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Mobile Licensing Principles
- two opposite models

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1. GENERAL

This paper tries to summarise and analyse the most important decisions that policy makers and regulators necessarily do when licensing mobile operators. These decisions seem to be crucial for the success of mobile operators. The impact of these decisions is not widely discussed; thus decisions are in some cases made without full understanding of the outcome, the impact on relation between fixed and mobile services.

Present licensing features were developed during the early 1980's when nobody had even the faintest idea of the future success of the mobile telecoms. Once granted, it is difficult to make essential changes in licences without very good reasons, even if the original reasons and estimates have changed completely.

As a means of clarifying the message and the impact of various decisions, the paper uses two extreme models, neither of which is implemented anywhere in its pure form. In reality licensing solutions are intermediate. Also, policy makers and regulators may well use several alternatives even in the same country.

The two extremes are:

- an **independent** service based on an own (countrywide) network; or
- a **local access** service, supplementing the wired service, similar to a wide area cordless phone.

2. FUNDAMENTAL CHOICES

2.1 Basic or Luxury Service?

INDEPENDENT	LOCAL ACCESS
Basic service, in wide use even by school children, similar to watches and calculators	Luxury service, status symbol, high charges, special luxury taxation can be applied

Everywhere the first mobile users are business users. This may not necessarily mean that policy makers should consider mobile telephony a luxury, or status, service forever.

The "luxury" stamp gives a strong message to everybody in the community. Lawmakers can apply numerous small disincentives and cost increasing obligations. Taxation can be heavier for mobile. Mobile may be required to subsidise other telecom services. Normal people say: look at that yuppie. Real estate owners charge high rates for antenna sites.

This discussion applies mainly in industrialised countries. In poor developing countries even a wired telephone is expensive and can be considered "luxury" with the same arguments as a mobile telephone. In poor countries the argument should perhaps rather be: choose the most economic solution, be it any technology. Leapfrogging should be allowed.

2.2 Local or countrywide?

INDEPENDENT	LOCAL ACCESS
Countrywide	Local wireless access
Independent network	Add-on to wired
Point of Interconnect on trunk / long distance level, one per country suffices	Point of Interconnect on local or local tandem switch level

An extreme interpretation of the *Local access* alternative would be to call it a wide area cordless phone.

There is no logical connection between basic / luxury service and local / countrywide. The only reason for combining basic and countrywide is that both try to make the best possible use of the potential of the technology. The *Local access* alternative restricts utilisation of the potential, just because the regulator does not allow countrywide services.

3. SUBSEQUENT CHOICES

3.1 Numbering

INDEPENDENT	LOCAL ACCESS
Countrywide access codes	Only local numbering allowed

The impact of numbering on the success of mobile services may be astonishing. The logic is as follows (when local services are heavily subsidised):

1. If mobile services are included in the local numbering plan, calls from the same local wired network should be local calls (consumer protection requirement);
2. Local call charges (if any) are not sufficient to cover mobile call termination charges;
3. The "receiver pays" principle has to be adopted;
4. Users do not publish their mobile numbers to avoid paying for unsolicited calls; and
5. Mobile phones are not useful for incoming calls.

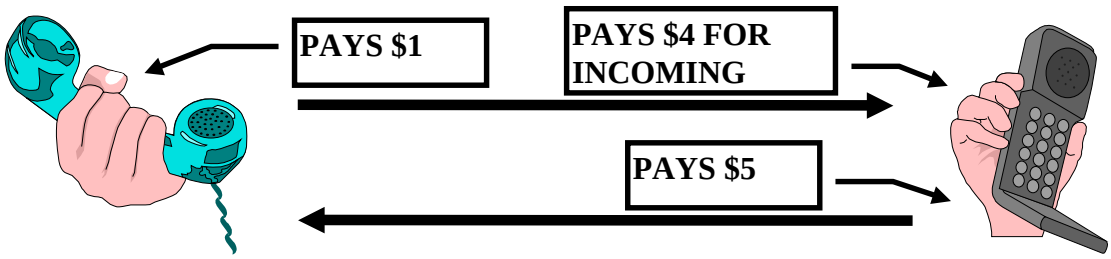
This logic is discussed in somewhat more detail below.

