Strategies for Mass Market Internet Access in Developing Countries

0. Summary

Voice and SMS penetration in developing countries is progressively approaching that in developed markets. Regulatory success factors supporting the development of a consumer mass market are widely recognized:

- introduction of mobile competitors to challenge fixed incumbents;
- allocation of sufficient radio spectrum to competing mobile operators to support national demands for voice; and
- otherwise regulators been relatively non-interventionist - relying on competitive ecosystems.

However, internet access and aggregate internet access speeds available to SMEs and households are now diverging internationally. Developed markets are accelerating away reflecting their starting conditions and complementary policy approaches. Developing countries are losing ground primarily as they have not yet focussed on how their key national starting condition – of mass market mobile access – can be leveraged by complementary policy. It is not sufficient, and will not be effective, to simply repeat developed country models.

Mass market internet access in developing countries will use mobile, or at least, radio-delivered approaches. Internet adoption can be rapid provided policy makers deliberately repeat approaches which have already proven to be successful for voice and SMS in their markets. Competitive ecosystems based on additional spectrum availability and stable, non-intrusive regulation will sustain communications investment in new access and services. In contrast, poor sector policy choices, excessive regulation, spectrum or taxation costs may undermine national strategies for mass market internet access. The key risk is that the *"digital divide"* now affecting SME and household internet take-up widens unnecessarily to create a *"digital chasm".*

1. Introduction

The ITU, reflecting agreement through the World Summit on the Information Society wishes to promote the creation of an enabling environment for the development of ICTs in developing countries and for extending their benefits to all. Regulators and policy makers active internationally recognize that this requires appropriate regulatory frameworks and that competition and investment incentives are essential.

While these goals and principles are widely accepted this paper attempts to answer, at a more detailed level, what developing country policy makers should actually now do in the short term to further communications development. It identifies key regulatory success factors which enable a competitive communications ecosystem and which encourage mass market access.

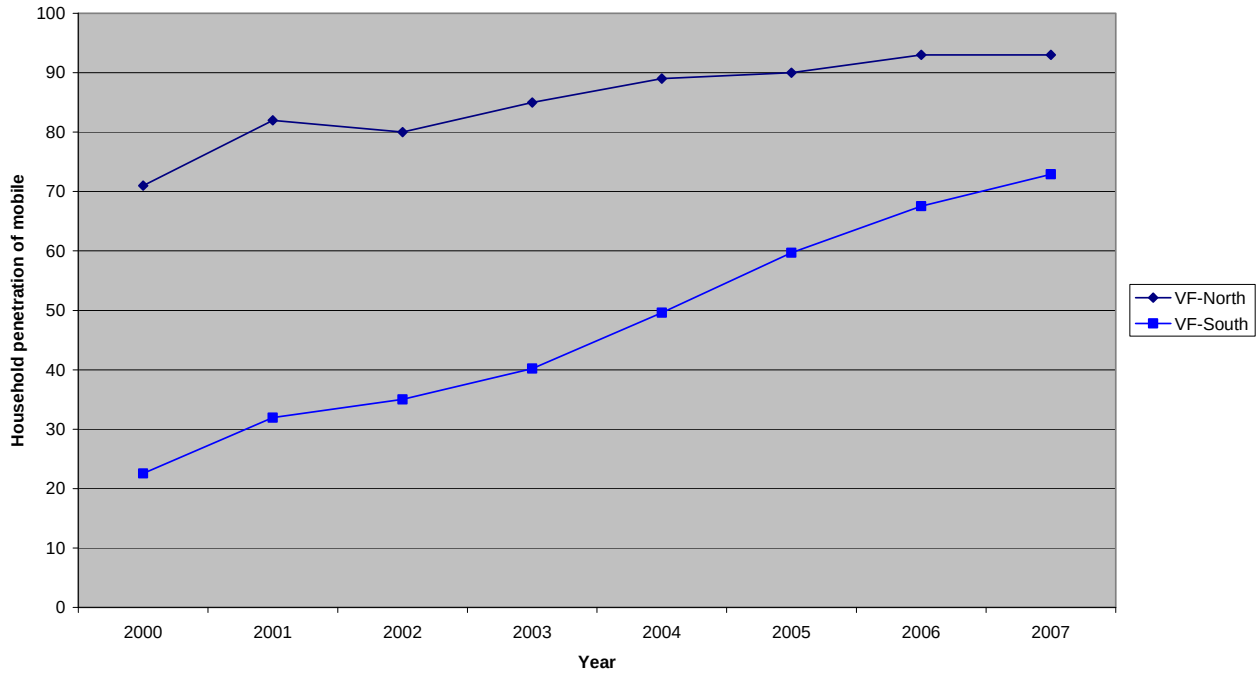
Policy makers face many challenges including how to support investment, and how to identify good regulatory approaches in the current economic downturn. While these are complex issues Vodafone believes that developing country politicians, regulators and policy makers control the destiny of their national communications industry. They have in their hands the ability to create success in the sector – or failure – based on the policies they adopt. Rates of adoption of internet services in developing countries will depend on how quickly policy makers identify and repeat the lessons which are driving continuing mass market take-up of voice and SMS in their markets.

