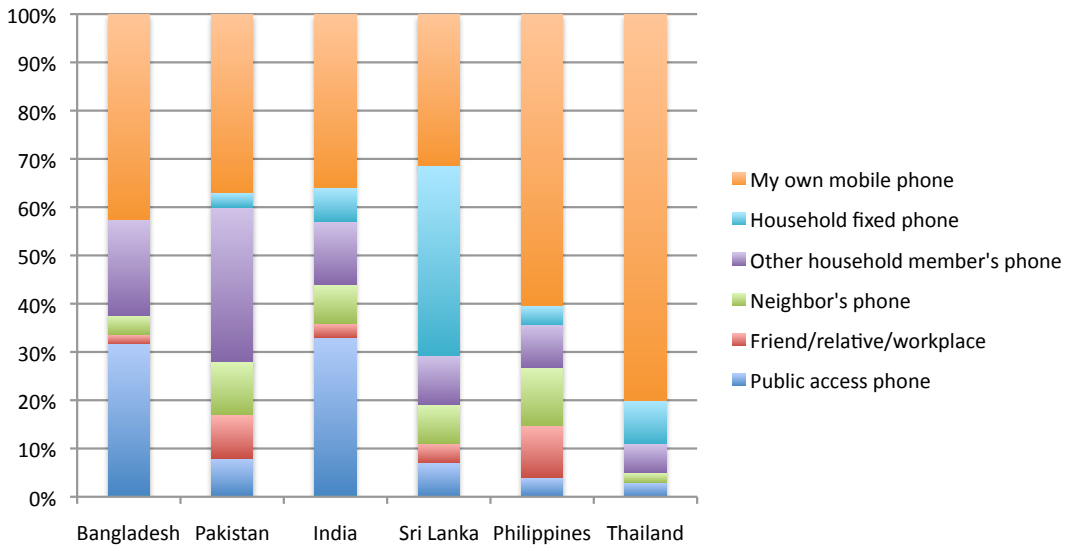



**Figure 9 – Most frequently used phone (% of BOP teleusers). Source: LirneAsia, 2005**

To end this section, it is of paramount importance that we understand the relevance and impact of the effects that network usage has on the demand for services, or the *network effects*. The basic idea underlying this concept is very simple: the more people using a network, the more valuable the network itself becomes.

This is a consequence of the fact that networks –wireless networks, in our case– and products derived thereof are never consumed in isolation. Customers will use a network to establish a connection with other customers, so the more customers the network can reach the more valuable access to that network is.

To view an example of these network effects, let's consider that a certain individual A has news that he wishes to communicate to individual B. Clearly, a network would benefit by offering the chance of doing so, but beyond that, consider that then B would like to pass these news along to C, who in turn decides to call A back and ask him directly. All these secondary communications (from B to C and from C to A) are clear examples of networking effects. Clearly, A has benefitted from having B in the network, because he could call him, and C has also benefitted even though he has no direct relation with A (because he gets the news). Even more important, however, is the fact that the operator has also benefitted, since one single communication has spurred two others.

Network effects are vital to understanding the dynamics of wireless demand. The only reason why we didn't include them in our previous analysis is that far from being a filter of demand –i.e., far from reducing potential demand– they encourage it. In our previous estimation we made the unspoken simplification assumption that *every household*, given the right price, would want to be connected. We believe this to be a fairly correct assumption, and so the impact of this network effects in boosting demand need not be considered.

We will see in the competition section that this is not the case when analyzing the market structure. There, the impact of these effects has been –and still is– material in determining the dynamics of competition. In fact, network effects are important supply-side constraints and will play an important role in determining the correct level of output for a given company, through a process known as internalization of network effects.

We'll end this section highlighting the fact that not all network effects reinforce demand and production. Congestion, which is a network effect present when the traffic generated by the subscribers of a network is close to capacity, is a clear example of a negative network effect.

## Operations

In this segment we'll briefly try to address the major issues that MTOs experience when conducting normal operations in developing countries. We won't spend much time discussing them, mainly because generally these hurdles to business operations are extremely specific to each particular region, and thus very difficult to address in any general manner.

Broadly, any MTO will have to deal with the following issues:

Distribution – In emerging markets, making your product available to the consumers can pose a very challenging problem. Political restrictions on travel business, let alone geographical inconveniences can all be very burdensome on a company's operations. Much like in developed markets, companies generally use one of three main distribution channels: the service provider's own retail outlets, cellular equipment dealers, or direct sales in supermarkets, malls and other retail outlets. However, and unlike companies in developed markets, MTOs have searched for special collaborators to overcome specific problems of accessibility to the consumer. Namely, they have associated with hotels and banks to reach the highest number of people possible. We'll discuss one such association in the business case (Grameenphone).

Ability to pay – Of obvious capital importance, the MTO needs to make sure that their customers will have the ability to pay. Also, it will need to develop special capabilities to help ease the process of payment. The development of prepaid cards and the above mentioned associations with banks are typical examples.

Maintenance – The MTO will have to carry out periodical maintenance of its network and other facilities. The time and money spent on these operations will depend, primarily, of the degradation of the equipment and other elements of the network, which will in turn depend on exogenous factors (weather, vandalism, etc.) very particular to each market.

Technical specificities – When we deploy a network, we will be required to design implementations with different technologies depending on the environment around us. Namely, the weather and the length of the haul – the distance the signal will have to travel. These specificities will have a very direct impact on the cost and price of the communications service.

Workforce – In order to operate in a foreign environment, the MTO will need technical, but also human capital. Being able to recruit management and working talent at a local level can prove to be difficult in an environment with low literacy rates, for example. Other challenges might be related to working contracts and local corruption.

### Competition

The original thought behind competition is to improve the quality of services to the end-users while decreasing the price. In a telecommunications market this is no trivial issue, and in order to understand the nature of this competition we first need to understand the dynamics of the business of wireless carriers.

Before the liberalization process that took place in the 80s and 90s, most wireless –and telecommunications– markets were dominated by one single, government-owned monopoly –the incumbent. This incumbent would operate in a strictly regulated environment, so as to spare the end-customers the pain of dealing with monopoly prices. In fact, in most cases airtime prices would be set directly by government and would remain stable for long periods of time.

This all changed when markets liberalized. Governments deregulated the sector, and most incumbents were privatized and became the present MTOs. Now with private players in charge of the telecommunications industry, the market was suddenly open to foreign investment, and foreign and local competition. The government, although no longer the owner of the incumbent, still holds a lot of

clout in the form of operating licenses, which they only grant to a finite –and reduced– number of companies.

Thus we reached the present state whereby private companies, domestic and foreign, operate a finite resource –the access to the electromagnetic spectrum through government licenses– and are exposed to the market forces and subject to competition. Consequently, once liberalization was in full swing and competition became intense, prices for wireless services plummeted. Ideally, they would only decrease to a new point of market equilibrium where a dynamic of monopolistic competition would establish itself allowing the industry to flourish, and the end-users to pay a fair and low price for their communication needs.

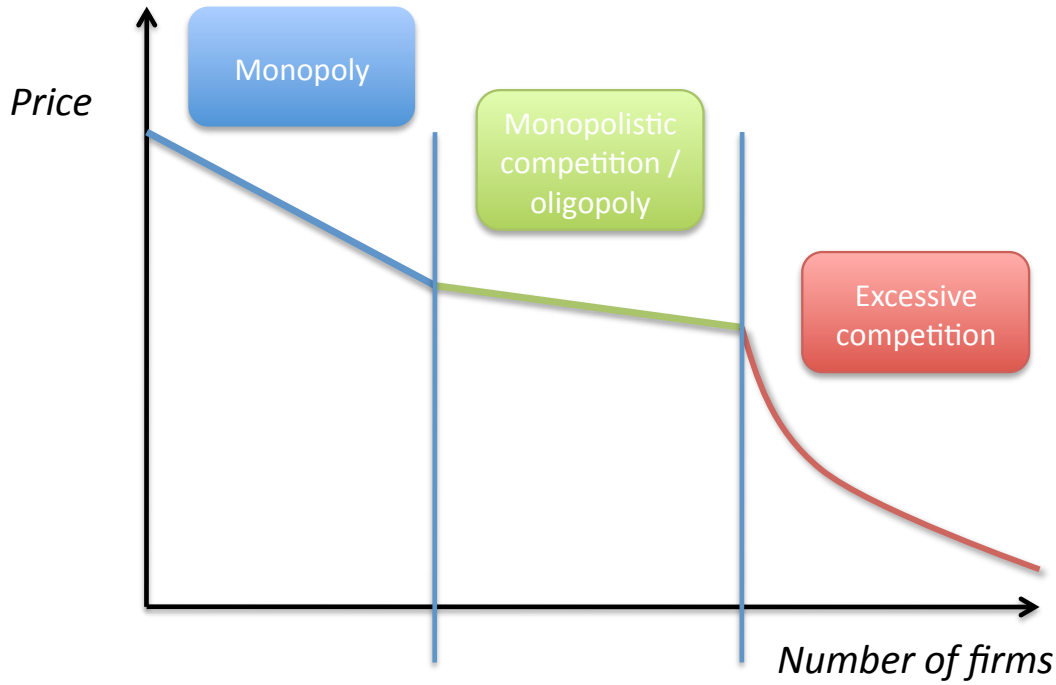



Figure 10 – Sketch of a wireless market structure

In Figure 10 we can see that the price falls as the number of firms increases. Governments try to keep the market under oligopoly or, at most, monopolistic competition. The reason for this is that if an excessive number of companies are allowed to enter the market, then competition will become fierce; first, only at a marketing level. After, as churn rates increase and revenues become unstable,

companies will feel a growing pressure to lower prices and increment their market share, which will almost invariably result in a price war. Ultimately, this constant decrease in price will lead to an overall reduction in the profitability of the industry as a whole, leaving companies cash-stripped and unable to offer high quality services. Also, long-term investment will cease to be profitable and infrastructure deployment and R&D activity will stall.

It is also important to note that when companies are in a situation of monopolistic competition or tacit oligopoly, competition typically occurs both at the level price and at the level of marketing campaigns and differentiation of services, such as better customer support, more comprehensive packages, increased coverage, etc.

Another complementary reasoning behind the present market structure stems from the process of *internalization of network effects*, which we mentioned in the demand section of this same chapter.

If we assume ownership over the network, then we can conclude that positive network effects will provide profit opportunities for the owner (Liebowitz and Margolis, 2002) –note that this was not the case with state owned monopolies: in the case of public ownership there is no economical incentive to capture the benefits of additional members and hence no incentive to expand the network. The danger would be to suffer a sort of "tragedy of commons" and end up with a network smaller that it is efficient. This was one of the main drivers behind the privatization and liberalization process.

The process of extracting economic value from known network effects is known as *internalization of network effects*. Add to this internalization the economies of scale and of scope that come from larger operations and we can see that companies will have a vested interest in creating well concentrated markets of a few, large operations. This puts us effectively en route towards a natural state of oligopoly, provided that the companies find economic incentive in operating the market.

Thus we may conclude that the main difficulty in avoiding the vicious circle of excessive competition is to determine the appropriate number of companies that should be allowed to enter a wireless market as operators. The optimal number will be the one that:

- Achieves the fiercest competition possible and the internalization of the maximum amount of positive network effects,
- Avoids forcing a price war and negative network effects like congestion.

The underlying thesis for wanting to avoid a price war situation is that we believe that the consumer will be ultimately better off if companies remain competitive in a market of monopolistic competition. The reason for this is that telecom is a sector where there is still ample room for growth, and the mark-up that consumers pay for differentiation and innovation is the driver of the technological advancement underpinning this development. If a price war occurs, companies will be worse off because they will face a situation of declining revenues and maintained costs, and customers will also be eventually worse off because they won't benefit from the scientific, industrial and social progress brought about by better communications.

There is, however, no definite number and the situation is different from one country to another. We will briefly discuss this issue further for the case of the Indian market in next chapter's case study.

In order to properly structure our analysis of the competitive environment of a given region, we should look at the following indicators:

**Table 8 – Indicators of the competitive structure of a wireless market**

| **Competitive Indicators** | |
|---|---|
| ***Market Structure*** | Number of firms |
| | Herfindahl-Hirschmann Index |
| | Geographic divisions |
| | Other barriers to entry |

| | |
|---|---|
| ***Wireless carrier indicators*** | Pricing policies |
| | Technology deployment |
| | Investment and Capex |
| | Marketing campaigns |
| | Quality of service |
| | Joint ventures with non-carriers |
| | Collusion |
| ***Consumer indicators*** | Churn rate |
| ***Market trends*** | Price movements |
| | Growth of subscriber base |
| | Growth of industry revenues |
| | Minutes of Use |
| | New products |

## Chapter 3: Telenor's Asian Expansion

In the previous chapters we have outlined the framework that telecom companies should follow in order to assess a wireless market opportunity in a developing market. Now we will try to illustrate some of these concepts using the Norwegian company Telenor[5] as an example.

The reason for choosing Telenor is that its international expansion over the last decade has led the company to a situation where roughly 48% of its revenues and 60% of its EBITDA is derived from wireless operations in underserved markets in developing countries (see annex for details). Also, it was one of the first European companies to move into the South-East Asia region, starting as early as 1997 with the greenfield development of the Grameenphone company.

In this case study we will try to analyze Telenor's expansion in the Asian market. We will briefly mention their past strategies and then move on to assess the latest acquisition of a controlling stake in Unitec Wireless, the –still at a greenfield stage– wireless arm of Unitech Ltd., one of India's largest property developers.

We will not, however, perform an entire analysis of the Indian market. Rather, we will focus on specific points of the first and third steps of the framework we just developed assessing:

- The investment's fit in Telenor's Asian business strategy (Step one of the framework –the Business Model Level)
- Brief overview of India's regulatory framework (Step two of the framework –the Operating Model Level)
- India's regional market structures and their relative market potential (the *market structure* segment of Step three of the framework –the Service Model Level)

[5] To get a general overview of Telenor's activities and financial position please consult the Annex.

## Initial forays

Along with Vodafone, Telenor was one of the first European companies to enter the Asian markets[6]. Its first investment in the region can be traced back to 1997, when the company decided to acquire an interest in the greenfield operation that was to become today's enormously successful Grameenphone.