Local call charges (when cost based) are sufficient for some mobile applications, and thus (hopefully) sustainable local mobile services are emerging. However, they are designed differently from the "traditional" countrywide, wide coverage services. The two solutions may exist in parallel in the *Independent* alternative, while countrywide solutions are by definition not allowed in the extreme *Local access* alternative.

In some countries area codes are being exhausted, which is one reason for not allocating area codes for mobile services. For various reasons a numbering reform is delayed. The question arises: should numbering administration steer development, or development steer numbering administration?

3.2 Receiver Pays

INDEPENDENT	LOCAL ACCESS
"I order and pay the call"	"I order the call, you pay air time"
Caller pays one charge like any other calls (long distance, international)	Mobile pays for radio part also for incoming calls, air time charges in addition to wired charges
Calls in opposite directions are about equally priced	Calls in opposite directions are very differently priced
Caller pays for benefit of mobility	Mobile pays for benefit of mobility



The concept of "air time" applies only in the *Local access* alternative. There is no separate air time charge in the *Independent* concept, all call charges include air and wire transmission without any distinction. Still various articles and even consultant reports misuse the term "air time charge".

Result:

INDEPENDENT	LOCAL ACCESS
Mobile numbers are published like any other phone numbers	Mobile numbers are not published, to avoid paying for unsolicited calls
Mobile phones are used bothways as standard phones, easy to integrate wired / mobile	Mobile phones are not useful for incoming calls, sometimes only used for backup or emergency or as "portable call boxes"

There are two main reasons for having a phone (any phone):

- The user can call others; and
- Others can call the user.

In many cases paying for unsolicited calls is in fact a minor issue compared to the overall benefit of having a mobile phone. However, it is a reality that numbers are not published. Human reactions are not always logical. The tail is wagging the dog...

The basic issue still remains valid: what is the sense of having a phone without incoming calls?

Then, who should pay for the advantage of mobility? The caller or the mobile user?

Arguments:

INDEPENDENT	LOCAL ACCESS
The caller wants to reach the mobile user, and gets frustrated if he cannot do so	The mobile user offers an advantage to others and pays for it
Normal business practice is that the person who orders also pays (caller pays, on a per call basis)	The mobile user orders and pays mobility, even if others (callers) decide on usage

Both sides have valid arguments. Policy makers have to make the choice.

3.3 Right of Way

The differences are also reflected in frequency management.

INDEPENDENT	LOCAL ACCESS
Countrywide frequency band allocations (actually continent-wide, partially world-wide to enable flexible roaming)	City-wide frequency band allocations, e.g. auctioned because mobile is luxury

Frequency band allocations can be considered similar to right of way. Auctioning right of way for copper and fibre cables is not use, even if right of way charges are in use in some countries (a ceiling applies for reasonability). High frequency band charges have a cost impact, which is transferred to user tariffs in any normal commercial environment.

Frequency auctions and similar are a politically easy way of imposing tax like charges on a particular industry, without the political level being accused of excess taxation.

3.4 Taxes and Charges

If the "luxury" stamp is put on mobile services, it would be politically easy to apply special mobile taxes.

Other charges may also apply, e.g. for antenna sites:

INDEPENDENT	LOCAL ACCESS
Antenna sites are reasonably charged, similar to right of way	Antenna sites are expensive

In the *Local access* alternative antenna sites are expensive because "luxury users can pay". In the *Independent* alternative different technologies are treated equally.

The "luxury stamp" has an impact on licence fees as well:

INDEPENDENT	LOCAL ACCESS
Same licence fee principles apply to all technologies	Higher or much higher licence fees for mobile services

3.5 National Call Termination (Interconnection) Charges

INDEPENDENT	LOCAL ACCESS
Each operator (wired or mobile) has one list of charges for all call terminations, independent of the source of the call	Wired operators charge full wired charges bothways and keep all, no payments from wired to mobile

The differences arise from the service concept: local access is considered similar to a large PABX. Thus the mobile operator pays user charges. PABX owners do not either get money for terminating calls, even in a large PABX network.

3.6 International Call Termination (Interconnection) Charges

When international call termination charges (settlement rates) are lowered towards cost as expected, averaged settlement rates will be well below many present mobile call termination charges. This situation invites arbitrage type business (call-back etc.).