2. Comparison of two developing and developed markets

Communications policy makers and regulators are concerned to ensure effective access to communications for their citizens. Differences in effective communications and information technology access between countries in the global South and in the global North may be contrasted and the difference in effective penetration rates described as a *"digital divide".*

It was once commonplace to compare the total number of phone connections in Africa with those in a developed market capital city[1]. Such comparisons have long been obsolete. Figure 1 compares household penetration of mobiles in two countries where Vodafone is active[2]. This illustrates a closing of the *"divide"* between developed and developing counties in terms of consumer access to voice. This does not mean that the question of universal access to voice is resolved, but rather that regulatory policies in developing markets have successfully, and relatively rapidly, enabled the creation of consumer mass markets in voice services and equipment.

Figure 1: Voice - mobile penetration in VF-South is closing the *"divide"* with VF-North



Despite difficult global economic conditions Vodafone internal data suggests developing market household penetration has continued to increase since 2007. Penetration trends for household access to mobile voice also mean that previous North-South differences in household access to messaging – in the form of SMS – are closing at an equivalent rate[3].

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1 A statistic widely quoted at the time of (and for some years after) the Maitland Missing Link Report to the ITU, 1984

2 VF-North is in Northern Europe. VF South is in Sub-Saharan Africa. Statistics are drawn from public data produced by national regulators in both cases.

3 SMS is the most commonly used form of communications globally and is crucial in providing access to certain consumer groups, notably profoundly deaf customers. It remains under-recognized by policy makers dealing with universal access. SMS is also the level of transmission required for a current international internet success story – Twitter – whose take up in developing countries can be expected to be as dramatic as in developed countries.

Regulatory success factors supporting these developments are widely recognized by policy makers and by those in industry. These include

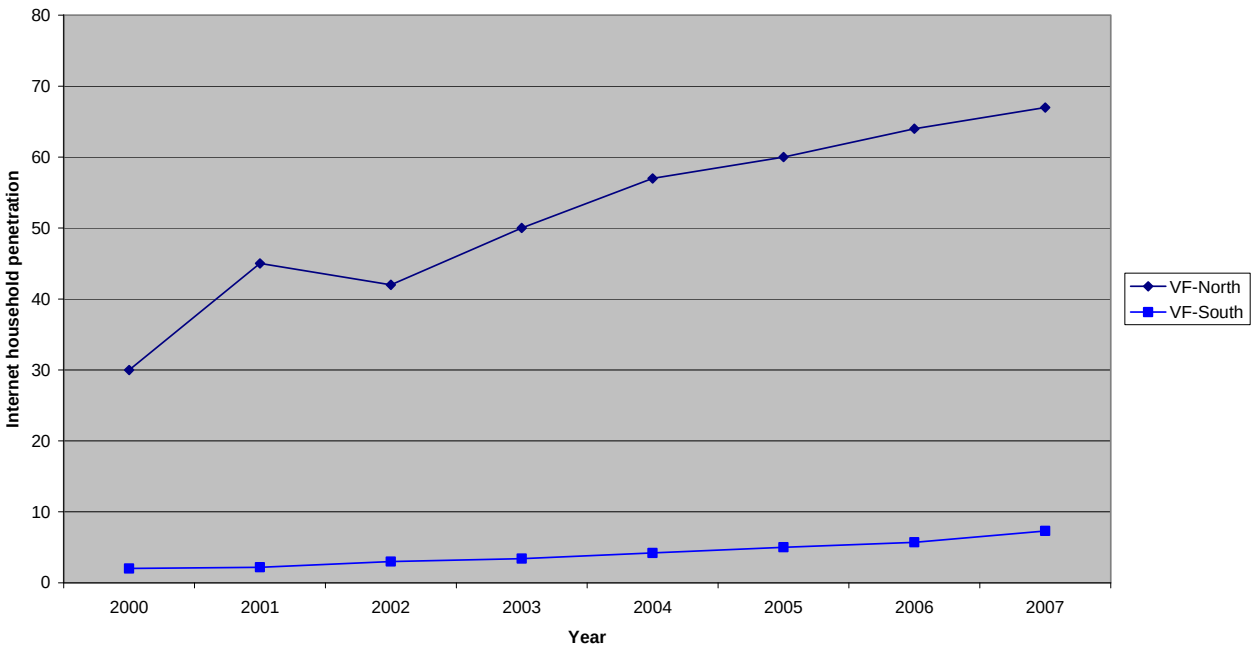
- introduction of mobile competitors to challenge fixed incumbents;
- allocation of sufficient radio spectrum to competing mobile operators to support national demands for voice; and
- otherwise regulators been relatively non-interventionist.

In multiple developing world markets these measures, combined with substantial foreign direct investment, have enabled the creation of a competitive ecosystem in which operators compete to win customers, expand coverage and grow revenues.

So, while exceptions can be identified, success in closing the voice divide has generally been associated with competition between vertically integrated mobile operators, with sufficient spectrum to expand and compete against each other for new customers. Regulatory intervention has primarily taken the form of the provision of new licences to allow additional entry. There has, in general, not been economic intervention designed to change the structure of the market or to control retail prices - reflecting the absence of individual operator market power in mobile markets.

