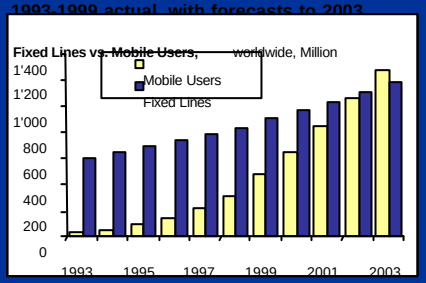
IMT-2000 Licensing

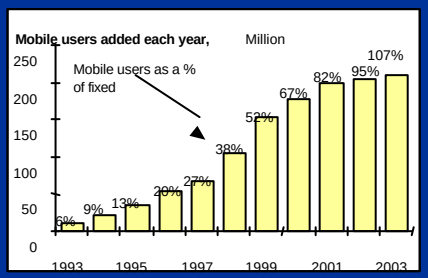
Principles and Methods

ITU-BDT Regional Seminar on IMT-2000 for Arab Region
Doha (Qatar) 29 September – 1 October 2003

Riccardo Passerini
Focal Point IMT-2000, ITU-BDT

The growth of mobile cellular services



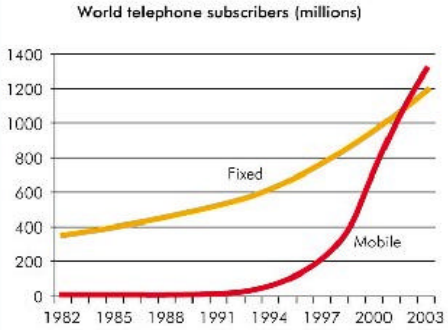


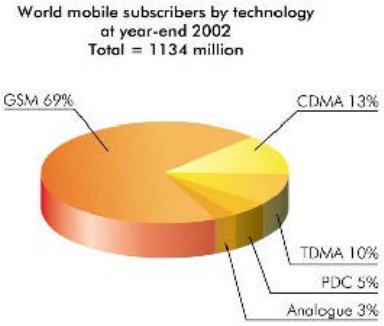
Source: *ITU World Telecommunication Indicators Database and ITU forecasts in Trends in Telecommunications Reform, 2000 -2001: Interconnection Regulation .*

The growth of mobile cellular services

Figure 1 — Mobile overtakes fixed

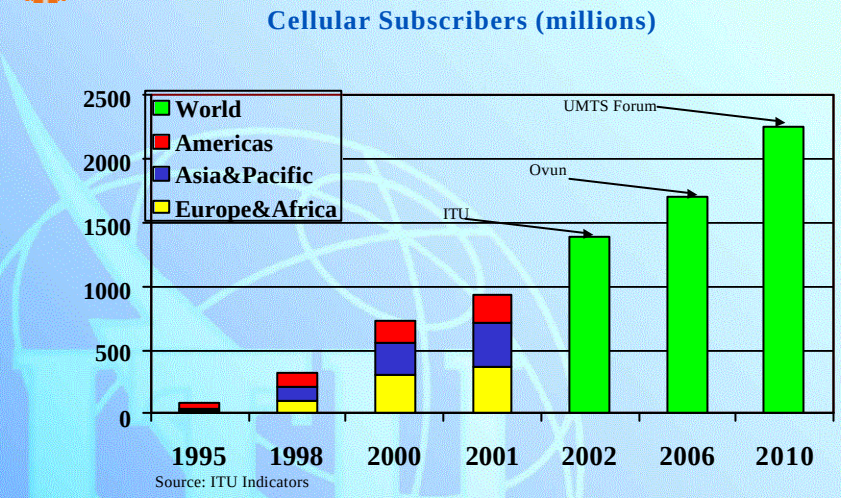
Number of fixed and mobile telephone subscribers worldwide (1982–2003) and distribution of mobile subscribers worldwide by technology (December 2002)