Today, Telenor is present in Pakistan, Bangladesh, Thailand and Malaysia. Together, these countries represent a potential client base of more than 438 million consumers, which is roughly 91 times the size of their domestic market, Norway.

Telenor's entry these markets has been a resounding financial success, their share of the group's revenues increasing every year –e.g., from 23% in 2006 to 30% in 2008. In fact, contrary to expectations, the Asian operations haven't even impacted negatively the group's EBITDA margin, which has grown to 35% from close to 25% in 2000. In fact, integration within the group has been achieved to the extent that the EBITDA margin of these companies is in line –and even above– some of the operations run by the group in Northern Europe.

Also impressive is the growth of the number of mobile subscribers for the Telenor group, which has grown from 2000 to 2008 at a breath-taking compounded annual growth of 30%. In fact, partly thanks to this Asian expansion, Telenor has become one of the largest wireless operators in the world in less than 10 years[7].

Telenor also has operations in Eastern Europe and a minority stake in Russia, and, along with TeliaSonera, is one of the major foreign wireless operators in the area. Additionally, it seems to maintain an active approach to its expansion in

[6] A complete timeline of Telenor's acquisitions in the Asian market can be consulted in the Annex.

[7] 5th by number of subscribers.

this market having engaged in the sizeable acquisition of Serbian Mobi 63 d.o.o. as recently as 2006.

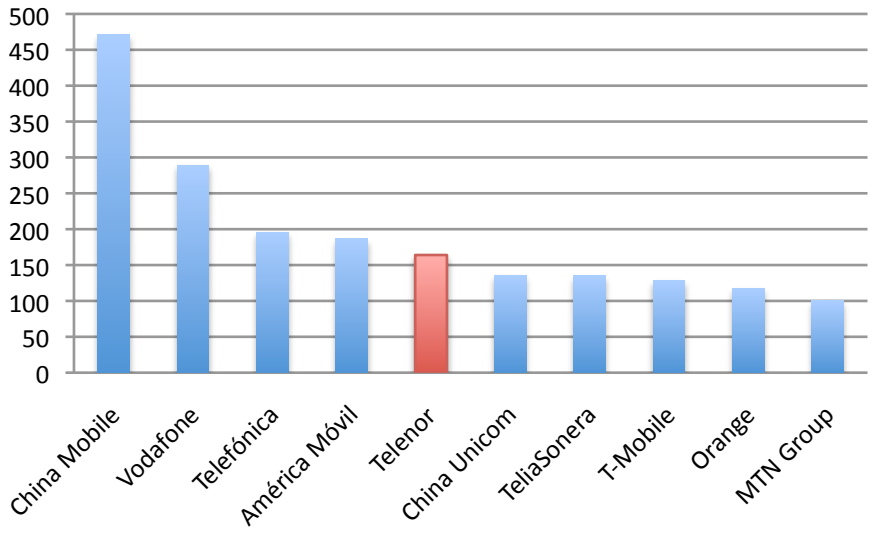



**Figure 11 – Ranking of wireless carriers by number of subscribers. Source: Annual Reports and institutional websites**

Also of interest is to note the differences in the subscriber base growth of Telenor's operations by country. While South East Asian operations have increased their share from 51% in 2006 to 64% in 2008 their Eastern European Operations have decreased their share from 40% to 30% and Northern Europe has come down to 6% from 9%.

Along with this growth we can notice the difference in customer behavior from one market to the other, represented here by the penetration rate of prepaid cards and the evolution of ARPU over time. Whereas we can see a very strong correlation between the country's income and the percentage rate of prepaid cards among subscribers, there is no discernable pattern for the ARPU. While declining in most operations, in some it has remained stable (Ukraine, Montenegro and Malaysia), in others it has increased (Serbia) and in others it has not remained stable at all (Thailand).

Next, we'll analyze Telenor's corporate strategy, to try and discern the main reasons behind their decision to enter the Indian market.

## Telenor's Asian business strategy

In this segment we'll analyze Telenor's Business model in Asia, and how well the acquisition of the Indian licenses fit into that model. We'll follow the process described in Chapter two, starting with the Business Model Level in this section and moving on to a brief overview of the Operating Model Level and the *market structure* section of the Service Model Level in the next two sections.

### Acquisition of Unitech Wireless

Telenor acquired Unitech Wireless on a two tranches deal clinched on March 20th of 2009 with the payment of the first installment of NOK 1.7bn, which is to be followed later in the year with a second installment of NOK 6.4bn[8]. By the end of the year, Telenor should have acquired control of the company, owning a controlling stake of 67.25%.

Unitech Wireless was the wireless carrier arm of India's second largest property developer, Unitech. Faced with financial problems subsequent to the oncoming of the financial crisis, Unitech chose to divest some non-core operations – amongst which their wireless division.

The company is the owner of wireless licenses and spectrum in every Indian province[9], which it bought from the Indian government at a cost of Rs 16.51bn. At the same time Unitech Wireless acquired the licensed, the government decided to grant extra licenses to the following operators: Datacom, Loop Telecom, Sistema Shyam Teleservices Ltd (SSTL), S Tel and Swan Telecom.

---

[8] The total deal value amounts to roughly Rs 61.2bn, with exchange rates as at the day of signature.

[9] The wireless Indian market is partitioned in 22 administrative divisions called circles, which are regulated by the Department of Telecommunications (DoT), in turn a branch of the Ministry of Home Affairs. We'll discuss the Indian market later in this chapter.

It is interesting to note that Telenor had already tried to enter the Indian market through the acquisition of Datacom in September 2008, retainer of 13 licenses in the same amount of circles. The deal finally fell through when Telenor's offer of ca. Rs 70bn didn't satisfy one of the main shareholders of Datacom.

Unitech Wireless has not yet started operations, but plans to initiate rollout of services in the third quarter of 2009, taking a phased approach and launching operations in only eight of the 22 circles where the company is licensed:

- Four circles in the south
- Two circles in Uttar Pradesh
- One circle in Bihar
- One circle in Orissa

The company has already retained two companies in charge of the construction of their GSM network (Huawei and Alcatel-Lucent, for a combined price of $400m) and outsourced their IT services to Wipro for $500m.

### Corporate strategy

The company's corporate strategy has been characterized since the 1990s by almost prescient acquisitions in underserved wireless markets ready to blossom. The first wave of acquisitions took place in the early nineties, when Telenor decided to expand their operations into the Eastern European markets. In the mid-nineties their focus swiveled towards the underserved markets of South East Asia, starting with Bangladesh in 1997 and moving later into Thailand, Malaysia, and Pakistan.

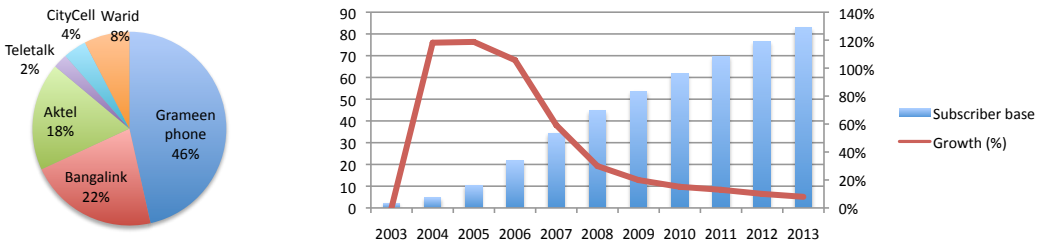



**Figure 12 – Bangladeshi Wireless Market. Market shares in 2008 and Projected Growth of Subscriber base. Source: Telenor, GrameenPhone, Frost and Sullivan**

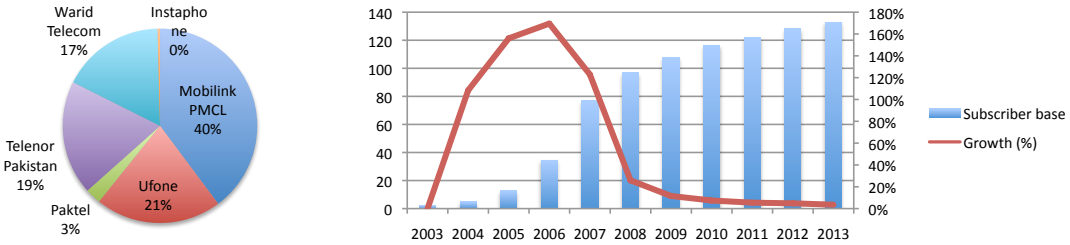



**Figure 13 – Pakistani Wireless Market. Market shares in 2007 and Growth of Subscriber base. Source: Telenor, Frost and Sullivan**

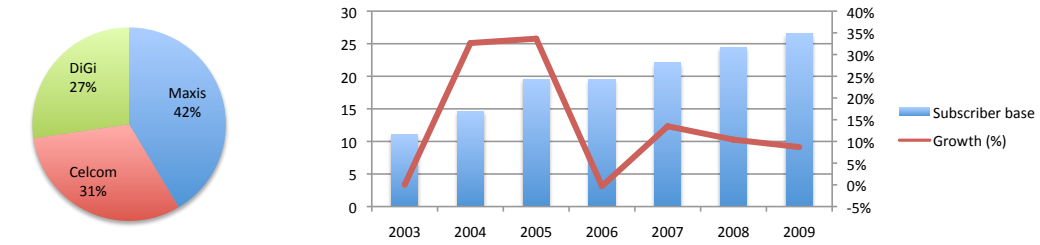



**Figure 14 – Malay Wireless Market. Market shares in 2007 and Growth of Subscriber base. Source: DiGi, Frost and Sullivan**

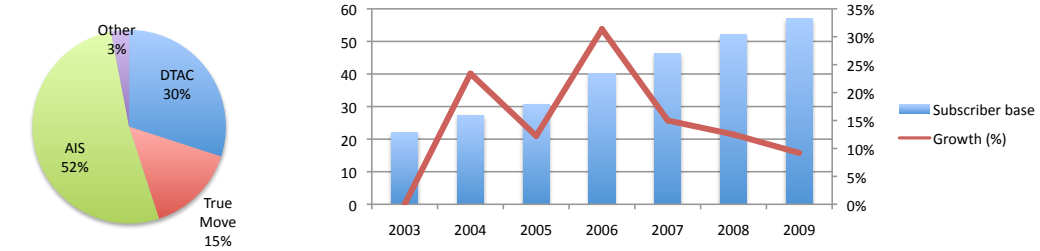



**Figure 15 – Thai Wireless Market. Market shares in 2007 and Growth of Subscriber base. Source: Telenor, Frost and Sullivan**

A quick review of their Asian portfolio tells us that the wireless markets where they are present are concentrated, but most importantly, we can see that the growth in the number of subscribers in all four markets is waning. In effect, after a few years of extremely high growth, markets seem to have stabilized at a rate inferior to 10%. This fact is best observed for the cases of Pakistan and Bangladesh.

The main difference between these two cases is that in the case of Bangladesh, Telenor was present through Grameenphone even before this aggressive growth started. In the latter case, however, market entry was much more timely. Telenor decided to enter the market in 2004, making it possible to just reap the benefits of the market boom.

Interestingly, Telenor also entered Malaysia (in 2000) and Thailand (in 2002) ahead of the years of maximum growth. In fact, this seems to be a constant in most of their investments with examples even in other regions (e.g., timely entrys in Ukraine and Serbia).

Also to be noted is the fact that all markets were entered through controlling acquisitions. This seems to be a divergence from their acquisition strategy in the late 90s whereby, barring Bangladesh, most acquisitions were minority stakes. However this seems to have changed with the turn of the century: minority acquisitions, mostly in European companies, were divested, and the focus turned towards the Asian markets[10].

Carefully examining Telenor's portfolio, we readily observe that acquisitions can be, among other factors, put down on two major criteria:

- Large populations
- Low penetration ratios

[10] For more detailed information see Telenor's acquisition timeline in the Annexes.

In this context, we can see how India would pose itself as a very attractive market for Telenor's expansion. However, one can argue that India would not be the only country meeting these two general criteria. This is, indeed, true, and as testament of that we will mention that Telenor's expansion plans, before deciding to enter the Indian market were very much focused on entering the Vietnamese market.

We must thus conclude that there are other factors beyond general compliance with the company's corporate strategy that drove the decision of opting for an entry into the Indian market rather than Vietnam. First, let's consider that, while many countries satisfy the two previous requirements, no country can match India's potential for wireless growth.

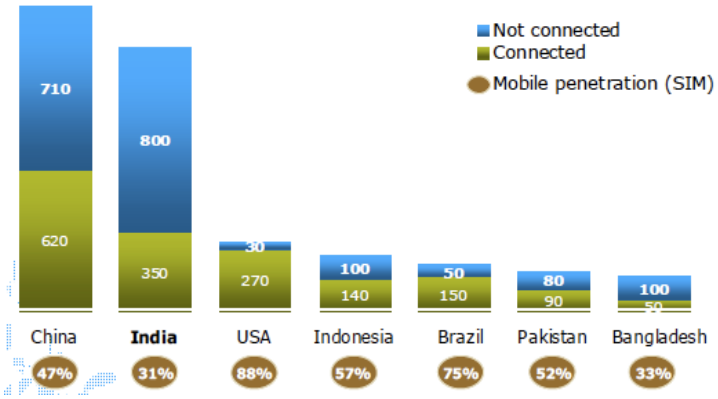



Figure 16 – Populations with and without mobile connections in 2008. Source: Telenor

India's low penetration rates and huge population make it a future locus of growth for the wireless sector. In fact, given that, as we said before, the number of firms in a market is limited both naturally by market dynamics constraints and artificially by the limited number of licenses that the government doles out, whichever companies will be able to become a part of the wireless reality in India will be, undoubtedly, amongst the largest operations in the world. Whereas size is not necessarily good for every business, we have already discussed that, for wireless, economies of scale, of scope, and internalization of network effects come, at least partly, with size.

Another important part of the opportunity that India represents comes in the shape of its very low ARPU, which might be undervalued. It stands to reason that the ARPU should be, to a certain extent, linked to the income of the user. This means that in those countries where the income is growing aggressively, the ARPU is also likely to increase. This, coupled with the fact that the ARPU is typically a waning figure for most markets around the world create a very high upside potential for the Indian market.