When we turn from voice and SMS to internet access a different picture emerges. Figure 2 compares household internet access in these two developed and developing countries.

Figure 2: Household internet access is diverging. VF-North shows steeper growth from a higher base



Hence, we see increasing divergence in internet access. While both countries show increased provision the starting position and policy approach in the developed market has been more effective in increasing the rate of household internet penetration. This has occurred despite the willingness of communications operators internationally to invest in both developed and developing markets during the period.

There are a number of possible explanations for this divergence. It is possible this simply shows different positions in a similar service adoption curve. In this case policy makers in developing countries can relax: their markets will show similar household internet penetration rates in time as competition in internet access and national demand increases. These statistics also do not take into account alternatives to household access in developing countries[4] including greater use of shared internet access – cybercafés etc..

While the timing of competitive entry is important Vodafone is sceptical that these explanations are complete. Developed markets have succeeded in increasing household internet access during the recent decade by combining specific starting conditions with complementary policy approaches. Such approaches vary by region or country as illustrated in Table 1.

Table 1

Region	Starting conditions	Complementary policy approach
Europe	Established, geographically wide-spread monopoly fixed national infrastructure. 2+ competing mobile infrastructures.	EU Regulatory framework provides for reviews to determine market power. Remedies imposed on fixed incumbents facilitate infrastructure and service competition. No remedies on competitive mobile operators - even where market shares diverge significantly.
US	Established, urban duopoly, rural monopoly fixed infrastructure. 2+ competing mobile infrastructures.	Duopoly-based competition for fixed services including voice between telco and cableco. Mobile operators free to compete nationally.

In Europe decisions to apply access and interconnection obligations on fixed incumbents with market power acted as a critical enabler of a competitive internet access market. This allowed emergence of competitive dial-up internet access propositions, using local, national and non-geographic numbers at a variety of tariffs.

However, this policy approach will not be effective for a developing country[5] where fixed network deployment is limited or non-existent. Access obligations, even based on market power, may interfere with incentives of both an *"immature"* fixed incumbent and of potential investors in competing networks: this may undermine extension of communications access. Where developing country fixed networks are not mature, or where *"maturity"* has been reached but with relatively low penetration or poor network quality, policy makers must seek alternative, nationally relevant approaches to increase household internet access.

Increasing divergence can be illustrated further by examining relative aggregate internet connectivity between these countries. Figure 3 compares current total speed of internet access per 100 households in both countries. In VF-North 100 households currently share approximately 210 Mbit/s. In contrast, 100 households in VF-South currently share approximately 5 Mbit/s[6].

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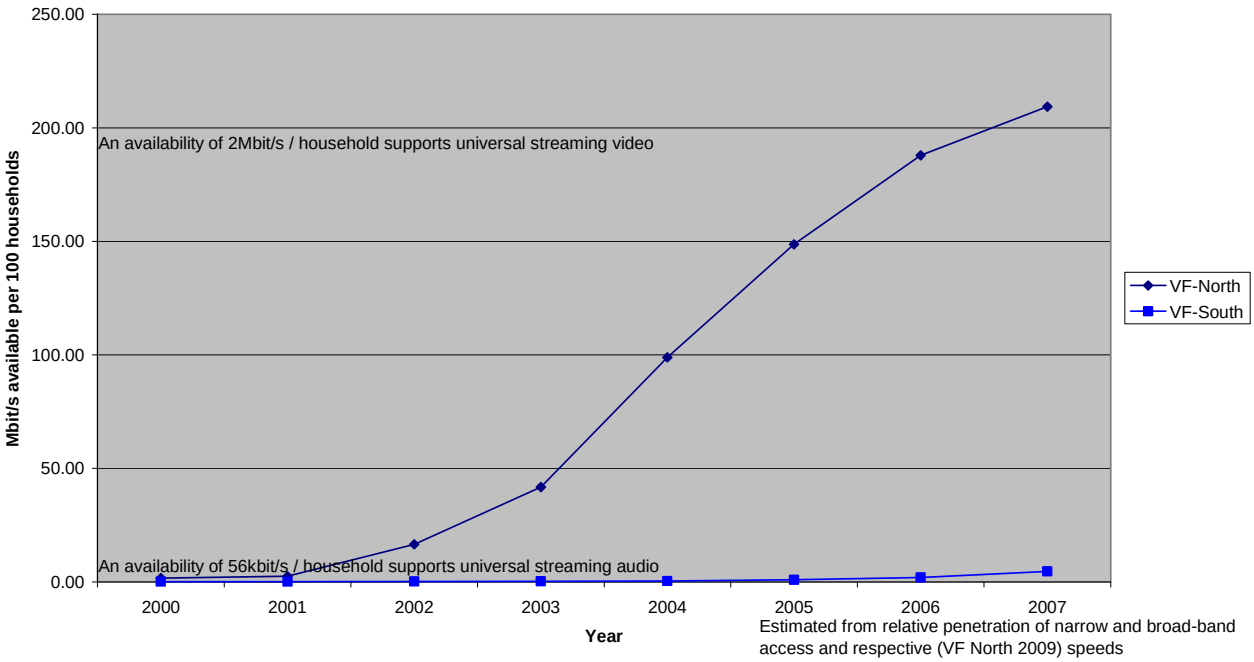
4 Twenty Years of Measuring the Missing Link – Tim Kelly, ITU 2005.