INDEPENDENT	LOCAL ACCESS
Mobile termination charges may well be higher than averaged call termination charges (settlement rates) for international calls, which creates complicated conflicts	Fits well into averaged call termination charges, as full charges are paid for the wired network and the mobile user pays separately for the mobile part (airtime)

In regimes with the I*ndependent* solution a growing pressure will build up towards either the *Local access* principles or other (new) solutions.

One possibility is that mobile call termination charges generally are lowered towards wired charges, as a result of lower costs. Another solution (presently in use) is to share the loss: provided that the regulator agrees, the terminating mobile operator applies lower international termination charges than national termination charges. A third solution is that international calls are charged based upon the receiving network type rather than on the destination country.

The outcome is not predictable for the time being. Time will show. None of the above solutions seems practical. The local access solution is problem free in this respect.

3.7 Roaming

INDEPENDENT	LOCAL ACCESS
National roaming is normally not needed, most networks are countrywide	National roaming has to be arranged even between cities
International roaming is a basic feature mandated in licences	International roaming can be added if technologies (standards) are compatible and operators agree
Roaming possibility is free, calls are charged	Roaming possibility in a different network is charged per day

The concept of roaming is not necessarily a licensing matter, even if it can be included in a licence. Charging per day for the roaming possibility is likely to restrict use of roaming. Such charging or free of charge is not necessarily a licensing matter, even if it can be included in a licence.

National roaming may well become an issue in *Independent* type regimes, when part of the mobile operators have lower (800 / 900 MHz) *and* higher frequency bands (1800 / 1900 MHz), others only higher frequency bands. Dual band operators have considerably larger geographical coverage, and higher band only operators may require national roaming to get dual band service and large coverage.

3.8 Rural and Remote Services

INDEPENDENT	LOCAL ACCESS
Mobile is frequently used as substitute for wired, especially in rural and remote areas	Difficult to substitute due to high prices and charging for incoming calls

Independent gives the user the choice between wired and mobile at a level playing field. On an annual basis mobile is not necessarily much more expensive than wired, if usage is moderate. This alternative may also remove part of the need to subsidise rural and remote wired telephony.

A GSM 450 technology concept has been discussed. It would be especially useful for rural and remote area substitution, if policy and licensing principles allow. Similar low frequency / wide range / low capacity solutions can be designed for any other mobile technology, if there is a sufficient market. Again, the market size depends to a large extent on policy makers.

Local access means that rural mobile telephone users may subsidise wired telephony users, also urban.

3.9 Economic Aspects

A number of observers argue that mobile networks (even including cost of handsets) are already (or at least will be in the future) cheaper than wired networks, with same usage (if moderate), provided that mobile networks are built as independent networks.

INDEPENDENT	LOCAL ACCESS
Rather neutral to cost development, actual costs follow real cost trends as no unnecessary networks are involved	Economically inefficient, mobile networks must use wired networks except for calls to own network, actual costs are costs of two networks (due to mandatory local POI)

4. WHY SUCH DIFFERENCES?

4.1 "Market Decides"

The issue of who decides is crucial:

INDEPENDENT	LOCAL ACCESS
Regulation is technology neutral, level playing field, users' choice	Regulation gives wired operators the upper hand

Regulators have different approaches. Regulators favouring the *Independent* alternative have a more technology neutral approach, giving users the choice, while regulators going for the *Local access* alternative seem to do the preference choice on behalf of the users, and favour wired services at the expense of mobile services.

4.2 Universal Service

INDEPENDENT	LOCAL ACCESS
Users' choice what to use	Regulator decides what to use

The very popular political universal service concept may possibly be a hindrance for development of mobile services. In practice a pronounced universal service concept presently favours wired services, as various subsidy schemes usually are geared towards supporting wired telephony.

Why not give users the choice? Travellers can choose between horses and cars...

5. OUTCOME OF THE TWO CONCEPTS

5.1 Statistics

An educated reader has already recognised that the *Independent* concept is more like an extreme European regime, mainly applied in Northern Europe (Finland is used as example). Concepts closer to the *Local access* alternative were used in some states in the USA during the 1980's, when mobile was luxury. At the time the price of the first mobile (car) phones could be half of the price of a cheap car.

The US Congress and the FCC are presently directing the US mobile policy towards a more technology neutral status, in particular as an outcome of the 1996 Telecommunications Act. However, it takes some time until the changes take effect.

UK has applied a policy that could be described as intermediate.