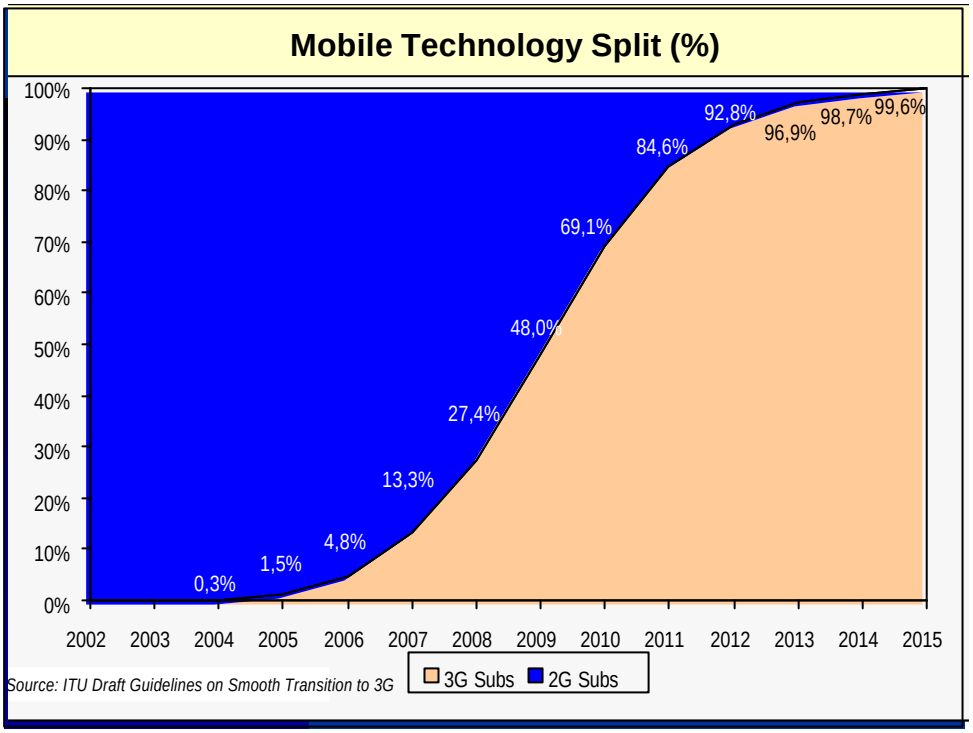
Source: Left chart: ITU World Telecommunication Indicator database.
Right chart: ITU adapted from GSM Association.

Trends – Mobile Growth (worldwide)



Source: ITU Indicators

Number of mobile subscribers already greater than fixed


Mobile Technology Split (%)
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
0,3%
1,5%
4,8%
13,3%
27,4%
48,0%
69,1%
84,6%
92,8%
96,9%
98,7%
99,6%
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
3G Subs
2G Subs
Source: ITU Draft Guidelines on Smooth Transition to 3G