5 Conditions in developing countries vary widely. In this paper Vodafone simply means a country where there is limited or no fixed infrastructure or where service quality and network reliability is poor.

6 Estimates are based on number of internet connections in each market which are broadband or narrowband. Broadband speeds based on current average unbundled broadband speeds in VF-North. Narrowband speeds estimated as 56 kbit/s. Statistics probably underestimate divergence as i/ competitive high speed broadband access in VF-North is not included and ii/ real broadband and narrowband speeds in VF-South may not meet these estimates.

Figure 3: Real divergence in aggregate household internet speed is much greater - reflecting rapid broadband rollout in VF-North. VF-South numbers are *"flat-lining"*



There is increasing divergence between VF-North and VF-South in terms of the aggregate speed of household internet access. In VF-North national internet capacity (at least in the backbone) is now greater than a 2Mbit/s per household level required to sustain streaming video. In contrast, national internet capacity in VF-South is currently 40x lower – although this still implies a national backbone capacity at 56kbit/s level per household required to sustain streaming audio.

In the EU obligations to re-sell wholesale broadband and to provide unbundled wholesale access to copper local loops have led to a significant increase in the take up of broadband. This has, in turn changed the form of internet access purchased and increased aggregate household speed. Again we see continuation of identified policy approaches, but applied to Digital Subscriber Loop (DSL) technologies as these are introduced by fixed incumbents. In the US duopoly-based competition has extended competitive telecommunications and cable fixed service bundles to voice, TV and internet access.

Again these policy approaches will not be effective for a developing country where fixed network deployment is limited or non-existent. Rather than attempt to duplicate approaches of developed markets, policy makers must seek alternative, nationally relevant approaches.

3. Does international divergence in *"aggregate"* internet access matter?

Research[7] for Vodafone, and for others, repeatedly concludes that high mobile penetration is associated with higher rates of economic growth. Recent[8] findings in India underline the point: *"Indian states with high mobile penetration can be expected to grow faster than those states with lower mobile penetration rates, by 1.2% points a year more for every 10% increase in the penetration rate."* These quantitative findings are associated with research into mobile use by urban and rural populations which illustrate a range of qualitative benefits to consumers. So we can see, at least, that voice and SMS penetration rates matter in developmental terms.

However, when it comes to internet access the picture is not so clear.

> In February 2001, incoming Federal Communications Commission Chairman Michael Powell commented on US digital divide arguments by comparing computer and internet access to luxury car ownership. *"I think there is a Mercedes divide,"* he said. *"I would like to have one, but I can't afford one."*
>
> This comment drew a response from Cynthia Lanius, Executive Director for the Center for Excellence and Equity in Education at Rice University who suggested*: "The issue is not, 'I don't have a Mercedes'. The issue is I don't have a car."* [9]

While the US market has moved on since 2001 a similar question can be put regarding divergence of aggregate internet access speeds. Does this type of divergence matter and, if so, how? This question can best be answered not simply in terms of aggregate speed but through an understanding of the services enabled by different internet access speeds[10].

Types of corporate and business communications service demand have remained relatively constant over the last two decades[11]. Business service demand is dominated by voice, e-mail, file transfer (now as e-mail attachments) and database access (now as web-surfing). These uses do not demand high-speed access unless as a consequence of large establishment size. Geographically-focussed demand has been met by targeted private investment in a few cases supported by regional development funds – and the developing world is no different.

Large business users (hotels, call centres, cybercafés etc.) in developing countries will increasingly be able to secure internet access services on commercial terms at the speeds they wish to meet demands of their users provided remaining bottlenecks in national and international backbone provision are addressed. These bottlenecks are based on no or limited international cable competition or regulatory restrictions on international gateway access. A more focused question is: will international divergence in internet access matter for Small and Medium-sized Enterprises (SMEs) and / or for consumers?

SMEs are commonly held to be a developmentally significant economic sector. Opportunities to exploit internet access for e-mail, file transfer and database access should benefit them and so the country where they are located. A presence on the internet may also secure additional customers.

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7 For example "Africa: The Impact of Mobile Phones" Vodafone Policy Paper Series Number 2, 2005.

8 "India: The Impact of Mobile Phones" Vodafone Policy Paper Series Number 9, 2009

9 Quoted in Wired Magazine see: http://www.wired.com/politics/law/news/2001/04/43349

10 Much public policy debate about broadband / Next Generation Access is at a superficial level. Arguments about *"how fat is my pipe"* rather than economic or social requirements associated with mass market deployment.

11 Source Enders Analysis: Very High Speed Broadband: A case for intervention – January 2007.

Consumer service demand has changed and expanded since 2000. While voice and messaging (including SMS and e-mail) remain the pre-eminent services there has been significant growth in video downloading and streaming often associated with use of social networks. In the developed world much current network demand is for peer-to-peer services which will operate faster on higher-speed access: they use the capacity which available. But this use is not associated with significant direct benefit or willingness to pay on the part of the customer[12].