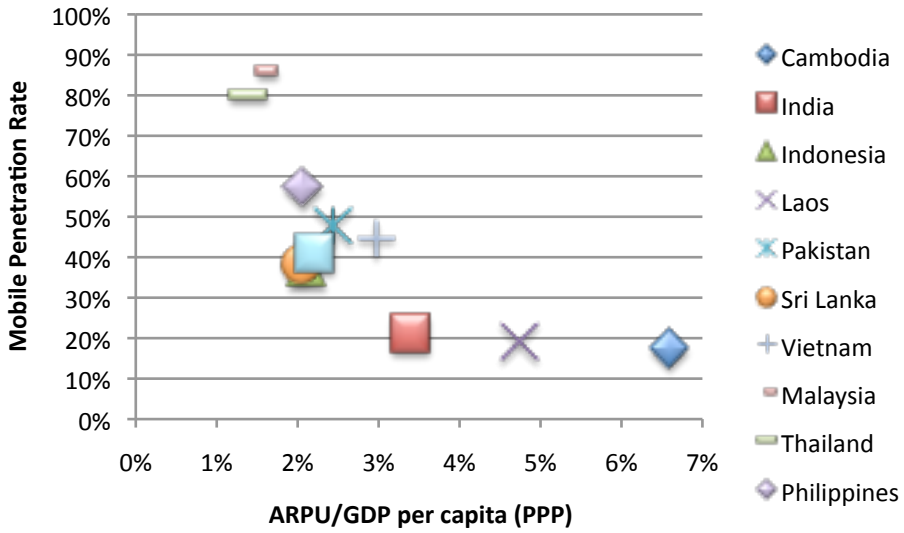



**Figure 17 – Mobile Penetration Rate vs. ARPU as a percentage of GDP (PPP). Source: Frost and Sullivan, Telenor, TRAI, BTRC**

Finally, another point in favor is its close relationship with markets where Telenor is also present, such as Bangladesh. Even though a great many national differences will characterize the Indian market in a unique way, the cultural divide to be bridged will surely be smaller thanks to their corporate acumen derived from dealing in somewhat similar markets.

### Marketing Strategy

Telenor derived approximately 50% of its revenue and 60% of its operating income from its activities outside the Nordic region. Needless to say, far from being considered purely foreign operations, Telenor's activities in the developing

markets of Eastern Europe and South East Asia are now a part of Telenor's core strategy.

However, there is an argument to be made that their stake in these markets provides them with more than just an economic return: it gives them brand power, and a reputation of competence and diligence in developing markets. Albeit much less tangible than dividends, this investment in brand recognition serves a dual purpose:

- To portray itself as an engine for growth in developing and underserved markets, and use this image to reinforce their corporate brand in markets close to home
- To wield its experience in developing countries as expertise to pressure local incumbents and regulators to ease the business conditions of new ventures

The first purpose is evident when looking at the company's reporting. Sentences like "We believe growth comes from truly understanding the needs of people to drive relevant change"[11] are a clear allusion to the company's interests in developing countries, and try to build goodwill towards the company from potential customers in all their markets. Other efforts to divulge the positive social impact of their business conduct abroad include presentations, seminars, and even consultancy studies.[12]

The second, more succinct, effect of the projection of their brand image is clearly observable on corporate communication related to new potential acquisitions. Their –admittedly very positive– track record in most developing markets where the company's present probably goes a long way when discussing the merits of a new business case.

---

[11] Company's motto on corporate website: www.telenor.com.

[12] *Economic impact of mobile communications in Serbia, Ukraine, Malaysia, Thailand, Bangladesh and Pakistan*, Deloitte, 2008.

So it is plain to see how very useful a positive socio-economic impact of their business activities in developing countries has been to improve their corporate image. We could thus argue that it is in the interest of the company's image to keep up investment in this kind of market.

## The Operating Model of the Indian Wireless Market

We will not delve deep into the legal structure of the Indian wireless market or other national-wide constraints such as we mentioned during the exposition of the model. Rather, we will develop the topic only to the extent necessary to enable a working understanding of the country's regulatory restrictions so as to fully comprehend the market structure analysis performed in the next section.

India's telecom liberalization has come a long way in recent years. At present, regulation is based in the New Telecommunications Policy act (NTP) of 1999, whereby rules for foreign and private ownership, market structure and other regulations were lain down to foster the build-up of the nation's telecom infrastructure.

An independent regulatory body, the TRAI (Telecom Regulatory Authority of India) was set-up in 1995 to overlook market conditions and ensure a level playfield. Its authority is independent from government. The final licensor of the spectrum is, however, the DoT (Department of Telecommunications), which is part of the Ministry of Home Affairs. The TRAI's responsibilities include ensuring companies abide with regulations, monitoring the competitiveness of the market and making recommendations, either *motu proprio* or on request, to the DoT. The end result is a complex balance of power between the two institutions and the ministry itself.

For the purpose of wireless communications, the country is demarcated in 22 different areas denominated Circles. Each circle roughly corresponds with the different Indian states. The three largest Indian cities –Mumbai, Kolkata and Chennai– and the national capital, New Delhi, all form independent circles.

When calling bids for tender, the Government divides all regional circles –i.e. excluding the city circles of Mumbai, Kolkata, Chennai and New Delhi, denominated Metro circles– in three categories, largely according to the revenue that could be reasonably extracted of each area. See Figure 18 for a graphical view of this segmentation:

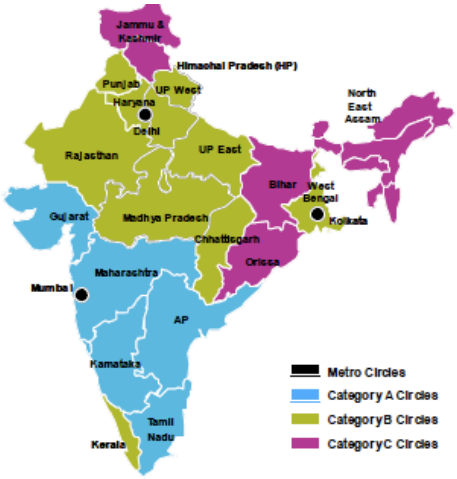



Figure 18 – Indian circles for wireless telecommunications. Source: Telenor

Initially, each circle was only legally entitled to hold two wireless operators, but this restriction was lifted in the late 90s and all circles have at least three operators. Also, licenses are currently awarded for 2G, GSM services, and valid for a span of 20 years.

Finally, it is important to mention that TRAI will halt any merger from taking place if:

- The combined entity will hold more than 40% of the market share in one circle
- The number of access providers in any of the circles is less than four after the merger or acquisition

## The Structure of The Indian Wireless Market

During the year 2008, India became the world's second largest wireless market, second only to China by number of subscribers. The Indian market is one of the

most competitive in the Asian region, with more than six wireless carriers in most circles, and nine licensed carriers overall.

The Indian market has grown phenomenally during the past decade, and given its current low penetration rate and per capita income, still has the potential for aggressive growth in short and medium term.

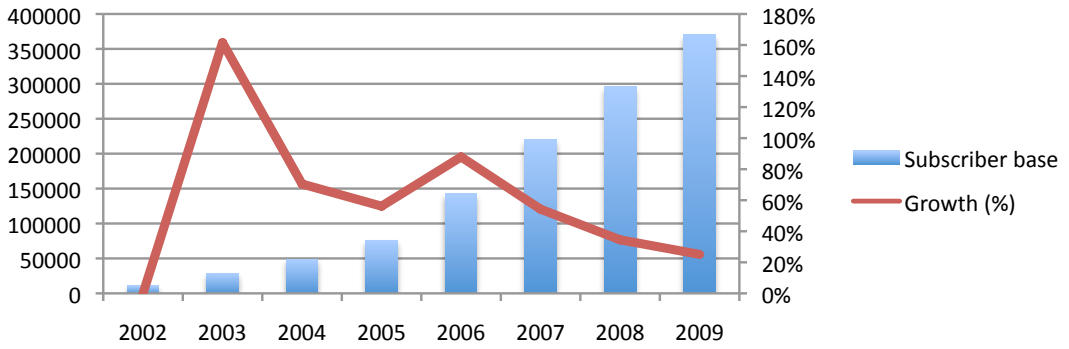



Figure 19 – Subscriber base (in thousands) and growth of the Indian wireless market. Source: TRAI

Even though it seems the peak growth has already been reached, we observe that as at early 2009, the growth of the subscriber's base is still well above 20% much higher than that of any of the other countries of operation in Telenor's portfolio.

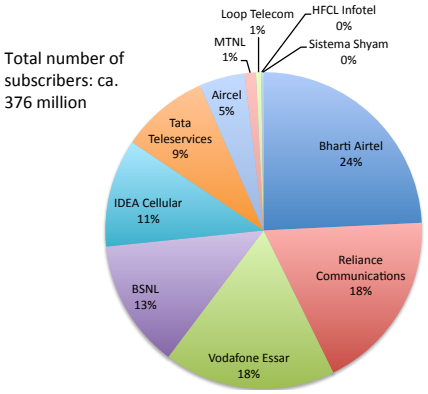



Figure 20 – Market share of main Indian wireless carriers. Source: TRAI

Regarding the state of the competition, we can readily observe that the Indian market is highly fragmented, with 7 major carriers, 4 minor, more local competitors, and as we will see very soon, even more to come in the very near future.

An immediate consequence of this strong competition is a decline in the price of the wireless services. In fact, India is one of the countries with the lowest ARPU in the world –around $57[13].

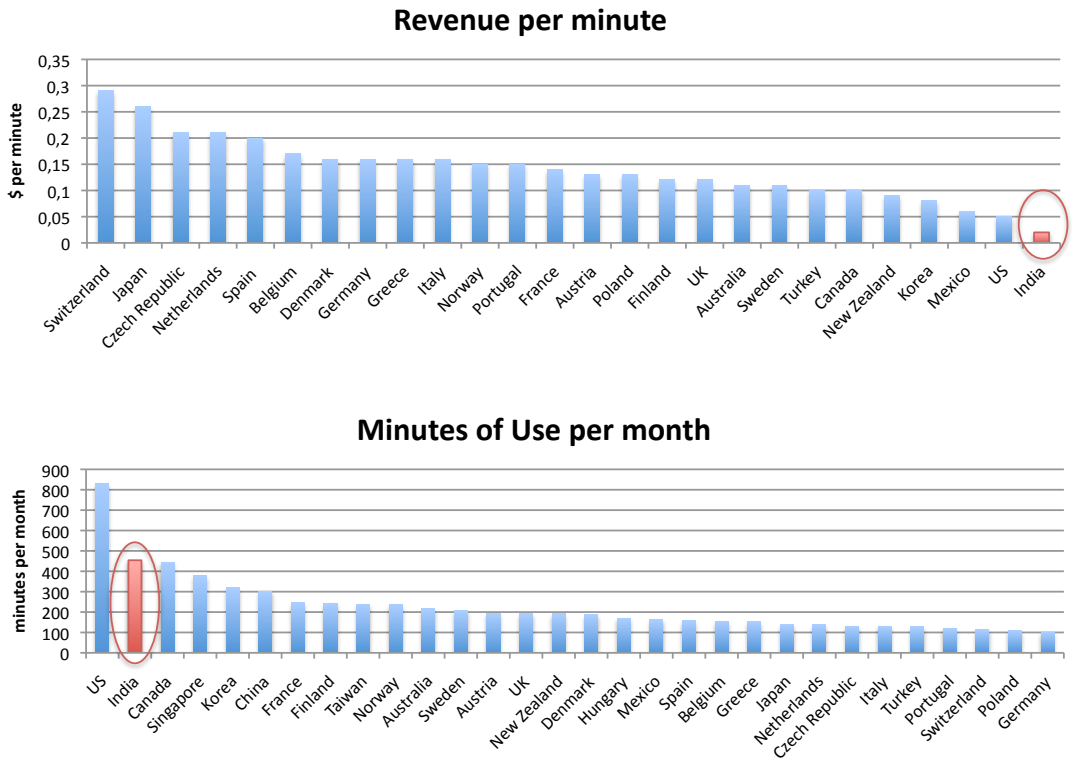



Figure 21 – Revenue per minute and MoU around the world

As we can see from the graphs, the situation in India is of extreme competitiveness for carriers, and the revenues per minute of conversation are lower than in any OECD country. On a more positive note for operators, however, the MoU in India is high and closing in into that of the U.S., the highest in the world.

We saw in Figure 20 that the Indian telecom market seems highly fragmented. But how does it compare to the rest of the world? If the number of wireless carriers in the Indian market is significantly higher than that of countries abroad,

[13] Source: DoT

we might conclude that the reason for its low prices lies not with the country's low income per capita, but with a heavily populated market.

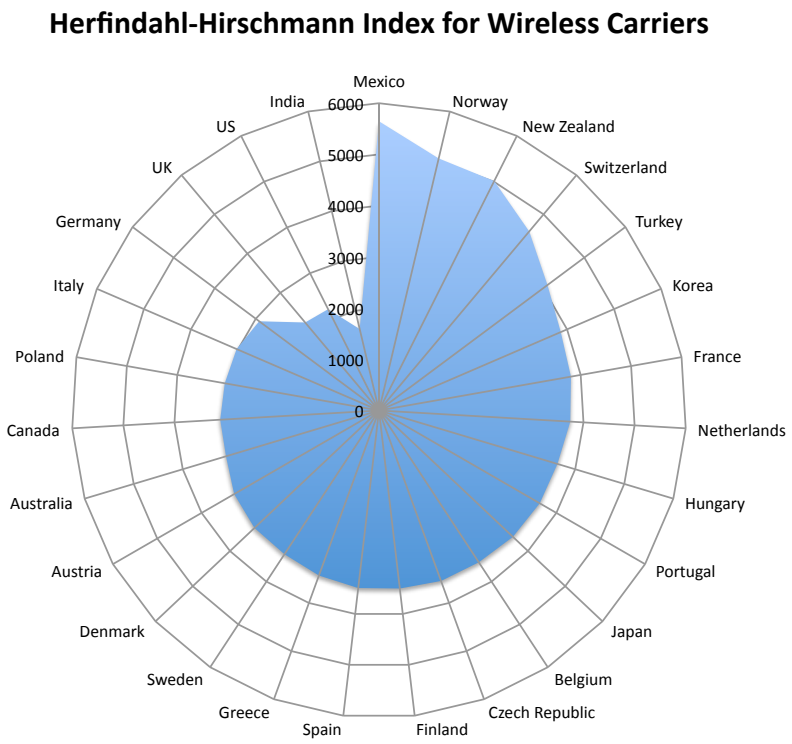



**Figure 22 – Herfindahl-HIrschmann Index[14] for Wireless Carriers through the world in 2008. Source: OECD, TRAI**

In effect, from Figure 22 we observe that the HHI is much smaller for India than for any other country in our statistical universe[15]. The choice for our universe is not trivial: most countries in the graph have long established and mature wireless markets, where prices, penetration and market shares have held relatively stable over time.