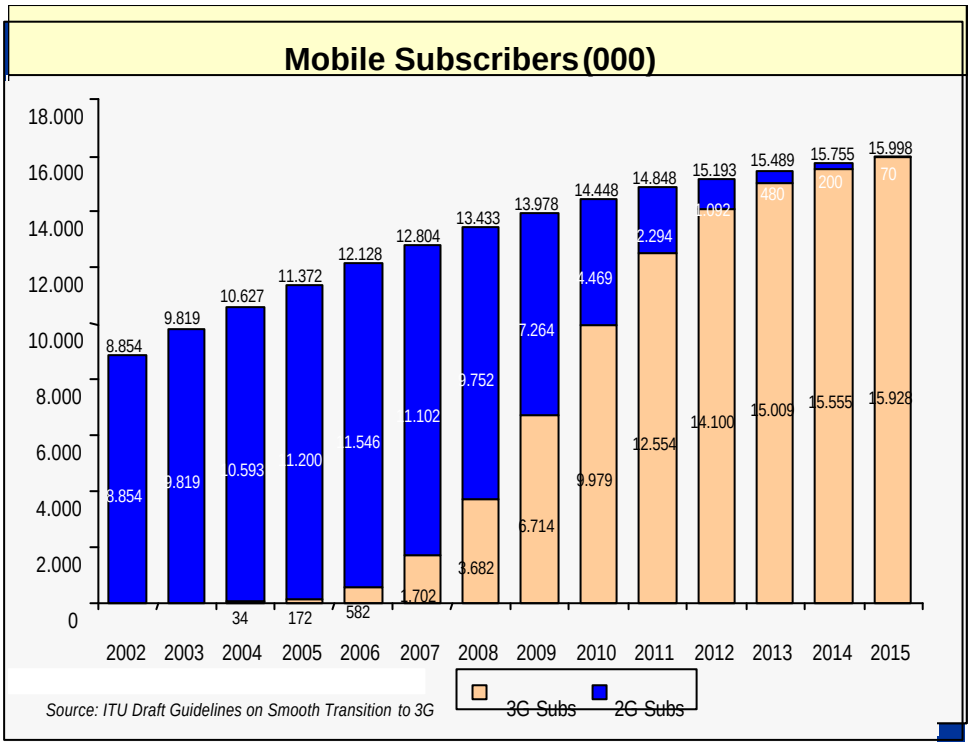
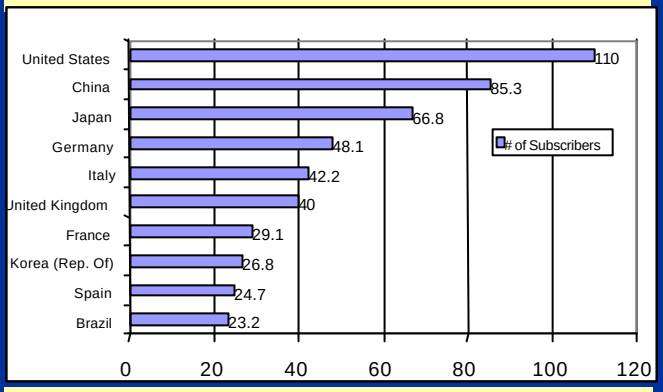

Mobile Subscribers (000)
18.000
16.000
14.000
12.000
10.000
8.000
6.000
4.000
2.000
0
8.854
9.819
10.627
11.372
12.128
12.804
13.433
13.978
14.448
14.848
15.193
15.489
15.755
15.998
3.854
9.819
10.593
1.200
1.546
1.102
9.752
7.264
4.469
2.294
1.092
480
200
70
34
172
582
1.702
3.682
6.714
9.979
12.554
14.100
15.009
15.555
15.928
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
3G Subs
2G Subs
Source: ITU Draft Guidelines on Smooth Transition to 3G

Figure 1: Top Mobile Economies (2000, millions)



Source: International Telecommunication Union

IMT-2000 spectrum and licensing considerations

- Radio spectrum, which is a scarce, finite and valuable resource, should be allocated in a way that achieves maximum efficiency
- Allocation of spectrum, especially for public mobile networks, raises many economic issues
- Today licensing requires:
  - Technical knowledge (standards + frequencies)
  - Knowledge of local market environment
  - Estimation of the future demand for services
- More than 100 IMT-2000 licences have so far (Table annex 1) been awarded globally

IMT-2000 spectrum and licensing considerations

Key questions before licensing

- How to contribute optimally to the development?
- How to act so that current decisions will meet the requirements when a commercial service of 3G starts?
- What decisions are needed now and what could be decided later?
- How will markets and technology develop?
- Will the regulative framework change before the networks are implemented?