We can also see that speeds vary within countries where there is mass market broadband access using DSL. Customer density affects returns on exchange-based unbundling. Distance from the exchange to the customer affects effective speed of access. Further national divergence can be expected as investment extends fibre towards the customer and allow Very High Speed Broadband (VHSB) at speeds of 20Mbit/s and beyond.

Whether investment in VHSB can be justified by actual service demand remains difficult to judge. The key additional service type which VHSB provides is streaming of one or more HDTV channels. What is absent at present is any indication of mass consumer willingness to pay for this over what might be paid for streaming video at lower (non-HDTV) speeds. In other words if a programme or film downloads at the speed which allows a customer to listen to or watch with adequate quality there appears to be limited consumer welfare benefit from a faster internet access service.

For developing market policy makers the point should be clear – North/South divergence in aggregate household speeds does not matter *per se.* Rather what matters is ensuring that a national mass market develops in internet access and devices which can support relevant services for SMEs and for consumers. Table 2 illustrates this proposition in terms of mass market services.

Table 2

Developing countries	**Mass market service**	**Which supports**
Now	Voice and SMS	Voice web, Twitter
Immediate target	Internet access (at up to 56kbit/s)	Streaming audio, radio, e-mail, web-browsing, Social Networking Services, IM, VoIP
Subsequent target	Broadband access (up to 2Mbit/s)	Streaming video, TV, file transfer

There is no justification for attempts to prioritize VHSB speed access for SMEs or consumers at this time (e.g. to support HDTV*)* although this does not rule out demand emerging in time. For example SME and consumer adoption of cloud computing approaches based on net books or other mobile devices may push up mass market access demands in developing markets. However, the question of download speeds versus application demand will remain relevant in terms of justification of investment.

So what is the enabling environment which will increase mass market *"car"* ownership – if not ownership by all consumers of a *"Mercedes"*?

12 In fact peer-to-peer file sharers would also appear to be resistant to paying for content which is under copyright. Consequently, certain governments, in responding to content lobbies, appear to be moving against peer-to-peer sharing where this involves content which is copyrighted. This may also be a strategic approach of developing market governments keen to encourage or preserve value in nationally distinctive content industries.

4. Enabling environment for effective deployment of mass market internet access

Regulatory success factors supporting the deployment of internet services in developing markets must combine an understanding of national starting conditions with the selection of complementary policy approaches to draw in new infrastructure investment and increase access.

Developing world policy makers should be:

- clear about present national circumstances;
- understand how past policy choices have been successful in creating mass market access and in closing the voice *"divide";* and
- how these can be extended and applied in order to create mass market internet access.

Table 3 illustrates typical starting conditions and policy approaches in early 2000s.

Table 3

Region	Starting conditions in early 2000s	Historic policy approach
Developing markets	Geographically limited fixed infrastructure. Single or no mobile infrastructure.	Introduction of mobile competitors challenges incumbent in voice. Allocation of sufficient radio spectrum to operators supports national demands for voice. Otherwise non-interventionist.

Developing country regulators will, in general, not enjoy the starting conditions seen in developed markets – notably of one or more extensive fixed infrastructures. On the other hand developing markets increasingly have mobile access to voice and SMS at mass market levels. Vodafone believes policy makers can extend policy approaches which have already been successful in voice to leverage these specific starting conditions. In other words repeat what has worked to date.

Policy leverage of mass market mobile voice in developing markets will include:

- encourage multiple mobile operators to compete among themselves and with fixed incumbents to serve the national internet access market based on a technology neutral approach to licence and service provision;
- allocate sufficient additional radio spectrum to competing operators to support national demands for broadband internet access; and
- otherwise continue with a policy of being non-interventionist in terms of market structure.

This is not to advocate a technology-specific approach. Vodafone expects fibre-based access to expand in city centres, special economic zones and other urban, business-dense areas. New high-density housing may be built with fibre access pre-installed – particularly if aimed at wealthier purchasers. Fibre will also increasingly complement microwave and satellite national and international back-haul and, ultimately, will serve the majority of traffic routes in emerging markets - just as it does in developed markets. Satellite access will occupy niches reflecting its capacity and cost characteristics and will increasingly be used for broadcast.

But it is to argue that mass market internet access by households and by SMEs will use mobile, or at least, radio-delivered technologies – and this adoption in developing countries can be a rapid one provided that policy makers create the right enabling conditions – a competitive ecosystem.

Table 4 illustrates past and current staring conditions and complementary historic and continuing policy recommendations.

Table 4

Region	Starting conditions now	Historic policy approach
Developing markets now (voice focus)	Geographically limited fixed access. 2 - 7 competing mobile voice infrastructures. Mobile voice and SMS access reaching mass market levels.	Introduction of mobile competitors challenges fixed incumbent in voice. Allocation of sufficient radio spectrum to competing operators supports national demands for voice. Otherwise non-interventionist.
Region	**Starting conditions now**	**Continuing policy approach**
Developing markets now (Voice and internet focus)	Geographically limited fixed access. 2 - 7 competing mobile voice infrastructures. Mobile voice and SMS access reaching mass market levels.	Encourage competitive provision based on technology neutral licence approach. Allocation of sufficient additional radio spectrum to competing operators supports national demands for broadband internet access. Otherwise non-interventionist.