In the light of this evidence it is easy to see that the Indian wireless market is far more competitive than most developed markets. Although this could be interpreted as a sure sign of overheated competition, one might argue that the

[14] The Herfindahl Hirschmann Index is computed as the addition of the squared market shares of the largest hundred companies in a market. A market is said to be uncompetitive when the HHI figure rises above 1,800.

[15] Composed of the OECD countries plus India.

specificities of the Indian market make high competition a desirable trade. For example, we might consider the fact that the client base grew at a staggering 40% in 2008, which is hardly the case in most developed markets. Additionally, given that the mobile penetration is still very low, the subscriber base still needs to grow by hundreds of millions before the country is at a par with neighboring wireless marketplaces.

While this extreme growth in numbers may be a reason behind this highly competitive market, empirical evidence from Telenor's other endeavors in South-East Asian markets might indicate that fragmented markets lead to industry consolidation. One clear example is the case of the Malay market, where Telenor's low revenues shot up after the consolidation wave that swept through the country in 2005.

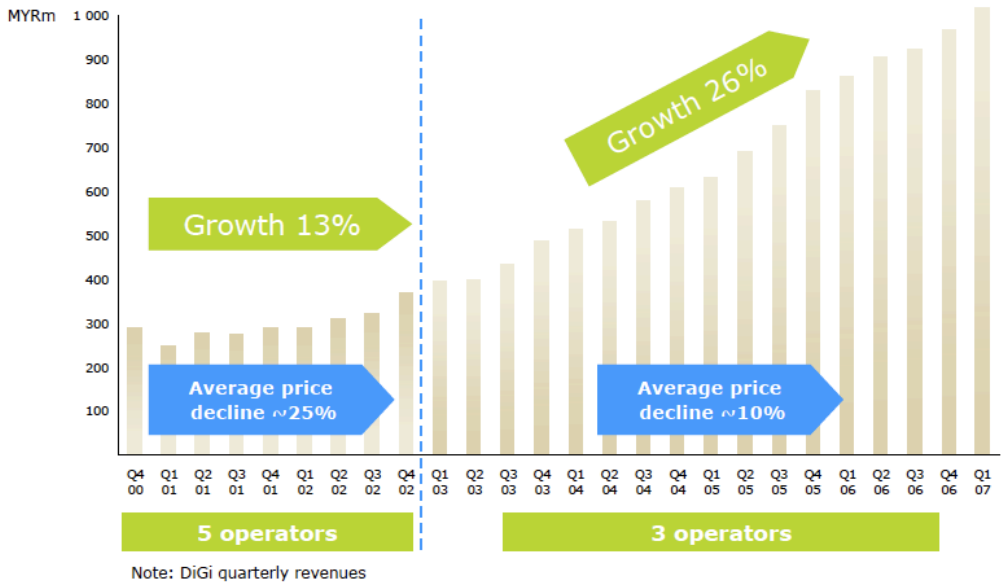



Figure 23 – DiGi revenues from 2001 to 2006

The main reason behind this boom revenue was that, although price decline in the Malay telecom market was continued throughout, its pace gave up strongly after the market consolidated. This seems to indicate that, while a certain decrease in price is warranted in the wireless industry, this decline should be driven by technology advancements, and not cannibalistic competition.

Given the empirical effect on the Malay market, and for the reasons we gave in the analysis of the competition segment during the exposition of our framework, we conclude that there is an optimal number of players in the wireless market. However, we don't know what that number might be for the Indian market, or, in fact, any market at all. While we mentioned before that one of the main reasons to limit the amount of players was that costs had to be recouped and that excessive competition might trigger a price war, here we'll mention two more reasons to curb the number of licensees of a wireless market.

The first reason is that in a market where the purpose is to establish communication between individuals, it is of paramount importance that customers be able to reach each other, even if they have different providers. This involves the different carriers agreeing upon a set of technical criteria to connect falls from base stations belonging to different companies, an order of precedence, network sharing agreements, roaming contracts, etc. In fact, this is even more relevant in India than in most OECD countries, due to the fact that in most OECD countries, the market has stabilized and a consensus on the technology of preference has been reached long ago[16]. In India, on the other hand, the two major 2G technologies are still competing. Even though this tendency towards multiple technologies seems to be receding and GSM is slowly but surely becoming the standard, CDMA accounts for roughly 25% of all mobile connections[17]. If anything, this duplicity of technologies makes collaboration between competing companies even harder, and can be a deterrent to enter the market.

The second comes upon close observation of more mature wireless markets. Ideally, we would like to be able to directly compare the number of operators in fully developed markets to those in India. However, authorization procedures for a new operator (licensing, registration, etc.) differs from one country to the next

[16] GSM being the chosen technology in all European countries, and CDMA being the American standard.

[17] Datum released by the TRAI for the year 2008.

in terms of the term and geographical limits of validity of the license, so it is very difficult surmise anything by comparing solely the number of operators across countries. In order to overcome this difficulty, and instead of taking the number of licensed operators, we will look at the number of carriers in each country with a market share higher than 5% of the subscriber base. This way, we can harmonize the comparison across the different geographies.

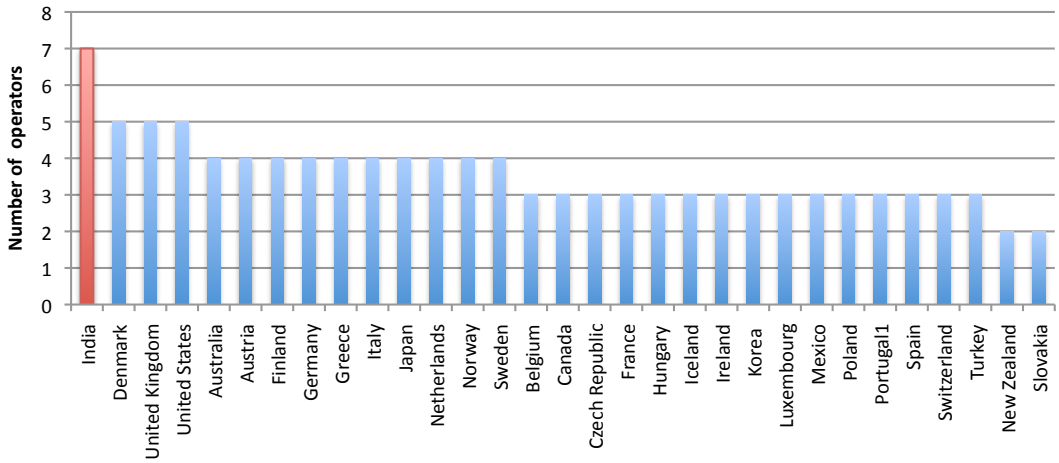



**Figure 24 – Number of operators with a subscriber market share higher than 3% in the OECD and India. Source: OECD**

Not surprisingly, we find that India has more carriers than any other OECD country. Interestingly, we notice that the number of operators is not related to the size of the population they serve: Germany, with close to 80 million citizens, has the same number of operators as Norway, with a population size of roughly 3 million. Since there is no demographical trend, the argument that the size of the Indian market would allow for more operators seems unwarranted.

Even though there is little evidence as to what is the appropriate density of the competition for the wireless market, an interesting conclusion could be posited in light of this evidence. In order to arrive to this conclusion, we will use the number of companies in each country as the input to an infinitely repeated game. In order to set up the rules of the game, we'll need to make certain assumptions:

- Wireless is a market in perfect competition

- The number of companies is limited by the ability to internalize network effects and economies of scale and scope that make production cheaper
- Regulations and the effect of government intrusion is not considered

The main consequences of these two assumptions are that competition is completely based on price –if a company posts a price lower than the market price all subscribers will switch and it will gain 100% market share– and that barriers of entry into the business are very high given the savings concomitant to a larger size. Of course, this is not the case in real life.

In real life, wireless competition is best described as a monopolistic competition with a number of players that is artificially curbed by the availability of access to a country's spectrum and naturally curbed by the aforementioned internalization of network effects.

In any case, the assumptions depict a market whose characteristics are far from reality conceptually, but close enough effectively. If we now assume that the total market revenue is of value $\prod$, that the number of players in the market is *N*, and that the game consists on setting a price for your product, then each player *i* faces the following decision on each turn:

- If player *i* decides to lower the price below the market price, then he'll gain $\prod$ for the first year, as he'll obtain 100% of the market share. However, we'll hypothesize that on the following year his revenue will be minimal because, in response to the "betrayal" of lowering prices, all other competitors have now posted prices below his and he has lost its market share. For simplicity's sake, we will model his revenue on the second year as zero. We can model the future earnings of player *i* in this case as: $\Pi_{t=1} + 0_{t=2} + \ldots + 0_{t=n}$
- If player *i* decides to equate his prices to the market price, then his revenue will be the total value of the market that year, $\prod$, divided by his market share. For simplicity's sake, we'll assume that each player has the same market share, that is, market share of player *i* is equal to *1/N*. We

can model the future earnings of player *i* in this case as: $\frac{1}{N}\Pi_{t=1} + \beta\frac{1}{N}\Pi_{t=2} + \ldots + \beta^n\frac{1}{N}\Pi_{t=n}$

Where *ß* is the discount factor of future earnings, given the time-value of money. Given these constraints, no player will cheat and equilibrium on the number of players will be preserved if and only if:

$$\Pi_{t=1} + 0_{t=2} + \ldots + 0_{t=n} \prec \frac{1}{N}\Pi_{t=1} + \beta\frac{1}{N}\Pi_{t=2} + \ldots + \beta^n\frac{1}{N}\Pi_{t=n}$$

If we further assume that $\Pi_{t=1} = \Pi_{t=2} = \Pi_{t=n}$, then we can conclude that:

$$N = \frac{1}{1-\beta}$$

Given that *ß* is the discount factor of future revenue, it can be associated with a certain required rate of return under the form:

$$r = \frac{1}{\beta} - 1$$

As we can see in Table 9, the results we obtain following this reasoning are extremely contradictory. We will try to reason in terms of the implicit *r*, since the rate of return is a measure we are very used to. We would expect the required rate of return, *r*, to be an indication of the risk undertaken by companies when launching into the wireless market in these countries. The reason being that *r* is the empirical discount rate for our projected earnings as calculated in the model. The first anomaly comes in the same of the magnitude of r. Averaging 44%, it seems to be extremely high to be a rate of return.

Secondly, we observe that the rate *r* has very little to do with the risk typically associated with doing business in these countries: it is relatively low for India, and extremely high for western European countries such as France or Spain.

**Table 9 – Number of operators by country, along with the associated *ß* and implicit rates of return. Source: OECD, estimates**

| Number of Operators | *N* | Implicit ß | Implicit r |
|---|---|---|---|
| India | 7 | 0,86 | 17% |
| Denmark | 5 | 0,80 | 25% |
| United Kingdom | 5 | 0,80 | 25% |
| United States | 5 | 0,80 | 25% |
| Australia | 4 | 0,75 | 33% |
| Austria | 4 | 0,75 | 33% |
| Finland | 4 | 0,75 | 33% |
| Germany | 4 | 0,75 | 33% |
| Greece | 4 | 0,75 | 33% |
| Italy | 4 | 0,75 | 33% |
| Japan | 4 | 0,75 | 33% |
| Netherlands | 4 | 0,75 | 33% |
| Norway | 4 | 0,75 | 33% |
| Sweden | 4 | 0,75 | 33% |
| Belgium | 3 | 0,67 | 50% |
| Canada | 3 | 0,67 | 50% |
| Czech Republic | 3 | 0,67 | 50% |
| France | 3 | 0,67 | 50% |
| Hungary | 3 | 0,67 | 50% |
| Iceland | 3 | 0,67 | 50% |
| Ireland | 3 | 0,67 | 50% |
| Korea | 3 | 0,67 | 50% |
| Luxembourg | 3 | 0,67 | 50% |
| Mexico | 3 | 0,67 | 50% |
| Poland | 3 | 0,67 | 50% |
| Portugal | 3 | 0,67 | 50% |
| Spain | 3 | 0,67 | 50% |
| Switzerland | 3 | 0,67 | 50% |
| Turkey | 3 | 0,67 | 50% |
| New Zealand | 2 | 0,50 | 100% |
| Slovakia | 2 | 0,50 | 100% |

There are two possible explanations that account for the value of these rates of returns:

- The risk associated with operating a wireless carrier is in no way related to the usual risks involved with business: political, regulatory, stability of GDP, etc.
- The force behind the bloated rate of return in more developed countries are the very high barriers of entry imposed by:
    - Regulators and limitations on the access to licenses
    - The internalization of network effects derived from larger operations as well as economies of scale and scope

We lean for the second option, which would result in the Indian market being excessively fragmented, even given its enormous size and potential. Remember that, as we say before, the number of operators seems to be driven by forces unrelated to the population served.

One last argument could be that, even though the size of the overall market doesn't seem to impact the number of carriers, the segmentation of the market might. In fact, if different regions in India behave like entirely different markets and carriers are very focalized in different parts of the country, then the net result would be a geographically split market run by local oligopolies. However, a closer look at the Indian regional markets shows that this is not the case.