IMT-2000 Licensing

“Principles of licensing procedures and methods”

The principles of licensing procedures

- The public interest
- Transparency
- Public participation
- Fairness
- Non-discrimination
- Efficiency

Principles of licensing procedures

Public interest

- criteria for licensing should be based on the public interest (however defined) and not on the interests of any one or more of the parties (published in official government documents as well as in electronic and other media, such as website)
- criteria should be as objective as possible

Principles of licensing procedures

Transparency (re criteria and process)

1. criteria must be published in enough detail to be absolutely clear (in official government documents as well as in electronic and other media, such as website)
2. the entire process should be transparent (no ex parte contact with applicants)

Principles of licensing procedures

Public involvement

1. the public should be invited to participate in a meaningful way in the process
2. Invitations should be transparent, for example, published in electronic and/or other media freely available to the public

Principles of licensing procedures

Fairness

- the process should be fair to all parties involved or interested, including the public
- all interested parties must have an adequate opportunity to be heard
- reasons must be given for decisions - decisions must be rational

Principles of licensing procedures

Efficient

- the process must not impose unnecessary burdens on either the applicants or the independent regulator

Principles of licensing procedures

Non-discrimination

- the criteria and process should be non-discriminatory
- exceptions for appropriate set-asides for example, for nationals

Principles - where are procedures to be found

- Telecommunications legislation
- Administrative procedures legislation or a constitutional right to fair administrative procedures
- Regulations (subordinate legislation)

Licensing methods

- There are many methods of spectrum licensing that have been used both for first and second generation mobile licenses, as well as for IMT-2000 licenses.
- Most countries have required special licenses in order for operators to provide IMT-2000 services, while other countries have taken a more flexible licensing approach and allow operators to use current spectrum for IMT-2000 services and/or license spectrum use on a more generic basis, such as for “advanced wireless services.”
- Some regulators allow first and second generation systems to migrate to IMT-2000 in their current bands and do not require further authorization to do so

Licensing Methods

- Non-competing application procedures
  - **First-Come, First-Served**
- Competing application procedures
  - Comparative processes (beauty contest)
  - Auctions
  - Lotteries
  - Hybrid

Non-competing application

First-Come, First-Served

- When spectrum was not a scarce resource, regulators used a first-come, first-served approach to licensing spectrum.
- Royalty payments (e.g.):
  - Fixed fee for first five years,
  - thereafter 5% of the annual 3G revenue
- As spectrum has become more valuable, the regulator is unlikely going to assign frequencies on a first-come, first-served basis any more, except in the most remote areas

Non-competing application

First-Come, First-Served

Advantages First Come, First Served

- Speed
- Inexpensive

Disadvantages First Come, First Served

- License may not end up in the hands of an entity that values it the most and can bring greatest value to the economy.
- The value of the license is not taken into account.

Competing application procedures

- Comparative applications
- Auctions
- Lotteries
- Hybrid

Comparative applications

- In a "beauty contest" (also referred as "beauty parade" or "comparative hearing/parade), the Regulator/Ministry selects/scores the winning applicant using comparative criteria (scoring Matrix, Annex 2).
- Used in many countries for 2G In many countries and it has also been used in some countries to issue licenses for IMT-2000.
- Criteria to compare the prospective license applications are established and can include:

  - the technical and financial stability of the applicants,
  - the technical characteristics of the system being deployed,
  - the coverage area being proposed,
  - the schedule for build-out"(roll out).

Draft procedure for comparative process

1. Proposed selection criteria and process chosen by the independent regulator
2. Public given an opportunity to comment on proposals (e.g. three months)
3. Final selection criteria and process made public by the independent regulator
4. Applications are called for

Draft procedure for comparative process

5. Applications are submitted (e.g. six months)
6. Public given an opportunity to comment on applications (e.g three months)
7. Applicants given an opportunity to reply to public comment at least three months)
8. A hearing may be held where the regulator can question the applicants and/or the public can question the applicants

Draft procedure for comparative process

9. The independent regulator may, at any time, call for additional information from applicants
10. The independent regulator considers all information and makes a decision on who should be awarded the license (with reasons given)
11. There could be an appeal process built in here
12. The license is awarded

Comparative applications

Advantages Beauty Contests

- if done properly, the BEST applicant will be awarded the license
- Allows the regulator to determine the contender that will best serve the public interest.
- Final costs for operators are more easily predicted than other options such as auctions. The money to the investment to develop the networks and services for the user benefits.
- Long term benefit for the economy/society than short term help to the state budget
- More freedom for the regulator to amend the regulation if needed (national roaming, convergence, new market needs etc.)
- Allows for equity considerations, such as minority ownership, small business ownership, etc.