Developing markets which adopt these three key policy recommendations can expect to achieve:

- 2 - 5 competing national mobile voice and internet infrastructures - reflecting entry and consolidation in different markets and declining fragmentation of spectrum allocations;
- complemented by a modern, fibre-based access in urban, business dense areas and by the use of satellite in specific niches.

Mobile voice, SMS and internet access should reach national mass market levels where SMEs and consumers have internet speeds of between 56kbit/s and 2 Mbit/s accessible on a range of low-cost mobile devices including phones, personal digital assistants and PCs.

5. Further discussion of successful policy approaches

Vodafone argues that successful leverage of mass market mobile voice in developing markets can be based on:

- encouraging mobile operators to compete among themselves and with fixed incumbents to serve the national internet access market based on a technology neutral approach to licence and service provision;
- allocating sufficient additional radio spectrum to competing operators to support national demands for broadband internet access; and
- otherwise continuing with a policy of being non-interventionist in terms of market structure.

These *"top-level"* policy approaches are capable of being disaggregated in order to identify components which should guide policy makers to effective regulatory approaches.

5.1 Encourage mobile operators to compete among themselves and with fixed incumbents to serve the national internet access market based on a technology neutral licence and service provision

Historic approaches to licensing communications providers have been market / technology based. Fixed and mobile operators have been licensed separately. Other forms of licences have been available for value added service providers.

Developing market policy makers have recognized the advent of increased competition between providers of different market / technology heritages. It is common to label this *"convergence"* and, increasingly, to propose reform to create *"unified"* licensing. Such regimes too often replace vertical market facing licensing with unproven horizontal *"line of business"* licensing. This neither reduces core numbers of licences, nor simplifies regulation. In particular, it creates boundary and arbitrage risks in a regulatory regime and introduces new forms of complexity for regulators seeking to intervene for consumer benefit. Table 5 illustrates difficulties with *"unified"* regimes.

Table 5: Summary of unified licensing regimes

Informed by good principles…	**…but too complex and contradictory**
Technology and service neutral licensing approach Expectation that providers will compete in multiple economic markets Need for spectrum reform recognized Universal service recognized as a key policy issue	Creation of new *"line of business"* licensing an unwieldy basis for introducing consumer protection mechanisms across network / service boundaries and risks of regulatory arbitrage / gaming. Limited treatment of economic markets or market power Technology neutrality principles not extended consistently to spectrum to permit re-farming etc. Spectrum policy too often an *"after thought"* – when increasing availability and flexibility of spectrum permissions is key to improving services in emerging markets. Treatment of universal service too often starts with creation of a new tax – reducing rather than encouraging market access and coverage incentives.

In certain countries separate licensing of infrastructure and services has been justified by assuming the advent of Next Generation Networks (NGNs) where it is suggested that these will be separate. However, this approach fails to be truly technologically neutral, does not reflect starting conditions in developing markets and is not supported by evidence of benefit.

The first problem is inevitable as regulation is anticipating a specific technological approach: NGN architecture envisaged in ITU standards. The difficulties which emerging market policy makers risk is illustrated (on one hand) in markets where unified licensing is applied significantly in advance of installation of NGA and that (on the other hand) the ITU has already commenced discussions regarding successor approaches to NGNs: New Generation Networks.

There clearly are significant regulatory issues with moves to NGNs in developed markets with an extensive fixed monopoly infrastructure. These are primarily associated with Next Generation Access (NGA) where current copper access is progressively modernized by fibre installation and the strategic threat is that fixed incumbents exploit NGA to re-monopolize the national fixed access environment. This may, subsequently, affect competition in developed country national mobile markets should fixed and mobile services converge in the future.

This risk is not significant where fixed infrastructures are immature and is negligible where the fixed network is not extensive. Rather policy makers should concern themselves with encouraging competition between operators at technologically efficient levels (whatever the technology) and treat the fixed network as one competitor, but without market power[13].

Optimum policy approaches to licensing to encourage competition should be technologically neutral and – in general – simpler than unified regimes which being advocated / introduced in developing countries. Approaches which Vodafone believes will be effective internationally and will be flexible to provide for both technology and market change should consist of:

- a single technologically neutral licence or authorization removing the need for multiple licences;
- used by all players to compete freely in all parts of a market – as makes business sense;
- all national and international services should be permitted under this but many requirements would only triggered by either business activity[14] or based on a market power analysis.

This single licence or authorization should be overseen by an independent National Regulatory Authority (NRA). Communications regulation should be reinforced by adoption of horizontal Competition Law and creation of an associated National Competition Authority (NCA) to address concerns regarding fair competition in communications and other strategic consumer markets.

Adoption of Competition Law will reinforce sector policy approaches based on understanding of economic markets and enduring market power. Irrespective of communications technologies in use, a capacity to analyse markets and apply regulation based on economic analysis will remain core to NRA success. These NRA capacities are technologically independent.