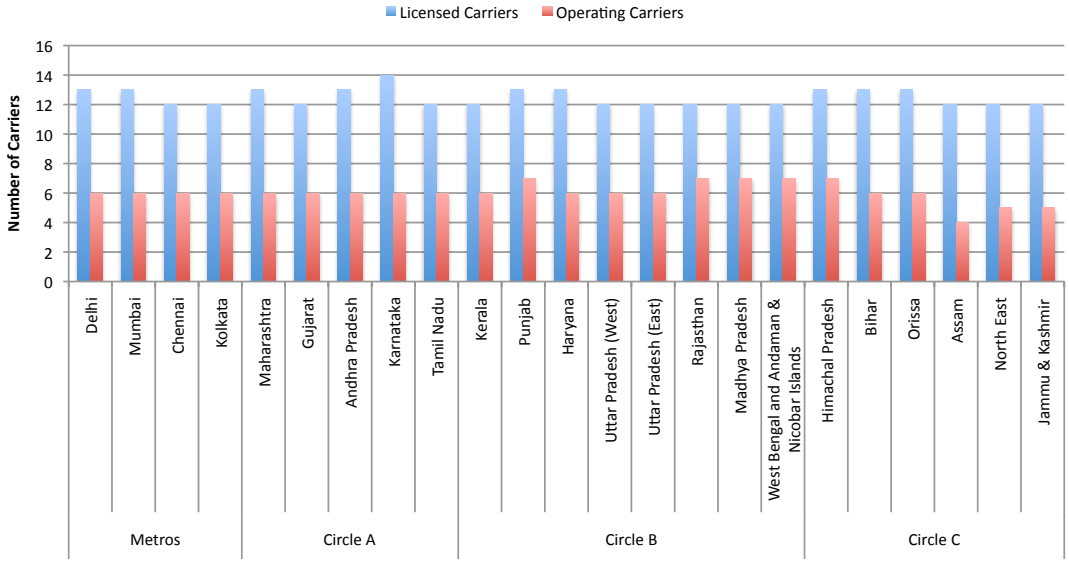



**Figure 25 – Number of licensed and operating carriers by circle. Source: TRAI Annual Report, 2008**

As we can see, not only the number of operators remains high on a per circle basis, but it is also likely to increase dramatically –double, in most cases– with the new licenses doled out by the Indian government in January 2008 and later in the same year[18].

[18] It was during this expansion in the number of wireless licenses that Unitech Wireless bought the rights to operate mobile networks in the 22 Indian circles. Other companies that also bought rights are Swan Telecom, Datacom, Spice Communications and S Tel.

## Further Research

Even though the telecommunications market is a part of our daily lives, its supply and demand dynamics are very hard to model and predict, and empirical research on the subject seems to be scarce. Even though very interesting theoretical research papers have been published (cf. reference papers), there is a dearth of freely available factual data.

It would also be of extreme interest for the industry to further develop our understanding of the nature of the various network effects and of how to internalize them. Ideally, this would lead to a way of clearly quantifying these effects, which would be, in turn, a step towards understanding the competition dynamics of the wireless market. In fact, we believe that quantification of the number of players in a given wireless market would be a great help in the development of economically-sound policies that can lead to a fast development of the sector, and hence, more research should also be devoted to this subject.

Also, research exploring the correlations between internationalization into developing markets and performance measures of wireless operators firms would help both companies and governments in setting –and abiding by– good developmental policies and regulations.

Finally, given the outcome of our analysis on the Indian market, it would be enlightening to learn more about the effects of colluding telecom companies. The fact that the number of companies is so high in India could signal a break-up in collusion efforts by the country's major MTOs, but empirical analysis should be conducted to assess the veracity of that statement.

## Conclusion

We started this paper by providing the macroeconomic reasons for wireless companies to expand their operations into developing markets. We observed that developed markets were reaching a saturation point amidst an environment of constantly declining ARPU, mainly due to cultural reasons involving new ways of communication. Finally, we pointed out that growth in developing markets will be strong, fast, and sustainable, and its driven by a large unmet demand and a friendly regulatory environment brought about by liberalization processes.

In Chapter 2 the business analysis framework we believe companies should use to assess opportunities in foreign mobile markets. We decided the process had to be a three-stage, recursive and sequential approach, so as to allow for new information collected during later stages to percolate to the company's strategy since inception. The different steps we defined for our framework were:

**Table 10 – Summary of Stages of Business Analysis Framework for developing markets**

| **Stages of the Business Case analysis framework** | | |
|---|---|---|
| *Step* | *Constraints* | *Sub-steps* |
| Business Model | *Company and Global constraints* | Corporate and Marketing Strategy |
| | | Financial Considerations |
| | | Technology design |
| Operating Model | *National constraints* | Revenue expectations |
| | | Regulatory Issues |
| | | Government Policy |
| Service Model | *Local constraints* | Service Mix |
| | | Demand Dynamics |
| | | Operations |
| | | Competition |

In Chapter 3 we examined the case of Telenor. We described their business activity, their current portfolio of operations, and analyzed their latest acquisition using parts of the business framework developed in Chapter 2.

We found that the decision to enter the Indian market was a very good fit with their corporate and marketing strategies, and sound from a technological and regulatory point of view, given their experience in similar markets and the seeming willingness of the Indian government to welcome foreign investments. However, while examining the local constraints of the market we noticed that the marketplace was already teeming with highly competitive local companies. We also observed that this competition was likely to increase further as a consequence of the policies implemented by the Indian government since January 2008. We compared the amount of competition in the Indian wireless market with those of more developed economies, and unsuccessfully tried to establish a correlation between the number of operators in the markets and some macro variables. We then moved on to analyze the number of companies in a market as the result of a infinitely repeated competitive game, and found that the number of players is heavily restricted by very high barriers of entry and government licenses that keep required returns abnormally bloated. We noticed that this was not the case in the Indian market, signaling a fierce competition with high risk of triggering price wars in all its regions. Given the landscape we observe in more developed markets we are inclined to believe that the Indian market will undergo a period of massive consolidation in the near to mid-term.

Taking into account all the above and considering their almost prescient track record for risky investments, we believe the decision of Telenor to move into the Indian market was strategically found. We also believe its success is pinned on a wave of consolidation in the Indian market.

# Bibliography

## References


Barrantes, R., Galperin, H. (2008). *Can the poor afford mobile telephony? Evidence from South America*. Telecommunications Policy 32 (2008) 521– 530

Barro, R.J. (1999). *Inequality and Growth in a Panel of Countries*. Presented at the American Enterprise Institute

Bhawan, M.D., Marg, J.L.N. (2007). *Review of License terms and conditions and capping of number of access providers*. TRAI Consultation Paper No 7/2007

Clegg, J. & Kamall, S. (1998). *The internationalization of telecommunications services firms in the European Union*. Transnational Corporations, 7(2), 39-96

Cornia, G.A., Julius, C. (2001). *Inequality, Growth and Poverty in the Era of Liberalization and Communication*. UNU World Institute for Development Economics Research

Curwen, P. (2005). *The telecommunication sector shows signs of revival*. Info, Vol. 7, 1, 41-52

Graack, C. (1996). *Telecom Operators in the European Union: Internationalization Strategies and Network Alliances*. Telecommunications Policy, Vol. 20, 5, 341-355

Jakopin, N.M., Gerpott, T.J. (2004). *Internationalization Trends of Mobile Network Operators*. 15th Biennial ITS Conference, Berlin

Knight-John, M., Zainudeen, A., Khan, A.S. (2005). *An Investigation of the Replicability of a Microfinance Approach to Extending Telecommunication Access to Marginal Customers*. WDR Dialogue Theme 3rd Cycle, Discussion Paper WDR 0506

Liebowitz, S. and Margolis, S. (2002). *Network Effects*. Handbook of Telecommunication Economics, Volume 1, 3, 79–81

Squire, L. (1973). *Some aspects of optimal pricing for telecommunications*. Bell Journal of Economics and Managerial Science, 4, 525–525

Taylor, L. (2002). *Customer Demand Analysis*. Handbook of Telecommunication Economics, Volume 1, 4, 101–105

Xie, W., White, S. (2005). *Latecomer Strategies: Leveraging and Learning By China's Handset Makers*. INSEAD, Faculty Research


## Books


Cave, M., Vogelsang, I., Majumdar, S. (2002). *Handbook of Telecommunications Economics, Structure, Regulation and Competition*. Editor: Elsevier

Gibbons, R. (1992). *Game Theory for Applied Economists*. Editor: Princeton University Press

Goulvestre, J.P. (1997). *Economie des Telecoms*. Editor: Hermes

McGuigan, J., Moyer, R., Harris, F. (2007). *Economics for Managers*. Editor: Southwestern College, International Edition

Prahalad, C.K. (2006). *The Fortune at the Bottom of the Pyramid*. Editor: Wharton School Publishing

## Websites

http://www.btrc.gov.bd/ – Bangladesh Telecommunications Regulatory Commission

http://www.trai.gov.in/ – Telecom Regulatory Authority of India

http://www.coai.in/ – Cellular Operators Association of India

http://hdr.undp.org/en/statistics/ – Human Development Reports, UNDP

http://www.telenor.com/ – Telenor's Corporate Website

http://www.tataindicom.com/ – Tata Indicom's Website

## Other Bibliography

Deloitte (2008). *Economic Impact of Mobile Communications in Serbia, Ukraine, Malaysia, Thailand, Bangladesh and Pakistan*

Guttman-McCabe, C. (2009). *The United States and World Wireless Markets: Competition and Innovation Are Driving Value in the US*. CTIA, the Wireless Association

International Telecommunications Union (2009). *Measuring the Information Society, the ICT Development Index 2009*

LirneAsia (2009). *India's Rural Millions: Connected?* Presentation to the Cellular Association of Operators of India, Mumbai.

OECD (2000). *Cellular Mobile Pricing Structure and Trends*. Directorate for Science, Technology and Industry

Telecom Regulatory Authority of India, Annual Report, 2007-2008

The Economist (2004). *Beyond the digital divide*. March 2004

The Economist (2005). *Less is more –Mobile phones and development*. July 2005

World Bank, (2008). *Global Economic Prospects, Technology Diffusion in the Developing World 2008*

Yusuf, M.A., Alam, Q. (2007). *Mobile phone sector in Bangladesh*. The Daily Star, July 2007

# Annexes

## Annex 1: Glossary

**Airtime**: Actual time spent talking on the handset. Carriers bill customers based on how many minutes of airtime they use each month.

**ARPU**: Average Revenue Per User

**Base Station**: A central radio transmitter/receiver that establishes and maintains communications between handsets or between a handset and another base station.

**Churn**: Customers leaving one service provider for another.

**CDMA** or **Code Division Multiple Access**: A spread-spectrum approach to digital transmission. A basic feature of CDMA in a voice application, for instance, involves digitizing and sub-dividing each conversation and tagging the resulting data with a code. CDMA is one of the more efficient air interfaces in commercial wireless systems.

**GDP**: Gross Domestic Product

**GSM**: Groupe Spéciale Mobile or Global Standard for Mobile Communications

**HHI**: Herfindahl-Hirschmann Index

**ITU**: International Telecommunications Union

**MMS**: Multimedia Messaging Service

**MTO**: Multinational Telecommunications Operator

**Private-Public Partnership**: Any of the many issues pertaining the relationship between the public good and corporate interests in a telecom market.

**Roaming**: The ability to use a wireless handset to make and receive calls outside one's home calling area.

**SMS**: Short Messaging Service

**TDMA** or **Time Division Multiple Access**: A digital wireless communications transmission method which digitizes a communication and inserts it into a radio channel by allocating unique time slots to each user within that channel.

**Trunk line**: A main line of a telephone system, or any other network

**UMTS**: Universal Mobile Telecommunications System

**Underserved Market**: is defined here as all populations currently served by little or not appropriate (cell, land or otherwise) phone infrastructure

**Universal Access**: A set of initiatives whose objective is to make telephone technology available to the whole of the population within a country. The parameters of these objectives –i.e., the ease of access– are defined differently from country to country.

**Universal Service**: A set of initiatives to make telecommunications services –telephone, Internet, fax and other means of communication– available to every person within a country. The parameters of these objectives –Internet connection speed, telephonic voice quality, etc.– are defined very differently from country to country.

**Wireless**: Radio-based systems that allow transmission of telephone and/or data signals through the air without a physical connection, such as copper wire or fiber-optic cable.

**WLL**: Wireless Local Loop

## Annex 2: Telenor

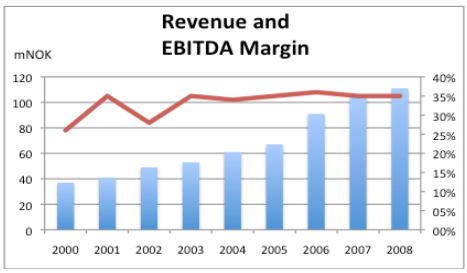
| | |
|---|---|
| Name | Telenor ASA |
| Employees | 39,250 |
| Year of Establishment | 1855 |
| Place of Incorporation | Oslo |
| Stock Exchange | Oslo Stock Exchange |

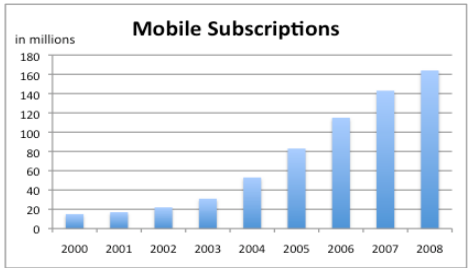
Telenor is the largest telecommunications operator in Norway and the European Nordic Region. It was founded as Norway's state-owned telecommunications monopoly in 1855 under the name Telegrafverket. Its current portfolio of operations includes not only wireless telephony, but also the operation of landlines in Norway and Denmark, broadband services, broadcasting, and a broad range of wholesale services oriented to business customers. Despite this apparent business diversification, more than 80% of its revenue in 2008 came from its mobile operations, and it is in this area that the company is actively seeking most of its growth. Also, the company ranks 5th worldwide by number of wireless subscribers.