Comparative applications

Disadvantages Beauty Contests

- Can be a lengthy process, particularly if the license is valuable. Applicants are often willing to exhaust all administration and litigation options. costly in terms of money and other resources, a subjective process and likely to be reviewed in the courts, requires an experienced and strong regulator to consider applications competently and without undue influence by any of the interested parties
- Can get expensive for the applicants if they are willing to spend large sums of money to succeed in the beauty contest process.
- Provides no method for deciding between two applicants that are essentially equal. The regulator may ultimately have to arbitrarily award the license.
- Government is responsible for choosing between alternative business plans stretching well into the future, and relating to new products and services that have not yet been developed.
- Need to be carefully structured to be fully transparent. Doubts over transparency of beauty contest process can lead to suspicions and dissatisfaction with the outcome.

Auctions

- Auctions award the licenses based upon the bidders' willingness to pay. Since the 1990s when spectrum auctions first began to be used for awarding spectrum licenses, billions of dollars have been raised in spectrum auctions and a fierce debate has arisen concerning the efficiency, competitive impact and social implications of this form of allocating spectrum.
- There are a variety of methodologies that have been used for spectrum auctions, including continuous, simultaneous multiple-round, and package.
- Preliminary minimum criteria re technical and financial ability (or other such criteria such as requirements for local participation or empowerment/affirmative action participation) applied to obtain entry as a bidder (pre-qualification phase)

Auctions

Advantages Auctions

- The costs to government are less than with comparative application processes and the process is not as lengthy in time
- License goes to the entity that values it the most. Auctions promote economic efficiency, one of the goals of spectrum management. Winning bids should come from the companies that can find ways of maximizing the stream of future benefits.
- Spectrum is a public resource and therefore the profits benefit the citizens. The proceeds of the auction go to the government for national purposes (results in taxpayer sharing of national spectrum resource)
- Auctions can provide information about the economic value of spectrum. For instance, if applicants are willing to pay a high price to be able to provide one service, but will pay a very low price for a different service, then the regulator can determine which service has greater economic benefit and, therefore, can determine where it needs to focus its future spectrum management efforts.

Auctions

Disadvantages Auctions (1)

- Auctions may lead to increased concentration in the industry. The regulator can consider placing spectrum caps to limit the amount of spectrum that one entity can hold, or limit eligibility to participate to non-incumbents. In addition, a nation can address monopoly concerns through its antitrust laws or competition policies.
- Auctions may ignore non-financial objectives that are in the public interest, such as equity considerations. The auction design can support those objectives by including strategies such as set-asides and providing bidding credits for certain groups that commit to addressing certain public interest factors.
- There may be some incentive for the government to act like any monopoly by restricting output and raising the price. In other words, if the government wanted to maximize the revenues to the treasury, it could withhold spectrum.

Auctions

Disadvantages Auctions (2)

- Auctions may result in speculatively high bids for licenses for services that are not commercial at the time of the auction. Auctions can also be affected by hype and other non-economic forces. Auctions may result in speculatively high bids for licenses for services that are
- Full information on IMT-2000 market characteristics is not always available, leaving some or all bidders without adequate information on market conditions, the regulatory environment, demand characteristics and the likely pricing structures.
- Likeliness of winner's curse that results in high prices for the license and leads to decreased investment capacity for operators and high end-user prices
- **often money that should be used to build a network and provide services is spent buying a license in the first place and thus consumers in the end are disadvantaged with higher prices**, and if there is not a clear process and consistent and fair application of the process, then it is likely to be challenged in the courts

Lotteries

- Lotteries - preliminary minimum criteria re technical and financial ability (or other such criteria such as requirements for local participation or empowerment/affirmative action participation) applied to obtain entry as a lottery player to participate to the random selection

Lotteries

Advantages Lotteries

- the costs are less than with comparative processes and the process is not as lengthy in time
- Provides a mechanism for selecting from substantially equal applications.