The situation in these countries can be shown in some graphs. Readers should avoid to make definite conclusions, as the outcome does not depend only on licensing matters. Technology choices, business approaches, etc. have a significant impact. This paper does not and cannot analyse all those factors.

Figure 1 shows the development of the most commonly used measure for penetration, measured in relation to population.

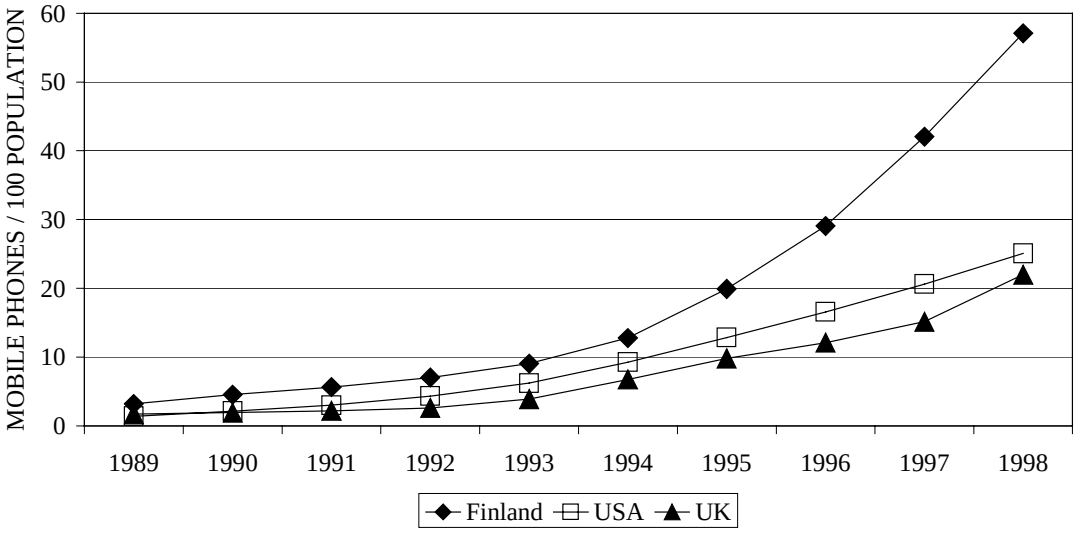


Figure 1: Mobile penetration per 100 inhabitants. Source: ITU and Finnish telecommunications statistics

Figure 2 shows penetration per household (Finland), including wired telephony.

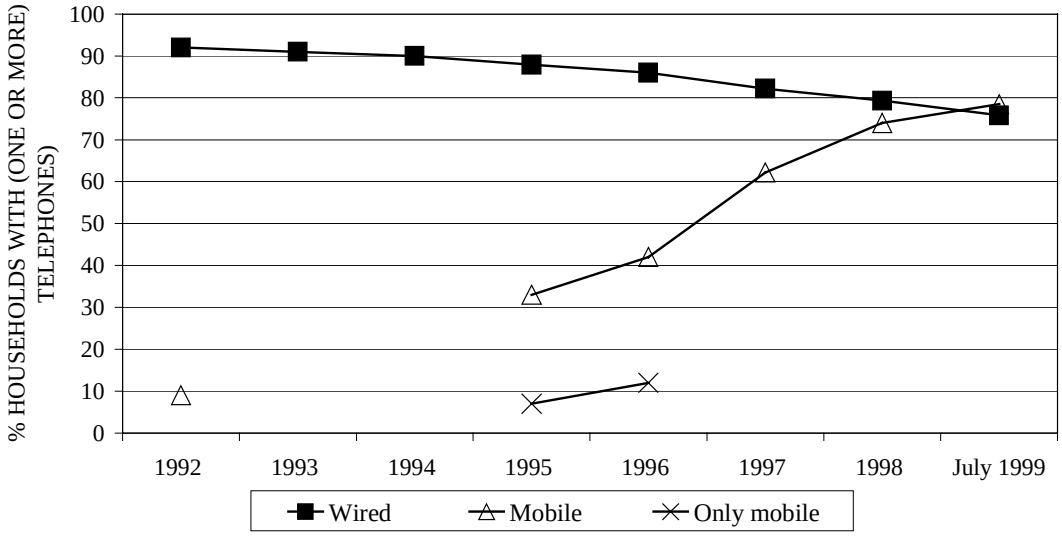


Figure 2: Telephone penetration per 100 households in Finland. Penetration here means one or more telephones. Household penetration is not regularly monitored, especially not only mobile. Source: Statistics Finland.