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13 This is a simplification and is not suggested to do away with the need for market analysis. Rather the point being made is – again – national starting conditions matter and intrusive remedies which may be applied in developed markets to correct potential monopoly distortions will not be appropriate where fixed infrastructure is not extensive or mature. Examples of inappropriate regulation might include structural separation or DSL unbundling or use of cost based pricing rather than retail minus in cases where resale is mandated.

14 Business activity might include (for example) requirements around physical construction of infrastructure or might reflect certain market roles such as that of a national broadcaster.

5.2 Allocate sufficient additional radio spectrum to competing operators to support national demands for broadband internet access

Spectrum is the raw material of mobile and other radio-based communications service provision. Internationally mobile spectrum has been allocated primarily to provide voice services – for example in 2G bands. Developed countries are recognizing that a coherent approach to releasing spectrum for new services, including 3G and Digital Dividend spectrum. Developing countries should move similarly so that internet access divergence narrows rather than widens.

To support national demands for broadband internet access nationally regulators may consider a number of measures. Again these should recognize national starting conditions

- Ensure that operators make best use of existing spectrum. Where licenses are renewed or are subject to a license transformation process spectrum rights should be continued. Post-reform providers should be free to use their existing spectrum in a technology and service neutral way subject to not interfering with the spectrum of other users.
- Provide new spectrum to expand sector capacity Release free spectrum in current bands to be used by existing and/or new operators. Allow spectrum in other bands to be used where demand exists.
- Allocating or auctioning spectrum bands individually without an overall strategic framework is unlikely to be effective in maximizing access. At a strategic level, develop a national strategic spectrum plan for the Digital Dividend and examine the use of spectrum by state bodies including defence and law enforcement to ensure this is efficient. Where it is not provide economic incentives to these state bodies to encourage reform.

Optimum regulation should allow spectrum permissions which are:

- long term – to support investment. A questionable aspect of transitions to *"unified"* licence regimes is a decoupling of spectrum from general licence permissions. Market-facing approaches to mobile voice licensing typically bundled spectrum with mobile communications licences. In a technology neutral licensing environment there is no good reason why spectrum permissions should be for different periods to other permissions. Short permissions, or permissions, which are subject to repeated reviews as to pricing cannot do other than undermine investment incentives.
- technology and service neutral to allow spectrum holders to select the most appropriate technology;
- make maximum use of internationally harmonized spectrum bands so that developing countries can share in the lower cost of equipment production which results from successful international harmonization processes; and which
- take into account the physical characteristics of the spectrum and, for example, allow lower frequency Digital Dividend spectrum to be made available to facilitate national internet access coverage provision in less populated areas.
- not unduly fragmented to ensure that operators' use of spectrum is efficient overall.

Countries should ultimately plan to allow a spectrum market to emerge and this to operate flexibly, ultimately moving towards an environment which permits trading between spectrum permission holders.

5.3 Otherwise continue with a policy of being non-interventionist

By non-interventionist Vodafone has a specific approach in mind. We mean that regulators should focus on the creation of a competitive ecosystem and not seek to intervene in terms of economic market structure unless on the basis of a finding of enduring market power following a rigorous market analysis.

Four areas where inappropriate intervention can be expected to impede the successful creation of a mass market in broadband services are:

- infrastructure sharing;
- voice call termination;
- interaction between state and sector resources including taxation and public subsidy; and
- universal service policy.

Expansion of communications services depends crucially on the marginal profitability of individual customers and areas. Marginal profitability is affected by both costs and revenues.

Infrastructure sharing

Operators are increasingly seeking to reduce costs in core and marginal areas by sharing infrastructure. This may vary from share of sites and masts, to more integrated provision, for example Radio Access Network sharing of new 3G networks. This is part of the competitive process and, subject to Competition Law, regulators should encourage this. Prohibitions on network sharing are likely to limit mass market access, particularly in highly rural areas, and reduce scope for environmental benefits.

Voice call termination

As we see from internet service roll out in developed markets a key commercial basis is the increased use of service bundling. In fixed markets bundling operates across voice, TV and internet. In developing markets Vodafone expects to see equivalent service bundling where voice, SMS and internet are all offered from the same internet-capable device to maximize marginal customer profitability.

Regulated voice call termination at *"below cost"* levels can be expected to reduce the overall attractiveness of marginal customers and to affect particularly customers whose use of mobile is predominately to receive calls / SMS. Expect termination prices to fall over time as technology improves and usage volumes grow (and as a result of infrastructure sharing) but mandating termination below cost has an adverse effect on commercial attractiveness of marginal customer groups. In particular, it reduces operator incentives to extend rural infrastructure and can re-focus competitive activity from extending coverage to urban *"cream-skimming".*

Interaction between state and sector resources including taxation and public subsidy

Taxation is an inevitable part of a national business and consumer environment. Customers and operators and must play an equitable part in supporting governmental activities through taxation. But tax systems may embed conflicts between policy makers' objectives in the communications and information technology sectors and the short-term revenue raising priorities of tax authorities.

In developed markets broadband internet access has emerged as an aspect of national and regional stimulus packages designed to combat current economic circumstances. Table 6 illustrates contrasting interactions between state and sector in developing and developed markets.