Lotteries

Disadvantages Lotteries

- The license may be awarded to an entity that is not qualified to build and operate the system. Any person may be able to participate in the lottery if no pre-qualification requirements are set. The regulator can establish criteria for participation in the lottery. However, this can be legally challenged and make the lottery process a lengthy one.
- Speculators will participate in the lottery, with the purpose of reselling the license and reaping huge windfall profits. Reselling the license is known as “flipping it.” So rather than the public getting the benefit of the revenues, the lottery winner will realize the revenues from the sale of licenses they got for minimal investment.
- If an unqualified party wins the lottery, the regulator has the challenge of deciding whether to let them sell it or not.
- winners often use the process to buy a “lottery ticket” and never intend to operate a network or provide a service, but simply want to resell a valuable asset (the license) for profit, thus you are not likely to get the best applicant

Hybrid

- A number of countries, including Austria, Italy and Hong Kong, have adopted a "hybrid" approach to IMT-2000 license allocation.
- Tenderers have to pre-qualify in terms of criteria similar to those established for beauty contests to bid.
- Licenses are then allocated on the basis of an auction.
- Advantages and disadvantages of a hybrid approach are themselves a combination of the advantages and disadvantages of beauty contests and auctions.

Hybrid

Advantages Hybrid

- Ensures that contenders have appropriate resources and business plans to serve the public interest. Can require that licensees meet specific policy goals.
- License goes to the qualified entity that values it the most. Winning bids should come from the qualified companies that can find ways of maximizing the stream of future benefits.
- Spectrum is a public resource and therefore the profits benefit the citizens. The proceeds of the auction go to the government for national purposes.
- Allows for equity considerations, such as minority ownership, small business ownership, etc.

Hybrid

Disadvantages Hybrid (1)

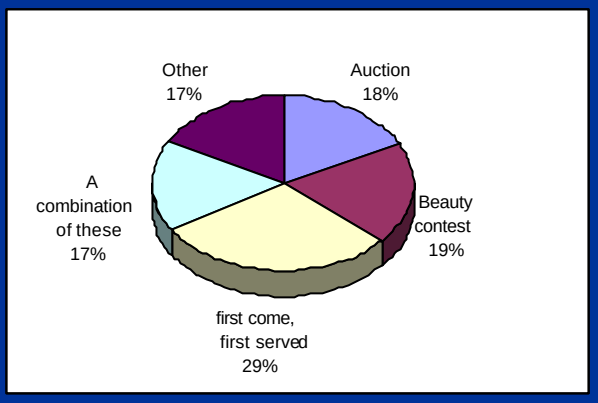
- Auctions may lead to increased concentration in the industry. The regulator can consider placing spectrum caps to limit the amount of spectrum that one entity can hold. In addition, a nation can address monopoly concerns through its antitrust laws or competition policies.
- Can be time consuming, particularly if the license is valuable. Applicants are often willing to exhaust all administration and litigation options.
- Beauty contest portion needs to be carefully structured to be fully transparent. Doubts over transparency of beauty contest process can lead to suspicions and dissatisfaction with the outcome.
- Can get expensive for the applicants if they are willing to spend large sums of money to succeed in the beauty contest portion of the process.