Penetration per *household* is not regularly measured and published, thus figures are not that easy to find. The figure indicates something interesting: wired household penetration is *decreasing* (!) rather rapidly. Since 1990 wired household penetration has decreased 19 per cent points, down from 94 %. In July 1999 mobile household penetration took over wired penetration.

The perhaps final measure of mobile success is neither penetration per population nor per household, but traffic. Figure 3 shows the development in three countries from which data could be found. The development trend is clear: mobile gains ground, but the speed of development differs.

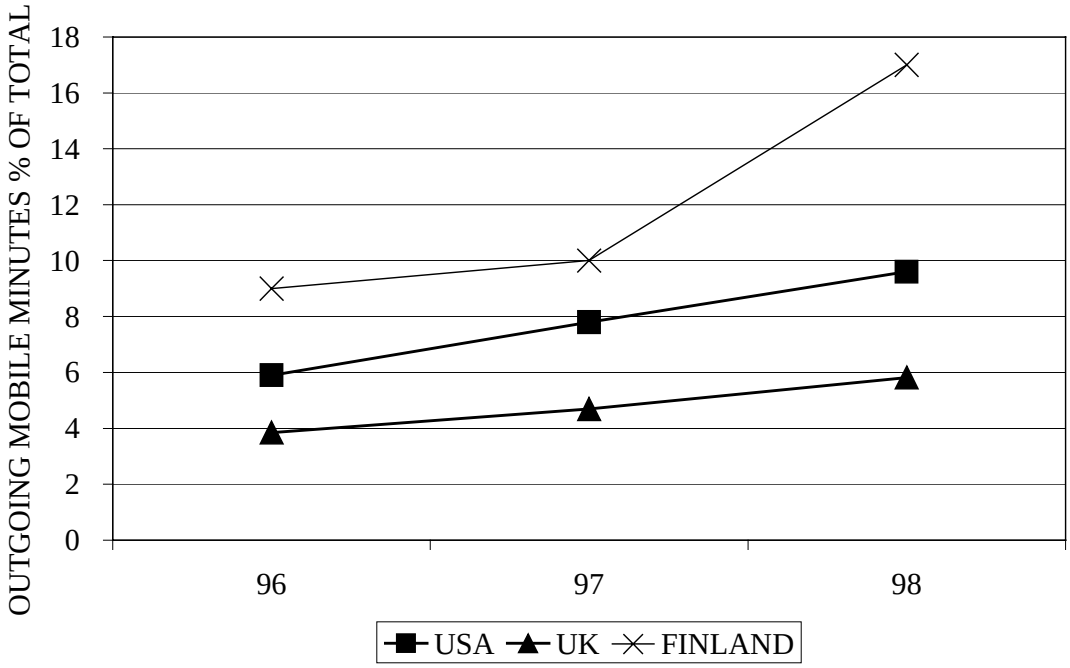


Figure 3 Outgoing mobile minutes as % of total outgoing call minutes in all telephone networks. Sources: Global Mobile 7 / 1999, Finnish Telecommunications statistics.

Wired traffic includes quite a lot of Internet. This is not (yet) the case in mobile traffic, and will probably not be unless mobile operators opt for a reasonably priced data traffic mass market in the third generation mobile services.

5.2 New approaches

The two black and white extremes described in this text are not reality, the real picture is more mixed. Some examples of recent development:

- In the USA caller pays (as opposite to receiver pays) has been in use in some places;
- Country-wide mobile services are emerging in the USA;
- The EU commission is said to discuss introduction of "receiver pays"; and
- More than 30 local GSM1800 licences have been granted in Finland, with local numbering, applying essentially local call charges.

6. CONCLUSION

Technology choices seem to interest the public, including sector professionals, much more than boring policy and regulatory choices. Technology is "sexy".

The author would like to emphasise that there are no "right" or "wrong" decisions. Every country has its own history, policy and legal environment, business culture and other peculiarities. What may seem to be wrong in one country at one point in time may well be considered the best solution in the same country at some other point in time, or in another country.

The only firm conclusion that the author would like to draw from the above is the following, and even that without sufficient scientific evidence:

> *Licensing and other regulatory matters may be at least equally important for operator success as technology choices.*