*Selected Aggregate Financial Information*

**Telenor ASA** *(Figures in mNOK[19])*

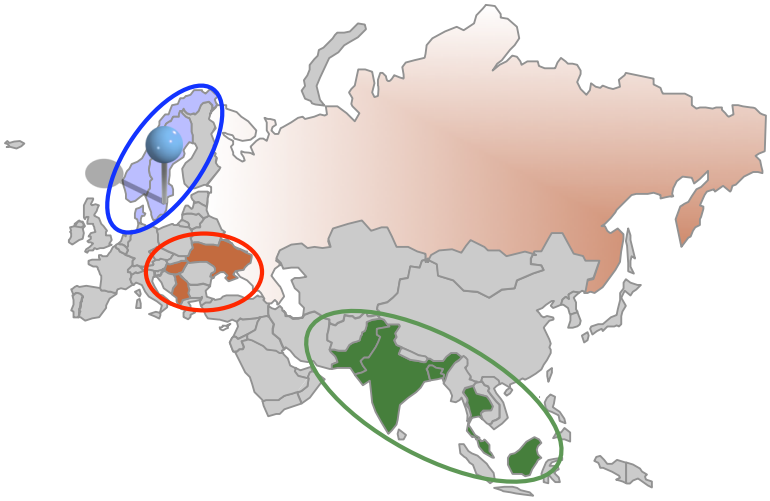
| | ***2006*** | ***2007*** | ***2008*** |
|---|---|---|---|
| Revenue | 91.077 | 92.473 | 97.194 |
| *% growth* | | *1,5%* | *5,1%* |
| EBITDA | 32.687 | 29.257 | 29.392 |
| *% of sales* | *35,9%* | *31,6%* | *30,2%* |
| Operating Profit | 17.708 | 14.985 | 15.182 |
| *% of sales* | *19,4%* | *16,2%* | *15,6%* |
| Net Income | 18.535 | 19.203 | 14.810 |
| *% of sales* | *20,4%* | *20,8%* | *15,2%* |




[19] 1 Norwegian Kroner (NOK) = 0.112 Euro as at June 8th, 2009

*International Presence*



Having restricted its activities to Norway for well over a century, Telenor started taking an active approach towards international development nearing the turn of the century.

As a result of this expansionary policy, Telenor is active in three regions:

| *Northern Europe* | *Eastern Europe* | *South-East Asia* |
|---|---|---|
| Norway | Hungary | Bangladesh |
| Sweden | Serbia | Malaysia |
| Denmark | Montenegro | Thailand |
| | Ukraine | India |
| | Russia | |

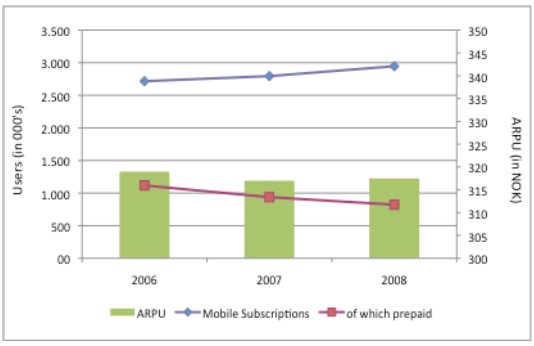
*Segment Information*

Telenor reports on a per division basis, with each division corresponding approximately to a country where the company is present. Except for the broadcasting and broadband activities in Norway, Sweden and Denmark, the company is only engaged in wireless communications across the board.

**Mobile Norway**

*Figures in 000's*

| | 2006 | 2007 | 2008 |
|---|---|---|---|
| Mobile Subscriptions | 2.716 | 2.794 | 2.946 |
| *% growth* | *0,0%* | *2,9%* | *5,4%* |
| *of which prepaid* | 1.117 | 937 | 822 |
| *% growth* | *-11,1%* | *-16,1%* | *-12,3%* |
| ARPU | 319 | 317 | 318 |
| Revenue (mNOK) | 13.062 | 13.142 | 12.877 |
| *% growth* | | *0,6%* | *-2,0%* |
| EBITDA | 5.494 | 4.703 | 4.582 |
| *% of sales* | *42,1%* | *35,8%* | *35,6%* |
| Operating Profit | 4.604 | 3.977 | 3.774 |
| *% of sales* | *35,2%* | *30,3%* | *29,3%* |

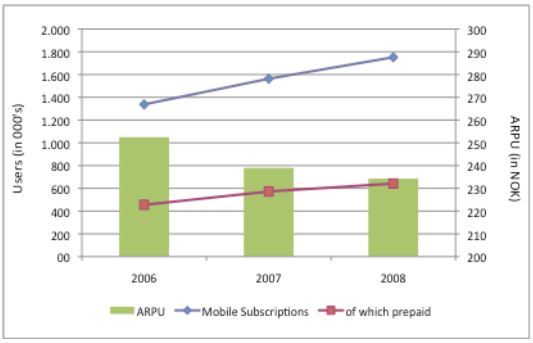


**Mobile Denmark***

*Figures in 000's*

| | 2006 | 2007 | 2008 |
|---|---|---|---|
| Mobile Subscriptions | 1.337 | 1.563 | 1.752 |
| *% growth* | *7,6%* | *16,9%* | *12,1%* |
| *of which prepaid* | 455 | 572 | 642 |
| *% growth* | *14,5%* | *25,8%* | *12,2%* |
| ARPU | 253 | 239 | 234 |
| Revenue (mNOK) | 6.359 | 7.067 | 7.627 |
| *% growth* | | *11,1%* | *7,9%* |
| EBITDA | 1.613 | 1.780 | 1.797 |
| *% of sales* | *25,4%* | *25,2%* | *23,6%* |
| Operating Profit | 219 | 568 | 441 |
| *% of sales* | *3,4%* | *8,0%* | *5,8%* |

**Includes Danish fixed line operations*

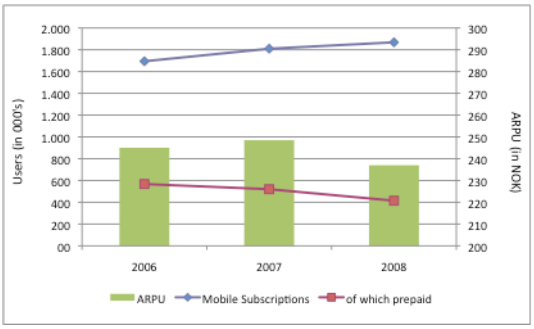



**Mobile Sweden***

*Figures in 000's*

| | 2006 | 2007 | 2008 |
|---|---|---|---|
| Mobile Subscriptions | 1.694 | 1.810 | 1.869 |
| *% growth* | *4,4%* | *6,8%* | *3,2%* |
| *of which prepaid* | 568 | 520 | 415 |
| *% growth* | *-3,8%* | *-8,4%* | *-20,3%* |
| ARPU | 245 | 249 | 237 |
| Revenue (mNOK) | 9.202 | 9.990 | 9.532 |
| *% growth* | | *8,6%* | *-4,6%* |
| EBITDA | 1.507 | 1.973 | 1.943 |
| *% of sales* | *16,4%* | *19,7%* | *20,4%* |
| Operating Profit | -711 | -496 | -149 |
| *% of sales* | *-7,7%* | *-5,0%* | *-1,6%* |

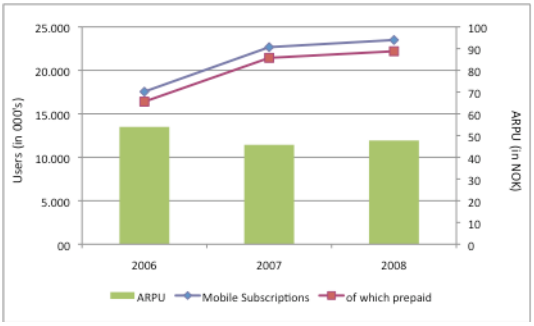
**Includes Swedish fixed line operations*




**Kyivstar - Ukraine**

*Figures in 000's*

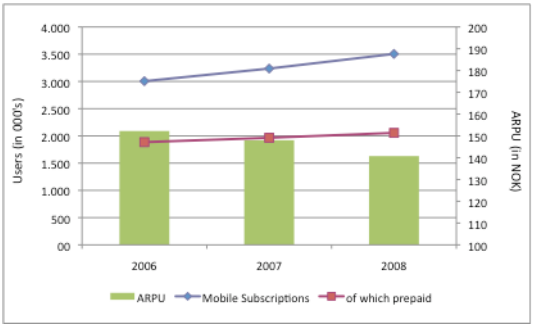
| | 2006 | 2007 | 2008 |
|---|---|---|---|
| Mobile Subscriptions | 17.547 | 22.670 | 23.495 |
| *% growth* | *43,7%* | *29,2%* | *3,6%* |
| *of which prepaid* | 16.399 | 21.439 | 22.198 |
| *% growth* | *46,0%* | *30,7%* | *3,5%* |
| ARPU | 54 | 46 | 48 |
| Revenue (mNOK) | 10.956 | 12.582 | 13.834 |
| *% growth* | | *14,8%* | *10,0%* |
| EBITDA | 6.516 | 7.330 | 8.088 |
| *% of sales* | *59,5%* | *58,3%* | *58,5%* |
| Operating Profit | 4.900 | 5.564 | 6.077 |
| *% of sales* | *44,7%* | *44,2%* | *43,9%* |




**Pannon - Hungary**

*Figures in 000's*

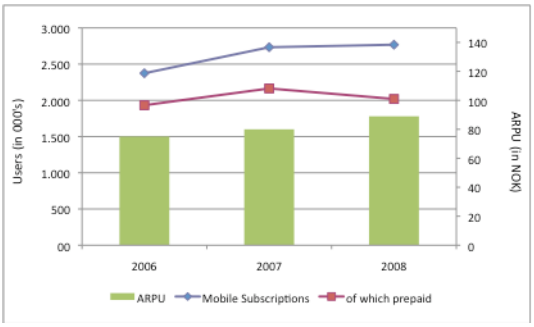
| | 2006 | 2007 | 2008 |
|---|---|---|---|
| Mobile Subscriptions | 3.005 | 3.236 | 3.506 |
| *% growth* | *7,3%* | *7,7%* | *8,3%* |
| *of which prepaid* | 1.886 | 1.966 | 2.056 |
| *% growth* | *-35,2%* | *4,3%* | *4,6%* |
| ARPU | 152 | 148 | 141 |
| Revenue (mNOK) | 5.951 | 6.142 | 6.159 |
| *% growth* | | *3,2%* | *0,3%* |
| EBITDA | 2.205 | 2.458 | 2.503 |
| *% of sales* | *37,1%* | *40,0%* | *40,6%* |
| Operating Profit | 1.068 | 1.727 | 1.800 |
| *% of sales* | *17,9%* | *28,1%* | *29,2%* |



**Telenor Serbia**

*Figures in 000's*

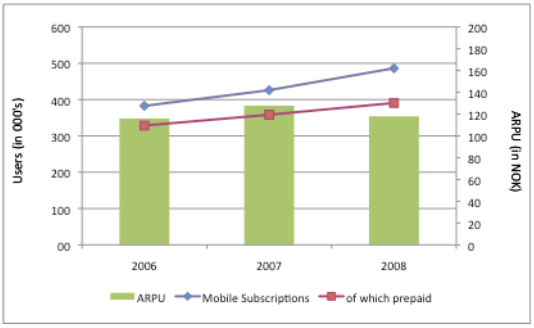
| | 2006 | 2007 | 2008 |
|---|---|---|---|
| Mobile Subscriptions | 2.374 | 2.733 | 2.768 |
| *% growth* | *7,9%* | *15,1%* | *1,3%* |
| *of which prepaid* | 1.933 | 2.164 | 2.019 |
| *% growth* | *7,6%* | *12,0%* | *-6,7%* |
| ARPU | 75 | 80 | 89 |
| Revenue (mNOK) | 726 | 2.935 | 3.166 |
| *% growth* | | *304,3%* | *7,9%* |
| EBITDA | 309 | 1.063 | 1.432 |
| *% of sales* | *42,6%* | *36,2%* | *45,2%* |
| Operating Profit | 132 | 431 | 737 |
| *% of sales* | *18,2%* | *14,7%* | *23,3%* |




**Promonte - Montenegro**

*Figures in 000's*

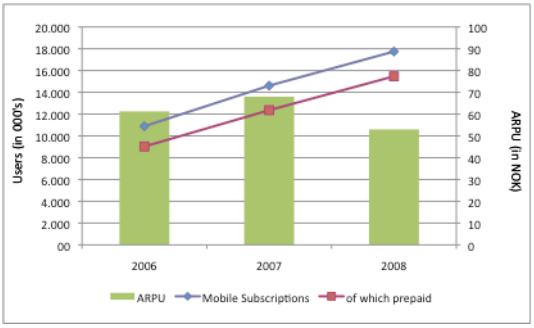
| | 2006 | 2007 | 2008 |
|---|---|---|---|
| Mobile Subscriptions | 383 | 426 | 486 |
| *% growth* | *12,7%* | *11,3%* | *14,1%* |
| *of which prepaid* | 329 | 358 | 391 |
| *% growth* | *10,5%* | *9,1%* | *9,1%* |
| ARPU | 116 | 128 | 118 |
| Revenue (mNOK) | 612 | 763 | 775 |
| *% growth* | | *24,7%* | *1,6%* |
| EBITDA | 307 | 337 | 325 |
| *% of sales* | *50,2%* | *44,2%* | *41,9%* |
| Operating Profit | 151 | 184 | 157 |
| *% of sales* | *24,7%* | *24,1%* | *20,3%* |