Hybrid

Disadvantages Hybrid (2)

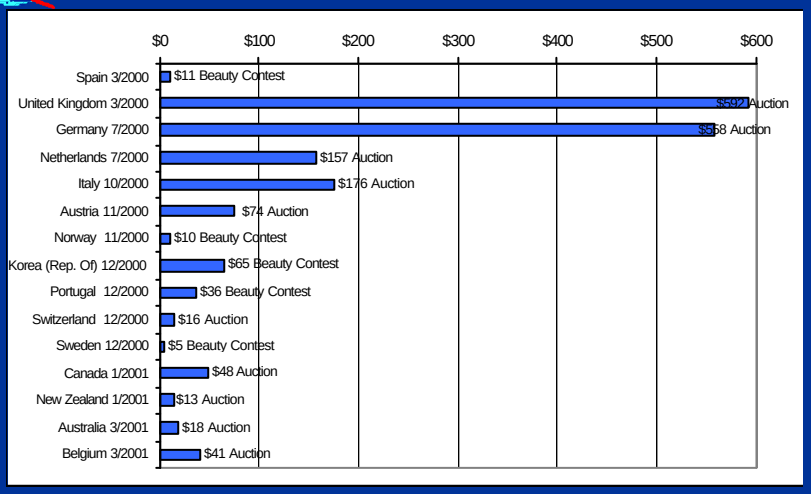
- There may be some incentive for the government to act like any monopoly by restricting output and raising the price. In other words, if the government wanted to maximize the revenues to the treasury, it could withhold spectrum.
- Auctions may result in speculatively high bids for licenses for services that are not commercial at the time of the auction. Auctions can also be affected by hype and other non-economic forces.
- Full information on IMT-2000 market characteristics is not always available, leaving some or all bidders without adequate information on market conditions, the regulatory environment, demand characteristics and the likely pricing structures.
- Likeliness of winner's curse that results in high prices for the license and leads to decreased investment capacity for operators and high end-user prices

Spectrum licensing methods



Source: ITU

3G Licences: Average Cost per Inhabitant

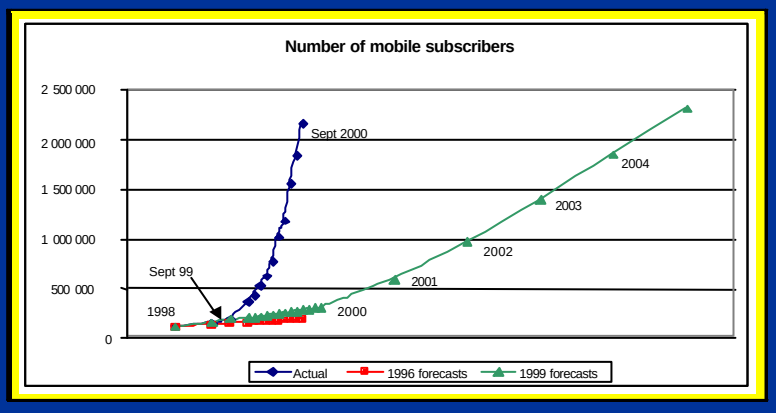


Source: ITU

Spectrum price

- Spectrum must be available at the right price
- What would be the right market value and the right price?
- The right price can change between the licensing process and the start of operation
- Large up-front payments for spectrum will adversely affect the growth of 3G services
- The end user will always pay for the spectrum in the end
- The number of licenses awarded has to be determined taking into account the available spectrum and competition issues
- The number of licenses to be awarded is an element of competition policy and can critically determine the success or failure of the 3G regulatory framework and of 3G service provision in general.
- The ITU has nominated the bands to be considered for the implementation of IMT-2000. Within these bands, each national government selects the amount of spectrum to be made available for 3G services, taking into account competing demands and uses for the spectrum.

Growth of Moroccan mobile subscribers



Source: ITU Effective Regulation: Moroccan Case Study.

Moroccan mini-case study

- ITU Case Studies on Effective Regulation: Moroccan Case Study Morocco found at at :http://www.itu.int/ITU-D/treg/Case_Studies/Index.html

IMT-2000 Licensing

“Licensing Condition - Obligations of licensees”

Licensing condition

- Rights and Obligations should be contained in regulation, not in licenses
- Licensing conditions are among the regulatory issues that are of importance to developing countries
  - **Technology Requirements**
  - **Financial requirements**
  - **Coverage**
  - **Timing of IMT-2000 licenses**
  - **Number of operators**
  - **Infrastructure Sharing**

Licensing condition

Technology Requirements:

It is worth considering whether policy makers/regulators should follow a technology neutral approach or should mandate a particular technology and related migration path. A technology neutral approach on has led to considerable benefits to end users in terms of a rapid technological evolution and lower prices.