Region	Economic conditions	State and sector interaction
Developed market	Many demands on state resources High GDP/capita	Direct and indirect taxation of ICT sector at national average Inclusion of broadband internet access in US Stimulus Package. Consideration of broadband internet access funding within EU
Developing market	Many demands on state resources Low GDP/capita	Direct and indirect taxation of ICT sector higher than national average Which may include multiple and high taxes on ICT sector customers and companies

Multiple taxes and high tax levels create a strategic problem for policies designed to encourage mass market adoption of communications and information technology. This impacts the ability of the communications sector to operate as an engine of development. Expect emerging markets to divide into communications development *"winners"* and *"losers"* – with taxation a key explanatory factor in where a country ends up.

Reform of *"bad"* taxes in the sector should be a key starting point of communications policy makers. These are taxes which:

1/ distort competition between players, mute the effects of the competitive ecosystem and suppress consumer benefit; or

2/ act directly on a per-customer basis to raise the threshold level of access of poor customers and households to communications.

Policy makers should analyse the form and level of sector specific taxation on communications services and equipment and come to a view on its impact on usage and take-up. The key question is: are taxation policies consistent with communications and information technology objectives? Might populations and governments be better off by policies which encouraged up-take and taxation of subsequent economic growth rather than increasing the level of taxation on inputs?

Rationing of spectrum / auction design intended to maximize value to the state as opposed to availability for service deployment is a related area where short term financial objectives of the State may conflict with optimum policies for mass market adoption.

Universal service policy

Universal service policy debates range across two different policy areas. Policy makers may be concerned to improve access by lagging members of society to services already used by the mass market. Exclusion may be due to poverty, living in a highly rural area, disability or a combination. In some emerging markets voice and SMS service use may already be in this category.

There are also broader developmental concerns regarding access to new or *"emerging"* internet technologies which will be used by high-spending customers. In most emerging markets internet access, and particularly broadband access, falls into this second category. This paper argues for a strategic approach which should address these needs en route to mass market consumer access.

Vodafone believes the core of universal service policy is how to address exclusion of the lagging minority in society in the services used by the majority. How to best to encourage the spread of new services (including ones yet thought of) are more correctly forms of industrial or R&D policy.

Both policy areas can be important and the first stage in addressing these in emerging markets is the same: creating an effectively competitive communications ecosystem supporting mass market development. Access to both existing mass market services and to new services will expand where policies are designed to enable competition to flourish and which facilitate investment, but will struggle where policies weigh down the sector.

Vodafone expects that universal service approaches which encourage the mass market to reach a *"competitive high water mark"* will ultimately prove more successful than formal universal service interventions. This applies to both voice and SMS and to internet service provision. The box below illustrates this point.

In 1999 the UK telecommunications regulator[15] identified customer groups *"whose [telephony] needs might not be met without intervention"* as people:

> *"on low incomes; who use the telephone infrequently; in short term rented accommodation; in remote rural areas; in areas of urban deprivation; with disabilities; and of pensionable age (principally of concern when they fall into one of the above)."*

When it reported again in 2001 it concluded competition had delivered for 4 of 6 groups. Customers who were found to have their telephony needs met include those: on low incomes; who use the phone infrequently; in short-term (and insecure) rented accommodation; and in areas of urban deprivation

In developed countries competitive mobile ecosystems have lead to *"virtual universal access to telephony"*[16]. In contrast interventions which begin from the position that the sector should be subject to an additional tax – even if under the name of universal service – are beginning with a solution rather than considering the nature of the problem.

There may ultimately be a need to go beyond a *"competitive high water mark"* through interventions which stimulate (for example) supply in remote rural areas. Supply may be supported, for example, passive infrastructure for multi-operator use in rural areas. Demand may be stimulated through re-use of local content (example streamed / available for down-load as well as broadcast radio) as well as adaption of international content to national languages / markets.

Policy makers and regulators cannot approach questions of universal service without first putting place the measures designed to produce a mass market. It is meaningless to talk about universal internet or broadband access without first enabling the growth of these services so that they are consumed by the majority of a national population.

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15 Source: Oftel Universal Service documents

16 *"From the mid-1990s, with [UK] phone ownership stuck at 93% of households there was much talk of the 'unphoned', and regulatory programmes were put in place to advance towards 'universal service' – affordable basic telephone services for all. Yet, within a couple of years or so the issue had been swept aside by the staggering popularity of mobile phones. It is especially noteworthy that this advent of virtually universal access to telephony has been market led, not the outcome of a regulatory initiative."* From: Journal of the Child Poverty Action Group - Winter 2001

Other regulation

These recommendations are not an attempt to preclude all regulation – for example the role of consumer protection although this too should be subject to an objective analysis of evidence including an understanding of costs and benefits of intervention. Vodafone would advocate consumer protection concerns are best approached by regulators working in conjunction with the market.

An example might be concerns about network quality where transparency rather than direct regulation should be applied in order to ensure that the market works effectively for consumers. Systematic monitoring of call success and quality and subsequent publication of results from multiple networks should add to existing competitive incentives. Attempts to *"decree"* minimum service levels which cut across market processes are likely to result in unexpected outcomes.

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