**DTAC - Thailand**

*Figures in 000's*

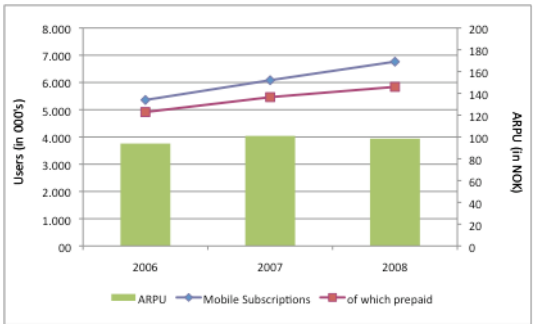
| | 2006 | 2007 | 2008 |
|---|---|---|---|
| Mobile Subscriptions | 10.889 | 14.614 | 17.746 |
| *% growth* | *20,8%* | *34,2%* | *21,4%* |
| *of which prepaid* | 9.025 | 12.360 | 15.472 |
| *% growth* | *20,1%* | *37,0%* | *25,2%* |
| ARPU | 61 | 68 | 53 |
| Revenue (mNOK) | 8.124 | 11.925 | 12.000 |
| *% growth* | | *46,8%* | *0,6%* |
| EBITDA | 2.944 | 3.414 | 3.946 |
| *% of sales* | *36,2%* | *28,6%* | *32,9%* |
| Operating Profit | 1.531 | 1.347 | 2.635 |
| *% of sales* | *18,8%* | *11,3%* | *22,0%* |




**DiGi - Malaysia**

*Figures in 000's*

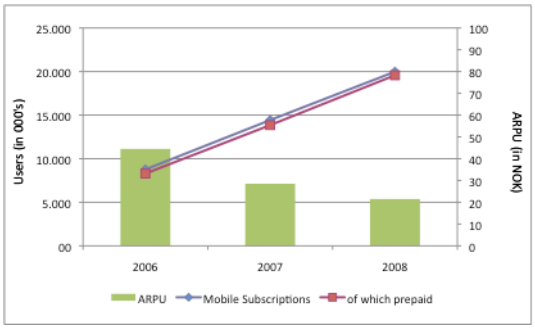
| | 2006 | 2007 | 2008 |
|---|---|---|---|
| Mobile Subscriptions | 5.357 | 6.083 | 6.764 |
| *% growth* | *4,4%* | *13,6%* | *11,2%* |
| *of which prepaid* | 4.914 | 5.462 | 5.839 |
| *% growth* | *2,2%* | *11,1%* | *6,9%* |
| ARPU | 94 | 101 | 99 |
| Revenue (mNOK) | 6.373 | 7.430 | 8.112 |
| *% growth* | | *16,6%* | *9,2%* |
| EBITDA | 2.945 | 3.581 | 3.668 |
| *% of sales* | *46,2%* | *48,2%* | *45,2%* |
| Operating Profit | 1.835 | 2.453 | 2.575 |
| *% of sales* | *28,8%* | *33,0%* | *31,7%* |



**Grameenphone - Bangladesh**

*Figures in 000's*

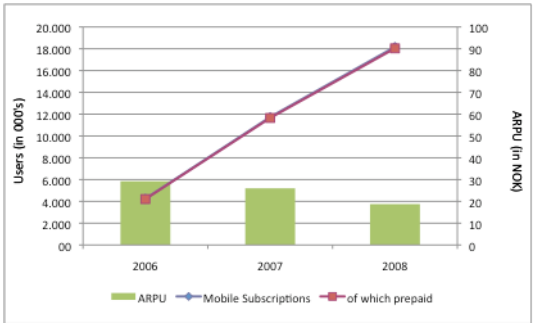
| | 2006 | 2007 | 2008 |
|---|---|---|---|
| Mobile Subscriptions | 8.762 | 14.430 | 19.984 |
| *% growth* | *67,4%* | *64,7%* | *38,5%* |
| *of which prepaid* | 8.294 | 13.851 | 19.572 |
| *% growth* | *69,6%* | *67,0%* | *41,3%* |
| ARPU | 45 | 29 | 22 |
| Revenue (mNOK) | 4.314 | 4.622 | 5.049 |
| *% growth* | | *7,1%* | *9,2%* |
| EBITDA | 2.516 | 2.122 | 2.345 |
| *% of sales* | *58,3%* | *45,9%* | *46,4%* |
| Operating Profit | 1.836 | 1.239 | 1.111 |
| *% of sales* | *42,6%* | *26,8%* | *22,0%* |



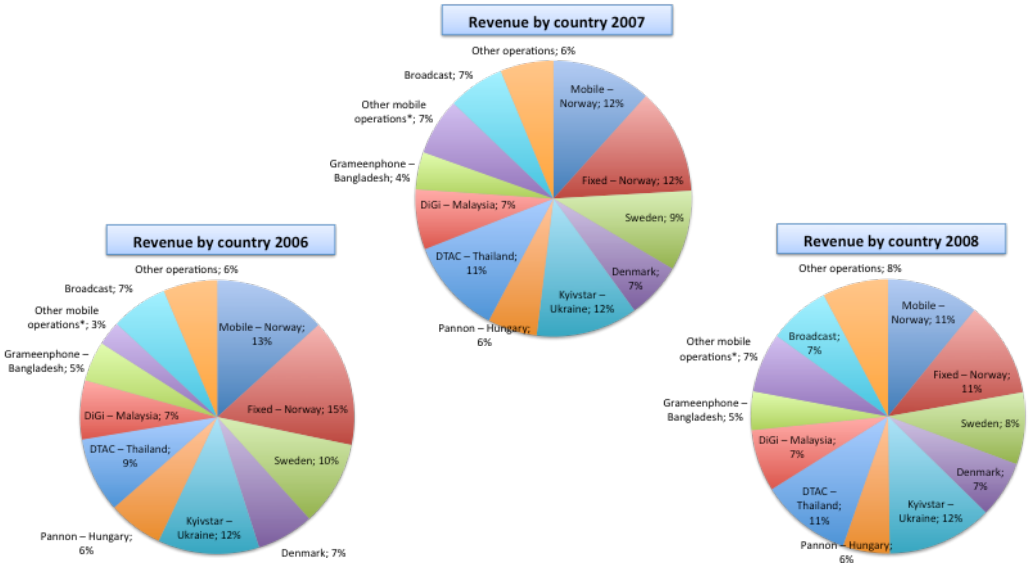

**Telenor Pakistan**

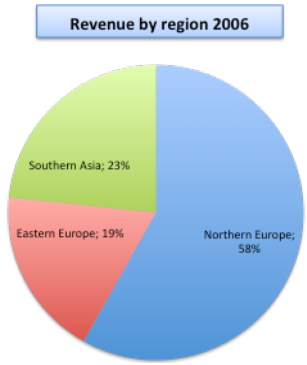
*Figures in 000's*

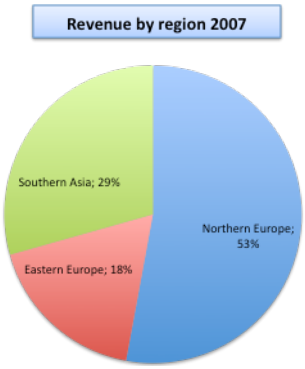
| | 2006 | 2007 | 2008 |
|---|---|---|---|
| Mobile Subscriptions | 4.248 | 11.737 | 18.172 |
| *% growth* | *163,6%* | *176,3%* | *54,8%* |
| *of which prepaid* | 4.209 | 11.652 | 18.040 |
| *% growth* | *165,4%* | *176,8%* | *54,8%* |
| ARPU | 29 | 26 | 19 |
| Revenue (mNOK) | 1.299 | 3.414 | 4.011 |
| *% growth* | | *162,8%* | *17,5%* |
| EBITDA | -328 | 373 | 709 |
| *% of sales* | *-25,3%* | *10,9%* | *17,7%* |
| Operating Profit | -777 | -362 | -310 |
| *% of sales* | *-59,8%* | *-10,6%* | *-7,7%* |