Financial requirements:

Helps eliminate non-serious players and ensure a certain level of performance.

Licensing condition

Coverage:

To prevent the development of information-rich and information-poor communities, the policy makers/regulators of the various countries will need to ensure ubiquitous access to IMT-2000 services. However, from the service provider's point of view, it may not be viable to roll out expensive infrastructure in high-cost areas. It may be preferable to roll out network coverage in phases, based on demand and likely applications. Existing technologies and systems in place should have a scalable low cost migration path. Case studies have shown that operators can undertake gradual, phased upgrades to IMT-2000.

Licensing condition

Coverage and Roll-out

- To encourage the efficient use of spectrum by not leaving it unused longer than necessary
- To encourage infrastructure competition
- Coverage obligations introduced in many licences issued so far
- Roll-out of the 3G networks should be done according to market demand
- Coverage obligations should be linked to level of network service capability
- There is a danger of regulation driving the market if the level of these obligations is set too high

Licensing condition

Timing of IMT-2000 licenses:

The timing for introduction of a new service is crucial and varies from country to country. It is necessary to judge the market potential and to deploy technologies that are proven and established. Developing countries can ill-afford to experiment with technology. However, the process of introducing wideband wireless services is time consuming and would require licensing and regulatory preparedness from an early period. It would be advisable that developing countries begin consultation right as early as possible.

Licensing condition

Number of operators:

The limited availability of spectrum restricts the number of operators. In developed countries 3 to 5 operators have been preferred. Another issue is who should be eligible for this license: fixed operators, mobile operators, new operators, all or a combination of these. Japan, as an example, decided to exclude fixed operators from the licensing process.Mandatory roaming on 2 G networks: In case new operators are allowed to enter on the market, the regulator should decide whether to impose or not the obligation, on existing mobile operators, to provide pre-IMT-2000 roaming services to new entrants.

Licensing condition

Infrastructure Sharing:

Infrastructure sharing is particularly important for countries with widely dispersed populations and emerging mobile markets. It reduces the cost of network deployment and can improve penetration. It would also be necessary to identify the elements that can be shared, the amount of cost reduction that such sharing would bring about, for example, antenna masts, towers, and land building. Another issue for discussion is whether the regulator should play a pro-active role to encourage infrastructure sharing or should it be left entirely for operators.

Licensing condition

Sharing of facilities/infrastructure and National Roaming

- Sharing of facilities can give a rapid deployment of networks and introduction of services
- Sharing of network infrastructure may conflict with the goal of infrastructure competition
- Sharing should be on a commercial basis
- National roaming may be a way to achieve coverage of unprofitable regions
- Licence conditions should allow commercially negotiated roaming agreements, if infrastructure competition is maintained
- National roaming should only as an exception be mandatory. It can during a transitionally period help new operators to establish a market

Licensing condition

Miscellaneous items

- **Offered transmission speed**
  Some licences indicate minimum requirements, e.g. 256 kbit/s (depending on the level of mobility)
- **Duration of the licence**
  Offering licences for a period of less than 10 years would not encourage any serious deployment of infrastructure
- **Technical standard**
  Some licences clearly indicate the standard to be used, some "within the ITU IMT-2000 family of standards"

Licensing condition/obligation

Miscellaneous items

- **Universal service obligations**
  - Telecommunications as a right
  - Economic development
  - Close gap between haves and have nots
- **Other social obligations**
  - Human resource development
  - Technical
  - Management
  - Other
- **Encouraging ownership and control to promote diversity – local partners**
  - Minimum ownership and control by certain categories of persons