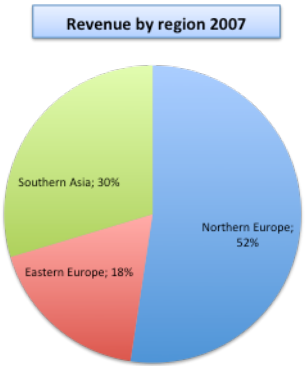


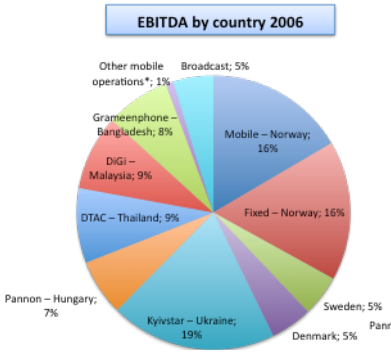

## *Economic trend*

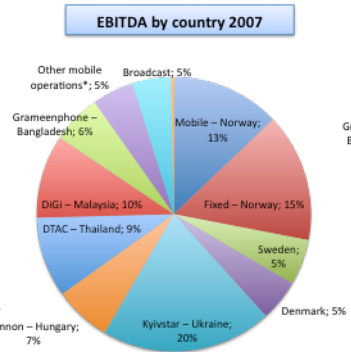


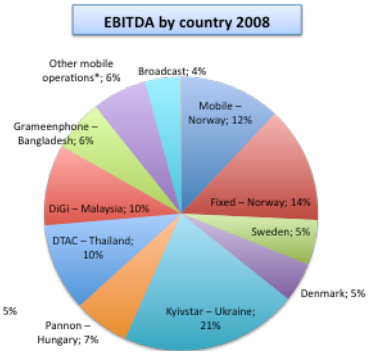


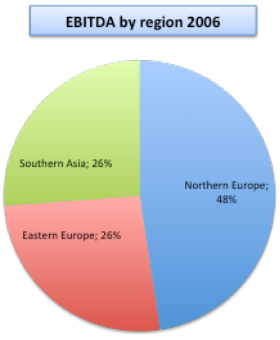



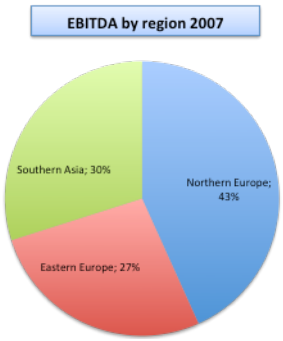



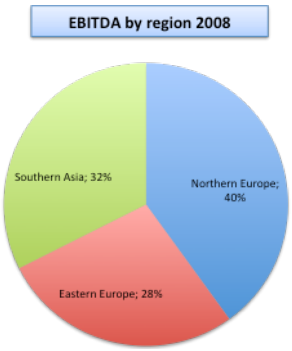



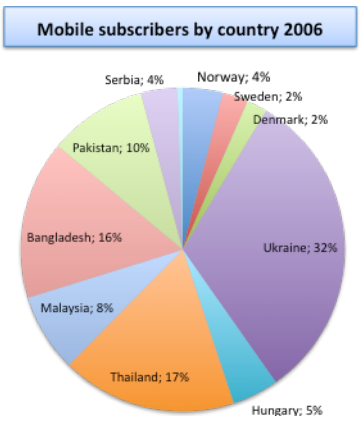



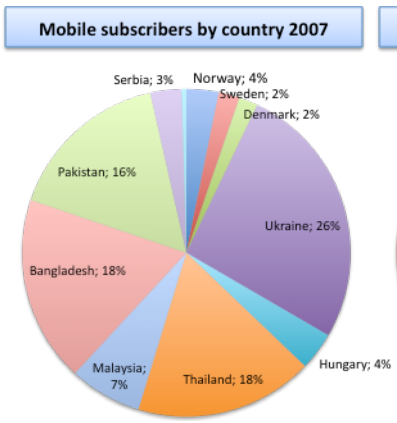



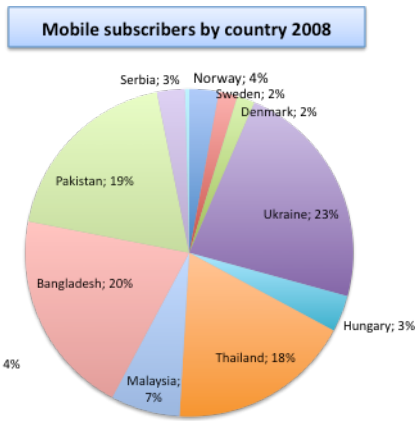



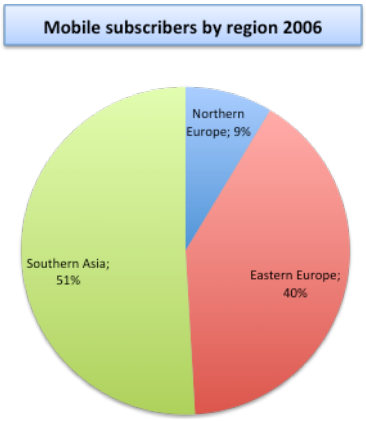



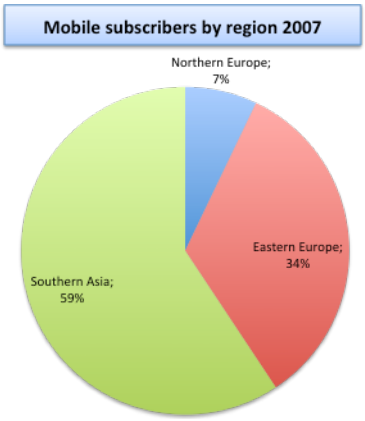

*Subscriber trend*

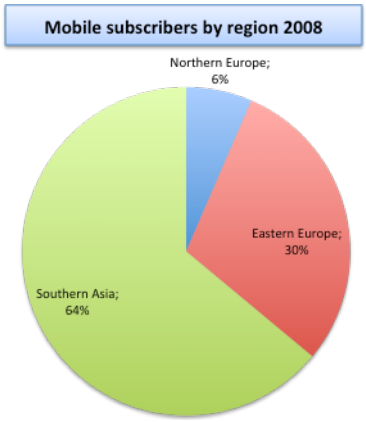


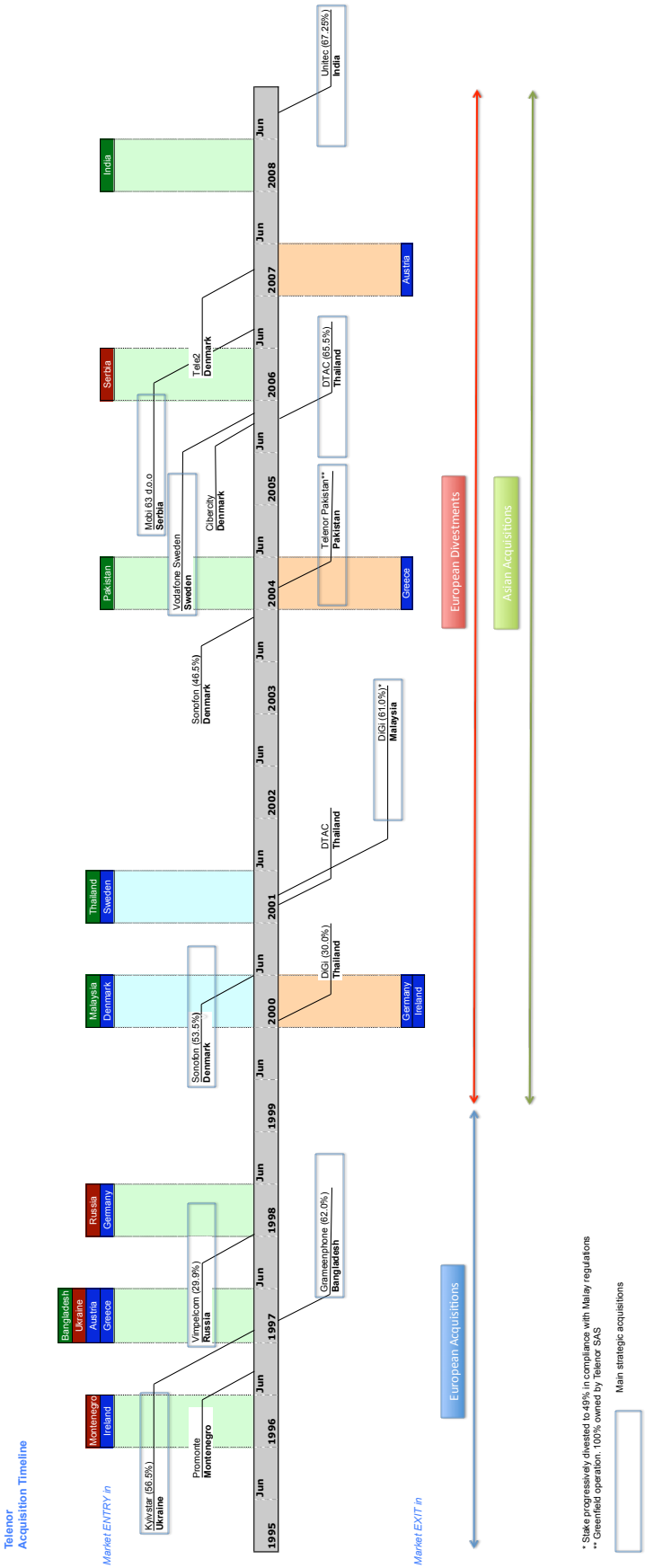




Mobile subscribers by region 2006
Northern Europe; 9%
Eastern Europe; 40%
Southern Asia; 51%


Mobile subscribers by region 2007
Northern Europe; 7%
Eastern Europe; 34%
Southern Asia; 59%


Mobile subscribers by region 2008
Northern Europe; 6%
Eastern Europe; 30%
Southern Asia; 64%

## Annex 3: Telenor's expansion timeline



## Annex 4: List of 50 largest countries by population[20]

| | | Population (thousands) | | | | |
|---|---|---|---|---|---|---|
| | *Country or area* | *1950* | *2009* | *2015* | *2025* | *2050* |
| | **World** | **2 529 346** | **6 829 360** | **7 302 186** | **8 011 533** | **9 149 984** |
| 1 | China | 544 951 | 1 345 751 | 1 395 998 | 1 453 140 | 1 417 045 |
| 2 | India | 371 857 | 1 198 003 | 1 294 192 | 1 431 272 | 1 613 800 |
| 3 | United States of America | 157 813 | 314 659 | 332 334 | 358 735 | 403 932 |
| 4 | Indonesia | 77 152 | 229 965 | 244 191 | 263 287 | 288 110 |
| 5 | Brazil | 53 975 | 193 734 | 202 866 | 213 802 | 218 512 |
| 6 | Pakistan | 41 177 | 180 808 | 205 504 | 246 286 | 335 195 |
| 7 | Bangladesh | 43 595 | 162 221 | 175 217 | 195 012 | 222 495 |
| 8 | Nigeria | 36 680 | 154 729 | 175 928 | 210 057 | 289 083 |
| 9 | Russian Federation | 102 702 | 140 874 | 137 983 | 132 345 | 116 097 |
| 10 | Japan | 82 824 | 127 156 | 125 791 | 120 793 | 101 659 |
| 11 | Mexico | 27 741 | 109 610 | 115 528 | 123 366 | 128 964 |
| 12 | Philippines | 19 996 | 91 983 | 101 734 | 117 270 | 146 156 |
| 13 | Viet Nam | 27 367 | 88 069 | 93 647 | 102 054 | 111 666 |
| 14 | Egypt | 21 514 | 82 999 | 91 778 | 104 970 | 129 533 |
| 15 | Ethiopia | 18 434 | 82 825 | 96 237 | 119 822 | 173 811 |
| 16 | Germany | 68 376 | 82 167 | 81 346 | 79 258 | 70 504 |
| 17 | Turkey | 21 484 | 74 816 | 79 966 | 87 364 | 97 389 |
| 18 | Iran (Islamic Republic of) | 16 913 | 74 196 | 79 454 | 87 134 | 96 975 |
| 19 | Thailand | 20 607 | 67 764 | 69 939 | 72 628 | 73 361 |
| 20 | Dem. Republic of the Congo | 12 184 | 66 020 | 77 419 | 98 123 | 147 512 |
| 21 | France | 41 832 | 62 343 | 63 900 | 65 769 | 67 668 |
| 22 | United Kingdom | 50 616 | 61 565 | 63 528 | 66 601 | 72 365 |
| 23 | Italy | 46 367 | 59 870 | 60 604 | 60 018 | 57 066 |
| 24 | South Africa | 13 683 | 50 110 | 51 684 | 53 766 | 56 802 |
| 25 | Myanmar | 17 158 | 50 020 | 53 087 | 57 585 | 63 373 |
| 26 | Republic of Korea | 19 211 | 48 333 | 49 153 | 49 484 | 44 077 |
| 27 | Ukraine | 37 298 | 45 708 | 44 165 | 41 617 | 35 026 |
| 28 | Colombia | 12 000 | 45 660 | 49 385 | 54 920 | 62 877 |
| 29 | Spain | 28 009 | 44 904 | 47 203 | 49 265 | 51 260 |
| 30 | United Republic of Tanzania | 7 650 | 43 739 | 52 109 | 67 394 | 109 450 |
| 31 | Sudan | 9 190 | 42 272 | 47 730 | 56 688 | 75 884 |
| 32 | Argentina | 17 150 | 40 276 | 42 548 | 45 883 | 50 943 |
| 33 | Kenya | 6 077 | 39 802 | 46 433 | 57 573 | 85 410 |
| 34 | Poland | 24 824 | 38 074 | 37 788 | 36 964 | 32 013 |
| 35 | Algeria | 8 753 | 34 895 | 38 088 | 42 882 | 49 610 |
| 36 | Canada | 13 737 | 33 573 | 35 493 | 38 659 | 44 414 |
| 37 | Uganda | 5 158 | 32 710 | 39 710 | 53 406 | 91 271 |
| 38 | Morocco | 8 953 | 31 993 | 34 330 | 37 865 | 42 583 |
| 39 | Iraq | 5 719 | 30 747 | 35 884 | 44 692 | 63 995 |
| 40 | Nepal | 8 126 | 29 331 | 32 503 | 38 031 | 49 028 |
| 41 | Peru | 7 632 | 29 165 | 31 197 | 34 528 | 39 776 |
| 42 | Venezuela (Bolivarian Republic of) | 5 094 | 28 583 | 31 292 | 35 370 | 42 042 |
| 43 | Afghanistan | 8 151 | 28 150 | 34 246 | 44 970 | 73 938 |
| 44 | Uzbekistan | 6 314 | 27 488 | 29 456 | 32 715 | 36 439 |
| 45 | Malaysia | 6 110 | 27 468 | 30 041 | 33 770 | 39 664 |
| 46 | Saudi Arabia | 3 201 | 25 721 | 28 933 | 34 176 | 43 658 |
| 47 | Dem. People's Rep. of Korea | 9 737 | 23 906 | 24 399 | 25 128 | 24 562 |
| 48 | Ghana | 4 981 | 23 837 | 26 925 | 32 233 | 45 213 |
| 49 | Yemen | 4 316 | 23 580 | 27 819 | 35 509 | 53 689 |
| 50 | Mozambique | 6 442 | 22 894 | 25 957 | 31 190 | 44 148 |

[20] Source: World Population Survey (United Nations, 2009)

## Annex 5: Cellular mobile competition in the OECD[21]

Mobile operator market share according to number of subscribers (%)

| Number of Operators | 1 | 2 | 3 | 4 | 5 | Other |
|---|---|---|---|---|---|---|
| Australia | 45,1 | 32,5 | 17,2 | 5,2 | | |
| Austria | 39,6 | 24,4 | 20,7 | 12 | 3,3 | |
| Belgium | 48,3 | 33,4 | 18,3 | | | |
| Canada | 36,4 | 26,9 | 36,7 | | | |
| Czech Republic | 41 | 40 | 19 | | | |
| Denmark | 41,2 | 23,5 | 21 | 5 | 9,3 | |
| Finland | 65,7 | 4,3 | 18,5 | 11,5 | | |
| France | 46,8 | 35,9 | 17,3 | | | |
| Germany | 37,3 | 36,8 | 13,6 | 12,3 | | |
| Greece | 37,4 | 35,6 | 19,4 | 7,6 | | |
| Hungary | 45 | 33,2 | 21,8 | | | |
| Iceland | 63,6 | 34,3 | 2,1 | | | |
| Ireland | 48,6 | 38 | 13,4 | | | |
| Italy | 40 | 33,1 | 19,1 | 7,8 | | |
| Japan | 53 | 23,5 | 15,8 | 2,8 | | 4,9 |
| Korea | 50,9 | 32,1 | 17 | | | |
| Luxembourg | 53 | 40 | 7 | | | |
| Mexico | 78,9 | 14 | 4 | 3,1 | | |
| Netherlands | 51,2 | 23 | 11,3 | 14,5 | | |
| New Zealand | 52,8 | 47,1 | | | | |
| Norway | 59,5 | 24,4 | 8 | 6,3 | 1,8 | |
| Poland | 35 | 31 | 34 | | | |
| Portugal[1] | 46,4 | 38,3 | 15,3 | | | |
| Slovakia | 55,5 | 44,5 | | | | |
| Spain | 46,1 | 30 | 23,9 | | | |
| Sweden | 52 | 27,9 | 17 | 3,1 | | |
| Switzerland | 62,5 | 18,5 | 18,3 | 0,7 | | |
| Turkey | 63 | 22 | 15 | | | |
| United Kingdom | 26 | 23,3 | 22,7 | 22,6 | 5,4 | |
| United States | 25.4 | 24,1 | 21 | 10,2 | 5 | 14,3 |

[21] Source: OECD Secretariat estimates, 2005

## Annex 6: Number of operators in Service in OECD countries[22]

**Number of operators in service, June 2006**

| | Fixed PSTN (Local, National and International) | Network infrastructure capacity (Includes only companies not providing voice services) | Cellular Mobile | Wireless local loop (fixed wireless) | IMT-2000 Operators (i.e. UMTS / 3rd Generation) | MVNOs | Cable TV operators |
|---|---|---|---|---|---|---|---|
| Australia | 132 | - | 4 | 61 | 4 | 2+ | CATV operators do not require a licence |
| Austria | 102 | 159 | 4 | 7 | 4 | 1 | 80 |
| Belgium | 33 | 23 | 3 | 3 | 3 | 15 | 12 |
| Canada | 64 | | 17 | | 2 | Permitted | 52 |
| Czech Republic | 70 | 7 | 3 | 90 | 3 | 0 | 52 |
| Denmark | 32 | No registration | 4 | 4 | 4 | 1 | 2 major cable TV operators and a large number of smaller operators. There are approximately 7,000 cable or community antenna networks. |
| Finland | 45 | - | 15 | 2 | 3 | 1 | 29 |
| France | 257 | 46 | 25 | 179 | 3 | 6 active | 257 |
| Germany | 164 | 4 | 4 | 7 | 4 | 1 | 465 |
| Greece | 24 | 15 | 4 | 7 | 3 | No | 0 |
| Hungary | 55 | 0 | 3 | - | 3 | 0 | 526 |
| Iceland | 2 | 1 | 3 | 6 | 0 | 1 | 0 |
| Ireland | 46 | 51 | 4 | 13 | 3 | 1 | 20 |
| Italy | 89 | 41 | 3 | 15 | 4 | No | |
| Japan | 30 | 271 | 17 | 22 | 12 | Permitted | 696 |
| Korea | 5 | 19 | 3 | 1 | 3 | No | 107 |
| Luxembourg | 10 | 2 | 3 | 2 | 3 | Permitted | 74 |
| Mexico | 79 | 3 | 18 | 12 | 1 | No | 895 |
| Netherlands | 12 | | 4 | | 4 | 1 | +/- 60 |
| New Zealand | | | | | | Permitted | |
| Norway | 8 | 40 | 3 | 56 | 3 | 1 | 7 (large number providing cable TV in small local networks) |
| Poland | 98 | 68 | 3 | 112 | 4 | 78 | 518 |
| Portugal | 12 | 10 | 3 | 7 | 3 | 0 | 9 |
| Slovak Republic | 9 | 106 | 2 | 6 | 2 | 0 | 193 |
| Spain | 36 | | 3 | 4 | 4 | 23 | 347 |
| Sweden | 55 | | 4 | | 4 | 1 | |
| Switzerland | 136 | | 5 | 6 | 4 | 0 | 500 |
| Turkey | 42 | 4 | 3 | | | No | 4 |
| United Kingdom | 122 | 22 | 5 | 2 | 5 | 6 | 1 |
| United States | 1181 | | 155 | | 5+ | Permitted | 33 507 |

[22] Source: OECD Secretariat Estimates, 2006